HEMLOCK WAREHOUSE DEVELOPMENT PROJECT

INITIAL STUDY

FONTANA
CALIFORNIA

Lead Agency:
City of Fontana
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Fontana, CA 92335

Project Sponsor:
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February 2023

E | P | D Solutions, Inc.

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1 INTRODUCTION

The proposed Project includes re-development of an existing light industrial use and operation of a warehouse facility that would be a total of approximately 882,000 square feet (SF) within two stories on a 40.01-acre site (APNs 0237-131-25, 0237-131-26 and 0237-131-27). The building would have 114 loading docks and be used for sorting, warehousing, distribution, and office space. Approximately 25 percent of the warehousing square footage of the building (which is 220,500 SF) is analyzed for storage of refrigerated goods. The proposed building would have a maximum height of 60 feet.

1.1 PROJECT BACKGROUND

The Southwest Industrial Park (SWIP) Specific Plan was originally created by the City on December 6, 1983 and was intended to develop the City's industrial uses south of Interstate 10 (I-10). The SWIP Specific Plan originally encompassed approximately 1,800 acres. In 2011, the City determined that the SWIP Specific Plan should be revised to update land uses, regulations, and development standards (SWIP Specific Plan Update). In addition, the SWIP Specific Plan Update would promote orderly and compatible growth in newly annexed areas as well as older portions within the SWIP Specific Plan area[1]. On May 8, 2012, the City adopted Resolution No. 2012-035, certifying the Final Program Environmental Impact Report (FEIR) for the SWIP Specific Plan Update and Annexation (Approved Project), State Clearinghouse (SCH) No. 2009091089, in compliance with CEQA and the CEQA Guidelines. In 2005, the City of Fontana proposed the annexation of approximately 2,920.9 acres (4.6+/- square miles) of unincorporated land within its sphere of influence. This annexation action concluded in 2007 and included 32 separately identified unincorporated "islands." Of these, seven were located within the proposed boundaries of the SWIP Specific Plan.

The SWIP Specific Plan Update is a comprehensive policy and regulatory guidance document for development of land within the SWIP Specific Plan Update area. By providing the necessary regulatory and design guidance, the SWIP Specific Plan Update ensured that future development implement the goals and policies of the City of Fontana General Plan (General Plan). The SWIP Specific Plan Update area, which is comprised of approximately 3,111 acres in the southwestern portion of the City within San Bernardino County (County), includes nine land use districts. Slover Central Manufacturing/Industrial District (SCD)[2], at 423.7 acres, is one of those districts that the Approved Project FEIR analyzed 3,710,006 SF of new industrial use and 960,325 SF of existing development to remain in place within the SCD.

1.2 PURPOSE OF THE INITIAL STUDY

The City has received an application for the Hemlock Warehouse Development Project (proposed Project) for the development of a warehouse facility on approximately 40.01 acres of land located within the SCD that is south of Santa Ana Avenue, north of Jurupa Avenue, east of Hemlock Avenue, and west of Beech Avenue. The proposed Project site was analyzed in the Approved Project FEIR

[1] City of Fontana. 2011. *Southwest Industrial Park (SWIP) Specific Plan Update and Annexation Public Review Draft Program Environmental Impact Report.*

[2] City of Fontana. 2018. *Southwest Industrial Park Specific Plan – Land Use Map.* https://www.fontana.org/DocumentCenter/View/29671/SWIP-Land-Use-Plan-Map (accessed November 1, 2021).

for up to 1,394,268.4 SF of industrial uses. Therefore, the existing baseline condition for this Initial Study is assumed to include 1,394,268.4 SF of industrial uses and is compared against the proposed approximately 882,000 SF warehouse on the Project site.

The purpose of this Initial Study is to analyze any potential differences between the impacts identified from buildout of the Project site in the Approved Project FEIR, and those that would be associated with development of the proposed Project.

As identified above, pursuant to provisions of CEQA and the CEQA Guidelines, the City is the "Lead Agency" charged with the responsibility of deciding whether to approve development on the Project site. As part of its decision-making process, the City is required to review and consider whether the proposed Project would create new significant impacts or more severe significant impacts than those previously disclosed, analyzed and mitigated for in the Approved Project FEIR. Additional CEQA review is triggered if the proposed Project has the potential to create new significant impacts or more severe significant impacts than those disclosed, analyzed and mitigated for in the Approved Project FEIR. New threshold guidelines do not constitute "new information" requiring additional environmental review.[3]

This Initial Study has been prepared in accordance with the following:

- California Environmental Quality Act (CEQA) of 1970 (Public Resources Code Sections 21000 et seq.); and
- California Code of Regulations, Title 14, Division 6, Chapter 3 (State CEQA Guidelines, Sections 15000 et seq.) as amended and approved on December 28, 2018.

Pursuant to CEQA, this Initial Study has been prepared to analyze the potential for significant impacts on the environment resulting from implementation of the proposed Project. As required by State CEQA Guidelines ("Guidelines") Section 15063, this Initial Study is a preliminary analysis prepared by the Lead Agency, the City of Fontana, in consultation with other jurisdictional agencies, to determine the type of CEQA documentation and analysis that is required.

The proposed Project includes development pursuant to SWIP Specific Plan land uses that were previously analyzed in the Approved Project FEIR. Therefore, pursuant to CEQA Guidelines Section 15162(a), a subsequent EIR shall be prepared when:

(1) Substantial changes are proposed in the project which will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects;

(2) Substantial changes occur with respect to the circumstances under which the project is undertaken which will require major revisions of the previous EIR or Negative Declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects; or

(3) New information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified as complete or the Negative Declaration was adopted, shows any of the following:

(A) The project will have one or more significant effects not discussed in the previous EIR or negative declaration;

[3] *Concerned Dublin Citizens v. City of Dublin* (2013) 214 Cal.App.4th 1301.

(B) Significant effects previously examined will be substantially more severe than shown in the previous EIR;

(C) Mitigation measures or alternatives previously found not to be feasible would in fact be feasible, and would substantially reduce one or more significant effects of the project, but the project proponents decline to adopt the mitigation measure or alternative; or

(D) Mitigation measures or alternatives which are considerably different from those analyzed in the previous EIR would substantially reduce one or more significant effects on the environment, but the project proponents decline to adopt the mitigation measure or alternative.

As included herein a "significant effect" or "significant impact" on the environment means "*a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project*" (Guidelines Section15382).

1.3 IMPACTS IDENTIFIED BY THE SWIP SPECIFIC PLAN UPDATE FEIR

The SWIP Specific Plan Update Final EIR (Approved Project FEIR) evaluated buildout of the SWIP area pursuant to the maximum allowable development of the Specific Plan land uses. Table S-5 of the Draft Program EIR Executive Summary provides a list of the impacts that would result from construction and operation of the SWIP, which include the following:

Significant and Unavoidable Impact: The Approved Project FEIR identified significant and unavoidable impacts in the following environmental topic areas:

- Aesthetics, Light and Glare (Impact 4.1-1)
- Air Quality and Climate Change (Impacts 4.2-1, 4.2-2 and 4.2-4);
- Noise (Impact 4.7-3);
- Public Services, Utilities and Infrastructure (Impact 4.8-5); and
- Traffic and Circulation (Impact 4.9-1).

Less Than Significant Impact with Incorporation of Mitigation: The Approved Project FEIR identified impacts that could be mitigated to less than significant levels with incorporation of mitigation measures in the following environmental topic areas:

- Aesthetics, Light and Glare (Impact 4.1-3);
- Air Quality and Climate Change (Impact 4.2-5);
- Biological Resources (Impacts 4.3-1, 4.3-2, 4.3-3 and 4.3-5);
- Cultural Resources (Impacts 4.4-1, 4.4-2 and 4.4-3);
- Hazards and Hazardous Materials (Impacts 4.5-1, 4.5-2, 4.5-3, 4.5-4, 4.5-5 and 4.5-6);
- Noise (Impacts 4.7-1 and 4.7-2); and
- Public Services, Utilities, and Infrastructure (Impacts 4.8-1, 4.8-2, 4.8-3, 4.8-4, 4.8-6, 4.8-7, 4.8-8, and 4.8-9).

Less Than Significant Impact: The Approved Project FEIR identified less than significant impacts in the following environmental topic areas:

- Aesthetics, Light and Glare (Impacts 4.1-2, 4.1-4 and 4.1-5);
- Air Quality and Climate Change (Impact 4.2-3);

- Cultural Resources (Impact 4.4-4);
- Hazards and Hazardous Materials (EFNTBS item 4a);
- Hydrology and Water Quality (EFNTBS items 5a, 5b, 5c, 5d, 5e, 5f, 5h, and 5i);
- Land Use and Planning (Impacts 4.6-1 and 4.6-2);
- Population and Housing (EFNTBS item 8a and 8b);
- Public Services, Utilities and Infrastructure (Impact 4.8-10); and
- Traffic and Circulation (Impacts 4.9-2 and 4.9-3).

No Impact: The Approved Project FEIR determined that no impact would occur with respect to the following environmental topic areas below. These impacts were included in the Approved Project FEIR's "Effects Found Not To Be Significant (EFNTBS)" section (Section 8.0).

- Agricultural and Forestry Resources (EFNTBS items 1a, 1b, 1c, 1d and 1e);
- Geology and Soils (EFNTBS items 3a-4 and 3e);
- Hazards and Hazardous Materials (EFNTBS items 4b and 4c);
- Hydrology and Water Quality (EFNTBS items 5g and 5j);
- Mineral Resources (EFNTBS items 6a and 6b);
- Noise (EFNTBS item 7a); and
- Traffic and Circulation (EFNTBS items 9a and 9b).

1.4 SWIP SPECIFIC PLAN UPDATE FEIR MITIGATION MEASURES

The Approved Project FEIR includes standard regulations and mitigation measures that apply to the development projects within the SWIP area. The mitigation measures adopted as part of the Approved Project FEIR are related to: Aesthetics, Air Quality, Climate Change, Biological Resources, Cultural Resources, Hazards and Hazardous Materials, Noise, Public Services, Utilities and Infrastructure, Traffic and Circulation.

1.5 ENVIRONMENTAL SETTING AND BASELINE

The environmental setting is normally existing conditions at the time the CEQA analysis begins (CEQA Guidelines Section 15125). In most cases, this forms the baseline that the impact analysis will use as its starting point. However, when the project is within the scope of a Program EIR (such as the Approved Project FEIR), the effective baseline is the previously approved and analyzed project for which the Program EIR was certified (*Sierra Club v. City of Orange* [2008] 163 Cal.App.4th 523). "When a lead agency is considering whether to prepare a Subsequent EIR, it is specifically authorized to limit its consideration of the later project to effects not considered in connection with the earlier project." [Citation.] (*Temecula Band of Luiseño Mission Indians v. Rancho Cal. Water Dist.* [1996] 43 Cal.App.4th 425, 437). Here, the previous project is the SWIP Specific Plan Update as detailed in the Approved Project FEIR.

1.6 DOCUMENT ORGANIZATION

The Initial Study, in its entirety, comprises the following components:

Section 1.0 Introduction and Purpose. Discusses the document's purpose, format and content, California Environmental Quality Act (CEQA) requirements, the planning context under which the document was prepared, the Initial Study findings, a summary of

the public review and processing of the document, and a list of the technical reports used to prepare the document.

Section 2.0 Project Description. Provides a detailed description of the Project site and the discretionary actions required to implement the Project.

Section 3.0 Environmental Checklist. Provides the completed Initial Study and its associated analyses documenting the reasons to support the findings and conclusions of the Initial Study.

Section 4.0 References. Lists all plans, policies, regulatory requirements, and other documentation that are incorporated by reference in this document pursuant to CEQA Guidelines Section 15150.

Section 5.0 Preparers. Lists all the persons who were involved in the preparation of the IS.

1.7 INITIAL STUDY FINDINGS

Section 3.0 of this document contains the Environmental Checklist that was prepared for the proposed Project pursuant to CEQA requirements. The Environmental Checklist indicates that the proposed Project would result in no new impacts or less than significant new environmental effects under the issue areas of: aesthetics, agriculture and forestry resources, biological resources, cultural resources, geology and soils, hazards and hazardous materials, hydrology and water quality, land use and planning, mineral resources, population and housing, public services, recreation, utilities and service systems, and wildfire.

The Environmental Checklist indicates that the proposed Project could potentially result in new significant environmental effects under the issue areas of: air quality, energy, greenhouse gas emissions, noise, transportation, and tribal cultural resources. Therefore, these subjects will be further evaluated in a Subsequent EIR.

2 ENVIRONMENTAL SETTING

2.1 PROJECT LOCATION

The 40.01-acre Project site is located at 11115 Hemlock Avenue in the City of Fontana within San Bernardino County. The project site is located south of Santa Ana Avenue, north of Jurupa Avenue, east of Hemlock Avenue, and west of Beech Avenue within the southwestern portion of the City of Fontana.

Regional access to the Project site is provided by Interstate 10 (I-10) to the north from either the Cherry Avenue or Citrus Avenue exits; from State Route 60 (SR-60) to the south from the Country Village Road exit; and from Interstate 15 (I-15) to the west from the East Jurupa Street exit. Each of these routes connect to Santa Ana Avenue and Jurupa Avenue, which provide local access to the site as shown in Figure 2, *Project Vicinity*.

The site is identified by Assessor's Parcel Numbers (APN 0237-131-25, 0237-131-26 and 0237-131-27) and the site is located within the United States Geological Survey (USGS) 7.5-minute Fontana, California Quadrangle.

2.2 ENVIRONMENTAL SETTING AND SURROUNDING LAND USES

Project Site Existing Conditions
The Project site is currently occupied by Modular Space Corporation (ModSpace) for light industrial uses that include: leasing, storage, and refurbishing of modular trailers, offices, and storage bins. The Project site is developed with one building and three modular buildings, which total 11,590 SF. In addition, the site contains stored modular units, scrap metal and recycling collection bins, parking lots, and storage areas. The Project site ground surface is either paved with asphalt or gravel covered with limited areas of ornamental landscaping.

Based on visual observations, site grades appear to dip downwards toward the southwest at an estimated gradient of approximately 1 to 2± percent. The Project site's existing conditions are shown in Figure 3, *Project Aerial View*.

Existing Land Uses and Zoning Designations of the Project Site
The Project site has a General Plan Land Use designation of General Industrial (I-G) and is within the Southwest Industrial Park Specific Plan (SWIP) area which consists of approximately 3,111 acres of land in the southwestern portion of the City. The Project site is designated by the SWIP as part of the Slover Central Manufacturing/Industrial District (SCD). The SCD is intended to provide opportunities for light and heavy manufacturing activities that are supported by trucking routes and the existing rail spur. SCD allows for the development of manufacturing, fabrication, assembly, processing, trucking, warehousing and distribution, equipment, automobile and truck sales and services.

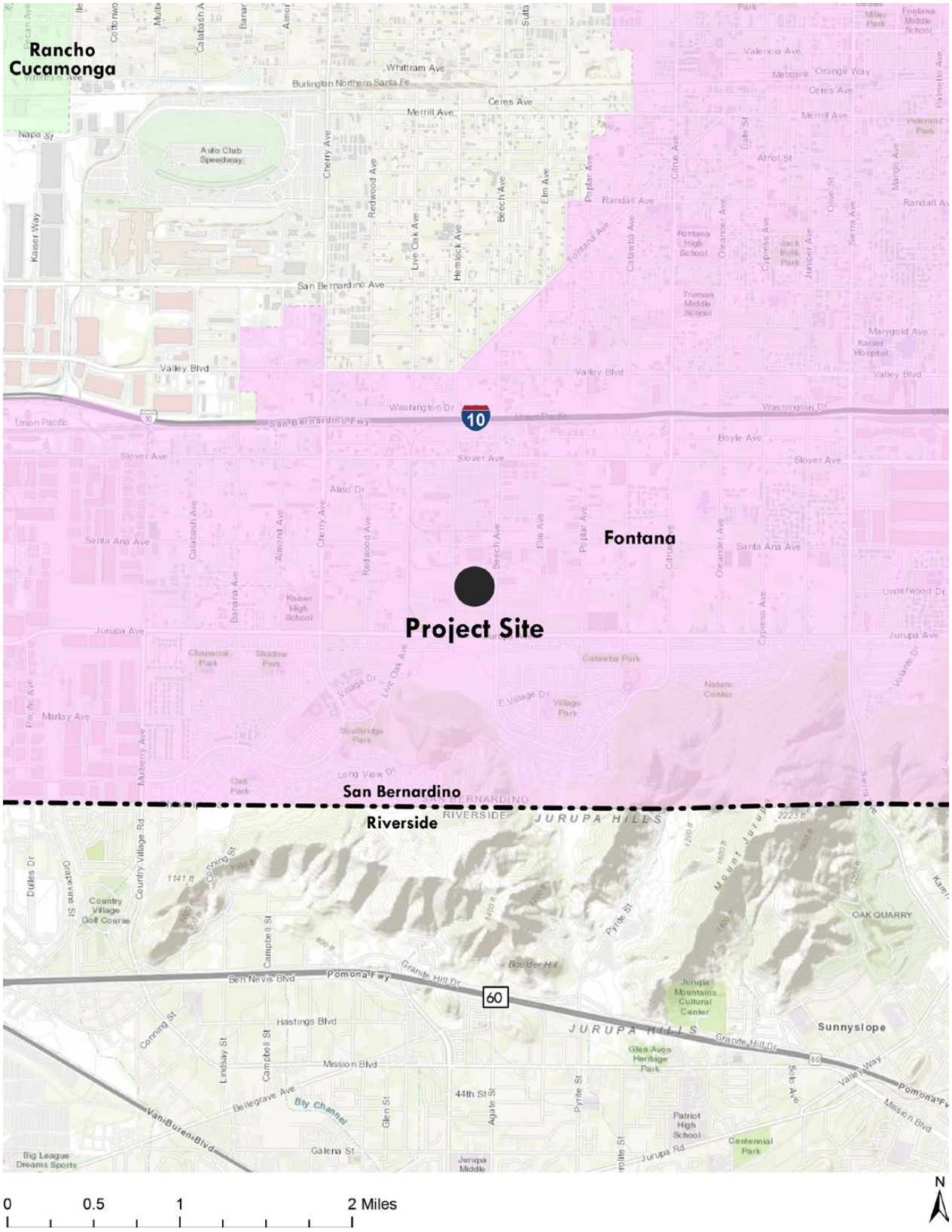
Surrounding Land Uses
The surrounding land uses are described in Table 2-1 along with the General Plan Land Use and zoning designations.

Table 2-1: Surrounding Existing Land Use and Zoning Designations

	Existing Land Use	County General Plan Designation	City Zoning Designation
North	Industrial uses, including warehousing, logistics facility, paint manufacturing, a plastics manufacturing, diesel repair; and trucking	General Industrial (I-G)	Southwest Industrial Park Slover Central Manufacturing / Industrial District (SCD)
West	Industrial uses, including warehousing/distribution, steel storage, plastic pipe manufacturing, vehicle storage yard to the west across Hemlock Avenue	General Industrial (I-G)	Southwest Industrial Park Slover Central Manufacturing / Industrial District (SCD)
South	Light industrial warehousing / distribution cross-dock facility	Light Industrial (I-L)	Southwest Industrial Park Jurupa North Research and Development District (JND)
East	Industrial uses, including steel distribution, construction rental equipment, trucking and truck storage, contractors' yard and logistics uses to the east across Beech Avenue	General Industrial (I-G)	Southwest Industrial Park Slover East Industrial District (SED)

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Regional Location

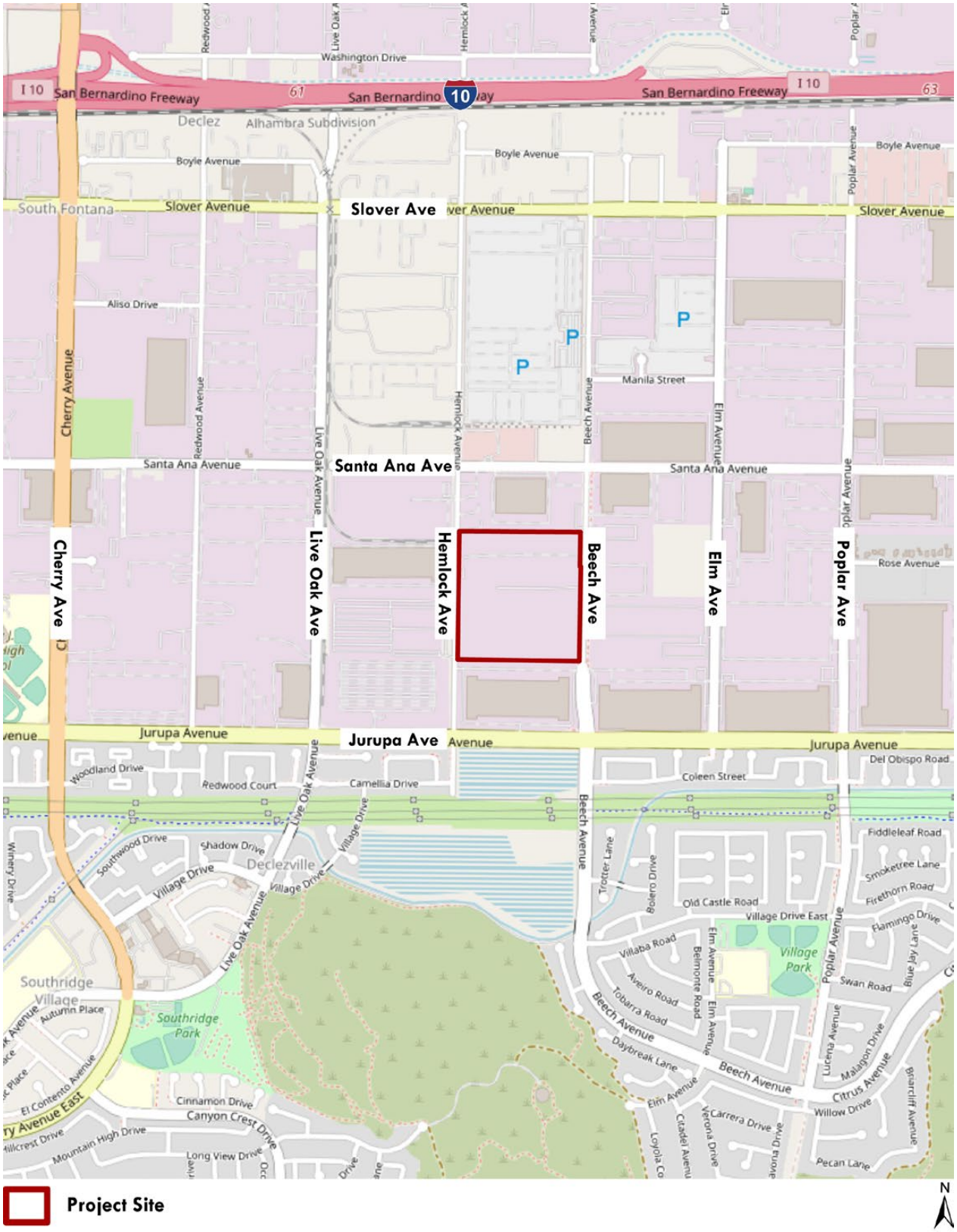


Hemlock Warehouse Development Project
City of Fontana

Figure 1

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Local Vicinity



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Project Aerial

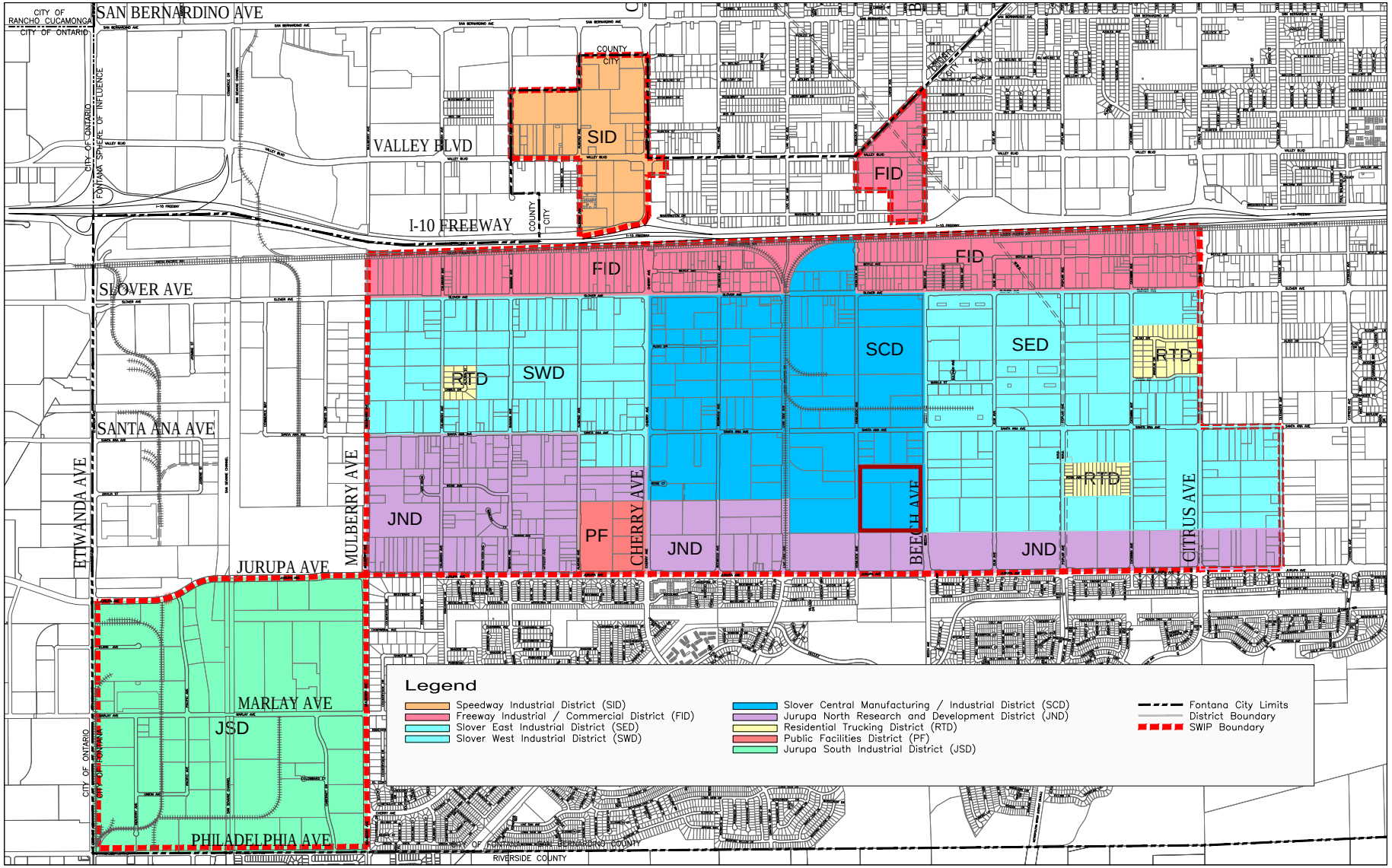


Hemlock Warehouse Development Project
City of Fontana

Figure 3

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Existing SWIP Specific Plan Land Use Plan



Project Site

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Hemlock Warehouse Development Project
City of Fontana

Figure 4

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3 PROJECT DECRIPTION

3.1 PROJECT FEATURES

Warehousing Facility
The proposed Project consists of development and operation of a warehouse facility that would be a total of approximately 882,000 SF within two stories. The proposed building would be a maximum height of 60 feet and would be used for sorting, warehousing, distribution, and office space. The proposed building structure would have a building footprint of approximately 747,000 SF, an office mezzanine area of 20,000 SF, and a warehouse mezzanine area of 115,000 SF, which would total 882,000 SF. Approximately 25 percent of the warehousing square footage of the building (which is 220,500 SF) is analyzed for the storage of refrigerated goods. The facility would have 114 loading docks that would be located on the east and west sides of the building. A summary of the Project is provided in Table 3-1.

Table 3-1: Project Summary

Feature	Proposed Project
Building Footprint Area	747,000 square feet
Office Mezzanine Area	20,000 square feet
Mezzanine Pick/Warehouse Area	115,000 square feet
Total Building Square Footage	**882,000 square feet**
Refrigerated Area	220,500 square feet
Loading Docks	114
Parking Auto Parking Trailer Parking	 412 stalls 308 stalls

Landscaping and Fencing
To screen the loading docks and truck trailer parking areas, 14-foot-high concrete walls would be located along the western and eastern boundaries of the Project site. Along the northern and southern boundary, 8-foot-high black tubular steel fencing is proposed. The Project would also install ornamental landscaping, including trees, shrubs, and groundcover along the Project site frontages of Hemlock Avenue and Beech Avenue pursuant to the SWIP SCD requirements.

Access and Circulation
Truck access to the proposed Project would be provided by a driveway along Hemlock Avenue and a driveway along Beech Avenue within the northern portion of the site. Also, two other driveways within the southern portion of the site would provide automobile access from Hemlock Avenue and Beech Avenue. The Project would include tube steel sliding automatic gates on both sides of the building and security guard shacks to secure the truck yard.

As listed on Table 3-1, the Project would include 308 truck/trailer parking spaces on the east and west sides of the building, and 412 vehicle parking spaces on the south side of the building that would include electric vehicle, vanpool, and accessible spaces, as shown in Figure 5, *Conceptual Site Plan.*

Infrastructure Improvements

Street Improvements

Street improvements would include sidewalk, curb and gutter, and street lighting along Hemlock Avenue and Beech Avenue Project site frontages.

Water and Sewer

The Project would install onsite water lines that would connect to existing 10-inch water line within Hemlock Avenue and the existing 12-inch line within Beech Avenue. The Project would also install onsite sewer lines that would connect to existing 8-inch line within Hemlock Avenue and the existing 12-inch line within Beech Avenue.

Stormwater Drainage

The Project would also install onsite storm drain, filtration, and detention facilities that would consist of catch basins and two underground infiltration basins. Overflows that are not infiltrated would be conveyed to the existing 66-inch storm drain in Hemlock Avenue and the 60-inch storm drain in Beech Avenue.

Other Infrastructure

The proposed Project would connect to existing dry utility infrastructure in the right of way of Hemlock Avenue and Beech Avenue, including telephone, electrical, and cable. Dry utilities would be installed underground.

Construction Activities

Construction activities for the Project would include demolition, site preparation, grading, concrete pours, building construction, paving, and architectural coatings. Grading work of soils would include cuts and fills of 3 to 4 feet in depth. The Project is assumed to be balance and no import/export is assumed.

Operational Characteristics

The Project would be operated as a warehouse space. Typical operational characteristics include employees and customers traveling to and from the site, delivery of materials and supplies to the site, truck loading and unloading, and manufacturing activities. The Project is anticipated to operate 7 days a week 24 hours a day, 365 days per year.

3.2 DISCRETIONARY APPROVALS AND PERMITS

In accordance with Sections 15050 and 15367 of the State CEQA Guidelines, the City is the designated Lead Agency for the proposed Project and has principal authority and jurisdiction for CEQA actions and Project approval. Responsible Agencies are those agencies that have jurisdiction or authority over one or more aspects associated with the development of a project and/or mitigation. Trustee Agencies are State agencies that have jurisdiction by law over natural resources affected by a proposed project.

The discretionary actions to be considered by the City as part of the proposed Project and cannot be taken until after certification of the Subsequent EIR include:

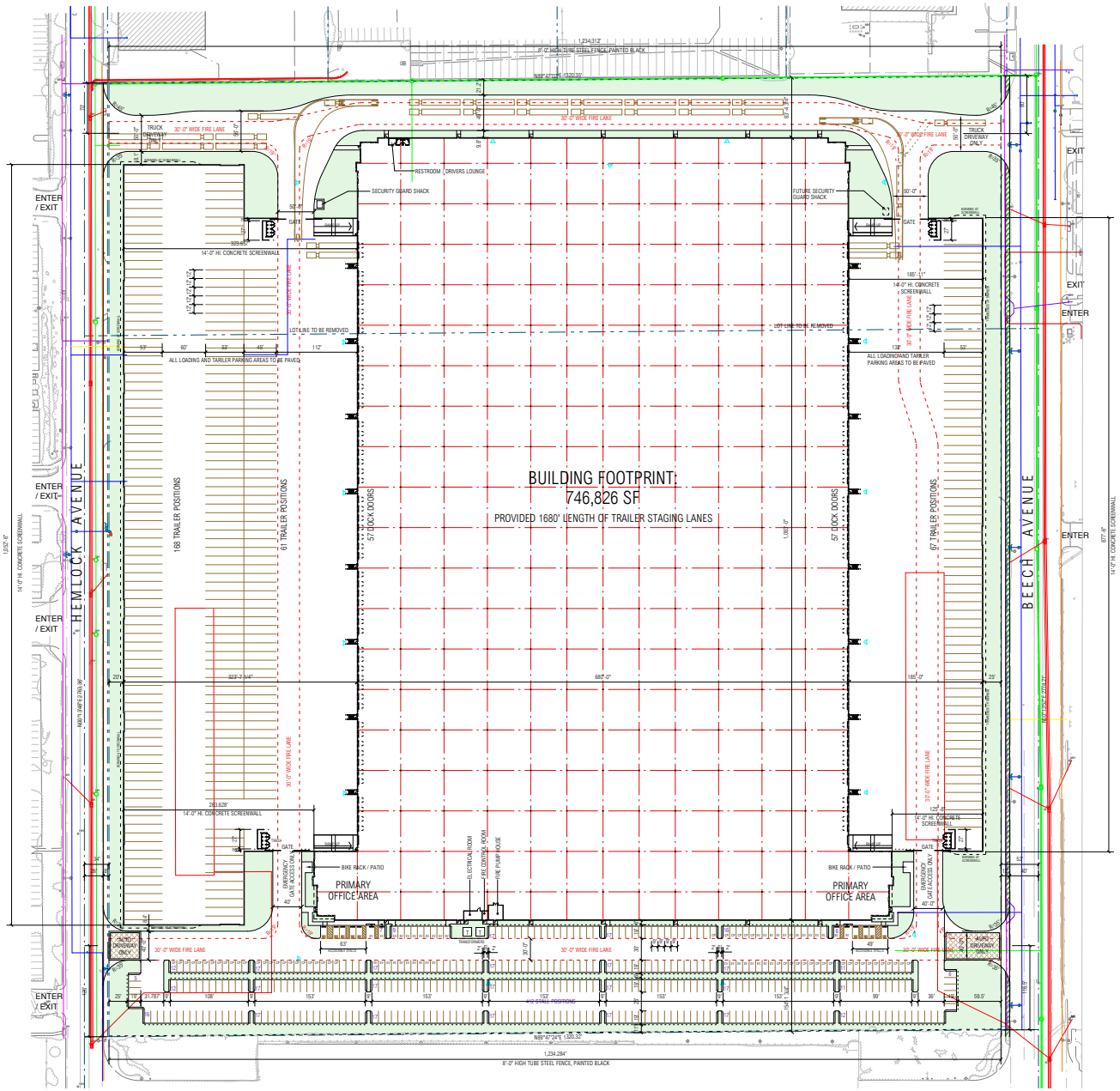
- Design Review
- Tentative Parcel Map to merge the parcels and update the Hemlock Avenue right-of-way

In addition, the proposed Project will require ministerial approvals that include, but are not limited to, the following:

- Regional Water Quality Control Board for approval of a Stormwater Pollution Prevention Plan
- South Coast Air Quality Management District construction permits

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Proposed Conceptual Site Plan



SITE LEGEND:

- ON-SITE LANDSCAPED AREA
- OFF-SITE LANDSCAPED AREA
- DECORATIVE AUTO / TRUCK DRIVEWAYS - NATURAL COLOR
- SITE PROPERTY LINES
- CITY CURB AND GUTTER LINES
- STREET CENTERLINES
- ON-SITE CURB LINES
- ON-SITE PARKING AND TRAILER STRIPPING

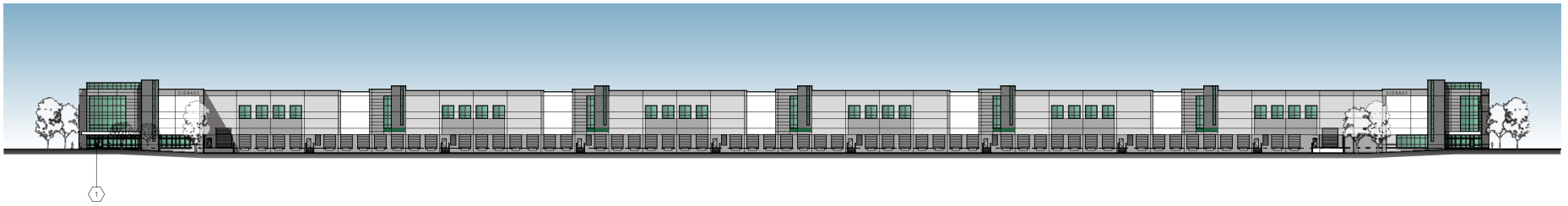
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Hemlock Industrial Development Project
City of Fontana

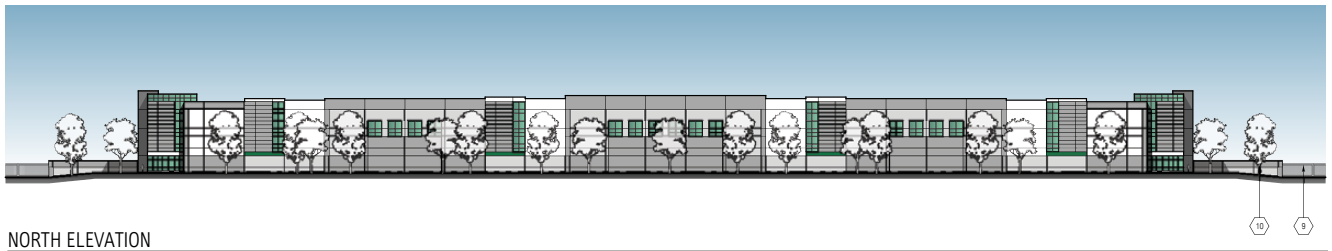
Figure 5

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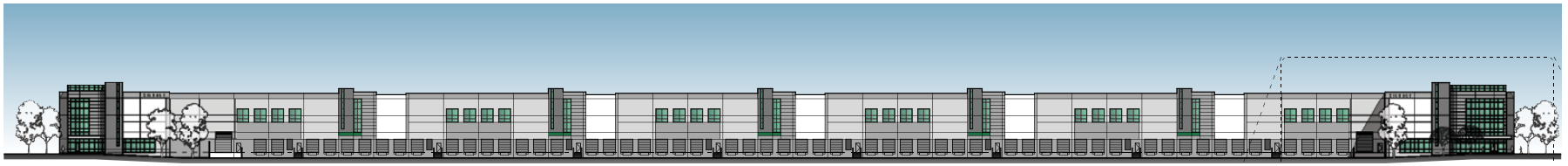
Proposed Project Conceptual Elevations



EAST ELEVATION



NORTH ELEVATION



WEST ELEVATION



SOUTH ELEVATION

FINISH SCHEDULE

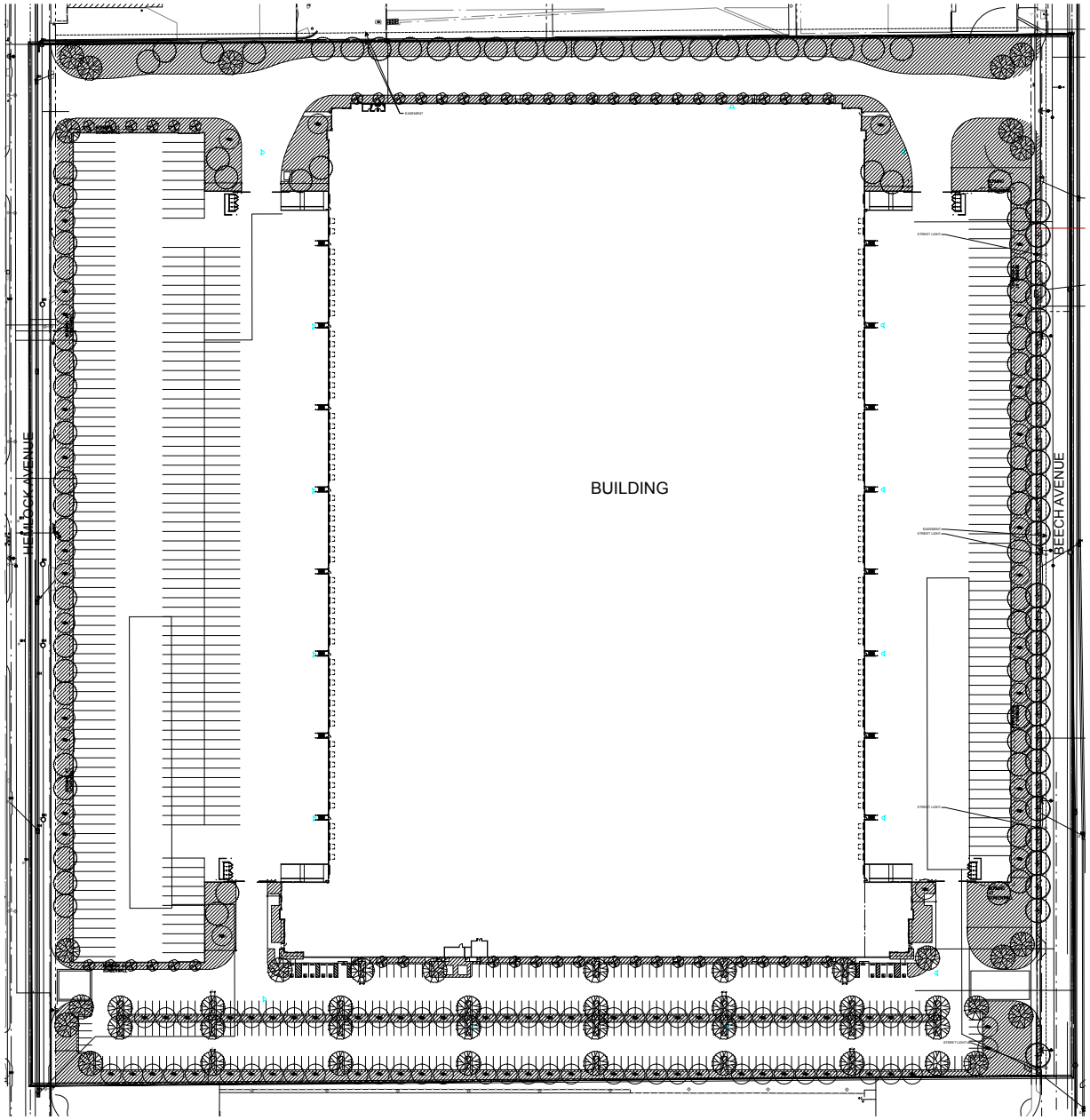
1. FIELD COLOR - PLD-9 PURE WHITE - SHERWIN WILLIAMS SW 7005
2. ACCENT COLOR - PLD-7 LIQUORICE TINT - SHERWIN WILLIAMS SW 7016
3. ACCENT COLOR - PLD-10 FIRST STAR - SHERWIN WILLIAMS SW 7646
4. ACCENT COLOR - PLD-6 SABLE - SHERWIN WILLIAMS SW 7015
5. PROLOGIS ACCENT COLOR - PLD-5 - NEW DARK GREEN - SHERWIN WILLIAMS SW 6762
6. VISION GLAZING - PILKINGTON EVERGREEN U-FACTOR 0.47, SHGC 0.40, VLT 59% 1" INSULATED GLASS UNIT W 1/2" AIRSPACE AND (2) 1/4" LITES. SEE KEYNOTES FOR LOCATIONS OF INSULATED UNITS.

KEYNOTES (000)

1. PRIMARY ENTRANCE.
2. PAINTED 12' WIDE X 15' HIGH LEVEL VERTICAL LIFT TRUCK DOOR.
3. PAINTED 9' WIDE X 10' HIGH VERTICAL LIFT TRUCK DOOR.
4. 3' X 7' PAINTED METAL MAN DOOR.
5. 2" WIDE X 3/4" DEEP HORIZONTAL / VERTICAL REVEAL.
6. REFLECTIVE GLASS IN STOREFRONT FRAME SYSTEM.
7. PAINTED CONCRETE TILT-UP EXTERIOR WALL CONSTRUCTION.
8. PROPOSED FUTURE TENANT SIGNAGE LOCATION (FOUR LOCATIONS).
9. 8' HIGH BLACK TUBULAR STEEL ROLLING GATE - TYP. AT YARD ENTRANCES. SEE SITE PLAN.
10. TYP. PAINTED CONCRETE SCREENWALL ELEVATION W/ ACCENT REVEALS AND PAINTED ACCENTS TO MATCH BUILDING ARCHITECTURE.
11. METAL CLAD CANOPY STRUCTURE.

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Conceptual Landscape Plan



PLANTING LEGEND

TREES

SYMBOL	BOTANICAL/COMMON NAME	SIZE	QTY	WUCOLS	REMARKS
	Brachychiton populneus Bottle Tree	15 Gal	52	M	Standard
	Cercidium praecox Sonoran Palo Verde	24" Box 15 Gal	53 41	L	Multi
	Pinus pinea Stone Pine	24" Box 15 Gal	33 41	L	Standard
	Quercus chrysolepis Canyon Live Oak	36" Box 24" Box	27 20	M	Standard
	Chorisia speciosa Floss Silk Tree	24" Box	64	L	Street Tree

50% - 15 Gal Provided = 134
40% - 24" Box Provided = 106
10% - 36" Box Provided = 27
Total Amount of Trees = 267

SHRUBS

SYMBOL	BOTANICAL/COMMON NAME	SIZE	QTY	WUCOLS	SPACING
	Alyogyne huegelii Blue Hibiscus	5 Gal	0	M	3' OC 2' from hardscape
	Baccharis p. 'Centenial' Coyote Bush	1 Gal	0	L	4' OC 2.5' from hardscape
	Carissa grandiflora Natal Plum	5 Gal	0	L	4' OC 2.5' from hardscape
	Elaeagnus pungens Silverberry	1 Gal	0	M	3' OC 2' from hardscape
	Heteromeles arbutifolia Toyon	5 Gal	0	M	5' OC 3' from hardscape
	Rhaphiolepis i. 'Clara' Indian Hawthorn	5 Gal	0	M	3' OC 2' from hardscape
	Rhaphiolepis i. 'Springtime' Indian Hawthorn	5 Gal	0	M	3' OC 2' from hardscape
	Rhamnus californica Coffeeberry	1 Gal	0	L	4' OC 2.5' from hardscape
	Pennisetum setaceum 'Cupreum' Purple Fountain Grass	1 Gal	0	L	3' OC 2' from hardscape

ACCENTS

SYMBOL	BOTANICAL/COMMON NAME	SIZE	QTY	WUCOLS	REMARKS
	Agave 'Blue Glow Blue Glow Agave	1 Gal	0	L	
	Agave desmeniana Smooth Agave	1 Gal	0	L	
	Agave victoria-reginae Agave	5 Gal	0	L	
	Aloe striata Coral Aloe	1 Gal	0	L	
	Echeveria 'Afterglow' Aftergow Echeveria	5 Gal	0	L	
	Hesperaloe parviflora Red Yucca	5 Gal	0	L	

GROUNDCOVER

SYMBOL	BOTANICAL/COMMON NAME	SIZE	SPACING	WUCOLS	REMARKS
	Drosanthemum floribundum Rosea Ice Plant	1 Gal	6' O.C.	L	
	Lantana montevidensis Trailing Lantana	1 Gal	36" O.C.	L	
	Verbena peruviana Peruvian Verbena	1 Gal	24" O.C.	M	

N

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4 ENVIRONMENTAL CHECKLIST

This section includes the completed environmental checklist form. The checklist form is used to assist in evaluating the potential environmental impacts of the proposed Project. The checklist form identifies potential Project effects as follows: 1) Potentially Significant New Impact; 2) Less Than Significant New Impact with Mitigation Incorporated; 3) Less Than Significant New Impact; and, 4) No New Impact. Substantiation and clarification for each checklist response is provided in Section 5 (Environmental Evaluation). Included in the discussion for each topic are standard condition/regulations and mitigation measures, if necessary, that are recommended for implementation as part of the proposed Project.

4.1 ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below (☒) would be potentially affected by this Project, involving at least one impact that is a "Potentially Significant New Impact" that was not previously identified in the Approved Project FEIR as indicated by the checklist on the following pages.

New Potentially Affected Environmental Factors

☐	Aesthetics	☐	Agriculture and Forest Resources	☒	Air Quality
☐	Biological Resources	☐	Cultural Resources	☐	Energy
☐	Geology/Soils	☒	Greenhouse Gas Emissions	☐	Hazards and Hazardous Materials
☐	Hydrology/Water Quality	☐	Land Use/Planning	☐	Mineral Resources
☒	Noise	☐	Population/Housing	☐	Public Services
☐	Recreation	☒	Transportation	☒	Tribal Cultural Resources
☐	Utilities/Service Systems	☐	Wildfire	☒	Mandatory Findings of Significance

4.2 DETERMINATION

(To be completed by the Lead Agency) on the basis of this initial evaluation

☐	I find that the proposed Project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
☐	I find that although the proposed Project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the Project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.
☒	I find that the proposed Project MAY have a potentially significant new effect on the environment that was not identified in the Approved Project FEIR, and a SUBSEQUENT ENVIRONMENTAL IMPACT REPORT is required.
☐	I find that the proposed Project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.
☐	I find that although the proposed Project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed Project, nothing further is required.



February 23, 2023

Signature Date

Rina Leung

Printed Name For

EVALUATION OF ENVIRONMENTAL IMPACTS

1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g. the project falls outside a landslide zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g. the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3) Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant New Impact" is

appropriate if there is substantial evidence that a new effect may be significant that was not previously identified in the Approved Project FEIR. If there are one or more "Potentially New Significant Impact" entries when the determination is made, a Supplemental EIR is required.

4) "Negative Declaration: Potentially Significant Unless Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from "Earlier Analysis," as described in (5) below, may be cross-referenced).

5) Earlier analysis may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063 (c)(3)(d). In this case, a brief discussion should identify the following:

   (a) Earlier Analysis Used. Identify and state where they are available for review.

   (b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

   (c) Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g. general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

8) This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.

9) The analysis of each issue should identify: (a) the significance criteria or threshold used to evaluate each question; and (b) the mitigation measure identified, if any, to reduce the impact to less than significance.

4.3 ENVIRONMENTAL CHECKLIST QUESTIONS

	Potentially Significant New Impact	Less Than Significant New Impact with Mitigation Incorporated	Less Than Significant New Impact	No Impact/ No New Impact
1. AESTHETICS. Except as provided in Public Resources Code Section 21099 would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway	☐	☐	☐	☒
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	☒	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☒	☐

Summary of Impacts Identified in the Approved Project FEIR

The Approved Project FEIR concluded that although the Approved Project includes various design features to minimize impacts to scenic vistas and would comply with existing local requirements, impacts related to the buildout of future development associated with the SWIP Specific Plan Update area would remain significant and unavoidable. The long-term buildout of industrial, commercial, and office uses throughout the SWIP Specific Plan Update area would result in a significant alteration in views of the Jurupa Mountains to the south and the San Gabriel/San Bernardino Mountains to the northwest. For this reason, the Approved Project FEIR concluded that impacts to scenic vistas would remain significant and unavoidable.

The Approved Project's impacts associated with light/glare, scenic resources, and long-term visual character were determined to be less than significant. Impacts associated with the short-term visual character of the SWIP Specific Plan Update area were determined to be less than significant with implementation of Mitigation Measure 4.1 3a.

Impacts Related to the Proposed Project

a) Have a substantial adverse effect on a scenic vista?

No New Impact.

Scenic vistas consist of expansive, panoramic views of important, unique, or highly valued visual features that are seen from public viewing areas. This definition combines visual quality with information about view exposure to describe the level of interest or concern that viewers may have for the quality of a particular view or visual setting. A scenic vista can be impacted in two ways: a development project can have visual impacts by either directly diminishing the scenic quality of the vista or by blocking the view corridors or "vista" of the scenic resource. Important factors in determining whether a proposed project would block scenic vistas include the project's proposed height, mass, and location relative to surrounding land uses and travel corridors.

The proposed Project would not have a substantial adverse effect on a scenic vista. The dominant scenic views from the Project site and the surrounding area include background views of the San Gabriel Mountains to the northwest, the San Bernardino National Forest to the north, the San Jacinto Mountains to the southeast, and the Jurupa Mountains to the south.

The Project site is located in an urban and industrially developed area within the SCD that provides for development of light industrial and warehousing uses. The site is in proximity to the I-10 and surrounded by trucking related uses industrial uses. The Project site is adjacent to industrial uses to the north and south, and roadways followed by industrial uses to the east and west. The existing roadway corridors of Hemlock Avenue and Beech Avenue that are adjacent to the site provide the only view corridors at the Project site that show long distance background view scenic vistas.

The maximum allowable structure height within the SCD is 100 feet. The proposed building would be within the allowed height and would have a maximum height of 60 feet (Figure 6: *Proposed Project Conceptual Elevations*). Because the proposed building would be well below the allowable building height and located between two existing buildings the proposed building structure's height would not encroachment into any scenic vistas. Also, the proposed building would be setback approximately 185 feet from Hemlock Avenue on the east side of the site and over 315 feet from Beech Avenue on the west side of the site. Thus, the Project would not encroach into roadway scenic corridors. Therefore, no impacts to scenic vistas would occur and this topic will not be analyzed in the Subsequent EIR.

b) Substantially damage scenic resources, including, trees, rock outcroppings, and historic buildings within a state scenic highway?

No New Impact.

The Project site is not located within view of a state scenic highway, as there are no designated scenic highways within the vicinity. The proposed Project would not result in impacts to trees, rock outcroppings, or historic buildings within a state scenic highway. The nearest eligible state scenic highway is Route 38 at I-10, which is approximately 18 miles east of the Project site. Therefore, no impacts to scenic resources would occur and this topic will not be analyzed in the Subsequent EIR.

c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?

Less Than Significant New Impact.

Consistent with the discussion in the Approved Project FEIR the Project site vicinity is highly industrialized in nature, primarily supporting heavy industrial and trucking/distribution-related uses.

The Project site and surrounding area is void of valuable scenic resources. The Project site is currently occupied by Modular Space Corporation (ModSpace) for light industrial uses that includes leasing, storage, and refurbishing of modular trailers, offices, and storage bins. The Project site is developed with one building and three modular buildings, which total 11,590 SF. In addition, the site contains stored modular units, scrap metal and recycling collection bins, parking lots, and storage areas. The Project site ground surface is either paved with asphalt or gravel covered with limited areas of ornamental landscaping.

Implementation of the proposed Project would not result in a substantial degradation of the visual character or quality of the site or its surroundings. The SWIP provides development regulations that set specific requirements for development intensity, lot dimensions, setbacks, structure heights, and accessory buildings that the proposed Project would adhere to. The SWIP also includes streetscape requirements that include landscaping design guidelines. Compliance with the existing regulations would be ensured through the City's development and permit process.

As shown below in Table 3, the proposed Project complies with the SWIP Specific Plan standards for the SCD which governs scenic quality at the Project site. Thus, impacts would be less than significant. No new impacts related to scenic quality would occur and this topic will not be analyzed in the Subsequent EIR.

Table AES-1: Slover Central Manufacturing/Industrial District Development Standards

Development Standard	Required	Provided
Maximum FAR	0.80 maximum allowable FAR	0.543 FAR
Lot Size	40,000 sq ft min.	40.01 acres
Lot Width	200 ft min.	1,234 ft
Lot Depth	175 ft min.	Over 1,000 ft
Maximum Structure Height	100 ft	60 ft maximum
Front and Side Setbacks	25 ft	Greater than 50 ft
Landscaping	15%	15%

d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Less Than Significant New Impact.

The Project site is located within an urban environment that contains existing nighttime lighting that such as, street lighting, vehicle lighting, security and landscape lighting, signage lighting, and interior building lighting that passes through windows.

The proposed warehouse development would result in similar levels of new lighting as identified in the Approved Project FEIR that would generally occur from security lighting, building entrance lighting, and parking lot lighting. However, the Project would be required to comply with Municipal Code (Chapter 30), that provides standards for shielding of exterior lighting to prevent glare and undesirable illumination to adjacent properties or streets. Per the Municipal Code, adequate lighting levels shall be provided to ensure a safe environment, while not creating areas of intense light or glare. Light fixtures and poles shall also be designed and placed in a manner consistent and compatible with overall site and building design, and high-intensity security lighting fixtures shall not be substituted for site or landscape lighting or general building exterior illumination but shall

be limited to loading and storage locations or other similar service areas. In addition, all lighting provided to illuminate parking areas or buildings shall be positioned so as to direct light away from adjoining properties. Consistency with the Municipal Code lighting requirements that would be verified through the City's development permitting process would ensure that potential impacts associated with light, would be less than significant, consistent with the Approved Project FEIR.

Reflective light (glare) can be caused by sunlight or artificial light reflecting from finished surfaces such as window glass or other reflective materials. Generally, darker or mirrored glass would have a higher visible light reflectance than clear glass. Buildings constructed of highly reflective materials from which the sun reflects at a low angle can cause adverse glare. The proposed warehouse development would not use highly reflective surfaces, or glass sided buildings. Although the building would contain windows and glass doorway entrances, the windows and doorway areas would be separated by stucco and architectural elements, which would limit the potential of glare. In addition, as described previously, lighting would be required to be angled down and shielded, which would avoid the potential of Project lighting to generate glare. Therefore, the proposed Project would not generate substantial sources of glare, and impacts would be less than significant, which is consistent with the findings of the Approved Project FEIR. Therefore, lighting and glare will not be further evaluated in the Subsequent EIR.

Approved Project FEIR Mitigation Measure

4.1-3a For future development associated with the project located in or immediately adjacent to residentially zoned property, the following General Condition of Approval shall be imposed: Construction documents shall include language that requires all construction contractors to strictly control the staging of construction equipment and the cleanliness of construction equipment stored or driven beyond the limits of the construction work area. Construction equipment shall be parked and staged within the project site to the extent practical. Staging areas shall be screened from view from residential properties with solid wood fencing or green fence. Construction worker parking may be located off-site with approval of the City; however, on-street parking of construction worker vehicles on residential streets shall be prohibited. Vehicles shall be kept clean and free of mud and dust before leaving the project site. Surrounding streets shall be swept daily and maintained free of dirt and debris.

Proposed Project Applicability: Mitigation Measure 4.1-3a is not applicable to the proposed Project because the site is not located in or immediately adjacent to residentially zoned property.

Conclusion for Aesthetics

The proposed Project would not result in any new or substantially more severe aesthetics related impacts than were identified in the Approved Project FEIR. Thus, none of the conditions identified in CEQA Guidelines Section 15162 that would trigger the need to evaluate aesthetics in the Subsequent EIR would occur. Thus, aesthetics will not be analyzed in the Subsequent EIR.

	Potentially Significant New Impact	Less Than Significant New Impact with Mitigation Incorporated	Less Than Significant New Impact	No Impact/ No New Impact
2. AGRICULTURE AND FORESTRY RESOURCES. In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

Summary of Impacts Identified in the Approved Project FEIR

The Approved Project FEIR identified that implementation of the SWIP Specific Plan Update would not impact or conflict with Prime Farmland, Unique Farmland, Farmland of Statewide Importance, a Williamson Act contract, or with the conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use because none of these resources exist within or adjacent to the SWIP area. As such, the Approved Project FEIR found that no impacts would occur, and no mitigation measures were required.

Impacts Related to the Proposed Project

a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

No New Impact.

The California Department of Conservation Important Farmland mapping identifies the Project site as Urban and Built-Up Land. No areas of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance is located on or adjacent to the Project site. Therefore, the proposed Project would not have impacts related to the conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural use and this topic will not be analyzed in the Subsequent EIR.

b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?

No New Impact.

The Williamson Act (California Land Conservation Act of 1965) restricts the use of agricultural and open space lands to farming and ranching by enabling local governments to contract with private landowners for indefinite terms in exchange for reduced property tax assessments. The Project site is not under an active Williamson Act contract and is part of the SCD that does not include agricultural, forest, or timberland uses. Therefore, the proposed Project would not result in impacts related to a Williamson Act contract or zoning for agricultural uses, and this topic will not be analyzed in the Subsequent EIR.

c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?

No New Impact.

The Project site contains a limited number of trees and does not include forestland or timberland. Additionally, the SWIP does not include areas zoned as forestland. The Project would not conflict with existing zoning for, or cause rezoning of, forestland, timberland, or timberland zoned Timberland Production. Thus, no impact would occur this topic will not be analyzed in the Subsequent EIR.

d) Result in the loss of forest land or conversion of forest land to non-forest use?

No New Impact.

As discussed in Response 3.2(c), the proposed Project would not result in the loss of forestland or the conversion of forestland to non-forest use. The Project site and adjacent area do not include forestland and has not historically been used as forestland. Thus, no impact would occur this topic will not be analyzed in the Subsequent EIR.

e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?

No New Impact.

As discussed in Response 3.2(a), the Project site and adjacent area have no agricultural or forest resources and is not designated as Prime, Unique, or Farmland of Statewide Importance[4]. Therefore, the proposed Project would not convert Farmland to non-agricultural uses or forestland to non-forest use. Thus, no impact would occur, and this topic will not be analyzed in the Subsequent EIR.

Approved Project FEIR Mitigation Measures

None.

Conclusion for Agricultural and Forest Resources

No new impacts nor substantially more severe agricultural and forest resources related impacts would result from the proposed Project. Consistent with the determination of the Approved Project FEIR, impacts related to agricultural or forest resources from implementation of the proposed Project would not occur. Thus, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the Approved Project FEIR.

Based on the foregoing, none of the conditions identified in CEQA Guidelines Section 15162 that would trigger the need to evaluate agricultural and forest resources in the Subsequent EIR. Thus, agricultural and forest resources will not be analyzed in the Subsequent EIR.

[4] California Department of Conservation California Important Farmland Finder. Website: https://maps.conservation.ca.gov/DLRP/CIFF/ (accessed December, 2022)

	Potentially Significant New Impact	Less Than Significant New Impact with Mitigation Incorporated	Less Than Significant New Impact	No Impact/ No New Impact
3. AIR QUALITY. Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☒	☐	☐	☐
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?	☒	☐	☐	☐
c) Expose sensitive receptors to substantial pollutant concentrations?	☒	☐	☐	☐
d) Result in other emissions (such as those leading to odors) affecting a substantial number of people?	☐	☐	☒	☐

Summary of Impacts Identified in the Approved Project FEIR

The Approved Project FEIR concluded that implementation of the SWIP Specific Plan would result in significant and unavoidable impacts relative to air quality for both short and long-term air quality as well as consistency with the applicable Air Quality Management Plan (AQMP). The Approved Project FEIR describes that development would be implemented under the SWIP that could individually exceed the SCAQMD thresholds, that implementation of Mitigation Measures 4.2-1a through 4.2-1l would lessen emissions, and that construction and operational-related air quality impacts would be addressed on a project-by-project basis. The Approved Project FEIR described that future site-specific development (such as the proposed Project) would require separate CEQA and City discretionary review, including imposition of additional project-specific mitigation if needed.

Impacts Related to the Proposed Project

a) Conflict with or obstruct implementation of the applicable air quality plan?

Potentially Significant New Impact.

The City of Fontana is located within the South Coast Air Basin (Basin). The Basin includes all of Orange County and portions of Los Angeles, Riverside, and San Bernardino Counties. Air quality within the Basin is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD) and the California Air Resources Board (CARB). Standards for air quality within the

Basin are documented in the SCAQMD's Air Quality Management Plan (AQMP).[5] The main purpose of an AQMP is to describe air pollution control strategies to be taken by a city, county, or region classified as a nonattainment area in order to bring the area into compliance with federal and State air quality standards. SCAQMD's 2016 AQMP is based on regional growth forecasts for the Southern California Association of Governments region. Whether the project would exceed the growth assumptions in the AQMP is, in part, based on projections from local general plans.

The Project site has a General Plan Land Use designation of General Industrial (I-G) and within the SWIP SCD that provides for light and heavy manufacturing activities at a maximum FAR of 0.80. The proposed building includes approximately 882,000 SF on the 40.01-acre site, which is a FAR of 0.543; and therefore, within the anticipated buildout of the Project site and SWIP area. Thus, the growth related to the Project is consistent with regional forecasts.

However, as described by the Approved Project FEIR construction and operational-related air quality emissions are to be addressed on a project-by-project basis to identify if Project activities would exceed SCAQMD thresholds, and if mitigation measures would be able to reduce impacts to a less than significant level. Project emissions that exceed thresholds would result in conflict with SCAQMD's AQMP and may result in new impacts that were not previously identified in the Approved Project FEIR. Thus, the potential for implementation of the proposed Project to conflict with or obstruct implementation of the AQMP will be evaluated in the Subsequent EIR.

b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?

Potentially Significant New Impact.

As discussed in Response 3(a), the proposed Project would develop an approximately 882,000 SF warehouse building, which could result in an increase in criteria pollutants in comparison to those identified in the Approved Project FEIR and may result in new or increased significant impacts. Therefore, an air quality analysis will be prepared to model the emissions generated by the proposed Project with inclusion of the Approved Project FEIR mitigation measures to determine if new or increased air quality impacts would occur. This impact will be analyzed in the Subsequent EIR, and additional mitigation measures will be provided as needed.

c) Expose sensitive receptors to substantial pollutant concentrations?

Potentially Significant New Impact.

Sensitive receptors are locations where uses or activities result in increased exposure of persons more sensitive to the unhealthful effects of emissions (such as children and the elderly). Examples of land uses that can be classified as sensitive receptors include residences, schools, daycare centers, parks, recreational areas, medical facilities, rest homes, and convalescent care facilities. The Subsequent EIR will evaluate the potential for construction and operation of the proposed Project to expose sensitive receptors to substantial pollutant concentrations, and additional mitigation measures will be recommended as needed.

[5] South Coast Air Quality Management District (SCAQMD). 2016. Air Quality Management Plan (March 2017), Website: https://www.aqmd.gov/home/air-quality/clean-air-plans/air-quality-mgt-plan/final-2016-aqmp.

d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

Less Than Significant New Impact.

The proposed warehouse development would not emit other emissions, such as those generating objectionable odors, that would affect a substantial number of people. The threshold for odor is identified by SCAQMD Rule 402, Nuisance, which states:

> *A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property. The provisions of this rule shall not apply to odors emanating from agricultural operations necessary for the growing of crops or the raising of fowl or animals.*

The type of facilities that are considered to result in other emissions, such as objectionable odors, include wastewater treatments plants, compost facilities, landfills, solid waste transfer stations, fiberglass manufacturing facilities, paint/coating operations (e.g., auto body shops), dairy farms, petroleum refineries, asphalt batch plants, chemical manufacturing, and food manufacturing facilities. Odors generated by the operation of warehousing uses are not expected to be significant or highly objectionable and would be required to be in compliance with SCAQMD Rule 402, which would prevent nuisances to sensitive land uses.

During construction, emissions from construction equipment, such as diesel exhaust, and volatile organic compounds from architectural coatings and paving activities may generate odors. However, these odors would be temporary and are not expected to affect a substantial number of people.

During operations of the proposed warehouse, all Project-generated solid waste would be stored in covered containers and removed at regular intervals in compliance with solid waste regulations and would not generate objectionable odors. Therefore, impacts relating to both operational and construction activity odors would be less than significant, and odors will not be evaluated in the Subsequent EIR.

Approved Project FEIR Mitigation Measures

4.2-1a All construction equipment shall be maintained in good operation condition so as to reduce emissions. The construction contractor shall ensure that all construction equipment is being properly serviced and maintained as per the manufacturer's specification. Maintenance records shall be available at the construction site for City verification.

Proposed Project Applicability: Mitigation Measure 4.2-1a is applicable to the proposed Project and would be included in the Project MMRP.

4.2-1b Prior to the issuance of any grading permits, all applicants shall submit construction plans to the City of Fontana denoting the proposed schedule and projected equipment use. Construction contractors shall provide evidence that low emission mobile construction equipment will be utilized, or that their use was investigated and found to be infeasible

for the project. Contractors shall also conform to any construction measures imposed by the SCAQMD as well as City Planning staff.

Proposed Project Applicability: Mitigation Measure 4.2-1b is applicable to the proposed Project and would be included in the Project MMRP.

4.2-1c All paints and coatings shall meet or exceed performance standards noted in SCAQMD Rule 1113.

Proposed Project Applicability: Mitigation Measure 4.2-1c is applicable to the proposed Project and would be included in the Project MMRP.

4.2-1d Projects that result in the construction of more than 19 single-family residential units, 40 multifamily residential units, or 45,000 square feet of retail/commercial/industrial space shall be required to apply paints either by hand or high-volume low pressure (HVLP) spray. These measures may reduce volatile organic compounds (VOC) associated with the application of paints and coatings by an estimated 60 to 75 percent. Alternatively, the contractor may specify the use of low volatility paints and coatings. Several of currently available primers have VOC contents of less than 0.85 pounds per gallon (e.g., dulux professional exterior primer 100 percent acrylic). Top coats can be less than 0.07 pounds per gallon (8 grams per liter) (e.g., Lifemaster 2000-series). This latter measure would reduce these VOC emissions by more than 70 percent. Larger projects should incorporate both the use of HVLP or hand application and the requirement for low volatility coatings.

Proposed Project Applicability: Mitigation Measure 4.2-1d is applicable to the proposed Project and would be included in the Project MMRP.

4.2-1e All asphalt shall meet or exceed performance standards noted in SCAQMD Rule 1108.

Proposed Project Applicability: Mitigation Measure 4.2-1e is applicable to the proposed Project and would be included in the Project MMRP.

4.2-1f Prior to the issuance of grading permits or approval of grading plans for future development projects within the project area, future developments shall include a dust control plan as part of the construction contract standard specifications. The dust control plan shall include measures to meet the requirements of SCAQMD Rules 402 and 403. Such measures may include, but are not limited to, the following:

- Phase and schedule activities to avoid high-ozone days and first-stage smog alerts.
- Discontinue operation during second-stage smog alerts.
- All haul trucks shall be covered prior to leaving the site to prevent dust from impacting the surrounding areas.
- Comply with AQMD Rule 403, particularly to minimize fugitive dust and noise to surrounding areas.
- Moisten soil each day prior to commencing grading to depth of soil cut.
- Water exposed surfaces at least twice a day under calm conditions, and as often as needed on windy days or during very dry weather in order to maintain a surface crust and minimize the release of visible emissions from the construction site.

- Treat any area that will be exposed for extended periods with a soil conditioner to stabilize soil or temporarily plant with vegetation.
- Wash mud-covered tires and under carriages of trucks leaving construction sites.
- Provide for street sweeping, as needed, on adjacent roadways to remove dirt dropped by construction vehicles or mud, which would otherwise be carried off by trucks departing project sites.
- Securely cover all loads of fill coming to the site with a tight-fitting tarp.
- Cease grading during periods when winds exceed 25 miles per hour.
- Provide for permanent sealing of all graded areas, as applicable, at the earliest practicable time after soil disturbance.
- Use low-sulfur diesel fuel in all equipment.
- Use electric equipment whenever practicable.
- Shut off engines when not in use.

Proposed Project Applicability: Mitigation Measure 4.2-1f is applicable to the proposed Project and would be included in the Project MMRP.

4.2-2a All "large-scale" (e.g., over 10 acres per day) project Applicants shall provide incentives to use mass transit including the placement of bus stop shelters along major thoroughfares if not so equipped. (City Staff shall determine what denotes a "large-scale" project.)

Proposed Project Applicability: Mitigation Measure 4.2-2a is applicable to the proposed Project and would be included in the Project MMRP.

4.2-2b All "large-scale" (e.g., over 10 acres per day) project Applicants shall incorporate a bike/walking path between these shelters, the proposed residential areas, and the proposed commercial areas. These paths shall be lit and configured so as to avoid potential conflict with roadways and railroad activities.

Proposed Project Applicability: Mitigation Measure 4.2-2b is applicable to the proposed Project and would be included in the Project MMRP.

4.2-2c All industrial and commercial facilities shall post signs requiring that trucks shall not be left idling for prolonged periods pursuant to Title 13 of the California Code of Regulations, Section 2485, which limits idle times to not more than five minutes.

Proposed Project Applicability: Mitigation Measure 4.2-2c is applicable to the proposed Project and would be included in the Project MMRP.

4.2-2d The City shall require that both industrial and commercial uses designate preferential parking for vanpools.

Proposed Project Applicability: Mitigation Measure 4.2-2d is applicable to the proposed Project and would be included in the Project MMRP.

4.2-2e The proposed commercial and industrial areas shall incorporate food service.

Proposed Project Applicability: Mitigation Measure 4.2-2e is applicable to the proposed Project and would be included in the Project MMRP.

4.2-2f All industrial and commercial site tenants with 50 or more employees shall be required to post both bus and MetroLink schedules in conspicuous areas.

Proposed Project Applicability: Mitigation Measure 4.2-2f is applicable to the proposed Project and would be included in the Project MMRP.

4.2-2g All industrial and commercial site tenants with 50 or more employees shall be requested to configure their operating schedules around the MetroLink schedule to the extent reasonably feasible.

Proposed Project Applicability: Mitigation Measure 4.2-2g is applicable to the proposed Project and would be included in the Project MMRP.

4.2-2h All residential and commercial structures shall be required to incorporate high efficiency/low polluting heating, air conditioning, appliances, and water heaters.

Proposed Project Applicability: Mitigation Measure 4.2-2h is not applicable to the proposed Project because the Project does not include residential and commercial structures.

4.2-2i All residential and commercial structures shall be required to incorporate thermal pane windows and weather-stripping.

Proposed Project Applicability: Mitigation Measure 4.2-2i is not applicable to the proposed Project because the Project does not include residential and commercial structures.

4.2-2j All residential, commercial, and industrial structures shall be required to incorporate light colored roofing materials.

Proposed Project Applicability: Mitigation Measure 4.2-2j is applicable to the proposed Project and would be included in the Project MMRP.

4.2-2k Prior to approval of future development projects within the project area, the City of Fontana shall conduct project-level environmental review to determine potential vehicle emission impacts associated with the project(s). Mitigation measures shall be developed for each project as it is considered to mitigate potentially significant impacts to the extent feasible. Potential mitigation measures may require that facilities with over 250 employees (full or part-time employees at a worksite for a consecutive six-month period calculated as a monthly average), as required by the Air Quality Management Plan, implement Transportation Demand Management (TDM) programs.

Proposed Project Applicability: Mitigation Measure 4.2-2k is applicable to the proposed Project and would be included in the Project MMRP.

4.2-2l New warehouse facilities or distribution centers that generate a minimum of 100 truck trips per day, or 40 truck trips with transport refrigeration units (TRUs) per day, or TRU operations exceeding 300 hours per week shall not be located closer than 1,000 feet from any existing or proposed sensitive land use such as residential, a hospital, medical offices, day care facilities, and/or fire stations (pursuant to the recommendations set forth in the CARB *Air Quality and Land Use Handbook*).

Proposed Project Applicability: Mitigation Measure 4.2-2l is applicable to the proposed Project and would be included in the Project MMRP.

Conclusion for Air Quality

As detailed previously, it is possible that new or substantially more severe air quality related impacts could result from the proposed Project than were identified in the Approved Project FEIR. Thus, conditions identified in CEQA Guidelines Section 15162 related to changes to the Project that require major revisions of the previous adopted EIR due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified effects could occur and would trigger the need to evaluate potential air quality impacts in the Subsequent EIR. Thus, air quality will be analyzed in the Subsequent EIR.

	Potentially Significant New Impact	Less Than Significant New Impact with Mitigation Incorporated	Less Than Significant New Impact	No Impact/ No New Impact
4. BIOLOGICAL RESOURCES. Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☒
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?	☐	☐	☐	☒
c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☒
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☒	☐	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

Summary of Impacts Identified in the Approved Project FEIR

The Approved Project FEIR concluded that future development occurring within the SWIP Specific Plan Update area would not adversely affect, either directly or through habitat modification, any species identified as a candidate, sensitive, or special status species, any riparian habitat or other sensitive natural community upon the implementation of the following mitigation measures: 4.3-1a through 4.3-1h. Similarly, the Approved Project FEIR determined that future development would not affect any wetlands and drainages with implementation of mitigation measure 4.3-3a, or habitat conservation plans upon the implementation of the following mitigation measures: 4.3-1a through

4.3-1f.

Impacts Related to the Proposed Project

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

No New Impact.

The Project site is completely disturbed and paved with asphalt or gravel covered with limited areas of ornamental landscaping. The site is used for light industrial uses that include leasing, storage, and refurbishing of modular trailers, offices, and storage bins. The site does not include any natural areas for sensitive species. No State- and/or federally listed threatened or endangered species are documented and no USFWS-designated Critical Habitat occurs on-site due to lack of suitable habitat and ongoing site disturbances related to existing urban uses on and adjacent to the Project site. No impacts to candidate, sensitive, or special status species would occur from implementation of the proposed Project. Therefore, this topic will not be analyzed in the Subsequent EIR.

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or US Fish and Wildlife Service?

No New Impact.

Riparian habitats are those occurring along the banks of rivers and streams. Sensitive natural communities are natural communities that are considered rare in the region by regulatory agencies, known to provide habitat for sensitive animal or plant species, or known to be important wildlife corridors.

As described above, the Project site is disturbed, paved, or gravel covered and does not include any natural areas. No riparian habitat or other sensitive natural communities occur within the Project site. The Project site is also not included in any local or regional plans, policies, and regulations that identify the area as riparian habitat or other sensitive natural community. Therefore, no impact would occur, and this topic will not be analyzed in the Subsequent EIR.

c) Have a substantial adverse effect on state or federally protected wetlands (including but not limited to, marsh, vernal, pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

No New Impact.

Wetlands are defined under the federal Clean Water Act as land that is flooded or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that normally does support, a prevalence of vegetation adapted to life in saturated soils. Wetlands include areas such as swamps, marshes, and bogs. The Project site is disturbed, paved, or gravel covered and does not contain wetlands. Therefore, no impacts to wetlands would occur, and this topic will not be analyzed in the Subsequent EIR.

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Less Than Significant New Impact with Mitigation Incorporated.

Wildlife movement corridors can be local or regional in scale; their functions may vary temporally and spatially based on conditions and species present. Wildlife corridors represent areas where wildlife movement is concentrated due to natural or anthropogenic constraints. Local corridors provide access to resources such as food, water, and shelter. Animals use these corridors, which are often hillsides or riparian areas, to move between different habitats. Regional corridors provide these functions and link two or more large habitat areas. They provide avenues for wildlife dispersal, migration, and contact between otherwise distinct populations.

The Project site is not located within a designated wildlife corridor or linkage. The site is flat land surrounded by industrial uses to the north and south and roadways followed by industrial uses to the east and west. Further, the site is surrounded by walls and fences, and does not have the capability to function as a wildlife movement corridor. Thus, impacts related to wildlife corridors would not occur.

However, the site contains a limited number of trees that could be utilized by nesting birds during the nesting bird season and roosting bats. Thus, consistent with the direction of the Approved Project FEIR, Mitigation Measures 4.3-1b and 4.3-1c would be implemented to require nesting bird surveys occur prior to vegetation removal during nesting season. Consistent with the findings of the Approved Project FEIR, with implementation of these mitigation measures, potential impacts related to native wildlife nursery sites would be less than significant. Therefore, no new or increased impacts would occur from implementation of the proposed warehouse development, and this topic will not be analyzed further in the Subsequent EIR.

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

No New Impact.

The Project site contains a limited number of ornamental trees that are located along or near the perimeter of the site. These trees would be removed and replaced with implementation of the proposed Project. Although the Project site does not contain any heritage, significant, or specimen trees, the Project would be required to comply with Municipal Code Section 28-64, *Permit Required for Removal of Heritage, Significant and Specimen Trees,* which specifies that no person shall remove or cause the removal of any heritage, significant, or specimen tree unless a Tree Removal Permit is first obtained. Impacts in this regard are considered less than significant following compliance with the provisions of the Municipal Code. The compliance with the municipal code requirements would be verified as part of the City's construction permitting process, which would ensure that the Project does not conflict with local policies or ordinances protecting trees. As a result, there would be no impact and this topic will not be analyzed in the Subsequent EIR.

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

No New Impact.

The Project site is not within the study area of an adopted Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. Therefore, implementation of the proposed Project would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. This topic will not be analyzed in the Subsequent EIR.

Approved Project FEIR Mitigation Measures

4.3-1a The City of Fontana Planning Division shall require that all future project applicants prepare a Biological Assessment prior to the issuance of grading permits. The Biological Assessment shall include a vegetation map of the proposed project area, analysis of the impacts associated with plant and animal species and habitats, and conduct habitat evaluations for burrowing owl, Delhi Sands flower-loving fly, San Diego pocket mouse, western mastiff bat, western yellow bat, and San Diego desert woodrat. If any of these species are determined to be present, then coordination with the U.S. Fish and Wildlife Service and/or California Department of Fish and Game shall be conducted to determine what, if any, permits or clearances are required prior to development.

Proposed Project Applicability: Mitigation Measure 4.3-1a is applicable to the proposed Project and would be included in the Project MMRP.

4.3-1b Any future land disturbance for site-specific developments within the Project site shall be conducted outside of the State-identified bird nesting season (February 15 through September 1). If construction during the nesting season must occur, the site shall be evaluated by a City-approved biologist prior to ground disturbance to determine if nesting birds exist on site. If any nests are discovered, the biologist shall delineate an appropriate buffer zone around the nest, depending on the species and type of construction activity. Only construction activities approved by the biologist shall take place within the buffer zone until the nest is vacated.

Proposed Project Applicability: Mitigation Measure 4.3-1b is applicable to the proposed Project and would be included in the Project MMRP.

4.3-1c: Prior to any ground disturbance, trees scheduled for removal shall be evaluated by a City-approved biologist for roosting bats. If a roost is present the biologist will develop a plan to minimize impacts to the bats to the greatest extent feasible.

Proposed Project Applicability: Mitigation Measure 4.3-1c is applicable to the proposed Project and would be included in the Project MMRP.

4.3-1d The City shall encourage the preservation of natural habitat in conjunction with private or public development projects.

Proposed Project Applicability: Mitigation Measure 4.3-1d is not applicable to the proposed Project because no natural habitat exists on or adjacent to site.

4.3-1e Mitigation shall be provided for removal of any natural habitat, including restoration of degraded habitat of the same type, creation of new or extension of existing habitat of the same type, financial contribution to a habitat conservation fund administered by a Federal, State, or local government agency, or by a non-profit agency conservancy.

Proposed Project Applicability: Mitigation Measure 4.3-1e is not applicable to the proposed Project because no natural habitat exists on or adjacent to site.

4.3-1f Local CEQA procedures shall be applied to identify potential impacts to rare, threatened, and endangered species.

Proposed Project Applicability: Mitigation Measure 4.3-1f has been accomplished through preparation of this Initial Study, which determined that no natural habitat for rare, threatened, or endangered species exists on or adjacent to site.

4.3-1g Evidence of satisfactory compliance shall be provided by Project Applicant with any required State and/or Federal permits, prior to issuance of grading permits for individual projects.

Proposed Project Applicability: Mitigation Measure 4.3-1g is not applicable to the proposed Project because no State or Federal permits related to biological resources are required for the proposed Project.

4.3-1h Any development that results in the potential take or substantial loss of occupied habitat for any threatened or endangered species shall conduct formal consultation with the appropriate regulatory agency and shall implement required mitigation pursuant to applicable protocols. Consultation shall be on a project-by-project basis and measures shall be negotiated independently for each development project.

Proposed Project Applicability: Mitigation Measure 4.3-1h is not applicable to the proposed Project because no natural habitat for rare, threatened, or endangered species exists on or adjacent to site.

4.3-3a For future development proposals that could potentially affect jurisdictional drainages or wetlands (to be determined by the City of Fontana Planning Division), the project applicant shall prepare a jurisdictional delineation to determine the extent of jurisdictional area, if any, as part of the regulatory permitting process.

Proposed Project Applicability: Mitigation Measure 4.3-3a is not applicable to the proposed Project because no jurisdictional wetlands or drainages exist on or adjacent to site.

Conclusion for Biological Resources

No new impacts nor substantially more severe biological resources related impacts would result from the proposed Project. Consistent with the determination of the Approved Project FEIR, impacts related to biological resources from implementation of the proposed Project would be less than significant with the applicable mitigation measures that were prescribed in the Approved Project FEIR. Thus, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the Approved Project FEIR.

Based on the foregoing, none of the conditions identified in CEQA Guidelines Section 15162 that would trigger the need to evaluate biological resources in the Subsequent EIR. Thus, biological resources will not be analyzed in the Subsequent EIR. However, Approved Project FEIR Mitigation Measures 4.3-1a, 4.3-1b, and 4.3-1c, would be included in the Project MMRP.

	Potentially Significant New Impact	Less Than Significant New Impact with Mitigation Incorporated	Less Than Significant New Impact	No Impact / No New Impact
5. CULTURAL RESOURCES. Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource pursuant to in § 15064.5?	☐	☐	☐	☒
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☒	☐	☐
c) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐

Summary of Impacts Identified in the Approved Project FEIR

The Approved Project FEIR determined that although the likelihood for adverse impacts to historical and archaeological resources within the SWIP Specific Plan Update area are not likely to occur, in order to maintain any potential unforeseeable impacts to a less than significant level, the following Mitigation Measures were provided for implementation with development projects in the SWIP area: Mitigation Measures 4.4-1a, 4.4-1b, 4.4-2a through 4.4-2c, and 4.4-3a and 4.4-3b.

Impacts Related to the Proposed Project

a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?

No New Impact.

Section 15064.5 defines historic resources as resources listed or determined to be eligible for listing by the State Historical Resources Commission, a local register of historical resources, or the lead agency. Generally, a resource is considered "historically significant" if it meets one of the following criteria:

i. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
ii. Is associated with the lives of persons important in our past;
iii. Embodies the distinctive characteristics of a type, period, region or method of construction, or represents the work of an important creative individual, or possesses high artistic values;
iv. Has yielded, or may be likely to yield, information important in prehistory or history.

The Cultural Resources Study (Appendix A) describes that all structures on the site postdate year 2000 and, therefore, do not meet the age threshold (50 years) for consideration as historic resources under CEQA criteria. The site is developed with one modern industrial office building and

three modular buildings, which total 11,590 SF. In addition, the site contains stored modular units, scrap metal and recycling collection bins, parking lots, and storage containers that are used for the modular business operations and are not historic. The Phase I Environmental Site Assessment and Limited Subsurface Investigation (Appendix B) describes that the Project site was first developed with residential and agricultural uses from the 1920s through the 1940s, undeveloped or used for agriculture between the 1940s and 1980s; developed with a truck/transport and construction company on the northwest corner in the early 1990s; and developed with the current structures and modular unit storage yard in 2000.
There are no historic resources on the Project site, and impacts would not occur. This topic will not be further evaluated in the Subsequent EIR.

b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

Less Than Significant New Impact with Mitigation Incorporated.

The potential impacts related to archaeological resources that would result from the proposed Project would be similar to those that were identified by the Approved Project FEIR because the areas of development would be the same as those evaluated in the Approved Project FEIR. Thus, the same potential for impacting an archeological resource would occur from implementation of the proposed Project.

The Cultural Resources Study that was completed for the Project conducted a records search, which identified 24 previously recorded resources within one mile of the Project site, none of which are within the Project site boundaries. The most common resource types are associated with the built environment. The Cultural Resources Study describes that the Project site has been cleared and graded since the 1950s, and that based upon the documentation of past ground disturbance, there is little potential for cultural resources to be present/disturbed by the proposed Project. The Cultural Resources Study further states that should any cultural resources be present within the site, they would most likely be historic material associated with the garbage dumps from Los Angeles fed to the hogs that were previously on the site. However, if such material does exist, it would have no provenience and would not be archaeologically significant. Thus, impacts related to archaeological resources would be less than significant. Also, the City's Cultural and Tribal Standard Conditions of Approval and the Approved Project FEIR Mitigation Measures 4.4-1b, 4.4-2a, and 4.4-2b would be included in the Project MMRP and implemented with the Project to further ensure the impacts would be less than significant. This topic will not be further evaluated in the Subsequent EIR.

c) Disturb any human remains, including those interred outside of formal cemeteries?

Less Than Significant New Impact with Mitigation Incorporated.

There are no known human remains on the Project site. The site is not part of a formal cemetery and is not known to have been used for disposal of human remains. In addition, the ground has been previously disturbed by historic agricultural uses and recent industrial development. Thus, human remains are not expected to be encountered during construction of the proposed Project. In addition, existing state regulations (California Health and Safety Code Section 7050.5) requires that in the unanticipated event of discovery or recognition of any human remains, there shall be no further excavation until the coroner has made recommendations concerning the treatment and disposition of the human remains to the person responsible. If the coroner determines that the remains are not subject to his or her authority and has reason to believe that they are those of a Native American,

he or she shall contact the Native American Heritage Commission within 24 hours. These requirements were included in the Approved Project FEIR as Mitigation Measures 4.4-1b and 4.4-2a. Implementation of the proposed Project would comply with provisions of state law and Mitigation Measures 4.4-1b and 4.4-2a regarding discovery of human remains, and impacts relating to the disturbance of human remains would be less than significant with implementation of the Approved Project FEIR mitigation measures. This topic will not be further evaluated in the Subsequent EIR. However, Mitigation Measures 4.4-1b and 4.4-2a will be included in the Project's MMRP.

City Standard Conditions of Approval

The proposed Project would be subject to the City's Cultural and Tribal Standard Conditions of Approval that are listed below.

- Upon discovery of any tribal cultural or archaeological resources, cease construction activities in the immediate vicinity of the find until the find can be assessed. All tribal cultural and archaeological and tribal monitor/consultant. If the resources are Native American in origin, interested Tribes (as a result of correspondence with area Tribes) shall coordinate with the landowner regarding treatment and curation of these resources. Typically, the Tribe will request preservation in place or recovery for educational purposes. Work may continue on other parts of the project while evaluation takes place.
- Preservation in place shall be the preferred manner of treatment. If preservation in place is not feasible, treatment may include implementation of archaeological data recovery excavation to remove the resource along the subsequent laboratory processing and analysis. All Tribal Cultural Resources shall be returned to the Tribe. Any historic archaeological material that is not Native American in origin shall be curated at a public, non-profit institution with a research interest in the materials, if such an institution agrees to accept the material. If no institution accepts the archaeological material, they shall be offered to the Tribe or a local school or historical society in the area for educational purposes.
- Archaeological and Native American monitoring and excavation during construction projects shall be consistent with current professional standards. All feasible care to avoid any unnecessary disturbance, physical modification, or separation of human remains and associated funerary objects shall be taken. Principal personnel shall meet the Secretary of the Interior standards for archaeology and have a minimum of 10 years' experience as a principal investigator working with Native American archaeological sites in southern California. The Qualified Archaeologists shall ensure that all other personnel are appropriately trained and qualified.

Approved Project FEIR Mitigation Measures

4.4-1a A qualified archaeologist shall perform the following tasks, prior to construction activities within project boundaries:

- Subsequent to a preliminary City review, if evidence suggests the potential for historic resources, a field survey for historical resources within portions of the project site not previously surveyed for cultural resources shall be conducted.
- Subsequent to a preliminary City review, if evidence suggests the potential for historic resources, the San Bernardino County Archives shall be contacted for information on historical property records.
- Subsequent to a preliminary City review, if evidence suggests the potential for sacred land resources, the Native American Heritage Commission shall be contacted for information regarding sacred lands.
- All historical resources within the project site, including archaeological and historic resources older than 50 years, shall be inventoried using appropriate State record forms and guidelines followed according to the California Office of Historic Preservation's handbook "Instructions for Recording Historical Resources." The archaeologist shall then submit two (2) copies of the completed forms to the San Bernardino County Archaeological Information Center for the assignment of trinomials.
- The significance and integrity of all historical resources within the project site shall be evaluated, using criteria established in the CEQA Guidelines for important archaeological resources and/or 36 CFR 60.4 for eligibility for listing on the National Register of Historic Places.
- Mitigation measures shall be proposed, and conditions of approval (if a local government action) recommended to eliminate adverse project effects on significant, important, and unique historical resources, following appropriate CEQA and/or National Historic Preservation Act's Section 106 guidelines.
- A technical resources management report shall be prepared, documenting the inventory, evaluation, and proposed mitigation of resources within the project site, following guidelines for Archaeological Resource Management Reports prepared by the California Office of Historic Preservation, Preservation Planning Bulletin 4(a), December 1989. One copy of the completed report, with original illustrations, shall be submitted to the San Bernardino County Archaeological Information Center for permanent archiving.

Proposed Project Applicability: Mitigation Measure 4.4-1a was completed through preparation of the Cultural Study for the Project, which is included as Appendix A.

4.4-1b If any historical resources and/or human resources are encountered before or during grading, the developer shall retain a qualified archaeologist to monitor construction activities and to take appropriate measures to protect or preserve them for study.

Proposed Project Applicability: Mitigation Measure 4.4-1b is applicable to the proposed Project and will be included the Project MMRP.

4.4-2a A qualified archaeologist shall perform the following tasks, prior to construction activities within project boundaries:

- Subsequent to a preliminary City review, if evidence suggests the potential for prehistoric resources, a field survey for prehistoric resources within portions of the project site not previously surveyed for cultural resources shall be conducted.
- Subsequent to a preliminary City review, if evidence suggests the potential for sacred land resources, the Native American Heritage Commission shall be contacted for information regarding sacred lands.
- All prehistoric resources shall be inventoried using appropriate State record forms and two (2) copies of the completed forms shall be submitted to the San Bernardino County Archaeological Information Center.
- The significance and integrity of all prehistoric resources within the project site shall be evaluated using criteria established in the CEQA Guidelines for important archaeological resources.
- If human remains are encountered on the project site, the San Bernardino County Coroner's Office shall be contacted within 24 hours of the find, and all work shall be halted until a clearance is given by that office and any other involved agencies.
- All resources and data collected within the project site shall be permanently curated at an appropriate repository within the County.

Proposed Project Applicability: Mitigation Measure 4.4-2a is applicable to the proposed Project and will be included the Project MMRP. Several of the requirements of Mitigation Measure 4.4-2a have been completed through preparation of the Cultural Study for the Project, which is included as Appendix A.

4.4-2b If any prehistoric archaeological resources are encountered before or during grading, the developer shall retain a qualified archaeologist to monitor construction activities and to take appropriate measures to protect or preserve them for study. With the assistance of the archaeologist, the City of Fontana shall:

- Enact interim measures to protect undesignated sites from demolition or significant modification without an opportunity for the City to establish its archaeological value.
- Consider establishing provisions to require incorporation of archaeological sites within new developments, using their special qualities as a theme or focal point.
- Pursue educating the public about the area's archaeological heritage.
- Propose mitigation measures and recommend conditions of approval (if a local government action) to eliminate adverse Project effects on significant, important, and unique prehistoric resources, following appropriate CEQA guidelines.
- Prepare a technical resources management report, documenting the inventory, evaluation, and proposed mitigation of resources within the Project area.

Submit one copy of the completed report, with original illustrations, to the San Bernardino County Archaeological Information Center for permanent archiving.

Proposed Project Applicability: Mitigation Measure 4.4-2b is applicable to the proposed Project and will be included the Project MMRP.

Conclusion for Cultural Resources

No historic resources exist, and the area is not sensitive for archaeological resources; therefore, impacts are less than significant. Cultural resources will not be analyzed in the Subsequent EIR. However, the applicable mitigation measures from the Approved Project FEIR will be included in the Project MMRP.

	Potentially Significant New Impact	Less Than Significant New Impact with Mitigation Incorporated	Less Than Significant New Impact	No Impact / No New Impact
6. ENERGY. Would the project:				
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	☐	☐	☒	☐
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☐	☒

Summary of Impacts Identified in the Approved Project FEIR

Although not addressed as a separate threshold in the Approved Project FEIR, the Approved Project FEIR analyzed energy conservation as part of the Other CEQA Considerations Section of the EIR and concluded that implementation of the SWIP Specific Plan Update would result in a less than significant impact on energy resources. This included development of the Project site with industrial/warehousing uses at a FAR of 0.80.

Impacts Related to the Proposed Project

a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

Less than Significant New Impact.

The proposed development and operation of the approximately 882,000 SF warehouse on the Project site may result in an increase in energy usage. However, the proposed Project would be required to comply with Title 24 Energy Efficiency Standards, the California Green Building Standards, and the City's Municipal Code Chapter 9 regarding sustainability standards for warehouse projects. The City's Municipal Code standards include drought tolerant landscaping for buffering and shade, anti-idling signage, electric vehicle charging stations, zero emission onsite operational equipment, rooftop solar panels to supply 100% of the power needed to operate all non-refrigerated portions of the facility, and electric plug-in units be installed at every loading dock servicing the refrigerated space and require that the transport refrigeration units (TRUs) plug in. The Municipal Code Chapter 9 standards also include requirements for construction activities, such as use of electric powered tools, vehicles, and equipment; provision of a charging location and facilities; and use of highest rated CARB Tier technologies. The City's development review and permitting process would ensure that these requirements are implemented through inclusion in plans, permitting, and compliance screening. Thus, the proposed Project would not result in wasteful, inefficient, and unnecessary energy consumption, and will not be evaluated in the Subsequent EIR.

b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

No New Impact.

The State of California has established a comprehensive framework for the use of efficient energy. This occurs through the implementation of the Clean Energy and Pollution Reduction Act of 2015 (SB 350), Assembly Bill (AB) 1007 (Pavley 2007), Title 24 Energy Efficiency Standards, and the California Green Building Standards. As described previously, the proposed Project would be designed and implemented pursuant to the Title 24 Energy Efficiency Standards, the California Green Building Standards, and the City's Municipal Code Chapter 9 regarding sustainability standards for warehouse projects that would be ensured through the City's development review and permitting process. This includes electric vehicle charging stations, rooftop solar panels to supply 100% of the power needed to operate all non-refrigerated portions of the facility, and electric plug-in units for loading docks servicing the refrigerated space and require that the TRUs plug in. Thus, the proposed project would not conflict with or obstruct a plan for renewable energy or energy efficiency, and this topic will not be evaluated in the Subsequent EIR.

Approved Project FEIR Mitigation Measures

None.

Conclusion for Energy

As detailed previously, the proposed Project would not result in wasteful, inefficient, or unnecessary consumption of energy or conflict/obstruct with renewable energy or energy efficiency. No new impacts or substantially more severe impacts related to energy would result from the proposed Project. Consistent with the determination of the Approved Project FEIR, impacts related to energy from implementation of the proposed Project would be less than significant. Thus, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the Approved Project FEIR.

Based on the foregoing, none of the conditions identified in CEQA Guidelines Section 15162 that would trigger the need to evaluate energy in the Subsequent EIR. Thus, energy will not be analyzed in the Subsequent EIR.

	Potentially Significant New Impact	Less Than Significant New Impact with Mitigation Incorporated	Less Than Significant New Impact	No Impact / No New Impact
7. GEOLOGY AND SOILS. Would the project:				
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42?	☐	☐	☐	☒
ii) Strong seismic ground shaking?	☐	☐	☒	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv) Landslides?	☐	☐	☐	☒
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☒	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	☐	☐	☐	☒
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☒	☐	☐

Summary of Impacts Identified in the Approved Project FEIR

The Approved Project FEIR describes that although several earthquake faults exist within and in proximity to the City, none exist beneath the SWIP area. The nearest fault to the SWIP area is the

Cucamonga Fault, which traverses through the northern portion of the City, approximately seven miles north of the SWIP area. Since no known earthquake faults are known to exist beneath the site, impacts related to fault rupture were determined to be less than significant.

The Approved Project FEIR also describes that the site is subject to strong seismic shaking, but that the effects of seismic shaking on structures can be reduced through conformance with site-specific and design-specific geotechnical and geologic reports pursuant to the California Building Code, and/or other local governing requirements that would reduce the impacts of ground shaking, liquefaction, landslides, and other seismic hazards to a less than significant level.

The Approved Project FEIR describes that the site is relatively flat and does not include or adjacent to land features that could be capable of landslides; thus, no impact would occur. Regarding soil erosion and the loss of topsoil, the Approved Project FEIR describes that construction would create the potential for erosion to occur. However, a Storm Water Pollution Prevention Program (SWPPP) incorporating Best Management Practices (BMPs) for erosion control would be required to be prepared prior to the start of grading activities for each development in accordance with the Santa Ana Regional Water Quality Control Board (RWQCB) that would reduce impacts to a less than significant level.

The Approved Project FEIR describes that the SWIP area may include expansive soils, but that compliance with the CBC would reduce impacts to a less than significant level. The Approved Project FEIR also describes that the SWIP area is capable of being served by wastewater infrastructure, and that no septic tanks or alternative wastewater disposal systems would be required.

Regarding paleontology, the Approved Project FEIR describes that the southern portions of the SWIP area may be underlain with older Pleistocene fan deposits that have moderate potential to produce Pleistocene vertebrate fossils. Therefore, excavations that extend into the Pleistocene Alluvium have a potential of containing substantial fossil vertebrate specimens. Therefore, the Approved Project FEIR included Mitigation Measures 4.4-3a and 4.4-3b to reduce potential impacts to a less than significant level.

Impacts Related to the Proposed Project

a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?

No New Impact.

In 1972, the Alquist-Priolo Special Studies Zones Act was signed into law and renamed the Alquist-Priolo Earthquake Fault Zoning Act (A-P Act) in 1994. The primary purpose of the Act is to mitigate the hazard of fault rupture by prohibiting the location of structures for human occupancy access the trace of an active fault. The A-P Act requires the State Geologist (Chief of the California Geology Survey) to delineate "Earthquake Fault Zones" along with faults that are "sufficiently active" and "well-defined." The boundary of an "Earthquake Fault Zone" is generally about 500 feet from major active faults and 200 to 300 feet from well-defined minor faults. The A-P Act dictates that cities and counties withhold development permits for sites within an Alquist-Priolo Earthquake Zone until geologic investigations demonstrate that the site zones are not threatened by surface displacements from future faulting.

As described in the Approved Project FEIR, the closest fault is the Cucamonga Fault, which traverses through the northern portion of the City, approximately seven miles from the Project site. Due to the distance to the fault, potential impacts related to fault rupture would not occur. This topic will not be analyzed in the Subsequent EIR.

ii. Strong seismic ground shaking?

Less than Significant New Impact.

As described in the Approved Project FEIR, the Project site is subject to strong seismic shaking, but that the effects of seismic shaking on structures can be reduced through conformance with the structural and seismic requirements of the California Building Code. The Project site, like most of southern California, could be subject to seismically related strong ground shaking. Ground shaking is a major cause of structural damage from earthquakes. The amount of motion expected at a building site can vary from none to forceful depending upon the distance to the fault, the magnitude of the earthquake, and the local geology.

A major earthquake along the Cucamonga Fault or another regional fault could cause substantial seismic ground shaking at the site. However, structures built in the City are required to be built in compliance with the CBC (California Code of Regulations, Title 24, Part 2) that provides provisions for earthquake safety based on factors including building occupancy type, the types of soils onsite, and the probable strength of ground motion. Compliance with the CBC would require the incorporation of: 1) seismic safety features to minimize the potential for significant effects as a result of earthquakes; 2) proper building footings and foundations; and 3) construction of the building structure so that it would withstand the effects of strong ground shaking.

The City's permitting process would ensure that all required CBC seismic safety measures are incorporated into the building. Compliance with the CBC as verified by the City's review process, would reduce impacts related to strong seismic ground shaking to a less than significant level, which is consistent with the findings of the Approved Project FEIR. Thus, no new impact would result, and this topic will not be analyzed in the Subsequent EIR.

iii. Seismic-related ground failure, including liquefaction?

Less than Significant New Impact.

Soil liquefaction is a phenomenon in which saturated, cohesionless soils layers, located within approximately 50 feet of the ground surface, lose strength due to cyclic pore water pressure generation from seismic shaking or other large cyclic loading. During the loss of stress, the soil acquires "mobility" sufficient to permit both horizontal and vertical movements. Soil properties and soil conditions such as type, age, texture, color, and consistency, along with historical depths to ground water are used to identify, characterize, and correlate liquefaction susceptible soils.

Soils that are most susceptible to liquefaction are clean, loose, saturated, and uniformly graded fine-grained sands that lie below the groundwater table within approximately 50 feet below ground surface. Lateral spreading is a form of seismic ground failure due to liquefaction in a subsurface layer.

The Geotechnical Investigation (Appendix C) for the proposed Project did not identify ground water within the 30-foot-deep borings and describes that water levels, soils identified on the site, and geologic hazard mapping shows that liquefaction on or near the Project site would not occur. Therefore, consistent with the findings of the Approved Project FEIR, impacts related to liquefaction would be less than significant and this topic will not be analyzed in the Subsequent EIR.

iv. Landslides?

No New Impact.

Landslides and other slope failures are secondary seismic effects that are common during or soon after earthquakes. Areas that are most susceptible to earthquake induced landslides are steep slopes underlain by loose, weak soils, and areas on or adjacent to existing landslide deposits.

The Geotechnical Investigation (Appendix C)) for the proposed Project describes that there are no hills or substantial changes to topography on or adjacent to the site. The site generally slopes downward to the southwest at a gradient of 1 to 2± percent. Due to the lack of substantial slopes on or adjacent to the Project site, impacts related to landslides would not occur. This topic will not be analyzed in the Subsequent EIR.

b) Result in soil erosion or the loss of topsoil?

Less Than Significant New Impact.

Construction of the proposed Project has the potential to contribute to soil erosion and the loss of topsoil. Grading and excavation activities that would be required that would expose and loosen topsoil, which could be eroded by wind or water. However, to reduce the potential for soil erosion and the loss of topsoil, a Stormwater Pollution Prevention Plan (SWPPP) is required by the Regional Water Quality Control Board (RWQCB) regulations to be developed by a QSD (Qualified SWPPP Developer). The SWPPP is required to address site-specific conditions related to specific grading and construction activities. The SWPPP is required to identify potential sources of erosion and sedimentation loss of topsoil during construction, identify erosion control BMPs to reduce or eliminate the erosion and loss of topsoil, such as use of silt fencing, fiber rolls, or gravel bags, stabilized construction entrance/exit, hydroseeding. With implementation of the SWPPP, construction impacts related to erosion and loss of topsoil would be less than significant, which is consistent with the findings of the Approved Project FEIR.

In addition, the proposed Project includes installation of landscaping, such that during operation of the proposed warehouse large areas of loose topsoil that could erode would not exist. As described in Section 10, *Hydrology and Water Quality*, the onsite drainage features that would be installed by the proposed Project have been designed to slow, filter, and infiltrate stormwater, which would also reduce the potential for stormwater to erode topsoil during operations. Furthermore, implementation of the proposed warehouse development requires City approval of a site- specific Water Quality Management Plan (WQMP), which would ensure that appropriate operational BMPs would be implemented to minimize or eliminate the potential for soil erosion or loss of topsoil to occur. As a result, potential impacts related to substantial soil erosion or loss of topsoil would be less than significant, which is consistent with the findings of the Approved Project FEIR. Thus, no new or increased impacts would result from the proposed Project, and this topic will not be further evaluated in the Subsequent EIR.

c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or offsite landslide, lateral spreading, subsidence, liquefaction or collapse?

Less than Significant New Impact.

As described previously, the Project site has no potential for landslides and the Geotechnical Investigation (Appendix C) describes that the site does not have potential for liquefaction; thus, the related lateral spreading and collapse potential would also not occur. In addition, the Geotechnical Investigation provides CBC design criteria to limit the potential for soils movement or collapse. Thus, consistent with the findings of the Approved Project FEIR implementation of existing regulations would reduce potential impacts related to landslide, collapse, liquefaction, subsidence, and lateral spreading to a less than significant level. This topic will not be further be analyzed in the Subsequent EIR.

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?

No New Impact.

Expansive soils contain certain types of clay minerals that shrink or swell as the moisture content changes; the shrinking or swelling can shift, crack, or break structures built on such soils. Arid or semiarid areas with seasonal changes of soil moisture experience, such as southern California, have a higher potential of expansive soils than areas with higher rainfall and more constant soil moisture.

The Geotechnical Investigation (Appendix C) described that the soils within the Project site consist of fine to medium sands and silty sands, with varying gravel content that have been classified as very low to non-expansive. Therefore, no impacts related to expansive soils would occur, and this topic will not be further be analyzed in the Subsequent EIR.

e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

No New Impact.

The development of the Project site would not involve use of septic tanks or alternative methods for disposal of wastewater into subsurface soils. The proposed Project would connect to existing public wastewater infrastructure that is adjacent to the site, which includes an 8-inch sewer line in Hemlock Avenue and a 12-inch line sewer line in Beech Avenue. Therefore, the proposed Project would not result in any impacts related to septic tanks or alternative wastewater disposal methods and this topic will not be analyzed in the Subsequent EIR.

f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Less Than Significant New Impact with Mitigation Incorporated.

Pursuant to the Approved Project FEIR Mitigation Measure 4.4-3a, a Paleontological Assessment for the Project site was prepared (Appendix D), which determined that the sediments that underlie the Project site contain late to middle Pleistocene (approximately 11,700 to 780,000 years ago) old

alluvial fan deposits (Qof3) that are sensitive for paleontological resources and occur as slightly raised areas protruding through the surrounding young alluvial fan sediments. At the western and eastern edges of the Project site, the old alluvial fan deposits are buried by Holocene and late Pleistocene (present day to approximately 120,000 years ago) young alluvial fan sediments (lQyfl) of the Lytle Creek fan. These findings are consistent with the sensitivity of the area as detailed in the Approved Project FEIR, which describe that implementation of ground disturbing construction would have the potential to impact unknown paleontological resources. Therefore, the Approved Project FEIR mitigation measures and the monitoring recommendations from the Paleontological Assessment are included as Mitigation Measure GEO-1 (per the Approved Project FEIR Mitigation Measure 4.4-3b) to reduce potential impacts to a less than significant level. Thus, consistent with the determinations of the Approved Project FEIR, impacts related to paleontological resources would be less than significant with implementation of mitigation. No new or increased impacts would result from the proposed Project, and this topic will not be further evaluated in the Subsequent EIR.

Approved Project FEIR Mitigation Measures

4.4-3a: A qualified paleontologist shall conduct a pre-construction field survey of any Project site within the Specific Plan Update area that is underlain by older alluvium. The paleontologist shall submit a report of findings that provides specific recommendations regarding further mitigation measures (i.e., paleontological monitoring) that may be appropriate.

Proposed Project Applicability: Mitigation Measure 4.4-3a has been completed with preparation of the Paleontological Assessment included as Appendix D.

4.4-3b Should mitigation monitoring be recommended for a specific project within the Project site (Specific Plan Update), the Mitigation Program shall include, but not be limited to, the following measures:

- Assign a paleontological monitor, trained and equipped to allow the rapid removal of fossils with minimal construction delay, to the site full-time during the interval of earth-disturbing activities.
- Should fossils be found within an area being cleared or graded, earth-disturbing activities shall be diverted elsewhere until the monitor has completed salvage. If construction personnel make the discovery, the grading contractor shall immediately divert construction and notify the monitor of the find.
- All recovered fossils shall be prepared, identified, and curated for documentation in the summary report and transferred to an appropriate depository (i.e., San Bernardino County Museum).
- A summary report shall be submitted to City of Fontana. Collected specimens shall be transferred with copy of report to San Bernardino County Museum.

Proposed Project Applicability: Mitigation Measure 4.4-3b is applicable to the proposed Project and would be included in the Project MMRP.

Proposed Project Mitigation Measures

Mitigation Measure GEO-1 Paleontological Resources Management Program (PRMP). A paleontological resource management program (PRMP) is required prior to the issuance of a grading permit. The PRMP shall, at a minimum, implement the following standard procedures:

1. The applicant shall retain a qualified paleontologist (Project Paleontologist) approved by the City to create and implement a Project-specific plan for monitoring site grading/earthmoving activities.
2. The Project paleontologist retained shall monitor mass grading and excavation activities in areas identified as likely to contain paleontological resources shall be performed by a qualified paleontologist or paleontological monitor. Starting at the surface, monitoring should be conducted fulltime in areas of grading or excavation in undisturbed sediments of alluvial fan deposits.
3. Paleontological monitors will be equipped to salvage fossils as they are unearthed to avoid construction delays. The monitor must be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens in a timely manner. Monitoring may be reduced if the potentially fossiliferous units are not present in the subsurface, or, if present, are determined on exposure and examination by qualified paleontological personnel to have low potential to contain fossil resources. The monitor shall notify the Project paleontologist, who will then notify the concerned parties of the discovery.
4. Paleontological salvage during trenching and boring activities is typically from the generated spoils and does not delay the trenching or drilling activities. Fossils are collected and placed in cardboard flats or plastic buckets and identified by field number, collector, and date collected. Notes are taken on the map location and stratigraphy of the site, which is photographed before it is vacated, and the fossils are removed to a safe place. On mass grading projects, discovered fossil sites are protected by flagging to prevent them from being overrun by earthmovers (scrapers) before salvage begins. Fossils are collected in a similar manner, with notes and photographs being taken before removing the fossils. Precise location of the site is determined with the use of handheld GPS units. If the site involves remains from a large terrestrial vertebrate, such as large bone(s) or a mammoth tusk, that is/are too large to be easily removed by a single monitor, a fossil recovery crew shall excavate around the find, encase the find within a plaster and burlap jacket, and remove it after the plaster is set. For large fossils, use of the contractor's construction equipment may be solicited to help remove the jacket to a safe location.
5. Isolated fossils are collected by hand, wrapped in paper, and placed in temporary collecting flats or five-gallon buckets. Notes are taken on the map location and stratigraphy of the site, which is photographed before it is vacated, and the fossils are removed to a safe place.
6. In accordance with the "Microfossil Salvage" section of the Society of Vertebrate Paleontology guidelines (2010:7), bulk sampling and screening of fine-grained sedimentary deposits (including carbonate-rich paleosols) must be performed if the deposits are identified to possess indications of producing fossil "microvertebrates" to test the feasibility of the deposit to yield fossil bones and teeth.

7. In the laboratory, individual fossils are cleaned of extraneous matrix, any breaks are repaired, and the specimen, if needed, is stabilized by soaking in an archivally approved acrylic hardener (e.g., a solution of acetone and Paraloid B-72).
8. Recovered specimens are prepared to a point of identification and permanent preservation (not display), including screen-washing sediments to recover small invertebrates and vertebrates. Preparation of individual vertebrate fossils is often more time-consuming than for accumulations of invertebrate fossils.
9. Identification and curation of specimens into a professional, accredited public museum repository with a commitment to archival conservation and permanent retrievable storage (e.g., SBCM) shall be conducted. The paleontological program should include a written repository agreement prior to the initiation of mitigation activities. Prior to curation, the lead agency (e.g., the City of Fontana) will be consulted on the repository/museum to receive the fossil material.
10. A final report of findings and significance will be prepared, including lists of all fossils recovered and necessary maps and graphics to accurately record their original location(s). The report, when submitted to and accepted by the appropriate lead agency, will signify satisfactory completion of the Project program to mitigate impacts to any potential nonrenewable paleontological resources (i.e., fossils) that might have been lost or otherwise adversely affected without such a program in place.

Conclusion for Geology and Soils

No new impacts nor substantially more severe geology and soils related impacts would result from the proposed Project. Consistent with the determination of the Approved Project FEIR, impacts related to geology and soils would be less than significant with implementation of mitigation measures. The new mitigation measure (Mitigation Measure GEO-1) provides the mitigation program that is required pursuant to the Approved Project FEIR Mitigation Measure 4.4-3b. Thus, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the Approved Project FEIR.

Based on the foregoing, none of the conditions identified in CEQA Guidelines Section 15162 that would trigger the need to evaluate biological resources in the Subsequent EIR. Thus, geology and soils will not be analyzed in the Subsequent EIR. However, the mitigation measures listed above would be included in the Project MMRP.

	Potentially Significant New Impact	Less Than Significant New Impact with Mitigation Incorporated	Less Than Significant New Impact	No Impact/ No New Impact
8. GREENHOUSE GAS EMISSIONS. Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☒	☐	☐	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☒	☐	☐	☐

Summary of Impacts Identified in the Approved Project FEIR

The EIR described that based on the greenhouse gas (GHG) reduction measures in Table 4.2-8, GHG emissions from the SWIP Specific Plan Update would be 32.5 percent below the business-as-usual scenario, which is consistent with AB 32 requirement to reduce GHG emissions to 1990 levels (a 28 percent reduction in "business as usual" GHG emissions Statewide). The EIR also described that the future evaluation of discretionary projects within the SWIP area (such as the proposed Project) would include modeling of GHG emissions, implementation of Mitigation Measures 4.2-2a through 4.2-2k and 4.2-5a, and an evaluation of consistency with applicable GHG regulations and policies.

Impacts Related to the Proposed Project

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Potentially Significant New Impact.

The proposed Project would develop an approximately 882,000 SF warehouse building, which could result in an increase in GHG emissions in comparison to those identified in the Approved Project FEIR and may result in new or increased significant impacts. Therefore, a GHG modeling analysis will be prepared to model the emissions generated by the proposed Project and compare emissions to applicable thresholds and result in new or increased impacts that were not identified in the Approved Project FEIR. This impact will be analyzed in the Subsequent EIR, and mitigation measures will be identified if necessary.

b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Potentially Significant Impact.

The State of California, through its Governors and Legislature, has established a comprehensive framework for the substantial reduction of GHG emissions over the next 40-plus years. This will

occur primarily through the implementation of Assembly Bill (AB) 32 (2006), Senate Bill (SB) 375 (2008), Executive Order S-3-05 (2005), Executive Order B-30-15 (2015), and SB 32 (2016), which address GHG emissions on a statewide, cumulative basis.

As described previously, it is possible that the proposed Project would result in an increase in GHG emissions. Therefore, the Subsequent EIR will further evaluate the level of GHG emissions produced by the proposed Project and evaluate its consistency with the applicable plans and policies. Mitigation measures will be identified if necessary.

Approved Project FEIR Mitigation Measures

4.2-5a Prior to the issuance of building permits, future development projects shall demonstrate the incorporation of project design features that achieve a minimum of 28.5 percent reduction in GHG emissions from business-as-usual conditions. Future project shall include:

Energy Efficiency

- Design buildings to be energy efficient and exceed Title 24 requirements by at least 5 percent.
- Install efficient lighting and lighting control systems. Site and design building to take advantage of daylight.
- Use trees, landscaping and sun screens on west and south exterior building walls to reduce energy use.
- Install light colored "cool" roofs and cool pavements.
- Provide information on energy management services for large energy users.
- Install energy efficient heating and cooling systems, appliances and equipment, and control systems (e.g., minimum of Energy Star rated equipment).
- Implement design features to increase the efficiency of the building envelope (i.e., the barrier between conditioned and unconditioned spaces).
- Install light emitting diodes (LEDs) for traffic, street, and other outdoor lighting.
- Limit the hours of operation of outdoor lighting.

Renewable Energy

- Install solar panels on carports and over parking areas. Ensure buildings are designed to have "solar ready" roofs.
- Use combined heat and power in appropriate applications.

Water Conservation and Efficiency

- Create water-efficient landscapes with a preference for a xeriscape landscape palette.
- Install water-efficient irrigation systems and devices, such as soil moisture-based irrigation controls.
- Design buildings to be water efficient. Install water-efficient fixtures and appliances (e.g., EPA WaterSense labeled products).
- Restrict watering methods (e.g., prohibit systems that apply water to non-vegetated surfaces) and control runoff.

- Restrict the use of water for cleaning outdoor surfaces and vehicles.
- Implement low-impact development practices that maintain the existing hydrologic character of the site to manage storm water and protect the environment. (Retaining storm water runoff on-site can drastically reduce the need for energy-intensive imported water at the site).
- Devise a comprehensive water conservation strategy appropriate for the project and location. The strategy may include many of the specific items listed above, plus other innovative measures that are appropriate to the specific project.
- Provide education about water conservation and available programs and incentives.

Solid Waste Measures

- Reuse and recycle construction and demolition waste (including, but not limited to, soil, vegetation, concrete, lumber, metal, and cardboard).
- Provide interior and exterior storage areas for recyclables and green waste and adequate recycling containers located in public areas.
- Provide education and publicity about reducing waste and available recycling services.

Transportation and Motor Vehicles

- Limit idling time for commercial vehicles, including delivery and construction vehicles.
- Promote ride sharing programs (e.g., by designating a certain percentage of parking spaces for ride sharing vehicles, designating adequate passenger loading and unloading and waiting areas for ride sharing vehicles, and providing a website or message board for coordinating rides).
- Create local "light vehicle" networks, such as neighborhood electric vehicle (NEV) systems.
- Provide the necessary facilities and infrastructure to encourage the use of low or zero-emission vehicles (e.g., electric vehicle charging facilities and conveniently located alternative fueling stations).
- Promote "least polluting" ways to connect people and goods to their destinations.
- Incorporate bicycle lanes and routes into street systems, new subdivisions, and large developments.
- Incorporate bicycle-friendly intersections into street design.
- For commercial projects, provide adequate bicycle parking near building entrances to promote cyclist safety, security, and convenience. For large employers, provide facilities that encourage bicycle commuting (e.g., locked bicycle storage or covered or indoor bicycle parking).
- Create bicycle lanes and walking paths directed to the location of schools, parks and other destination points.

Proposed Project Applicability: Mitigation Measure 4.2-5a is applicable to the proposed Project and would be included in the Project MMRP.

Conclusion for Greenhouse Gas Emissions

As detailed previously, it is possible that new or substantially more GHG related impacts could result from the proposed Project than were identified in the Approved Project FEIR. Thus, conditions identified in CEQA Guidelines Section 15162 related to changes to the Project that require major revisions of the previous adopted EIR due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified effects could occur and would trigger the need to evaluate potential GHG impacts in the Subsequent EIR. Thus, GHG will be analyzed in the Subsequent EIR.

	Potentially Significant New Impact	Less Than Significant New Impact with Mitigation Incorporated	Less Than Significant New Impact	No Impact/ No New Impact
9. HAZARDS AND HAZARDOUS MATERIALS. Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☒	☐	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☒	☐
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	☐	☐	☐	☒
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	☐	☐	☐	☒

Summary of Impacts Identified in the Approved Project FEIR

The Approved Project FEIR describes that hazardous materials used for construction and operation of land uses in the SWIP would be used in concentrations that would not pose significant threats during the transport, use and storage of such materials. Also, hazardous materials would be contained, stored, and used in accordance with manufacturers' instructions and handled in compliance with applicable standards and regulations, including California Occupational Safety and Health Administration requirements, and Title 8 and 22 of the Code of California Regulations. Accordingly, risks associated with hazards to the public or environment posed by the transport, use, disposal, or accident conditions related to hazardous materials were determined to be less than

significant with implementation of mitigation.

The Approved Project FEIR determined that the SWIP area may contain sites on a hazardous materials list or database. Therefore, the Approved Project FEIR provided mitigation to identify potential onsite contaminants and any needed remediation activities, that would reduce potential impacts related to a hazardous materials to a less than significant level.

Regarding emergency access, the Approved Project FEIR describes that the SWIP area is located in an area where adequate circulation and access is provided to facilitate emergency response. Future developments would comply with applicable fire access and code requirements for emergency evacuation that would be verified as part of mitigation included in the Approved Project FEIR.

Impacts Related to the Proposed Project

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

Less than Significant New Impact.

A hazardous material is defined as any material that, due to its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the environment. Hazardous materials include, but are not limited to, hazardous substances, hazardous wastes, and any material that regulatory agencies believe would be injurious to the health and safety of persons or harmful to the environment if released into the home, workplace, or environment. Hazardous wastes require special handling and disposal because of their potential to damage public health and the environment.

Construction
The construction activities that would occur by the proposed Project would involve transport, use, and disposal of hazardous materials such as paints, solvents, oils, grease, and caulking. In addition, hazardous materials would be needed for fueling and servicing construction equipment on the site. These types of materials are not acutely hazardous, and all storage, handling, use, and disposal of these materials are regulated by county, state, and federal regulations, which construction activities are required to strictly adhere to. As a result, the routine transport, use or disposal of hazardous materials during construction activities for the proposed Project would be less than significant, which is consistent with the findings of the Approved Project FEIR. Therefore, this topic will not be further evaluated in the Subsequent EIR.

Operation
The proposed Project includes operation of warehousing uses, which generally use and store limited hazardous materials, such as: cleaning agents, paints, pesticides, batteries, and aerosol cans. Normal routine use of these products would not result in a significant hazard to residents or workers in the vicinity of the Project site.

Also, should any future business that occupies the proposed warehouse building or handle acutely hazardous materials (as defined in Section 25500 of California Health and Safety Code, Division 20, Chapter 6.95) the business would require a hazardous materials permit from the Fire Department, as part of City operational permitting procedures. Such businesses are also required to comply with California's Hazardous Materials Release Response Plans and Inventory Law, which requires immediate reporting to the Fire Department regarding any release or threatened release

of a hazardous material, regardless of the amount handled by the business. In addition, any business handling at any one time, greater than 500 pounds of solid, 55 gallons of liquid, or 200 cubic feet of gaseous hazardous material, is required, under Assembly Bill 2185 (AB 2185), to file a Hazardous Materials Business Emergency Plan. A Hazardous Materials Business Emergency Plan is a written set of procedures and information created to help minimize the effects and extent of a release or threatened release of a hazardous material. The intent of the Hazardous Materials Business Emergency Plan is to satisfy federal and state right-to-know laws and to provide detailed information for use by emergency responders.

Therefore, if future businesses that use or store hazardous materials occupy the proposed building, the business owners and operators would be required to comply with all applicable federal, state, and local regulations, as verified by City operational permitting. Therefore, operational impacts associated with the disposal of hazardous materials and/or the potential release of hazardous materials would be less than significant. No new or increased impacts would occur, and this topic will not be analyzed further in the Subsequent EIR.

b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

Less than Significant New Impact with Incorporation of Mitigation.

Construction
A Phase I Environmental Site Assessment and Limited Subsurface Investigation (Appendix B) was prepared for the Project site, which found no evidence of any releases of hazardous materials at the Project site. The investigation included soil borings for the analysis of representative onsite soils, which did not identify any contamination within onsite soils. Therefore, impacts related to soils containing hazardous substances are not anticipated to be uncovered during construction of the proposed Project. Should potential contamination be identified, application of existing remediation regulations, through construction permitting measures, would remove and dispose of contaminated materials, consistent with the requirements of Mitigation Measure 4.5-2b. Adherence to existing regulations would ensure that impacts would be less than significant.

Also, as described previously, construction of the proposed Project would involve the limited use and disposal of hazardous materials. Equipment that would be used in construction has the potential to release gas, oils, greases, solvents; and spills of paint and other finishing substances. However, the amount of hazardous materials onsite would be limited, and construction activities would be required to adhere to all applicable regulations regarding hazardous materials storage and handling, as well as to implement construction BMPs (through implementation of a required SWPPP implemented by City permitting) to prevent a hazardous materials release and to promptly contain and clean up any spills, which would minimize the potential for harmful exposures. With compliance to existing laws and regulations, which is mandated by the City through construction permitting, the potential construction-related impacts would be less than significant, which is consistent with the findings of the Approved Project FEIR. Therefore, this topic will not be further evaluated in the Subsequent EIR.

Operation
As described previously, operation of the proposed warehouse building includes use of limited hazardous materials, such as: cleaning agents, paints, pesticides, batteries, and aerosol cans. These types of hazardous materials are not acutely hazardous and regulated by existing laws that have

been implemented to reduce risks related to the use of these substances. Similarly, should any future business that occupies the building handle acutely hazardous materials, it would be required to file a Hazardous Materials Business Plan to ensure proper use, storage, and disposal of hazardous substances. As a result, operation of the proposed Project would not create a reasonably foreseeable upset and accident condition involving the release of hazardous materials into the environment, and impacts would be less than significant. This topic will not be analyzed further in the Subsequent EIR.

c) Emit hazardous emissions or handle hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

Less than Significant New Impact.

The proposed warehouse development would not produce hazardous emissions or handle acutely hazardous materials, substances, or wastes. The nearest schools to the Project site are:

- Southridge Middle School, 14500 Live Oak Ave, Fontana, CA 92337, approximately 1.4 miles southwest of the Project site.
- Michael D'Arcy Elementary School, 11645 Elm Avenue, approximately 1.5 miles south of the Project site.
- Henry J. Kaiser High School, 11155 Almond Avenue, approximately 1.5 miles east of the Project site.
- Jurupa Hills High School, 10700 Oleander Avenue, approximately 2.0 miles east of the Project site.
- Canyon Crest Elementary School, 11851 Cherry Avenue, approximately 2.1 miles south of the Project site.

As noted in Response 9(a), the allowable uses by the SWIP in the proposed building do not include release of hazardous emissions or handling hazardous or acutely hazardous materials, substances, or wastes in significant quantities. Construction activities associated with the Project would use a limited amount of hazardous and flammable substances/oils during heavy equipment operation for site excavation, grading, and construction. The amount of hazardous chemicals present during construction is limited and would be contained in compliance with existing government regulations. Therefore, impacts related to hazardous emissions or the handling of hazardous or acutely hazardous materials, substances, or wastes within 0.25 mi of an existing or proposed school would be less than significant. No new or increased impact would occur and this topic will not be analyzed further in the Subsequent EIR.

d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

No New Impact.

According to the California Department of Toxic Substances Control (DTSC) EnviroStor database and the Phase I Environmental Site Assessment and Limited Subsurface Investigation (Appendix B) that was prepared for the Project site, the area is not located on a federal Superfund site, State response site, voluntary cleanup site, school cleanup site, corrective action site, or tiered permit site. Therefore, the proposed Project would not be located on a hazardous materials site pursuant to Government Code Section 65965.5. Thus, impacts related to being located on a known hazardous

materials site pursuant to Government Code Section 65965.5 will not be analyzed in the Subsequent EIR.

e) For a project within an airport land use plan, or where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?

No New Impact.

The Project site is not within an airport land use plan and is located over 6 miles to the west of the closest operating public airport or public use airport, which is the Ontario International Airport (ONT). Additionally, the proposed building would be a maximum of 60-feet high and would not be of a sufficient height to require modifications to the existing air traffic patterns at the airport and, therefore, would not affect aviation traffic levels or otherwise result in substantial aviation-related safety risks. Hence, the proposed Project would not result in impacts to an airport land use plan, or where such a plan has not been adopted, and would not result in a safety hazard or excessive noise for people residing or working in the Project area. This topic will not be further analyzed in the Subsequent EIR.

f) Impair implementation of an adopted emergency response plan or emergency evacuation plan?

Less than Significant New Impact.

The proposed Project would not physically interfere with an adopted emergency response plan or emergency evacuation plan. Direct access to the proposed development would be provided by two driveway locations along Hemlock Avenue, and two driveway locations along Beech Avenue which are directly adjacent to the east and west sides of the site. Construction activities would occur within the Project site and would not restrict access of emergency vehicles to the site or adjacent areas. In addition, travel along Hemlock Avenue and Beech Avenue would remain open and would not interfere with emergency access in the site vicinity. The proposed Project and all other development projects within the City are required to design and construct internal access, and size and location of fire suppression facilities (e.g., hydrants and sprinklers) to conform to the San Bernardino County Fire Department standards. The City Public Works and/or San Bernardino County Fire Department would review the development plans prior to approval to ensure adequate emergency access pursuant to the requirements in Section 503 of the California Fire Code (Title 24, California Code of Regulations, Part 9). As such, the proposed Project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan, and impacts would be less than significant, and topic will not be analyzed further in the Subsequent EIR.

g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?

No New Impact.

The Project site does not contain and is not adjacent to any wildland areas. According to the CalFire Fire Hazard Severity Zone map, the Project site is not within an area identified as a Fire Hazard Area. As a result, the proposed Project would not expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires. Therefore, this topic will not be analyzed in the Subsequent EIR.

Approved Project FEIR Mitigation Measures

4.5-1a The City shall require that new proposed facilities involved in the production, use, storage, transport, or disposal of hazardous materials be located a safe distance from land uses that may be adversely impacted by such activities. Conversely, new sensitive facilities, such as schools, child-care centers, and senior enters, shall not to be located near existing sites that use, store, or generate hazardous materials.

Proposed Project Applicability: Mitigation Measure 4.5-1a is not applicable to the proposed Project because the proposed warehouse does not involve production, use, storage, transport, or disposal of substantial or acute hazardous materials; and the Project site is not near any sensitive land uses. However, the measure would be included in the Project MMRP to ensure that an inconsistency does not occur as the Project is implemented.

4.5-1b The City shall assure the continued response and capability of the San Bernardino County Fire Department/Fontana Fire Protection District to handle hazardous materials incidents in the City and along the sections of freeways that extend across the City.

Proposed Project Applicability: Mitigation Measure 4.5-1b is not applicable to the proposed Project because the Project does not involve transport or handling substantial volumes of hazardous materials; that would require such a response. However, the measure would be included in the Project MMRP to ensure capability of handling hazardous materials, such permits for such uses occur in the future.

4.5-1c The City shall require all businesses that handle hazardous materials above the reportable quantity to submit an inventory of the hazardous materials that they manage to the San Bernardino County Fire Department – Hazardous Materials Division in coordination with the Fontana Fire Protection District.

Proposed Project Applicability: Mitigation Measure 4.5-1c is not applicable to the proposed Project because the proposed warehouse does not involve handling hazardous materials above the reportable quantity. However, the measure would be included in the Project MMRP to ensure that this regulation is implemented, if needed.

4.5-1d The City shall identify roadways along which hazardous materials are routinely transported. If essential facilities, such as schools, hospitals, childcare centers, or other facilities with special evacuation needs are located along these routes, identify emergency response plans that these facilities can implement in the event of an unauthorized release of hazardous materials in their area.

Proposed Project Applicability: Mitigation Measure 4.5-1d is not applicable to the proposed Project because the proposed warehouse does not involve transport of substantial volumes of hazardous materials; that would be routinely transported. However, the measure would be included in the Project MMRP to ensure future truck route planning, should permitting related to hazardous materials transport and the Project site be requested in the future.

4.5-2a A Phase I Environmental Site Assessment shall be prepared in accordance with American Society of Testing and Materials (ASTM) Standards and Standards and Practices for All Appropriate Inquiries prior to issuance of a Grading Permit for future development within the Project site. The Phase I Environmental Site Assessment shall investigate the potential for site contamination, and will identify Specific Recognized Environmental Conditions (i.e., asbestos-containing materials [ACMs], lead-based paints [LBPs], polychlorinated biphenyls [PCBs], etc.) that may require remedial activities prior to land acquisition or construction.

Proposed Project Applicability: Mitigation Measure 4.5-2a was completed through preparation of the Phase I Environmental Site Assessment and Limited Subsurface Investigation (Appendix B).

4.5-2b Prior to potential remedial excavation and grading activities within the site (if remediation is required), impacted areas shall be cleared of all maintenance equipment and materials (e.g., solvents, grease, waste oil), construction materials, miscellaneous stockpiled debris (e.g., scrap metal, pallets, storage bins, construction parts), above-ground storage tanks, surface trash, piping, excess vegetation, and other deleterious materials. These materials shall be removed off-site and properly disposed of at an approved disposal facility. Once removed, a visual inspection of the areas beneath the removed materials shall be performed. Any stained soils observed underneath the removed materials shall be sampled. In the event concentrations of materials are detected above regulatory cleanup levels during demolition or construction activities, the Project Applicant shall comply with the following measures in accordance with Federal, State, and local requirements:

- Excavation and disposal at a permitted, off-site facility;
- On-site remediation, if necessary; or
- Other measures as deemed appropriate by the County.

Proposed Project Applicability: Mitigation Measure 4.5-2b is not applicable to the proposed Project because the site does not contain impacted areas and no remediation is required.

4.5-2c Prior to the issuance of a grading or building permit, a Certified Environmental Professional shall confirm the presence or absence of ACMs and LBPs prior to structural demolition/renovation activities. Should ACMs or LBPs be present, demolition materials containing ACMs and/or LBPs shall be removed and disposed of at an appropriate permitted facility.

Proposed Project Applicability: Mitigation Measure 4.5-2c is not applicable to the proposed Project because the onsite buildings and trailers are from after the year 2000, when ACMs and LBPs were no longer used in construction and building materials, as detailed in the Phase I Environmental Site Assessment and Limited Subsurface Investigation (Appendix B).

4.5-2d In the event any electrical transformers require relocation as a result of future development associated with the project, the relocation shall be conducted under the purview of the local electricity purveyor to identify property-handling procedures regarding potential polychlorinated biphenyls (PCBs).

Proposed Project Applicability: Mitigation Measure 4.5-2d is not applicable to the proposed Project because relocation of electric transformers would not be required.

4.5-2e Due to the railroad alignment within project boundaries, any construction in which the soil around the railroad is to be disturbed shall be conducted under the purview of the Fontana Fire Protection District to identify proper handling procedures. Once the soil around the railroad has been removed, a visual inspection of the areas beneath and around the removed area shall be performed. Any stained soils observed underneath the area shall be sampled. Results of the sampling (if necessary) shall indicate the level of remediation efforts that may be required (if necessary).

Proposed Project Applicability: Mitigation Measure 4.5-2e is not applicable to the proposed Project because a railroad alignment is not located on or adjacent to the Project site.

4.5-2f Areas of exposed soils within Caltrans right-of-way that would be disturbed during excavation/grading activities shall be sampled and tested for lead prior to ground disturbance activities on a project-by-project basis, so that any special handling, treatment, or disposal provisions associated with aerially deposited lead may be included in construction documents (if aerially deposited lead is above regulatory criteria).

Proposed Project Applicability: Mitigation Measure 4.5-2f is not applicable to the proposed Project because the site is not located within or adjacent to the Caltrans right-of-way.

4.5-6a Prior to the issuance of grading permits, future developers shall prepare a Traffic Control Plan for implementation during the construction phase. The Plan may include the following provisions, among others:

- At least one unobstructed lane shall be maintained in both directions on surrounding roadways.
- At any time that only a single lane is available, the developer shall provide a temporary traffic signal, signal carriers (i.e., flagpersons), or other appropriate traffic controls to allow travel in both directions.
- If construction activities require the complete closure of a roadway segment, the developer shall provide appropriate signage indicating detours/alternative routes.

Proposed Project Applicability: Mitigation Measure 4.5-6a is applicable to the proposed Project and would be included in the Project MMRP.

4.5-6b Prior to construction, the City of Fontana Engineering Department shall consult with the City of Fontana Police Department to disclose temporary closures and alternative travel routes, in order to ensure adequate access for emergency vehicles when construction of future projects would result in temporary lane or roadway closures.

Proposed Project Applicability: Mitigation Measure 4.5-6b is applicable to the proposed Project and would be included in the Project MMRP.

Conclusion for Hazards and Hazardous Materials

No new impacts nor substantially more severe hazards and hazardous materials related impacts would result from the proposed Project. Consistent with the determination of the Approved Project FEIR, impacts related to hazards and hazardous materials from implementation of the proposed Project would be less than significant with compliance with existing regulations related to hazardous materials and mitigation measures from the Approved Project FEIR. Thus, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the Approved Project FEIR.

Based on the foregoing, none of the conditions identified in CEQA Guidelines Section 15162 that would trigger the need to evaluate hazards and hazardous materials in the Subsequent EIR. Thus, hazards and hazardous materials will not be analyzed in the Subsequent EIR.

	Potentially Significant New Impact	Less Than Significant New Impact with Mitigation Incorporated	Less Than Significant New Impact	No Impact / No New Impact
10. HYDROLOGY AND WATER QUALITY. Would the project:				
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	☐	☐	☒	☐
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	☒	☐
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:	☐	☐	☒	☐
i) result in substantial erosion or siltation on- or off-site;	☐	☐	☒	☐
ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;	☐	☐	☒	☐
iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	☐	☐	☒	☐
iv) impede or redirect flood flows?	☐	☐	☐	☒
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☐	☒
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	☒	☐

Summary of Impacts Identified in the Approved Project FEIR

The Approved Project FEIR describes that development in the SWIP area would be subject to NPDES requirements during both construction and operations that would require implementation of BMPs based on site-specific conditions during preparation of a SWPPP and WQMP and that developments would include water quality features to ensure that runoff is treated prior to

discharge and drainage improvements to serve future development and minimize impacts related to erosion or siltation.

The Approved Project FEIR also describes that construction and operation of the Project would not substantially deplete groundwater supplies and that the SWIP area is not subject to tsunami hazards given the distance from the Pacific Ocean. No open reservoirs or other large water bodies are located within or adjacent to the SWIP area. Therefore, the Approved Project FEIR determined that the SWIP area is not subject to flooding hazards associated with seiches or tsunamis.

Impacts Related to the Proposed Project

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

Less Than Significant New Impact.

The Project site is under the jurisdiction of the Santa Ana Regional Water Quality Control Board (RWQCB), which sets water quality standards for all ground and surface waters within its region. Water quality standards are defined under the Clean Water Act (CWA) to include both the beneficial uses of specific water bodies and the levels of water quality that must be met and maintained to protect those uses (water quality objectives). Water quality standards for all ground and surface waters overseen by the Santa Ana RWQCB are documented in its Basin Plan, and the regulatory program of the Santa Ana RWQCB is designed to minimize and control discharges to surface and groundwater, largely through permitting, such that water quality standards are effectively attained.

Construction
Construction of the proposed Project would be required through City permitting to implement of a grading and erosion control plan that is compliant with the Construction Activities General Permit (State Water Resources Board Order No. 2012-0006-DWQ, NPDES No. CAS000002), which requires preparation of a SWPPP by a Qualified SWPPP Developer. The SWPPP is necessary for plan check and approval by the City's Building and Safety Division, prior to provision of permits for the construction, and would include construction BMPs such as:

- Silt fencing, fiber rolls, or gravel bags
- Street sweeping and vacuuming
- Storm drain inlet protection
- Stabilized construction entrance/exit
- Vehicle and equipment maintenance, cleaning, and fueling
- Hydroseeding
- Material delivery and storage
- Stockpile management
- Spill prevention and control
- Solid waste management
- Concrete waste management

Adherence to the existing requirements and implementation of the appropriate BMPs per the permitting process would ensure that activities associated with construction would not violate any water quality standards. The proposed Project would be required to have an approved grading and erosion control plan and approval of a SWPPP, which would include construction BMPs to

minimize the potential for construction related sources of pollution, which would be implemented during construction to protect water quality. As a result, impacts related to the degradation of water quality during construction activities would be less than significant, which is consistent with the findings of the Approved Project FEIR. This topic will not be further evaluated in the Subsequent EIR.

Operation

The proposed Project would operate a warehouse facility, which would introduce the potential for pollutants such as, chemicals from cleaners, pesticides and sediment from landscaping, trash and debris, and oil and grease from vehicles. These pollutants could potentially discharge into surface waters and result in degradation of water quality. However, in accordance with State Water Resources Board Order No. 2012-0006-DWQ, NPDES No. CAS000002 each development would be required to incorporate a WQMP with post-construction (or permanent) Low Impact Development (LID) site design, source control, and treatment control BMPs. The LID site design would minimize impervious surfaces and provide infiltration of runoff into landscaped areas.

The source control BMPs would minimize the introduction of pollutants that may result in water quality impacts; and treatment control BMPs that would treat stormwater runoff. The proposed warehouse development would install two underground infiltration basins that would treat stormwater, which would remove coarse sediment, trash, and pollutants (i.e., sediments, nutrients, heavy metals, oxygen demanding substances, oil and grease, bacteria, and pesticides). The additional types of BMPs that would be implemented as part of the proposed Project are listed in Table HWQ-1.

Table HWQ-1: Types of BMPs Incorporated into the Project Design

Type of BMP	Description of BMPs
LID Site Design	Optimize the site layout: The site has been designed so that runoff from impervious surfaces would flow over pervious surfaces or to the detention basin. Runoff would be directed to the onsite detention basin that would slow and retain runoff.
	Use pervious surfaces: Landscaping and an onsite detention basin is incorporated into the Project design to increase the amount of pervious area and onsite retention of stormflows.
Source Control	Storm Drain Stenciling: All inlets/catch basins would be stenciled with the words "Only Rain Down the Storm Drain," or equivalent message.
	Need for future indoor & structural pest control: The building would be designed to avoid openings that would encourage entry of pests.
	Landscape/outdoor pesticide use: Final landscape plans would accomplish all of the following: • Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to storm water pollution. • Consider using pest-resistant plants, especially adjacent to hardscape. • To ensure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions
	Roofing, gutters and trim: The architectural design would avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.

Type of BMP	Description of BMPs
	Sidewalks and parking lots: Sidewalks and parking lots shall be swept regularly to prevent the accumulation of litter and debris. Debris from pressure washing would be collected to prevent entry into the storm drain system. Wash water containing any cleaning agent or degreaser would be collected and discharged to the sanitary sewer and not discharged to a storm drain.
Treatment Control	Infiltration Systems: The two underground infiltration basins proposed for the Project would detain runoff, filter it prior to discharge.

With implementation of the operational source and treatment control BMPs that would be reviewed and approved by the City during the Project permitting and approval process, potential pollutants would be reduced to the maximum extent feasible, and implementation of the proposed warehouse development would not substantially degrade water quality. Therefore, impacts would be less than significant, which is consistent with the findings of the Approved Project FEIR, and this topic will not be further evaluated in the Subsequent EIR.

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

Less Than Significant New Impact.

The Project site is largely covered with cement, asphalt, and other impervious surfaces. The Preliminary Hydrology Report (Appendix E) describes that stormwater currently sheet flows across the site to the catch basins in either Hemlock Avenue or Beech Avenue. Consistent with the Approved Project FEIR and pursuant to existing regulations, a Water Quality Management Plan (WQMP) is required to be completed for the Project to demonstrate that runoff would be retained and infiltrated to the 85th percentile, 24-hour rain event. Thus, the potential for groundwater recharge onsite would not be substantially affected.

In addition, groundwater within the Project area is adjudicated, which manages groundwater pumping such that substantial depletion of groundwater supplies would not occur. The Fontana Water Company Division 2020 Urban Water Management Plan (UWMP) describes that the Fontana Water Company draws the majority of its water supply from its wells that extract groundwater from the Chino Basin, Rialto-Colton Basin, and Lytle Basin. All three basins have been adjudicated and are managed for long term sustainability. Groundwater extractions and conditions are monitored and tracked annually by the Western-San Bernardino Watermaster. The proposed Project would not conflict with the groundwater basing adjudications. Also, a Water Supply Assessment is required for the Project to confirm that the water supplies needed for the Project are within those available pursuant to the UWMP; and therefore, groundwater would not be impacted. Impacts related to the groundwater recharge would be less than significant, which is consistent with the Approved Project FEIR, and this topic will not be further evaluated in the Subsequent EIR.

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

i. result in substantial erosion or siltation on- or off-site;

Less Than Significant New Impact.

Construction of the proposed Project has the potential to contribute to soil erosion and siltation. Grading and excavation activities that would be required that would expose and loosen topsoil, which could be eroded by wind or water. However, the NDPES Storm Water Permit that all projects in the City are required to conform to. To reduce the potential for soil erosion and the loss of topsoil, a SWPPP is required by the RWQCB regulations to be developed by a QSD (Qualified SWPPP Developer). The SWPPP is required to address site-specific conditions related to specific grading and construction activities. The SWPPP is required to identify potential sources of erosion and siltation during construction, identify erosion control BMPs to reduce or eliminate the erosion and siltation, such as use of silt fencing, fiber rolls, or gravel bags, stabilized construction entrance/exit, hydroseeding. With implementation of the SWPPP, construction impacts related to erosion and siltation would be less than significant, which is consistent with the findings of the Approved Project FEIR.

In addition, the proposed Project includes installation of landscaping, such that during operation of the proposed warehouse development large areas of loose topsoil that could erode would not exist. The onsite drainage features that would be installed by the proposed Project have been designed to slow, filter, and infiltrate stormwater, which would also reduce the potential for stormwater to erode soil during operations. Furthermore, implementation of the proposed Project requires City approval of a site-specific WQMP, which would ensure that appropriate operational BMPs would be implemented to minimize or eliminate the potential for soil erosion and sedimentation to occur. As a result, potential impacts related to substantial soil erosion or sedimentation would be less than significant, which is consistent with the findings of the Approved Project FEIR. Thus, no new or increased impacts would result from the proposed Project, and this topic will not be further evaluated in the Subsequent EIR.

ii. substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;

Less Than Significant New Impact.

As detailed previously, runoff generated by the proposed Project would be conveyed to two underground infiltration basins that would be installed on site to filter and infiltrate into site soils. In addition, the proposed Project includes installation of landscaping that provide for infiltration of stormwater runoff. As described previously, the site is currently impervious. The proposed onsite drainage features that would be installed by the proposed Project have been designed to slow, filter, and infiltrate stormwater, such that a substantial increase in stormwater runoff would not occur. Furthermore, implementation of the proposed Project requires City approval of a site-specific WQMP, which would manage stormwater runoff. As a result, potential impacts related an increase in stormwater runoff that could result in flooding would be less than significant, which is consistent with the findings of the Approved Project FEIR. Thus, no new or increased impacts would result from the proposed Project, and this topic will not be further evaluated in the Subsequent EIR.

iii. create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;

Less Than Significant New Impact.

As detailed previously, runoff generated by the proposed Project would be conveyed to two underground infiltration basins that would be installed on site to filter and infiltrate into site soils. In addition, the proposed Project includes installation of landscaping that provide for infiltration of stormwater runoff. As described previously, the onsite drainage features that would be installed by the proposed Project have been designed to meet the 85th percentile storm water capture requirements that would be verified by a WQMP, required for development permitting. As a result, potential impacts related an increase in stormwater runoff that could exceed the capacity of drainage systems or result in polluted runoff would be less than significant, which is consistent with the findings of the Approved Project FEIR. Thus, no new or increased impacts would result from the proposed Project, and this topic will not be further evaluated in the Subsequent EIR.

iv. impede or redirect flood flows?

No New Impact.

According to the Flood Insurance Rate Map (FIRM), published by the Federal Emergency Management Agency (FEMA) (06071C8665H), the Project site is not located within a flood hazard zone. Therefore, the proposed Project would not impede or redirect flood flows and impacts will not be analyzed further in the Subsequent EIR.

d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

No New Impact.

As discussed in Response 10(c)(iv), the Specific Plan area is not within a flood hazard area. As such, the Project is not at risk of inundation during a storm event. Therefore, the proposed Project would not risk release of pollutants within a flood hazard area. No new impacts would occur.

Tsunamis are generated ocean wave trains generally caused by tectonic displacement of the sea floor associated with shallow earthquakes, sea floor landslides, rock falls, and exploding volcanic islands. The Project site is over 39 miles from the nearest ocean shoreline. Based on the inland location of the site, the Project site is not at risk of inundation from tsunami. Therefore, consistent with the findings of the Approved Project FEIR, the proposed Project would not risk release of pollutants from inundation from a tsunami.

Seiching is a phenomenon that occurs when seismic ground shaking induces standing waves (seiches) inside water retention facilities (e.g., reservoirs and lakes). Such waves can cause retention structures to fail and flood downstream properties. The Project site is not located adjacent to any water retention facilities. For this reason, the Project is not at risk of inundation from seiche waves. Therefore, the proposed Project would not risk release of pollutants from inundation from seiche

and impacts. No new impacts would occur, and this topic will not be analyzed further in the Subsequent EIR.

e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

Less Than Significant New Impact.

As described previously, development projects are required to have an approved SWPPP, which would include construction BMPs to minimize the potential for construction related sources of pollution. Also, WQMPs with source control BMPs are required to minimize the introduction of pollutants and treatment control BMPs are included to treat runoff. With implementation of the WQMPs that are required by the City during the Project permitting and approval process, potential pollutants would be reduced to the maximum extent feasible, and implementation of the proposed Project would not obstruct implementation of a water quality control plan.

Also as described previously, the SWIP area receives water from groundwater basins that are adjudicated. Thus, the allowable withdrawal of water from the basin by water purveyors is limited. Additionally, the proposed Project would not pump water and water supplies would be provided by the Fontana Water Company. Thus, the proposed Project would not conflict with or obstruct a groundwater management plan. No new impacts would occur, and this topic will not be further evaluated in the Subsequent EIR.

Approved Project FEIR Mitigation Measures

None.

Conclusion for Hydrology and Water Quality

No new impacts nor substantially more severe hydrology and water quality related impacts would result from the proposed Project. Consistent with the determination of the Approved Project FEIR, impacts related to hydrology and water quality from implementation of the proposed Project would be less than significant with implementation of existing regulations. Thus, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the Approved Project FEIR. Based on the foregoing, none of the conditions identified in CEQA Guidelines Section 15162 that would trigger the need to evaluate biological resources in the Subsequent EIR.

	Potentially Significant New Impact	Less Than Significant New Impact with Mitigation Incorporated	Less Than Significant New Impact	No Impact / No New Impact
11. LAND USE AND PLANNING. Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☒	☐

Summary of Impacts Identified in the Approved Project FEIR

The Approved Project FEIR determined that the SWIP would not physically divide the established community as the Project would implement land uses that are similar to those that exist within the SWIP area. The Approved Project FEIR also determined that implementation of the SWIP would not conflict with applicable land use plans, policies, or regulations of an agency with jurisdiction over the planning area, including the City of Fontana General Plan, and the City's Zoning and Development Code. Rather, the SWIP Update was to act as a complimentary document to guide and regulate development facilitated by the Redevelopment Plan. Therefore, impacts were determined to be less than significant.

Impacts Related to the Proposed Project

a) Physically divide an established community?

No New Impact.

The Project site is a parcel of land that has been most recently used for light industrial uses and is adjacent to similar industrial uses to the north and south, and roadways followed by industrial uses to the east and west. Implementation of the proposed Project would develop site with a warehouse that would be consistent with the existing adjacent light industrial uses. The Project would utilize the existing street system.

These development of the site with a warehouse would not physically divide an established community. The new use would be similar to the existing industrial uses surrounding the site. In addition, the Project would not include new infrastructure (such as roadways) that would physically divide an established community. Therefore, consistent with the findings of the Approved Project FEIR, no impact would occur. This topic will not be evaluated in the Subsequent EIR.

b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

Less Than Significant New Impact.

The Project site has a General Plan Land Use designation of General Industrial (I-G) and is within the SWIP Slover Central Manufacturing/Industrial District (SCD). The SCD provides for light and heavy manufacturing activities that are supported by trucking routes. The SCD allows for manufacturing, fabrication, assembly, processing, trucking, warehousing and distribution, equipment, automobile and truck sales and services uses.

Consistent with the General Plan and SWIP SCD, the Project includes development and operation of a warehouse facility. The use is consistent with the vicinity, which is highly industrialized in nature, primarily supporting heavy industrial and trucking/distribution-related uses. The SWIP provides development regulations that set specific requirements for development intensity, lot dimensions, setbacks, structure heights, and accessory buildings that the proposed Project would adhere to. For example, the Project's FAR of 0.543 is within the allowable FAR of 0.80, and the Project's building height of 60 feet maximum is within the 100-foot allowable building height.

The proposed Project would be implemented in compliance with the SWIP and the City of Fontana Municipal Code. The SWIP is the main development implementation tool, and the Municipal Code applies in absence of a SWIP specification. The City's development permitting process would ensure that the proposed Project would be implemented in compliance with these existing regulations. As such, the proposed Project would not result in conflicts with the City General Plan land use, SWIP, or Municipal Code, and impacts would be less than significant, and this topic will not be analyzed in the Subsequent EIR.

Approved Project FEIR Mitigation Measures

None.

Conclusion for Land Use and Planning

No new impacts nor substantially more severe land use and planning related impacts would result from the proposed Project. Consistent with the determination of the Approved Project FEIR, impacts related to land use and planning from implementation of the proposed Project would be less than significant. No new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the Approved Project FEIR.

Based on the foregoing, none of the conditions identified in CEQA Guidelines Section 15162 that would trigger the need to evaluate land use and planning in the Subsequent EIR. Thus, land use and planning will not be analyzed in the Subsequent EIR.

	Potentially Significant New Impact	Less Than Significant New Impact with Mitigation Incorporated	Less Than Significant New Impact	No Impact / No New Impact
12. MINERAL RESOURCES. Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

Summary of Impacts Identified in the Approved Project FEIR

The Approved Project FEIR describes that no known deposits of mineral resources are located in the SWIP area, and no mineral resources are delineated in the General Plan or other land use plan. Therefore, the EIR determined that no impacts regarding mineral resources would occur.

Impacts Related to the Proposed Project

a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

No New Impact.

There are no known mineral resources within or adjacent to the Project site. The City's General Plan Conservation, Open Space, Parks and Trails does not identify any mineral resources within the City. The Project site has not historically been used for mining. Therefore, implementation of the proposed Project would not result in the loss of availability of a valuable known mineral resource. This topic will not be analyzed in the Subsequent EIR.

b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on the general plan, specific plan or other land use plan?

No New Impact.

As discussed in the previous response, no known valuable mineral resources exist on or near the Project site. The Project site is not designated for mineral recovery uses but is designated for urban uses. Therefore, no impacts related to the loss of availability of a locally important mineral resource recovery site, as delineated on a local general plan, specific plan, or other land use plan, would occur as a result of Project implementation. This topic will not be further analyzed in the Subsequent EIR.

Approved Project FEIR Mitigation Measures

None.

Conclusion for Mineral Resources

No new impacts nor substantially more severe mineral resource related impacts would result from the proposed Project. Consistent with the determination of the Approved Project FEIR, impacts related to mineral resources from implementation of the proposed Project would not occur. Thus, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the Approved Project FEIR.

Based on the foregoing, none of the conditions identified in CEQA Guidelines Section 15162 that would trigger the need to evaluate mineral resources in the Subsequent EIR. Thus, mineral resources will not be analyzed in the Subsequent EIR.

	Potentially Significant New Impact	Less Than Significant New Impact with Mitigation Incorporated	Less Than Significant New Impact	No Impact / No New Impact
13. NOISE. Would the project result in:				
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☒	☐	☐	☐
b) Generation of excessive groundborne vibration or groundborne noise levels?	☒	☐	☐	☐
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

Summary of Impacts Identified in the Approved Project FEIR

The Approved Project FEIR describes that construction activities associated with implementation of the SWIP would be conducted within the allowable hours specified in the City's Municipal Code, and that implementation of Mitigation Measures 4.7-1a and 4.7-1b would reduce construction noise associated with future development to less than significant levels by limiting the hours of construction and establishing a method to address complaints.

The Approved Project FEIR also describes that any new stationary noise source (i.e., generators, air compressors, loading bays, pumps, etc.) would be required to provide adequate sound attenuation such that City noise standards are achieved. Compliance with the City's standards and implementation of Mitigation Measure 4.7-2a would reduce potential stationary source noise impacts to less than significant levels.

Regarding roadway noise, the proposed Project would increase noise levels on the surrounding roadways. Therefore, Mitigation Measure 4.7-3a and 4.3-7b would ensure that new potential development would not exceed the goals of the City General Plan Noise Element and reduce vibration from railroad sources to a less than significant level. However, the Approved Project FEIR determined that future noise impacts from mobile sources cannot be determined, and therefore, future mobile noise source impacts and related cumulative impacts would be significant and unavoidable.

The Approved Project FEIR also describes that the Ontario International Airport is approximately 11 miles to the west and is not located within the 60 Ldn contour line of the airport, and the Project would not expose people residing or working in the SWIP area to excessive aircraft noise levels.

Impacts Related to the Proposed Project

a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Potentially Significant New Impact.

Construction of the proposed Project would include operation of heavy equipment for demolition of existing buildings and pavement on the site, excavation and grading, building construction, paving, and potentially early morning concrete pouring activities. Operation of the proposed warehouse building could have different noise levels and timing of operational activities than were evaluated in the Approved Project FEIR. The proposed warehouse would involve use of machinery, onsite truck movement, and loading dock activities. In addition, the truck traffic that would occur with operation of the proposed approximately 882,000 SF warehouse building, could result in a substantial increase in noise that was not identified in the Approved Project FEIR. Therefore, a noise study will be prepared, potential noise impacts will be evaluated in the Subsequent EIR, and mitigation measures will be included as necessary.

b) Generation of excessive groundborne vibration or groundborne noise levels?

Potentially Significant New Impact.

The volume of vibration that would occur from buildout of the proposed Project is likely to be similar to that identified in the Approved Project FEIR. However, to ensure that construction activities, would not impact sensitive noise receptors with excessive groundborne vibration from the operation of heavy equipment, potential impacts will be evaluated in the Subsequent EIR. Additionally, the truck movements related to proposed warehouse uses could have the potential to effect sensitive receptors. Therefore, this topic will be evaluated in the Subsequent EIR.

c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

No New Impact.

The Project site is not located within an airport land use plan and is not located within two miles of a private or public use airport. The Project site is located over 6 miles west of the Ontario International Airport. Therefore, implementation of the proposed Project would not expose people residing or working in the Project area to excessive noise levels related to airports, and no impacts would occur. Thus, further analysis of this issue will not be included in the Subsequent EIR.

Approved Project FEIR Mitigation Measures

4.7-1a The following measures shall be implemented when construction is to be conducted within 500 feet of any sensitive structures or has the potential to disrupt classroom activities or religious functions.

- The City shall restrict noise intensive construction activities to the days and hours specified under Section 18-63 of the City of Fontana Municipal Code. These days

and hours shall also apply any servicing of equipment and to the delivery of materials to or from the site.

- All construction equipment shall be equipped with mufflers and sound control devices (e.g., intake silencers and noise shrouds) no less effective than those provided on the original equipment and no equipment shall have an unmuffled exhaust.
- The City shall require that the contractor maintain and tune-up all construction equipment to minimize noise emissions.
- Stationary equipment shall be placed so as to maintain the greatest possible distance to the sensitive use structures.
- All equipment servicing shall be performed so as to maintain the greatest possible distance to the sensitive use structures.
- If construction noise does prove to be detrimental to the learning environment, the City shall allow for a temporary waiver thereby allowing construction on Weekends and/or holidays in those areas where this construction is to be performed in excess of 500 feet from any residential structures.
- The construction contractor shall provide an on-site name and telephone number of a contact person. Construction hours, allowable workdays, and the phone number of the job superintendent shall be clearly posted at all construction entrances to allow for surrounding owners and residents to contact the job superintendent. If the City or the job superintendent receives a complaint, the superintendent shall investigate, take appropriate corrective action, and report the action taken to the reporting party. In the event that construction noise is intrusive to an educational process, the construction liaison will revise the construction schedule to preserve the learning environment.

Proposed Project Applicability: Mitigation Measure 4.7-1a is not applicable to the proposed Project because the Project site is not located within 500 feet of any sensitive structures, classroom activities, or religious functions.

4.7-1b Should potential future development facilitated by the proposed project require off-site import/export of fill material during construction, trucks shall utilize a route that is least disruptive to sensitive receptors, preferably major roadways (Interstate 10, Interstate 15, State Route 60, Sierra Avenue, Beech Avenue, Jurupa Avenue, and Slover Avenue). Construction trucks should, to the extent practical, avoid the weekday and Saturday a.m. and p.m. peak hours (7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m.).

Proposed Project Applicability: Mitigation Measure 4.7-1b could be applicable to the proposed Project and would be included in the Project MMRP.

4.7-2a No new industrial facilities shall be constructed within 160 feet of any existing sensitive land use property line without the preparation of a dedicated noise analysis. This analysis shall document the nature of the industrial facility as well as "noise producing"

operations associated with that facility. Furthermore, the analysis shall document the placement of any existing or proposed noise-sensitive land uses situated within the 160-foot distance. The analysis shall determine the potential noise levels that could be received at these sensitive land uses and specify very specific measures to be employed by the industrial facility to ensure that these levels do not exceed those City noise requirements of 65 dBA CNEL. Such measures could include, but are not limited to, the use of enclosures for noisy pieces of equipment, the use of noise walls and/or berms for exterior equipment and/or on-site truck operations, and/or restrictions on hours of operations. No development permits or approval of land use applications shall be issued until the noted acoustic analysis is received and approved by the City Staff.

Proposed Project Applicability: Mitigation Measure 4.7-2a is not applicable to the proposed Project because the Project site is not located within 160 feet of any existing sensitive land use property line.

4.7-3b Prior to issuance of a grading permit, a developer shall contract for a site-specific noise study for the parcel. The noise study shall be performed by an acoustic consultant experienced in such studies and the consultant's qualifications and methodology to be used in the study must be presented to City staff for consideration. The site-specific acoustic study shall specifically identify potential noise impacts upon any proposed sensitive uses (addressing General Plan buildout conditions), as well as potential project impacts upon off-site sensitive uses due to construction, stationary and mobile noise sources. Mitigation for mobile noise impacts, where identified as significant, shall consider facility siting and truck routes such that project-related truck traffic utilizes existing established truck routes. Mitigation shall be required if noise levels exceed 65 dBA, as identified in Section 30-182 of the City's Municipal Code.

Proposed Project Applicability: Mitigation Measure 4.7-3b is applicable to the proposed Project and would be satisfied through the preparation of a noise impact analysis that will be included in the Subsequent EIR.

Conclusion for Noise

As detailed previously, it is possible that new or substantially more severe noise and/or vibration related impacts could result from the proposed Project than were identified in the Approved Project FEIR. Thus, conditions identified in CEQA Guidelines Section 15162 related to changes to the Project that require major revisions of the previous adopted EIR due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified effects could occur and would trigger the need to evaluate potential noise and vibration impacts in the Subsequent EIR. Thus, noise and vibration will be analyzed in the Subsequent EIR.

	Potentially Significant New Impact	Less Than Significant New Impact with Mitigation Incorporated	Less Than Significant New Impact	No Impact / No New Impact
14. POPULATION AND HOUSING. Would the project:				
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☒	☐
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Summary of Impacts Identified in the Approved Project FEIR

The Approved Project FEIR describes that the new employees generated by buildout of the SWIP would not result in a substantial increase in the local population; and the increase in population would be within the SCAG and City of Fontana General Plan estimates for the City. Also, the Approved Project FEIR determined that implementation of the Specific Plan would not displace existing housing or people. Therefore, no construction of replacement housing would be necessary.

Impacts Related to the Proposed Project

a) Induce substantial unplanned population growth in an area, either directly or indirectly?

Less Than Significant New Impact.

The Project site has a General Plan Land Use designation of General Industrial (I-G) and within the SWIP SCD that provides for light and heavy manufacturing activities at a maximum FAR of 0.80. The proposed building includes 882,000 SF on the 40.01-acre site, which is a FAR of 0.543; and therefore, within the anticipated buildout of the Project site and SWIP area. Thus, the growth related to the Project is consistent with regional forecasts.

The Approved Project FEIR describes that buildout of the SWIP would result in 39,416 new employment positions. SCAG's Employment Density Study estimates that warehousing uses generate approximately of one employee per 1,195 SF. Based on this estimate, the proposed Project would result in 738 employees, which is 1.9 percent of the number of employees at buildout.

The 2019 SCAG Local Profile for the City of Fontana identified that the City had 55,448 jobs in 2017 and the SCAG's Growth Forecast by Jurisdiction estimates that employment within the City of Fontana would grow to 75,100 by 2045. The increase of 738 employees that would result from the proposed Project would equate to 3.8 percent of the projected growth. Therefore, the growth that would result from the Project is within existing projections, and the additional jobs provided by the proposed Project would not result in substantial unplanned growth in the area.

Also, the Project site is in an urbanized area and the Project does not propose to expand surrounding utility infrastructure (e.g., water, electricity, cell tower, gas, sanitary sewer, and stormwater drains). Thus, the proposed Project would result in a less than significant impact related to inducement of substantial unplanned population growth, which is consistent with the findings of the Approved Project FEIR, and this topic will not be analyzed further in the Subsequent EIR.

b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

No New Impact.

The Project site is developed for industrial uses and is surrounded by industrial and trucking uses and roads followed by industrial uses. The area does not contain any housing and has not been historically used for housing. The proposed Project would not displace any housing and would not necessitate the construction of replacement housing. As a result, no new impact would occur, and this topic will not be analyzed in the Subsequent EIR.

Approved Project FEIR Mitigation Measures

None.

Conclusion for Population and Housing

No new impacts nor substantially more severe population and housing related impacts would result from the proposed Project. Consistent with the determination of the Approved Project FEIR, impacts related to population and housing from implementation of the proposed Project would be less than significant. Thus, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the Approved Project FEIR.

Based on the foregoing, none of the conditions identified in CEQA Guidelines Section 15162 that would trigger the need to evaluate population and housing in the Subsequent EIR. Thus, population and housing will not be analyzed in the Subsequent EIR.

	Potentially Significant New Impact	Less Than Significant New Impact with Mitigation Incorporated	Less Than Significant New Impact	No Impact/ No New Impact
15. PUBLIC SERVICES.				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
Fire protection?	☐	☐	☒	☐
Police protection?	☐	☐	☒	☐
Schools?	☐	☐	☒	☐
Parks?	☐	☐	☒	☐
Other public facilities?	☐	☐	☒	☐

Summary of Impacts Identified in the Approved Project FEIR

Fire Services. The Approved Project FEIR describes that two fire stations are located within the SWIP vicinity. Fire Station 72 is located at 15380 San Bernardino Avenue, approximately one-quarter mile north of the SWIP area, and Fire Station 74 is located at 11500 Live Oak Avenue, approximately one-quarter mile south of the SWIP area. The Approved Project FEIR states that development fees would be utilized to fund additional services and improvements that may be required to provide adequate fire protection to the SWIP area, and that impacts would be less than significant.

Police Services. The Approved Project FEIR describes that the City of Fontana Police Department's nearest staffed facility to the SWIP area is the Contact Station at the Palm Court Shopping Center located on the northeast corner of Slover Avenue and Sierra Avenue, approximately one mile east; and that police also currently respond to the area from the police headquarters adjacent to City Hall, approximately 2.75 miles northeast of the SWIP area. The Approved Project FEIR states that the SWIP would not result in the need to construct new police facilities and that project would be required to pay developer fees that would ensure that adequate law enforcement services exist in the area.

Schools. The Approved Project FEIR determined that the Specific Plan area is served by the Fontana Unified School District (FUSD). Pursuant to Senate Bill (SB) 50 (Section 65995 of the Government Code) payment of fees to the FUSD is considered full mitigation for development impacts. Requirements for fee payments were included in the Approved Project FEIR mitigation measures.

Parks. The Approved Project FEIR determined that the City currently collects a Park Development fees for residential uses. However, no Park Development fees are collected for commercial, office, or industrial development and that the increased population from the SWIP could result in the need for new and improved park and recreational facilities. The Approved Project FEIR included mitigation measures from the General Plan EIR to offset the SWIP's related demand for capital improvements to maintain adequate park facilities and equipment.

Impacts Related to the Proposed Project

a) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for:

Fire protection?
Police protection?
Schools?
Parks?
Other public facilities?

***Fire Protection* – Less Than Significant New Impact.**

As described by the Approved Project FEIR, the City of Fontana Fire Department provides fire protection services to the SWIP area, in addition to the rest of the City. The Fire Department has 7 fire stations, the closest of which is 0.9 mile from the Project site. The location of the stations within 4 miles of the Project site are listed below.

- Fire Station 74 located at 11500 Live Oak Avenue, 0.9 mile from the Project site.
- Fire Station 72 located at 15380 San Bernardino Avenue, 3.6 miles from the Project site.
- Fire Station 77 located at 17459 Slover Avenue, 3.7 miles from the Project site.
- Fire Station 73 located at 14360 Arrow, 4.0 miles from the Project site.

Implementation of the proposed Project would be required to adhere to the California Fire Code, as included in the City of Fontana Municipal Code Section 5-425. As part of project permitting, plans are reviewed City's Building and Safety Division to ensure that the project plans meet the fire protection requirements.

As detailed in Section 14, *Population and Housing*, the proposed Project would result in 738 employees. The additional employees would result in an incremental increase in demand for fire protection and emergency medical services. However, the existing fire station is 0.9 miles from the Project site and the increase in fire service demands from the proposed warehouse building would not require construction of a new or physically altered fire station that could cause environmental impacts. Therefore, impacts related to fire protection services would be less than significant, and this topic will not be analyzed in the Subsequent EIR.

***Police Protection* – Less Than Significant New Impact.**

The City of Fontana Police Department provides police protection to the City. The nearest Police Department facility is the Contact Station at the Palm Court Shopping Center located 3.0 miles from the Project site at 16920 Slover Avenue. The Police Department headquarters is located at 17005

Upland Avenue, approximately 5.8 miles from the site. The Project site is within an urban area that is currently being served by the Police Department. As described previously, proposed Project would result in an increase of increase of 738 employees. These additional employees and the additional goods that would be accommodated by the Project could create the need for additional police services. Operation of warehousing uses generate a typical range of sheriff service calls, such as burglaries, thefts, and employee disturbances. However, to reduce the need for law enforcement services, security concerns are addressed by inclusion of low-intensity security lighting and security cameras. Pursuant to the City's existing permitting process, site plans are reviewed to ensure that crime prevention and emergency access measures are incorporated appropriately to provide a safe environment. Although an incremental increase could occur from implementation of the Project, the increased need for law enforcement services would not result in the need for new or physically altered police facilities. Thus, impacts related to police services would be less than significant, and this topic will not be analyzed in the Subsequent EIR.

***Schools* – Less Than Significant New Impact.**

As described previously, proposed Project would result in an increase of increase of 738 employees at buildout. The addition of employees would not directly generate new students. Thus, potential impacts related to school facilities would be less than significant. In addition, existing regulations, which were included in the Approved Project FEIR as mitigation, requires fee payments to provide funding for school facilities necessary to address direct and cumulative service needs generated by new development. Because impacts related to schools would be less than significant, this topic will not be analyzed in the Subsequent EIR.

***Parks* – Less Than Significant New Impact.**

As described previously, proposed Project would result in an increase of increase of 738 employees. The addition of employees would not directly generate new residents that would use parks. Thus, potential impacts related to parks would be less than significant. This topic will not be analyzed in the Subsequent EIR.

***Other Services* – Less Than Significant New Impact.**

As described previously, proposed Project would result in an increase of increase of 738 employees. The addition of employees would not directly generate new residents that would need other services, such as libraries. Thus, potential impacts related to other services would be less than significant, and this topic will not be analyzed in the Subsequent EIR.

Approved Project FEIR Mitigation Measures

4.8-1a The City shall continue to work towards a ratio of 1.4 sworn officers per 1,000 residents.

Proposed Project Applicability: Mitigation Measure 4.8-1a remains the obligation of the City.

4.8-1b The Fontana Police Department shall continue to expand its Area Commander Program to more effectively serve specific areas of the City.

Proposed Project Applicability: Mitigation Measure 4.8-1b remains the obligation of the City.

4.8-1c The Fontana Police Department shall expand its Contact Stations to more effectively serve outlying areas.

Proposed Project Applicability: Mitigation Measure 4.8-1c remains the obligation of the City.

4.8-1d The Fontana Police Department shall continue its School Resource Officer Program on all current and future middle school campuses.

Proposed Project Applicability: Mitigation Measure 4.8-1d remains the obligation of the City.

4.8-1e The Fontana Police Department shall continue its extensive volunteer crime prevention programs, including Citizen Volunteers, Explorers, Citizens on Patrol, Neighborhood Watch, Police Reserves, and Community Emergency.

Proposed Project Applicability: Mitigation Measure 4.8-1e remains the obligation of the City.

4.8-1f The Fontana Police Department shall continue its bilingual incentive program to more effectively serve the Latino community.

Proposed Project Applicability: Mitigation Measure 4.8-1f remains the obligation of the City.

4.8-1g The City shall maintain an average police and fire response time of four to five minutes.

Proposed Project Applicability: Mitigation Measure 4.8-1g remains the obligation of the City.

4.8-1h The City shall continue to promote the establishment of Neighborhood Watch programs in residential neighborhoods, aimed at encouraging neighborhoods to form associations to patrol or watch for any suspicious activity.

Proposed Project Applicability: Mitigation Measure 4.8-1h remains the obligation of the City.

4.8-1i The City shall incorporate appropriate staffing levels in the annual budget process keyed to City growth in population and employment.

Proposed Project Applicability: Mitigation Measure 4.8-1i remains the obligation of the City.

4.8-2a The City shall maintain an average fire response time of four to five minutes.

Proposed Project Applicability: Mitigation Measure 4.8-1i remains the obligation of the City.

4.8-2b The City shall continue to maintain an Insurance Service office (ISO) fire rating of Class 3.

Proposed Project Applicability: Mitigation Measure 4.8-2b remains the obligation of the City.

4.8-2c The City shall ensure that new fire stations are built in areas of new development so that response times are not eroded.

Proposed Project Applicability: Mitigation Measure 4.8-2c remains the obligation of the City.

4.8-3a Planning and development in the City shall continue to be integrated with the needs of school districts for new facilities.

Proposed Project Applicability: Mitigation Measure 4.8-3a remains the obligation of the City.

4.8-3b The City shall continue to support local school districts in their efforts to obtain additional funding sources, including special assessment districts and supplementary state and federal funding.

Proposed Project Applicability: Mitigation Measure 4.8-3b remains the obligation of the City.

4.8-3c The City shall establish and maintain effective joint use agreements with school districts serving the community to achieve optimum, cost-effective use of school facilities.

Proposed Project Applicability: Mitigation Measure 4.8-3c remains the obligation of the City.

4.8-3d The City shall continue to withhold building permits until verification that applicable school fees have been collected by the appropriate school district.

Proposed Project Applicability: Mitigation Measure 4.8-3d remains the obligation of the City.

4.8-3e The City shall collaborate with school districts in designing adjacent school/recreation facilities to achieve maximum usability and cost-effectiveness for both the City and the school districts.

Proposed Project Applicability: Mitigation Measure 4.8-4e remains the obligation of the City.

4.8-3f The City shall collaborate with school districts in expanding educational opportunities and programs that benefit from City facilities.

Proposed Project Applicability: Mitigation Measure 4.8-3f remains the obligation of the City.

4.8-4a As part of future development and infrastructure projects within the Specific Plan Update area, the City shall continue to explore options to provide additional library service, through the Fontana Unified School district (FUSD) joint use agreements and/or City-sponsored facilities using General Fund or other revenue sources.

Proposed Project Applicability: Mitigation Measure 4.8-4a remains the obligation of the City.

Conclusion for Public Services

No new impacts nor substantially more severe public service related impacts would result from the proposed Project. Consistent with the determination of the Approved Project FEIR, impacts related to public services from implementation of the proposed Project would be less than significant with implementation of mitigation measures that were included in the Approved Project FEIR. Thus, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the Approved Project FEIR.

Based on the foregoing, none of the conditions identified in CEQA Guidelines Section 15162 that would trigger the need to evaluate public services in the Subsequent EIR. Thus, public services will not be analyzed in the Subsequent EIR. However, the Approved Project FEIR mitigation measures that are applicable to the proposed Project will be included in the Project MMRP.

	Potentially Significant New Impact	Less Than Significant New Impact with Mitigation Incorporated	Less Than Significant New Impact	No Impact / No New Impact
16. RECREATION.				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☒	☐
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☒	☐

Summary of Impacts Identified in the Approved Project FEIR

The Approved Project FEIR determined that the City currently collects a Park Development fees for residential uses. However, no Park Development fees are collected for commercial, office, or industrial development and that the increased population from the SWIP could result in the need for new and improved recreational facilities. The Approved Project FEIR included mitigation measures from the General Plan EIR to offset the SWIP's related demand for capital improvements to maintain adequate recreation facilities and equipment.

Impacts Related to the Proposed Project

a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that physical deterioration of the facility would be accelerated?

Less Than Significant New Impact.

As described previously, the proposed Project would result in 738 employees. The addition of employees would not directly generate new residents that would use park and recreation facilities. Thus, potential impacts related to recreation would be less than significant, and this topic will not be analyzed in the Subsequent EIR.

b) Require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

Less Than Significant New Impact.

The proposed Project does not include or require the construction or expansion of recreational facilities. No new recreation facilities are included in the proposed Project that, the construction of which could have an adverse physical effect on the environment. Therefore, impacts related to recreation would be less than significant, and this topic will not be analyzed in the Subsequent EIR.

Approved Project FEIR Mitigation Measures

4.8-5a A wide variety of parks and recreation facilities, including regional, community, neighborhood and sub-neighborhood parks, shall be provided throughout the City.

Proposed Project Applicability: Mitigation Measure 4.8-5a remains the obligation of the City.

4.8-5b The design of all parks shall meet the particular needs of the specialized populations they serve, such as seniors, young adults, families, and children.

Proposed Project Applicability: Mitigation Measure 4.8-5b iremains the obligation of the City.

4.8-5c Barrier-free access to all parks shall be provided.

Proposed Project Applicability: Mitigation Measure 4.8-5c remains the obligation of the City.

4.8-5d The park standards for the City shall be two-acres per thousand residents for community parks and three-acres per thousand for neighborhood parks.

Proposed Project Applicability: Mitigation Measure 4.8-5d remains the obligation of the City.

4.8-5e Each park within the City shall provide a variety of activity options for users, including active and passive uses.

Proposed Project Applicability: Mitigation Measure 4.8-5e remains the obligation of the City.

4.8-5f The City shall reevaluate the design of each of its parks as part of the periodic update of its Parks, Recreation, and Trails Master Plan. [GPEIR MM PR-6] 4.8-5g Each park within the City shall be evaluated for safety on a periodic basis.

Proposed Project Applicability: Mitigation Measure 4.8-5f remains the obligation of the City.

Conclusion for Recreation

No new impacts nor substantially more severe recreation related impacts would result from the proposed Project. Consistent with the determination of the Approved Project FEIR, impacts related to recreation from implementation of the proposed Project would be less than significant. Thus, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the Approved Project FEIR.

Based on the foregoing, none of the conditions identified in CEQA Guidelines Section 15162 that would trigger the need to evaluate recreation in the Subsequent EIR. Thus, recreation will not be analyzed in the Subsequent EIR.

	Potentially Significant New Impact	Less Than Significant New Impact with Mitigation Incorporated	Less Than Significant New Impact	No Impact / No New Impact
17. TRANSPORTATION. Would the project:				
a) Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☒	☐	☐	☐
b) Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	☒	☐	☐	☐
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☒	☐
d) Result in inadequate emergency access?	☐	☐	☒	☐

Summary of Impacts Identified in the Approved Project FEIR

The Approved Project FEIR determined that with buildout of the SWIP, a total of 10 deficient roadway segments and 19 deficient intersections would occur. The Approved Project FEIR also determined that upon implementation of Mitigation Measures 4.9-1dd through 4.9-1ll, which include a range of new roadway construction, roadway widenings, signalizations, and intersection improvements, identified facilities would operate at a satisfactory LOS based on agency criteria. However, since the majority of the recommended improvements not funded or outside of the City of Fontana's jurisdiction, implementation of these improvements cannot be assured. As such, impacts were determined to be significant and unavoidable. The Approved Project FEIR also determined that due to compliance with existing safety design standards, as verified through development permitting, the SWIP would not substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or result in impacts related to emergency access.

Impacts Related to the Proposed Project

a) Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?

Potentially Significant New Impact.

The proposed Project would increase the development on the site and increase the vehicular trips in the Project vicinity from construction and operation of the proposed approximately 882,000 SF warehouse facility. The vehicle and truck traffic related to the proposed Project could result in a potentially significant impact new impact on area roadways, including the potential for conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system. A traffic impact analysis will be prepared to assess existing traffic

conditions, forecast project-generated traffic volumes and distribution, and forecast traffic conditions in the Project opening year with and without the proposed Project and with and without cumulative development. Also, description of the existing and planned bicycle, pedestrian, and transit in the Project area will be provided and potential effects will be evaluated. Therefore, potential impacts related to conflicts with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities will be evaluated in the Subsequent EIR. The transportation related mitigation measures from the Approved Project FEIR will be included in the traffic impact analysis and the Subsequent EIR MMRP, as applicable.

b) Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?

Potentially Significant New Impact.

The CEQA Guidelines § 15064.3(b) provides criteria for analyzing transportation impacts. For land use projects, such as the proposed project, CEQA Guidelines § 15064.3(b) states that vehicle miles traveled exceeding an applicable threshold of significance may indicate a significant impact. In addition, it states that the analysis includes evaluation of factors such as the availability of transit, proximity to other destinations, etc. This section also provides guidance on setting thresholds for VMT and methodology for evaluating VMT. Per CEQA Guidelines Section 15064.3(c), the provisions of Section 15064.3 became applicable statewide beginning on July 1, 2020. Thus, at the time the Approved Project FEIR was prepared, in 2012, the requirements related to VMT analysis in EIRs did not exist. Due to the current VMT analysis requirements, the traffic impact analysis will include a VMT analysis that will be summarized in the Subsequent EIR, and mitigation measures will be included as necessary.

c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

Less than Significant New Impact.

The proposed Project does not include circulation features involving sharp curves, dangerous intersections, or other potentially hazardous geometric design features. The proposed Project includes only a warehouse facility. There are no proposed uses that would be incompatible. The development would also not increase any hazards related to a design feature. Operation of the proposed warehouse would involve trucks entering and exiting the site from Hemlock Avenue and Beech Avenue for access to the loading bays and trailer parking via two 50-foot-wide driveways that are designed to accommodate trucks. Passenger vehicles would enter and exit the site using two separate driveways from Hemlock Avenue and Beech Avenue. The onsite circulation design provides fire truck accessibility and turning ability throughout the site. Thus, no impacts related to vehicular circulation design features would occur from the proposed Project, and this topic will not be analyzed further in the Subsequent EIR.

d) Result in inadequate emergency access?

Less than Significant New Impact.

The proposed Project would not result in inadequate emergency access. Direct access to the proposed warehouse development would be provided by two driveway locations along Hemlock Avenue, and two driveway locations along Beech Avenue which are directly adjacent to the east

and west sides of the site. Construction activities would occur within the Project site and would not restrict access of emergency vehicles to the site or adjacent areas. In addition, travel along Hemlock Avenue and Beech Avenue would remain open and would not interfere with emergency access in the site vicinity. The proposed Project is required to design and construct internal access, and size and location of fire suppression facilities (e.g., hydrants and sprinklers) to conform to San Bernardino County Fire Department standards. The San Bernardino County Fire Department would review the development plans prior to approval to ensure adequate emergency access pursuant to the requirements in Section 503 of the California Fire Code (Title 24, California Code of Regulations, Part 9). As such, the proposed Project would not result in inadequate access, and impacts would be less than significant, and this topic will not be analyzed further in the Subsequent EIR.

Approved Project FEIR Mitigation Measures

4.9-1a Mulberry Avenue – Consistent with City of Fontana Circulation Master Plan, construct Mulberry Avenue connection from Slover Avenue to Valley Boulevard over I-10 freeway. This improvement is identified to provide additional north-south capacity, reducing forecast traffic on Etiwanda Avenue and Cherry Avenue.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1a will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1b Beech Avenue – Consistent with City of Fontana Circulation Master Plan, construct Beech Avenue from Slover Avenue to Valley Boulevard including an interchange with I-10. This improvement is consistent with City of Fontana Circulation Master Plan. This improvement is identified to provide additional north-south capacity and freeway access, reducing forecast traffic on Cherry Avenue and Citrus Avenue.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1b will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1c Jurupa Street between Etiwanda Avenue and Mulberry Avenue – Consistent with the City of Fontana Circulation Master Plan, widen the study roadway segment from a 4-lane divided roadway segment to a 6-lane divided roadway segment. This improvement is included in the City of Fontana 7-Year Capital Improvement Program but is not yet fully funded.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1c will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1d Mulberry Avenue between Slover Avenue and Jurupa Avenue – Consistent with the City of Fontana Circulation Master Plan, widen the study roadway segment from a 2-lane undivided roadway segment to a 4-lane undivided roadway segment.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1d will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1e Jurupa Street between Mulberry Avenue and Cherry Avenue – Consistent with the City of Fontana Circulation Master Plan, widen the study roadway segment from a 4-lane

divided roadway to a 6-lane divided roadway. This improvement is included in the City of Fontana 7-Year Capital Improvement Program but is not yet fully funded.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1e will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1f Beech Avenue between Slover Avenue and Jurupa Street – Consistent with the City of Fontana Circulation Master Plan, widen the study roadway segment from a 2-lane divided roadway to a 4-lane divided roadway.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1f will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1g Citrus Avenue between I-10 Eastbound Ramps and Santa Ana Avenue – Consistent with the City of Fontana Circulation Master Plan, widen the study roadway segment from a 2-lane undivided roadway segment to a 4-lane undivided roadway segment.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1g will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1h Citrus Avenue between Santa Ana Avenue and Jurupa Street – Consistent with the City of Fontana Circulation Master Plan, widen the study roadway segment from a 2-lane undivided roadway segment to a 4-lane undivided roadway segment.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1h will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1i Etiwanda Avenue/San Bernardino Avenue – Widen the northbound Etiwanda Avenue approach from two left-turn lanes, two through lanes, and one right-turn lane to consist of two left-turn lanes, three through lanes, and one right-turn lane. Widen the westbound San Bernardino Avenue approach from two left-turn lanes, one through lane, and one shared through/right-turn lane to consist of two left-turn lanes, two through lanes, and one right-turn lane. Additionally, modify the westbound San Bernardino Avenue signal phasing to include a westbound right-turn overlap, which will preclude U-turn movement from southbound to northbound Etiwanda Avenue.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1i will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1j Etiwanda Avenue/East Airport Drive-Slover Avenue – Widen the northbound Etiwanda Avenue approach from one left-turn lane, one through lane, and one shared through/right-turn lane to consist of two left-turn lanes, one through lane, and one shared through/right-turn lane. Widen the southbound Etiwanda Avenue approach from one left-turn lane, one through lane, and one shared through/right-turn lane to consist of two left-turn lanes, one through lane, and one shared through/right-turn lane. Widen the westbound Slover Avenue approach from one left-turn lane, one through lane, and one shared through/right-turn lane to consist of one left-turn lane, two through lanes, and two right-turn lanes.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1j will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1k Etiwanda Avenue/Jurupa Street – Widen the eastbound Jurupa Street approach from two left-turn lanes, two through lanes, and one right-turn lane to consist of two left-turn lanes, three through lanes, and one right-turn lane. Widen the westbound Jurupa Street approach from two left-turn lanes, two through lanes, and one right-turn lane to consist of two left-turn lanes, three through lanes, and one right-turn lane.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1k will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1l Mulberry Avenue/Slover Avenue – In concert with construction of the extension of Mulberry Avenue north of Slover Avenue, widen the northbound Mulberry Avenue approach from one left-turn lane and one right-turn lane to consist of one left-turn lane, two through lanes, and one right-turn lane. Construct and stripe the southbound Mulberry Avenue approach to consist of one left-turn lane, two through lanes, and one right-turn lane. Widen the eastbound Slover Avenue approach from two through lanes and one shared through/right-turn lane to consist of one left-turn lane, two through lanes, and one shared through/right-turn lane. Widen the westbound Slover Avenue approach from one left-turn lane and two through lanes to consist of one left-turn lane, two through lanes, and one right-turn lane. Additionally, modify the signal phasing to consist of protected left-turn phasing.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1l will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1m Mulberry Avenue/Santa Ana Avenue – Widen the northbound Mulberry Avenue approach from one left-turn lane, one through lane, and one right-turn lane to consist of one left-turn lane, two through lanes, and one right-turn lane. Re-stripe the eastbound Santa Ana Avenue approach from one shared left-turn/through lane and one right-turn lane to consist of one left-turn lane and one shared through/right-turn lane. Widen the westbound Santa Ana Avenue approach from one shared left-turn/ through/right-turn lane to consist of one left-turn lane, one through lane, and one shared through/right-turn lane. Additionally, modify the east-west signal phasing from permitted left-turns to protected left-turns.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1m will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1n Mulberry Avenue/Jurupa Street – Modify the northbound Mulberry Avenue signal phasing to include a northbound right-turn overlap, which will preclude U-turn movement from westbound to eastbound Jurupa Street. Widen the southbound Mulberry Avenue approach from one left-turn lane, two through lanes, and one right-turn lane to consist of two left-turn lanes, two through lanes, and one right-turn lane. Additionally, modify the southbound Mulberry Avenue signal phasing to include a southbound right-turn overlap, which will preclude U-turn movement from eastbound to westbound Jurupa Avenue. Widen the eastbound Jurupa Street approach from one left-turn lane, two

through lanes, and one right-turn lane to consist of two left-turn lanes, three through lanes, and one right-turn lane. Widen the westbound Jurupa Avenue approach from one left-turn lane, two through lanes, and one right-turn lane to consist of two left-turn lanes, three through lanes, and one right-turn lane.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1n will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1o Banana Avenue/Valley Boulevard – Signalize the Banana Avenue/Valley Boulevard intersection. According to the City of Fontana, the Banana Avenue/Valley Boulevard satisfies traffic signal warrants and is in the pre-construction phase.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1o will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1p Cherry Avenue/Valley Boulevard – Widen the northbound Cherry Avenue approach from one left-turn lane, two through lanes, and one defacto right-turn lane to consist of one left-turn lane, three through lanes, and one right-turn lane. Widen the southbound Cherry Avenue approach from one left-turn lane, two through lanes, and one right-turn lane to consist of one left-turn lane, three through lanes, and one right-turn lane. Widen the westbound Valley Boulevard approach from one left-turn lane, two through lanes, and one right-turn lane to consist of two left-turn lanes, two through lanes, and one right-turn lane.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1p will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1q Cherry Avenue/Slover Avenue – Widen the northbound Cherry Avenue approach from one left-turn lane, two through lanes, and one right-turn lane to consist of one left-turn lane, four through lanes and one right-turn lane. Widen the southbound Cherry Avenue approach from one left-turn lane, one through lane, and one shared through/right-turn lane to consist of two left-turn lanes, four through lanes, and two right-turn lanes. Widen the eastbound Slover Avenue approach from one left-turn lane, two through lanes, and one defacto right-turn lane to consist of two left-turn lanes, three through lanes, and one right-turn lane. Widen the westbound Slover Avenue approach from one left-turn lane, two through lanes, and one right-turn lane to consist of two left-turn lanes, three through lanes, and two right-turn lanes.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1q will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1r Cherry Avenue/Jurupa Street – Widen the northbound Cherry Avenue approach from two left-turn lanes, two through lanes, and one right-turn lane to consist of two left-turn lanes, three through lanes, and one right-turn lane. Widen the southbound Cherry Avenue approach from two left-turn lanes, two through lanes, and one right-turn lane to consist of two left-turn lanes, three through lanes, and two right-turn lanes. Widen the eastbound Jurupa Avenue approach from two left-turn lanes, two through lanes, and one shared through/right-turn lane to consist of two left-turn lanes, three through lanes, and one right-turn lane. Widen the westbound Jurupa Street approach from two left-

turn lanes, two through lanes, and one right-turn lane to consist of two left-turn lanes, three through lanes, and one right-turn lane.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1r will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1s Beech Avenue/Valley Boulevard – Signalize the Beech Avenue/Valley Boulevard intersection. Widen the northbound Beech Avenue approach from one shared left-turn/ through lane and one right-turn lane to consist of one left-turn lane, one through lane, and one shared through/right-turn lane. Widen the southbound Beech Avenue approach from one shared left-turn/through lane and one right-turn lane to consist of one left-turn lane, two through lanes, and one right-turn lane.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1s will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1t Beech Avenue/Slover Avenue – Signalize the Beech Avenue/Slover Avenue intersection. Widen the northbound Beech Avenue approach from one shared left-turn/through/right-turn lane to consist of one left-turn lane, two through lanes, and one right-turn lane. Widen the southbound Beech Avenue approach from one shared left-turn/through/right-turn lane to consist of one left-turn lane, two through lanes, and one right-turn lane. Widen the eastbound Slover Avenue approach from one left-turn lane, one through lane, and one shared through/right-turn lane to consist of two left-turn lanes, three through lanes, and one right-turn lane. Widen the westbound Slover Avenue approach from one left-turn lane, one through lane, and one shared through/right-turn lane to consist of one left-turn lane, three through lanes, and one right-turn lane.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1t will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1u Beech Avenue/Santa Ana Avenue – Signalize the Beech Avenue/Santa Ana Avenue intersection.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1u will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1v Beech Avenue/Jurupa Street – Signalize the Beech Avenue/Jurupa Street intersection. Widen the eastbound Jurupa Street approach from one shared left-turn/through lane and one shared through/right-turn lane to consist of one left-turn lane, two through lanes, and one right-turn lane. Widen the westbound Jurupa Street approach from one shared left-turn/through/right-turn lane to consist of one left-turn lane, two through lanes, and one right-turn lane.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1v will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1w Citrus Avenue/Valley Boulevard – Widen the northbound Citrus Avenue approach from one left-turn lane, one through lane, and one shared through/right-turn lane to consist

of two left-turn lanes, one through lane, and one shared through/right-turn lane. Widen the southbound Citrus Avenue approach from one left-turn lane, one through lane, and one shared through/right-turn lane to consist of one left-turn lane, two through lanes, and one right-turn lane. Widen the eastbound Valley Boulevard approach from two left-turn lanes, one through lane, and one shared through/right-turn lane to consist of two left-turn lanes, two through lanes, and two right-turn lanes.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1w will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1x Citrus Avenue/Slover Avenue – Widen the northbound Citrus Avenue approach from one left-turn lane and one shared through/right-turn lane to consist of one left-turn lane, two through lanes, and one right-turn lane. Widen the southbound Citrus Avenue approach from one left-turn lane, one through lane, and one right-turn lane to consist of one left-turn lane, two through lanes, and two right-turn lanes. Widen the eastbound Slover Avenue approach from one left-turn lane, two through lanes, and one defacto right-turn lane to consist of two left-turn lanes, three through lanes, and one right-turn lane. Widen the westbound Slover Avenue approach from one left-turn lane, one through lane, and one shared through/right-turn lane to consist of one left-turn lane, three through lanes, and one right-turn lane.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1x will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1y Citrus Avenue/Santa Ana Avenue – Signalize the Citrus Avenue/Santa Ana Avenue intersection. Widen the northbound Citrus Avenue approach from one shared left-turn/through/right-turn lane to consist of one left-turn lane and one shared through/right-turn lane. Widen the southbound Citrus Avenue approach from one shared left-turn/through/right-turn lane to consist of one left-turn lane and one shared through/right-turn lane. Widen the eastbound Santa Ana Avenue approach from one shared left-turn/through/right-turn lane to consist of one left-turn lane and one shared through/right-turn lane. Re-stripe the westbound Santa Ana Avenue approach from one shared left-turn/through lane and one right-turn lane to consist of one left-turn lane and one shared through/right-turn lane.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1y will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1z Citrus Avenue/Jurupa Street – Signalize the Citrus Avenue/Jurupa Street intersection. Widen the southbound Citrus Avenue approach from one left-turn lane and one shared through/right-turn lane to consist of one left-turn lane, one through lane, and one shared through/right-turn lane. Widen the eastbound Jurupa Street approach from one left-turn lane, two through lanes, and one shared through/right-turn lane to consist of one left-turn lane, three through lanes, and one right-turn lane. Widen the westbound Jurupa Street approach from one left-turn lane, one through lane, and one shared through/right-turn lane to consist of one left-turn lane, three through lanes, and one right-turn lane.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1z will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1aa Sierra Avenue/Slover Avenue – Widen the eastbound Slover Avenue approach from two left-turn lanes, two through lanes, and one right-turn lane to consist of two left-turn lanes, three through lanes, and one right-turn lane.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1aa will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1bb Sierra Avenue/Jurupa Street – Widen the southbound Sierra Avenue approach from two left-turn lanes, two through lanes, and one right-turn lane to consist of two left-turn lane, two through lanes, and two right-turn lanes. Widen the eastbound Jurupa Street approach from one left-turn lane, one shared left-turn/through lane, one through lane, and one right-turn lane to consist of two left-turn lanes, two through lanes, and one right-turn lane. Widen the westbound Jurupa Street approach from one left-turn lane, one through lane, and one right-turn lane to consist of one left-turn lane, three through lanes, and one right-turn lane. Improvements have recently been constructed at this intersection satisfying the lane configuration recommended.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1bb will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1cc Armstrong Road/SR-60 Eastbound Ramps – Contribute towards preparation of a Project Study Report to improve operations, circulation, and access at the Armstrong Road/SR-60 interchange.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1cc will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

Forecast Year 2030 with Approved Project Conditions

4.9-1dd Cypress Avenue – Consistent with City of Fontana Circulation Master Plan, construct Cypress Avenue from Slover Avenue to Valley Boulevard over I-10 freeway. This improvement is consistent with City of Fontana Circulation Master Plan. This improvement is identified to provide additional north-south capacity, reducing forecast traffic on Cherry Avenue and Citrus Avenue.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1dd will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1ee Country Village Road between Philadelphia Avenue and SR-60 Westbound Ramps – Consistent with the County of Riverside Circulation Master Plan, widen the study roadway segment from a 4-lane undivided roadway segment to a 6-lane divided roadway segment. Since this improvement is within the jurisdiction of the recently incorporated City of Jurupa Valley, implementation by the City of Fontana cannot be assured. Therefore, this improvement shall be included in the planning and collection of

fees and coordination with the appropriate lead agency shall occur to administer the improvement.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1ee will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1ff San Bernardino Avenue between Cherry Avenue and Fontana Avenue – Consistent with the City of Fontana Circulation Master Plan, widen the study roadway segment from a 2-lane divided roadway to a 4-lane divided roadway. Since this improvement is within the jurisdiction of the County of San Bernardino, implementation by the City of Fontana cannot be assured. Therefore, this improvement shall be included in the planning and collection of fees and coordination with the appropriate lead agency shall occur to administer the improvement.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1ff will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1gg Jurupa Street between Cherry Avenue and Citrus Avenue – Consistent with the City of Fontana Circulation Master Plan, widen the study roadway segment from a 5-lane divided roadway to a 6-lane divided roadway. A portion of this improvement has recently been implemented by the City of Fontana providing the capacity for a 6-lane roadway between Poplar Avenue and Citrus Avenue.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1gg will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1hh Jurupa Street between Citrus Avenue and Sierra Avenue – Consistent with the City of Fontana Circulation Master Plan, widen the study roadway segment from a 5-lane divided roadway to a 6-lane divided roadway. This improvement has recently been implemented by the City of Fontana providing the capacity for a 6-lane roadway between Citrus Avenue and Sierra Avenue.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1hh will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1ii I-15 Southbound Ramps/Jurupa Street – Widen the southbound I-15 Southbound Off-Ramp from one left-turn lane, one shared left-turn/through/right-turn lane, and one right-turn lane to consist of two left-turn lanes, one through lane, and one right-turn lane.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1ii will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1jj Commerce Way/Ontario Mills Parkway – Widen the northbound Commerce Way approach from two left-turn lanes, one through lane, and one right-turn lane.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1jj will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1kk Cherry Avenue/San Bernardino Avenue – Widen the eastbound San Bernardino Avenue approach from one left-turn lane, two through lanes, and one right-turn lane to consist of two left-turn lanes, two through lanes, and one right-turn lane.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1kk will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1ll Cherry Avenue/Santa Ana Avenue – Widen the southbound Cherry Avenue approach from one left-turn lane, two through lanes, and one shared through/right-turn lane to consist of one left-turn lane, three through lanes, and one right-turn lane.

Proposed Project Applicability: The applicability of Mitigation Measure 4.9-1ll will be determined as part of the traffic study that will be prepared and included in the Subsequent EIR.

4.9-1mm Prior to issuance of a grading permit, applicants for future development associated with the proposed project shall prepare site-specific traffic studies, to the satisfaction of the City's Engineering Department. As determined by these subsequent traffic studies, traffic improvements identified as mitigation measures in this Program EIR shall be implemented as a condition of the approved future development project, either through direct construction by the project applicant and/or through development impact fees.

Proposed Project Applicability: Mitigation Measure 4.9-1mm is applicable to the proposed Project. A site-specific traffic study will be prepared as part of the Subsequent EIR, and any required improvements would be implemented as a Condition of Approval and included the Project MMRP.

4.9-1nn The City of Fontana shall perform monitoring of traffic generation and phasing of development within the project area to defer or eliminate identified improvements due to potential circulation impact changes or reduced land use intensities. This monitoring shall be achieved through project-specific traffic studies tied to future development within the Specific Plan Update area with land use in excess of 100,000 square feet of non-residential land use

Proposed Project Applicability: Mitigation Measure 4.9-1nn is applicable to the proposed Project. A site-specific traffic study will be prepared as part of the Subsequent EIR and will include traffic counts to monitor the trip generation at or near the Project site, as directed by the City Traffic Engineering Division.

Conclusion for Transportation

As detailed previously, it is possible that new or substantially more severe transportation related impacts could result from the proposed Project than were identified in the Approved Project FEIR. Thus, conditions identified in CEQA Guidelines Section 15162 related to changes to the Project that require major revisions of the Approved Project FEIR due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified effects could occur and would trigger the need to evaluate potential transportation related impacts in the Subsequent EIR. Thus, transportation will be analyzed in the Subsequent EIR.

	Potentially Significant New Impact	Less Than Significant New Impact with Mitigation Incorporated	Less Than Significant New Impact	No Impact / No New Impact
18. TRIBAL CULTURAL RESOURCES.				
Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)?	☐	☐	☐	☒
b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?	☒	☐	☐	☐

Summary of Impacts Identified in the Approved Project FEIR

The Approved Project FEIR does not include a specific evaluation related to Tribal Cultural Resources; however, the EIR determined that ground disturbing construction activities within the SWIP area could have a significant impact on archaeological resources and protection related to tribal cultural resources was provided in the Approved Project FEIR mitigation measures that were included to reduce potential impacts to a less than significant level.

The EIR also describes that no known human remains, or Native American cultural resources have been identified within the SWIP area. However, mitigation was included to reduce potential impacts to a less than significant level that requires cessation of ground-disturbing activity and consultation with the County Coroner and Native American tribes in the event human remains are encountered during construction activities.

Impacts Related to the Proposed Project

a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)?

No New Impact.

There are no historic resources within the Project site, and no impacts related to historic resources as defined in Public Resources Code section 5020.1(k) would occur from implementation of the Project.

The Phase I Environmental Site Assessment and Limited Subsurface Investigation (Appendix B) describes that the Project site was first developed with residential and agricultural uses from the 1920s through the 1940s, undeveloped or used for agriculture between the 1940s and 1980s; developed with a truck/transport and construction company on the northwest corner in the early 1990s; and developed with the current structures and modular unit storage yard in 2000. There are no historic resources on the Project site, and impacts would not occur. This topic will not be further evaluated in the Subsequent EIR.

b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?

Potentially Significant New Impact.

Tribal cultural resources are sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either eligible or listed in the California Register of Historical Resources or local register of historical resources (Public Resources Code § 21074).

In order to determine whether any tribal cultural resources could be impacted by the proposed Project, California Native American tribes that are traditionally and culturally affiliated to the SWIP area will be contacted (Public Resources Code § 21080.3.1), and consultation undertaken with those Native American tribes that express an interest in engaging in consultation pursuant to Assembly Bill 52. In addition to tribal consultation, the Project shall consider the requests by the Soboba Band of Luiseño Indians and Morongo Band of Mission Indians per Approved Project FEIR Mitigation Measure 4.4-2c, as listed below. The Subsequent EIR will evaluate potential impacts of the proposed Project on tribal cultural resources, and additional mitigation measures will be provided if needed.

Approved Project FEIR Mitigation Measures

Mitigation Measures 4.4-1b and 4.4-2b. As listed in Section 5, *Cultural Resources*.

4.4-2c Where consistent with applicable local, State and federal law and deemed appropriate by the City, future site-specific development projects shall consider the following requests by the Soboba Band of Luiseño Indians, Morongo Band of Mission Indians and/or other tribes as appropriate:

- In the event Native American cultural resources are discovered during construction for future development, all work in the immediate vicinity of the find shall cease and a qualified archaeologist meeting Secretary of Interior standards shall be hired to assess the find. Work on the overall Project may continue during this period;

- Initiate consultation between the appropriate Native American tribal entity (as determined by a qualified archaeologist meeting Secretary of Interior standards) and the City/Project Applicant;
- Transfer cultural resources investigations to the appropriate Native American entity (as determined by a qualified archaeologist meeting Secretary of Interior standards) as soon as possible;
- Utilize a Native American Monitor from the appropriate Native American entity (as determined by a qualified archaeologist meeting Secretary of Interior standards) where deemed appropriate or required by the City, during initial ground-disturbing activities, cultural resource surveys, and/or cultural resource excavations.

Proposed Project Applicability: Mitigation Measure 4.4-2c is applicable to the proposed Project and will be included the Project MMRP.

Conclusion for Tribal Cultural Resources

Pursuant to the requirements of AB 52, tribal consultation will be completed as part of the Subsequent EIR. Thus, tribal cultural resource related impacts will be analyzed in the Subsequent EIR. In addition, the applicable mitigation measures from the Approved Project FEIR would be included in the Project MMRP.

	Potentially Significant New Impact	Less Than Significant New Impact with Mitigation Incorporated	Less Than Significant New Impact	No Impact / No New Impact
19. UTILITIES AND SERVICE SYSTEMS. Would the project:				
a) Require or result in the relocation or construction of new or expanded water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☐	☒	☐
c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☒	☐
d) Generate solid waste in excess of State or local standards or in excess of the capacity of local infrastructure or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☒	☐
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☐	☒

Summary of Impacts Identified in the Approved Project FEIR

Water Infrastructure. The Approved Project FEIR describes that existing distribution capacity may be sufficient for buildout of the SWIP and that several planned distribution improvements by either IEUA and/or City of Fontana would assist in accommodating increased conveyance demand within the area. In addition, each project would be reviewed to ensure that adequate water conveyance infrastructure exists, and impacts related to water distribution capacity were determined to be less than significant.

Wastewater Infrastructure. The Approved Project FEIR describes that existing wastewater conveyance capacity may be sufficient for buildout of the SWIP; however, new conveyance facilities would be needed in annexation areas, and would be determined per each development project. The Approved Project FEIR also describes that wastewater generated in the City of Fontana is handled at IEUA's Regional Plant 1 in Ontario that processes approximately 36 million GPD of sewage, has a capacity of 44 million gallons per day (MGD), leaving a surplus capacity of approximately 8 MGD.

Water Supplies. The Approved Project FEIR describes that a Water Supply Assessment was prepared to evaluate water supply with the demand for water that would be generated by the

Project, which determined that existing and future water entitlements from groundwater, surface, and imported sources in addition to recycling and conservation will be sufficient to meet the project's demand at buildout, in addition to forecast demand for the entire service area. The Approved Project FEIR included mitigation measures from the General Plan and determined that impact would be less than significant.

Solid Waste. The Approved Project FEIR describes that future development in the SWIP area would be served by a landfill with sufficient permitted capacity to accommodate the solid waste disposal needs. In addition, the proposed Project would be in compliance with all State and local requirements related to solid waste. Thus, impacts in this regard would be less than significant with mitigation incorporated.

Impacts Related to the Proposed Project

a) Require or result in the relocation or construction of new or expanded water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

Less Than Significant New Impact.

The proposed Project would install new water and sewer infrastructure on the site and connect to the existing 10-inch water line and 8-inch sewer line within Hemlock Avenue and the existing 12-inch water and sewer lines within Beech Avenue. New or expanded off-site water and wastewater infrastructure would not be required be constructed to serve the proposed Project. Thus, impacts would be less than significant, and this topic will not be further evaluated in the Subsequent EIR.

b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?

Less Than Significant New Impact.

The Fontana Water Company that supplies water to the SWIP area has prepared a 2020 Urban Water Management Plan (UWMP) that projects water demand based upon General Plan and SWIP land uses. The total demand was compared to available water supplies for normal, single-dry, and multiple-dry years, and the 2020 UWMP determined that adequate water supplies are available to meet the projected demand in all scenarios.

Because the site's proposed use is consistent with the existing land use designation, and the proposed 882,000 SF building (0.543 FAR) is below the allowable FAR of 0.80 that would provide for a 1,394,268.4 SF of building space, the Project's water demand projection is included in the UWMP, which determined that the Fontana Water Company would have sufficient water supplies to serve the service area during normal, dry and multiple dry years through 2045. Also, a Water Supply Assessment is required for the Project to confirm that the water supplies needed for the Project are within those available pursuant to the UWMP. Therefore, no new impacts related to water demand would result from the proposed Project. Impacts would be less than significant, and this topic will not be further evaluated in the Subsequent EIR.

c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

Less than Significant New Impact.

As described in the previous response, the proposed 882,008 SF building (with a FAR of 0.543) is below the allowable FAR of 0.80 that would provide for a 1,394,268.4 SF of building space, the Project's wastewater demand is included in the wastewater facility planning and projections. The City's Sewer Master Plan (2000) identifies a sewage flow generation factor of 10.76 gallons per acre per day. Based on this, the proposed Project would result in 430.5 gallons per day.

The permitted capacity of the IEUA Regional Plant 1 in Ontario is 44 million gallons per day (mgd) with average sewage flows of 28 mgd. The increase of 430.5 gallons per day would be well within the available capacity of the Fontana WWTP. Thus, impacts would be less than significant, and this issue will not be evaluated further in the Subsequent EIR.

d) Generate solid waste in excess of State or local standards or in excess of the capacity of local infrastructure or otherwise impair the attainment of solid waste reduction goals?

Less Than Significant New Impact.

In 2019, a majority (70 percent) of the solid waste from the City of Fontana that was disposed of in landfills, went to the Mid-Valley Sanitary Landfill. The Mid-Valley Sanitary Landfill is permitted to accept 7,500 tons per day of solid waste and is permitted to operate through March 2045. In September 2022, the facility received a peak tonnage of 4,253.49 tons and in October 2022, the facility received a peak tonnage of 4,380.60 tons. Thus, the facility had additional capacity of 3,119.4 tons per day. Therefore, the landfill would be able to accommodate the addition of solid waste from buildout of the proposed Project. Thus, impacts related to solid waste generation and landfill capacity would be less than significant, and this topic would not be further analyzed in the Subsequent EIR.

e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

No New Impact.

The proposed Project would result in new development that would generate an increased amount of solid waste as described in the previous response. All solid waste-generating activities within the City is subject to the requirements set forth in Section 5.408.1 of the California Green Building Standards Code that requires demolition and construction activities to recycle or reuse a minimum of 65 percent of the nonhazardous construction and demolition waste, and AB 341 that requires diversion of a minimum of 75 percent of operational solid waste. Implementation of the proposed Project would be consistent with all state regulations, as ensured through the City's development project permitting process. Therefore, the proposed Project would comply with all solid waste statute and regulations; and impacts would not occur. Impacts related to solid waste regulations will not be evaluated further in the Subsequent EIR.

Approved Project FEIR Mitigation Measure

4.8-8a The City shall maintain its current Master Plan of Sewers as the basis for development of a sewer system to serve the community.

Proposed Project Applicability: Mitigation Measure 4.8-8a remains an obligation of the City.

4.8-8b The City shall design and operate its local and trunk sewer system in close collaboration with the Inland Empire Utilities Agency (IEUA).

Proposed Project Applicability: Mitigation Measure 4.8-8b remains an obligation of the City.

4.8-8c The City shall establish and maintain an aggressive water recycling program.

Proposed Project Applicability: Mitigation Measure 4.8-8c remains an obligation of the City.

4.8-8d The City shall devote sufficient financial support for wastewater system maintenance so that current levels of service, health, and safety are sustained or improved.

Proposed Project Applicability: Mitigation Measure 4.8-8d remains an obligation of the City.

4.8-7a The City shall work closely with water supply agencies to assure the continued supply of water.

Proposed Project Applicability: Mitigation Measure 4.8-7a remains an obligation of the City.

4.8-7b The City shall act to conserve water in whatever cost-effective ways are reasonably available.

Proposed Project Applicability: Mitigation Measure 4.8-7b remains an obligation of the City.

4.8-7c The City shall manage urban runoff to minimize water supply contamination.

Proposed Project Applicability: Mitigation Measure 4.8-7c is applicable to the proposed Project. As detailed in Section 10, Hydrology and Water Quality, the Project would implement an SWPPP during construction and a WQMP during operations that would manage and minimize water contamination through BMPs that include two underground infiltration basins that would be installed on site to filter runoff and minimize water supply contamination.

4.8-7d The City shall collaborate with water management authorities to devise and implement creative and cost-effective water management strategies.

Proposed Project Applicability: Mitigation Measure 4.8-7d remains an obligation of the City. The Project would provide appropriate funding for water management via connection fees and service fees.

4.8-7e The City shall provide educational material to its residents and businesses regarding the critical necessity for careful use of water and management of water systems.

Proposed Project Applicability: Mitigation Measure 4.8-7e i remains an obligation of the City.

4.8-9a The City shall continue to maintain a contractual arrangement that achieves maximum recycling rates at a reasonable price.

Proposed Project Applicability: Mitigation Measure 4.8-9a is not applicable to the proposed Project because the Project does not involve provisions of, or contracting for, recycling services.

4.8-9b Where joint programs offer improvement efficiency or reduced cost, the City shall collaborate with other entities in recycling efforts.

Proposed Project Applicability: Mitigation Measure 4.8-9b remains an obligation of the City. The Project would have onsite recycling bins and solid waste services that would implement existing recycle and diversion requirements, consistent with other properties within the City.

4.8-9c The City shall continue to provide services to resident and business citizens that facilitate community cleanup, curbside collections and diversion of oil and other hazardous waste materials.

Proposed Project Applicability: Mitigation Measure 4.8-9c remains an obligation of the City . Any hazardous waste on the site would be disposed of consistent with existing regulations, as detailed in Section 9.0, *Hazards and Hazardous Materials*.

4.8-9d The City should maintain an aggressive public information program to stimulate waste reduction by its resident and business citizens.

Proposed Project Applicability: Mitigation Measure 4.8-9d remains an obligation of the City. The Project would have onsite recycling bins and the solid waste service provider would provide recycling services, consistent with other properties within the City.

Conclusion for Utilities and Service Systems

No new impacts nor substantially more severe utility and service systems related impacts would result from the proposed Project. Consistent with the determination of the Approved Project FEIR, impacts related to utility and service systems from implementation of the proposed Project would be less than significant with implementation of the mitigation measures that were included in the Approved Project FEIR. Thus, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the Approved Project FEIR.

Based on the foregoing, none of the conditions identified in CEQA Guidelines Section 15162 that would trigger the need to evaluate utility and service systems in the Subsequent EIR. Thus, utility and service systems will not be analyzed in the Subsequent EIR. However, the Approved Project FEIR mitigation measures are applicable to the proposed Project will be included in the Project MMRP.

	Potentially Significant New Impact	Less Than Significant New Impact with Mitigation Incorporated	Less Than Significant New Impact	No Impact / No New Impact
20. WILDFIRES. If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:				
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☐	☐	☒
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☐	☐	☒
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	☐	☒

Summary of Impacts Identified in the Approved Project FEIR

The SWIP Specific Plan Update area is located within an urbanized area and is surrounded by development on all sides; it is not located adjacent to wildlands that may increase the risk of wildland fires. Furthermore, future development in the SWIP area would be subject to all applicable standards and regulations related to fire protection and prevention, and it was determined that impacts related to wildland fire hazards would be less than significant.

Impacts Related to the Proposed Project

a) Substantially impair an adopted emergency response plan or emergency evacuation plan?

No New Impact. According to the CalFire Fire Hazard Severity Zone map, the Project site is not within an area identified as a Fire Hazard Area. In addition, the proposed Project would not substantially impair an adopted emergency response plan or emergency evacuation plan. The Project site is adjacent to roadways, and the site is not adjacent to or in the vicinity of wildlands. Therefore, the proposed Project would not impair an adopted emergency response plan or emergency evacuation plan within or near a very high fire hazard severity zone. Wildfire risks will not be further evaluated in the Subsequent EIR.

b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

No New Impact. As described in the previous response, the Project site is not within a High Fire Hazard Severity Zone. The Project site is flat and does not generally have prevailing winds or other factors that could exacerbate fire risks. The proposed Project would not result in exposure of persons to pollutant concentrations from a wildfire. Thus, impacts will not be further evaluated in the Subsequent EIR.

c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?

No New Impact. As described in the previous responses, the Project site is not within a High Fire Hazard Severity Zone, and the proposed Project does not include infrastructure that could exacerbate fire risks. The proposed warehouse development would connect to the existing utility infrastructure that is adjacent to the site. Thus, no new impacts would result, and wildfire risks will not be further evaluated in the Subsequent EIR.

d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?

No New Impact. As described in the previous responses, the Project site is not within a High Fire Hazard Severity Zone. In addition, the Project site is generally flat area and does not contain or is adjacent to large slopes, and the proposed Project would not generate large slopes. Furthermore, the proposed Project installation of drainage facilities. Thus, the Project would not result in risks related to wildfires or risks related to downslope or downstream flooding or landslides after wildfires. Thus, wildfire risks will not be further evaluated in the Subsequent EIR.

Approved Project FEIR Mitigation Measures

None.

Conclusion for Wildfires

No new impacts nor substantially more severe wildfire related impacts would result from the proposed Project. Consistent with the determination of the Approved Project FEIR, impacts related to wildfires from implementation of the proposed Project would not occur. Thus, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the Approved Project FEIR.

Based on the foregoing, none of the conditions identified in CEQA Guidelines Section 15162 that would trigger the need to evaluate wildfires in the Subsequent EIR. Thus, wildfires will not be analyzed in the Subsequent EIR.

21. MANDATORY FINDINGS OF SIGNIFICANCE.	**Potentially Significant New Impact**	**Less Than Significant New Impact with Mitigation Incorporated**	**Less Than Significant New Impact**	**No Impact / No New Impact**
a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☒	☐	☐	☐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☒	☐	☐	☐

Summary of Impacts Identified in the Approved Project FEIR

As detailed in previous response, the Approved Project FEIR determined that buildout of the SWIP would have the potential to degrade the quality of habitat for sensitive species and eliminate example of California history or prehistory. The Approved Project FEIR also determined that the impacts have the potential to be cumulatively considerable and have adverse impacts on human beings. Therefore, the Approved Project FEIR included various mitigation measures as listed previously to reduce potential impacts to the extent feasible. However, the Approved Project FEIR determined that buildout of the SWIP would result the following significant and unavoidable impacts after implementation of feasible mitigation:

- Aesthetics (project-level and cumulative scenic vistas);
- Air Quality (project-level and cumulative construction and regional operational emissions, and air quality management plan consistency)
- Noise (Long-Term and cumulative mobile noise)
- Public Services and Utilities (parks/recreation)
- Traffic and Circulation (project-level and cumulative increased traffic volumes)

Impacts Related to the Proposed Project

a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered

plant or animal or eliminate important examples of the major periods of California history or prehistory?

Potentially Significant New Impact with Mitigation Incorporated.

As detailed in Section 4, *Biological Resources*, the Project site is completely disturbed and paved with asphalt or gravel covered with limited areas of ornamental landscaping. The site is used for light industrial uses that include leasing, storage, and refurbishing of modular trailers, offices, and storage bins. The site does not include any natural areas for sensitive species. No suitable habitat for any sensitive species occurs due to the developed nature of the site and ongoing site disturbances related to existing urban uses. Although a limited number of trees exist on the site, consistent with the direction of the Approved Project FEIR, Mitigation Measures 4.3-1b and 4.3-1c would be implemented to require nesting bird surveys occur prior to vegetation removal during nesting season, and impacts would be less than significant. No further evaluation in the Subsequent EIR is required.

Also as described in, Section 5, *Cultural Resources*, the Cultural Resources Study (Appendix A) describes that the Project site does not include any historical resources. It has been cleared and graded since the 1950s, and that based upon the documentation of past ground disturbance, there is little potential for cultural resources to be present/disturbed by the proposed Project. In addition, mitigation measures from the Approved Project FEIR would be applied to the Project to ensure that impacts related to archaeological resources would be less than significant. This topic will not be further evaluated in the Subsequent EIR.

b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?

Potentially Significant New Impact.

Cumulative impacts are defined as two or more individual effects that, when considered together, are considerable or that compound or increase other environmental impacts. The cumulative impact from several projects is the change in the environment that results from the incremental impact of the development when added to the impacts of other closely related past, present, and reasonably foreseeable or probable future developments. Cumulative impacts can result from individually minor, but collectively significant, developments taking place over a period. The CEQA Guidelines, Section 15130 (a) and (b), states:

a. Cumulative impacts shall be discussed when the project's incremental effect is cumulatively considerable.
b. The discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as is provided of the effects attributable to the project. The discussion should be guided by the standards of practicality and reasonableness.

As described above, the proposed Project would develop the site consistent with the existing SWIP designation within the allowable floor area ratio. Although the Project is consistent with the planned uses on the site, the proposed Project could have the potential to result in cumulative impacts to air quality, energy, greenhouse gas, noise, transportation, and tribal cultural resources. The extent and

significance of potential cumulative impacts resulting from the combined effects of the proposed Project plus other past, present, and reasonably foreseeable future projects will be evaluated in the Subsequent EIR.

c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

Potentially Significant New Impact.

As detailed in the previous responses, the proposed Project could cause substantial adverse effects on human beings if not properly mitigated. The proposed Project could result in impacts to air quality, greenhouse gas, land use, noise, and transportation that could result in adverse effects on human beings. Therefore, these impacts will be addressed in the Subsequent EIR, and additional mitigation measures will be provided as needed.

Approved Project FEIR Mitigation Measures

As listed in the previous responses.

Conclusion for Mandatory Findings of Significance

As detailed previously, it is possible that new or substantially more severe impacts related to these mandatory findings of significance could result from the proposed Project than were identified in the Approved Project FEIR. Thus, conditions identified in CEQA Guidelines Section 15162 related to changes to the Project that require major revisions of the previous Approved Project FEIR due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified effects could occur and would trigger the need to evaluate potential impacts in the Subsequent EIR. Thus, mandatory findings of significance will be analyzed in the Subsequent EIR.

5 REFERENCES

California Department of Conservation California Important Farmland Finder. Accessed: https://maps.conservation.ca.gov/DLRP/CIFF/

California Department of Toxic Substances Control EnviroStor Database. Accessed: https://www.envirostor.dtsc.ca.gov/public

California State Scenic Highway System Map. Accessed: https://www.arcgis.com/apps/webappviewer/index.html?id=465dfd3d807c46cc8e8057116f1aacaa

CalFire Fire Hazard Severity Zones Maps. Accessed: https://osfm.fire.ca.gov/divisions/wildfire-planning-engineering/wildland-hazards-building-codes/fire-hazard-severity-zones-maps/

CalRecycle Jurisdiction Disposal and Alternative Daily Cover (ADC) Tons by Facility. Accessed: https://www2.calrecycle.ca.gov/LGCentral/DisposalReporting/Destination/DisposalByFacility

CalRecycle Solid Waste Information System (SWIS) database. Accessed: https://www2.calrecycle.ca.gov/SolidWaste/Site/Search

City of Fontana SWIP Public Review Draft Program EIR, 2011. Accessed: https://www.fontana.org/DocumentCenter/View/36382/SWIP-Public-Review-Draft-Program-EIR

City of Fontana SWIP Specific Plan, 2012. Accessed: https://www.fontana.org/DocumentCenter/View/29312/Southwest-Industrial-Specific-Plan---Combined-Document

City of Fontana General Plan Update 2015-2035. Accessed: https://www.fontana.org/2632/General-Plan-Update-2015---2035

Cultural Resources Study, 2022. Prepared by Brian F. Smith and Associates, Inc. Appendix A

FEMA Flood Map Service Center. Accessed: https://msc.fema.gov

Geotechnical Investigation, 2015. Prepared by Southern California Geotechnical, Appendix C

Inland Empire Utilities Agency Regional Water Recycling Plant No. 1. Accessed: https://www.ieua.org/regional-water-recycling-plant-no-1/#:~:text=1%20(RP%2D1)%20is,44%20million%20gallons%20per%20day.

Paleontological Assessment, 2022. Prepared by Brian F. Smith and Associates, Inc. Appendix D

Phase I Environmental Site Assessment & Limited Subsurface Investigation, 2015. Prepared by Partner Engineering and Science. Appendix B

Preliminary Hydrology Report, 2022. Prepared by WestLAND Group, Inc. Appendix E

San Gabriel Valley Water Company Fontana Water Company Division 2020 Urban Water Management Plan, June 2021. Accessed: https://www.fontanawater.com/wp-content/uploads/2021/10/FWC-2020-UWMP-June-2021-Final.pdf

SCAG 2019 Local Profile. Accessed: https://scag.ca.gov/sites/main/files/file-attachments/fontana_localprofile.pdf?1606014851

SCAG's Employment Density Study, October 31, 2001. Accessed: http://www.mwcog.org/file.aspx?A=QTTITR24POOOUIw5mPNzK8F4d8djdJe4LF9Exj6IXOU%3D

SCAG's Growth Forecast By Jurisdiction 2016-2045. Accessed: https://scag.ca.gov/subarea-forecasting

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March 1, 2023

Rina Leung, Senior Planner
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8353 Sierra Avenue
Fontana, CA 92335

RE: Hemlock Warehouse Development Project, SCH # 2009091089

Dear Ms. Leung:

Thank you for the opportunity to provide comments on the Notice of Preparation for the Hemlock Warehouse Development Project. While the logistics industry is an important component of our modern economy, warehouses can bring various environmental impacts to the communities where they are located. For example, diesel trucks visiting warehouses emit nitrogen oxide (NO_x)—a primary precursor to smog formation and a significant factor in the development of respiratory problems like asthma, bronchitis, and lung irritation—and diesel particulate matter (a subset of fine particular matter that is smaller than 2.5 micrometers)—a contributor to cancer, heart disease, respiratory illnesses, and premature death.[1] Trucks and on-site loading activities can also be loud, bringing disruptive noise levels during 24/7 operation that can cause hearing damage after prolonged exposure.[2] The hundreds, and sometimes thousands, of daily truck and passenger car trips that warehouses generate can contribute to traffic jams, deterioration of road surfaces, traffic accidents, and unsafe conditions for pedestrians and bicyclists. Depending on the circumstances of an individual project, warehouses may also have other environmental impacts.

To help lead agencies avoid, analyze, and mitigate warehouses' environmental impacts, the Attorney General Office's Bureau of Environmental Justice has published a document containing best practices and mitigation measures for warehouse projects. We have attached a

[1] California Air Resources Board, Nitrogen Dioxide & Health, https://ww2.arb.ca.gov/resources/nitrogen-dioxide-and-health (NOx); California Air Resources Board, Summary: Diesel Particular Matter Health Impacts, https://ww2.arb.ca.gov/resources/summary-diesel-particulate-matter-health-impacts; Office of Environmental Health Hazard Assessment and American Lung Association of California, Health Effects of Diesel Exhaust, https://oehha.ca.gov/media/downloads/calenviroscreen/indicators/diesel4-02.pdf (DPM).

[2] Noise Sources and Their Effects, https://www.chem.purdue.edu/chemsafety/Training/PPETrain/dblevels.htm (a diesel truck moving 40 miles per hour, 50 feet away, produces 84 decibels of sound).

copy of this document to this letter, and it is also available online.[3] We encourage you to consider the information in this document as you prepare the draft environmental impact report for this project.

Priority should be placed on avoiding land use conflicts between warehouses and sensitive receptors and on mitigating the impacts of any unavoidable land use conflicts. However, even projects located far from sensitive receptors may contribute to harmful regional air pollution, so you should consider measures to reduce emissions associated with the project to help the State meet its air quality goals. A distant warehouse may also impact sensitive receptors if trucks must pass near sensitive receptors to visit the warehouse.

The Bureau will continue to monitor proposed warehouse projects for compliance with the California Environmental Quality Act and other laws. We are available to discuss as you prepare the draft environmental impact report and consider how to guide warehouse development in your jurisdiction. Please do not hesitate to contact the Environmental Justice Bureau at ej@doj.ca.gov if you have any questions.

Sincerely,

CHRISTIE VOSBURG
Supervising Deputy Attorney General

For ROB BONTA
Attorney General

[3] https://oag.ca.gov/system/files/media/warehouse-best-practices.pdf.

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ROB BONTA
Attorney General

State of California
DEPARTMENT OF JUSTICE

Warehouse Projects: Best Practices and Mitigation Measures to Comply with the California Environmental Quality Act

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In carrying out its duty to enforce laws across California, the California Attorney General's Bureau of Environmental Justice (Bureau)[1] regularly reviews proposed warehouse projects for compliance with the California Environmental Quality Act (CEQA) and other laws. When necessary, the Bureau submits comment letters to lead agencies regarding warehouse projects, and in rare cases the Bureau has filed litigation to enforce CEQA.[2] This document builds upon the Bureau's work on warehouse projects, collecting information gained from the Bureau's review of hundreds of warehouse projects across the state.[3] It is meant to help lead agencies pursue CEQA compliance and promote environmentally-just development as they confront warehouse project proposals.[4] While CEQA analysis is necessarily project-specific, this document provides information on feasible best practices and mitigation measures, nearly all of which have been adapted from actual warehouse projects in California.

I. Background

In recent years, the proliferation of e-commerce and rising consumer expectations of rapid shipping have contributed to a boom in warehouse development.[5] California, with its ports, population centers, and transportation network, has found itself at the center of this trend. In 2020, the Ports of Los Angeles, Long Beach, and Oakland collectively accounted for over 34% of all United States international container trade.[6] The Ports of Los Angeles and Long Beach alone generate about 35,000 container truck trips every day.[7] Accordingly, the South Coast Air Basin now contains approximately 3,000 warehouses of over 100,000 square feet each, with a total warehouse capacity of approximately 700 million square feet, an increase of 20 percent over the last five years.[8] This trend has only accelerated, with e-commerce growing to

[1] https://oag.ca.gov/environment/justice.
[2] https://oag.ca.gov/environment/ceqa; *People of the State of California v. City of Fontana* (Super. Ct. San Bernardino County, No. CIVSB2121829); *South Central Neighbors United et al. v. City of Fresno et al.* (Super. Ct. Fresno County, No. 18CECG00690).
[3] This September 2022 version revises and replaces the prior March 2021 version of this document.
[4] Anyone reviewing this document to determine CEQA compliance responsibilities should consult their own attorney for legal advice.
[5] As used in this document, "warehouse" or "logistics facility" is defined as a facility consisting of one or more buildings that stores cargo, goods, or products on a short- or long-term basis for later distribution to businesses and/or retail customers.
[6] Data from the Bureau of Transportation Statistics, Container TEUs (Twenty-foot Equivalent Units) (2020), https://data.bts.gov/stories/s/Container-TEU/x3fb-aeda/ (Ports of Los Angeles, Long Beach, and Oakland combined for 14.157 million TEUs, 34% of 41.24 million TEUs total nationwide) (last accessed September 18, 2022).
[7] U.S. Dept. of Transportation, Federal Highway Administration, *FHWA Operations Support – Port Peak Pricing Program Evaluation* (2020), available at https://ops.fhwa.dot.gov/publications/fhwahop09014/sect2.htm (last accessed September 18, 2022).
[8] South Coast Air Qual. Mgmt. Dist., *Final Socioeconomic Assessment for Proposed Rule 2305 – Warehouse Indirect Source Rule – Warehouse Actions and Investments to Reduce Emissions (WAIRE) Program and Proposed Rule 316 – Fees for Rule 2305*, at 7-8, 41 (May 2021).

13% of all retail sales and 2021 being a second consecutive record year for new warehouse space leased.[9] The latest data and forecasts predict that the next wave of warehouse development will be in the Central Valley.[10]

When done properly, these activities can contribute to the economy and consumer welfare. However, imprudent warehouse development can harm local communities and the environment. Among other pollutants, diesel trucks visiting warehouses emit nitrogen oxide (NO_x)—a primary precursor to smog formation and a significant factor in the development of respiratory problems like asthma, bronchitis, and lung irritation—and diesel particulate matter (a subset of fine particular matter that is smaller than 2.5 micrometers)—a contributor to cancer, heart disease, respiratory illnesses, and premature death.[11] Trucks and on-site loading activities can also be loud, bringing disruptive noise levels during 24/7 operation that can cause hearing damage after prolonged exposure.[12] The hundreds, and sometimes thousands, of daily truck and passenger car trips that warehouses generate contribute to traffic jams, deterioration of road surfaces, and traffic accidents.

These environmental impacts also tend to be concentrated in neighborhoods already suffering from disproportionate health impacts and systemic vulnerability. For example, a comprehensive study by the South Coast Air Quality Management District found that communities located near large warehouses scored far higher on California's environmental justice screening tool, which measures overall pollution and demographic vulnerability.[13] That

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[9] U.S. Census Bureau News, Quarterly Retail E-Commerce Sales 4th Quarter 2021 (February 22, 2022), https://www.census.gov/retail/mrts/www/data/pdf/ec_current.pdf (last accessed September 18, 2022); CBRE Research, *2022 North America Industrial Big Box Report: Review and Outlook*, at 2-3 (March 2022), *available at* https://www.cbre.com/insights/reports/2022-north-america-industrial-big-box#download-report (last accessed September 18, 2022).

[10] CBRE Research, *supra note* 9, at 4, 36; New York Times, *Warehouses Are Headed to the Central Valley, Too* (Jul. 22, 2020), *available* at https://www.nytimes.com/2020/07/22/us/coronavirus-ca-warehouse-workers.html.

[11] California Air Resources Board, Nitrogen Dioxide & Health, https://ww2.arb.ca.gov/resources/nitrogen-dioxide-and-health (last accessed September 18, 2022) (NOx); California Air Resources Board, Summary: Diesel Particular Matter Health Impacts, https://ww2.arb.ca.gov/resources/summary-diesel-particulate-matter-health-impacts (last accessed September 18, 2022); Office of Environmental Health Hazard Assessment and American Lung Association of California, Health Effects of Diesel Exhaust, https://oehha.ca.gov/media/downloads/calenviroscreen/indicators/diesel4-02.pdf (last accessed September 18, 2022) (DPM).

[12] Noise Sources and Their Effects, https://www.chem.purdue.edu/chemsafety/Training/PPETrain/dblevels.htm (last accessed September 18, 2022) (a diesel truck moving 40 miles per hour, 50 feet away, produces 84 decibels of sound).

[13] South Coast Air Quality Management District, "Final Socioeconomic Assessment for Proposed Rule 2305 – Warehouse Indirect Source Rule – Warehouse Actions and Investments to Reduce Emissions (WAIRE) Program and Proposed Rule 316 – Fees for Rule 2305" (May 2021), at 4-5.

study concluded that, compared to the South Coast Air Basin averages, communities in the South Coast Air Basin near large warehouses had a substantially higher proportion of people of color; were exposed to more diesel particulate matter; had higher rates of asthma, cardiovascular disease, and low birth weights; and had higher poverty and unemployment rates.[14] Each area has its own unique history, but many of these impacts and vulnerabilities reflect historic redlining practices in these communities, which devalued land and concentrated poverty, racial outgroups, and pollution into designated areas.[15]

II. Proactive Planning: General Plans, Local Ordinances, and Good Neighbor Policies

To systematically guide warehouse development, we encourage local governing bodies to proactively plan for logistics projects in their jurisdictions. Proactive planning allows jurisdictions to prevent land use conflicts before they materialize and direct sustainable development. Benefits also include providing a predictable business environment, protecting residents from environmental harm, and setting consistent expectations jurisdiction-wide.

Proactive planning can take many forms. Land use designation and zoning decisions should channel development into appropriate areas. For example, establishing industrial districts near major highway and rail corridors but away from sensitive receptors[16] can help attract investment while avoiding conflicts between warehouse facilities and residential communities. Transition zones with lighter industrial and commercial land uses may also help minimize conflicts between residential and industrial uses.

In addition, general plan policies, local ordinances, and good neighbor policies should set minimum standards for logistics projects. General plan policies can be incorporated into existing economic development, land use, circulation, or other related general plan elements. Many jurisdictions alternatively choose to consolidate policies in a separate environmental justice element. Adopting general plan policies to guide warehouse development may also help

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[14] *Id*. at 5-7.

[15] Beginning in the 1930s, federal housing policy directed investment away from Black, immigrant, and working-class communities by color-coding neighborhoods according to the purported "riskiness" of loaning to their residents. In California cities where such "redlining" maps were drawn, nearly all of the communities where warehouses are now concentrated were formerly coded "red," signifying the least desirable areas where investment was to be avoided. *See* University of Richmond Digital Scholarship Lab, Mapping Inequality, https://dsl.richmond.edu/panorama/redlining/#loc=12/33.748/-118.272&city=los-angeles-ca (Los Angeles), https://dsl.richmond.edu/panorama/redlining/#loc=13/32.685/-117.132&city=san-diego-ca (San Diego), https://dsl.richmond.edu/panorama/redlining/#loc=11/37.81/-122.38&city=oakland-ca (Oakland), https://dsl.richmond.edu/panorama/redlining/#loc=13/37.956/-121.326&city=stockton-ca (Stockton), https://dsl.richmond.edu/panorama/redlining/#loc=12/36.751/-119.86&city=fresno-ca (Fresno) (all last accessed September 18, 2022).

[16] In this document, "sensitive receptors" refers to residences, schools, public recreation facilities, health care facilities, places of worship, daycare facilities, community centers, or incarceration facilities.

jurisdictions comply with their obligations under SB 1000, which requires local government general plans to identify objectives and policies to reduce health risks in disadvantaged communities, promote civil engagement in the public decision making process, and prioritize improvements and programs that address the needs of disadvantaged communities.[17]

Local ordinances and good neighbor policies that set development standards for all warehouses in the jurisdiction are a critical and increasingly common tool that serve several goals. When well-designed, these ordinances direct investment to local improvements, provide predictability for developers, conserve government resources by streamlining project review processes, and reduce the environmental impacts of industrial development. While many jurisdictions have adopted warehouse-specific development standards, an ordinance in the City of Fontana provides an example to review and build upon.[18] Good neighbor policies in Riverside County and by the Western Riverside Council of Government include additional measures worth consideration.[19]

The Bureau encourages jurisdictions to adopt their own local ordinances that combine the strongest policies from those models with measures discussed in the remainder of this document.

III. Community Engagement

Early and consistent community engagement is central to establishing good relationships between communities, lead agencies, and warehouse developers and tenants. Robust community engagement can give lead agencies access to community residents' on-the-ground knowledge and information about their concerns, build community support for projects, and develop creative solutions to ensure new logistics facilities are mutually beneficial. Examples of best practices for community engagement include:

- Holding a series of community meetings at times and locations convenient to members of the affected community and incorporating suggestions into the project design.
- Posting information in hard copy in public gathering spaces and on a website about the project. The information should include a complete, accurate project description, maps and drawings of the project design, and information about how the public can provide input and be involved in the project approval process. The

[17] For more information about SB 1000, *see* https://oag.ca.gov/environment/sb1000.
[18] https://oag.ca.gov/system/files/attachments/press-docs/Final%20Signed%20Fontana%20Ordinance.pdf (last accessed September 18, 2022).
[19] For example, the Riverside County policy requires community benefits agreements and supplemental funding contributions toward additional pollution offsets, and the Western Riverside Council of Governments policy sets a minimum buffer zone of 300 meters between warehouses and sensitive receptors. https://www.rivcocob.org/wp-content/uploads/2020/01/Good-Neighbor-Policy-F-3-Final-Adopted.pdf (last accessed September 18, 2022) (Riverside County); http://www.wrcog.cog.ca.us/DocumentCenter/View/318/Good-Neighbor-Guidelines-for-Siting-Warehouse-Distribution-Facilities-PDF?bidId= (last accessed September 18, 2022) (Western Riverside Council of Governments).

information should be in a format that is easy to navigate and understand for members of the affected community.

- Providing notice by mail to residents and schools within a certain radius of the project and along transportation corridors to be used by vehicles visiting the project, and by posting a prominent sign on the project site. The notice should include a brief project description and directions for accessing complete information about the project and for providing input on the project.
- Providing translation or interpretation in residents' native language, where appropriate.
- For public meetings broadcast online or otherwise held remotely, providing for access and public comment by telephone and supplying instructions for access and public comment with ample lead time prior to the meeting.
- Partnering with local community-based organizations to solicit feedback, leverage local networks, co-host meetings, and build support.
- Considering adoption of a community benefits agreement, negotiated with input from affected residents and businesses, by which the developer provides benefits to the affected community.
- Creating a community advisory board made up of local residents to review and provide feedback on project proposals in early planning stages.
- Identifying a person to act as a community liaison concerning on-site construction activity and operations, and providing contact information for the community liaison to the surrounding community.
- Requiring signage in public view at warehouse facilities with contact information for a local designated representative for the facility operator who can receive community complaints, and requiring any complaints to be answered by the facility operator within 48 hours of receipt.

IV. Warehouse Siting and Design Considerations

The most important consideration when planning a logistics facility is its location. Warehouses located in residential neighborhoods or near sensitive receptors expose community residents and those using or visiting sensitive receptor sites to the air pollution, noise, traffic, and other environmental impacts they generate. Therefore, placing facilities away from sensitive receptors significantly reduces their environmental and quality of life harms on local communities. The suggested best practices for siting and design of warehouse facilities does not relieve lead agencies' responsibility under CEQA to conduct a project-specific analysis of the project's impacts and evaluation of feasible mitigation measures and alternatives; lead agencies' incorporation of the best practices must be part of the impact, mitigation and alternatives analyses to meet the requirements of CEQA. Examples of best practices when siting and designing warehouse facilities include:

- Per California Air Resources Board (CARB) guidance, siting warehouse facilities so that their property lines are at least 1,000 feet from the property lines of the nearest sensitive receptors.[20]
- Providing adequate amounts of on-site parking to prevent trucks and other vehicles from parking or idling on public streets and to reduce demand for off-site truck yards.
- Establishing setbacks from the property line of the nearest sensitive receptor to warehouse dock doors, loading areas, and truck drive aisles, and locating warehouse dock doors, loading areas, and truck drive aisles on the opposite side of the building from the nearest sensitive receptors—e.g., placing dock doors on the north side of the facility if sensitive receptors are near the south side of the facility.
- Placing facility entry and exit points from the public street away from sensitive receptors—e.g., placing these points on the north side of the facility if sensitive receptors are adjacent to the south side of the facility.
- Ensuring heavy duty trucks abide by the on-site circulation plans by constructing physical barriers to block those trucks from using areas of the project site restricted to light duty vehicles or emergency vehicles only.
- Preventing truck queuing spillover onto surrounding streets by positioning entry gates after a minimum of 140 feet of space for queuing, and increasing the distance by 70 feet for every 20 loading docks beyond 50 docks.
- Locating facility entry and exit points on streets of higher commercial classification that are designed to accommodate heavy duty truck usage.
- Screening the warehouse site perimeter and onsite areas with significant truck traffic (e.g., dock doors and drive aisles) by creating physical, structural, and/or vegetative buffers that prevent or substantially reduce pollutant and noise dispersion from the facility to sensitive receptors.
- Planting exclusively 36-inch box evergreen trees to ensure faster maturity and four-season foliage.
- Requiring all property owners and successors in interest to maintain onsite trees and vegetation for the duration of ownership, including replacing any dead or unhealthy trees and vegetation.
- Posting signs clearly showing the designated entry and exit points from the public street for trucks and service vehicles.
- Including signs and drive aisle pavement markings that clearly identify onsite circulation patterns to minimize unnecessary onsite vehicle travel.
- Posting signs indicating that all parking and maintenance of trucks must be conducted within designated on-site areas and not within the surrounding community or public streets.

[20] CARB, Air Quality and Land Use Handbook: A Community Health Perspective (April 2005), at ES-1. CARB staff has released draft updates to this siting and design guidance which suggests a greater distance may be warranted in some scenarios. CARB, Concept Paper for the Freight Handbook (December 2019), *available at* https://ww2.arb.ca.gov/sites/default/files/2020-03/2019.12.12%20-%20Concept%20Paper%20for%20the%20Freight%20Handbook_1.pdf (last accessed September 18, 2022).

V. Air Quality and Greenhouse Gas Emissions Analysis and Mitigation

Emissions of air pollutants and greenhouse gases are often among the most substantial environmental impacts from new warehouse facilities. CEQA compliance demands a proper accounting of the full air quality and greenhouse gas impacts of logistics facilities and adoption of all feasible mitigation of significant impacts. Although efforts by CARB and other authorities to regulate the heavy-duty truck and off-road diesel fleets have made excellent progress in reducing the air quality impacts of logistics facilities, the opportunity remains for local jurisdictions to further mitigate these impacts at the project level. Lead agencies and developers should also consider designing projects with their long-term viability in mind. Constructing the necessary infrastructure to prepare for the zero-emission future of goods movement not only reduces a facility's emissions and local impact now, but it can also save money as demand for zero-emission infrastructure grows. In planning new logistics facilities, the Bureau strongly encourages developers to consider the local, statewide, and global impacts of their projects' emissions.

Examples of best practices when studying air quality and greenhouse gas impacts include:

- Fully analyzing all reasonably foreseeable project impacts, including cumulative impacts. In general, new warehouse developments are not ministerial under CEQA because they involve public officials' personal judgment as to the wisdom or manner of carrying out the project, even when warehouses are permitted by a site's applicable zoning and/or general plan land use designation.[21]
- When analyzing cumulative impacts, thoroughly considering the project's incremental impact in combination with past, present, and reasonably foreseeable future projects, even if the project's individual impacts alone do not exceed the applicable significance thresholds.
- Preparing a quantitative air quality study in accordance with local air district guidelines.
- Preparing a quantitative health risk assessment in accordance with California Office of Environmental Health Hazard Assessment and local air district guidelines.
- Refraining from labeling compliance with CARB or air district regulations as a mitigation measure—compliance with applicable regulations is required regardless of CEQA.
- Disclosing air pollution from the entire expected length of truck trips. CEQA requires full public disclosure of a project's anticipated truck trips, which entails calculating truck trip length based on likely truck trip destinations, rather than the distance from the facility to the edge of the air basin, local jurisdiction, or other truncated endpoint. All air pollution associated with the project must be considered, regardless of where those impacts occur.

[21] CEQA Guidelines § 15369.

- Accounting for all reasonably foreseeable greenhouse gas emissions from the project, without discounting projected emissions based on participation in California's Cap-and-Trade Program.

Examples of measures to mitigate air quality and greenhouse gas impacts from construction are below. To ensure mitigation measures are enforceable and effective, they should be imposed as permit conditions on the project where applicable.

- Requiring off-road construction equipment to be hybrid electric-diesel or zero-emission, where available, and all diesel-fueled off-road construction equipment to be equipped with CARB Tier IV-compliant engines or better, and including this requirement in applicable bid documents, purchase orders, and contracts, with successful contractors demonstrating the ability to supply the compliant construction equipment for use prior to any ground-disturbing and construction activities.
- Prohibiting off-road diesel-powered equipment from being in the "on" position for more than 10 hours per day.
- Using electric-powered hand tools, forklifts, and pressure washers, and providing electrical hook ups to the power grid rather than use of diesel-fueled generators to supply their power.
- Designating an area in the construction site where electric-powered construction vehicles and equipment can charge.
- Limiting the amount of daily grading disturbance area.
- Prohibiting grading on days with an Air Quality Index forecast of greater than 100 for particulates or ozone for the project area.
- Forbidding idling of heavy equipment for more than three minutes.
- Keeping onsite and furnishing to the lead agency or other regulators upon request, all equipment maintenance records and data sheets, including design specifications and emission control tier classifications.
- Conducting an on-site inspection to verify compliance with construction mitigation and to identify other opportunities to further reduce construction impacts.
- Using paints, architectural coatings, and industrial maintenance coatings that have volatile organic compound levels of less than 10 g/L.
- Providing information on transit and ridesharing programs and services to construction employees.
- Providing meal options onsite or shuttles between the facility and nearby meal destinations for construction employees.

Examples of measures to mitigate air quality and greenhouse gas impacts from operation include:

- Requiring all heavy-duty vehicles engaged in drayage[22] to or from the project site to be zero-emission beginning in 2030.

[22] "Drayage" refers generally to transport of cargo to or from a seaport or intermodal railyard.

- Requiring all on-site motorized operational equipment, such as forklifts and yard trucks, to be zero-emission with the necessary charging or fueling stations provided.
- Requiring tenants to use zero-emission light- and medium-duty vehicles as part of business operations.
- Forbidding trucks from idling for more than three minutes and requiring operators to turn off engines when not in use.
- Posting both interior- and exterior-facing signs, including signs directed at all dock and delivery areas, identifying idling restrictions and contact information to report violations to CARB, the local air district, and the building manager.
- Installing solar photovoltaic systems on the project site of a specified electrical generation capacity that is equal to or greater than the building's projected energy needs, including all electrical chargers.
- Designing all project building roofs to accommodate the maximum future coverage of solar panels and installing the maximum solar power generation capacity feasible.
- Constructing zero-emission truck charging/fueling stations proportional to the number of dock doors at the project.
- Running conduit to designated locations for future electric truck charging stations.
- Unless the owner of the facility records a covenant on the title of the underlying property ensuring that the property cannot be used to provide refrigerated warehouse space, constructing electric plugs for electric transport refrigeration units at every dock door and requiring truck operators with transport refrigeration units to use the electric plugs when at loading docks.
- Oversizing electrical rooms by 25 percent or providing a secondary electrical room to accommodate future expansion of electric vehicle charging capability.
- Constructing and maintaining electric light-duty vehicle charging stations proportional to the number of employee parking spaces (for example, requiring at least 10% of all employee parking spaces to be equipped with electric vehicle charging stations of at least Level 2 charging performance)
- Running conduit to an additional proportion of employee parking spaces for a future increase in the number of electric light-duty charging stations.
- Installing and maintaining, at the manufacturer's recommended maintenance intervals, air filtration systems at sensitive receptors within a certain radius of facility for the life of the project.
- Installing and maintaining, at the manufacturer's recommended maintenance intervals, an air monitoring station proximate to sensitive receptors and the facility for the life of the project, and making the resulting data publicly available in real time. While air monitoring does not mitigate the air quality or greenhouse gas impacts of a facility, it nonetheless benefits the affected community by providing information that can be used to improve air quality or avoid exposure to unhealthy air.
- Requiring all stand-by emergency generators to be powered by a non-diesel fuel.
- Requiring facility operators to train managers and employees on efficient scheduling and load management to eliminate unnecessary queuing and idling of

trucks.

- Requiring operators to establish and promote a rideshare program that discourages single-occupancy vehicle trips and provides financial incentives for alternate modes of transportation, including carpooling, public transit, and biking.
- Meeting CalGreen Tier 2 green building standards, including all provisions related to designated parking for clean air vehicles, electric vehicle charging, and bicycle parking.
- Designing to LEED green building certification standards.
- Providing meal options onsite or shuttles between the facility and nearby meal destinations.
- Posting signs at every truck exit driveway providing directional information to the truck route.
- Improving and maintaining vegetation and tree canopy for residents in and around the project area.
- Requiring that every tenant train its staff in charge of keeping vehicle records in diesel technologies and compliance with CARB regulations, by attending CARB-approved courses. Also require facility operators to maintain records on-site demonstrating compliance and make records available for inspection by the local jurisdiction, air district, and state upon request.
- Requiring tenants to enroll in the United States Environmental Protection Agency's SmartWay program, and requiring tenants who own, operate, or hire trucking carriers with more than 100 trucks to use carriers that are SmartWay carriers.
- Providing tenants with information on incentive programs, such as the Carl Moyer Program and Voucher Incentive Program, to upgrade their fleets.

VI. Noise Impacts Analysis and Mitigation

The noise associated with logistics facilities can be among their most intrusive impacts to nearby sensitive receptors. Various sources, such as unloading activity, diesel truck movement, and rooftop air conditioning units, can contribute substantial noise pollution. These impacts are exacerbated by logistics facilities' typical 24-hour, seven-days-per-week operation. Construction noise is often even greater than operational noise, so if a project site is near sensitive receptors, developers and lead agencies should adopt measures to reduce the noise generated by both construction and operation activities.

Examples of best practices when studying noise impacts include:

- Preparing a noise impact analysis that considers all reasonably foreseeable project noise impacts, including to nearby sensitive receptors. All reasonably foreseeable project noise impacts encompasses noise from both construction and operations, including stationary, on-site, and off-site noise sources.
- Adopting a lower significance threshold for incremental noise increases when baseline noise already exceeds total noise significance thresholds, to account for the cumulative impact of additional noise and the fact that, as noise moves up the decibel scale, each decibel increase is a progressively greater increase in sound

pressure than the last. For example, 70 dBA is ten times more sound pressure than 60 dBA.

- Disclosing and considering the significance of short-term noise levels associated with all aspects of project operation (i.e. both on-site noise generation and off-site truck noise). Considering only average noise levels may mask noise impacts sensitive receptors would consider significant—for example, the repeated but short-lived passing of individual trucks or loading activities at night.

Examples of measures to mitigate noise impacts include:

- Constructing physical, structural, or vegetative noise barriers on and/or off the project site.
- Planning and enforcing truck routes that avoid passing sensitive receptors.
- Locating or parking all stationary construction equipment as far from sensitive receptors as possible, and directing emitted noise away from sensitive receptors.
- Verifying that construction equipment has properly operating and maintained mufflers.
- Requiring all combustion-powered construction equipment to be surrounded by a noise protection barrier
- Limiting operation hours to daytime hours on weekdays.
- Paving roads where truck traffic is anticipated with low noise asphalt.
- Orienting any public address systems onsite away from sensitive receptors and setting system volume at a level not readily audible past the property line.

VII. Traffic Impacts Analysis and Mitigation

Warehouse facilities inevitably bring truck and passenger car traffic. Truck traffic can present substantial safety issues. Collisions with heavy-duty trucks are especially dangerous for passenger cars, motorcycles, bicycles, and pedestrians. These concerns can be even greater if truck traffic passes through residential areas, school zones, or other places where pedestrians are common and extra caution is warranted.

Examples of measures to mitigate traffic impacts include:

- Designing, clearly marking, and enforcing truck routes that keep trucks out of residential neighborhoods and away from other sensitive receptors.
- Installing signs in residential areas noting that truck and employee parking is prohibited.
- Requiring preparation and approval of a truck routing plan describing the facility's hours of operation, types of items to be stored, and truck routing to and from the facility to designated truck routes that avoids passing sensitive receptors. The plan should include measures for preventing truck queuing, circling, stopping, and parking on public streets, such as signage, pavement markings, and queuing analysis and enforcement. The plan should hold facility operators responsible for violations of the truck routing plan, and a revised plan should be required from any new tenant that occupies the property before a business license

is issued. The approving agency should retain discretion to determine if changes to the plan are necessary, including any additional measures to alleviate truck routing and parking issues that may arise during the life of the facility.
- Constructing new or improved transit stops, sidewalks, bicycle lanes, and crosswalks, with special attention to ensuring safe routes to schools.
- Consulting with the local public transit agency and securing increased public transit service to the project area.
- Designating areas for employee pickup and drop-off.
- Implementing traffic control and safety measures, such as speed bumps, speed limits, or new traffic signs or signals.
- Placing facility entry and exit points on major streets that do not have adjacent sensitive receptors.
- Restricting the turns trucks can make entering and exiting the facility to route trucks away from sensitive receptors.
- Constructing roadway improvements to improve traffic flow.
- Preparing a construction traffic control plan prior to grading, detailing the locations of equipment staging areas, material stockpiles, proposed road closures, and hours of construction operations, and designing the plan to minimize impacts to roads frequented by passenger cars, pedestrians, bicyclists, and other non-truck traffic.

VIII. Other Significant Environmental Impacts Analysis and Mitigation

Warehouse projects may result in significant environmental impacts to other resources, such as to aesthetics, cultural resources, energy, geology, or hazardous materials. All significant adverse environmental impacts must be evaluated, disclosed and mitigated to the extent feasible under CEQA. Examples of best practices and mitigation measures to reduce environmental impacts that do not fall under any of the above categories include:

- Appointing a compliance officer who is responsible for implementing all mitigation measures, and providing contact information for the compliance officer to the lead agency, to be updated annually.
- Creating a fund to mitigate impacts on affected residents, schools, places of worship, and other community institutions by retrofitting their property. For example, retaining a contractor to retrofit/install HVAC and/or air filtration systems, doors, dual-paned windows, and sound- and vibration-deadening insulation and curtains.
- Sweeping surrounding streets on a daily basis during construction to remove any construction-related debris and dirt.
- Directing all lighting at the facility into the interior of the site.
- Using full cut-off light shields and/or anti-glare lighting.
- Requiring submission of a property maintenance program for agency review and approval providing for the regular maintenance of all building structures, landscaping, and paved surfaces.
- Using cool pavement to reduce heat island effects.

- Planting trees in parking areas to provide at least 35% shade cover of parking areas within fifteen years to reduce heat island impacts.
- Using light colored roofing materials with a solar reflective index of 78 or greater.
- Including on-site amenities, such as a truck operator lounge with restrooms, vending machines, and air conditioning, to reduce the need for truck operators to idle or travel offsite.
- Designing skylights to provide natural light to interior worker areas.
- Installing climate control and air filtration in the warehouse facility to promote worker well-being.

IX. Conclusion

California's world-class economy, ports, and transportation network position it at the center of the e-commerce and logistics industry boom. At the same time, California is a global leader in environmental protection and environmentally just development. The guidance in this document furthers these dual strengths, ensuring that all can access the benefits of economic development. The Bureau will continue to monitor proposed projects for compliance with CEQA and other laws. Lead agencies, developers, community advocates, and other interested parties should feel free to reach out to us as they consider how to guide warehouse development in their area.

Please do not hesitate to contact the Environmental Justice Bureau at ej@doj.ca.gov if you have any questions.

STATE OF CALIFORNIA Gavin Newsom, Governor

NATIVE AMERICAN HERITAGE COMMISSION

RECEIVED
FEB 28 2023
By

February 23, 2023

Rina Leung
City of Fontana
8353 Sierra Avenue
Fontana, CA 92335

Re: 2009091089, Hemlock Warehouse Development Project, San Bernardino County

Dear Ms. Leung:

The Native American Heritage Commission (NAHC) has received the Notice of Preparation (NOP), Draft Environmental Impact Report (DEIR) or Early Consultation for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code §21000 et seq.), specifically Public Resources Code §21084.1, states that a project that may cause a substantial adverse change in the significance of a historical resource, is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, §15064.5 (b) (CEQA Guidelines §15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an Environmental Impact Report (EIR) shall be prepared. (Pub. Resources Code §21080 (d); Cal. Code Regs., tit. 14, § 5064 subd.(a)(1) (CEQA Guidelines §15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources within the area of potential effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code §21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code §21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code §21084.3 (a)). **AB 52 applies to any project for which a notice of preparation, a notice of negative declaration, or a mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements.** If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. §800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments.

Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.

AB 52

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AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

1. Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:

- **a.** A brief description of the project.
- **b.** The lead agency contact information.
- **c.** Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code §21080.3.1 (d)).
- **d.** A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code §21073).

2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code §21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or Environmental Impact Report. (Pub. Resources Code §21080.3.1(b)).

- **a.** For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code §65352.4 (SB 18). (Pub. Resources Code §21080.3.1 (b)).

3. Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:

- **a.** Alternatives to the project.
- **b.** Recommended mitigation measures.
- **c.** Significant effects. (Pub. Resources Code §21080.3.2 (a)).

4. Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:

- **a.** Type of environmental review necessary.
- **b.** Significance of the tribal cultural resources.
- **c.** Significance of the project's impacts on tribal cultural resources.
- **d.** If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code §21080.3.2 (a)).

5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code §6254 (r) and §6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code §21082.3 (c)(1)).

6. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:

- **a.** Whether the proposed project has a significant impact on an identified tribal cultural resource.
- **b.** Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code §21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code §21082.3 (b)).

7. Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:

a. The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or

b. A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code §21080.3.2 (b)).

8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code §21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code §21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code §21082.3 (a)).

9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code §21084.3 (b). (Pub. Resources Code §21082.3 (e)).

10. Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:

a. Avoidance and preservation of the resources in place, including, but not limited to:

i. Planning and construction to avoid the resources and protect the cultural and natural context.

ii. Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.

b. Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:

i. Protecting the cultural character and integrity of the resource.

ii. Protecting the traditional use of the resource.

iii. Protecting the confidentiality of the resource.

c. Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.

d. Protecting the resource. (Pub. Resource Code §21084.3 (b)).

e. Please note that a federally recognized California Native American tribe or a non-federally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code §815.3 (c)).

f. Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code §5097.991).

11. Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An Environmental Impact Report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:

a. The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code §21080.3.1 and §21080.3.2 and concluded pursuant to Public Resources Code §21080.3.2.

b. The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.

c. The lead agency provided notice of the project to the tribe in compliance with Public Resources Code §21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code §21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code §65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf.

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code §65352.3 (a)(2)).
2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.
3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code §65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code §5097.9 and §5097.993 that are within the city's or county's jurisdiction. (Gov. Code §65352.3 (b)).
4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:
    a. The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
    b. Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/.

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (https://ohp.parks.ca.gov/?page_id=30331) for an archaeological records search. The records search will determine:
    a. If part or all of the APE has been previously surveyed for cultural resources.
    b. If any known cultural resources have already been recorded on or adjacent to the APE.
    c. If the probability is low, moderate, or high that cultural resources are located in the APE.
    d. If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
    a. The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.
    b. The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:
   a. A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.
   b. A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.
   a. Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, §15064.5(f) (CEQA Guidelines §15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.
   b. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.
   c. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code §7050.5, Public Resources Code §5097.98, and Cal. Code Regs., tit. 14, §15064.5, subdivisions (d) and (e) (CEQA Guidelines §15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions or need additional information, please contact me at my email address: Cameron.Vela@nahc.ca.gov.

Sincerely,

Cameron Vela

Cameron Vela
Cultural Resources Analyst

cc: State Clearinghouse

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 • www.aqmd.gov

SENT VIA E-MAIL:
rleung@fontana.org
Rina Leung, Senior Planner
City of Fontana
Planning Department
Fontana, California, 92335

March 27, 2023

Notice of Preparation of a Subsequent Environmental Impact Report Hemlock Warehouse Development Project (Proposed Project)

South Coast Air Quality Management District (South Coast AQMD) staff appreciates the opportunity to comment on the above-mentioned document. Our comments are recommendations on the analysis of potential air quality impacts from the Proposed Project that should be included in the Subsequent Environmental Impact Report (EIR). Please send a copy of the Subsequent EIR upon its completion and public release directly to South Coast AQMD as copies of the Subsequent EIR submitted to the State Clearinghouse are not forwarded. **In addition, please send all appendices and technical documents related to the air quality, health risk, and greenhouse gas analyses and electronic versions of all emission calculation spreadsheets, and air quality modeling and health risk assessment input and output files (not PDF files). Any delays in providing all supporting documentation for our review will require additional review time beyond the end of the comment period.**

CEQA Air Quality Analysis

Staff recommends that the Lead Agency use South Coast AQMD's CEQA Air Quality Handbook and website[1] as guidance when preparing the air quality and greenhouse gas analyses. It is also recommended that the Lead Agency use the CalEEMod[2] land use emissions software, which can estimate pollutant emissions from typical land use development and is the only software model maintained by the California Air Pollution Control Officers Association.

South Coast AQMD has developed both regional and localized significance thresholds. South Coast AQMD staff recommends that the Lead Agency quantify criteria pollutant emissions and compare the emissions to South Coast AQMD's CEQA regional pollutant emissions significance thresholds[3] and localized significance thresholds (LSTs)[4] to determine the Proposed Project's air quality impacts. The localized analysis can be conducted by either using the LST screening tables or performing dispersion modeling.

The Lead Agency should identify any potential adverse air quality impacts that could occur from all phases of the Proposed Project and all air pollutant sources related to the Proposed Project. Air quality impacts from both construction (including demolition, if any) and operations should be calculated. Construction-related air quality impacts typically include, but are not limited to, emissions from the use of heavy-duty equipment from grading, earth-loading/unloading, paving, architectural coatings, off-road mobile sources (e.g., heavy-duty construction equipment) and on-road mobile sources (e.g., construction

[1] South Coast AQMD's CEQA Handbook and other resources for preparing air quality analyses can be found at: http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook.
[2] CalEEMod is available free of charge at: www.caleemod.com.
[3] South Coast AQMD's CEQA regional pollutant emissions significance thresholds can be found at: http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf.
[4] South Coast AQMD's guidance for performing a localized air quality analysis can be found at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/localized-significance-thresholds.

worker vehicle trips, material transport trips, and hauling trips). Operation-related air quality impacts may include, but are not limited to, emissions from stationary sources (e.g., boilers and air pollution control devices), area sources (e.g., solvents and coatings), and vehicular trips (e.g., on- and off-road tailpipe emissions and entrained dust). Air quality impacts from indirect sources, such as sources that generate or attract vehicular trips, should be included in the analysis. Furthermore, emissions from the overlapping construction and operational activities should be combined and compared to South Coast AQMD's regional air quality CEQA ***operational*** thresholds to determine the level of significance.

If the Proposed Project generates diesel emissions from long-term construction or attracts diesel-fueled vehicular trips, especially heavy-duty diesel-fueled vehicles, it is recommended that the Lead Agency perform a mobile source health risk assessment[5].

In the event that implementation of the Proposed Project requires a permit from South Coast AQMD, South Coast AQMD should be identified as a Responsible Agency for the Proposed Project in the Subsequent EIR. The assumptions in the air quality analysis in the Subsequent EIR will be the basis for evaluating the permit under CEQA and imposing permit conditions and limits. Questions on permits should be directed to South Coast AQMD's Engineering and Permitting staff at (909) 396-3385.

South Coast AQMD staff is concerned about potential public health impacts of siting warehouses within close proximity of sensitive land uses, especially in communities that are already heavily affected by the existing warehouse and truck activities. The South Coast AQMD's Multiple Air Toxics Exposure Study (MATES V), completed in August 2021, concluded that the largest contributor to cancer risk from air pollution is diesel particulate matter (DPM) emissions[6]. According to the MATES V Carcinogenic Risk interactive Map, the area surrounding the Proposed Project has an estimated cancer risk over 470 in one million[7]. Operation of warehouses generates and attracts heavy-duty diesel-fueled trucks that emit DPM. When the health impacts from the Proposed Project are added to those existing impacts, residents living in the communities surrounding the Proposed Project will possibly face an even greater exposure to air pollution and bear a disproportionate burden of increasing health risks.

Mitigation Measures

In the event that the Proposed Project results in significant adverse air quality impacts, CEQA requires that all feasible mitigation measures that go beyond what is required by law be utilized to minimize these impacts. Any impacts resulting from mitigation measures must also be analyzed. Several resources to assist the Lead Agency with identifying potential mitigation measures for the Proposed Project include South Coast AQMD's CEQA Air Quality Handbook,[8] South Coast AQMD's Mitigation Monitoring and Reporting Plan for the 2022 Air Quality Management Plan,[9] and Southern California Association of Government's Mitigation Monitoring and Reporting Plan for the 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy.[10].

Mitigation measures for operational air quality impacts from mobile sources that the Lead Agency should consider in the Subsequent EIR may include the following:

[5] South Coast AQMD's guidance for performing a mobile source health risk assessment can be found at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/mobile-source-toxics-analysis.
[6] South Coast AQMD. August 2021. *Multiple Air Toxics Exposure Study in the South Coast Air Basin V*. Available at: http://www.aqmd.gov/home/air-quality/air-quality-studies/health-studies/mates-v.
[7] South Coast AQMD. MATES V Data Visualization Tool. Accessed at: MATES Data Visualization (arcgis.com).
[8] https://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook
[9] South Coast AQMD's 2022 Air Quality Management Plan can be found at: http://www.aqmd.gov/home/air-quality/clean-air-plans/air-quality-mgt-plan (Chapter 4 - Control Strategy and Implementation).
[10] Southern California Association of Governments' 2020-2045 RTP/SCS can be found at: https://www.connectsocal.org/Documents/PEIR/certified/Exhibit-A_ConnectSoCal_PEIR.pdf.

- Require zero-emissions (ZE) or near-zero emission (NZE) on-road haul trucks such as heavy-duty trucks with natural gas engines that meet the CARB's adopted optional NOx emissions standard at 0.02 grams per brake horsepower-hour (g/bhp-hr), if and when feasible. Given the state's clean truck rules and regulations aiming to accelerate the utilization and market penetration of ZE and NZE trucks such as the Advanced Clean Trucks Rule[11] and the Heavy-Duty Low NOx Omnibus Regulation[12], ZE and NZE trucks will become increasingly more available to use. The Lead Agency should require a phase-in schedule to incentive the use of these cleaner operating trucks to reduce any significant adverse air quality impacts. South Coast AQMD staff is available to discuss the availability of current and upcoming truck technologies and incentive programs with the Lead Agency. At a minimum, require the use of 2010 model year[13] that meet CARB's 2010 engine emissions standards at 0.01 g/bhp-hr of particulate matter (PM) and 0.20 g/bhp-hr of NOx emissions or newer, cleaner trucks. Include environmental analyses to evaluate and identify sufficient electricity and supportive infrastructures in the Energy and Utilities and Service Systems Sections in the CEQA document, where appropriate. Include the requirement in applicable bid documents, purchase orders, and contracts. Operators shall maintain records of all trucks associated with project construction to document that each truck used meets these emission standards, and make the records available for inspection. The Lead Agency should conduct regular inspections to the maximum extent feasible to ensure compliance.
- Limit the daily number of trucks allowed at the Proposed Project to levels analyzed in the Final CEQA document. If higher daily truck volumes are anticipated to visit the site, the Lead Agency should commit to re-evaluating the Proposed Project through CEQA prior to allowing this higher activity level.
- Provide electric vehicle (EV) charging stations or at a minimum, provide the electrical infrastructure and electrical panels should be appropriately sized. Electrical hookups should be provided for truckers to plug in any onboard auxiliary equipment.

Mitigation measures for operational air quality impacts from other area sources that the Lead Agency should consider in the Subsequent EIR may include the following:

- Maximize use of solar energy by installing solar energy arrays.
- Use light colored paving and roofing materials.
- Utilize only Energy Star heating, cooling, and lighting devices, and appliances.
- Use of water-based or low VOC cleaning products that go beyond the requirements of South Coast AQMD Rule 1113.

Design considerations for the Proposed Project that the Lead Agency should consider to further reduce air quality and health risk impacts include the following:

- Clearly mark truck routes with trailblazer signs, so that trucks will not travel next to or near sensitive land uses (e.g., residences, schools, day care centers, etc.).
- Design the Proposed Project such that truck entrances and exits are not facing sensitive receptors and trucks will not travel past sensitive land uses to enter or leave the Proposed Project site.

[11] CARB. June 25, 2020. *Advanced Clean Trucks Rule*. Accessed at: https://ww2.arb.ca.gov/our-work/programs/advanced-clean-trucks.

[12] CARB has recently passed a variety of new regulations that require new, cleaner heavy-duty truck technology to be sold and used in state. For example, on August 27, 2020, CARB approved the Heavy-Duty Low NOx Omnibus Regulation, which will require all trucks to meet the adopted emission standard of 0.05 g/hp-hr starting with engine model year 2024. Accessed at: https://ww2.arb.ca.gov/rulemaking/2020/hdomnibuslownox.

[13] CARB adopted the statewide Truck and Bus Regulation in 2010. The Regulation requires diesel trucks and buses that operate in California to be upgraded to reduce emissions. Newer heavier trucks and buses must meet particulate matter filter requirements beginning January 1, 2012. Lighter and older heavier trucks must be replaced starting January 1, 2015. By January 1, 2023, nearly all trucks and buses will need to have 2010 model year engines or equivalent. More information on the CARB's Truck and Bus Regulation is available at: https://www.arb.ca.gov/msprog/onrdiesel/onrdiesel.htm.

- Design the Proposed Project such that any check-in point for trucks is inside the Proposed Project site to ensure that there are no trucks queuing outside.
- Design the Proposed Project to ensure that truck traffic inside the Proposed Project site is as far away as feasible from sensitive receptors.
- Restrict overnight truck parking in sensitive land uses by providing overnight truck parking inside the Proposed Project site.

On May 7, 2021, South Coast AQMD's Governing Board adopted Rule 2305 – Warehouse Indirect Source Rule – Warehouse Actions and Investments to Reduce Emissions (WAIRE) Program, and Rule 316 – Fees for Rule 2305. Rules 2305 and 316 are new rules that will reduce regional and local emissions of nitrogen oxides (NOx) and particulate matter (PM), including diesel PM. These emission reductions will reduce public health impacts for communities located near warehouses from mobile sources that are associated with warehouse activities. Also, the emission reductions will help the region attain federal and state ambient air quality standards. Rule 2305 applies to owners and operators of warehouses greater than or equal to 100,000 square feet. Under Rule 2305, operators are subject to an annual WAIRE Points Compliance Obligation that is calculated based on the annual number of truck trips to the warehouse. WAIRE Points can be earned by implementing actions in a prescribed menu in Rule 2305, implementing a site-specific custom plan, or paying a mitigation fee. Warehouse owners are only required to submit limited information reports, but they can opt in to earn Points on behalf of their tenants if they so choose because certain actions to reduce emissions may be better achieved at the warehouse development phase, for instance the installation of solar and charging infrastructure. Rule 316 is a companion fee rule for Rule 2305 to allow South Coast AQMD to recover costs associated with Rule 2305 compliance activities. Since the Proposed Project consists of the development of a 882,000 square foot warehouse, the Proposed Project's warehouse owners and operators will be required to comply with Rule 2305 once the warehouse is occupied. Therefore, South Coast AQMD staff recommends that the Lead Agency review South Coast AQMD Rule 2305 to determine the potential WAIRE Points Compliance Obligation for future operators and explore whether additional project requirements and CEQA mitigation measures can be identified and implemented at the Proposed Project that may help future warehouse operators meet their compliance obligation[14]. South Coast AQMD staff is available to answer questions concerning Rule 2305 implementation and compliance by phone or email at (909) 396-3140 or waire-program@aqmd.gov. For implementation guidance documents and compliance and reporting tools, please visit South Coast AQMD's WAIRE Program webpage[15].

South Coast AQMD staff is available to work with the Lead Agency to ensure that air quality, greenhouse gas, and health risk impacts from the Proposed Project are accurately evaluated and mitigated where feasible. If you have any questions regarding this letter, please contact me at swang1@aqmd.gov.

Sincerely,

Sam Wang

Sam Wang
Program Supervisor, CEQA IGR
Planning, Rule Development & Implementation

SW
SBC230301-09
Control Number

[14] South Coast AQMD Rule 2305 – Warehouse Indirect Source Rule – Warehouse Actions and Investments to Reduce Emissions (WAIRE) Program. Accessed at: http://www.aqmd.gov/docs/default-source/rule-book/reg-xxiii/r2305.pdf.
[15] South Coast AQMD WAIRE Program. Accessed at: http://www.aqmd.gov/waire.

CARECA

03/27/2023

VIA EMAIL ONLY

Rina Leung, Senior Planner
City of Fontana
8353 Sierra Avenue
Fontana, CA 92335
Email: rleung@fontana.org

RE: NOP Comments for Hemlock Warehouse Development Project

Dear Ms. Leung,

Thank you for providing Californians Allied for a Responsible Economy ("CARE CA") with the opportunity to comment on the Notice of Preparation ("NOP") for the Hemlock Warehouse Development Project (the "Project") Draft Environmental Impact Report (DEIR). The Project will be a new 2-story warehouse building totaling approximately 882,000 square feet space. The Project requires approval for a Tentative Parcel Map and Design Review.

The Initial Study identifies the Project's potentially significant impacts under CEQA to include air quality, greenhouse gas emissions, noise, transportation, tribal cultural resources, and mandatory findings of significance. CARE CA respectfully requests complete analysis of these impacts, imposition of all feasible mitigation and study of a reasonable range of alternatives.

In addition, we request that the City take into consideration the following comments:

a) According to the Initial Study, approximately 25 percent of the building square footage will be cold storage. This means that trucks and trailers going in and out of the Project site would be equipped with transport refrigeration units (TRU). The TRUs would emit large quantities of diesel exhaust while operating within the Project site. The City should, therefore, model air pollutant emissions from on-site TRUs in the DEIR and also include potential cancer risks to sensitive receptors from on-site TRUs in a Health Risk Assessment.

In addition, the DEIR should also specify the type of refrigerant that will be used in the cooling system. Different types of refrigerants have different impacts on GHG. As more cold storage warehouses are built, the use of high global warming potential (GWP) refrigerants with potent greenhouse gas emissions will further exacerbate global climate change. Next generation refrigeration systems can reduce the contribution to climate change of high GWP refrigerants by

using natural refrigerant alternatives that have minimal climate impacts. The City should embrace this shift by requiring use of natural refrigerant alternatives that would reduce the Project's impact on greenhouse gas emissions (GHG).

b) We are concerned about air quality impacts and public health. Assuming the industry standard 24 hour a day, 7 days a week operation, hundreds and hundreds of heavy-duty diesel trucks (some equipped with TRUs) will come in and out of the Project site on any given day. The high daily volumes of truck traffic and on-site equipment (e.g. forklifts, backup generators and yard tractors) will pollute the air with toxic diesel emissions and expose nearby communities to toxic and cancerous air pollution. The DEIR must include a mobile source Health Risk Assessment that includes both construction and operational diesel PM emissions and cancer risk assessment. In addition, estimates of the significance of air quality impacts must be consistent with current epidemiological studies regarding the effects of pollution and various kinds of environmental stress on public health. Every effort must be made to ensure that public health impacts are studied, quantified, and fully mitigated.

c) Mitigation measures must be effective and enforceable. Every effort must be made to incorporate modern technology in the mitigation measures and MMRP. For example, a requirement that all off-road equipment and trucks using the site during construction and operations be zero emission, near-zero emissions or alternative-fueled vehicle would both reduce and/or eliminate air pollution impacts and CO2 emissions.

d) Provide all sources and referenced materials when the DEIR is made available.

Thank you for the opportunity to submit NOP comments. CARE CA respectfully urges the City to take this opportunity to protect the environment and the community to the maximum extent feasible. We look forward to reviewing and commenting on subsequent environmental review documents when these documents are released for public review.

Sincerely,



Jeff Modrzejewski
Executive Director

APPENDIX A: CULTURAL RESOURCES STUDY

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CULTURAL RESOURCES STUDY FOR THE 22-114 HEMLOCK AVENUE PROJECT

CITY OF FONTANA, SAN BERNARDINO COUNTY, CALIFORNIA

APNs 0237-131-25, -26, and -27

Lead Agency:

City of Fontana
Community Development Department
8353 Sierra Avenue
Fontana, California 92335

Preparer:

Brian F. Smith and Associates, Inc.
14010 Poway Road, Suite A
Poway, California 92064



Signature

Project Proponent:

EPD Solutions
2355 Main Street, Suite 100
Irvine, California 92614

October 20, 2022

Archaeological Database Information

Authors:	Andrew J. Garrison and Brian F. Smith
Consulting Firm:	Brian F. Smith and Associates, Inc. 14010 Poway Road, Suite A Poway, California 92064 (858) 679-8218
Client/Project Proponent:	EPD Solutions 2355 Main Street, Suite 100 Irvine, California 92614
Report Date:	October 20, 2022
Report Title:	Cultural Resources Study for the 22-114 Hemlock Avenue Project, City of Fontana, San Bernardino County, California (APNs 0237-131-25, -26, and -27)
Type of Study:	Phase I Cultural Resources Survey
Cultural Resources:	None
USGS Quadrangle:	Section 26, Township 1 South, Range 6 West of the USGS *Fontana, California* (7.5-minute) Quadrangle
Acreage:	40.01 acres
Key Words:	USGS *Fontana* Quadrangle (7.5 minute); archaeological survey; negative; monitoring not recommended.

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MANAGEMENT SUMMARY/ABSTRACT

In response to a request by EPD Solutions, Brian F. Smith and Associates, Inc. (BFSA) conducted a cultural resources study for the 22-114 Hemlock Avenue Project. The project is located south of Santa Ana Avenue, north of Jurupa Avenue, and bound on the east and west, respectively, by Beech and Hemlock avenues, in the city of Fontana, San Bernardino County, California. The 40.01-acre property, which includes Assessor's Parcel Numbers (APNs) 0237-131-25, -26, and -27, is located on the 7.5-minute USGS *Fontana, California* topographic quadrangle in Section 26, Township 1 South, Range 6 West. The subject property is highly disturbed, having been previously utilized for agriculture and as part of the Fontana Farms hog ranch before being cleared in the mid- to late twentieth century and developed as an industrial/commercial business and storage yard currently utilized by ModSpace.

The purpose of this investigation was to locate and record any cultural resources present within the project and subsequently assess any resources as part of the City of Fontana's environmental review process conducted in compliance with the California Environmental Quality Act (CEQA). The archaeological investigation of the project included the review of an archaeological records search from the South Central Coastal Information Center (SCCIC) at California State University, Fullerton (CSU Fullerton) in order to assess previous archaeological studies and identify any previously recorded archaeological sites within the project boundaries or in the immediate vicinity. Results from the SCCIC records search did not identify any previously recorded resources within the subject property; however, 24 resources (eight prehistoric and 16 historic) have been recorded within one mile of the project. The most common resources type is associated with the historic built environment. Historic aerials do show that the property did historically contain elements of the Fontana Farms hog ranch; however, the subject property has been cleared and graded since the 1950s and is now developed. As such, there is a low potential for either historic or prehistoric resources within the project. BFSA also requested, at its own discretion, a review of the Sacred Lands File (SLF) from the Native American Heritage Commission (NAHC). However, as of the date of this report, no response has been received.

The cultural resources survey was conducted on October 17, 2022 and did not identify any cultural resources. The subject property is completely disturbed, covered with buildings, asphalt, gravel, and commercial landscaping. During the survey, ground visibility was limited; however, based on the review of aerial imagery and the noted construction history, the property has been completely cleared and graded since the 1950s and all pemanent structures within the property were constructed after 2000. Therefore, no archeological monitoring of earthwork is recommended or warranted based upon the findings of this cultural resources assessment. However, in accordance with the Mitigation Monitoring and Reporting Program (MMRP) in the Final Environmental Impact Report (FEIR) of the Fontana General Plan Update 2015-2035 (City of Fontana 2018a), it is recommended that a condition be included in the development permit that states in the event that any historic or prehistoric artifacts or features are encountered during

grading, the applicant is required to retain a qualified archaeologist meeting the Secretary of the Interior's standards. A copy of this report will be permanently filed with the SCCIC at CSU Fullerton. All notes, photographs, and other materials related to this project will be curated at the archaeological laboratory of BFSA in Poway, California.

1.0 INTRODUCTION

1.1 Project Description

The archaeological survey program for the project was conducted in order to comply with CEQA and City of Fontana environmental guidelines. The project is south of Santa Ana Avenue, north of Jurupa Avenue, and bound on the east and west, respectively, by Beech and Hemlock avenues, in the city of Fontana, San Bernardino County, California (Figure 1.1–1). The property, which includes APNs 0237-131-25, -26, and -27, is located on the 7.5-minute USGS *Fontana, California* topographic quadrangle in Section 26, Township 1 South, Range 6 West (Figure 1.1–2). The project applicant proposes to construct a commercial warehouse building with associated parking and hardscape within the 40.01-acre (gross) property (Figure 1.1–3).

The subject property is highly disturbed, having been previously utilized for agriculture and part of the Fontana Farms hog ranch before being cleared in the mid- to late twentieth century and developed as an industrial/commercial business and storage yard currently utilized by ModSpace. As a result of the previous land use, the property appears to have been cleared multiple times and graded. The decision to request this investigation was based upon the cultural resource sensitivity of the locality, as suggested by known site density and predictive modeling. Sensitivity for cultural resources in a given area is usually indicated by known settlement patterns. The proximity to Lytle Creek and the terrestrial ecosystems surrounding the creek are part of an environmental setting that supported a significant prehistoric population for over 10,000 years. Regarding historic resources, the property is located within an area that historically supported rural residential/agricultural and commercial businesses, and structures older than 50 years of age are common in the project vicinity.

1.2 Environmental Setting

The project is generally located in southwestern San Bernardino County in the city of Fontana. The subject property is part of the Chino Basin and located south of the San Gabriel Mountains, north of the Jurupa Mountains, and west of the San Bernardino Mountains. The San Gabriel Mountains extend east from Newhall Pass in Los Angeles County to the Cajon Pass in San Bernardino County. These mountains are part of the Transverse Ranges with peaks exceeding 9,000 feet above mean sea level (AMSL).

The project is located near the western margin and distal southern end of the broad Lytle Creek alluvial fan that emanates from the San Gabriel Mountains approximately nine to 10 miles to the north as a result of uplift and dissection of the eastern San Gabriel Mountains (Wirths 2022). The main source of these sediments is from the Lytle Creek drainage, near where the northwest-southeast-trending San Andreas fault zone cuts across and separates the San Gabriel and San Bernardino mountain ranges (Morton and Miller 2006).

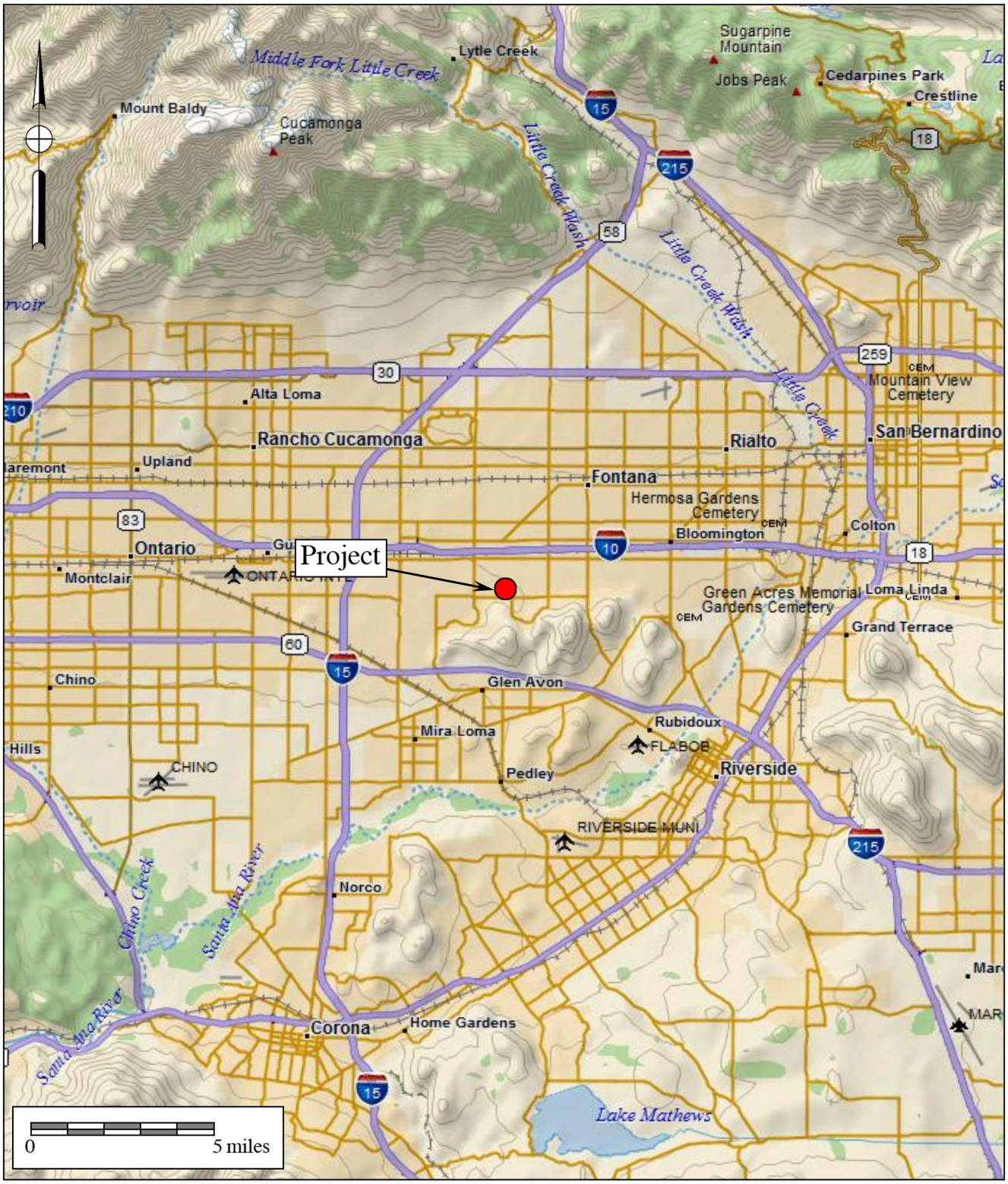


Figure 1.1–1

General Location Map

The 22-114 Hemlock Avenue Project

DeLorme World Base Map Service (1:250,000 series)

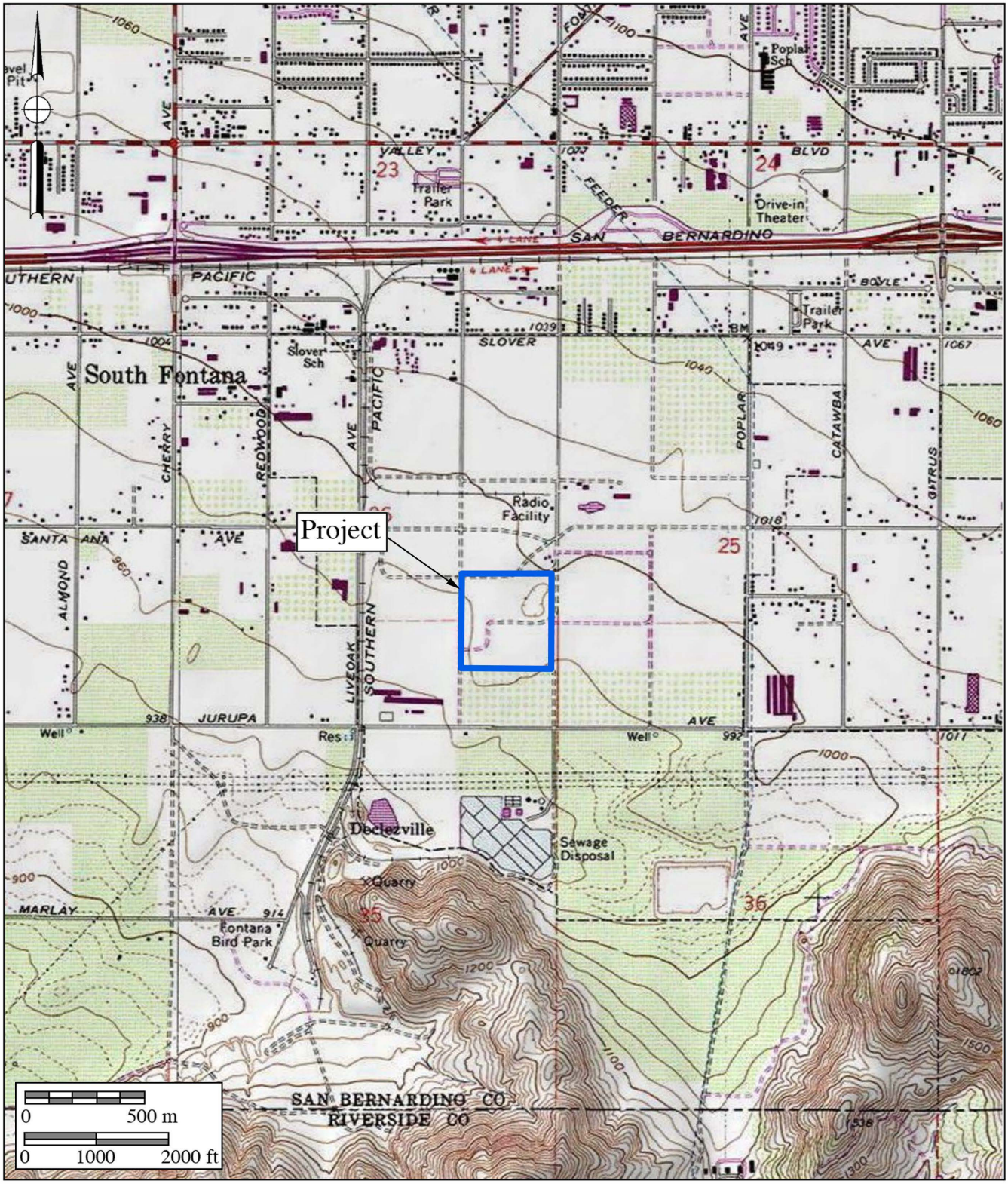


Figure 1.1–2

Project Location Map

The 22-114 Hemlock Avenue Project

USGS *Fontana* Quadrangle (7.5-minute series)

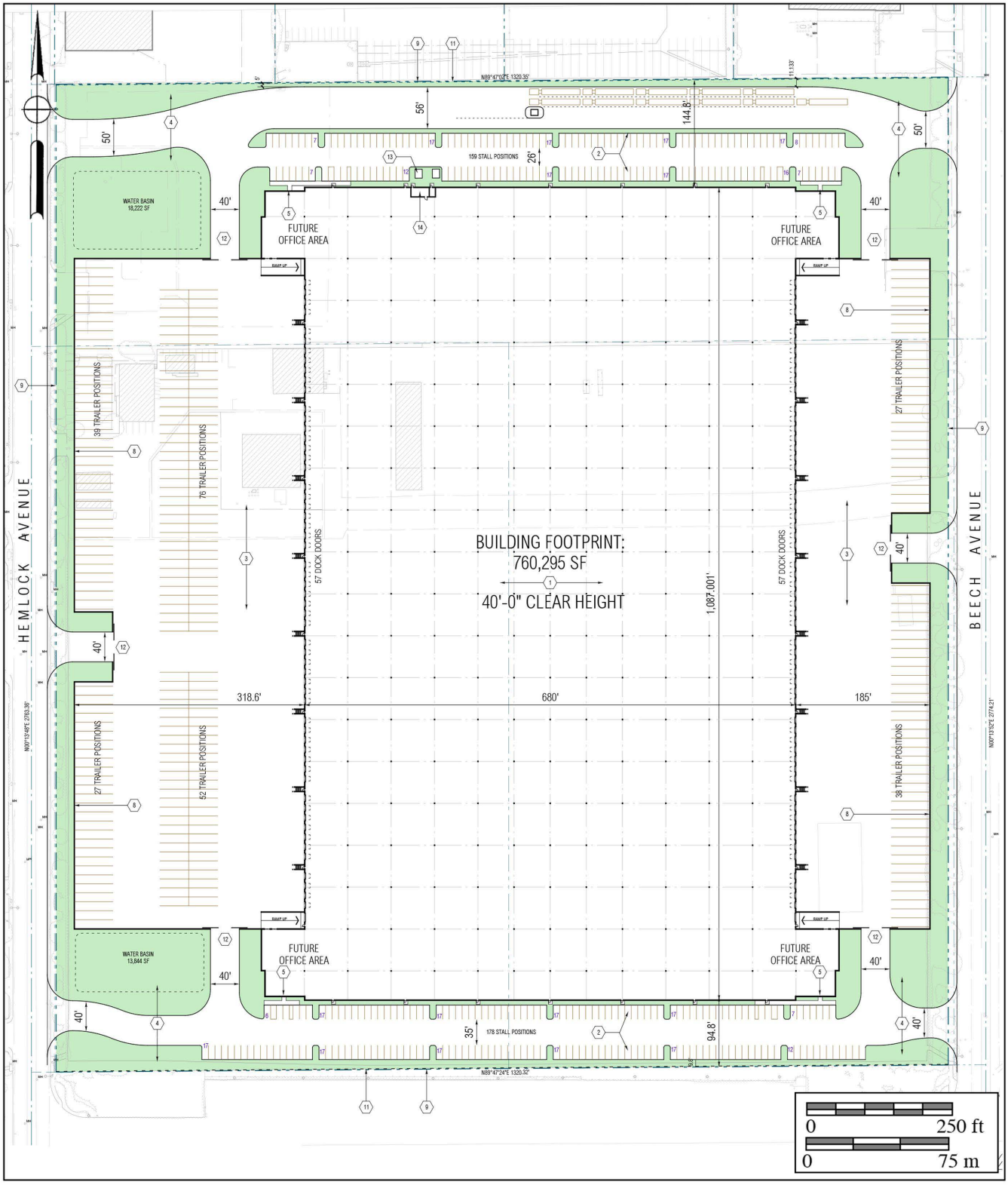


Figure 1.1–3

Conceptual Development Plan

The 22-114 Hemlock Avenue Project

Geomorphically, the project is relatively flat-lying, with a gentle slope to the southwest. The project is underlain by late to middle Pleistocene (approximately 11,700 to 780,000 years ago [Cohen and Gibbard 2011]) old alluvial fan deposits that occur as slightly raised areas protruding through the surrounding young alluvial fan sediments. At the western and eastern edges of the project, the old alluvial fan deposits are buried by Holocene and late Pleistocene (present day to approximately 120,000 years ago [Cohen and Gibbard 2011]) young alluvial fan sediments of the Lytle Creek fan (Wirths 2022; Morton 2003). Soils within the project are characterized as Tujunga gravelly loamy sand, 0 to 9 percent slopes (TvC) (NRCS 2022).

During the prehistoric period, vegetation near the project provided sufficient food resources to support prehistoric human occupants. Animals that inhabited the project during prehistoric times included mammals such as rabbits, squirrels, gophers, mice, rats, deer, and coyotes, in addition to a variety of reptiles and amphibians. The natural setting of the project during the prehistoric occupation offered a rich nutritional resource base. Fresh water was likely obtainable from the Chino Creek, Cucamonga Creek, and the Santa Ana River.

1.3 Cultural Setting

Paleo Indian, Archaic Period Milling Stone Horizon, and the Late Prehistoric Shoshonean groups are the three general cultural periods represented in San Bernardino County. The following discussion of the cultural history of San Bernardino County references the San Dieguito Complex, the Encinitas Tradition, the Milling Stone Horizon, the La Jolla Complex, the Pauma Complex, and the San Luis Rey Complex, since these culture sequences have been used to describe archaeological manifestations in the region. The Late Prehistoric component in the southwestern area of San Bernardino County was represented by the Gabrielino and Serrano Indians. According to Kroeber (1976), the Serrano probably owned a stretch of the Sierra Madre from Cucamonga east to above Mentone and halfway up to San Timoteo Canyon, including the San Bernardino Valley and just missing Riverside County. However, Kroeber (1976) also states that this area has been assigned to the Gabrielino, "which would be a more natural division of topography, since it would leave the Serrano pure mountaineers."

Absolute chronological information, where possible, will be incorporated into this discussion to examine the effectiveness of continuing to use these terms interchangeably. Reference will be made to the geologic framework that divides the culture chronology of the area into four segments: late Pleistocene (20,000 to 10,000 years before the present [YBP]), early Holocene (10,000 to 6,650 YBP), middle Holocene (6,650 to 3,350 YBP), and late Holocene (3,350 to 200 YBP).

Paleo Indian Period (Late Pleistocene: 11,500 to circa 9,000 YBP)

The Paleo Indian Period is associated with the terminus of the late Pleistocene (12,000 to 10,000 YBP). The environment during the late Pleistocene was cool and moist, which allowed for glaciation in the mountains and the formation of deep, pluvial lakes in the deserts and basin lands

(Moratto 1984). However, by the terminus of the late Pleistocene, the climate became warmer, which caused glaciers to melt, sea levels to rise, greater coastal erosion, large lakes to recede and evaporate, extinction of Pleistocene megafauna, and major vegetation changes (Moratto 1984; Martin 1967, 1973; Fagan 1991). The coastal shoreline at 10,000 YBP, depending upon the particular area of the coast, was near the 30-meter isobath, or two to six kilometers further west than its present location (Masters 1983).

Paleo Indians were likely attracted to multiple habitat types, including mountains, marshlands, estuaries, and lakeshores. These people likely subsisted using a more generalized hunting, gathering, and collecting adaptation, utilizing a variety of resources including birds, mollusks, and both large and small mammals (Erlandson and Colten 1991; Moratto 1984; Moss and Erlandson 1995).

Archaic Period (Early and Middle Holocene: circa 9,000 to 1,300 YBP)

The Archaic Period of prehistory began with the onset of the Holocene circa 9,000 YBP. The transition from the Pleistocene to the Holocene was a period of major environmental change throughout North America (Antevs 1953; Van Devender and Spaulding 1979). The general warming trend caused sea levels to rise, lakes to evaporate, and drainage patterns to change. In southern California, the general climate at the beginning of the early Holocene was marked by cool/moist periods and an increase in warm/dry periods and sea levels. The coastal shoreline at 8,000 YBP, depending upon the particular area of the coast, was near the 20-meter isobath, or one to four kilometers further west than its present location (Masters 1983).

The rising sea level during the early Holocene created rocky shorelines and bays along the coast by flooding valley floors and eroding the coastline (Curray 1965; Inman 1983). Shorelines were primarily rocky with small littoral cells, as sediments were deposited at bay edges but rarely discharged into the ocean (Reddy 2000). These bays eventually evolved into lagoons and estuaries, which provided a rich habitat for mollusks and fish. The warming trend and rising sea levels generally continued until the late Holocene (4,000 to 3,500 YBP).

At the beginning of the late Holocene, sea levels stabilized, rocky shores declined, lagoons filled with sediment, and sandy beaches became established (Gallegos 1985; Inman 1983; Masters 1994; Miller 1966; Warren and Pavesic 1963). Many former lagoons became saltwater marshes surrounded by coastal sage scrub by the late Holocene (Gallegos 2002). The sedimentation of the lagoons was significant in that it had profound effects upon the types of resources available to prehistoric peoples. Habitat was lost for certain large mollusks, namely *Chione* and *Argopecten,* but habitat was gained for other small mollusks, particularly *Donax* (Gallegos 1985; Reddy 2000). The changing lagoon habitats resulted in the decline of larger shellfish, the loss of drinking water, and the loss of Torrey Pine nuts, causing a major depopulation of the coast as people shifted inland to reliable freshwater sources and intensified their exploitation of terrestrial small game and plants, including acorns (originally proposed by Rogers 1929; Gallegos 2002).

The Archaic Period in southern California is associated with a number of different cultures,

complexes, traditions, horizons, and periods, including San Dieguito, La Jolla, Encinitas, Milling Stone, Pauma, and Intermediate.

Late Prehistoric Period (Late Holocene: 1,300 YBP to 1790)

Approximately 1,350 YBP, a Shoshonean-speaking group from the Great Basin region moved into San Bernardino County, marking the transition into the Late Prehistoric Period. This period has been characterized by higher population densities and elaborations in social, political, and technological systems. Economic systems diversified and intensified during this period, with the continued elaboration of trade networks, the use of shell-bead currency, and the appearance of more labor-intensive, yet effective, technological innovations. Technological developments during this period included the introduction of the bow and arrow between A.D. 400 and 600 and the introduction of ceramics. Atlatl darts were replaced by smaller arrow darts, including the Cottonwood series points. Other hallmarks of the Late Prehistoric Period include extensive trade networks as far reaching as the Colorado River Basin and cremation of the dead.

Protohistoric Period (Late Holocene: 1790 to Present)

Gabrielino

The territory of the Gabrielino at the time of Spanish contact covers much of present-day Los Angeles and Orange counties. The southern extent of this culture area is bounded by Aliso Creek, the eastern extent is located east of present-day San Bernardino along the Santa Ana River, the northern extent includes the San Fernando Valley, and the western extent includes portions of the Santa Monica Mountains. The Gabrielino also occupied several Channel Islands including Santa Barbara Island, Santa Catalina Island, San Nicholas Island, and San Clemente Island. Because of their access to certain resources, including a steatite source from Santa Catalina Island, this group was among the wealthiest and most populous aboriginal groups in all of southern California. Trade of materials and resources controlled by the Gabrielino extended as far north as the San Joaquin Valley, as far east as the Colorado River, and as far south as Baja California (Bean and Smith 1978a; Kroeber 1976).

The Gabrielino lived in permanent villages and smaller resource gathering camps occupied at various times of the year depending upon the seasonality of the resource. Larger villages were comprised of several families or clans, while smaller seasonal camps typically housed smaller family units. The coastal area between San Pedro and Topanga Canyon was the location of primary subsistence villages, while secondary sites were located near inland sage stands, oak groves, and pine forests. Permanent villages were located along rivers and streams, as well as in sheltered areas along the coast. As previously mentioned, the Channel Islands were also the locations of relatively large settlements (Bean and Smith 1978a; Kroeber 1976).

Resources procured along the coast and on the islands were primarily marine in nature and included tuna, swordfish, ray, shark, California sea lion, Stellar sea lion, harbor seal, northern elephant seal, sea otter, dolphin, porpoise, various waterfowl species, numerous fish species,

purple sea urchin, and mollusks such as rock scallop, California mussel, and limpet. Inland resources included oak acorn, pine nut, Mohave yucca, cacti, sage, grass nut, deer, rabbit, hare, rodent, quail, duck, and a variety of reptiles such as western pond turtle and snakes (Bean and Smith 1978a; Kroeber 1976).

The social structure of the Gabrielino is little known; however, there appears to have been at least three social classes: 1) the elite, which included the rich, chiefs, and their immediate family; 2) a middle class, which included people of relatively high economic status or long-established lineages; and 3) a class of people that included most other individuals in the society. Villages were politically autonomous units comprised of several lineages. During times of the year when certain seasonal resources were available, the village would divide into lineage groups and move out to exploit them, returning to the village between forays (Bean and Smith 1978a; Kroeber 1976).

Each lineage had its own leader, with the village chief coming from the dominant lineage. Several villages might be allied under a paramount chief. Chiefly positions were of an ascribed status, most often passed to the eldest son. Chiefly duties included providing village cohesion, leading warfare and peace negotiations with other groups, collecting tribute from the village(s) under his jurisdiction, and arbitrating disputes within the village(s). The status of the chief was legitimized by his safekeeping of the sacred bundle, which was a representation of the link between the material and spiritual realms and the embodiment of power (Bean and Smith 1978a; Kroeber 1976).

Shamans were leaders in the spirit realm. The duties of the shaman included conducting healing and curing ceremonies, guarding the sacred bundle, locating lost items, identifying and collecting poisons for arrows, and making rain (Bean and Smith 1978a; Kroeber 1976).

Marriages were made between individuals of equal social status and, in the case of powerful lineages, marriages were arranged to establish political ties between the lineages (Bean and Smith 1978a; Kroeber 1976).

Men conducted the majority of the heavy labor, hunting, fishing, and trading with other groups. Women's duties included gathering and preparing plant and animal resources, and making baskets, pots, and clothing (Bean and Smith 1978a; Kroeber 1976).

Gabrielino houses were domed, circular structures made of thatched vegetation. Houses varied in size and could house from one to several families. Sweathouses (semicircular, earth-covered buildings) were public structures used in male social ceremonies. Other structures included menstrual huts and a ceremonial structure called a *yuvar,* an open-air structure built near the chief's house (Bean and Smith 1978a; Kroeber 1976).

Clothing was minimal. Men and children most often went naked, while women wore deerskin or bark aprons. In cold weather, deerskin, rabbit fur, or bird skin (with feathers intact) cloaks were worn. Island and coastal groups used sea otter fur for cloaks. In areas of rough terrain, yucca fiber sandals were worn. Women often used red ochre on their faces and skin for adornment or protection from the sun. Adornment items included feathers, fur, shells, and beads (Bean and Smith 1978a; Kroeber 1976).

Hunting implements included wood clubs, sinew-backed bows, slings, and throwing clubs. Maritime implements included rafts, harpoons, spears, hook and line, and nets. A variety of other tools included deer scapulae saws, bone and shell needles, bone awls, scrapers, bone or shell flakers, wedges, stone knives and drills, metates, mullers, manos, shell spoons, bark platters, and wood paddles and bowls. Baskets were made from rush, deer grass, and skunkbush. Baskets were fashioned for hoppers, plates, trays, and winnowers for leaching, straining, and gathering. Baskets were also used for storing, preparing, and serving food, and for keeping personal and ceremonial items (Bean and Smith 1978a; Kroeber 1976).

The Gabrielino had exclusive access to soapstone, or steatite, procured from Santa Catalina Island quarries. This highly prized material was used for making pipes, animal carvings, ritual objects, ornaments, and cooking utensils. The Gabrielino profited well from trading steatite since it was valued so much by groups throughout southern California (Bean and Smith 1978a; Kroeber 1976).

Serrano

Aboriginally, the Serrano occupied an area east of present-day Los Angeles. According to Bean and Smith (1978b), definitive boundaries are difficult to place for the Serrano due to their sociopolitical organization and a lack of reliable data:

> The Serrano were organized into autonomous localized lineages occupying definite, favored territories, but rarely claiming any territory far removed from the lineage's home base. Since the entire dialectical group was neither politically united nor amalgamated into supralineage groups, as many of their neighbors were, one must speak in terms of generalized areas of usage rather than pan-tribal holdings. (Strong [1929] in Bean and Smith 1978b)

However, researchers place the Serrano in the San Bernardino Mountains east of Cajon Pass and at the base of and north of the mountains near Victorville, east to Twentynine Palms, and south to the Yucaipa Valley (Bean and Smith 1978b). Serrano has been used broadly for languages in the Takic family including Serrano, Kitanemuk, Vanyume, and Tataviam.

The Serrano were part of "exogamous clans, which in turn were affiliated with one of two exogamous moieties, *tuk^{w}utam* (Wildcat) and *wahiʔiam* (Coyote)" (Bean and Smith 1978b). According to Strong (1971), details such as number, structure, and function of the clans are unknown. Instead, he states that clans were not political, but were rather structured based upon "economic, marital, or ceremonial reciprocity, a pattern common throughout Southern California" (Bean and Smith 1978b). The Serrano formed alliances amongst their own clans and with Cahuilla, Chemehuevi, Gabrielino, and Cupeño clans (Bean and Smith 1978b). Clans were large, autonomous, political and landholding units formed patrilineally, with all males descending from a common male ancestor, including all wives and descendants of the males. However, even after

marriage, women would still keep their original lineage, and would still participate in those ceremonies (Bean and Smith 1978b).

According to Bean and Smith (1978b), the cosmogony and cosmography of the Serrano are very similar to those of the Cahuilla:

> There are twin creator gods, a creation myth told in "epic poem" style, each local group having its own origin story, water babies whose crying foretells death, supernatural beings of various kinds and on various hierarchically arranged power-access levels, an Orpheus-like myth, mythical deer that no one can kill, and tales relating the adventures (and misadventures) of Coyote, a tragicomic trickster-transformer culture hero. (Bean [1962-1972] and Benedict [1924] in Bean and Smith 1978b)

The Serrano had a shaman, a person who acquired their powers through dreams, which were induced through ingestion of the hallucinogen datura. The shaman was mostly a curer/healer, using herbal remedies and "sucking out the disease-causing agents" (Bean and Smith 1978b).

Serrano village locations were typically located near water sources. Individual family dwellings were likely circular, domed structures. Daily household activities would either take place outside of the house out in the open, or under a ramada constructed of a thatched willow pole roof held up by four or more poles inserted into the ground. Families could consist of a husband, wife/wives, unmarried female children, married male children, the husband's parents, and/or widowed aunts and uncles. Rarely, an individual would occupy his own house, typically in the mountains. Serrano villages also included a large ceremonial house where the lineage leader would live, which served as the religious center for lineages or lineage-sets, granaries, and sweathouses (Bean and Smith 1978b).

The Serrano were primarily hunters and gatherers. Vegetal staples varied with locality. Acorns and piñon nuts were found in the foothills, and mesquite, yucca roots, cacti fruits, and piñon nuts were found in or near the desert regions. Diets were supplemented with other roots, bulbs, shoots, and seeds (Heizer 1978). Deer, mountain sheep, antelopes, rabbits, and other small rodents were among the principal food packages. Various game birds, especially quail, were also hunted. The bow and arrow was used for large game, while smaller game and birds were killed with curved throwing sticks, traps, and snares. Occasionally, game was hunted communally, often during mourning ceremonies (Benedict 1924; Drucker 1937; Heizer 1978). Earth ovens were used to cook meat, bones were boiled to extract marrow, and blood was either drunk cold or cooked to a thicker consistency and then eaten. Some meat and vegetables were sun-dried and stored. Food acquisition and processing required the manufacture of additional items such as knives, stone or bone scrapers, pottery trays and bowls, bone or horn spoons, and stirrers. Mortars, made of either stone or wood, and metates were also manufactured (Strong 1971; Drucker 1937; Benedict 1924).

The Serrano were very similar technologically to the Cahuilla. In general, manufactured

goods included baskets, some pottery, rabbit-skin blankets, awls, arrow straighteners, sinew-backed bows, arrows, fire drills, stone pipes, musical instruments (rattles, rasps, whistles, bull-roarers, and flutes), feathered costumes, mats for floor and wall coverings, bags, storage pouches, cordage (usually comprised of yucca fiber), and nets (Heizer 1978).

Ethnohistoric Period (1769 to Present)

The historic background of the project area began with the Spanish colonization of Alta California. The first Spanish colonizing expedition reached southern California in 1769 with the intention of converting and civilizing the indigenous populations, as well as expanding the knowledge of and access to new resources in the region (Brigandi 1998). As a result, by the late eighteenth century, a large portion of southern California was overseen by Mission San Luis Rey (San Diego County), Mission San Juan Capistrano (Orange County), and Mission San Gabriel (Los Angeles County), who began colonization the region and surrounding areas (Chapman 1921).

Up until this time, the only known way to feasibly travel from Sonora to Alta California was by sea. In 1774, Juan Bautista de Anza, an army captain at Tubac, requested and was given permission by the governor of the Mexican State of Sonora to establish an overland route from Sonora to Monterey (Chapman 1921). In doing so, Juan Bautista de Anza passed through what is now Riverside County and described the area in writing for the first time (Caughey 1970; Chapman 1921). In 1797, Father Presidente Lausen (of Mission San Diego de Alcalá), Father Norberto de Santiago, and Corporal Pedro Lisalde (of Mission San Juan Capistrano) led an expedition through southwestern Riverside County in search of a new mission site to establish a presence between San Diego and San Juan Capistrano (Engelhardt 1921). Their efforts ultimately resulted in the establishment of Mission San Luis Rey in Oceanside, California.

Each mission gained power through the support of a large, subjugated Native American workforce. As the missions grew, livestock holdings increased and became more vulnerable to theft. In order to protect their interests, the southern California missions began to expand inland to try and provide additional security (Beattie and Beattie 1939; Caughey 1970). In order to meet their needs, the Spaniards embarked on a formal expedition in 1806 to find potential locations within what is now the San Bernardino Valley. As a result, by 1810, Father Francisco Dumetz of Mission San Gabriel had succeeded in establishing a religious site, or capilla, at a Cahuilla rancheria called Guachama (Beattie and Beattie 1939). San Bernardino Valley received its name from this site, which was dedicated to San Bernardino de Siena by Father Dumetz. The Guachama rancheria was located in present-day Bryn Mawr in San Bernardino County.

These early colonization efforts were followed by the establishment of estancias at Puente (circa 1816) and San Bernardino (circa 1819) near Guachama (Beattie and Beattie 1939). These efforts were soon mirrored by the Spaniards from Mission San Luis Rey, who in turn established a presence in what is now Lake Elsinore, Temecula, and Murrieta (Chapman 1921). The indigenous groups who occupied these lands were recruited by missionaries, converted, and put to work in the missions (Pourade 1961). Throughout this period, the Native American populations

were decimated by introduced diseases, a drastic shift in diet resulting in poor nutrition, and social conflicts due to the introduction of an entirely new social order (Cook 1976).

Mexico achieved independence from Spain in 1822 and became a federal republic in 1824. As a result, both Baja and Alta California were classified as territories (Rolle 1969). Shortly thereafter, the Mexican Republic sought to grant large tracts of private land to its citizens to begin to encourage immigration to California and to establish its presence in the region. Part of the establishment of power and control included the desecularization of the missions circa 1832. These same missions were also located on some of the most fertile land in California and were considered highly valuable as a result. The resulting land grants, known as "ranchos," covered expansive portions of California and by 1846, more than 600 land grants had been issued by the Mexican government. Rancho Jurupa was the first rancho to be established and was issued to Juan Bandini in 1838. Although Bandini primarily resided in San Diego, Rancho Jurupa was located in what is now Riverside County (Pourade 1963).

The treatment of Native Americans grew worse during the Rancho Period. Most of the Native Americans were forced off of their land or put to work on the now privately-owned ranchos, most often as slave labor. In light of the brutal ranchos, the degree to which Native Americans had become dependent upon the mission system is evident when, in 1838, a group of Native Americans from Mission San Luis Rey petitioned government officials in San Diego to relieve suffering at the hands of the rancheros:

> We have suffered incalculable losses, for some of which we are in part to be blamed for because many of us have abandoned the Mission … We plead and beseech you … to grant us a Rev. Father for this place. We have been accustomed to the Rev. Fathers and to their manner of managing the duties. We labored under their intelligent directions, and we were obedient to the Fathers according to the regulations, because we considered it as good for us. (Brigandi 1998:21)

Native American culture had been disrupted to the point where they could no longer rely upon prehistoric subsistence and social patterns. Not only does this illustrate how dependent the Native Americans had become upon the missionaries, but it also indicates a marked contrast in the way the Spanish treated the Native Americans compared to the Mexican and United States ranchers. Spanish colonialism (missions) is based upon utilizing human resources while integrating them into their society. The Mexican and American ranchers did not accept Native Americans into their social order and used them specifically for the extraction of labor, resources, and profit. Rather than being incorporated, they were either subjugated or exterminated (Cook 1976).

By 1846, tensions between the United States and Mexico had escalated to the point of war (Rolle 1969). In order to reach a peaceful agreement, the Treaty of Guadalupe Hidalgo was put into effect in 1848, which resulted in the annexation of California to the United States. Once

California opened to the United States, waves of settlers moved in searching for gold mines, business opportunities, political opportunities, religious freedom, and adventure (Rolle 1969; Caughey 1970). By 1850, California had become a state and was eventually divided into 27 separate counties. While a much larger population was now settling in California, this was primarily in the central valley, San Francisco, and the Gold Rush region of the Sierra Nevada mountain range (Rolle 1969; Caughey 1970). During this time, southern California grew at a much slower pace than northern California and was still dominated by the cattle industry established during the earlier rancho period.

During the same decade, circa 1852, the Native Americans of southern Riverside County, including the Luiseño and the Cahuilla, thought they had signed a treaty resulting in their ownership of all lands from Temecula to Aguanga east to the desert, including the San Jacinto Valley and the San Gorgonio Pass. The Temecula Treaty also included food and clothing provisions for the Native Americans. However, Congress never ratified these treaties, and the promise of one large reservation was rescinded (Brigandi 1998).

With the completion of the Southern Pacific Railroad in 1869, southern California saw its first major population expansion. The population boom continued circa 1874 with the completion of connections between the Southern Pacific Railroad in Sacramento to the transcontinental Central Pacific Railroad in Los Angeles (Rolle 1969; Caughey 1970). The population influx brought farmers, land speculators, and prospective developers to the region.

General History of the City of Fontana

In 1869, Andrew Jackson Pope, cofounder of the Pope & Talbot Company, a lumber dealer based out of San Francisco (Ancestry.com 2009a, 2009b; University of Washington Libraries, Special Collections 2018), purchased 3,840 acres of land in San Bernardino County as part of the Land Act of 1820. "During the ensuing years, Andrew Pope and W.C. Talbot acquired other properties in the West, chiefly in California. By 1874, they owned a real estate empire, including almost 80,000 acres of ranch lands" (World Forestry Center 2017).

Pope passed away in 1878 amid water rights conflicts between grant owners (himself) and settlers surrounding his Fontana-area lands. As a result of the water rights conflict, in which the United States Supreme Court sided with the grant owners, the Lytle Creek Water Company was formed in 1881. The purpose of the Lytle Creek Water Company was to:

> [U]nify the interests of appropriators to the stream, to fight the grant owners. These latter had the law on their side, but the settlers had the water, and were holding and using it. An injunction was issued in favor of the grant owners, restraining the settlers from using the water, but it was never enforced. The conflict was a long and bitter one. In the meantime, the grant owners, and others operating with them, quietly bought up the stock of the Lytle Creek Water Company, until enough to control it was secured, and sold out these rights to the projectors of the Semi-tropic

> Land and Water Company, with the riparian lands, which movement seems to have quieted the conflict. (Hall 1888)

The Semi-Tropic Land and Water Company was incorporated in 1887. That year, the company platted the settlement of Rosena, but no structures were erected. By 1888, the company had acquired "something more than twenty-eight thousand five hundred acres of land, embracing the channel of Lytle creek for ten miles" (Hall 1888). In the early 1900s:

> The use of the automobile had grown considerably … and there was a need for better roads, the The National Old Trails (N.O.T.) Association was organized to promote a highway between Los Angeles and New York; which was aligned close to the tracks of the AT & Santa Fe railroad through California and Arizona, passing through Fontana. (Whittall 2020)

In 1903, San Bernardino contractor and agriculturist A.B. Miller and "his pioneer Fontana Development Company purchased Rosena and by 1905, had begun the building of a farming complex that included an assortment of barns, dining rooms, a 200-man bunk house, a kitchen, a company store, as well as the ranch house used by the foreman" (Anicic 1982). By 1906, Miller had also taken over the remainder of the Semi-Tropic Land and Water Company assets and created the Fontana Farms Company and the Fontana Land Company. Afterward, Miller oversaw the construction of an irrigation system that utilized the water from Lytle Creek, as well as the planting of "half a million eucalyptus saplings as windbreaks" (Cornford 1995).

In 1913, the town of Fontana was platted between Foothill Boulevard and the Santa Fe railroad tracks. That year, Foothill Boulevard was improved "and the Automobile Club of Southern California's map of 1912 shows the N.O.T. highway running on the north side of the Santa Fe Railroad, passing through Rialto and heading straight, west until reaching Cucamonga" (Whittall 2020). Much of the land to the south of the Fontana townsite, including the subject property, was utilized as a hog farm, while the remainder of the Fontana Farms Company land was subdivided into small farms. The smaller "starter farms" were approximately 2.5 acres and the new owner was able to choose between grapevines or walnut trees, all supplied by the Fontana Farms nursery.

"In 1926, the N.O.T. alignment became part of the newly created U.S. Highway 66. And it was gradually improved and widened after that date" (Whittall 2020). "By 1930 the Fontana Company had subdivided more than three thousand homesteads, half occupied by full-time settlers, some of them immigrants from Hungary, Yugoslavia, and Italy" (Cornford 1995).

Kaiser Steel was founded in Fontana in the 1940s and became one of the main producers of steel west of the Mississippi River. The facility was financed and built by the wartime government agency known as the Defense Plant Corporation (DPC) and was one of two steel plants in the west (Graves 2009). To provide for his workers' health needs, Henry J. Kaiser constructed

the Fontana Kaiser Permanente medical facility, which is now the largest managed care organization in the United States. According to Cornford (1995):

> For hundreds of Dustbowl refugees from the Southwest, still working in the orchards at the beginning of World War Two, Kaiser Steel was the happy ending to the Grapes of Wrath. Construction of the mill drained the San Bernardino Valley of workers, creating an agricultural labor shortage that was not relieved until the coming of the *braceros* in 1943. Kaiser originally believed that he could apply his Richmond methods to shaping the Fontana workforce: leaving the construction crews in place and "training them in ten days to make steel" under the guidance of experts hired from the East. But he underestimated the craft knowledge and folklore, communicated only through hereditary communities of steelworkers, that were essential to making steel. Urgent appeals, therefore, were circulated through the steel valleys of Pennsylvania, Ohio, and West Virginia, recruiting draft-exempt steel specialists for Fontana.[61]
>
> The impact of five thousand steelworkers and their families on local rusticity was predictably shattering. The available housing stock in Fontana and western San Bernardino County (also coveted by incoming military families) was quickly saturated. With few zoning ordinances to control the anarchy, temporary and substandard shelters of every kind sprouted up in Fontana and neighboring districts like Rialto, Bloomington, and Cucamonga. Most of the original blast furnace crew was housed in a gerrybuilt trailer park known affectionately as "Kaiserville." Later arrivals were often forced to live out of their cars. The old Fontana Farms colonists came under great pressure to sell to developers and speculators. Others converted their chicken coops to shacks and rented them to single workers—a primitive housing form that was still common through the 1950s.[62]
>
> Although areas of Fontana retained their Millerian charm, especially the redtiled village center along Sierra with its art-deco theater and prosperous stores, boisterous, often rowdy, juke joints and roadhouses created a different ambience along Arrow Highway and Foothill Boulevard. Neighboring Rialto—presumably the location of Eddie Mars's casino in Chandler's *The Big Sleep* —acquired a notorious reputation as a wide-open gambling center and L.A. mob hangout (a reputation which it has recovered in the 1990s as the capital of the Inland Empire's crack gangs). Meanwhile the ceaseless truck traffic from the mill, together with the town's adjacency to Route 66 (and, today, to Interstates 10 and 15), made Fontana a major regional trucking center, with bustling twenty-four-hour fuel stops and cafes on its outskirts …

> Boomtown Fontana of the 1940s ceased to be a coherent community or cultural fabric. Instead it was a colorful but dissonant *bricolage* of Sunkist growers, Slovene chicken ranchers, gamblers, mobsters, over-the-road truckers, industrialized Okies, *braceros*, the Army Air Corps (at nearby bases), and transplanted steelworkers and their families.

Wallis (2018) elaborates:

> Towards the tail end of the war, Kaiser would propose a massive steel deal in an attempt to rejuvenate the Kaiser steel company. This deal would expand the company because Kaiser foresaw a spike in postwar steel production. "At one point he became expansive in the outlining of Los Angeles' probable role in the immense industrial development of Southern California. [3] Kaiser had a feeling that not only would items like washing machines and stove production spike after the war but rail and automobile production would spike as well. "…overall steel production of 1,800,000 a year of steel products ranging from ships, washing machines, housing structural shapes, utensils, roofing and stoves to rails and sheet metal for tinplate and most size pipes." [4] Kaisers deal and his bold productions would see the companies steel production increase greatly after the war to a point where it actually is said to have broken steel production records. "Henry J. Kaiser said in a year-end statement today that a record breaking 853,000 tons of steel ingots were produced at the Fontana plant in 1948.

Following the war:

> … the [Kaiser] Health Plan in Fontana went public, and with the strong support of labor unions like the Retail Clerks International Union and the International Longshoremen and Warehousemen Union [ILWU] it began to grow throughout the region. The first facility outside of Fontana was established in Harbor City in 1950 when the entire West Coast ILWU signed up for the plan. (Cushing 2013)

At that time, Henry Kaiser expanded his efforts beyond the steel mill itself and into experimental aviation and mass-produced housing. Although his "venture into experimental aviation was short-lived," he had "substantial success" in the field of mass-produced housing (Cornford 1995). "For two decades he had been building homes for his dam and shipyard workers, even master planning entire communities" (Cornford 1995). "Shortly after V-J Day Kaiser dramatically announced a 'housing revolution'" consisting of "'a nearly 100 mile plant-to-site assembly line' in Southern California (where he predicted that immigration would reach a million per year in the immediate postwar period)" (Cornford 1995). This assembly line consisted of the "construction of ten

thousand prefabricated homes in the Westchester, North Hollywood, and Panorama City areas" (Cornford 1995):

> After the turbulent, sometimes violent, transitions of the 1940s, Fontana settled down into the routines of a young milltown. The Korean War boom enlarged the Kaiser workforce by almost 50 per cent and stimulated a new immigration from the East that reinforced the social weight of traditional steelworker families. The company devoted new resources to organizing the leisure time of its employees, while the union took a more active role in the community. The complex craft subcultures of the plant intersected with ethnic self-organization to generate competing cliques and differential pathways for mobility. At the same time, the familiar sociology of plant-community interaction was overlaid by lifestyles peculiar to Fontana's Millerian heritage and its location on the borders of metropolitan Los Angeles and the Mojave Desert. Although locals continued to joke that Fontana was just Aliquippa with sunshine, it was evolving into a *sui generis* working-class community. (Cornford 1995)

The increased immigration to the area during and after the war created a housing boom equivalent to that seen in other areas focused upon wartime production, such as San Diego (City of San Diego 2007) and Seattle (Stropes et al. 2019). One of the most common architectural styles during the Post-war boom was the Minimal Traditional style. Between 1935 and 1950, the Minimal Traditional home was one of the few designs approved by the Federal Housing Administration (FHA). "In an explosion of building at the war's end, 5.1 million homes were built between 1946 and 1949. Minimal Traditionals made up a significant portion of these" (McAlester 2015). "By 1950 the Minimal Traditional was being replaced by Ranch homes. Postwar prosperity meant that larger homes could be built and financed, and the Ranch was a perfect fit for the tastes of a new decade" (McAlester 2015).

The city of Fontana was incorporated on June 25, 1952 "and shortly after, the freeway system in LA would start to divert traffic away from Route 66" (Whittall 2020). However, despite traffic being diverted away from the Fontana area:

> In the 1950s and '60s, Fontana was home to a drag racing strip that was a venue in the NHRA circuit. Mickey Thompson's Fontana International Dragway was also referred to as Fontana Drag City or Fontana Drag Strip. The original Fontana strip is long since defunct, but the owners of NASCAR's new Auto Club Speedway opened a new NHRA-sanctioned drag strip in Fontana in mid-2006 to resurrect Fontana's drag-racing heritage. (Kiddle Encyclopedia 2022)

"In 1964, Route 66 was replaced by the freeway and two years later, Fontana joined the city of

Duarte trying to have a large sign posted in San Bernardino to announce that Route 66 remained a through route into Los Angeles, they failed" (Whittall 2020).

Kaiser Steel was eventually closed in the 1980s; however, the city has since become a transportation hub for trucking due to the number of highways that intersect in the area (Anicic 2005; City of Fontana 2018b).

Between 1980 and 1987, Fontana's population doubled from 35,000 to 70,000, assisted by the Fontana Redevelopment Agency, who provided incentives for housing developers to build within the city (City of Fontana 2018c; Cornford 1995). This process led to the first specific plan and development agreement for the SouthRidge residential area. Residential development continued to grow through the 1990s; however, commercial activities in the downtown area declined as new commercial developments near freeways and the new residential areas pulled shopping away from the historic downtown core (City of Fontana 2018c).

History of the Project Area

An aerial photograph from 1938 shows the southern portion of the project as vacant agricultural land while the northern portion of the project contains various pens and livestock holding areas. The subject property was originally part of the Fontana Farms hog ranch. The hog ranch opened in 1921 (San Bernardino County 2022). By 1925, the hog ranch was one of the largest of such operations in the world with a population of 44,244 hogs (Ballester and Goodman 2015). Between the early 1920s and the late 1950s, the hogs were fed garbage shipped in by rail from Los Angeles, which was dumped directly into the pens:

> This entailed a tremendous job of organization and planning for the procuring, feeding, breeding, shipping and handling of hogs numbering up to 67,300 the ranch's biggest year. A special spur was run from the mainline railroad track to allow the gondolas bearing the garbage to travel down the middle of the ranch while a huge crane mounted on a railroad car distributed the garbage into the feeding areas [Plate 1.3–1]. (Evans 1989)

Accounts of silver settings, phonograph needles, and other expensive non-food related items found in the garbage were commonplace (Blackstock 2017; Evans 1989; Scalf 2018).



Plate 1.3–1: Hogs being fed by steam shovel at the Fontana Farms hog ranch circa 1935.
(Photograph courtesy of the Los Angeles Public Library)

The Fontana Farms Company deeded the ranch to M.H. Lerner, Sidney Lerner, and A.A. Spiegle in 1945 who later deeded the operation to Riverside Grain and Milling around 1948 (Ballester and Goodman 2015). A historic aerial photograph from 1948 shows the continued use of the current project within the hog ranch (Plate 1.3–2). Evans (1989) indicates that the hog ranch shut down in 1950. By 1959, most elements of the hog ranch had been removed (Ballester and Goodman 2015). An aerial photograph from 1959 shows much of the subject property had been cleared and portions of property appear to have been graded (Plate 1.3–3). The clearing of the property continued and by 1967, all remnants of the former hog ranch appear to have been removed from the subject property (Plate 1.3–4). The 1985 aerial photograph shows that the property had been completely cleared, while the northwestern corner of the property appears to have been recently graded. By 1994, the northwestern corner appears to contain a commercial/industrial storage yard and the 2002 aerial photograph shows the property containing some structures and being utilized as a commercial/industrial yard for a prefabricated/modular structure business. More recent aerial photographs show the addition and removal of prefabricated structures and/or trailers throughout the years, but no significant changes have been made to the property since 2002.



Plate 1.3–2

1948 Aerial Photograph

The 22-114 Hemlock Avenue Project



Plate 1.3–3

1959 Aerial Photograph

The 22-114 Hemlock Avenue Project



Plate 1.3–4

1967 Aerial Photograph

The 22-114 Hemlock Avenue Project

1.3.1 Results of the Archaeological Records Search

An archaeological records search was conducted utilizing data obtained from the SCCIC at CSU Fullerton for the project and a one-mile search radius. The results of the records search indicate that no resources have been recorded within the subject property. However, 24 resources (eight prehistoric and 16 historic) are located within one mile of the project. The prehistoric resources consist of three artifacts scatters and five isolates, while the historic resources are primarily associated with the built environment (Table 1.3–1).

Table 1.3–1
Cultural Resources Located Within
One Mile of the 22-114 Hemlock Avenue Project

Site(s)	Description
SBR-1632, SBR-4549, and SBR-4550	Prehistoric artifact scatter
P-36-060216, P-36-060217, P-36-060219, P-36-060221, and P-36-060222	Prehistoric isolate
SBR-4584H	Historic Declez Ranch / Felice Pagliuso Winery/Chapel Site
SBR-7426H	Historic Southern Pacific Railroad Declezville Branch Line
SBR-7795H	Historic foundations, sidewalks, and trash deposits
SBR-9862H	Historic gasoline filling station feature
SBR-10,330H	Historic Southern Pacific Railroad alignment
P-36-020026, P-36-020027, P-36-020028, P-36-020029, P-36-020030, P-36-020031, P-36-029643, and P-36-033192	Historic single-family residence(s)
P-36-026051	Historic transmission line
SBR-28,639H	Historic refuse scatter and concrete footings associated with the Fontana Farms hog ranch
SBR-29,467H	Historic sewage treatment plant

The records search data also identified 28 studies that have been conducted within one mile of the project (see Appendix B), none of which included the subject property.

The following historic sources were also reviewed:

- The National Register of Historic Places Index
- The Office of Historic Preservation (OHP), Archaeological Determinations of Eligibility
- The OHP, Built Environment Resources Directory
- Historic aerial photographs (1938 to 2020)
- San Bernardino County Property Information Management System (PIMS) data

- The USGS 15' 1896 *San Bernardino*, 7.5' 1943 *Fontana,* 7.5' 1953 *Fontana,* and 7.5' 1975 *Fontana* topographic maps

No archaeological resources were identified as a result of any of the above sources; however, as discussed above, the aerial photographs show the early use of the property as part of the Fontana Farms hog ranch before being cleared and developed for industrial/commercial use. The historic USGS maps do not show the hog ranch facilities within the property; however, on the 1953 *Fontana* USGS map, a railroad spur is shown as extending onto the subject property, likely utilized for feeding the hogs as indicated above. Based upon the San Bernardino County PIMS data, all permanent structures within the property were constructed after 2000.

1.3.2 Native American Heritage Commission Sacred Lands File Search

At BFSA's discretion, a SLF search was requested from the NAHC on September 15, 2022. The search was conducted to determine if any recorded Native American sacred sites or locations of religious or ceremonial importance, not recorded with the SCCIC, are present within the project. However, as of the date of this report, the search results have not been received from the NAHC. All correspondence can be found within Appendix C.

1.4 Applicable Regulations

Resource importance is assigned to districts, sites, buildings, structures, and objects that possess exceptional value or quality illustrating or interpreting the heritage of San Bernardino County in history, architecture, archaeology, engineering, and culture. A number of criteria are used in demonstrating resource importance. Specifically, the criteria outlined in CEQA provide the guidance for making such a determination, as provided below.

1.4.1 California Environmental Quality Act

According to CEQA (§15064.5a), the term "historical resource" includes the following:

1) A resource listed in or determined to be eligible by the State Historical Resources Commission for listing in the California Register of Historical Resources (CRHR) (Public Resources Code [PRC] SS5024.1, Title 14 CCR. Section 4850 et seq.).
2) A resource included in a local register of historical resources, as defined in Section 5020.1(k) of the PRC or identified as significant in a historical resource survey meeting the requirements of Section 5024.1(g) of the PRC, shall be presumed to be historically or culturally significant. Public agencies must treat any such resource as significant unless the preponderance of evidence demonstrates that it is not historically or culturally significant.
3) Any object, building, structure, site, area, place, record, or manuscript, which a lead agency determines to be historically significant or significant in the architectural,

engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be a historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record. Generally, a resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing on the CRHR (PRC SS5024.1, Title 14, Section 4852) including the following:

a) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
b) Is associated with the lives of persons important in our past;
c) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
d) Has yielded, or may be likely to yield, information important in prehistory or history.

4) The fact that a resource is not listed in, or determined eligible for listing in the CRHR, not included in a local register of historical resources (pursuant to Section 5020.1[k] of the PRC), or identified in a historical resources survey (meeting the criteria in Section 5024.1[g] of the PRC) does not preclude a lead agency from determining that the resource may be a historical resource as defined in PRC Section 5020.1(j) or 5024.1.

According to CEQA (§15064.5b), a project with an effect that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment. CEQA defines a substantial adverse change as:

1) Substantial adverse change in the significance of a historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource would be materially impaired.
2) The significance of a historical resource is materially impaired when a project:

a) Demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the CRHR; or
b) Demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources pursuant to Section 5020.1(k) of the PRC or its identification in a historical resources survey meeting the requirements of Section 5024.1(g) of

the PRC, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or,

c) Demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its eligibility for inclusion in the CRHR as determined by a lead agency for purposes of CEQA.

Section 15064.5(c) of CEQA applies to effects upon archaeological sites and contains the following additional provisions regarding archaeological sites:

1. When a project will impact an archaeological site, a lead agency shall first determine whether the site is a historical resource, as defined in subsection (a).
2. If a lead agency determines that the archaeological site is a historical resource, it shall refer to the provisions of Section 21084.1 of the PRC, Section 15126.4 of the guidelines, and the limits contained in Section 21083.2 of the PRC do not apply.
3. If an archaeological site does not meet the criteria defined in subsection (a), but does meet the definition of a unique archaeological resource in Section 21083.2 of the PRC, the site shall be treated in accordance with the provisions of Section 21083.2. The time and cost limitations described in PRC Section 21083.2(c-f) do not apply to surveys and site evaluation activities intended to determine whether the project location contains unique archaeological resources.
4. If an archaeological resource is neither a unique archaeological nor historical resource, the effects of the project on those resources shall not be considered a significant effect on the environment. It shall be sufficient that both the resource and the effect on it are noted in the Initial Study or Environmental Impact Report, if one is prepared to address impacts on other resources, but they need not be considered further in the CEQA process.

Section 15064.5(d-e) contains additional provisions regarding human remains. Regarding Native American human remains, paragraph (d) provides:

(d) When an Initial Study identifies the existence of, or the probable likelihood of, Native American human remains within the project, a lead agency shall work with the appropriate Native Americans as identified by the NAHC, as provided in PRC SS5097.98. The applicant may develop an agreement for treating or disposing of, with appropriate dignity, the human remains and any items associated with Native American burials with the appropriate Native Americans as identified by the NAHC. Action implementing such an agreement is exempt from:

1) The general prohibition on disinterring, disturbing, or removing human remains from any location other than a dedicated cemetery (Health and Safety Code Section 7050.5).
2) The requirements of CEQA and the Coastal Act.

2.0 STUDY OBJECTIVES

The primary object of this study is to identify any cultural resources, should they exist, within the project. For the current project, the study area under investigation is in the city of Fontana in the southwestern portion of San Bernardino County. The scope of work for the cultural resources study conducted for the project included the survey of the 40.01-acre property. Given the area involved, the research goals for this project are focused upon realistic study options. Since the main objective of the investigation is to identify the presence of and potential impacts to cultural resources, the goal is not necessarily to answer wide-reaching theories regarding the development of early southern California, but to investigate the role and importance of the identified resources. Nevertheless, the assessment of the significance of a resource must take into consideration a variety of characteristics, as well as the ability of the resource to address regional research topics and issues.

At the survey level, the principal research objective is a generalized investigation of changing settlement patterns in both the prehistoric and historic periods within the study area. The overall goal is to understand settlement and resource procurement patterns of the project area occupants. Therefore, adequate information on site function, context, and chronology from an archaeological perspective is essential for the investigation. The fieldwork and research were undertaken with these primary research goals in mind:

1) To identify cultural resources occurring within the project;
2) To determine, if possible, site type and function, context of the deposit, and chronological placement of each cultural resource identified;
3) To place each cultural resource identified within a regional perspective; and
4) To provide recommendations for the treatment of each of the cultural resources identified.

3.0 ANALYSIS OF PROJECT EFFECTS

The cultural resources study of the project consisted of an institutional records search and an intensive cultural resource survey of the entire 40.01-acre property. This study was conducted in conformance with City of Fontana environmental guidelines, Section 21083.2 of the California PRC, and CEQA. Statutory requirements of CEQA (Section 15064.5) were followed for the identification and evaluation of resources. Specific definitions for archaeological resource type(s) used in this report are those established by the State Historic Preservation Office (SHPO 1995).

3.1 Methods

The survey methodology employed during the current investigation followed standard archaeological field procedures and was sufficient to accomplish a thorough assessment of the project. The field methodology employed for the project included walking evenly spaced survey transects set approximately 15 to 20 meters apart while visually inspecting the ground surface. Photographs documenting overall survey conditions were taken frequently.

3.2 Results of the Field Survey

Senior Project Archaeologist Andrew Garrison conducted the pedestrian survey of the project on October 17, 2022. At the time of the survey, the property was primarily characterized as previously developed and containing structures and a storage yard for ModSpace, a company that specializes in prefabricated trailers and modular structures. Generally, the property appears to have been completely cleared and graded for the industrial development that occupies the property (Plate 3.2–1). Buildings, hardscape, gravel, and commercial landscaping cover the entirety of the project. Due the existing development, the natural ground surface was not visible. Collectively, seven structures that appeared to have currently or previously been utilized by ModSpace are located on the property. These buildings include a permanent office structure which is currently boarded up, a steel warehouse building, a manufacturing facility comprised of multiple modular buildings, and four prefabricated trailer structures (Plates 3.2–2 to 3.2–4). In addition, the company's storage yard contains hundreds of modular prefabricated structures of various sizes (Plate 3.2–5). Vegetation primarily consists of maintained planters and commercial landscaping located at the entrances of the project along Hemlock and Beech avenues (Plate 3.2–6).

The survey did not result in the identification of any historic or prehistoric cultural resources within the project. As previously noted, all structures found on the property postdate 2000 and, therefore, do not meet the age threshold (50 years) for consideration as historic resources under CEQA criteria.



Plate 3.2–1: Overview of the project, facing north.



Plate 3.2–2: View of the boarded-up office building in the northwest portion of the project, facing northeast.



Plate 3.2–3: View of the steel warehouse and prefabricated buildings in the center of the property, facing southeast.



Plate 3.2–4: View of the manufacturing facility in the center of the project, facing northeast.



Plate 3.2–5: View of the modular structure storage yard, facing northeast.



Plate 3.2–6: View of the Hemlock Avenue entrance to the property showing the commercial landscaping, facing northeast.

4.0 RECOMMENDATIONS

The cultural resources study for the 22-114 Hemlock Avenue Project was completed in accordance with City of Fontana environmental policies and CEQA significance evaluation criteria. The records search identified 24 previously recorded resources within one mile of the project, none of which are within the project boundaries. However, the most common resource types are associated with the built environment. Although the property did at one time contain elements of the Fontana Farms hog ranch, the property has been cleared and graded since the 1950s. This characterization of the property as disturbed is relevant to the consideration of cultural resources being present within the project. Therefore, although the existing development on the subject property restricted visibility of the natural ground surface, based upon the documentation of past ground disturbance, there is little potential for cultural resources to be present/disturbed by the proposed project. Should any cultural resources be present within the property, they would most likely be historic material associated with the garbage dumps from Los Angeles fed to the hogs that were previously on the property. However, if such material does exist within the project, it would have no provenience and, therefore, would not be archaeologically significant.

The subject property is completely disturbed, currently covered with buildings, asphalt and gravel, and commercial landscaping. No evidence of any cultural resources was observed during the survey and based on the review of aerial photographs and records search results it is unlikely any significant resources exist within the subject property. As such, archeological monitoring of grading is not recommended or warranted based upon the findings of this cultural resources assessment. However, in accordance with the MMRP in the FEIR of the Fontana General Plan Update 2015-2035 (City of Fontana 2018a), the following mitigation measures are recommended for the project:

> **1)** If any prehistoric archaeological resources are encountered before or during grading, the developer shall retain a qualified archaeologist to monitor construction activities and to take appropriate measures to protect or preserve them for study. With the assistance of the archaeologist, the City of Fontana shall:
>
> - Enact interim measures to protect undesignated sites from demolition or significant modification without an opportunity for the City to establish its archaeological value.
> - Consider establishing provisions to require incorporation of archaeological sites within new developments, using their special qualities as a theme or focal point.
> - Pursue educating the public about the area's archaeological heritage.
> - Propose mitigation measures and recommend conditions of approval (if a local government action) to eliminate adverse project effects on significant,

important, and unique prehistoric resources, following appropriate CEQA guidelines.

- Prepare a technical resources management report, documenting the inventory, evaluation, and proposed mitigation of resources within the project area. Submit one copy of the completed report, with original illustrations, to the San Bernardino County Archaeological Information Center for permanent archiving.

2) Where consistent with applicable local, State, and federal law and deemed appropriate by the City, future site-specific development projects shall consider the following requests by the Soboba Band of Luiseño Indians and Morongo Band of Mission Indians:

- In the event Native American cultural resources are discovered during construction for future development, all work in the immediate vicinity of the find shall cease and a qualified archaeologist meeting Secretary of Interior standards shall be hired to assess the find. Work on the overall project may continue during this period;
- Initiate consultation between the appropriate Native American tribal entity (as determined by a qualified archaeologist meeting Secretary of Interior standards) and the City/project applicant;
- Transfer cultural resources investigations to the appropriate Native American entity (as determined by a qualified archaeologist meeting Secretary of Interior standards) as soon as possible;
- Utilize a Native American monitor from the appropriate Native American entity (as determined by a qualified archaeologist meeting Secretary of Interior standards) where deemed appropriate or required by the City, during initial ground-disturbing activities, cultural resource surveys, and/or cultural resource excavations.

5.0 LIST OF PREPARERS AND ORGANIZATIONS CONTACTED

The archaeological survey program for the project was directed by Principal Investigator Brian F. Smith. The archaeological fieldwork was conducted by Senior Project Archaeologist Andrew Garrison. The report text was prepared by Andrew Garrison and Brian Smith. Report graphics were provided by Emily Soong. Technical editing and report production were conducted by Courtney McNair. The SCCIC at CSU Fullerton provided the archaeological records search information. Archival research was conducted at the BFSA research library, the Fontana Historical Society, the Fontana Public Library, and the offices of the San Bernardino Assessor/County Recorder/County Clerk.

6.0 REFERENCES CITED

Ancestry.com

2009a *1860 United States Federal Census* (database online). Provo, UT, USA: Ancestry.com Operations, Inc.

2009b *1870 United States Federal Census* (database online). Provo, UT, USA: Ancestry.com Operations, Inc.

Anicic, John Charles, Jr.

1982 National Register of Historic Places Inventory – Nomination Form, Fontana Farms Company Ranch House, Camp #1 (Pepper Street House). Fontana Historical Society. Form on file at the United States Department of the Interior Heritage Conservation and Recreation Service.

2005 *Images of America: Fontana.* Arcadia Publishing, Charleston, South Carolina; Chicago, Illinois; Portsmouth, New Hampshire; and San Francisco, California.

Antevs, Ernst

1953 The Postpluvial or the Neothermal. *University of California Archaeological Survey Reports* 22:9–23, Berkeley, California.

Ballester, Daniel and John D. Goodman, II

2015 Site Form for Site P-36-28639. On file at the South Central Coastal Information Center at California State University, Fullerton, Fullerton, California.

Bean, Lowell John and Charles R. Smith

1978a Gabrielino. In *California,* edited by R.F. Heizer. Handbook of North American Indians, Vol. 8. William C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.

1978b Serrano. In *California,* edited by R.F. Heizer. Handbook of North American Indians, Vol. 8. William C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.

Beattie, George W. and Helen P. Beattie

1939 *Heritage of the Valley: San Bernardino's First Century.* Biobooks, Oakland, California.

Benedict, Ruth Fulton

1924 A Brief Sketch of Serrano Culture. *American Anthropologist* 26(3).

Blackstock, Joe

2017 How Fontana Hog Farm Workers Found Silver. *Inland Valley Daily Bulletin*.

Electronic document, https://www.dailybulletin.com/2017/12/18/how-fontana-hog-farm-workers-found-silver/, accessed October 18, 2022.

Brigandi, Phil
1998 *Temecula: At the Crossroads of History*. Heritage Media Corporation, Encinitas, California.

Caughey, John W.
1970 *California, A Remarkable State's Life History*. Prentice-Hall Inc., Englewood Cliffs, New Jersey.

Chapman, Charles E.
1921 *A History of California: The Spanish Period*. The Macmillan Company, New York.

City of Fontana
2018a Fontana Forward General Plan Update 2015-2035, Final Environmental Impact Report (State Clearinghouse #2016021099). Electronic document, https://www.fontana.org/DocumentCenter/View/29525/Final-Environmental-Impact-Report-for-the-General-Plan-Update, accessed June 29, 2021.

2018b About the City of Fontana. Electronic document, https://www.fontana.org/255/About-The-City-of-Fontana, accessed June 11, 2018.

2018c Fontana Forward General Plan Update 2015-2035 Draft Environmental Impact Report (State Clearinghouse #2016021099). Electronic document, https://www.fontana.org/Document Center/View/26716/54-Cultural-Resources, accessed June 29, 2021.

City of San Diego
2007 San Diego Modernism Historic Context Statement. Submitted to the State of California Office of Historic Preservation and on file at the City of San Diego, San Diego, California.

Cohen, K.M. and P.L. Gibbard
2011 Global chronostratigraphical correlation table for the last 2.7 million years. Subcommission on Quaternary Stratigraphy (International Commission on Stratigraphy), Cambridge, England. Electronic document, http://quaternary.stratigraphy.org/wp-content/uploads/2018/04/POSTERstratchart-v2011.jpg.pdf, accessed June 29, 2021.

Cook, Sherburne F.
1976 *The Conflict Between the California Indian and White Civilization*. University of California Press, Berkeley and Los Angeles, California.

Cornford, Danial (editor)
1995 *Working People of California*. University of California Press, Berkeley, Los Angeles, and Oxford, California.

Curray, Joseph R.
1965 Late Quaternary History: Continental Shelves of the United States. In *Quaternary of the United States*, edited by H.E. Wright Jr. and D.G. Frey, pp. 723–735. Princeton University Press, Princeton, New Jersey.

Cushing, Lincoln
2013 The roots of Southern California Kaiser Permanente. Electronic document, https://about.kaiserpermanente.org/our-story/our-history/the-roots-of-southern-california-kaiser-permanente, accessed April 18, 2022.

Drucker, Philip
1937 Culture Element Distributions: V. Southern California. *Anthropological Records* 1(1):1–52. University of California, Berkeley.

Engelhardt, Zephyrin
1921 *San Luis Rey Mission, The King of the Missions*. James M. Barry Company, San Francisco, California.

Erlandson, Jon M. and Roger H. Colten (editors)
1991 An Archaeological Context for Archaeological Sites on the California Coast. In *Hunter-Gatherers of Early Holocene Coastal California*. Perspectives in California Archaeology, Volume 1, Institute of Archaeology, University of California, Los Angeles.

Evans, Kimberly
1989 The community of Fontana: An integrated approach. California State University, San Bernardino. Theses Digitization Project (444). Electronic document, https://scholarworks.lib.csusb.edu/etd-project/444, accessed October 18, 2022.

Fagan, B.
1991 *Ancient North America: The Archaeology of a Continent*. Thames and Hudson. London.

Gallegos, Dennis
1985 A Review and Synthesis of Environmental and Cultural Material for the Batiquitos Lagoon Region. In *San Diego State University Cultural Resource Management Casual Papers* 2(1).

2002 Southern California in Transition: Late Holocene Occupation of Southern San Diego County. In *Catalysts to Complexity: Late Holocene Societies of the California Coast,* edited by Jon M. Erlandson and Terry Jones. Institute of Archaeology, University of

California, Los Angeles.

Graves, Steven M.
2010 Geography 417, California for Educators: World War II and the late 20th Century. Electronic document, https://www.csun.edu/~sg4002/courses/417/417_lectures/417_post_war.htm, accessed April 18, 2022.

Hall, William Hammond
1888 *The Field, Water-Supply, and Works, Organization and Operation in San Diego, San Bernardino, and Los Angeles Counties: The Second Part of the Report of the State Engineer of California on Irrigation and the Irrigation Question*. State Office, J.D. Young, Supt. State Printing, Sacramento.

Heizer, Robert F. (editor)
1978 Trade and Trails. In *California,* pp. 690–693. Handbook of North American Indians, Vol. 8. William C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.

Inman, Douglas L.
1983 Application of Coastal Dynamics to the Reconstruction of Paleocoastlines in the Vicinity of La Jolla, California. In *Quaternary Coastlines and Marine Archaeology*, edited by Patricia M. Masters and N.C. Flemming. Academic Press, Inc., Orlando, Florida.

Kiddle Encyclopedia
2022 Auto Club Speedway facts for kids. Electronic document, https://kids.kiddle.co/Auto_Club_Speedway, accessed April 18, 2022.

Kroeber, A.L.
1976 *Handbook of the Indians of California*. Reprinted. Dover Editions, Dover Publications, Inc., New York. Originally published 1925, Bulletin No. 78, U.S. Government Printing Office, Washington, D.C.

Martin, P.S.
1967 Prehistoric Overkill. In *Pleistocene Extinctions: The Search for a Cause*, edited by P. Martin and H.E. Wright. Yale University Press: New Haven.

1973 The Discovery of America. *Science* 179(4077):969–974.

Masters, Patricia M.
1983 Detection and Assessment of Prehistoric Artifact Sites off the Coast of Southern California. In *Quaternary Coastlines and Marine Archaeology: Towards the Prehistory of Land Bridges and Continental Shelves*, edited by P.M. Masters and N.C. Flemming, pp. 189–213. Academic Press, London.

McAlester, Virginia Savage
2015 *A Field Guide to American Houses (Revised): The Definitive Guide to Identifying and Understanding America's Domestic Architecture.* Alfred A. Knopf, New York.

Miller, J.
1966 *The Present and Past Molluscan Faunas and Environments of Four Southern California Coastal Lagoons*. Master's thesis on file at the University of California at San Diego, San Diego, California.

Moratto, Michael J.
1984 *California Archaeology*. Academic Press, New York.

Morton, D.M. and F.K. Miller
2006 Geologic map of the San Bernardino and Santa Ana 30' x 60' quadrangles, California: U.S. Geological Survey Open-File Report 06-1217, scale 1:100,000.

Moss, M.L. and J. Erlandson
1995 Reflections on North American Coast Prehistory. *Journal of World Prehistory* 9(1):1–46.

National Resources Conservation Service (NRCS)
2022 Web Soil Survey: An online soil survey browser. Electronic document, https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm, accessed October 18, 2022.

Office of Historic Preservation
1995 *Instructions for Recording Historical Resources*. Department of Parks and Recreation, Sacramento, California.

Pourade, Richard F.
1961 Time of the Bells. In *The History of San Diego* 2. Union-Tribune Publishing Company, San Diego, California.

1963 The Silver Dons. In *The History of San Diego* 3. Union-Tribune Publishing Company, San Diego, California.

Reddy, Seetha
2000 Settling the Highlands: Late Holocene Highland Adaptations on Camp Pendleton, San Diego County California. Prepared for the Army Corps of Engineers by ASM Affiliates. Unpublished report on file at South Coastal Information Center at San Diego State University, San Diego, California.

Rogers, Malcolm J.
1929 Field Notes, 1929 San Diego-Smithsonian Expedition. Manuscript on file at San Diego Museum of Man.

Rolle, Andrew F.
1969 *California: A History*. 2nd ed. Thomas Y. Crowell Company, New York.

San Bernardino County
2022 150 Years of County History. Electronic document, https://www.sbcounty.gov/main/pages/150Years.aspx, accessed October 18, 2022.

Scalf, Darlene
2018 History Room at Lewis Library Provides Lots of Interesting Information About Fontana. *Fontana Herald News*. Electronic document, https://www.fontanaheraldnews.com/news/history-room-at-lewis-library-provides-lots-of-interesting-information-about-fontana/article_893a2342-fd4a-11e7-8d08-7726b9a7703e.html, accessed October 18, 2022.

State Historic Preservation Office (SHPO)
1995 *Instructions for Recording Historical Resources*. Office of Historic Preservation, Sacramento.

Strong, William Duncan
1971 Aboriginal Society in Southern California. Reprint of 1929 *Publications in American Archaeology and Ethnology* No. 26, University of California, Berkeley.

Stropes, Tracy A., J.R.K. Stropes, and Brian F. Smith
2019 A Cultural Resources Assessment for the 8801 East Marginal Way Project, City of Tukwila, King County, Washington. Brian F. Smith and Associates, Inc. Unpublished report on file at the City of Tukwila, Tukwila, Washington.

University of Washington Libraries, Special Collections
2018 Pope & Talbot records, circa 1849-1975. Electronic file, http://archiveswest.orbis cascade.org/ark:/80444/xv14450/pdf, accessed February 26, 2019.

Van Devender, T.R. and W.G. Spaulding
1979 Development of Vegetation and Climate in the Southwestern United States. *Science* 204:701–710.

Wallis, Eileen V.
2018 World War II in California's Inland Empire. Electronic document, https://scalar.usc.edu/works/world-war-ii-in-californias-inland-empire/kaiser-steel, accessed April 18, 2022.

Whittall, Austin
2020 The History of Route 66. Electronic document, https://www.theroute-66.com/history.html, accessed April 18, 2022.

Warren, Claude N. and M.G. Pavesic

1963 Shell Midden Analysis of Site SDI-603 and Ecological Implications for Cultural Development of Batequitos Lagoon, San Diego County, Los Angeles. *University of California, Los Angeles, Archaeological Survey Annual Report,* 1960-1961:246-338.

Wirths, Todd A.

2022 Paleontological Resource Assessment for the 22-114 Hemlock Avenue Project, City of Fontana, San Bernardino County, California (APNs 237-131-25, -26, and -27). Brian F. Smith and Associates, Inc. Unpublished report on file at Brian F. Smith and Associates, Inc., Poway, California.

World Forestry Center

2017 Andrew Jackson Pope (1820-1978). Electronic document, https://www.worldforestry .org/wp-content/uploads/2016/03/POPE-ANDREW-JACKSON.pdf, accessed February 26, 2019.

APPENDIX A

Resumes of Key Personnel

Brian F. Smith, MA

Owner, Principal Investigator

Brian F. Smith and Associates, Inc.
14010 Poway Road • Suite A •
Phone: (858) 679-8218 • Fax: (858) 679-9896 • E-Mail: bsmith@bfsa-ca.com

Education

Master of Arts, History, University of San Diego, California **1982**

Bachelor of Arts, History, and Anthropology, University of San Diego, California **1975**

Professional Memberships

Society for California Archaeology

Experience

Principal Investigator **1977–Present**
Brian F. Smith and Associates, Inc. **Poway, California**

Brian F. Smith is the owner and principal historical and archaeological consultant for Brian F. Smith and Associates. Over the past 32 years, he has conducted over 2,500 cultural resource studies in California, Arizona, Nevada, Montana, and Texas. These studies include every possible aspect of archaeology from literature searches and large-scale surveys to intensive data recovery excavations. Reports prepared by Mr. Smith have been submitted to all facets of local, state, and federal review agencies, including the US Army Corps of Engineers, the Bureau of Land Management, the Bureau of Reclamation, the Department of Defense, and the Department of Homeland Security. In addition, Mr. Smith has conducted studies for utility companies (Sempra Energy) and state highway departments (CalTrans).

Professional Accomplishments

These selected major professional accomplishments represent research efforts that have added significantly to the body of knowledge concerning the prehistoric life ways of cultures once present in the southern California area and historic settlement since the late 18th century. Mr. Smith has been principal investigator on the following select projects, except where noted.

Downtown San Diego Mitigation and Monitoring Reporting Programs: Large numbers of downtown San Diego mitigation and monitoring projects, some of which included Broadway Block (2019), 915 Grape Street (2019), 1919 Pacific Highway (2018), Moxy Hotel (2018), Makers Quarter Block D (2017), Ballpark Village (2017), 460 16th Street (2017), Kettner and Ash (2017), Bayside Fire Station (2017), Pinnacle on the Park (2017), IDEA1 (2016), Blue Sky San Diego (2016), Pacific Gate (2016), Pendry Hotel (2015), Cisterra Sempra Office Tower (2014), 15th and Island (2014), Park and G (2014), Comm 22 (2014), 7th and F Street Parking (2013), Ariel Suites (2013), 13th and Marker (2012), Strata (2008), Hotel Indigo (2008), Lofts at 707 10th Avenue Project (2007), Breeza (2007), Bayside at the Embarcadero (2007), Aria (2007), Icon (2007), Vantage Pointe (2007), Aperture (2007), Sapphire Tower (2007), Lofts at 655 Sixth Avenue (2007), Metrowork (2007), The Legend (2006), The Mark (2006), Smart Corner (2006), Lofts at 677 7th Avenue (2005), Aloft on Cortez Hill (2005), Front and Beech Apartments (2003), Bella Via Condominiums (2003), Acqua Vista Residential Tower (2003), Northblock Lofts (2003), Westin Park Place Hotel (2001), Parkloft

Apartment Complex (2001), Renaissance Park (2001), and Laurel Bay Apartments (2001).

1900 and 1912 Spindrift Drive: An extensive data recovery and mitigation monitoring program at the Spindrift Site, an important prehistoric archaeological habitation site stretching across the La Jolla area. The project resulted in the discovery of over 20,000 artifacts and nearly 100,000 grams of bulk faunal remains and marine shell, indicating a substantial occupation area (2013-2014).

San Diego Airport Development Project: An extensive historic assessment of multiple buildings at the San Diego International Airport and included the preparation of Historic American Buildings Survey documentation to preserve significant elements of the airport prior to demolition (2017-2018).

Citracado Parkway Extension: A still-ongoing project in the city of Escondido to mitigate impacts to an important archaeological occupation site. Various archaeological studies have been conducted by BFSA resulting in the identification of a significant cultural deposit within the project area.

Westin Hotel and Timeshare (Grand Pacific Resorts): Data recovery and mitigation monitoring program in the city of Carlsbad consisted of the excavation of 176 one-square-meter archaeological data recovery units which produced thousands of prehistoric artifacts and ecofacts, and resulted in the preservation of a significant prehistoric habitation site. The artifacts recovered from the site presented important new data about the prehistory of the region and Native American occupation in the area (2017).

The Everly Subdivision Project: Data recovery and mitigation monitoring program in the city of El Cajon resulted in the identification of a significant prehistoric occupation site from both the Late Prehistoric and Archaic Periods, as well as producing historic artifacts that correspond to the use of the property since 1886. The project produced an unprecedented quantity of artifacts in comparison to the area encompassed by the site, but lacked characteristics that typically reflect intense occupation, indicating that the site was used intensively for food processing (2014-2015).

Ballpark Village: A mitigation and monitoring program within three city blocks in the East Village area of San Diego resulting in the discovery of a significant historic deposit. Nearly 5,000 historic artifacts and over 500,000 grams of bulk historic building fragments, food waste, and other materials representing an occupation period between 1880 and 1917 were recovered (2015-2017).

Archaeology at the Padres Ballpark: Involved the analysis of historic resources within a seven-block area of the "East Village" area of San Diego, where occupation spanned a period from the 1870s to the 1940s. Over a period of two years, BFSA recovered over 200,000 artifacts and hundreds of pounds of metal, construction debris, unidentified broken glass, and wood. Collectively, the Ballpark Project and the other downtown mitigation and monitoring projects represent the largest historical archaeological program anywhere in the country in the past decade (2000-2007).

4S Ranch Archaeological and Historical Cultural Resources Study: Data recovery program consisted of the excavation of over 2,000 square meters of archaeological deposits that produced over one million artifacts, containing primarily prehistoric materials. The archaeological program at 4S Ranch is the largest archaeological study ever undertaken in the San Diego County area and has produced data that has exceeded expectations regarding the resolution of long-standing research questions and regional prehistoric settlement patterns.

Charles H. Brown Site: Attracted international attention to the discovery of evidence of the antiquity of man in North America. Site located in Mission Valley, in the city of San Diego.

Del Mar Man Site: Study of the now famous Early Man Site in Del Mar, California, for the San Diego Science Foundation and the San Diego Museum of Man, under the direction of Dr. Spencer Rogers and Dr. James R. Moriarty.

Old Town State Park Projects: Consulting Historical Archaeologist. Projects completed in the Old Town State Park involved development of individual lots for commercial enterprises. The projects completed in Old Town include Archaeological and Historical Site Assessment for the Great Wall Cafe (1992), Archaeological Study for the Old Town Commercial Project (1991), and Cultural Resources Site Survey at the Old San Diego Inn (1988).

Site W-20, Del Mar, California: A two-year-long investigation of a major prehistoric site in the Del Mar area of the city of San Diego. This research effort documented the earliest practice of religious/ceremonial activities in San Diego County (circa 6,000 years ago), facilitated the projection of major non-material aspects of the La Jolla Complex, and revealed the pattern of civilization at this site over a continuous period of 5,000 years. The report for the investigation included over 600 pages, with nearly 500,000 words of text, illustrations, maps, and photographs documenting this major study.

City of San Diego Reclaimed Water Distribution System: A cultural resource study of nearly 400 miles of pipeline in the city and county of San Diego.

Master Environmental Assessment Project, City of Poway: Conducted for the City of Poway to produce a complete inventory of all recorded historic and prehistoric properties within the city. The information was used in conjunction with the City's General Plan Update to produce a map matrix of the city showing areas of high, moderate, and low potential for the presence of cultural resources. The effort also included the development of the City's Cultural Resource Guidelines, which were adopted as City policy.

Draft of the City of Carlsbad Historical and Archaeological Guidelines: Contracted by the City of Carlsbad to produce the draft of the City's historical and archaeological guidelines for use by the Planning Department of the City.

The Mid-Bayfront Project for the City of Chula Vista: Involved a large expanse of undeveloped agricultural land situated between the railroad and San Diego Bay in the northwestern portion of the city. The study included the analysis of some potentially historic features and numerous prehistoric

Cultural Resources Survey and Test of Sites Within the Proposed Development of the Audie Murphy Ranch, Riverside County, California: Project manager/director of the investigation of 1,113.4 acres and 43 sites, both prehistoric and historic—included project coordination; direction of field crews; evaluation of sites for significance based on County of Riverside and CEQA guidelines; assessment of cupule, pictograph, and rock shelter sites, co-authoring of cultural resources project report. February- September 2002.

Cultural Resources Evaluation of Sites Within the Proposed Development of the Otay Ranch Village 13 Project, San Diego County, California: Project manager/director of the investigation of 1,947 acres and 76 sites, both prehistoric and historic—included project coordination and budgeting; direction of field crews; assessment of sites for significance based on County of San Diego and CEQA guidelines; co-authoring of cultural resources project report. May-November 2002.

Cultural Resources Survey for the Remote Video Surveillance Project, El Centro Sector, Imperial County: Project manager/director for a survey of 29 individual sites near the U.S./Mexico Border for proposed video surveillance camera locations associated with the San Diego Border barrier Project—project coordination and budgeting; direction of field crews; site identification and recordation; assessment of potential impacts to cultural resources; meeting and coordinating with U.S. Army Corps of Engineers, U.S. Border Patrol, and other government agencies involved; co-authoring of cultural resources project report. January, February, and July 2002.

Cultural Resources Survey and Test of Sites Within the Proposed Development of the Menifee West GPA, Riverside County, California: Project manager/director of the investigation of nine sites, both prehistoric and historic—included project coordination and budgeting; direction of field crews; assessment of sites

for significance based on County of Riverside and CEQA guidelines; historic research; co-authoring of cultural resources project report. January-March 2002.

Cultural Resources Survey and Test of Sites Within the Proposed French Valley Specific Plan/EIR, Riverside County, California: Project manager/director of the investigation of two prehistoric and three historic sites—included project coordination and budgeting; survey of project area; Native American consultation; direction of field crews; assessment of sites for significance based on CEQA guidelines; cultural resources project report in prep. July-August 2000.

Cultural Resources Survey and Test of Sites Within the Proposed Development of the Menifee Ranch, Riverside County, California: Project manager/director of the investigation of one prehistoric and five historic sites—included project coordination and budgeting; direction of field crews; feature recordation; historic structure assessments; assessment of sites for significance based on CEQA guidelines; historic research; co-authoring of cultural resources project report. February-June 2000.

Salvage Mitigation of a Portion of the San Diego Presidio Identified During Water Pipe Construction for the City of San Diego, California: Project archaeologist/director—included direction of field crews; development and completion of data recovery program; management of artifact collections cataloging and curation; data synthesis and authoring of cultural resources project report in prep. April 2000.

Enhanced Cultural Resource Survey and Evaluation for the Tyrian 3 Project, La Jolla, California: Project manager/director of the investigation of a single-dwelling parcel—included project coordination; assessment of parcel for potentially buried cultural deposits; authoring of cultural resources project report. April 2000.

Enhanced Cultural Resource Survey and Evaluation for the Lamont 5 Project, Pacific Beach, California: Project manager/director of the investigation of a single-dwelling parcel—included project coordination; assessment of parcel for potentially buried cultural deposits; authoring of cultural resources project report. April 2000.

Enhanced Cultural Resource Survey and Evaluation for the Reiss Residence Project, La Jolla, California: Project manager/director of the investigation of a single-dwelling parcel—included project coordination; assessment of parcel for potentially buried cultural deposits; authoring of cultural resources project report. March-April 2000.

Salvage Mitigation of a Portion of Site SDM-W-95 (CA-SDI-211) for the Poinsettia Shores Santalina Development Project and Caltrans, Carlsbad, California: Project archaeologist/ director—included direction of field crews; development and completion of data recovery program; management of artifact collections cataloging and curation; data synthesis and authoring of cultural resources project report in prep. December 1999-January 2000.

Survey and Testing of Two Prehistoric Cultural Resources for the Airway Truck Parking Project, Otay Mesa, California: Project archaeologist/director—included direction of field crews; development and completion of testing recovery program; assessment of site for significance based on CEQA guidelines; authoring of cultural resources project report, in prep. December 1999-January 2000.

Cultural Resources Phase I and II Investigations for the Tin Can Hill Segment of the Immigration and Naturalization Services Triple Fence Project Along the International Border, San Diego County, California: Project manager/director for a survey and testing of a prehistoric quarry site along the border—NRHP eligibility assessment; project coordination and budgeting; direction of field crews; feature recordation; meeting and coordinating with U.S. Army Corps of Engineers; co-authoring of cultural resources project report. December 1999-January 2000.

Mitigation of a Prehistoric Cultural Resource for the Westview High School Project for the City of San Diego, California: Project archaeologist/ director—included direction of field crews; development and completion of data recovery program including collection of material for specialized faunal and botanical analyses; assessment of sites for significance based on CEQA guidelines; management of artifact collections cataloging and curation; data synthesis; co-authoring of cultural resources project report, in prep. October 1999-January 2000.

Mitigation of a Prehistoric Cultural Resource for the Otay Ranch SPA-One West Project for the City of Chula Vista, California: Project archaeologist/director—included direction of field crews; development of data recovery program; management of artifact collections cataloging and curation; assessment of site for significance based on CEQA guidelines; data synthesis; authoring of cultural resources project report, in prep. September 1999-January 2000.

Monitoring of Grading for the Herschel Place Project, La Jolla, California: Project archaeologist/ monitor—included monitoring of grading activities associated with the development of a single- dwelling parcel. September 1999.

Survey and Testing of a Historic Resource for the Osterkamp Development Project, Valley Center, California: Project archaeologist/ director—included direction of field crews; development and completion of data recovery program; budget development; assessment of site for significance based on CEQA guidelines; management of artifact collections cataloging and curation; data synthesis; authoring of cultural resources project report. July-August 1999.

Survey and Testing of a Prehistoric Cultural Resource for the Proposed College Boulevard Alignment Project, Carlsbad, California: Project manager/director —included direction of field crews; development and completion of testing recovery program; assessment of site for significance based on CEQA guidelines; management of artifact collections cataloging and curation; data synthesis; authoring of cultural resources project report, in prep. July-August 1999.

Survey and Evaluation of Cultural Resources for the Palomar Christian Conference Center Project, Palomar Mountain, California: Project archaeologist—included direction of field crews; assessment of sites for significance based on CEQA guidelines; management of artifact collections cataloging and curation; data synthesis; authoring of cultural resources project report. July-August 1999.

Survey and Evaluation of Cultural Resources at the Village 2 High School Site, Otay Ranch, City of Chula Vista, California: Project manager/director —management of artifact collections cataloging and curation; assessment of site for significance based on CEQA guidelines; data synthesis; authoring of cultural resources project report. July 1999.

Cultural Resources Phase I, II, and III Investigations for the Immigration and Naturalization Services Triple Fence Project Along the International Border, San Diego County, California: Project manager/director for the survey, testing, and mitigation of sites along border—supervision of multiple field crews, NRHP eligibility assessments, Native American consultation, contribution to Environmental Assessment document, lithic and marine shell analysis, authoring of cultural resources project report. August 1997- January 2000.

Phase I, II, and II Investigations for the Scripps Poway Parkway East Project, Poway California: Project archaeologist/project director—included recordation and assessment of multicomponent prehistoric and historic sites; direction of Phase II and III investigations; direction of laboratory analyses including prehistoric and historic collections; curation of collections; data synthesis; coauthorship of final cultural resources report. February 1994; March-September 1994; September-December 1995.

Andrew J. Garrison, MA, RPA

Project Archaeologist

Brian F. Smith and Associates, Inc.
14010 Poway Road • Suite A •
Phone: (858) 679-8218 • Fax: (858) 679-9896 • E-Mail: agarrison@bfsa-ca.com

Education

Master of Arts, Public History, University of California, Riverside **2009**

Bachelor of Science, Anthropology, University of California, Riverside **2005**

Bachelor of Arts, History, University of California, Riverside **2005**

Professional Memberships

Register of Professional Archaeologists
Society for California Archaeology
Society for American Archaeology
California Council for the Promotion of History
Society of Primitive Technology
Lithic Studies Society
California Preservation Foundation
Pacific Coast Archaeological Society

Experience

Project Archaeologist **June 2017–Present**
Brian F. Smith and Associates, Inc. **Poway, California**

Project management of all phases of archaeological investigations for local, state, and federal agencies including National Register of Historic Places (NRHP) and California Environmental Quality Act (CEQA) level projects interacting with clients, sub-consultants, and lead agencies. Supervise and perform fieldwork including archaeological survey, monitoring, site testing, comprehensive site records checks, and historic building assessments. Perform and oversee technological analysis of prehistoric lithic assemblages. Author or co-author cultural resource management reports submitted to private clients and lead agencies.

Senior Archaeologist and GIS Specialist **2009–2017**
Scientific Resource Surveys, Inc. **Orange, California**

Served as Project Archaeologist or Principal Investigator on multiple projects, including archaeological monitoring, cultural resource surveys, test excavations, and historic building assessments. Directed projects from start to finish, including budget and personnel hours proposals, field and laboratory direction, report writing, technical editing, Native American consultation, and final report submittal. Oversaw all GIS projects including data collection, spatial analysis, and map creation.

Preservation Researcher **2009**
City of Riverside Modernism Survey **Riverside, California**

Completed DPR Primary, District, and Building, Structure and Object Forms for five sites for a grant-funded project to survey designated modern architectural resources within the City of Riverside.

Information Officer **2005, 2008–2009**
Eastern Information Center (EIC), University of California, Riverside **Riverside, California**

Processed and catalogued restricted and unrestricted archaeological and historical site record forms. Conducted research projects and records searches for government agencies and private cultural resource firms.

Reports/Papers

2019 A Class III Archaeological Study for the Tuscany Valley (TM 33725) Project National Historic Preservation Act Section 106 Compliance, Lake Elsinore, Riverside County, California. Contributing author. Brian F. Smith and Associates, Inc.

2019 A Phase I and II Cultural Resources Assessment for the Jack Rabbit Trail Logistics Center Project, City of Beaumont, Riverside County, California. Brian F. Smith and Associates, Inc.

2019 A Phase I Cultural Resources Assessment for the 10575 Foothill Boulevard Project, Rancho Cucamonga, California. Brian F. Smith and Associates, Inc.

2019 Cultural Resources Study for the County Road and East End Avenue Project, City of Chino, San Bernardino County, California. Brian F. Smith and Associates, Inc.

2019 Phase II Cultural Resource Study for the McElwain Project, City of Murrieta, California. Contributing author. Brian F. Smith and Associates, Inc.

2019 A Section 106 (NHPA) Historic Resources Study for the McElwain Project, City of Murrieta, Riverside County, California. Brian F. Smith and Associates, Inc.

2018 Cultural Resource Monitoring Report for the Sewer Group 818 Project, City of San Diego. Brian F. Smith and Associates, Inc.

2018 Phase I Cultural Resource Survey for the Stone Residence Project, 1525 Buckingham Drive, La Jolla, California 92037. Brian F. Smith and Associates, Inc.

2018 A Phase I Cultural Resources Assessment for the Seaton Commerce Center Project, Riverside County, California. Brian F. Smith and Associates, Inc.

2017 A Phase I Cultural Resources Assessment for the Marbella Villa Project, City of Desert Hot Springs, Riverside County, California. Brian F. Smith and Associates, Inc.

2017 Phase I Cultural Resources Survey for TTM 37109, City of Jurupa Valley, County of Riverside. Brian F. Smith and Associates, Inc.

2017 A Phase I Cultural Resources Assessment for the Winchester Dollar General Store Project, Riverside County, California. Brian F. Smith and Associates, Inc.

2016 John Wayne Airport Jet Fuel Pipeline and Tank Farm Archaeological Monitoring Plan. Scientific Resource Surveys, Inc. On file at the County of Orange, California.

2016 Historic Resource Assessment for 220 South Batavia Street, Orange, CA 92868 Assessor's Parcel Number 041-064-4. Scientific Resource Surveys, Inc. Submitted to the City of Orange as part of

Mills Act application.

2015 Historic Resource Report: 807-813 Harvard Boulevard, Los Angeles. Scientific Resource Surveys, Inc. On file at the South Central Coastal Information Center, California State University, Fullerton.

2015 Exploring a Traditional Rock Cairn: Test Excavation at CA-SDI-13/RBLI-26: The Rincon Indian Reservation, San Diego County, California. Scientific Resource Surveys, Inc.

2014 Archaeological Monitoring Results: The New Los Angeles Federal Courthouse. Scientific Resource Surveys, Inc. On file at the South Central Coastal Information Center, California State University, Fullerton.

2012 Bolsa Chica Archaeological Project Volume 7, Technological Analysis of Stone Tools, Lithic Technology at Bolsa Chica: Reduction Maintenance and Experimentation. Scientific Resource Surveys, Inc.

Presentations

2017 "Repair and Replace: Lithic Production Behavior as Indicated by the Debitage Assemblage from CA-MRP-283 the Hackney Site." Presented at the Society for California Archaeology Annual Meeting, Fish Camp, California.

2016 "Bones, Stones, and Shell at Bolsa Chica: A Ceremonial Relationship?" Presented at the Society for California Archaeology Annual Meeting, Ontario, California.

2016 "Markers of Time: Exploring Transitions in the Bolsa Chica Assemblage." Presented at the Society for California Archaeology Annual Meeting, Ontario, California.

2016 "Dating Duress: Understanding Prehistoric Climate Change at Bolsa Chica." Presented at the Society for California Archaeology Annual Meeting, Ontario, California.

2014 "New Discoveries from an Old Collection: Comparing Recently Identified OGR Beads to Those Previously Analyzed from the Encino Village Site." Presented at the Society for California Archaeology Annual Meeting, Visalia, California.

2012 Bolsa Chica Archaeology: Part Seven: Culture and Chronology. Lithic demonstration of experimental manufacturing techniques at the April meeting of The Pacific Coast Archaeological Society, Irvine, California.

APPENDIX B

Archaeological Records Search Results

(Deleted for Public Review; Bound Separately)

APPENDIX C

NAHC Sacred Lands File Search

(Deleted for Public Review; Bound Separately)

APPENDIX B: PHASE I ENVIRONMENTAL SITE ASSESSMENT AND LIMITED SUBSURFACE INVESTIGATION

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PARTNER
Engineering and Science, Inc.



PHASE I ENVIRONMENTAL SITE ASSESSMENT AND LIMITED SUBSURFACE INVESTIGATION REPORT

ModSpace Corporation
11115 Hemlock Avenue
Fontana, California 92337

Report Date: September 18, 2015
Partner Project No. 15-144194.1



Prepared for:

Prologis
Pier 1, Bay 1
San Francisco, California 94111

PARTNER
Engineering and Science, Inc.

September 18, 2015

Janet Frentzel
Prologis
Pier 1, Bay 1
San Francisco, California 94111

Subject: Phase I Environmental Site Assessment and Limited Subsurface Investigation Report
ModSpace Corporation
11115 Hemlock Avenue
Fontana, California 92337
Partner Project No. 15-144194.1

Dear Ms. Frentzel:

Partner Engineering and Science, Inc. (Partner) is pleased to provide the results of the *Phase I Environmental Site Assessment and Limited Subsurface Investigation* report on the abovementioned address (the "subject property"). This assessment was performed in general conformance with the scope and limitations as detailed in the ASTM Practice E1527-13 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process.

This assessment included a site reconnaissance as well as research and interviews with representatives of the public, property ownership, site manager, and regulatory agencies. An assessment was made, conclusions stated, and recommendations outlined.

We appreciate the opportunity to provide environmental services to you. If you have any questions concerning this report, or if we can assist you in any other matter, please contact me at (818) 337-1203.

Sincerely,

Misty Vazquez, PE
Principal

EXECUTIVE SUMMARY

Partner Engineering and Science, Inc. (Partner) has performed a Phase I Environmental Site Assessment (ESA) in general accordance with the scope of work and limitations of ASTM Standard Practice E1527-13, the Environmental Protection Agency Standards and Practices for All Appropriate Inquiries (AAI) (40 CFR Part 312)), and as set forth by the Master Services Agreement between Prologis and Partner dated April 18, 2013 for the property located at 11115 Hemlock Avenue in the City of Fontana, San Bernardino County, California (the "subject property"). The Phase I Environmental Site Assessment is designed to provide Prologis with an assessment concerning environmental conditions (limited to those issues identified in the report) as they exist at the subject property.

In addition to the preparation of the Phase I ESA and based on findings, Partner implemented and conducted a Limited Subsurface Investigation. The findings and conclusions from the subsurface investigation are included in this Phase I ESA.

Property Description

The subject property is located between Hemlock Avenue to the west and Beech Avenue to the east, and south of commercial businesses along Santa Ana Street to the north within a mixed commercial and industrial area of the City of Fontana in San Bernardino County, California. Please refer to the table below for further description of the subject property:

Subject Property Data	
Address:	11115 Hemlock Avenue, Fontana, California 92337
Property Use:	Commercial Leasing and Storage Yard for Modular Units
Land Acreage (Ac):	35 Ac
Number of Buildings:	One Maintenance Building One Modular Office Building used for offices One Modular Office Building used as a model
Number of Floors:	One
Gross Building Area (SF):	5,700 SF (Total)
Net Rentable Area (SF):	5,700 SF (Total)
Date of Construction:	2000
Assessor's Parcel Number (APN):	0237-131-25P-000
Type of Construction:	Steel – Maintenance Building Wood framed – Modular Units
Current Tenants:	Modular Space Corporation (ModSpace)
Site Assessment Performed By:	Robin Blanchard of Partner
Site Assessment Conducted On:	August 4, 2015

The subject property is currently occupied by Modular Space Corporation (ModSpace) for commercial use. Onsite operations consist of leasing, storage, and refurbishing of modular trailers, offices, and storage bins. In addition to the current structures, the subject property is improved with asphalt and gravel paved parking and storage areas.

According to available historical sources, the subject property was formerly undeveloped as early as 1901; residential and agricultural from the 1920s through the 1940s, undeveloped or used for agriculture between the 1940s and 1980s; developed with a truck/transport and construction company on the north west corner in the early 1990s; and developed with the current structures and modular unit storage yard in 2000. Tenants on the subject property include Allegiance Construction Co/ DINHY Construction Corp (2002-2008), GE Capital Modular Space (2000-2007), ModSpace (2007-Present).

The immediately surrounding properties consist of commercial and industrial properties to the north, including a paint manufacturer; a newly constructed commercial facility to the south; commercial and industrial buildings and a truck transport yard to the west across Hemlock Avenue; and construction rental equipment and contractors' yards and undeveloped land to the east across Beech Avenue.

According to the City of Fontana and investigation reports for a site located within one mile to the northwest (RWQCB file T0607100535 at 14527 Slover Avenue) and north, the depth to groundwater in the vicinity of the subject property is inferred to be over 250 feet below ground surface (bgs) and to flow toward the south/southwest.

Findings

A *recognized environmental condition (REC)* refers to the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: due to release to the environment; under conditions indicative of a release to the environment; or under conditions that pose a material threat of a future release to the environment. The following was identified during the course of this assessment:

- Partner did not identify recognized environmental conditions during the course of this assessment.

A *controlled recognized environmental condition (CREC)* refers to a REC resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority, with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls. The following was identified during the course of this assessment:

- Partner did not identify controlled recognized environmental conditions during the course of this assessment.

A *historical recognized environmental condition (HREC)* refers to a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls. The following was identified during the course of this assessment:

- According to records obtained from the site contact and reported by San Bernardino County Fire Department (SBCFD), approximately 1,100 gallons of waste perchloroethylene (PCE) and waste filters contained within 27 55-gallon drums were illegally dumped on the northwestern portion of the subject property on June 22, 2000. The northwestern portion of the subject property was

vacant and paved with asphalt at the time of the incident. Several of the drums were damaged and approximately 5-10 gallons of PCE was released to the asphalt paved surface. Grab soil samples were collected and analyzed and PCE was identified in all soil samples. A disposal manifest indicated that the PCE drums and spilled material were neutralized, overpacked for transport, and disposed offsite in accordance with applicable regulations. No information regarding the location or depth of the soil samples was identified and no manifests specifically indicating removal of impacted soil were identified. The final notations indicate that PCE did not impact soil deeper than the surface and that surface material was "scraped" and completely removed. No documentation was identified to confirm that soil had been impacted and no disposal records or manifests were identified to confirm removal of impacted soil.

Given the absence of confirmation soil sampling data and cleanup documentation, Partner conducted a limited subsurface investigation to evaluate the presence or absence of soil contamination. The scope of the investigation included collection of soil samples for volatile organic compound (VOC) analyses from a total of three hand auger soil borings in the area of the reported spill. No VOCs were detected above applicable regulatory guidelines. Based on the results, no additional assessment is recommended.

An *environmental issue* refers to environmental concerns identified by Partner, which do not qualify as RECs; however, warrant further discussion. The following was identified during the course of this assessment:

- The subject property is equipped with a clarifier located adjacent to the west of the onsite Maintenance Building. This feature is currently utilized to treat wastewater produced from washing the floor of the Maintenance Building. The Maintenance Building was previously used for limited vehicle repair activities until approximately 2012. According to Doug Egge, Fleet Manager for ModSpace, this feature was installed in 2000 and was last pumped out on in July of 2015. Mr. Egge reported that the clarifier is pumped out twice annually. The wastewater from this feature discharges to the municipal sewer system. Based on the nature of use and relatively small quantities of hazardous substances in close proximity of this feature, the clarifier is not expected to represent a significant environmental concern.

Conclusions, Opinions and Recommendations

Partner has performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E1527-13 of 11115 Hemlock Avenue in the City of Fontana, San Bernardino County, California (the "subject property"). Any exceptions to, or deletions from, this practice are described in Section 1.5 of this report.

This assessment has revealed no evidence of recognized environmental conditions in connection with the subject property; however, environmental issues were identified. Based on the conclusions of this assessment, Partner does not recommend further investigation at this time.

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1.0 INTRODUCTION

Partner Engineering and Science, Inc. (Partner) has performed a Phase I Environmental Site Assessment (ESA) in general conformance with the scope and limitations of ASTM Standard Practice E1527-13 the Environmental Protection Agency Standards and Practices for All Appropriate Inquiries (AAI) (40 CFR Part 312), and as set forth by the Master Services Agreement between Prologis and Partner dated April 18, 2013 for the property located at 11115 Hemlock Avenue in the City of Fontana, San Bernardino County, California (the "subject property"). Any exceptions to, or deletions from, this scope of work are described in the report.

In addition to the preparation of the Phase I ESA and based on findings, Partner implemented and conducted a Limited Subsurface Investigation. The findings and conclusions from the subsurface investigation are included in this Phase I ESA.

1.1 Purpose

The purpose of this ESA is to identify existing or potential Recognized Environmental Conditions (as defined by ASTM Standard E1527-13) affecting the subject property that: 1) constitute or result in a material violation or a potential material violation of any applicable environmental law; 2) impose any material constraints on the operation of the subject property or require a material change in the use thereof; 3) require clean-up, remedial action or other response with respect to Hazardous Substances or Petroleum Products on or affecting the subject property under any applicable environmental law; 4) may affect the value of the subject property; and 5) may require specific actions to be performed with regard to such conditions and circumstances. The information contained in the ESA Report will be used by Client to: 1) evaluate its legal and financial liabilities for transactions related to foreclosure, purchase, sale, loan origination, loan workout or seller financing; 2) evaluate the subject property's overall development potential, the associated market value and the impact of applicable laws that restrict financial and other types of assistance for the future development of the subject property; and/or 3) determine whether specific actions are required to be performed prior to the foreclosure, purchase, sale, loan origination, loan workout or seller financing of the subject property.

This ESA was performed to permit the *User* to satisfy one of the requirements to qualify for the innocent landowner, contiguous property owner, or bona fide prospective purchaser limitations on scope of Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) (42 U.S.C. §9601) liability (hereinafter, the "*landowner liability protections*," or "*LLPs*"). ASTM Standard E1527-13 constitutes "*all appropriate inquiry* into the previous ownership and uses of the *property* consistent with good commercial or customary practice" as defined at 42 U.S.C. §9601(35)(B).

1.2 Scope of Work

The scope of work for this ESA is in general accordance with the requirements of ASTM Standard E1527-13. This assessment included: 1) a property and adjacent site reconnaissance; 2) interviews with key personnel; 3) a review of historical sources; 4) a review of regulatory agency records; and 5) a review of a regulatory database report provided by a third-party vendor. Partner contacted local agencies, such as

environmental health departments, fire departments and building departments in order to determine any current and/or former hazardous substances usage, storage, and/or releases of hazardous substances on the subject property. Additionally, Partner researched information on the presence of activity and use limitations (AULs) at these agencies. As defined by ASTM E1527-13, AULs are the legal or physical restrictions or limitations on the use of, or access to, a site or facility: 1) to reduce or eliminate potential exposure to hazardous substances or petroleum products in the soil or groundwater on the subject property; or 2) to prevent activities that could interfere with the effectiveness of a response action, in order to ensure maintenance of a condition of no significant risk to public health or the environment. These legal or physical restrictions, which may include institutional and/or engineering controls (IC/ECs), are intended to prevent adverse impacts to individuals or populations that may be exposed to hazardous substances and petroleum products in the soil or groundwater on the property.

If requested by Client, this report may also include the identification, discussion of, and/or limited sampling of asbestos-containing materials (ACMs), lead-based paint (LBP), mold, and/or radon.

Based on the findings of this Phase I ESA, Partner implemented and conducted a Limited Subsurface Investigation at the subject property in order to evaluate the presence or absence of soil contamination associated with reported illegal dumping (i.e., of drums of tetrachloroethylene waste) on the subject property. The scope of work including advancement of borings in the area of the dumping and collection of soil samples for analysis. The results did not identify evidence of a release to the subsurface. Further details regarding the Limited Subsurface Investigation are provided in Section 7.0 below.

1.3 Limitations

Partner warrants that the findings and conclusions contained herein were accomplished in accordance with the methodologies set forth in the Scope of Work. These methodologies are described as representing good commercial and customary practice for conducting an ESA of a property for the purpose of identifying recognized environmental conditions. There is a possibility that even with the proper application of these methodologies there may exist on the subject property conditions that could not be identified within the scope of the assessment or which were not reasonably identifiable from the available information. Partner believes that the information obtained from the record review and the interviews concerning the subject property is reliable. However, Partner cannot and does not warrant or guarantee that the information provided by these other sources is accurate or complete. The conclusions and findings set forth in this report are strictly limited in time and scope to the date of the evaluations. The conclusions presented in the report are based solely on the services described therein, and not on scientific tasks or procedures beyond the scope of agreed-upon services or the time and budgeting restraints imposed by the Client. No other warranties are implied or expressed.

Some of the information provided in this report is based upon personal interviews, and research of available documents, records, and maps held by the appropriate government and private agencies. This report is subject to the limitations of historical documentation, availability, and accuracy of pertinent records, and the personal recollections of those persons contacted.

This practice does not address requirements of any state or local laws or of any federal laws other than the all appropriate inquiry provisions of the LLPs. Further, this report does not intend to address all of the safety concerns, if any, associated with the subject property.

Environmental concerns, which are beyond the scope of a Phase I ESA as defined by ASTM include the following: ACMs, LBP, radon, and lead in drinking water. These issues may affect environmental risk at the subject property and may warrant discussion and/or assessment; however, are considered non-scope issues. If specifically requested by the Client, these non-scope issues are discussed in Section 6.3.

1.4 User Reliance

Prologis engaged Partner to perform this assessment in accordance with an agreement governing the nature, scope, and purpose of the work as well as other matters critical to the engagement. All reports, both verbal and written, are for the sole use and benefit of Prologis. Either verbally or in writing, third parties may come into possession of this report or all or part of the information generated as a result of this work. In the absence of a written agreement with Partner granting such rights, no third parties shall have rights of recourse or recovery whatsoever under any course of action against Partner, its officers, employees, vendors, successors or assigns. Any such unauthorized user shall be responsible to protect, indemnify and hold Partner, Client and their respective officers, employees, vendors, successors and assigns harmless from any and all claims, damages, losses, liabilities, expenses (including reasonable attorneys' fees) and costs attributable to such Use. Unauthorized use of this report shall constitute acceptance of and commitment to these responsibilities, which shall be irrevocable and shall apply regardless of the cause of action or legal theory pled or asserted. Additional legal penalties may apply.

This report has been completed under specific Terms and Conditions relating to scope, relying parties, limitations of liability, indemnification, dispute resolution, and other factors relevant to any reliance on this report. Any parties relying on this report do so having accepted the Terms and Conditions for which this report was completed.

1.5 Limiting Conditions

The findings and conclusions contain all of the limitations inherent in these methodologies that are referred to in ASTM E1527-13.

2.0 SITE DESCRIPTION

2.1 Site Location and Legal Description

The subject property at 11115 Hemlock Avenue is located between Hemlock Avenue to the west and Beech Avenue to the east, and south of commercial businesses along Santa Ana Street to the north within a mixed commercial and industrial area of the City of Fontana in San Bernardino County, California. According to the San Bernardino County Assessor and the City of Fontana, the subject property is legally described as Lots 964 and 965 of the Lands of the Semi-Tropic Land and Water Company, and ownership has been vested in Resun Modspace, Inc. since 2007.

Please refer to Figure 1: Site Location Map, Figure 2: Site Plan, Figure 3: Topographic Map, and Appendix A: Site Photographs for the location and site characteristics of the subject property.

2.2 Current Property Use

The subject property is currently occupied by Modular Space Corporation (ModSpace) for commercial use. Onsite operations consist of leasing, storage, and refurbishing of modular trailers, offices, and storage bins. The units are renovated as necessary by spot painting, re-carpeting, and dent repair. Heating, ventilation, and air conditioning units are inspected but not repaired onsite. The subject property consists of one metal Maintenance Building, one modular Office Building that serves as the headquarters, one model modular office unit, and several metal storage bins. The remainder of the subject property is occupied by stored modular units. In addition to the current structures, the subject property is improved with gravel and asphalt-paved parking and storage areas and limited landscaping.

The subject property is designated for commercial and industrial development by the City of Fontana.

The subject property was identified as a California Air Resources Control Board (CARB) Facility Index System (FINDS), US EPA Resources and Recovery Act Small Quantity Generator of Hazardous Waste (RCRA-SQG), Hazardous Waste Information System (HAZNET), California Hazardous Material Incident Report System (CHMIRS), and San Bernardino County Permit (San Bern. Co. Permit) site in the regulatory database report, as further discussed in Section 4.2.

2.3 Current Use of Adjacent Properties

The subject property is located within a mixed commercial and industrial area of the City of Fontana in San Bernardino County. During the vicinity reconnaissance, Partner observed the following land use on properties in the immediate vicinity of the subject property:

Immediately Surrounding Properties

North: Plano Manufacturing (10975 Hemlock Avenue); Continental Coatings 10938 Beech Avenue); and a multi-tenant commercial building (15146 Santa Ana Avenue)

South: A newly constructed commercial building and truck depot (11251 Hemlock Avenue)

East: Hemlock Avenue beyond which are JM Eagle Co (10990 Hemlock Avenue); a newly constructed vacant commercial building (11100 Hemlock Avenue); Interstate Distributors trucking yard (11128 Hemlock Avenue); and Brown-Strauss Steel (14970 Jurupa Avenue)

West: Beech Avenue beyond which are AM Ortega Construction (11011 Beech Avenue), National Construction Rentals (11029 Beech Avenue), Amico (11093 Beech Avenue), and vacant land (11115-11181 Beach Avenue)

The adjacent property to the east was identified as a National Pollutant Discharge Elimination System (NPDES), San Bern. Co. Permit, CARB Emissions (EMI), and Waste Discharge System (WDS) site; the adjacent property to the northeast was identified as US EDR Historical Auto Station (US EDR Hist. Auto Stat.) and San Bern. Co. Permit site; the adjacent property to the north is identified as a NPDES, San Bern. Co. Permit, EMI, RCRA Large Quantity Generator of Hazardous Waste (RCRA-LQG), RCRA Non-Generator of Hazardous Waste (RCRA-NonGen/NLR), and WDS site; and the adjacent property to the west is identified as an Aboveground Storage Tank (AST), NPDES, and San Bern. Co. Permit site in the regulatory database report of Section 4.2.

2.4 Physical Setting Sources

2.4.1 Topography

The United States Geological Survey (USGS) *Fontana, California* Quadrangle 7.5-minute series topographic map was reviewed for this ESA. According to the contour lines on the topographic map, the subject property is located at approximately 982 feet above mean sea level (MSL). The contour lines in the area of the subject property indicate the area is sloping toward the southwest. The subject property is depicted on the 2012 map as undeveloped.

A copy of the most recent topographic map is included as Figure 3.

2.4.2 Hydrology

According to offsite soil investigation reports and topographic map interpretation, groundwater in the vicinity of the subject property is inferred to flow toward the southwest. According to the City of Fontana and investigation reports for a sites located within one mile to the northwest (RWQCB file T0607100535 at 14527 Slover Avenue) and north, the depth to groundwater in the vicinity of the subject property is inferred to be over 250 feet below ground surface (bgs). The nearest surface water in the vicinity of the subject property is an unnamed reservoir located within 1,000 feet to the south of the subject property. No settling ponds, lagoons, surface impoundments, wetlands, or natural catch basins were observed at the subject property during this assessment.

According to available information, a public water system operated by the Cucamonga Valley Water District (CVWD) serves the subject property vicinity. According to a representative of the CVWD, shallow groundwater beneath the subject property is not utilized for domestic purposes. The sources of public water for the area of the subject property within the City of Fontana are surface water from the State

Water Project, obtained mainly from the Colorado River and sources in Northern California, and local deep groundwater wells located within 10 miles of the subject property.

2.4.3 Geology/Soils

The subject property is situated within the Chino sub-basin just north of the Jurupa Mountains and approximately five miles south of the junction of the San Gabriel and San Bernardino Mountains at the northern edge of the Transverse Ranges physiographic province of the State of California. The subject property is located at the basal portion of a gently sloping alluvial fan originating at the foot of the San Gabriel Mountains to the north. The uppermost geologic formations underlying the soils at the subject property are Holocene and Upper Pleistocene alluvium, consisting mainly of alluvial-fan deposits to approximately 150 feet bgs.

Soils encountered during an onsite soils investigation in 2002 were described as silt with some gravel and sand with gravel and rock fragments to 4 feet bgs. Soils encountered at an unnamed property located one mile north (SECOR, 1998) were described as decomposed granite to 20 feet bgs with less weathered and more dense granodiorite to approximately 26 feet bgs.

Based on information obtained from the USDA Natural Resources Conservation Service Web Soil Survey online database, the subject property is mapped as Kilmore Loam. The Kilmore series consists of very moderately well-drained, loamy textured soil to 60 inches. Slopes range from 1 to 2 percent.

2.4.4 Flood Zone Information

Partner performed a review of the Flood Insurance Rate Map, published by the Federal Emergency Management Agency. According to Community Panel Number 06071C8665H, there is no flood map printed for the subject property.

3.0 HISTORICAL INFORMATION

Partner obtained historical use information about the subject property from a variety of sources. A chronological listing of the historical data found is summarized in the table below:

Historical Use Information		
Period/Date	**Source**	**Description/Use**
1901-1920s	Aerial Photographs, Topographic Maps	Undeveloped/Native land
1920s-1940s	Aerial Photographs, Previous Report, Sanborn Maps, Topographic Maps	Undeveloped, residential, and/or used for agriculture
1940s-1980s	Aerial Photographs, Previous Report, Topographic Maps	Agricultural or undeveloped
1980s-1990s	Aerial Photographs, Topographic Maps, Previous Report	Undeveloped and used for commercial trucking and storage on the north end
2000-Present	Aerial Photographs, Building Records, Previous Report, Interviews, Onsite Observations	Commercial storage and refurbishing of modular office and trailer units

Tenants on the subject property include Allegiance Construction Co/ DINHY Construction Corp (2002-2008), GE Capital Modular Space (2000-2007), ModSpace (2007-Present). The subject property parcel was historically used for agricultural purposes. There is a potential that agricultural related chemicals such as pesticides, herbicides, and fertilizers, may have been used and stored onsite. The subject property is either paved over or covered by building structures that minimize direct contact to any potential remaining concentrations in the soil. Additionally, during previous site development activities, near surface soils (where residual agricultural chemical concentrations would have most likely been present, if at all) were generally mixed with fill material or disturbed during grading. Two soil samples were collected and analyzed for pesticides and herbicides in 2002 and only trace concentrations of pesticides, below applicable regulatory limits, were detected in one of the samples. Based on these reasons, Partner concludes that the possible former use of agricultural chemicals is not expected to represent a significant environmental concern at this time. No other potential environmental concerns were identified in association with the current or former use of the subject property.

3.1 Aerial Photograph Review

Partner obtained available aerial photographs of the subject property and surrounding area from Environmental Data Resources (EDR). The following observations were noted to be visible on the subject property and adjacent properties during the aerial photograph review:

Date: 1938 and 1948	***Scale: 1"=500'***
Subject Property:	Vacant or agricultural land with a few trails and a few small structures across the center and north of the subject property
North:	Developed with multiple small plots with small structures aligned in an east/west manner
South:	Developed with a young orchard
East:	Developed with agricultural fields or young orchards across a dirt road or trail
West:	Developed with several small regularly spaced structures, agricultural fields and orchards and an unpaved area with dirt trails across Hemlock Avenue

Date: 1953, 1959 and 1967	***Scale: 1"=500'***
Subject Property:	No significant changes visible except for a potential drainage path crossing the northern portion of the subject property from northeast to southwest.
North:	Appears to be primarily unpaved, cleared land with a few structures remaining
South:	No significant changes visible
East:	Developed with orchards to the east/southeast and numerous regularly spaced, small plots, each with a small structure and roads or tracks between the plots
West:	No significant changes visible except for development of commercial structures nonadjacent to the west and southwest of the subject property

Date: 1975	***Scale: 1"=500'***
Subject Property:	Appears to be undeveloped, unpaved land with a few dirt trails extending offsite to the north and to the east
North:	Unpaved land with a potential drainage course and dirt trails and a few small structures
South:	No significant changes visible
East:	No significant changes visible
West:	Appears developed with numerous roads and trails and unpaved areas with parking or storage

Date: 1985	***Scale: 1"=500'***
Subject Property:	No significant changes visible except for a few very small structures on the northwest corner of the property
North:	Developed with a few commercial buildings along Hemlock Avenue and one small structure along Beech Avenue with the remainder of the block developed as unpaved land and dirt trails.
South:	No significant changes visible
East:	No significant changes visible
West:	No significant changes visible across Beech Avenue

Date: 1990	***Scale: 1"=500'***
Subject Property:	Unpaved, cleared land with a few trails on the southeast
North:	Developed with a few more commercial buildings along Beech Avenue
South:	Unpaved, cleared land
East:	Developed with commercial facilities to the west and northwest across Beech Avenue, as observed during the site visit.
West:	Appears to have been cleared and graded with apparent steel beam storage to the southwest across Hemlock Avenue to the southwest

Date: 1994	***Scale: 1"=500'***
Subject Property:	Developed with a few small structures and parking areas on the northwest corner with an area that appears to be paved. The remainder of the subject property is unpaved with several dirt roads.
North:	No significant changes visible
South:	No significant changes visible
East:	No significant changes visible. A dirt road extends onto the subject property from the area located to the southwest across Beech Avenue
West:	No significant changes visible

Date: 2005	***Scale: 1"=500'***
Subject Property:	Developed as a storage area for trailers and modular buildings. The current Maintenance Building and modular office appear on the western portion of the site as observed during the site visit.
North:	No significant changes visible
South:	No significant changes visible
East:	Fully developed with commercial structures to the east and northeast and with unpaved land to the southeast across Beech Avenue
West:	Developed with a large commercial facility to the northwest and an apparent truck depot to the southwest across Hemlock Avenue, as observed during the site visit.

Date: 2006	***Scale: 1"=500'***
Subject Property:	No significant changes visible. There are less stored trailers and modular units on the subject property than observed on the 2005 photograph.
North:	No significant changes visible
South:	No significant changes visible
East:	No significant changes visible
West:	No significant changes visible

Date: 2009, 2010, and 2012	***Scale: 1"=500'***
Subject Property:	No significant changes visible. Appears fully occupied again with stored modular units
North:	Fully developed with commercial facilities as observed during the site visit
South:	No significant changes visible
East:	No significant changes visible
West:	No significant changes visible

Copies of select aerial photographs are included in Appendix B.

3.2 Fire Insurance Maps

Partner reviewed the collection of Sanborn Fire insurance maps from EDR. The following observations were noted to be depicted on the subject property and adjacent properties during the fire insurance map review:

Date: 1929 and 1938	
Subject Property:	Developed with three small structures across the center of the property and one small structure on the northwest corner
North:	Developed with six small regularly spaced structures
South:	Undeveloped land
East:	Depicted with two small structures
West:	Depicted with multiple small, regularly spaced structures across Hemlock Avenue

Copies of reviewed Sanborn Maps are included in Appendix B.

3.3 City Directories

Partner reviewed historical city directories obtained from EDR for past names and businesses that were listed for the subject property and adjacent properties. The findings are presented in the following table:

City Directory Search for 11115 Hemlock Avenue (Subject Property)	
Year(s)	**Occupant Listed**
2002	DINH Construction Co/ GE Capital Modular Space
2003	DINH Construction Co
2008	Allegiance Construction Co/ DINHY Construction Corp/GE Capital Modular Space

Based on the city directory review, no environmentally sensitive listings were identified for the subject property address.

City Directory Search for Adjacent Properties	
Year(s)	**Occupant Listed**
1990	Plano Mfg (10975 Hemlock); J M Manufacturing Company Inc. (10990 Hemlock)
1996	Plano Mfg (10975 Hemlock); J M Manufacturing Company Inc. (10990 Hemlock); Security Environmental Systems Inc. (11015 Hemlock)
2002	Plano Mfg (10975 Hemlock); J M Manufacturing Company Inc. (10990 Hemlock)
2008	Plano Mfg (10975 Hemlock); XXXX (10990 Hemlock); Interstate Distributor (11128 Hemlock)
2013	Plano (10975 Hemlock); J M Eagle (10990 Hemlock); Interstate Distributor (11128 Hemlock); Verizon Supply Chain Services (15101 Santa Ana)

* XXXX= A phone number is present but is not registered to a tenant or is disconnected.

According to the city directory review, the adjacent properties have been occupied by various commercial facilities and a truck/transport company since at least 1990. Based on the city directory review, no environmentally sensitive listings were identified for the adjacent property addresses.

Copies of reviewed city directories are included in Appendix B.

3.4 Historical Topographic Maps

Partner reviewed historical topographic maps obtained from EDR. The following observations were noted to be depicted on the subject property and adjacent properties during the topographic map review:

Date: 1901	
Subject Property:	Undeveloped
North:	Undeveloped
South:	Undeveloped
East:	Undeveloped
West:	Undeveloped

Date: 1942, 1943, 1953, 1954	
Subject Property:	Undeveloped with agricultural fields depicted on the south end. Hemlock Avenue is depicted on the north side of the western site perimeter
North:	No significant changes depicted
South:	Depicted as developed with agricultural fields or orchards
East:	Depicted as developed with agricultural fields or orchards
West:	No significant changes depicted.

Date: 1967, 1973, 1975, 1980	
Subject Property:	No significant changes depicted with the exception of a contoured depression depicted on the northeast end of the subject property and a few trails
North:	Depicted with several trails
South:	No significant changes depicted
East:	No significant changes depicted
West:	Depicted with a few non-adjacent commercial structures

Copies of reviewed topographic maps are included in Appendix B.

4.0 REGULATORY RECORDS REVIEW

4.1 Regulatory Agencies

4.1.1 Health Department and Fire Department

Regulatory Agency Data	
Name of Agency:	San Bernardino County Health Department/ County of San Bernardino Fire Department (SBCHD/SBCFD)
Point of Contact:	Public Records Counter/Email
Agency Address:	620 South "E" Street, San Bernardino, California
Agency Phone Number:	(929) 386-8401
Date of Contact:	August 4, 2015
Method of Communication:	In Person/Email
Summary of Communication:	Records available from SBCFD included inspection reports dated 2004 through 2015. No violations or citations were identified in the reports, which indicated that paints, oils, and solvents, in small quantities were used onsite for refurbishing of modular units. No onsite vehicle maintenance or fueling was reported and no reports of spills or releases from onsite operations were on file with SBCFD. SBCFD reported that approximately 1,100 gallons of waste perchloroethylene (PCE) and waste filters contained within 27 55-gallon drums was illegally dumped on the northern portion of the subject property on June 22, 2000. The northern portion of the subject property was vacant and paved with asphalt at the time of the incident. Several of the drums were damaged and approximately 5-10 gallons of PCE was released to the asphalt paved surface. Eight grab soil samples were collected and analyzed and PCE was identified in all of the soil samples. A disposal manifest was also provided indicating that the PCE drums and spilled material were neutralized, over packed for transport and disposed offsite in accordance with applicable regulations. No information regarding the location or depth of the soil samples was identified and no manifests specifically indicating removal of impacted soil were identified. The final notations indicate that PCE did not impact soil deeper than the surface and that surface material was "scraped" and completely removed. Based on the limited amount of PCE released (10 gallons maximum) and the spill response and cleanup documentation reviewed, this minor release does not represent a concern for the subject property. Given the documented release of PCE on the subject property, Partner recommended and performed a Limited Subsurface Investigation. The results of this investigation are further discussed in Section 7.0 below. Based on a telephone conversation with SBCHD on September 1, 2015, no violations or outstanding issues were reported for the subject property and no current or former USTs were reported

Regulatory Agency Data	
	onsite. SBCHD reported verbally that no additional documentation was available for the documented release of PCE in 2002; specifically no reports or manifests indicating soil was excavated and disposed offsite were identified in SBCHD and SBCFD files. A copy of the current San Bernardino County Hazardous Materials Permit was provided during the site inspection.

4.1.2 Air Pollution Control Agency

Regulatory Agency Data	
Name of Agency:	South Coast Air Quality Management District (SCAQMD)
Point of Contact:	Online
Agency Address:	21865 Copley Drive, Diamond Bar, California 91765
Agency Phone Number:	(909) 396-2000
Date of Contact:	August 12, 2015
Method of Communication:	Online - *www3.aqmd.gov*/FINDS Database
Summary of Communication:	No Permits to Operate (PTO), Notices of Violation (NOV), or Notices to Comply (NTC) or the presence of AULs, dry cleaning machines, or USTs were on file for the subject property with the SCAQMD.

4.1.3 Regional Water Quality Agency

Regulatory Agency Data	
Name of Agency:	Regional Water Quality Control Board (RWQCB) – Santa Ana Region
Point of Contact:	Online
Agency Address:	3737 Main Street, Suite 500, Riverside, California
Agency Phone Number:	(951) 782-4130
Date of Contact:	August 12, 2015
Method of Communication:	Online - *www.geotracker.waterboards.ca.gov* Database
Summary of Communication:	No records regarding hazardous substance use, storage or releases, or the presence of USTs and AULs on the subject property were on file with the RWQCB GeoTracker database.

4.1.4 Department of Toxic Substances Control

Regulatory Agency Data	
Name of Agency:	California Department of Toxic Substances Control (DTSC)
Point of Contact:	Online
Agency Address:	5796 Corporate Avenue, Cypress California
Agency Phone Number:	(800) 728-6942
Date of Contact:	August 12, 2015
Method of Communication:	Online - www.envirostor.dtsc.ca.gov/public and hwts.dtsc.ca.gov/ Databases
Summary of Communication:	No records regarding hazardous substance use, storage or releases, or the presence of USTs and AULs on the subject property were on file with the DTSC. The DTSC HWTS database records reviewed

Regulatory Agency Data	
	online indicate that hazardous wastes categorized as SIC Code 7359 were generated and disposed by GE Modular from 2003 through 2007 and by Modspace from 2007 through 20012, as discussed further in Section 4.2.2. No violations are reported.

4.1.5 Building Department

Regulatory Agency Data	
Name of Agency:	Fontana Building Department (FBD)
Point of Contact:	Public Counter
Agency Address:	8353 Sierra Avenue, Fontana, California
Agency Phone Number:	(909) 350-7600
Date of Contact:	August 4, 2015
Method of Communication:	In Person
Summary of Communication:	Records were available for review, as discussed in the following table.

Building Records Reviewed for 11115 Hemlock Avenue (Subject Property)		
Year(s)	**Owner/Applicant**	**Description**
1999	GE/ GE Capital Modular	Permit for a temporary power pole Grading permit for a Modular 2-Bay Shop and Storage Building Permit to construct a block wall on the east and west side of the property
2000	Gaul Construction/GE	Permit for foundation system and utilities for a pre-manufactured modular office Certificate of Occupancy for a pre-fabricated modular office building Permit to construction a new 70.25 x 80.25 two-bay repair building with restroom, office, utility and mechanical rooms
2001	GE/John Boruchin	Permit for signage
2003	GE Capital Modular Space	Grading Permit for 30,700 square feet for trailer storage
2004	GE Capital	Permit to construct a block wall

A copy of pertinent documents is included in Appendix B of this report.

4.1.6 Planning Department

Regulatory Agency Data	
Name of Agency:	Fontana Planning Department (FPD)
Point of Contact:	Public Counter
Agency Address:	8353 Sierra Avenue, Fontana, California
Agency Phone Number:	(909) 350-7600
Date of Contact:	August 4, 2015
Method of Communication:	In Person
Summary of Communication:	According to records reviewed, the subject property is zoned SP-SWIP (Jurupa North District Southwest Industrial Park Specific Plan) for commercial/industrial development by the City of Fontana

4.1.7 Oil & Gas Exploration

Regulatory Agency Data	
Name of Agency:	California Division of Oil, Gas and Geothermal Resources (DOGGR)
Point of Contact:	Online
Agency Address:	5816 Corporate Ave., Suite 200, Cypress, California
Agency Phone Number:	(714) 816-6847
Date of Contact:	August 12, 2015
Method of Communication:	Online – www.conservation.ca.gov/doggr
Summary of Communication:	According to DOGGR, no oil or gas wells are located on or adjacent to the subject property.

4.1.8 Assessor's Office

Regulatory Agency Data	
Name of Agency:	San Bernardino County Assessor (SBCA)
Point of Contact:	Telephone/Online Database
Agency Address:	172 W. Third Street, San Bernardino California
Agency Phone Number:	(909) 387-8307
Date of Contact:	August 12, 2015
Method of Communication:	Online - http://www.sbcounty.gov/assessor/pims/
Summary of Communication:	According to records reviewed, the subject property is identified by Assessor Parcel Number (APN) 0237-131-25P-000 and ownership of the subject property is vested in Resun Modspace, Inc.

4.2 Mapped Database Records Search

Information from standard federal, state, county, and city environmental record sources was provided by Environmental Data Resources, Inc. (EDR). Data from governmental agency lists are updated and integrated into one database, which is updated as these data are released. The information contained in this report was compiled from publicly available sources and the locations of the sites are plotted utilizing a geographic information system, which geocodes the site addresses. The accuracy of the geocoded locations is approximately +/-300 feet.

Using the ASTM definition of migration, Partner considers the migration of hazardous substances or petroleum products in any form onto the subject property during the evaluation of each site listed on the radius report, which includes solid, liquid, and vapor.

4.2.1 Regulatory Database Summary

Radius Report Data

Database	Search Radius (mile)	Subject Property	Adjacent Properties	Sites of Concern
Federal NPL or Delisted NPL Site	1.00	N	N	N
Federal CERCLIS Site	0.50	N	N	N
Federal CERCLIS-NFRAP Site	0.50	N	N	N
Federal RCRA CORRACTS Facility	1.00	N	N	N

Radius Report Data				
Database	**Search Radius (mile)**	**Subject Property**	**Adjacent Properties**	**Sites of Concern**
Federal RCRA TSDF Facility	0.50	N	N	N
Federal RCRA Generators Site (LQG, SQG, CESQG)	0.25	**Y**	**Y**	N
Federal IC/EC Registries	0.50	N	N	N
Federal ERNS Site	Subject Property	N	N	N
State/Tribal Equivalent NPL	1.00	N	N	N
State/Tribal Equivalent CERCLIS	1.00	N	N	N
State/Tribal Landfill/Solid Waste Disposal Site	0.50	N	N	N
State/Tribal Leaking Storage Tank Site	0.50	N	N	N
State/Tribal Registered Storage Tank Sites (UST/AST)	0.25	N	**Y**	N
State/Tribal Voluntary Cleanup Sites (VCP)	0.50	N	N	N
State/Tribal Spills	0.50	N	N	N
Federal Brownfield Sites	0.50	N	N	N
State Brownfield Sites	0.50	N	N	N
EDR MGP	Varies	N	N	N
EDR US Hist Auto Station	Varies	N	**Y**	N
EDR US Hist Cleaners	Varies	N	N	N
San Bernardino County Permit	Varies	**Y**	**Y**	N
CHMIRS	Varies	**Y**	N	N

4.2.2 Subject Property Listings

The subject property is identified as a FINDS, San Bernardino Co. Permit, HAZNET, RCRA-SQG, and CHMIRS site in the regulatory database report, as discussed below:

- The subject property, identified as Modular Space Corporation DBA ModSpace at 11115 Hemlock Avenue is identified on the FINDS database with no information reported. The FINDS database indicates listing in other databases.
- The subject property, identified as Modular Space Corporation DBA ModSpace at 11115 Hemlock Avenue is identified on the San Bern. Co. Permit, HAZNET, and RCRA-SQG databases. The facility is permitted to handle one to three hazardous chemicals and no violations are reported. The facility is also permitted as a RCRA-SQG as of 2009 and permitted to generate ignitable waste and barium, cadmium, and chromium. No violations or releases are reported. The HAZNET listings indicate the business (categorized as SIC Code 7359) has generated the following categories of hazardous wastes:

  2008: 0.41 ton of other organic solids; 1.5 tons of off-specification, aged or surplus organics; and 0.0375 ton of unspecified organic liquid mixture

  2009: 0.0650 ton of off-specification, aged or surplus organics; 0.005 ton of unspecified organic liquid mixture, 0.05 ton of other organic solids, 0.675 ton of unreported wastes, 0.025 ton of alkaline solution without metals and pH>=12.5

2010: 0.075 ton of unreported wastes, and 0.05 ton of other inorganic solid waste
2011: 6.255 tons of unspecified oil-containing waste
2012: 6.255 tons of unreported wastes

Waste codes, although not specifically listed for the above reported waste categories, included D001 (ignitable waste), D005 (barium), D006 (cadmium), and D007 (chromium).

Based on the nature of the listing, lack of violations or listed releases, these listings are not expected to represent a significant environmental concern.

- The subject property, identified as A Vacant Property at 11115 Hemlock Avenue is identified on the CHMIRS database for a release of 5-10 gallons of PCE on June 22, 2000. The listing contains the same information as that obtained from SBCFD regarding the 27 55-gallon drums of waste PCE, filters and sludge which were illegally dumped on the northern portion of the subject property on June 22, 2000 (see Section 4.1.1). No additional information is reported by EDR. Based on the information reviewed indicating the spill was contained, cleaned up and disposed offsite under the guidance of SBCHD, and the small quantity of PCE released to a paved surface, this listing is not expected to represent a significant environmental concern.

- The subject property, identified as GE Modular Space at 11115 Hemlock Avenue is identified on the HAZNET database. No violations are reported and the HAZNET listings indicate the business generated 0.03 ton of other inorganic solid waste, and 0.15 ton of off-specification, aged, or surplus organics waste in 2007. Based on the nature of the listing, and absence of other reports indicating violations or a release, this listing is not expected to represent a significant environmental concern.

4.2.3 Adjacent Property Listings

The adjacent property to the east was identified as a NPDES, San Bernardino County Permit, EMI, and WDS site; the adjacent property to the northeast was identified as US EDR Hist. Auto Stat and San Bernardino County Permit site; the adjacent property to the north is identified as a NPDES, San Bernardino Co. Permit, EMI, RCRA-LQG, RCRA-NonGen/NLR, and WDS site; and the adjacent property to the west is identified as an AST, NPDES and San Bern. Co. Permit site in the regulatory database report, as discussed below:

- The property, identified as Amico Corp at 11093 Beech Avenue, is located adjacent to the east of the subject property. This listing indicate the NPDES permit was issued to the facility for structural metals work and was terminated in 2013 with no violations reported. The facility is permitted by San Bernardino County as an inactive special generator with 26 to 50 employees and no violations are reported. The EMI listings date to 1987 and indicate the facility has generated organic hydrocarbon gases and reactive organic gases to air with no violations. The WDS listing indicates the facility is a metals fabrication business with a minor threat to water quality should a release occur. No violations or reported releases are associated with any of the listings. Based on the lack of violations or reported releases this facility is not expected to

represent a significant environmental concern and it is unlikely that a regulatory file review for this site would alter the findings of this assessment.

- The property, identified as Commercial Collision Center and European Automobile Engineering and A.M. Ortega Construction at 11001 Beech Avenue is located to the northeast of the subject property. The site is identified as a historical auto station site from 2003 through 2009 and no releases or violations are identified. The site is also identified as a San Bernardo County Permitted hazardous materials site from 2004 through 2015 also with no violations or releases listed. Based on the lack of violations or reported releases this facility is not expected to represent a significant environmental concern and it is unlikely that a regulatory file review for this site would alter the findings of this assessment.
- The property, identified as Continental Coatings company, Inc. at 10938 Beech Avenue is located to the north of the subject property. The site is identified as a NPDES, San Bernardino Co. Permit, EMI, RCRA-LQG, and WDS site as of 2004. The facility is permitted to generate hazardous wastes including ignitable waste, methyl ethyl ketone, and non-halogenated solvents and is categorized as a waste-generating recycler using 51 to 70 hazardous chemicals stored in onsite ASTs. This facility has received a written informal Notice of Violation in 2004 and a compliance evaluation inspection was performed. No further information is reported and the facility is listed as in compliance as of 2004. The WDS listing is active and indicates the facility has no waste treatment systems and represents a minor threat to water quality in the event of a release. The EMI listings indicate the facility is permitted to generate organic hydrocarbon gases, reactive organic gases, particulate matter, and particulate matter of 10 micrometers and smaller dating from 2009. No violations or reported releases are reported associated with any of the listings. Based on the lack of violations or reported releases this facility is not expected to represent a significant environmental concern and it is unlikely that a regulatory file review for this site would alter the findings of this assessment.
- The property, identified as Musashi Paint California Co Ltd. at 10938 Beech Avenue is located to the north of the subject property. The site is identified as a RCRA-NonGen/NLR site as of 2013. The facility is permitted to generate hazardous wastes including ignitable waste and non-halogenated solvents. Based on the lack of violations or reported releases this facility is not expected to represent a significant environmental concern and it is unlikely that a regulatory file review for this site would alter the findings of this assessment.
- The property, identified as Interstate Dist Co at 11128 Hemlock Avenue is located to the west of the subject property. The site is identified as an AST, NPDES, and San Bern. Co. Permit site as of 2003. The site is permitted as a conditionally exempt small quantity generator to use and store 4-10 hazardous chemicals with a 10,001-100,000 gallon facility capacity. The AST listing indicates a total volume of 20,110 gallons. Based on the lack of violations or reported releases this facility is not expected to represent a significant environmental concern and it is unlikely that a regulatory file review for this site would alter the findings of this assessment.

Based on the findings, vapor migration is not expected to represent a significant environmental concern at this time.

4.2.4 Sites of Concern Listings

No sites of concern are identified in the regulatory database report.

Based on the findings, vapor migration is not expected to represent a significant environmental concern at this time.

4.2.5 Orphan Listings

No orphan listings relevant to the subject property are identified in the regulatory database report.

A copy of the regulatory database report is included in Appendix C.

5.0 USER PROVIDED INFORMATION AND INTERVIEWS

In order to qualify for one of the *Landowner Liability Protections (LLPs)* offered by the Small Business Liability Relief and Brownfields Revitalization Act of 2001 (the *Brownfields Amendments*), the *User* must conduct the following inquiries required by 40 CFR 312.25, 312.28, 312.29, 312.30, and 312.31. The *User* should provide the following information to the *environmental professional*. Failure to provide this information could result in a determination that *all appropriate inquiries* is not complete. The *User* is asked to provide information or knowledge of the following:

- Review Title and Judicial Records for Environmental Liens and AULs
- Specialized Knowledge or Experience of the User
- Actual Knowledge of the User
- Reason for Significantly Lower Purchase Price
- Commonly Known or *Reasonably Ascertainable* information
- Degree of Obviousness
- Reason for Preparation of this Phase I ESA

Fulfillment of these user responsibilities is key to qualification for the identified defenses to CERCLA liability. Partner requested our Client to provide information to satisfy User Responsibilities as identified in Section 6 of the ASTM guidance.

Pursuant to ASTM E1527-13, Partner requested the following site information from Prologis (User of this report).

User Responsibilities

Item	Provided By User	Not Provided By User	Discussed Below	Does Not Apply
Environmental Pre-Survey Questionnaire			**X**	
Title Records, Environmental Liens, and AULs			**X**	
Specialized Knowledge			**X**	
Actual Knowledge			**X**	
Valuation Reduction for Environmental Issues			**X**	
Identification of Key Site Manager	**Section 5.1.3**			
Reason for Performing Phase I ESA	**Section 1.1**			
Prior Environmental Reports	**X**		**X**	
Other		**X**		

5.1 Interviews

5.1.1 Interview with Owner

Ms. Pat McCormick, representative of the subject property owner, is also the key site manager and information obtained from Ms. McCormick is reported below in Section 5.1.3.

5.1.2 Interview with Report User

Please refer to Section 5.2 below for information requested from the Report User. The information requested was not received prior to the issuance of this report. Because the Report User (Client) is a prospective purchaser of the subject property, it is understood that the Report User would not have knowledge of the property that would significantly impact our ability to satisfy the objectives of this assessment. The lack of this information is not considered to represent a significant data gap.

5.1.3 Interview with Key Site Manager

Ms. Pat McCormick, key site manager, indicated that she had no information pertaining to any pending, threatened, or past litigation relevant to hazardous substances or petroleum products in, on, or from the subject property; any pending, threatened, or past administrative proceedings relevant to hazardous substances or petroleum products in, on, or from the subject property; or any notices from a governmental entity regarding any possible violation of environmental laws or possible liability relating to hazardous substances or petroleum products.

According to Ms. McCormick, the subject property was developed in 2000 for commercial use as a modular unit storage and leasing facility. Prior to that, the subject property was undeveloped. Ms. McCormick stated there is a clarifier in use and small quantities of aerosol paints, cleaners, and fuel are used and stored on the subject property. Ms. McCormick further stated there are no USTs, ASTs, or groundwater monitoring wells on the subject property to the best of her knowledge.

5.1.4 Interviews with Past Owners, Operators and Occupants

Interviews with past owners, operators and occupants were not conducted since information regarding the potential for contamination at the subject property was obtained from other sources.

5.1.5 Interview with Others

As the subject property is not an abandoned property as defined in ASTM 1527-13, interview with others were not performed.

5.2 User Provided Information

5.2.1 Title Records, Environmental Liens, and AULs

At the request of the User, Partner contracted EDR to perform a limited chain of title and/or environmental lien search for the subject property. No environmental liens or AULs were identified for the subject property.

Copies of pertinent pages are included in Appendix B.

5.2.2 Specialized Knowledge

No specialized knowledge of environmental conditions associated with the subject property was provided by the User at the time of the assessment.

5.2.3 Actual Knowledge of the User

No actual knowledge of any environmental lien or AULs encumbering the subject property or in connection with the subject property was provided by the User at the time of the assessment.

5.2.4 Valuation Reduction for Environmental Issues

No knowledge of valuation reductions associated with the subject property was provided by the User at the time of the assessment.

5.2.5 Commonly Known or Reasonably Ascertainable Information

The User did not provide information that is commonly known or *reasonably ascertainable* within the local community about the subject property at the time of the assessment.

5.2.6 Previous Reports and Other Provided Documentation

The following information was provided to Partner for review during the course of this assessment:

Phase I Environmental Site Assessment Report, 25 Undeveloped Acres, Fontana, California, SECOR International Incorporated, January 22, 1998

SECOR International Incorporated (SECOR) prepared this report on behalf of GE Capital Modular Space. The assessment was performed in general accordance with ASTM Standard E1527-00. The assessment consisted of a site reconnaissance, interviews with knowledgeable personnel, review of historical information, and a review of federal, state, and local regulatory databases. The assessment was performed on the southern 25-acre portion of the subject property and did not include the northern 10-acre parcel. Pertinent information contained in this report is summarized below:

- At the time of the 1998 assessment, the subject property was unoccupied and consisted of vacant, cleared land with several dirt roads, minor amounts of construction debris (wood and concrete), and a small area of asphalt pavement near the northern end of the current subject property boundaries.
- According to the SECOR report, the subject property was formerly occupied by a eucalyptus grove prior to 1983 (Partner's review of historical aerial photographs indicates the property adjacent to the south was occupied by a grove, however, no evidence of an onsite grove was identified).
- No current or former ASTs or USTs were identified on the subject property.
- No oil or hazardous substances were identified at the subject property.

SECOR identified no RECs and recommended no further investigation.

Phase I Environmental Site Assessment of Hemlock Avenue and Beech Avenue, Fontana, California 92337 EMG, April 16, 2002

EMG prepared this report on behalf of GE Capital Modular Space. The assessment was performed in general accordance with ASTM Standard E1527-00. The assessment consisted of a site reconnaissance, interviews with knowledgeable personnel, review of historical information, and a review of federal, state, and local regulatory databases. The assessment was performed on the northern 10-acre portion of the subject property and did not include the southern 25-acre portion. Pertinent information contained in this report is summarized below:

- At the time of the 2002 assessment, the subject property was unoccupied and consisted of vacant cleared land with a building pad and asphalt paved areas. The southern portion of the subject property (not included in the 2002 assessment) was reportedly developed as a GE Modular Building storage yard with operations reported as similar to those observed by Partner during the recent site visit.
- According to the EMG report, the subject property was occupied by residential buildings from the 1920s to 1940s, agricultural land from 1949 through the late 1980s and used for tractor trailer storage in the early through the mid-1990s. A neighboring tenant and the former owner of the site reported that a trucking company used the property for staging and waste storage in the early 1990s for up to 1.5 years. Reportedly a low-lying area on the east side of the site was filled using soil from the southern 25-acre portion of the subject property create a level surface in 1992.
- No current or former ASTs or USTs were identified on the subject property.
- No oil and hazardous substances were identified at the subject property. No mention was made of the reported spill of PCE on the northern portion of the subject property in 2002 reported by SBCFD. The EMG Report indicated that SBCFD had reported that their "files are not available for review." No request appears to have been submitted by EMG to SBCHD, which reports for SBCFD.
- EMG reviewed a previous Phase I Environmental Site Assessment report for the southern portion of the subject property prepared by SECOR and dated January 2, 1998. This report is discussed above.

EMG identified no RECs and recommended no further investigation.

Phase II Environmental Assessment of Hemlock Avenue and Beech Avenue, Fontana, California 92337, EMG, April 23, 2002

EMG prepared this report on behalf of GE Capital Modular Space. The assessment consisted of drilling and sampling six soil borings to evaluate the potential for onsite impacts to soils from historical onsite agricultural operations and from a potential release from the adjacent property located to the northeast of the subject property (Continental Coatings), which reportedly uses volatile organic compounds (VOCs) for onsite paint manufacturing. No mention was made of the reported spill of PCE on the northern portion of the subject property in 2002 reported by SBCFD. Pertinent information contained in this report is summarized below:

- At the time of the 2002 assessment, the subject property was unoccupied except for a small area of asphalt pavement on the north end of the site. Based on Partner's review of the 1998 SECOR Report, the asphalt pavement likely remained from the reported use of the northwestern portion of the property as a tractor/trailer storage and trucking facility in the early 1990s.
- EMG advanced four borings to 10 feet bgs along the northern perimeter of the subject property and collected and analyzed soil samples for VOCs using EPA Method 8260B; and advanced two soil borings to 4 feet bgs on the east and west sides of the subject property and analyzed soil samples for VOCS using EPA Method 8260B, pesticides using EPA Methods 8141 and 8081, and herbicides using EPA Method 8151. Samples from depths of 4 to 5 feet bgs and 9 to 10 feet bgs were analyzed. Based on information received from ModSpace Corporation on September 2, 2015, the westernmost boring was placed near the center of the reported PCE spill that occurred in 2002,
- The analytical results for the soil samples did not reveal the presence of detectable concentrations of VOCs or herbicides. Trace concentrations of 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT were detected in one soil sample collected from a depth of 3 to 4 feet bgs at 0.00266, 0.0300, and 0.00333 parts per million (ppm), respectively. These concentrations are well below applicable regulatory limits of 2.4, 1.7, and 1.7 ppm, respectively.

EMG recommended no further investigation based on the analytical results of the soil samples analyzed.

6.0 SITE RECONNAISSANCE

The weather at the time of the site visit was sunny and clear. Refer to Section 1.5 for limitations encountered during the field reconnaissance and Sections 2.1 and 2.2 for subject property operations. The table below provides the site assessment details:

Site Assessment Data	
Site Assessment Performed By:	Robin Blanchard
Site Assessment Conducted On:	August 4, 2015

The table below provides the subject property personnel interviewed during the field reconnaissance:

Site Visit Personnel for 11115 Hemlock Avenue (Subject Property)			
Name	**Title/Role**	**Contact Number**	**Site Walk* Yes/No**
Ms. Pat McCormick	Key Site Manager	1-800-523-7918	Yes
Mr. Doug Egge	Fleet Manager	1-800-523-7918	Yes

* Accompanied Partner during the field reconnaissance activities and provided information pertaining to the current operations and maintenance of the subject property

No potential environmental concerns were identified during the onsite reconnaissance.

6.1 General Site Characteristics

6.1.1 Solid Waste Disposal

Solid waste generated at the subject property is disposed in commercial dumpsters located north of the Maintenance Building on the subject property. An independent solid waste disposal contractor, Burrtech, removes solid waste from the subject property. According to property personnel, only office and packaging trash is collected in the on-site solid waste dumpsters. Used tires, metal scrap, and scrap equipment is collected in bins and taken offsite by various contractors for recycling.

6.1.2 Sewage Discharge and Disposal

Sanitary discharges on the subject property are directed into the municipal sanitary sewer system. The City of Fontana services the subject property vicinity. No wastewater treatment facilities or septic systems are observed or reported on the subject property. One clarifier is operated onsite and receives wastewater from floor washing operations at the Maintenance Building.

6.1.3 Surface Water Drainage

Storm water is removed from the subject property primarily by sheet flow action across the paved surfaces towards storm water drains located in the public right of way. Site storm water from roofs, landscaped areas, and paved areas is directed to the public right of way. The subject property is connected to a municipal owned and maintained sewer system.

The subject property does not appear to be a designated wetland area, based on information obtained from the United States Fish & Wildlife Service; however, a comprehensive wetlands survey would be required in order to formally determine actual wetlands on the subject property. No surface

impoundments, wetlands, natural catch basins, settling ponds, or lagoons are located on the subject property. No drywells were identified on the subject property.

6.1.4 Source of Heating and Cooling

Heating and cooling systems as well as domestic hot water equipment are fueled by electricity and natural gas provided by Southern California Edison (SCE) and The Gas Company (SoCal Gas). The mechanical systems are comprised of exterior packaged electrical HVAC units. Hot water is provided by individual natural gas and electric hot water heaters.

6.1.5 Wells and Cisterns

No aboveground evidence of wells or cisterns was observed during the site reconnaissance.

6.1.6 Wastewater

Domestic wastewater generated at the subject property is disposed by means of the sanitary sewer system. No industrial process is performed at the subject property.

6.1.7 Septic Systems

No septic systems were observed or reported on the subject property.

6.1.8 Additional Site Observations

No additional general site characteristics were observed during the site reconnaissance.

6.2 Potential Environmental Hazards

6.2.1 Hazardous Substances and Petroleum Products Used or Stored at the Site

Partner identified hazardous substances used, stored, and/or generated on the subject property as noted in the following table:

Hazardous Substances and/or Petroleum Products Noted Onsite

Substance	Container Size	Location	Nature of Use	Disposal Method
Aerosol Paint	50 typical retail aerosol containers	Maintenance Building	Modular Unit touch ups and striping	N/A
Gasoline and Diesel Fuel	Four 2-gallon totes	Maintenance Building	Fueling Forklift and portable generator	N/A
Oils, lubricants and cleaners	3x1-gallon containers and various retail size containers	Maintenance Building	Equipment Maintenance	N/A
Propane	3 canisters	Maintenance Building	Fueling Forklift	N/A

The materials were found to be properly labeled and stored at the time of the assessment with no signs of leaks, stains, or spills. Secondary containment is provided. Based on the nature of use, overall small quantities observed, presence of secondary containment, and lack of violations on-file with the local fire department, these materials are not expected to represent a significant environmental concern.

6.2.2 Aboveground & Underground Hazardous Substance or Petroleum Product Storage Tanks (ASTs/USTs)

No evidence of current or former ASTs or USTs was observed during the site reconnaissance.

6.2.3 Evidence of Releases

No spills, stains or other indications that a surficial release has occurred at the subject property were observed.

6.2.4 Polychlorinated Biphenyls (PCBs)

Older transformers and other electrical equipment could contain PCBs at a level that subjects them to regulation by the U.S. EPA. PCBs in electrical equipment are controlled by United States Environmental Protection Agency regulations 40 CFR, Part 761. Under the regulations, there are three categories into which electrical equipment can be classified: 1) Less than 50 parts per million (ppm) of PCBs – "*Non-PCB";* 2) 50 ppm-500 ppm – "*PCB-Contaminated;*" and, 3) Greater than 500 ppm – "*PCB-Containing.*" The manufacture, process, or distribution in commerce or use of any PCB in any manner other than in a totally enclosed manner was prohibited after January 1, 1977.

The on-site reconnaissance addressed indoor and outdoor transformers that may contain PCBs. One pad-mounted transformer was observed on the subject property. The transformer is not labeled indicating PCB content. No staining or leakage was observed in the vicinity of the transformer. Partner contacted a customer service representative of SCE, who confirmed that SCE maintains ownership and operational responsibility for the transformer and that the unit does not contain PCBs. Based on the good condition of the equipment, the transformer is not expected to represent a significant environmental concern.

No other potential PCB-containing equipment (interior transformers, oil-filled switches, hoists, lifts, dock levelers, hydraulic elevators, balers, etc.) was observed on the subject property during Partner's reconnaissance.

6.2.5 Strong, Pungent or Noxious Odors

No strong, pungent, or noxious odors were evident during the site reconnaissance.

6.2.6 Pools of Liquid

No pools of liquid were observed on the subject property during the site reconnaissance.

6.2.7 Drains, Sumps and Clarifiers

Partner observed the following drains, sumps, and/or clarifiers located on the subject property:

Drains, Sumps, and Clarifiers Observed Onsite			
	Floor Drain(s)	Sump(s)	Clarifier(s)
Number Observed:	One	None	One
Location:	Maintenance Building	None	Maintenance Building
Point of Discharge:	Clarifier	None	Sewer
Sealed/Bermed:	No	None	No

The clarifier, also referred to as an oil/water separator, was installed in 2000 and is used to treat wastewater streams generated from floor washing in the Maintenance Building. Prior to 2012, limited vehicle repair operations and washing were conducted in the maintenance building. According to Mr. Egge of ModSpace, the clarifier is maintained by Safety Kleen on a bi-annual basis. Mr. Egge did not report the size/capacity of the clarifier. Based on the use of the clarifier solely for floor and vehicle washing activities, it is presumed that a release from this feature would be minimal and not represent an environmental concern.

6.2.8 Pits, Ponds and Lagoons

No pits, ponds, or lagoons were observed on the subject property.

6.2.9 Stressed Vegetation

No stressed vegetation was observed on the subject property.

6.2.10 Additional Potential Environmental Hazards

No additional environmental hazards, including landfill activities or radiological hazards, were observed.

6.3 Non-ASTM Services

6.3.1 Asbestos-Containing Materials (ACMs)

Asbestos is the name given to a number of naturally occurring, fibrous silicate minerals mined for their useful properties such as thermal insulation, chemical and thermal stability, and high tensile strength. The Occupational Safety and Health Administration (OSHA) regulation 29 CFR 1926.1101 requires certain construction materials to be *presumed* to contain asbestos, for purposes of this regulation. All thermal system insulation (TSI), surfacing material, and asphalt/vinyl flooring that are present in a building constructed prior to 1981 and have not been appropriately tested are "presumed asbestos-containing material" (PACM).

The subject property buildings were constructed in 2000. As such, an asbestos evaluation was not required by the scope of services.

6.3.2 Lead-Based Paint (LBP)

Lead is a highly toxic metal that affects virtually every system of the body. LBP is defined as any paint, varnish, stain, or other applied coating that has 1 mg/cm^2 (or 5,000 µg/g or 0.5% by weight) or more of lead. It is unlikely that LBP is present in buildings constructed after 1978. Therefore, due to the age of the subject property buildings, it is unlikely that LBP is present.

6.3.3 Radon

Radon is a colorless, odorless, naturally occurring, radioactive, inert, gaseous element formed by radioactive decay of radium (Ra) atoms. The US EPA has prepared a map to assist National, State, and local organizations to target their resources and to implement radon-resistant building codes. The map divides the country into three Radon Zones, according to the table below:

EPA Radon Zones		
EPA Zones	**Average Predicted Radon Levels**	**Potential**
Zone 1	Exceed 4.0 pCi/L	Highest
Zone 2	Between 2.0 and 4.0 pCi/L	Moderate
Zone 3	Less than 2.0 pCi/L	Low

It is important to note that the EPA has found homes with elevated levels of radon in all three zones, and the US EPA recommends site-specific testing in order to determine radon levels at a specific location. However, the map does give a valuable indication of the propensity of radon gas accumulation in structures.

Radon sampling was not conducted as part of this assessment. Review of the US EPA Map of Radon Zones places the subject property in Zone 2. Based upon the radon zone classification and commercial use, radon is not considered to be a significant environmental concern.

6.3.4 Lead in Drinking Water

According to available information, a public water system operated by the Cucamonga Valley Water District (CVWD) serves the subject property vicinity. According to a representative of the CVWD, shallow groundwater beneath the subject property is not utilized for domestic purposes. The sources of public water for the area of the subject property within the City of Fontana are surface water from the State Water Project, obtained primarily from Northern California and the Colorado River and local deep groundwater wells located within 30 miles of the subject property. According to the City of Fontana and the 2014 Annual Water Quality Report, water supplied to the subject property is in compliance with all State and Federal regulations pertaining to drinking water standards, including lead and copper. Water sampling was not conducted to verify water quality.

6.3.5 Mold

Molds are microscopic organisms found virtually everywhere, indoors and outdoors. Mold will grow and multiply under the right conditions, needing only sufficient moisture (e.g., in the form of very high humidity, condensation, or water from a leaking pipe, etc.) and organic material (e.g., ceiling tile, drywall, paper, or natural fiber carpet padding).

Partner observed accessible, interior areas for the subject property buildings for significant evidence of mold growth with the exceptions detailed in Section 1.5 of this report; however, this ESA should not be used as a mold survey or inspection. Additionally, this limited assessment was not designed to assess all areas of potential mold growth that may be affected by mold growth on the subject property. Rather, it is intended to give the client an indication as to whether or not conspicuous (based on observed areas) mold growth is present at the subject property. This evaluation did not include a review of pipe chases, mechanical systems, or areas behind enclosed walls and ceilings.

No obvious indications of water damage or mold growth were observed during Partner's visual assessment.

6.4 Adjacent Property Reconnaissance

The adjacent property reconnaissance consisted of observing the adjacent properties from the subject property premises. With the exception of the facilities noted below, no items of environmental concern were identified on the adjacent properties during the site assessment, including hazardous substances, petroleum products, ASTs, USTs, evidence of releases, PCBs, strong or noxious odors, pools of liquids, sumps or clarifiers, pits or lagoons, stressed vegetation, or any other potential environmental hazards.

6.4.1 Hazardous Substances and Petroleum Products Used or Stored at the Site

Numerous 55-gallon drums were observed stored on the adjacent property to the north near Beech Avenue. The drums appeared to contain new product and were in good condition with no evidence of spills or release. The facility offsite to the northwest operates several large ASTs. No obvious evidence of spills or releases was noted in the area of the ASTs.

6.4.2 ASTs/USTs for Hazardous Substances or Petroleum Products

The facility offsite to the northwest operates several large ASTs. No obvious evidence of spills or releases was noted in the area of the ASTs.

7.0 LIMITED SUBSURFACE INVESTIGATION

7.1 Background

Based on the findings of the Phase I ESA, Partner implemented and conducted a Limited Subsurface Investigation at the subject property to evaluate the presence or absence of soil contamination associated with reported illegal dumping (i.e., of drums of tetrachloroethylene waste) on the subject property.

7.2 Field Activities

The investigation scope included the advancement of three soil borings (B1 through B3) for the collection and analysis of representative soil samples on September 4, 2015.

Utility Clearance

Partner delineated the work area with white spray paint and notified Underground Service Alert (USA) to clear public utility lines as required by law at least 48 hours prior to drilling activities. USA issued ticket number B52450174 for the project.

Health and Safety Plan

Partner reviewed the site-specific Health and Safety Plan with on-site personnel involved in the project prior to the commencement of drilling activities.

Drilling Equipment

Partner advanced borings B1 through B3 utilizing a hand-auger with a two-inch diameter bucket attached. The hand-auger bucket was decontaminated between sample intervals and boring locations to prevent cross-contamination.

Boring Locations

Borings B1 through B3 were advanced in the eastern, southwestern, and northern portions of the former cement slab, respectively. Attempted-boring location AB3 was abandoned after refusal at five-inches bgs. Refer to Appendix D - Figure 1 for a map indicating boring locations.

Borings B2 and B3, and attempted-boring AB3 were overlain by asphalt, which was penetrated by Penhall (subcontractor) using a hand held coring drill with an attached three-inch diameter core bit. Borings B1 through B3 were advanced to a terminal depth of 1.5, 4.5, and 2 feet bgs, respectively, where refusal was encountered.

7.3 Soil Sampling

Soil was manually excavated from borings B1 through B3 using a 2.0-inch diameter hand-auger. At the desired sampling depths, soil was collected from the hand-auger bucket using a disposable plastic syringe and retained in two laboratory-supplied, 40-milliliter (mL), sodium bisulfate-preserved and one 40-mL, methanol-preserved volatile organics analysis (VOA) vials in accordance with United States Environmental Protection Agency (EPA) Method 5035 sampling protocol, and soil was then transferred from the hand-auger bucket to an eight-ounce jar. The VOA vials and eight-ounce jar were labeled for identification and stored in an iced cooler. Soil cuttings generated during the advancement of the hand-auger borings were

visually inspected for discoloration, monitored for odors, and classified in accordance with the Unified Soil Classification System (USCS). Soil from the sampled depths was placed in a sealable plastic bag and field-screened with a photoionization detector (PID) calibrated to isobutylene.

Soil samples were collected from each boring at the terminal depth; an additional sample was taken from boring B2 at two feet bgs.

Based on observations, the underlying subsurface consists predominantly of red-brown, moist, loose, fine to medium grained, poorly graded gravelly sand (SP) from the ground surface to approximately 4.5 feet bgs.

Refer to Appendix D for boring logs from this investigation.

7.4 Laboratory Analyses

Partner collected four soil samples on September 4, 2015, which were transported in an iced cooler under proper chain-of-custody protocol to Alpha Scientific Corporation (ASC), a state-certified laboratory [California Department of Health Services (DHS) Environmental Laboratory Accreditation Program (ELAP) certificate number 2633] in the City of Cerritos, California, for analysis on the same day. Based on field-screening results, visual observations, and/or olfactory observations, one soil sample per boring (three soil samples total) was analyzed for VOCs in accordance with EPA Method 8260B. The remaining soil samples were placed on hold at the laboratory.

7.5 Laboratory Analysis Results

None of the analyzed soil samples contained detectable concentrations of VOCs above the laboratory method detection limits (MDLs).

Please see Appendix D - Table 1 and Table 2 for a summary of the borings, sampling schedule, and laboratory analytical results for this investigation. See Appendix D for the full laboratory analysis report, which includes chain-of-custody and laboratory quality assurance/quality control (QA/QC) documentation. Laboratory QA/QC data were within acceptable limits.

7.6 Discussion

Regional Screening Levels (RSLs) (formerly Preliminary Remediation Goals) are generic, risk-based chemical concentrations developed by the EPA Region 9 for use in initial screening-level evaluations. RSLs combine human health toxicity values with standard exposure factors to estimate contaminant concentrations that are considered to be health protective of human exposures over a lifetime through direct-contact exposure pathways (e.g., via inhalation and/or ingestion of and/or dermal contact with impacted soil). RSLs are not legally enforceable standards, but rather are considered guidelines to evaluate if potential risks associated with encountered chemical impacts may warrant further evaluation.

None of the analyzed soil samples contained detectable concentrations of VOCs above the laboratory MDLs. The MDLs for VOCs were below their respective RSLs, indicating that the potential concentrations of VOCs on site that were below the laboratories ability to detect would still be below the available regulatory guidelines.

7.7 Summary and Conclusions

The results of this limited subsurface Investigation found no evidence of a release of hazardous materials at the subject property. Partner recommends no further investigation of the subject property at this time.

8.0 FINDINGS AND CONCLUSIONS

Findings

A *recognized environmental condition (REC)* refers to the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: due to release to the environment; under conditions indicative of a release to the environment; or under conditions that pose a material threat of a future release to the environment. The following was identified during the course of this assessment:

- Partner did not identify recognized environmental conditions during the course of this assessment.

A *controlled recognized environmental condition (CREC)* refers to a REC resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority, with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls. The following was identified during the course of this assessment:

- Partner did not identify controlled recognized environmental conditions during the course of this assessment.

A *historical recognized environmental condition (HREC)* refers to a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls. The following was identified during the course of this assessment:

- According to records obtained from the site contact and reported by the San Bernardino County Fire Department, approximately 1,100 gallons of waste PCE and waste filters contained within 27 55-gallon drums were illegally dumped on the northwestern portion of the subject property on June 22, 2000. The northwestern portion of the subject property was vacant and paved with asphalt at the time of the incident. Several of the drums were damaged and approximately 5-10 gallons of PCE was released to the asphalt paved surface. Grab soil samples were collected and analyzed and PCE was identified in all soil samples. A disposal manifest indicated that the PCE drums and spilled material were neutralized, overpacked for transport, and disposed offsite in accordance with applicable regulations. No information regarding the location or depth of the soil samples was identified and no manifests specifically indicating removal of impacted soil were identified. The final notations indicate that PCE did not impact soil deeper than the surface and that surface material was "scraped" and completely removed. No documentation was identified to confirm that soil had been impacted and no disposal records or manifests were identified to confirm removal of impacted soil.

  Given the absence of confirmation soil sampling data and cleanup documentation, Partner conducted a limited subsurface investigation to evaluate the presence or absence of soil contamination. The scope of the investigation included collection of soil samples for VOC

analyses from a total of three hand auger soil borings in the area of the reported spill. No VOCs were detected above applicable regulatory guidelines. Based on the results, no additional assessment is recommended.

An *environmental issue* refers to environmental concerns identified by Partner, which do not qualify as RECs; however, warrant further discussion. The following was identified during the course of this assessment:

- The subject property is equipped with a clarifier located adjacent to the west of the onsite Maintenance Building. This feature is currently utilized to treat wastewater produced from washing the floor of the Maintenance Building. The Maintenance Building was previously used for limited vehicle repair activities until approximately 2012. According to Doug Egge, Fleet Manager for ModSpace, this feature was installed in 2000 and was last pumped out on in July of 2015. Mr. Egge reported that the clarifier is pumped out twice annually. The wastewater from this feature discharges to the municipal sewer system. Based on the nature of use and relatively small quantities of hazardous substances in close proximity of this feature, the clarifier is not expected to represent a significant environmental concern.

Conclusions, Opinions and Recommendations

Partner has performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E1527-13 of 11115 Hemlock Avenue in the City of Fontana, San Bernardino County, California (the "subject property"). Any exceptions to, or deletions from, this practice are described in Section 1.5 of this report.

This assessment has revealed no evidence of recognized environmental conditions in connection with the subject property; however, environmental issues were identified. Based on the conclusions of this assessment, Partner does not recommend further investigation at this time.

8.0 SIGNATURES OF ENVIRONMENTAL PROFESSIONALS

Partner has performed a Phase I Environmental Site Assessment of the property located at 11115 Hemlock Avenue in the City of Fontana, San Bernardino County, California in general conformance with the scope and limitations of the protocol and the limitations stated earlier in this report. Exceptions to or deletions from this protocol are discussed earlier in this report.

By signing below, Partner declares that, to the best of our professional knowledge and belief, we meet the definition of *Environmental Professional* as defined in §312.10 of 40 CFR §312. Partner has the specific qualifications based on education, training, and experience to assess a *property* of the nature, history, and setting of the subject *property*. Partner has developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

Prepared By:



Robin Blanchard
Environmental Professional

Reviewed By:



Debbie Stott, PG
Principal



Misty Vazquez, PE
Principal

9.0 REFERENCES

Reference Documents

American Society for Testing and Materials, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, ASTM Designation: E1527-13.

Environmental Data Resources (EDR), Radius Report, July 2015

Federal Emergency Management Agency, Federal Insurance Administration, National Flood Insurance Program, Flood Insurance Map, accessed via internet, August 2015

United States Department of Agriculture, Natural Resources Conservation Service, accessed via internet, August 2015

United States Department of Agriculture, Natural Resources Conservation Service, Web Soil Survey, accessed via the internet, August 2015

United States Environmental Protection Agency, EPA Map of Radon Zones (Document EPA-402-R-93-071), accessed via the internet, August 2015

United States Geological Survey, accessed via the Internet, August 2015

United States Geological Survey Topographic Map 1995, 7.5 minute series, accessed via internet, August 2015

FIGURES

1 SITE LOCATION MAP

2 SITE PLAN

3 TOPOGRAPHIC MAP

PARTNER

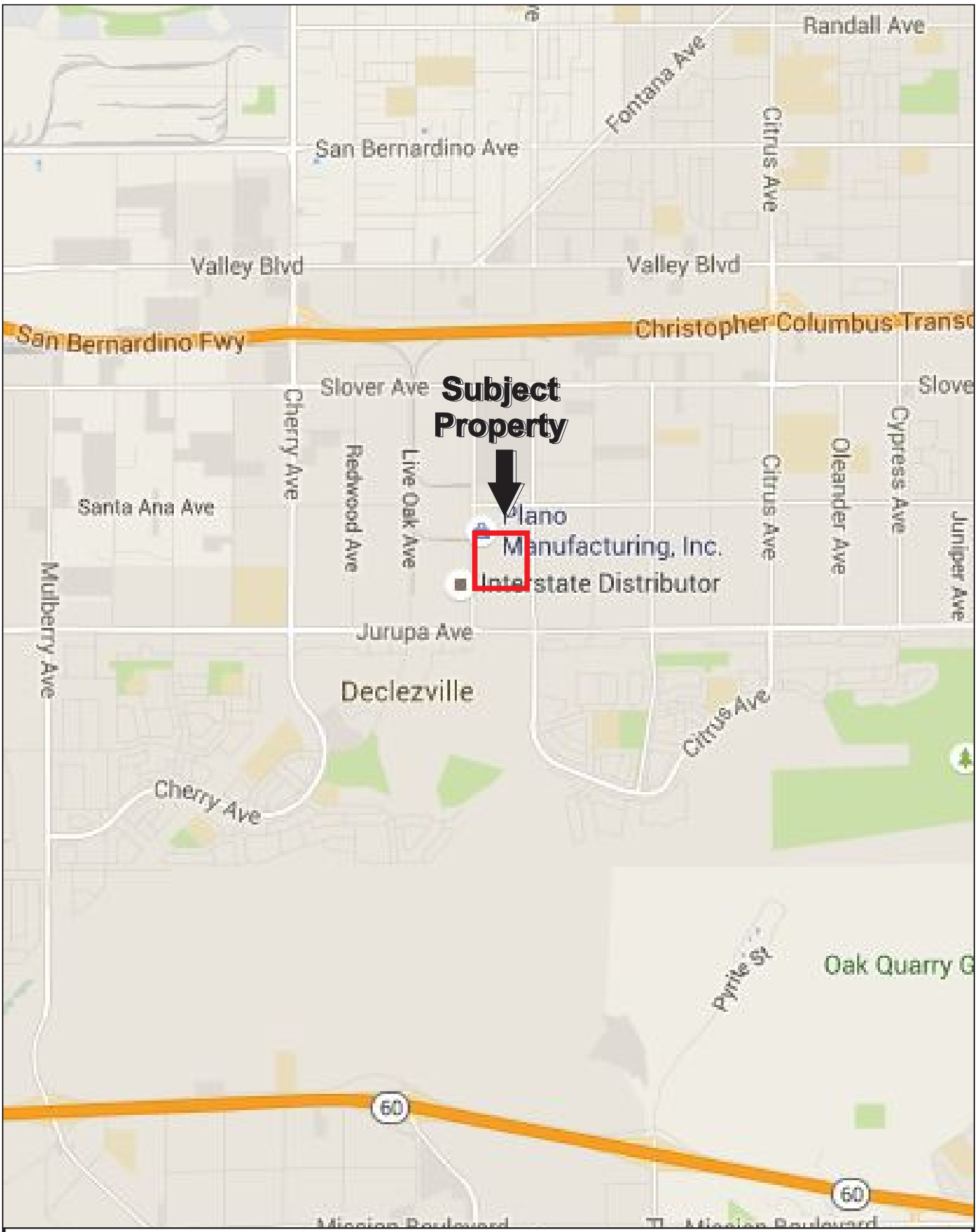


FIGURE 1: SITE LOCATION MAP
Project No. 15-144194.1

Drawing Not To Scale

N

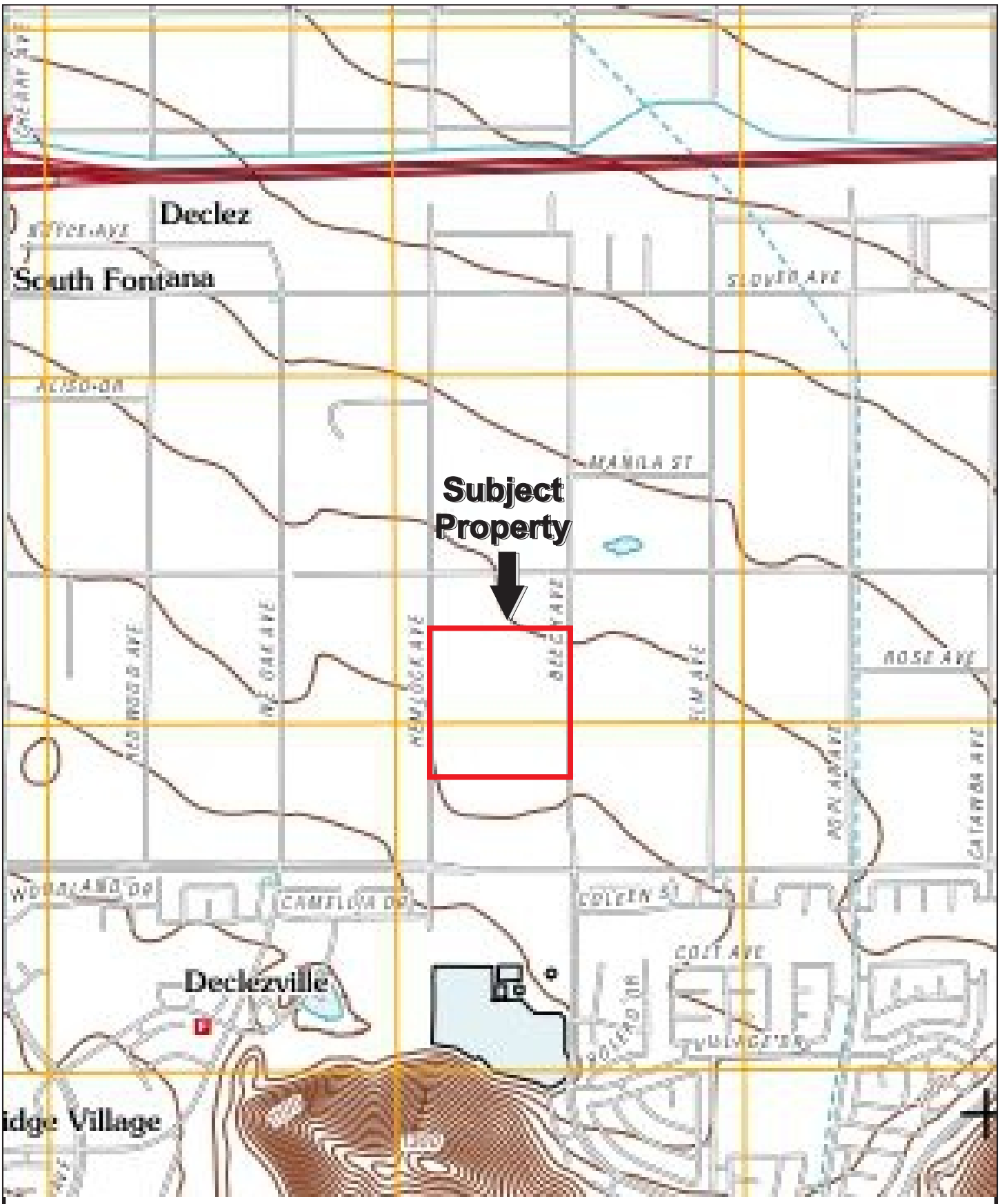
PARTNER



FIGURE 2 SITE PLAN

Project No. 15-144194.1

PARTNER



USGS 7.5 Minute *Fontana, California* Quadrangle Created: 2012

FIGURE 3: TOPOGRAPHIC MAP

Project No. 15-144194.1

N

PARTNER

APPENDIX A: SITE PHOTOGRAPHS



1. View to east of the subject property from the main entrance on Hemlock Avenue



2. View west of the onsite modular office trailer used as the onsite headquarters



3. View to north of the "model" modular office trailer previously used for offices and storage



4. Interior view of the modular office trailer used as onsite headquarters and offices



5. View to west of the landscaped area on the north side of the modular office trailer used for head-quarters



6. View of stored modular offices and trailers typical of storage across the subject property



7. View to south along rows of modular offices stored on the southern portion of the subject property



8. View to east along the southern site boundary



9. View to southwest of the stored modular trailers on the eastern portion of the subject property



10. View to south along the eastern site boundary



11. View of northern entrance on the east side of the subject property accessed from Beech Avenue



12. View to west of modular office trailers with HVAC units on the center portion of the subject property



13. View west along the northern boundary of the subject property



14. View of stored materials located adjacent to the north of the subject property on the adjacent site



15. View south along the northern portion of the western boundary of the subject property



16. View south of the paved and gravel covered areas on the southwest of the northern portion of the site



17. View northeast of storage bins for tires and equipment located near the center of the subject property



18. View to southeast of the maintenance building located near the center of the subject property



19. View south along the southern portion of the western boundary of the subject property



20. View east of the interior of the onsite Maintenance building and interior trench drain



21. View of the interior ceiling of the Maintenance Building



22. View east along the interior north wall of the Maintenance Building with offices and storage



23. View of stored gasoline and diesel fuel in the Maintenance Building



24. View of stored aerosol and liquid paint containers in the Maintenance Building



25. Stored paint remover, cleaners, and maintenance products stored in the Maintenance Building



26. Portable electrical generator, welding equipment and forklift charger in the Maintenance Building



27. View of offices in the Maintenance Building



28. Janitorial storage closet in the maintenance building



29. View to north of the three-stage subsurface interceptor located west of the Maintenance Building



30. Compressor located within the Maintenance Building



31. Scrap metal bins located on the south side of the Maintenance Building



32. View to west/northwest of the adjacent vacant commercial building to the west across Hemlock Avenue



33. View of adjacent trucking facility to the southwest across Hemlock Avenue



34. View to northwest of the adjacent property and railroad spur to the northwest



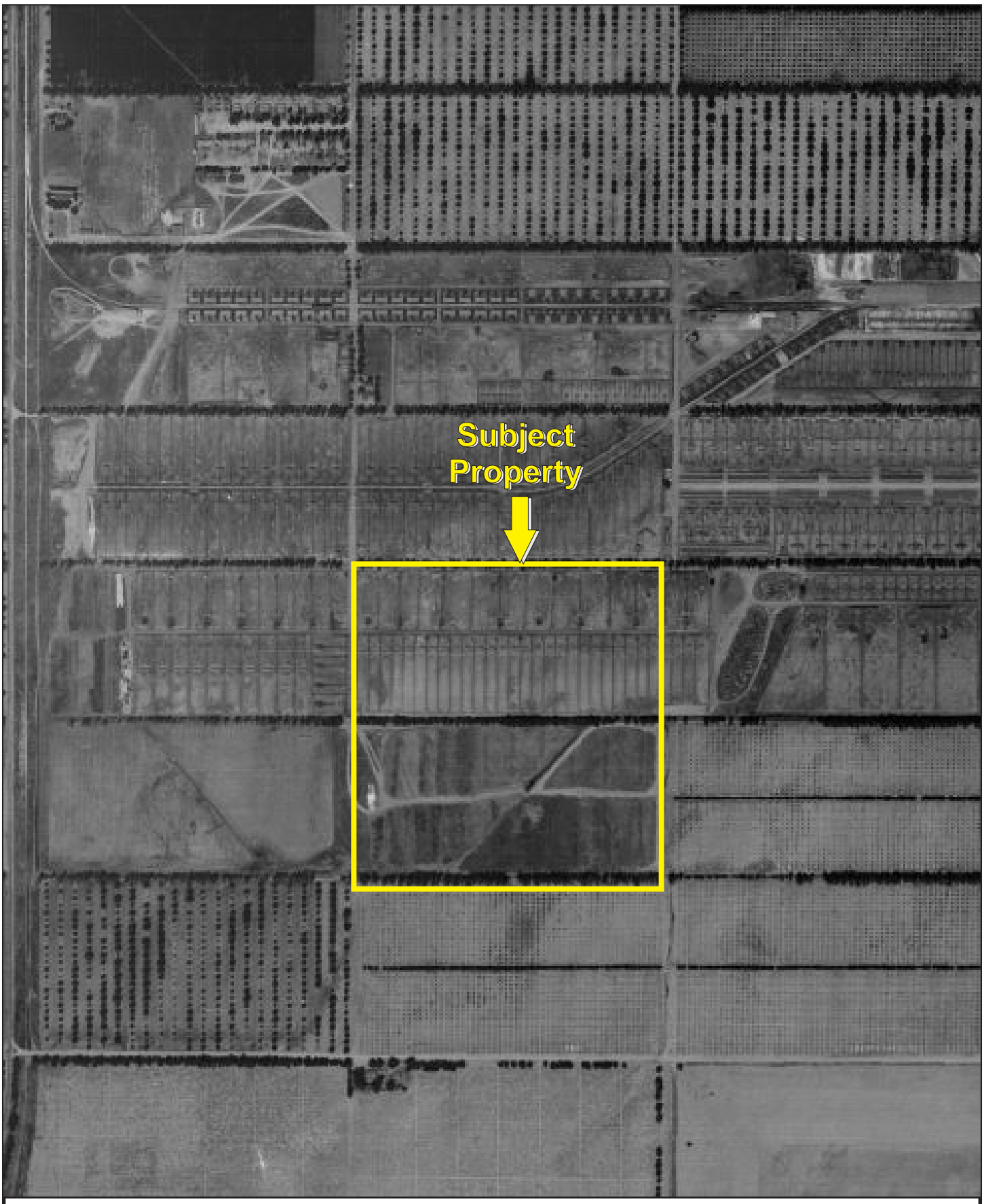
35. View southeast of adjacent properties and undeveloped land to the east across Beech Street



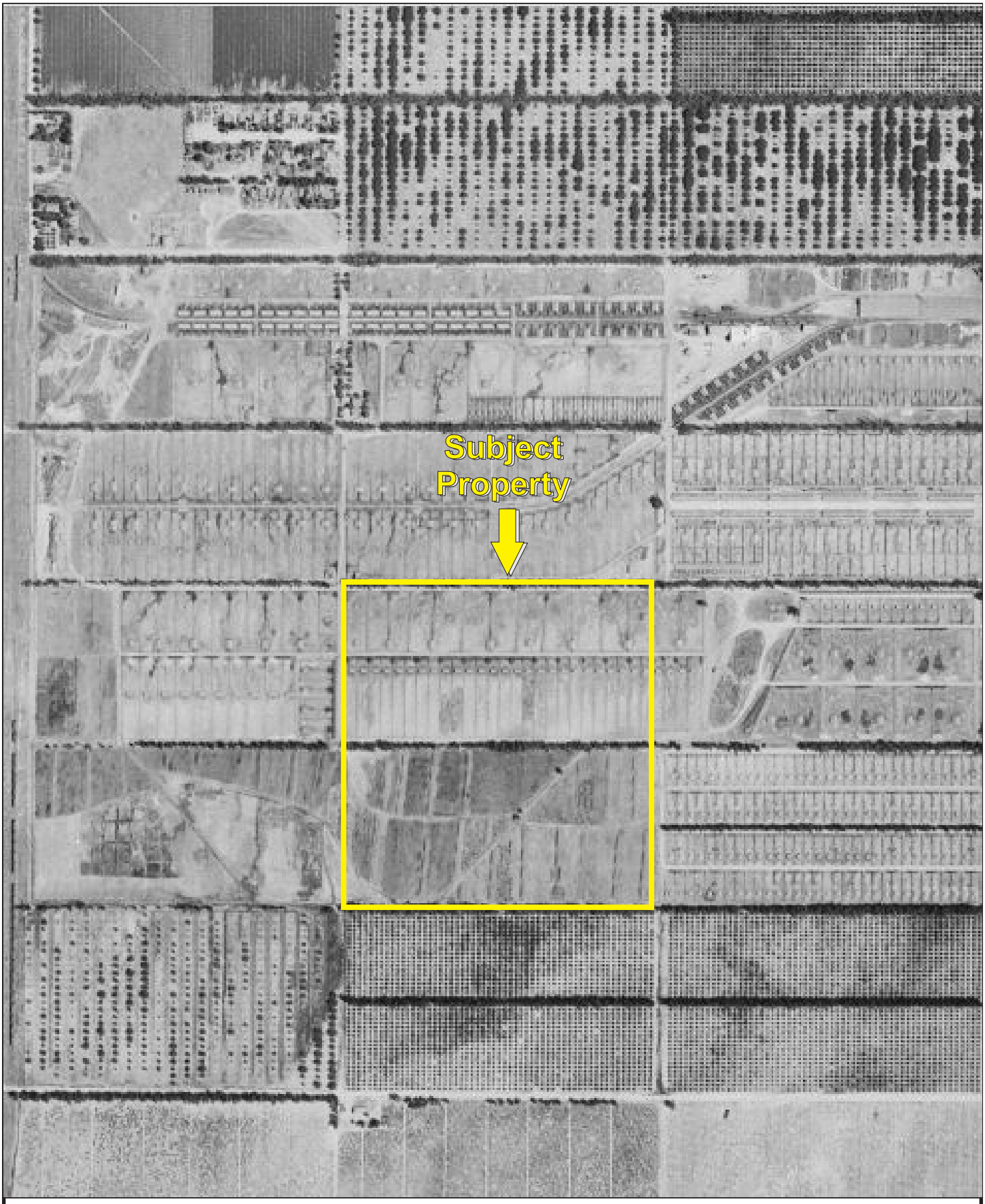
36. View of adjacent business center to the south of the subject property

APPENDIX B: HISTORICAL/REGULATORY DOCUMENTATION

PARTNER



Date: 1938

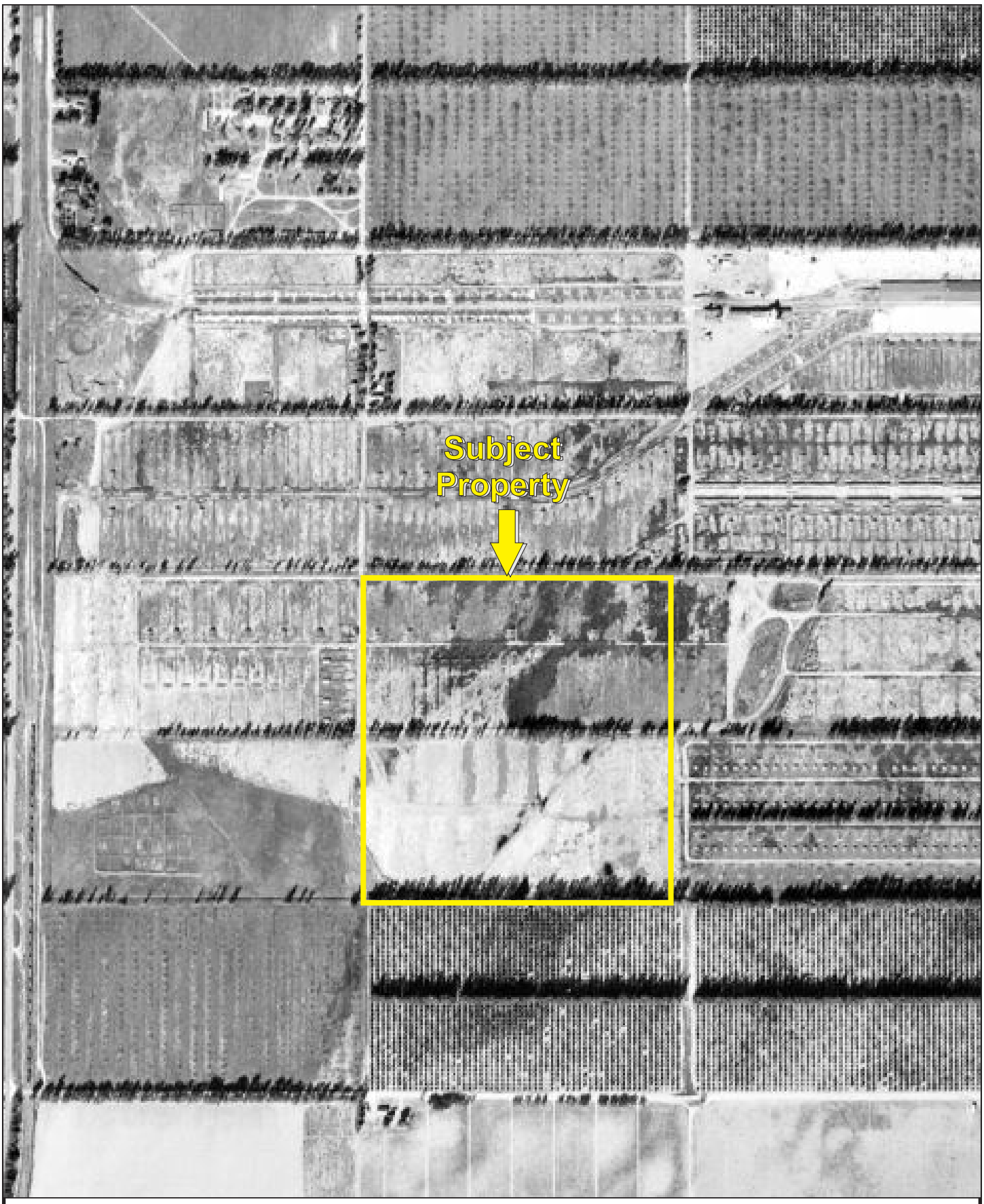


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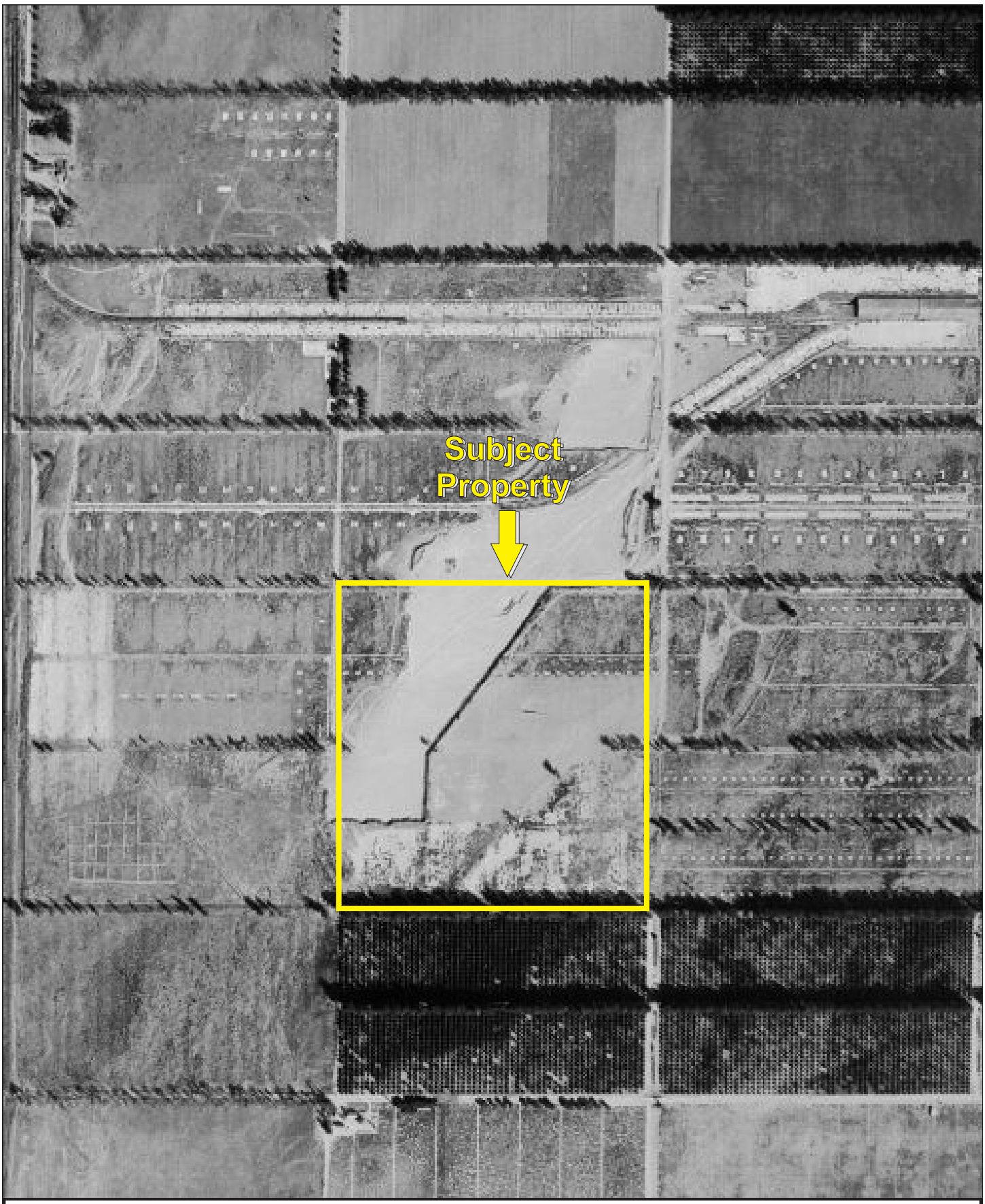
APPENDIX B: AERIAL PHOTOGRAPHS

Project No. 15-144194.1

PARTNER



Date: 1953



Date: 1959



Date: 1967

APPENDIX B: AERIAL PHOTOGRAPHS

Project No. 15-144194.1

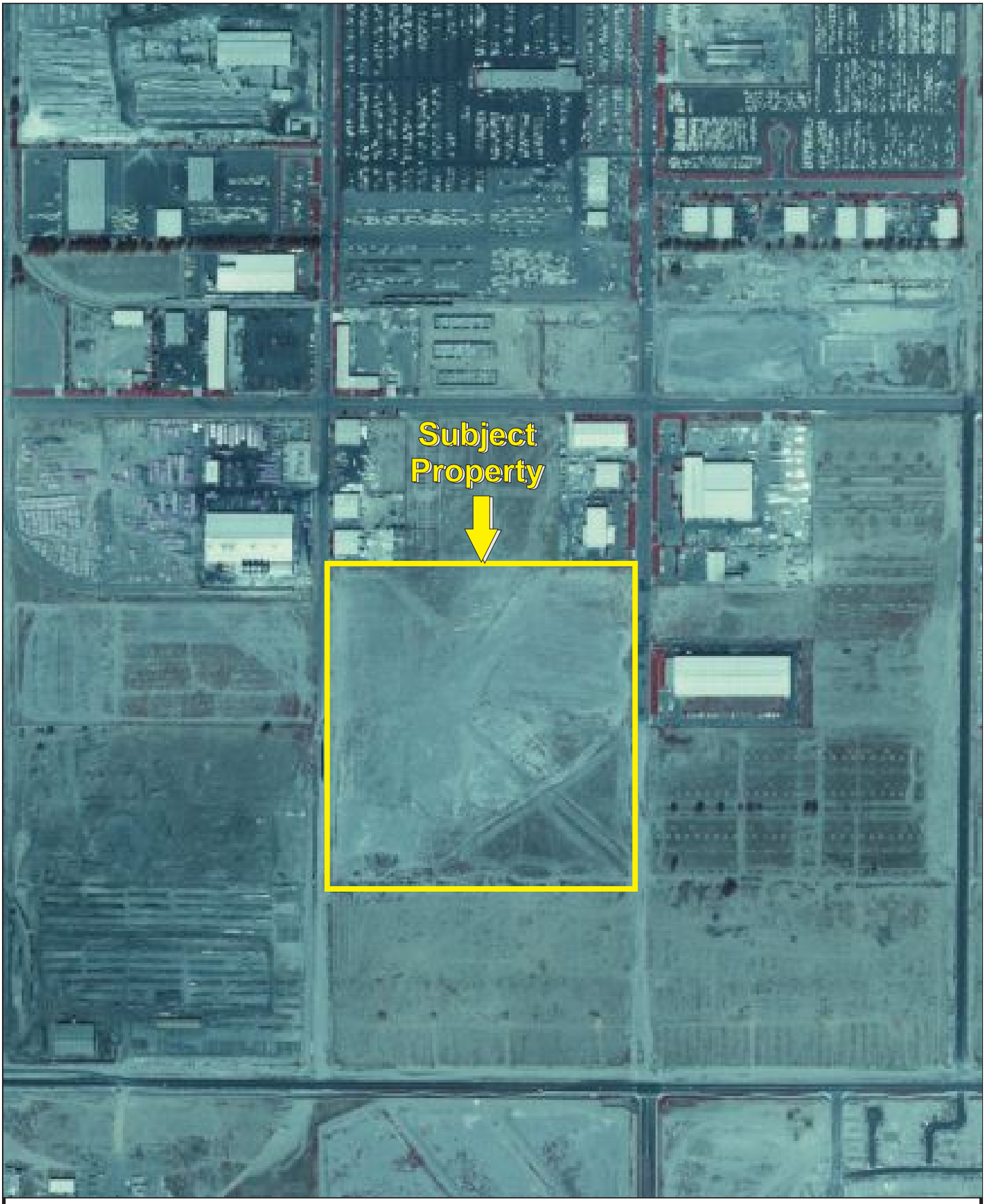
PARTNER



Date: 1975



Date: 1985

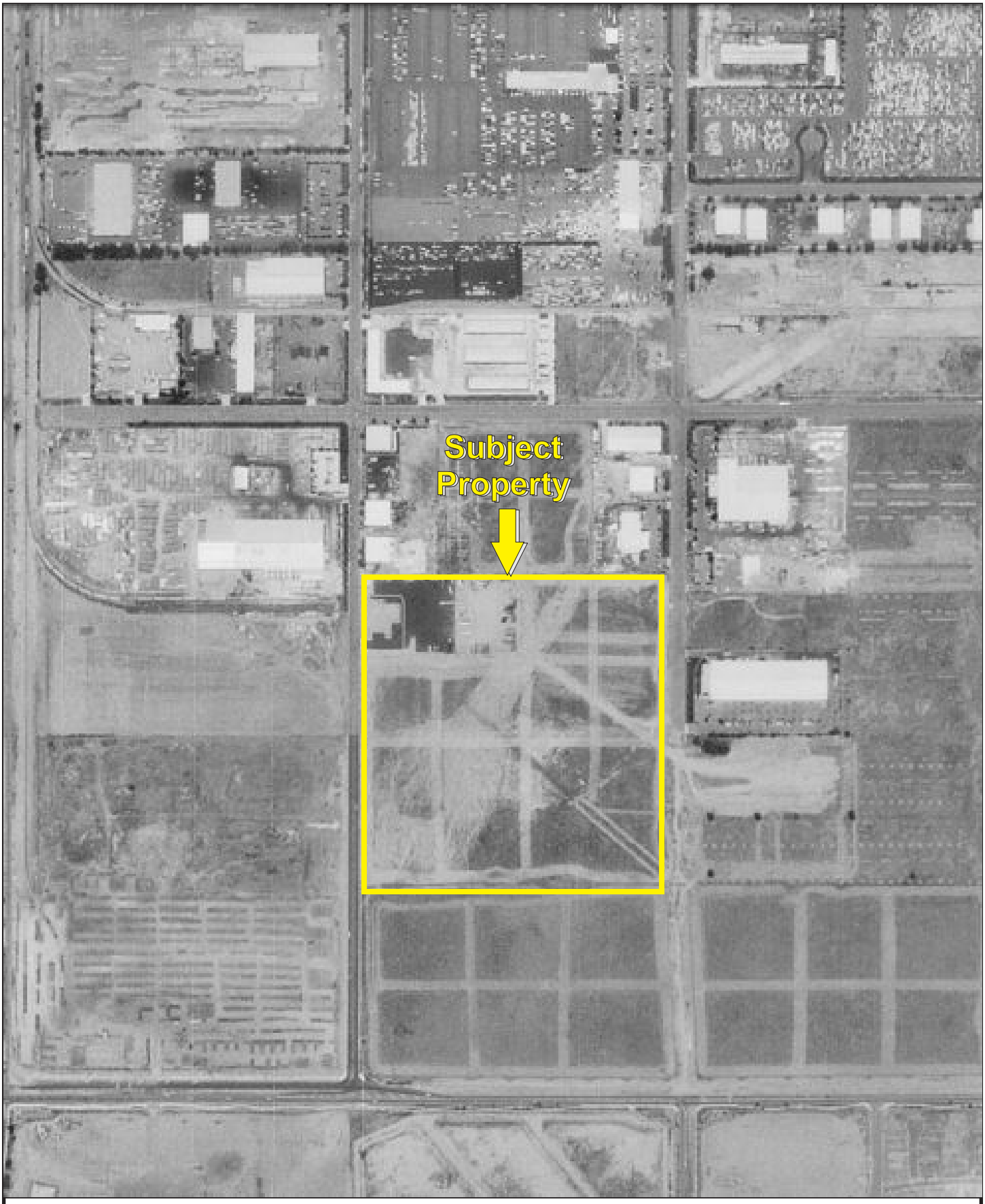


Date: 1990

APPENDIX B: AERIAL PHOTOGRAPHS

Project No. 15-144194.1

PARTNER



Date: 1994

APPENDIX B: AERIAL PHOTOGRAPHS

Project No. 15-144194.1

PARTNER



Date: 2006

APPENDIX B: AERIAL PHOTOGRAPHS

Project No. 15-144194.1

PARTNER



Date: 2009

APPENDIX B: AERIAL PHOTOGRAPHS

Project No. 15-144194.1

PARTNER

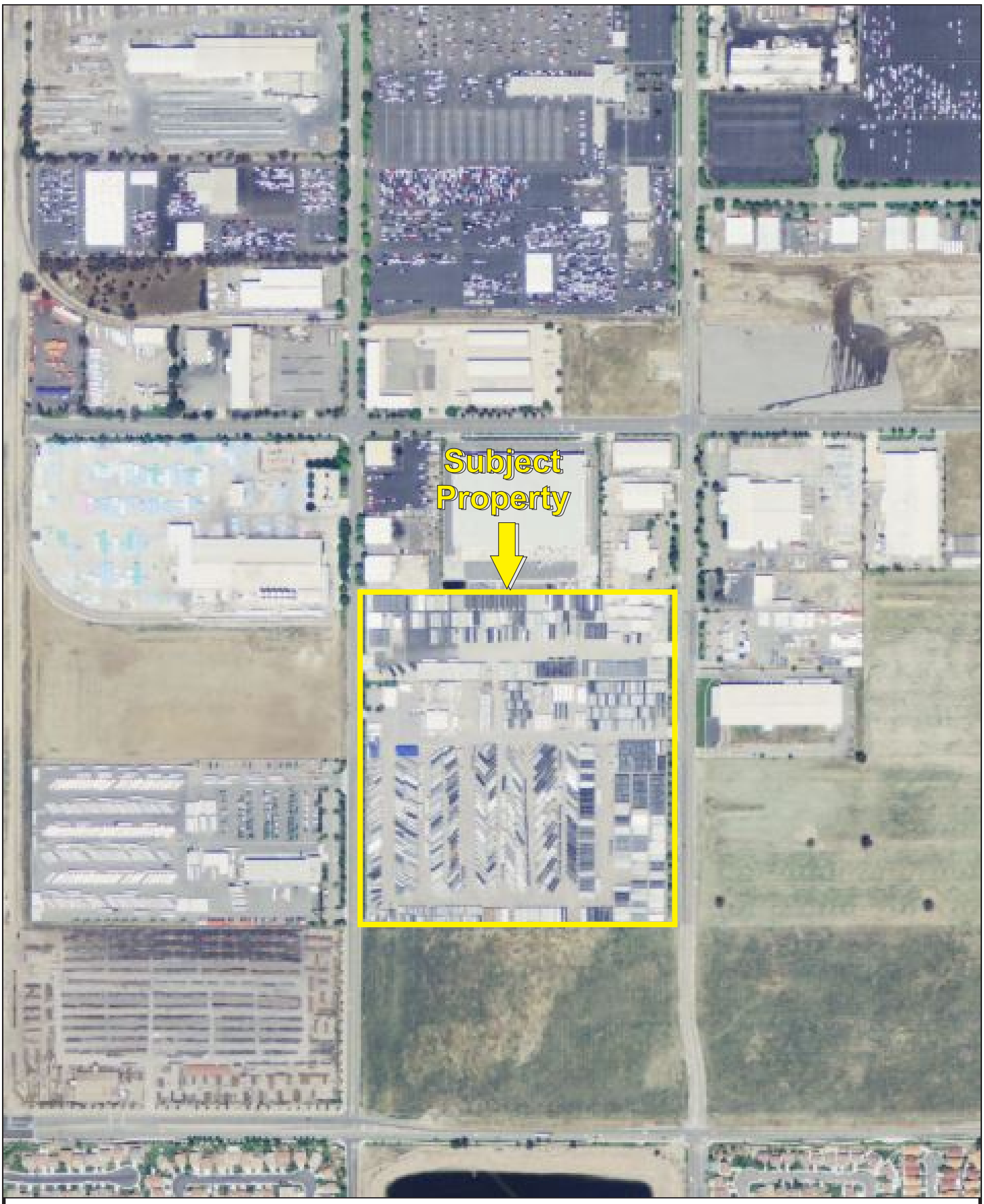


Date: 2010

APPENDIX B: AERIAL PHOTOGRAPHS

Project No. 15-144194.1

PARTNER



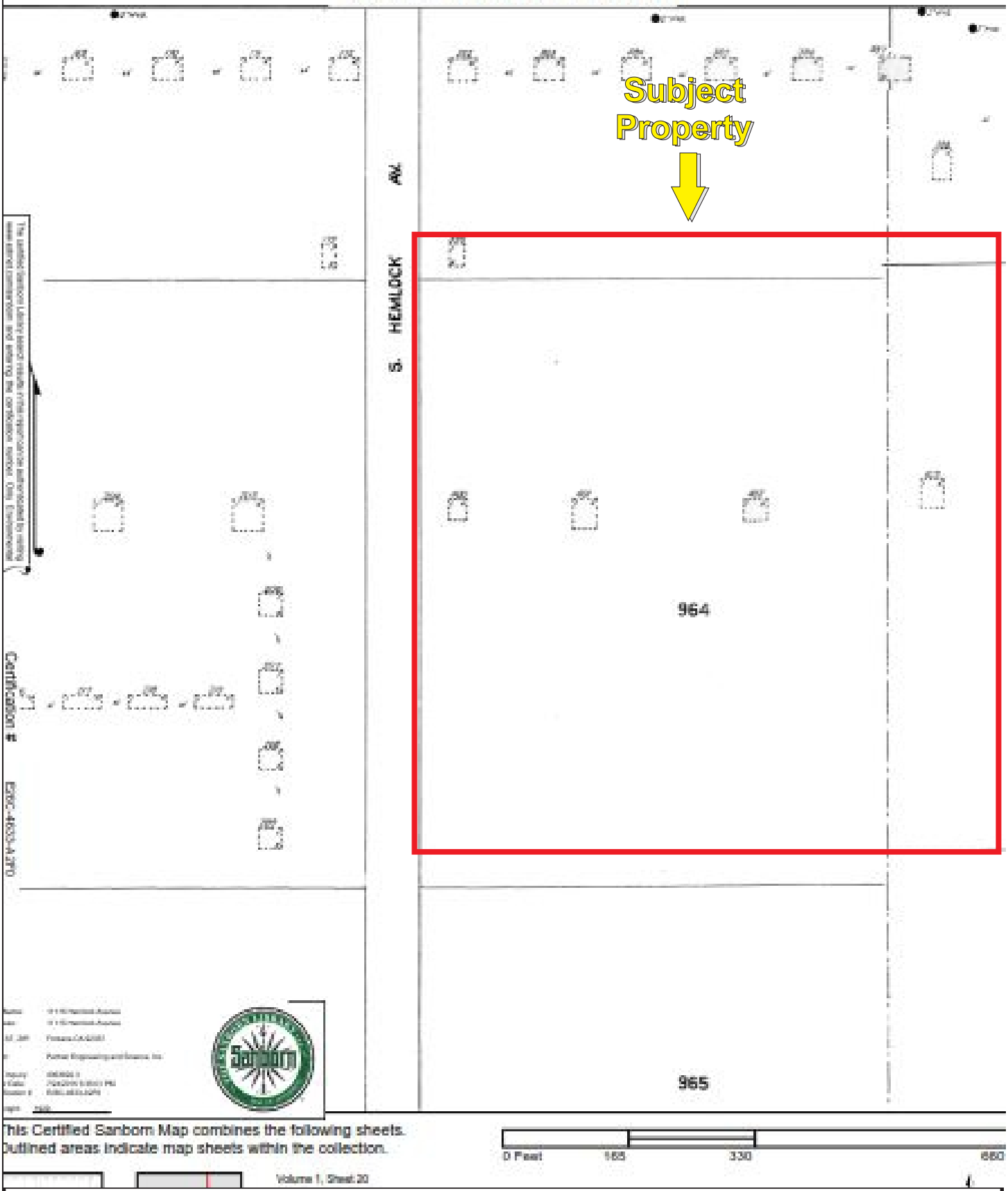
Date: 2012

APPENDIX B: AERIAL PHOTOGRAPHS

Project No. 15-144194.1

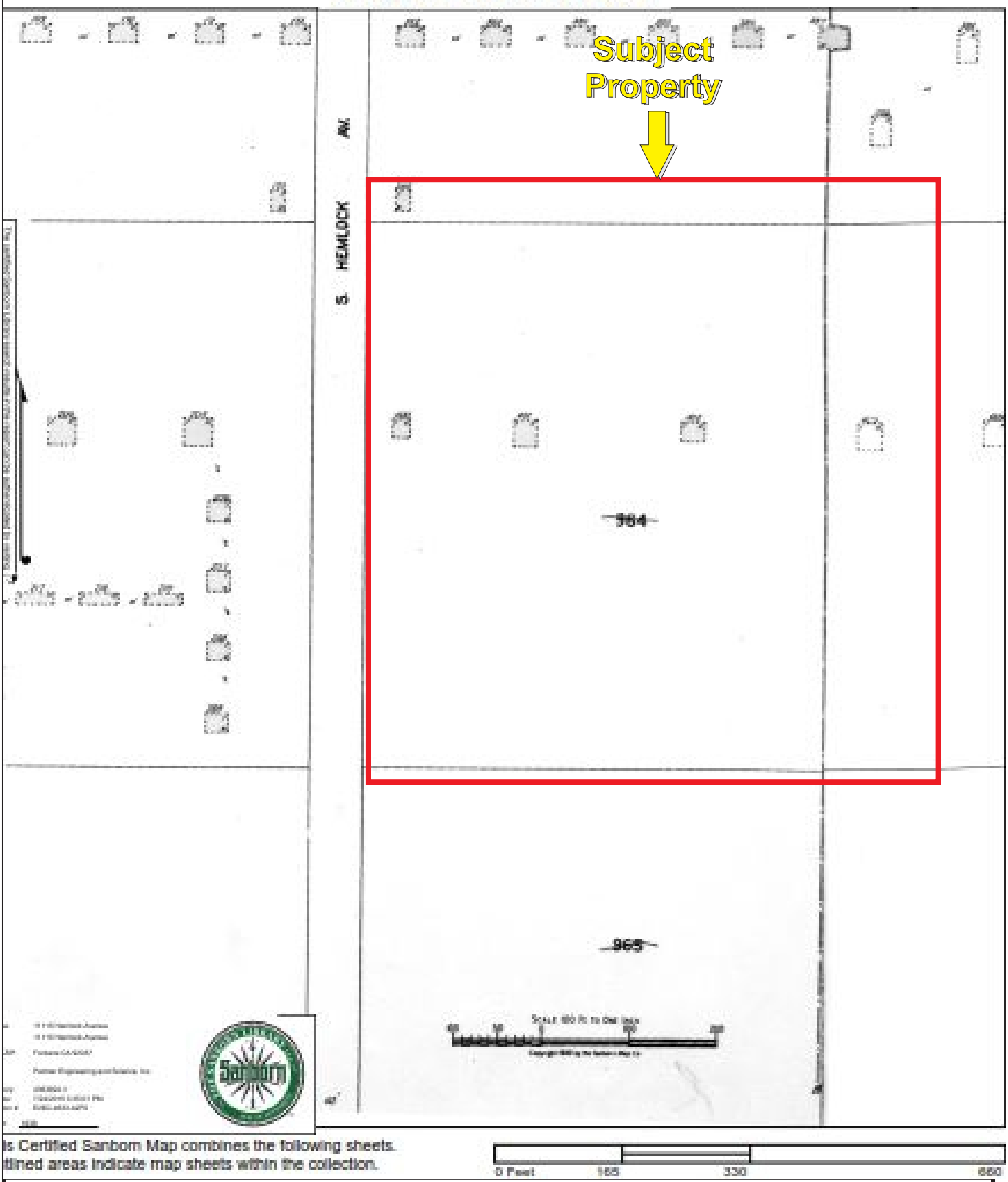
PARTNER

1929 Certified Sanborn Map



Date: 1929

1938 Certified Sanborn Map



Date: 1938

11115 Hemlock Avenue
11115 Hemlock Avenue
Fontana, CA 92337

Inquiry Number: 4363822.6
July 28, 2015

The EDR-City Directory Abstract

Environmental Data Resources Inc

6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

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SECTION

Executive Summary

Findings

City Directory Images

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

DESCRIPTION

Environmental Data Resources, Inc.'s (EDR) City Directory Abstract is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's City Directory Abstract includes a search and abstract of available city directory data. For each address, the directory lists the name of the corresponding occupant at five year intervals.

Business directories including city, cross reference and telephone directories were reviewed, if available, at approximately five year intervals for the years spanning 1922 through 2013. This report compiles information gathered in this review by geocoding the latitude and longitude of properties identified and gathering information about properties within 660 feet of the target property.

A summary of the information obtained is provided in the text of this report.

RESEARCH SUMMARY

The following research sources were consulted in the preparation of this report. An "X" indicates where information was identified in the source and provided in this report.

Year	Source	TP	Adjoining	Text Abstract	Source Image
2013	Cole Information Services	-	X	X	-
2008	Haines Company, Inc.	X	X	X	-
2003	Haines & Co Publishers	X	X	X	-
2002	SBC PACIFIC BELL	X	X	X	-
1996	Pacific Bell	-	X	X	-
1995	GTE Directories	-	-	-	-
1991	GTE California Incorporated	-	X	X	-
1990	Pacific Bell	-	X	X	-
1985	GTE Directories	-	-	-	-
1981	General Telephone Company of California	-	-	-	-
1980	GTE	-	-	-	-
1975	Pacific Telephone Co	-	-	-	-
1970	General Telephone Company of California	-	-	-	-
1965	Luskey Brothers & Co	-	-	-	-
1964	Luskey Brothers & Co	-	-	-	-
1961	Luskey Brothers& Co Publishers	-	-	-	-
1960	Luskey Brothers & Co Publishers	-	-	-	-
1956	General Telephone Company Publishers	-	-	-	-
1955	Luskey Brothers Co Publishers	-	-	-	-
1951	Los Angeles Directory Company Publishers	-	-	-	-
1950	The Pacific Telephone and Telegraph Co	-	-	-	-
1949	San Bernardino Directory Co. Publishers	-	-	-	-

EXECUTIVE SUMMARY

Year	Source	TP	Adjoining	Text Abstract	Source Image
1946	Los Angeles Directory Company Publishers	-	-	-	-
1945	Southern California Telephone Company	-	-	-	-
1942	San Bernardino Directory Co Publisher	-	-	-	-
1941	Associated Telephone Company Limited	-	-	-	-
1940	Los Angeles Directory Co.	-	-	-	-
1938	Los Angeles Directory Co.	-	-	-	-
1936	San Bernardino Directory Co Publisher	-	-	-	-
1934	Los Angeles Directory Co.	-	-	-	-
1931	Los Angeles Directory Co.	-	-	-	-
1930	San Bernardino Directory Co Publisher	-	-	-	-
1926	Los Angeles Directory Co Publisher	-	-	-	-
1923	Los Angeles Directory Company	-	-	-	-
1922	R.L. Polk & Co Publishers	-	-	-	-

EXECUTIVE SUMMARY

SELECTED ADDRESSES

The following addresses were selected by the client, for EDR to research. An "X" indicates where information was identified.

Address	*Type*	*Findings*
10990 Hemlock Avenue	Client Entered	X
10975 Hemlock Avenue	Client Entered	X
11128 Hemlock Avenue	Client Entered	X
11429 Hemlock Avenue	Client Entered	
15101 Santa Ana	Client Entered	

FINDINGS

TARGET PROPERTY INFORMATION

ADDRESS

11115 Hemlock Avenue
Fontana, CA 92337

FINDINGS DETAIL

Target Property research detail.

HEMLOCK AVE

11115 HEMLOCK AVE

Year	*Uses*	*Source*
2008	ALLEGIANCE CONSTRUCTION CO	Haines Company, Inc.
	DINH CONSTRUCTION CORP	Haines Company, Inc.
	GE CAPITAL MODULAR SPACE	Haines Company, Inc.
2003	DINH CONSTRUCTION CO	Haines & Co Publishers
2002	DINH CONSTRUCTION CO	SBC PACIFIC BELL
	GE CAPITAL MODULAR	SBC PACIFIC BELL
	SPACE	SBC PACIFIC BELL

FINDINGS

ADJOINING PROPERTY DETAIL

The following Adjoining Property addresses were researched for this report. Detailed findings are provided for each address.

HEMLOCK AVE

10975 HEMLOCK AVE

Year	Uses	Source
2013	PLANO	Cole Information Services
	PLANO	Cole Information Services
2008	PLANO MFG	Haines Company, Inc.
2003	PLANO MFG	Haines & Co Publishers
	PLANO Lawrence	Haines & Co Publishers
2002	PLANO MFC	SBC PACIFIC BELL
1996	PLANO MFG	Pacific Bell
1991	Piano Mfg	GTE California Incorporated
1990	PLANO MFG	Pacific Bell

10990 HEMLOCK AVE

Year	Uses	Source
2013	J M EAGLE	Cole Information Services
	J M EAGLE	Cole Information Services
2008	XXXX	Haines Company, Inc.
2003	J M MANUFACTURING COMPANY INC	Haines & Co Publishers
2002	COMPANY INC	SBC PACIFIC BELL
	J M MANUFACTURING	SBC PACIFIC BELL
1996	J M MANUFACTURING COMPANY INC	Pacific Bell
1990	J M MANUFACTURING COMPANY INC	Pacific Bell

11015 HEMLOCK AVE

Year	Uses	Source
1996	SECURITY ENVIRONMENTAL SYSTEMS INC	Pacific Bell

11128 HEMLOCK AVE

Year	Uses	Source
2013	INTERSTATE DISTRIBUTOR	Cole Information Services
	INTERSTATE DISTRIBUTOR	Cole Information Services
2008	INTRST DISTRIBUTOR	Haines Company, Inc.
	INTRST DISTRIBUTOR CO	Haines Company, Inc.

FINDINGS

Hemlock Avenue

10975 Hemlock Avenue

Year	*Uses*	*Source*
2008	PLANO MFG	Haines Company, Inc.
2003	PLANO Lawrence	Haines & Co Publishers
	PLANO MFG	Haines & Co Publishers
2002	PLANO MFC	SBC PACIFIC BELL
1996	PLANO MFG	Pacific Bell
1991	Piano Mfg	GTE California Incorporated
1990	PLANO MFG	Pacific Bell

10990 Hemlock Avenue

Year	*Uses*	*Source*
2008	XXXX	Haines Company, Inc.
2003	J M MANUFACTURING COMPANY INC	Haines & Co Publishers
2002	J M MANUFACTURING	SBC PACIFIC BELL
	COMPANY INC	SBC PACIFIC BELL
1996	J M MANUFACTURING COMPANY INC	Pacific Bell
1990	J M MANUFACTURING COMPANY INC	Pacific Bell

11128 Hemlock Avenue

Year	*Uses*	*Source*
2008	INTRST DISTRIBUTOR CO	Haines Company, Inc.
	INTRST DISTRIBUTOR	Haines Company, Inc.

SANTA ANA AVE

15101 SANTA ANA AVE

Year	*Uses*	*Source*
2013	VERIZON SUPPLY CHAIN SERVICES	Cole Information Services

FINDINGS

TARGET PROPERTY: ADDRESS NOT IDENTIFIED IN RESEARCH SOURCE

The following Target Property addresses were researched for this report, and the addresses were not identified in the research source.

Address Researched	Address Not Identified in Research Source
11115 Hemlock Avenue	2013, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922

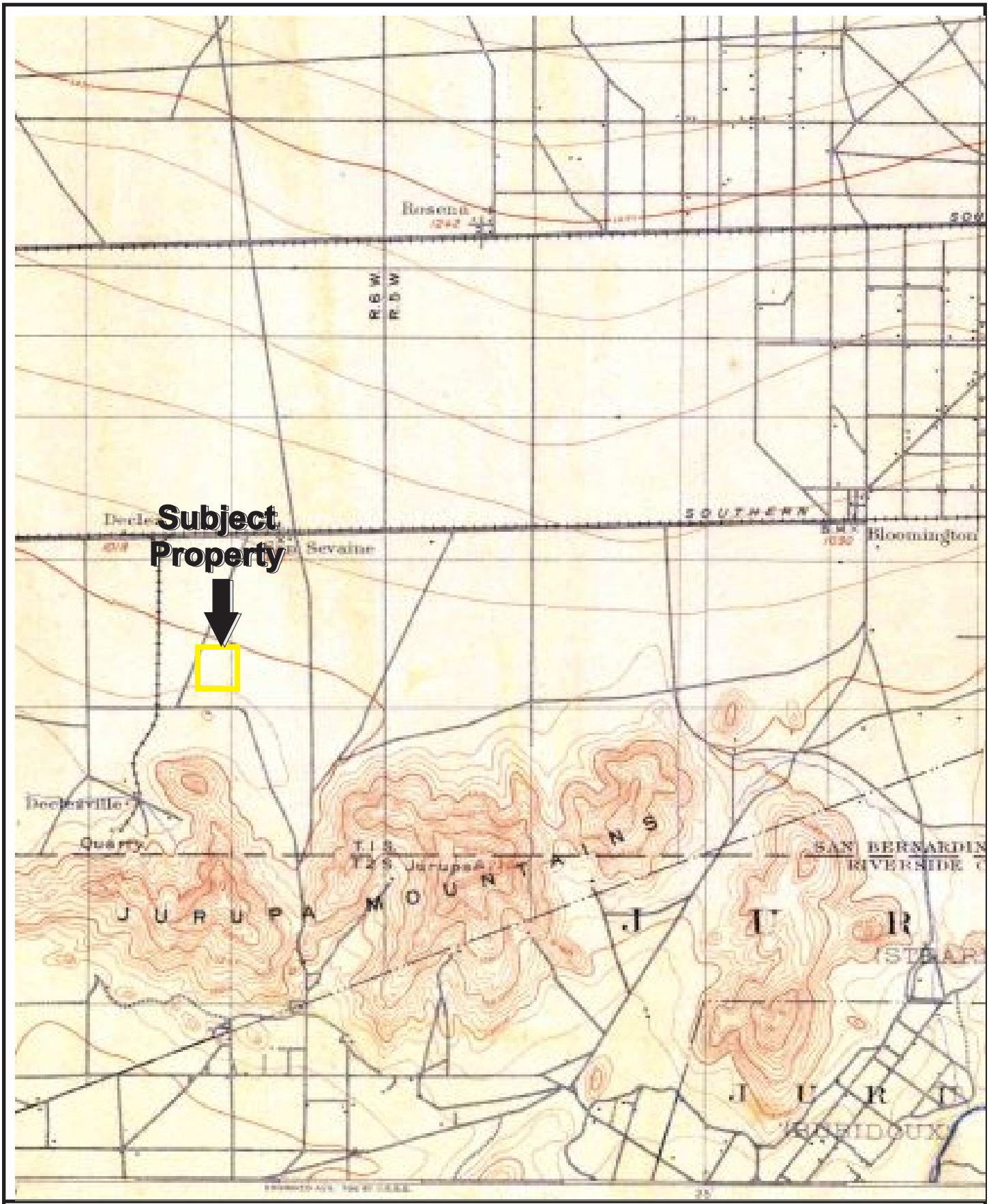
ADJOINING PROPERTY: ADDRESSES NOT IDENTIFIED IN RESEARCH SOURCE

The following Adjoining Property addresses were researched for this report, and the addresses were not identified in research source.

Address Researched	Address Not Identified in Research Source
10975 HEMLOCK AVE	2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922
10975 HEMLOCK AVE	2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922
10975 HEMLOCK AVE	2013, 1995, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922
10975 Hemlock Avenue	2013, 1995, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922
10990 HEMLOCK AVE	2013, 1995, 1991, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922
10990 HEMLOCK AVE	2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922
10990 HEMLOCK AVE	2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922
10990 Hemlock Avenue	2013, 1995, 1991, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922
11015 HEMLOCK AVE	2013, 2008, 2003, 2002, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922
11128 HEMLOCK AVE	2013, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922
11128 HEMLOCK AVE	2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922

FINDINGS

Address Researched	Address Not Identified in Research Source
11128 HEMLOCK AVE	2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922
11128 Hemlock Avenue	2013, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922
11429 Hemlock Avenue	2013, 2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922
15101 Santa Ana	2013, 2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922
15101 SANTA ANA AVE	2008, 2003, 2002, 1996, 1995, 1991, 1990, 1985, 1981, 1980, 1975, 1970, 1965, 1964, 1961, 1960, 1956, 1955, 1951, 1950, 1949, 1946, 1945, 1942, 1941, 1940, 1938, 1936, 1934, 1931, 1930, 1926, 1923, 1922

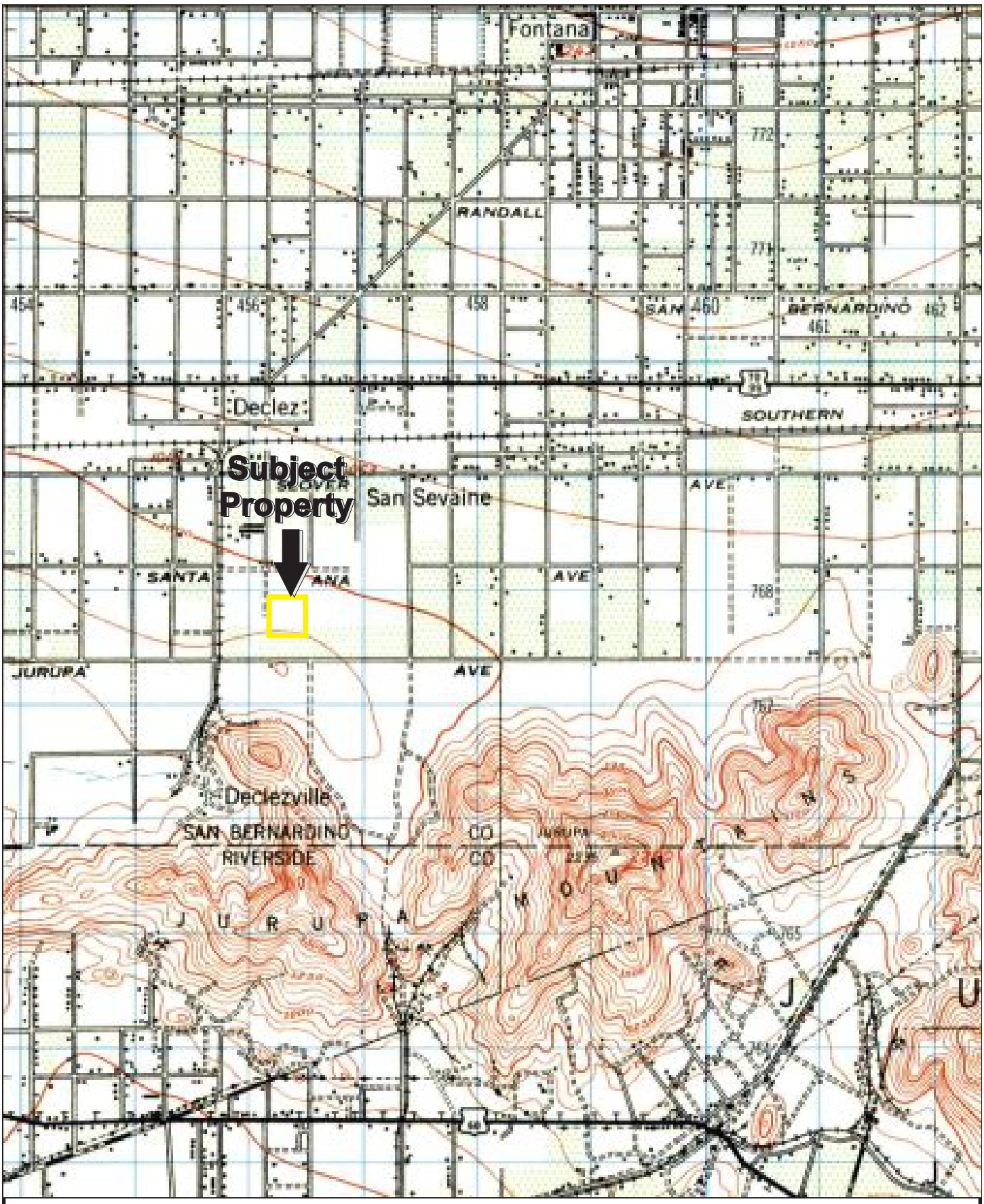


USGS 7.5 Minute *San Bernardino, California* Quadrangle Created: 1901

APPENDIX B: HISTORIC TOPOGRAPHIC MAPS

Project No. 15-144194.1

PARTNER

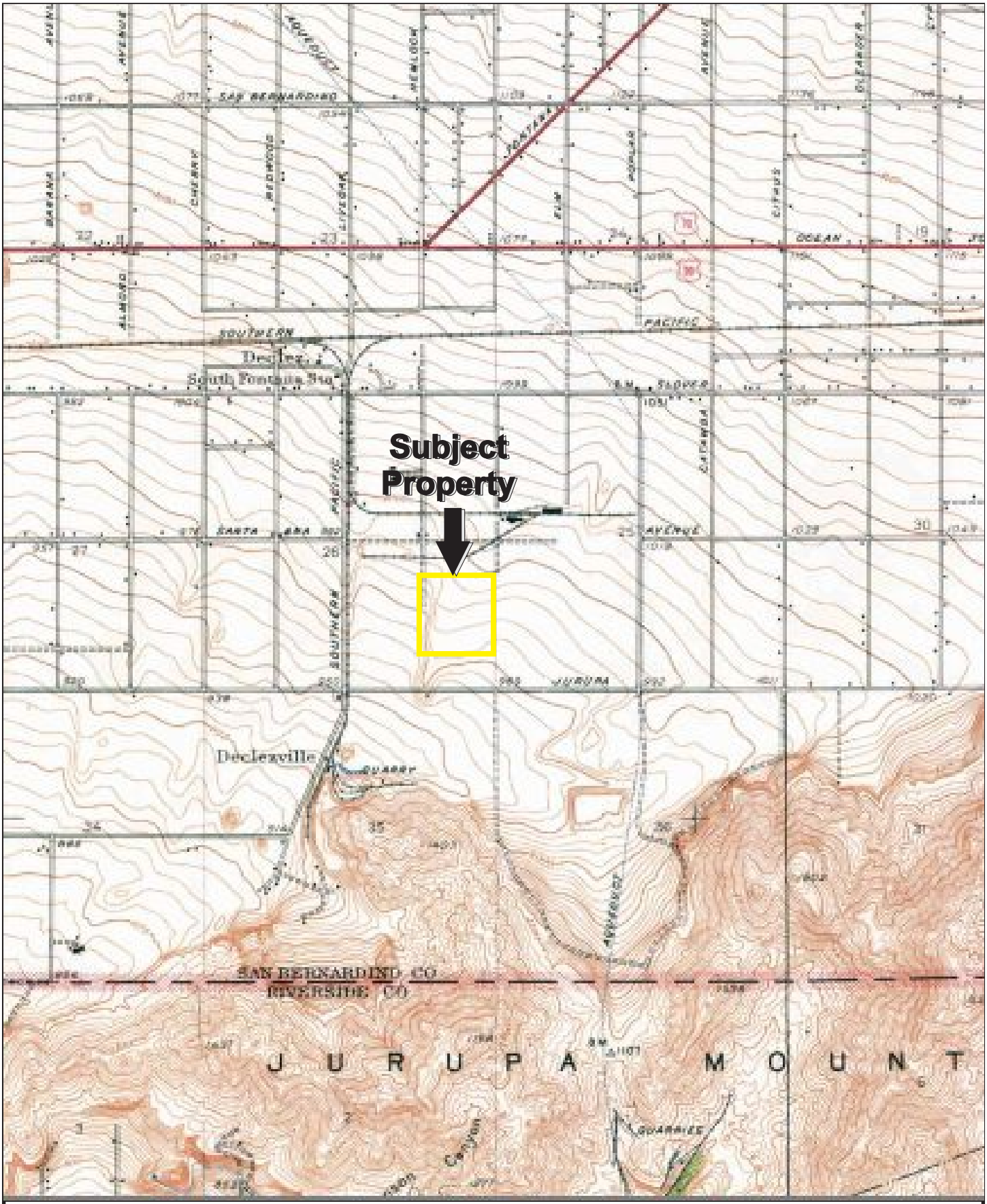


USGS 7.5 Minute *San Bernardino, California* Quadrangle Created: 1942

APPENDIX B: HISTORIC TOPOGRAPHIC MAPS

Project No. 15-144194.1

PARTNER

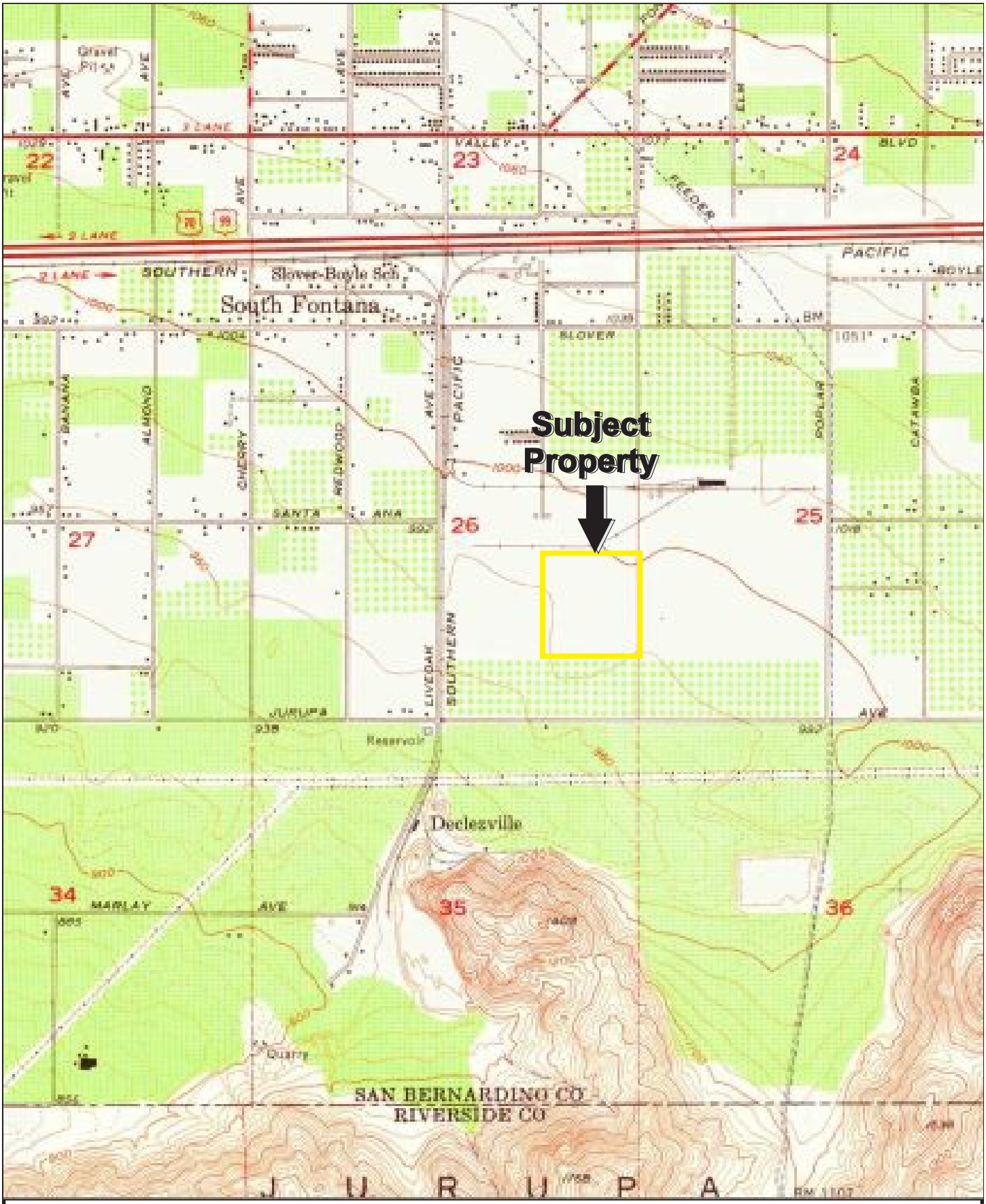


USGS 7.5 Minute *Fontana, California* Quadrangle Created: 1943

APPENDIX B: HISTORIC TOPOGRAPHIC MAPS

Project No. 15-144194.1

PARTNER

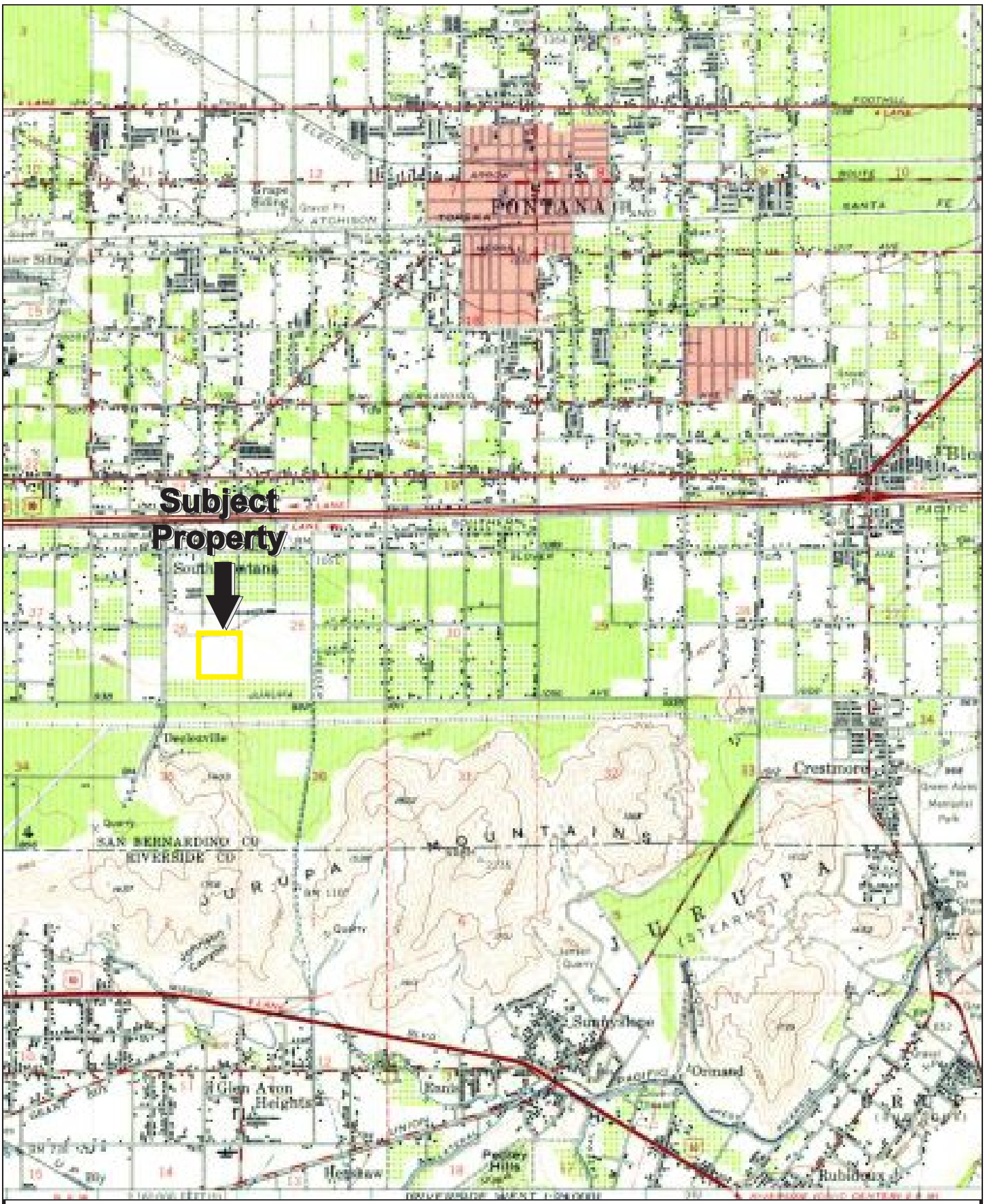


USGS 7.5 Minute *Fontana, California* Quadrangle Created: 1953

APPENDIX B: HISTORIC TOPOGRAPHIC MAPS

Project No. 15-144194.1

PARTNER

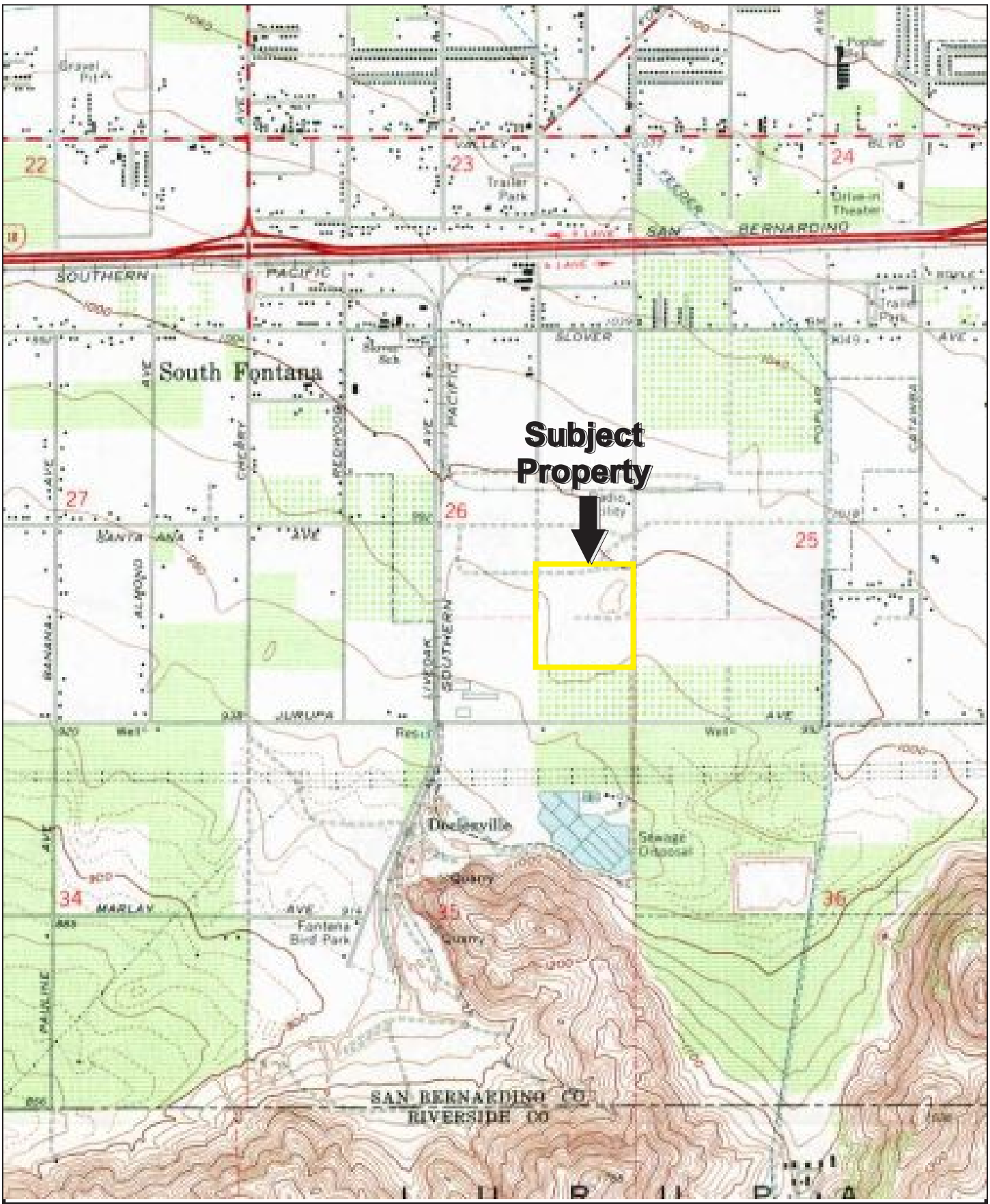


USGS 7.5 Minute *San Bernardino, California* Quadrangle Created: 1954

APPENDIX B: HISTORIC TOPOGRAPHIC MAPS

Project No. 15-144194.1

PARTNER

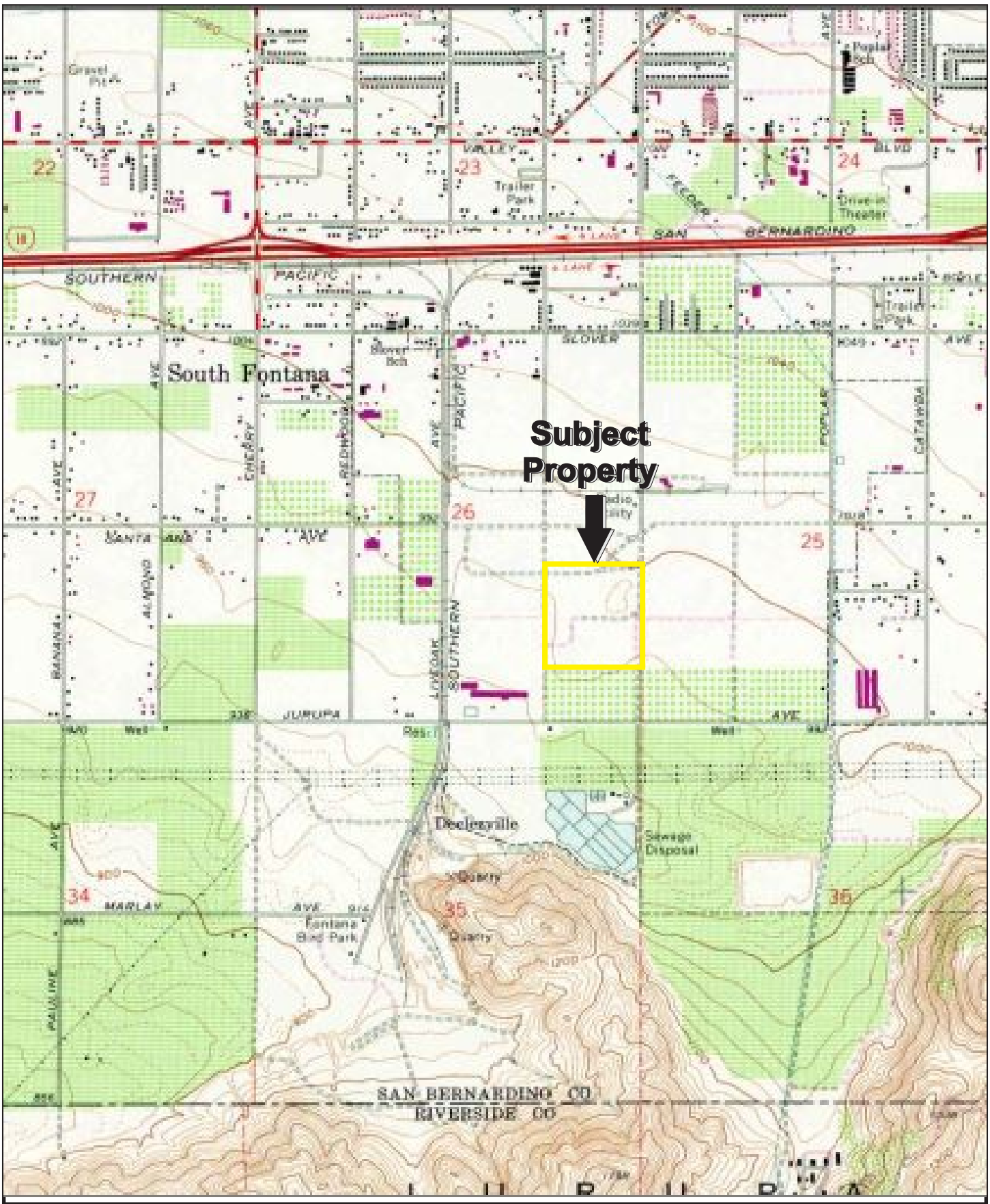


USGS 7.5 Minute *Fontana, California* Quadrangle Created: 1967

APPENDIX B: HISTORIC TOPOGRAPHIC MAPS

Project No. 15-144194.1

PARTNER

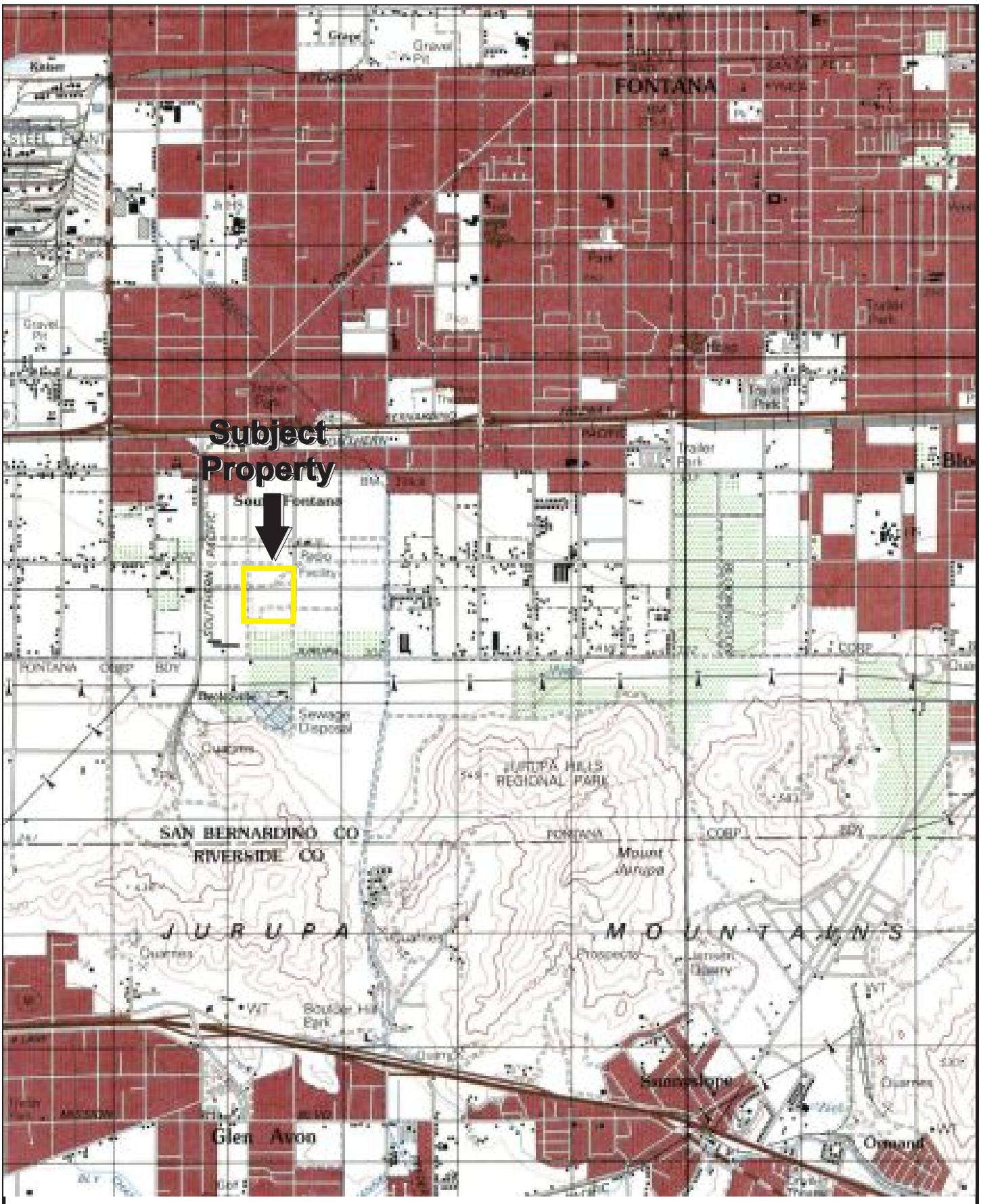


USGS 7.5 Minute *Fontana, California* Quadrangle — Created: 1967/ Revised 1973

APPENDIX B: HISTORIC TOPOGRAPHIC MAPS

Project No. 15-144194.1

PARTNER

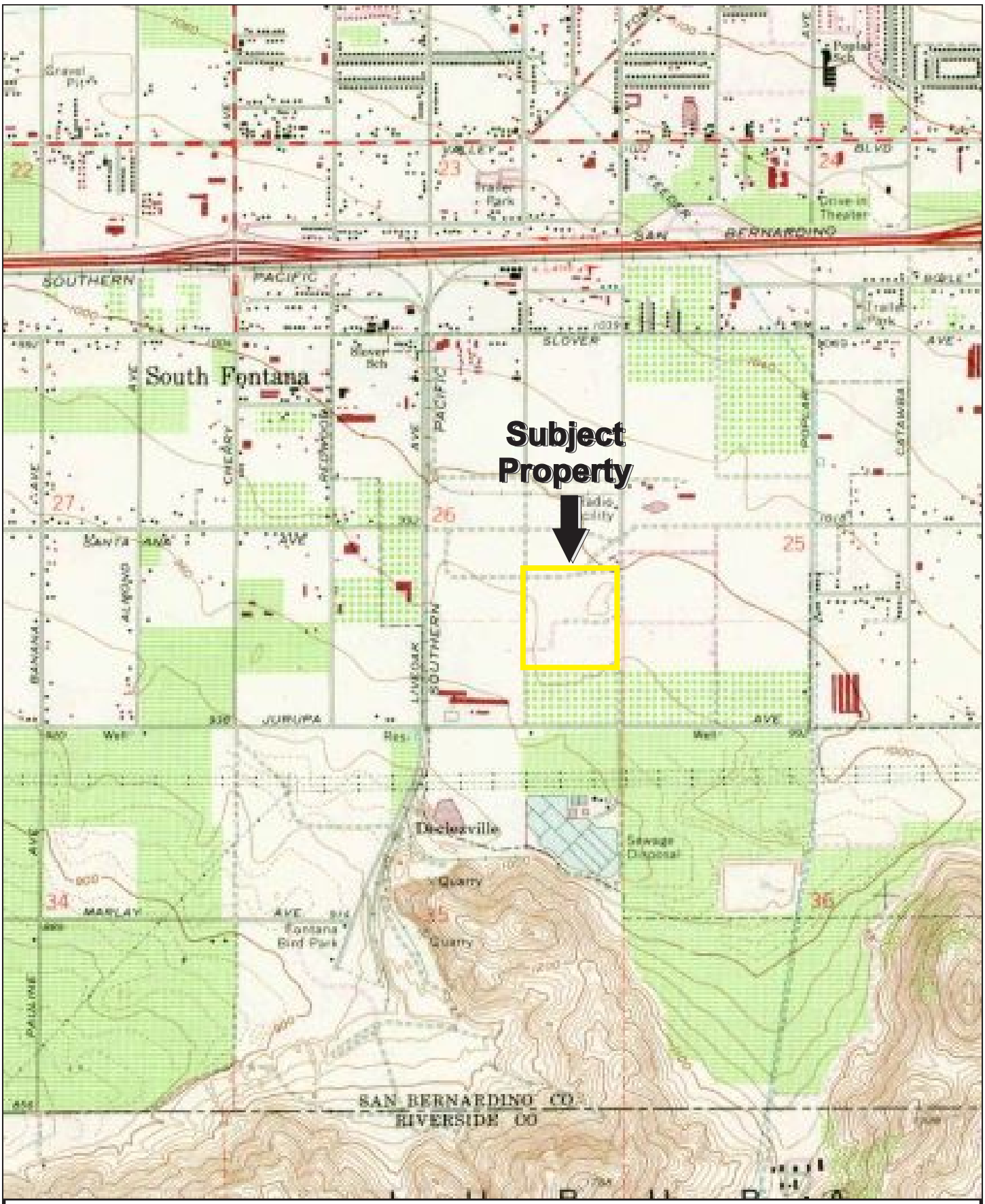


USGS 7.5 Minute *San Bernardino, California* Quadrangle Created: 1975

APPENDIX B: HISTORIC TOPOGRAPHIC MAPS

Project No. 15-144194.1

PARTNER



USGS 7.5 Minute *Fontana, California* Quadrangle — Created: 1967/Revised: 1980

APPENDIX B: HISTORIC TOPOGRAPHIC MAPS

Project No. 15-144194.1

PARTNER

11115 Hemlock Avenue
11115 Hemlock Avenue
Fontana, CA 92337

Inquiry Number: 4363822.11
July 23, 2015

EDR Building Permit Report

Target Property and Adjoining Properties

Environmental Data Resources Inc

6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

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Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EDR BUILDING PERMIT REPORT

About This Report

The EDR Building Permit Report provides a practical and efficient method to search building department records for indications of environmental conditions. Generated via a search of municipal building permit records gathered from more than 1,600 cities nationwide, this report will assist you in meeting the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13), or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

Building permit data can be used to identify current and/or former operations and structures/features of environmental concern. The data can provide information on a target property and adjoining properties such as the presence of underground storage tanks, pump islands, sumps, drywells, etc., as well as information regarding water, sewer, natural gas, electrical connection dates, and current/former septic tanks.

ASTM and EPA Requirements

ASTM E 1527-13 lists building department records as a "standard historical source," as detailed in § 8.3.4.7: "Building Department Records - The term building department records means those records of the local government in which the property is located indicating permission of the local government to construct, alter, or demolish improvements on the property." ASTM also states that "Uses in the area surrounding the property shall be identified in the report, but this task is required only to the extent that this information is revealed in the course of researching the property itself."

EPA's Standards and Practices for All Appropriate Inquires (AAI) states: "§312.24: Reviews of historical sources of information. (a) Historical documents and records must be reviewed for the purposes of achieving the objectives and performance factors of §312.20(e) and (f). Historical documents and records may include, but are not limited to, aerial photographs, fire insurance maps, building department records, chain of title documents, and land use records."

Methodology

EDR has developed the EDR Building Permit Report through our partnership with BuildFax, the nation's largest repository of building department records. BuildFax collects, updates, and manages building department records from local municipal governments. The database now includes 30 million permits, on more than 10 million properties across 1,600 cities in the United States.

The EDR Building Permit Report comprises local municipal building permit records, gathered directly from local jurisdictions, including both target property and adjoining properties. Years of coverage vary by municipality. Data reported includes (where available): date of permit, permit type, permit number, status, valuation, contractor company, contractor name, and description.

Incoming permit data is checked at seven stages in a regimented quality control process, from initial data source interview, to data preparation, through final auditing. To ensure the building department is accurate, each of the seven quality control stages contains, on average, 15 additional quality checks, resulting in a process of approximately 105 quality control "touch points."

For more information about the EDR Building Permit Report, please contact your EDR Account Executive at (800) 352-0050.

EDR® Environmental Data Resources Inc

BUILDFAX® PROPERTY HISTORY

EXECUTIVE SUMMARY: SEARCH DOCUMENTATION

A search of building department records was conducted by Environmental Data Resources, Inc (EDR) on behalf of Partner Engineering and Science, Inc. on Jul 23, 2015.

TARGET PROPERTY

11115 Hemlock Avenue
Fontana, CA 92337

SEARCH METHODS

EDR searches available lists for both the Target Property and Surrounding Properties.

RESEARCH SUMMARY

Building permits identified: **YES**

The following research sources were consulted in the preparation of this report. An "X" indicates where information was identified in the source and provided in this report.

Fontana

Year	*Source*	*TP*	*Adjoining*
2015	City of Fontana, Department of Building and Safety		
2014	City of Fontana, Department of Building and Safety	X	
2013	City of Fontana, Department of Building and Safety		
2012	City of Fontana, Department of Building and Safety		X
2011	City of Fontana, Department of Building and Safety		
2010	City of Fontana, Department of Building and Safety		
2009	City of Fontana, Department of Building and Safety		
2008	City of Fontana, Department of Building and Safety	X	
2007	City of Fontana, Department of Building and Safety		
2006	City of Fontana, Department of Building and Safety		X
2005	City of Fontana, Department of Building and Safety		
2004	City of Fontana, Department of Building and Safety		X
	City of Fontana, Department of Building and Safety	X	
2003	City of Fontana, Department of Building and Safety		X
	City of Fontana, Department of Building and Safety	X	
2002	City of Fontana, Department of Building and Safety		X
2001	City of Fontana, Department of Building and Safety		X
	City of Fontana, Department of Building and Safety	X	
2000	City of Fontana, Department of Building and Safety		X
	City of Fontana, Department of Building and Safety	X	
1999	City of Fontana, Department of Building and Safety	X	
1998	City of Fontana, Department of Building and Safety		X
1997	City of Fontana, Department of Building and Safety		
1996	City of Fontana, Department of Building and Safety		X
1995	City of Fontana, Department of Building and Safety		X
1994	City of Fontana, Department of Building and Safety		X
1993	City of Fontana, Department of Building and Safety		
1992	City of Fontana, Department of Building and Safety		

EXECUTIVE SUMMARY: SEARCH DOCUMENTATION

Year	Source	TP	Adjoining
1991	City of Fontana, Department of Building and Safety		
1990	City of Fontana, Department of Building and Safety		

BUILDING DEPARTMENT RECORDS SEARCHED

Name: Fontana
Years: 1990-2015
Source: City of Fontana, Department of Building and Safety, FONTANA, CA
Phone: (909) 350-7640

Name: Hesperia
Years: 2012-2014
Source: City of Hesperia, Building and Safety, HESPERIA, CA
Phone: (760) 947-1000

Name: Redding
Years: 1987-2015
Source: City of Redding, Development Services, Building Division, HAYWARD, CA
Phone: 530-225-4014

Name: Rialto
Years: 2000-2012
Source: City of Rialto, Building and Safety, RIALTO, CA
Phone: (909) 820-2505

Name: Riverside
Years: 2003-2015
Source: City of Riverside, Comm Devel, Building and Safety Division, RIVERSIDE, CA
Phone: (951) 826-5697

Name: San Bernardino County
Years: 2002-2015
Source: San Bernardino County, Land Use, Building & Safety, VICTORVILLE, CA
Phone: (909) 387-8311

Name: Baldwin Park
Years: 1996-2012
Source: Baldwin Park, Building and Safety, BALDWIN PARK, CA
Phone: (626) 813-5265

TARGET PROPERTY FINDINGS

TARGET PROPERTY DETAIL

11115 Hemlock Avenue
Fontana, CA 92337

11115 HEMLOCK AVE

Date:	**12/16/2014**
Permit Type:	**TPT**
Description:	**ONE-WAY OVERSIZE LOAD PERMIT FOR EUGENE GAVLIK TRUCKING**
Permit Description:	**Traffic Permit**
Work Class:	OVERSIZE LOAD
Proposed Use:	ONE-WAY W/ IN LIMITS
Permit Number:	TPT14-001157
Status:	ISSUED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	EUGENE GAVLIK TRUCKING

Date:	**4/14/2008**
Permit Type:	
Description:	**BUSINESS LICENSE: MODULAR HOUSING -- TENANT: MODULAR SPACE CORPORATION 610-232-0893 NO NAME PROVIDED**
Permit Description:	
Work Class:	
Proposed Use:	
Permit Number:	PMT08-01255
Status:	CLS
Valuation:	$0.00
Contractor Company:	
Contractor Name:	

TARGET PROPERTY FINDINGS

Date: **11/24/2004**
Permit Type:
Description: **CONSTRUCT 920LF @ 6FT HIGH BLOCK WALLS WITH 104 6FT HIGH PILASTERS AND 112LF @ 6FT HIGH WROUGHT IRON GATES.**

Permit Description:
Work Class:
Proposed Use:
Permit Number: PMT04-09595
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

Date: **6/12/2003**
Permit Type:
Description: **30,700' SQ FT OF GRADE AT SITE FOR TRAILER STORAGE OWNER: GE CAPITAL MODULAR.**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 03060253
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

Date: **1/22/2001**
Permit Type:
Description: **INSTALL (1) NON-ILLUMINATED MONUMENT SIGN**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 01010354
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

TARGET PROPERTY FINDINGS

Date: **3/28/2000**
Permit Type:
Description: **A NEW 70.25' X 80.25' 2-BAY REPAIR GARAGE WITH A MANAGER'S OFFICE, RESTROOMS AND UTILITY AND MECHANICAL ROOMS. SEE PERMIT # 00030538 FOR MODULAR OFFICE BLDG.**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 00030532
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

Date: **3/28/2000**
Permit Type:
Description: **FOUNDATION SYSTEM AND UTILITIES FOR A 48' X 76' PRE-MANUFACTURED MODULAR OFFICE BUILDING. SEE PERMIT # 00030532 FOR THE REPAIR GARAGE.**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 00030538
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

TARGET PROPERTY FINDINGS

Date: **9/28/1999**
Permit Type:
Description: **(No location in Sierra.) 4261 L.F. OF 6' HIGH BLOCK WALL PER CITY STANDARD. BLOCK WALLS AT ENTIRE PERIMETER OF SITE EXCEPT FOR WROUGHT IRON ROLLING GATES AT THE ENTRANCE AT BEECH AND HEMLOCK.**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 9905698
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

Date: **9/15/1999**
Permit Type:
Description: **11115 HEMLOCK AVE. PRECISE GRADING FOR A MODULAR OFFICE, 2-BAY SHOP AND FOR STORAGE YARD OF MODULAR STRUCTURES.**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 9902396
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

Date: **8/12/1999**
Permit Type:
Description: **(No location in Sierra.) TEMPORARY POWER POLE WITH (2) SUB POLES**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 9904326
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

TARGET PROPERTY FINDINGS

Date:
Permit Type:
Description: **PLAN CHECK TO INSTALL 900 L.F. OF 6' HIGH BLOCK WALL @ HEMLOCK & BEECH @ NORTH SIDE OF THE P.L. NOTE: BLOCK WALL IS ADJACENT TO THIS ADDRESS OWNER: G.E. CAPITAL MODULAR SPACE**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 02080159
Status: EXP
Valuation: $0.00
Contractor Company:
Contractor Name:

Date:
Permit Type:
Description: **INSTALL 900 L.F. OF 6' HIGH BLOCK, 112 LF OF 6 FT W.I. GATES**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 02120358
Status: EXP
Valuation: $0.00
Contractor Company:
Contractor Name:

Date:
Permit Type:
Description: **PLAN CHECK FOR A 70.25' X 80.25' 2-BAY REPAIR GARAGE AND A 48' X 76' MODULAR OFFICE BUILDING. SEE PERMIT # 00030532 FOR REPAIR GARAGE AND PERMIT # 00030538 FOR MODULAR OFFICE BUILDING.**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 9902121
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

TARGET PROPERTY FINDINGS

Date:
Permit Type:
Description: **PLAN CHECK FOR 900 LF OF 6FT HIGH BLOCKWALL @ HEMLOCK & BEECH AT THE NORTH SIDE FOR THE PROPERTY LINE. PREVIOUSLY PLAN CHECK#02080159(EXPEDITE PLAN CHECK FEE PAID)**

Permit Description:
Work Class:
Proposed Use:
Permit Number: PMT04-08112
Status: REC
Valuation: $0.00
Contractor Company:
Contractor Name:

ADJOINING PROPERTY FINDINGS

ADJOINING PROPERTY DETAIL

The following Adjoining Property addresses were researched for this report. Detailed findings are provided for each address.

HEMLOCK AVE

10990 HEMLOCK AVE

Date:	**9/24/2012**
Permit Type:	**FPMT**
Description:	**ONSITE PLAN (RELOCATION OF PIPE) (JM PIPING)**
Permit Description:	**Fire Prevention Permit**
Work Class:	ONSITE
Proposed Use:	
Permit Number:	FPMT12-000237
Status:	ISSUED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	GOLDEN STATE FIRE PROTECTION

Date:	**9/20/2012**
Permit Type:	**BLD**
Description:	**PERMIT FOR 2,400 SF SHELL BUILDING ADDITION TO**
Permit Description:	**Building Permit**
Work Class:	INDUST ADD
Proposed Use:	IND CITYWIDE
Permit Number:	BLD12-001720
Status:	ISSUED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	H.E. HAMMER

ADJOINING PROPERTY FINDINGS

Date:	**5/29/2012**
Permit Type:	**FPMT**
Description:	**COMM SPK**
Permit Description:	**Fire Prevention Permit**
Work Class:	SPRINKLER MOD
Proposed Use:	COM/IND
Permit Number:	FPMT12-000068
Status:	ISSUED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	GOLDEN STATE FIRE PROTECTION

Date:	**8/2/2006**
Permit Type:	**INEW**
Description:	**PERMIT FOR A NEW 16,065 EQUIPMENT BUILDING FOR PIPE ASSEMBLY @ WEST REAR OF EXSITING MANUFACTURING BUILDING FOR "J-M MANUFACTURING"**
Permit Description:	**Industrial-New**
Work Class:	
Proposed Use:	
Permit Number:	PMT06-06953
Status:	Closed
Valuation:	$377,528.00
Contractor Company:	
Contractor Name:	H E HAMMER CONSTRUCTION CORP.

ADJOINING PROPERTY FINDINGS

Date: **5/12/2003**
Permit Type:
Description: **TENANT IMPROVEMENT OFFICE ADDITION AT EXISTING MEZZANINE FOR OFFICE USE 943SF. IN EXISTING WARE HOUSE/FACTORY. LOCATED AT BLDG INTERIOR @ EAST END**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 03030716
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

Date: **3/6/2001**
Permit Type:
Description: **CONSTRUCT A 3,500' SQ FT ALUMINUM METAL SOLID STORAGE SHELTER, ATTACHED TO THE REAR OF THE SHOP BUILDING.**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 01030128
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

ADJOINING PROPERTY FINDINGS

Date: **6/17/1998**
Permit Type:
Description: **(No location in Sierra.) GRADING & PAVING FOR J-M MANUFACTURING, NEW PIPE STORAGE YARD, LOCATED AT THE S.E. CORNER OF LIVE OAK & SANTA ANA AVE, NORTH OF THE RAIL SIDING THAT SERVES THE PROPERTY, WITH A RAIL LINE LOCATED BETWEEN THE PROPERTY AND LIVE OAK A**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 9800079
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

Date: **4/3/1996**
Permit Type:
Description: **(No location in Sierra.) 720sf OFFICE ADDITION AT NORTH WALL OF PLANT**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 0003881
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

ADJOINING PROPERTY FINDINGS

Date: **10/24/1995**
Permit Type:
Description: **(No location in Sierra.) 38'X 42' METAL COVER I.C.B.O. #4244P OVER EXISTING PRE-COOLER WATER SYSTEM.**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 0002522
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

Date: **10/24/1995**
Permit Type:
Description: **(No location in Sierra.) 6'X 8' METAL CANOPY OVER EXISITNG DEHIMIDIFIER**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 0003168
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

ADJOINING PROPERTY FINDINGS

Date: **3/30/1995**
Permit Type:
Description: **(No location in Sierra.) T.I. TO ESTABLISH OCCUPANCY AND COMPLETE ADDITION TO INDUSTRIAL PLANT (ELECTRICAL, LIGHTING, EXITING SIGNAGE AND LIGHTING, PLATFORM TO SUPPORT HOPPERS, ADDITION OF A PIPE EXTRUSION LINE, 4 ROOF MOUNTED EXHAUST FANS, AND OTHER RE**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 0000941
Status: EXP
Valuation: $0.00
Contractor Company:
Contractor Name:

Date: **3/21/1995**
Permit Type:
Description: **(No location in Sierra.) ESTABLISH OCCUPANCY--GRINDER BUILDING & ELECTRICAL EQUIPMENT**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 0000874
Status: EXP
Valuation: $0.00
Contractor Company:
Contractor Name:

ADJOINING PROPERTY FINDINGS

Date: **11/21/1994**
Permit Type:
Description: **ALONG P.L. CMU X 6' @ PL 520'@ HMLK,1175'@ S.A., 450'@ W. P.L**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 0000160
Status: EXP
Valuation: $0.00
Contractor Company:
Contractor Name:

Date:
Permit Type:
Description: **(No location in Sierra.) T.I. OFFICE/BREAK ROOM**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 0001654
Status:
Valuation: $0.00
Contractor Company:
Contractor Name:

Date:
Permit Type:
Description: **(No location in Sierra.) 38X42 METAL COVER ADDED TO FRONT OF BLDG**

Permit Description:
Work Class:
Proposed Use:
Permit Number: S000068
Status: VOI
Valuation: $0.00
Contractor Company:
Contractor Name:

ADJOINING PROPERTY FINDINGS

Date:
Permit Type:
Description: **TENANT IMPROVEMENT OFFICE ADDITION AT EXISTING MEZEANINE FOR OFFICE USE 943SF. IN EXISTING WARE HOUSE/FACTORY.**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 02120012
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

Date:
Permit Type:
Description: **(PERMIT # PMT06-06953) PLAN CHECK (IND'L.) EQUIP. BLDG. FOR PIPE ASSEMBLY -- (J-M MANUFACTURING) (EXPEDITE)**

Permit Description:
Work Class:
Proposed Use:
Permit Number: PMT06-04681
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

ADJOINING PROPERTY FINDINGS

11015 HEMLOCK AVE

Date:
Permit Type:
Description: **(No location in Sierra.) 6000 SF CONCRETE TILT-UP BUILDING (DR 93-44) WITH ATTACHED 20'X 60' METAL CANOPY FOR TRUCK WASHING. BUILDING CONSISTS OF APPROX. 1700 SF 2ND FLOOR OFFICES. WITH 1ST FLOOR USED AS TRUCK MAINTENANCE BAYS, STORAGE, RESTROOMS ETC.. TH**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 0001345
Status: EXP
Valuation: $0.00
Contractor Company:
Contractor Name:

Date:
Permit Type:
Description: **(No location in Sierra.) 190 LF OF 6' HIGH BLOCKWALL PER CITY STD ALONG FRONT OF PROPERTY. APPROX. 950 LF OF 6' HIGH CHAIN LINK FENCE AT EAST AND SOUTH PROPERTY LINES.**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 0001536
Status: EXP
Valuation: $0.00
Contractor Company:
Contractor Name:

ADJOINING PROPERTY FINDINGS

Date:
Permit Type:
Description: **11015 HEMLOCK AVENUE 5,000 SQ. FT. OFFICE BLDG. FOR TRUCKING YARD**

Permit Description:
Work Class:
Proposed Use:
Permit Number: S015820
Status: VOI
Valuation: $0.00
Contractor Company:
Contractor Name:

11128 HEMLOCK AVE

Date: **4/21/2004**
Permit Type:
Description: **INSTALLATION OF TRUCK SCALES. NOT INCLUDED ARE SIGNS,READER BOARDS,SIGNAL LIGHTS INSTALLATION OF TRUCK SCALE ONLY.**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 03050042
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

ADJOINING PROPERTY FINDINGS

Date: **4/5/2004**
Permit Type:
Description: **BUSINESS LICENSE APPLICATION FOR WASHING TRUCKS -- TENANT: J.L.E. TRUCK WASH, LLC**

Permit Description:
Work Class:
Proposed Use:
Permit Number: PMT04-02029
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

Date: **4/5/2004**
Permit Type:
Description: **BUSINESS LICENSE APPLICATION FOR TRUCKING COMPANY -- TENANT: INTERSTATE DISTRIBUTOR CO.**

Permit Description:
Work Class:
Proposed Use:
Permit Number: PMT04-02031
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

ADJOINING PROPERTY FINDINGS

Date: **2/29/2004**
Permit Type:
Description: **PLAN CHECK TO INSTALL A FLAGPOLE 25'. OWNER: JOHN BORUCHIN INTERSTATE DISTRIBUTION CENTER**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 03060298
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

Date: **11/25/2003**
Permit Type:
Description: **NEW TRUCK WASH BUILDING WITH CANOPY.**

Permit Description:
Work Class:
Proposed Use:
Permit Number: PMT03-01500
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

Date: **9/4/2003**
Permit Type:
Description: **INSTALL A 12,000 GALLON ABOVE GROUND FUEL TANK WITH THICKEN DRIVE SLAB EACH SIDE OF TANK.**

Permit Description:
Work Class:
Proposed Use:
Permit Number: PMT03-01611
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

ADJOINING PROPERTY FINDINGS

Date: **9/2/2003**
Permit Type:
Description: **25' tall flag pole for 6' x 4' flag.**

Permit Description:
Work Class:
Proposed Use:
Permit Number: PMT03-01431
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

Date: **8/13/2003**
Permit Type:
Description: **(1) 50 AMP SUB PANEL, (4) SWITCHES, (1) MONITORING SYSTEM, (2) 1/2 HP METERS, (2) 240 CIRCUITS, (2)120 CIRCUITS.**

Permit Description:
Work Class:
Proposed Use:
Permit Number: PMT03-01067
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

ADJOINING PROPERTY FINDINGS

Date: **8/12/2003**
Permit Type:
Description: **APPROX. 10,000 S.F. 2-STORY OFFICE WITH ATTACHED TRUCK MAINTENANCE FACILITY. MAINTENANCE FACILITY (OWNER: INTERSTATE DISTRIBUTOR INC.) AREA INCLUDES A 2-STORY AREA WITH OFFICES AND STORAGE ON THE 1ST FLOOR AND RESTROOMS, STORAGE AND MEZZANINE ON THE 2ND F**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 02120086
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

Date: **7/28/2003**
Permit Type:
Description: **ADD (4) 400 WATT WALL LIGHTS ON BUILDING & (1) ADDRESS LIGHT, ADD (2) POLE LIGHTS @ PAKING LOT PER ORIGINAL CONSTRUCTION PLANS.**

Permit Description:
Work Class:
Proposed Use:
Permit Number: PMT03-00573
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

ADJOINING PROPERTY FINDINGS

Date: **5/22/2003**
Permit Type:
Description: **INSTALLATION OF TRUCK SCALES. NOT INCLUDED ARE SIGNS,READER BOARDS,SIGNAL LIGHTS INSTALLATION OF TRUCK SCALE ONLY, PER THIS PERMIT.**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 03050528
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

Date: **4/23/2003**
Permit Type:
Description: **8'X 108 L.F. OF MASONRY WALL TO CREATE 58' X 50' STORAGE AREA AT N.E. CORNER OF THE TRUCK LOT. ADJACENT TO THE GUARD SHACK.**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 03040658
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

ADJOINING PROPERTY FINDINGS

Date: **4/23/2003**
Permit Type:
Description: **144 S.F.GUARD SHACK AT FRONT+ELECTRICAL REVISIONS TRUCK MAINTENANCE FACILITY. (OWNER: INTERSTATE DISTRIBUTOR INC.)**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 03040656
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

Date: **9/23/2002**
Permit Type:
Description: **ADD (3) 120 V CIRCUITS & (11) OUTLETS FOR SECURITY CAMERAS & FENCE SENOR OWNER: INTERSTATE DISTRIBUTOR CO**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 02090720
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

ADJOINING PROPERTY FINDINGS

Date: **9/17/2002**
Permit Type:
Description: **INSTALL (1) 1200 AMP SERVICE, (1) 125 AMP 227/4800 PANEL & (10) LIGHTS & PARKING LOT OWNER: INTERSTATE DISTRIBUTOR CO**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 02090591
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

Date: **8/22/2002**
Permit Type:
Description: **8'TALL MASONRY WALLS=620'+50'+50'@ PROPERTY REAR. 50'+161'+8'+13'+241'+12'+81'+50'+2-20'& 2-3' GATES @ FRONT-IN LINE WITH OFFICES.PLUS 460'X4'RETAINING WITH FENCE ON TOP AT LEFT P.L. & 90'X4.66'RETAINIG WITH FENCE ON TOP AT RIGHT P.L. ENGINEERED PLANS.**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 02080534
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

ADJOINING PROPERTY FINDINGS

Date: **5/23/2002**
Permit Type:
Description: **ROUGH & PRECISE GRADE FOR TRUCK MAINT.& STORAGE FACILITY, 827640 SF GRADING, 314480 SF PAVING, 5 DRAINAGE STRUCTURES INC. SUMP**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 02050921
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

Date: **10/17/2000**
Permit Type:
Description: **STOCKPILE GRADING OWNER - JOHN BORUCIN**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 00100189
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

Date:
Permit Type:
Description: **STOCKPILE GRADING OWNER - JOHN BORUCIN**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 00090285
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

ADJOINING PROPERTY FINDINGS

Date:
Permit Type:
Description: **ROUGH GRADING & PRECISE GRADE FOR SEMI-TRUCK STORAGE FACILITY & MAINTENANCE SHOP OWNER: INTERSTATE DISTRIBUTOR CO**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 02010514
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

Date:
Permit Type:
Description: **PLAN CHECK FOR WALL CONSTRUCTION (RETAINING & FREESTANDING) OWNER: INTERSTATE DISTRIBUTORS**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 02071308
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

ADJOINING PROPERTY FINDINGS

Date:
Permit Type:
Description: **PLAN CHECK FOR NEW 2 STORY, 10,000 S.F. OFFICE BUILDING W/ATTACHED 19,520 S.F. TRUCK MAINT. FAC. (OWNER: INTERSTATE DISTRIBUTOR INC.) DEVELOPMENT IMPACT FEES DEFERRED. CONTACT H.P. KANG FOR MORE INFO.**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 02071700
Status: ACT
Valuation: $0.00
Contractor Company:
Contractor Name:

Date:
Permit Type:
Description: **PLAN CHECK FOR ADDITION OF LIGHT STANDARDS, AND ADDITION OF A 200 AMP. & 1200AMP.SERVICE.**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 02080598
Status: VOI
Valuation: $0.00
Contractor Company:
Contractor Name:

ADJOINING PROPERTY FINDINGS

Date:
Permit Type:
Description: **REVISION TO GRADING PLANS THAT WERE ALREADY ISSUED PLAN CHECK # TO ISSUED PLAN #02010514 PLANS WERE DROPPED OFF AT THE COUNTER, THEY WERE NOT SUBMITTED, PER RICHARD A. NO FEES AT THIS TIME**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 02101275
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

Date:
Permit Type:
Description: **PLAN CHECK FOR CHAIN LINK FENCE WITH SECURITY WIRE INSTALLATION OWNER: INTERSTATE DISTRIBUTORS**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 02110405
Status: EXP
Valuation: $0.00
Contractor Company:
Contractor Name:

ADJOINING PROPERTY FINDINGS

Date:
Permit Type:
Description: **PLAN CHECK REVISIONS TO CHANGE 8'X 10' COMPRESSOR ROOM FROM MASONRY AS SHOWN ON ORIGINAL PERMIT TO CONCRETE TILT-UP (NO PLAN CHECK FEES @ THIS TIME) OWNER: INTERSTATE DISTRIBUTOR CO**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 03020673
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

Date:
Permit Type:
Description: **GUARD HOUSE @ 144 SQ FT , ELECTRICAL REVISIONS. REFERENCE TO APPROVED PC#02071700 NO FEES TAKEN IN FOR THIS PLAN CHECK.**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 03030388
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

ADJOINING PROPERTY FINDINGS

Date:
Permit Type:
Description: **NEW TRUCK WASH BUILDING WITH CANOPY**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 03040875
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

Date:
Permit Type:
Description: **INSTALL (1) 1200 AMP SERVICE, (1) 125 AMP 227/4800 PANEL & (10) LIGHTS & PARKING LOT OWNER: INTERSTATE DISTRIBUTOR CO**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 02081008
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

Date:
Permit Type:
Description: **INSTALL A 12,000 GALLON AST DIESEL TANK**

Permit Description:
Work Class:
Proposed Use:
Permit Number: PMT03-00751
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

ADJOINING PROPERTY FINDINGS

Date:
Permit Type:
Description: **TEMPORARY CERTIFICATE OF OCCUPANCY (60 DAYS) FOR NEW TRUCK -- TERMINAL**

Permit Description:
Work Class:
Proposed Use:
Permit Number: PMT03-01052
Status: REC
Valuation: $0.00
Contractor Company:
Contractor Name:

Date:
Permit Type:
Description: **PLAN CHECK REVISIONS TO PC# PMT03-00751, RECALULATED TANK SLABS AND -- ADD DRIVE SLABS AROUND TANK.**

Permit Description:
Work Class:
Proposed Use:
Permit Number: PMT03-02160
Status: CLS
Valuation: $0.00
Contractor Company:
Contractor Name:

Date:
Permit Type:
Description: **60 day temp c of o for truck terminal/maintenance bldng.**

Permit Description:
Work Class:
Proposed Use:
Permit Number: PMT03-01010
Status: REC
Valuation: $0.00
Contractor Company:
Contractor Name:

GLOSSARY

General Building Department concepts

- **ICC:** The International Code Council. The governing body for the building/development codes used by all jurisdictions who've adopted the ICC guidelines. MOST of the US has done this. Canada, Mexico, and other countries use ICC codes books and guides as well. There are a few states who have added guidelines to the ICC codes to better fit their needs. For example, California has added seismic retrofit requirements for most commercial structures.
- **Building Department (Permitting Authority, Building Codes, Inspections Department, Building and Inspections):** This is the department in a jurisdiction where an owner or contractor goes to obtain permits and inspections for building, tearing down, remodeling, adding to, re-roofing, moving or otherwise making changes to any structure, Residential or Commercial.
- **Jurisdiction:** This is the geographic area representing the properties over which a Permitting Authority has responsibility.
- **GC:** General Contractor. Usually the primary contractor hired for any Residential or Commercial construction work.
- **Sub:** Subordinate contracting companies or subcontractors. Usually a "trades" contractor working for the GC. These contractors generally have an area of expertise in which they are licensed like Plumbing, Electrical, Heating and Air systems, Gas Systems, Pools etc. (called "trades").
- **Journeymen:** Sub contractors who have their own personal licenses in one or more trades and work for different contracting companies, wherever they are needed or there is work.
- **HVAC (Mechanical, Heating & Air companies):** HVAC = Heating, Ventilation, and Air Conditioning.
- **ELEC (Electrical, TempPole, TPole, TPower, Temporary Power, Panel, AMP Change, Power Release):** Electrical permits can be pulled for many reasons. The most common reason is to increase the AMPs of power in an electrical power panel. This requires a permit in almost every jurisdiction. Other commons reason for Electrical permits is to insert a temporary power pole at a new construction site. Construction requires electricity, and in a new development, power has yet to be run to the lot. The temporary power pole is usually the very first permit pulled for new development. The power is released to the home owner when construction is complete and this sometimes takes the form of a Power Release permit or inspection.
- **"Pull" a permit:** To obtain and pay for a building permit.
- **CBO:** Chief Building Official
- **Planning Department:** The department in the development process where the building /structural plans are reviewed for their completeness and compliance with building codes
- **Zoning Department:** The department in the development process where the site plans are reviewed for their compliance with the regulations associated with the zoning district in which they are situated.
- **Zoning District:** A pre-determined geographic boundary within a jurisdiction where certain types of structures are permitted / prohibited. Examples are Residential structure, Commercial/Retail structures, Industrial/Manufacturing structures etc. Each zoning district has regulations associated with it like the sizes of the lots, the density of the structures on the lots, the number of parking spaces required for certain types of structures on the lots etc.
- **PIN (TMS, GIS ID, Parcel#):** Property Identification Number and Tax Map System number.
- **State Card (Business license):** A license card issued to a contractor to conduct business.
- **Building Inspector (Inspector):** The inspector is a building department employee that inspects building construction for compliance to codes.
- **C.O.:** Certificate of Occupancy. This is the end of the construction process and designates that the owners now have permission to occupy a structure after its building is complete. Sometimes also referred to as a Certificate of Compliance.

GLOSSARY

Permit Content Definitions

- Permit Number: The alphanumerical designation assigned to a permit for tracking within the building department system. Sometimes the permit number gives clues to its role, e.g. a "PL" prefix may designate a plumbing permit.
- Description: A field on the permit form that allows the building department to give a brief description of the work being done. More often than not, this is the most important field for EP's to find clues to the prior use(s) of the property.
- Permit Type: Generally a brief designation of the type of job being done. For example BLDG-RES, BLDG-COM, ELEC, MECH etc.

Sample Building Permit Data

Date: Nov 09, 2000
Permit Type: Bldg -
New Permit Number: 101000000405
Status: Valuation: $1,000,000.00
Contractor Company: OWNER-BUILDER
Contractor Name:

Description: New one store retail (SAV-ON) with drive-thru pharmacy. Certificate of Occupancy.

11115 Hemlock Avenue
11115 Hemlock Avenue
Fontana, CA 92337

Inquiry Number: 4363822.7
July 27, 2015

EDR Environmental Lien and AUL Search

EDR® Environmental Data Resources Inc

6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

EDR Environmental Lien and AUL Search

The EDR Environmental Lien and AUL Search Report provides results from a search of available current land title records for environmental cleanup liens and other activity and use limitations, such as engineering controls and institutional controls.

A network of professional, trained researchers, following established procedures, uses client supplied address information to:

- search for parcel information and/or legal description;
- search for ownership information;
- research official land title documents recorded at jurisdictional agencies such as recorders' offices, registries of deeds, county clerks' offices, etc.;
- access a copy of the deed;
- search for environmental encumbering instrument(s) associated with the deed;
- provide a copy of any environmental encumbrance(s) based upon a review of key words in the instrument(s) (title, parties involved, and description); and
- provide a copy of the deed or cite documents reviewed.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EDR Environmental Lien and AUL Search

TARGET PROPERTY INFORMATION

ADDRESS

11115 Hemlock Avenue
11115 Hemlock Avenue
Fontana, CA 92337

RESEARCH SOURCE

Source 1:

San Bernardino Recorder
San Bernardino, CA

PROPERTY INFORMATION

Deed 1:

Type of Deed:	deed
Title is vested in:	Resun Modspace
Title received from:	GE Capital Modular Space
Deed Dated	3/30/2007
Deed Recorded:	4/9/2007
Book:	NA
Page:	na
Volume:	na
Instrument:	na
Docket:	NA
Land Record Comments:	
Miscellaneous Comments:	
Legal Description:	See Exhibit
Legal Current Owner:	Resun Modspace Inc
Parcel # / Property Identifier:	0237-131-25-0000
Comments:	See Exhibit

ENVIRONMENTAL LIEN

Environmental Lien: Found ☐ Not Found ☒

OTHER ACTIVITY AND USE LIMITATIONS (AULs)

AULs: Found ☐ Not Found ☒

Deed Exhibit 1

Recorded in Official Records, County of San Bernardino

4/09/2007
8:00 AM
EM

LARRY WALKER
Auditor/Controller – Recorder

730 Chicago Title Company – CIS

Doc#: 2007–0214064

Titles: 1 Pages: 3

Fees	22.00
Taxes	** Conf **
Other	0.00
PAID	$22.00

RECORDING REQUESTED BY:
CHICAGO TITLE COMPANY

WHEN RECORDED MAIL TO

SKADDEN, ARPS, SLATE, MEAGHER
& FLOM LLP
300 SOUTH GRAND AVENUE, SUITE 3400
LOS ANGELES, CA 90071
ATTN: ERIC STEIGLITZ, ESQ.

AND MAIL TAX STATEMENTS TO:

RESUN MODSPACE, INC.
22810 QUICKSILVER DRIVE
DULLES, VA 20166
ATTN: DEB POPKO

Title Order No.: 72035145-K26 Space Above This Line For Recorder's Use APN: 0237-131-25-0-000
Escrow No.: 71085075-X55 0237-131-26-0-000
0237-131-27-0-000

GRANT DEED

THE UNDERSIGNED GRANTOR DECLARES:
DOCUMENTARY TRANSFER TAX is NOT OF PUBLIC RECORD, and

FOR A VALUABLE CONSIDERATION, receipt of which is hereby acknowledged,

GE CAPITAL MODULAR SPACE, A DIVISION OF TRANSPORT INTERNATIONAL POOL, INC., a Pennsylvania corporation ("Grantor")

hereby GRANTS to RESUN MODSPACE, INC., a Delaware corporation

the following described real property in the City of Fontana, County of San Bernardino, State of California:

SEE EXHIBIT "A" ATTACHED HERETO AND MADE A PART HEREOF (the "Property").

TO HAVE AND TO HOLD the Property, together with all and singular the rights and appurtenances thereto in anywise belonging unto the said Property, subject to non-delinquent taxes and assessments and all matters of record.

MAIL TAX STATEMENTS AS DIRECTED ABOVE

Dated: March 30, 2007.

GE CAPITAL MODULAR SPACE, A DIVISION OF TRANSPORT INTERNATIONAL POOL, INC.,
a Pennsylvania corporation

By: _____
Name: ~~Joseph A. Cutuso~~ Joseph Cutuso
Its: President - CEO

STATE OF NEW YORK }
COUNTY OF NEW YORK } *S.S.*

On March 30th, 2007 before me, John Ellsworth, a Notary Public, personally appeared Joseph Cutuso,

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

WITNESS my hand and official seal.

Signature: _____ [Seal]

JOHN ELLSWORTH
Notary Public, State of New York
No. 01EL4995735
Qualified in New York County
Commission Expires June 6, 2010

EXHIBIT "A"

PARCEL A:

LOT 964, ACCORDING TO MAP SHOWING SUBDIVISION OF THE LANDS OF THE SEMI-TROPIC LAND AND WATER COMPANY, IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AS PER MAP RECORDED IN BOOK 11, PAGE 12 OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

EXCEPT THE SOUTH 310 FEET OF SAID LOT 964.

PARCEL B:

LOT 965 TOGETHER WITH THE SOUTH 310 FEET OF LOT 964 ACCORDING TO MAP SHOWING SUBDIVISION OF THE LANDS OF THE SEMI-TROPIC LAND AND WATER COMPANY, IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AS PER MAP RECORDED IN BOOK 11, PAGE 12 OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

A CERTIFICATE OF COMPLIANCE BEING RECORDED APRIL 1, 1998 AS INSTRUMENT NO. 19980121425 OFFICIAL RECORDS.

11115 Hemlock Avenue
11115 Hemlock Avenue
Fontana, CA 92337

Inquiry Number: 4363822.8
July 23, 2015

The EDR Property Tax Map Report

EDR® Environmental Data Resources Inc

6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

EDR Property Tax Map Report

Environmental Data Resources, Inc.'s EDR Property Tax Map Report is designed to assist environmental professionals in evaluating potential environmental conditions on a target property by understanding property boundaries and other characteristics. The report includes a search of available property tax maps, which include information on boundaries for the target property and neighboring properties, addresses, parcel identification numbers, as well as other data typically used in property location and identification.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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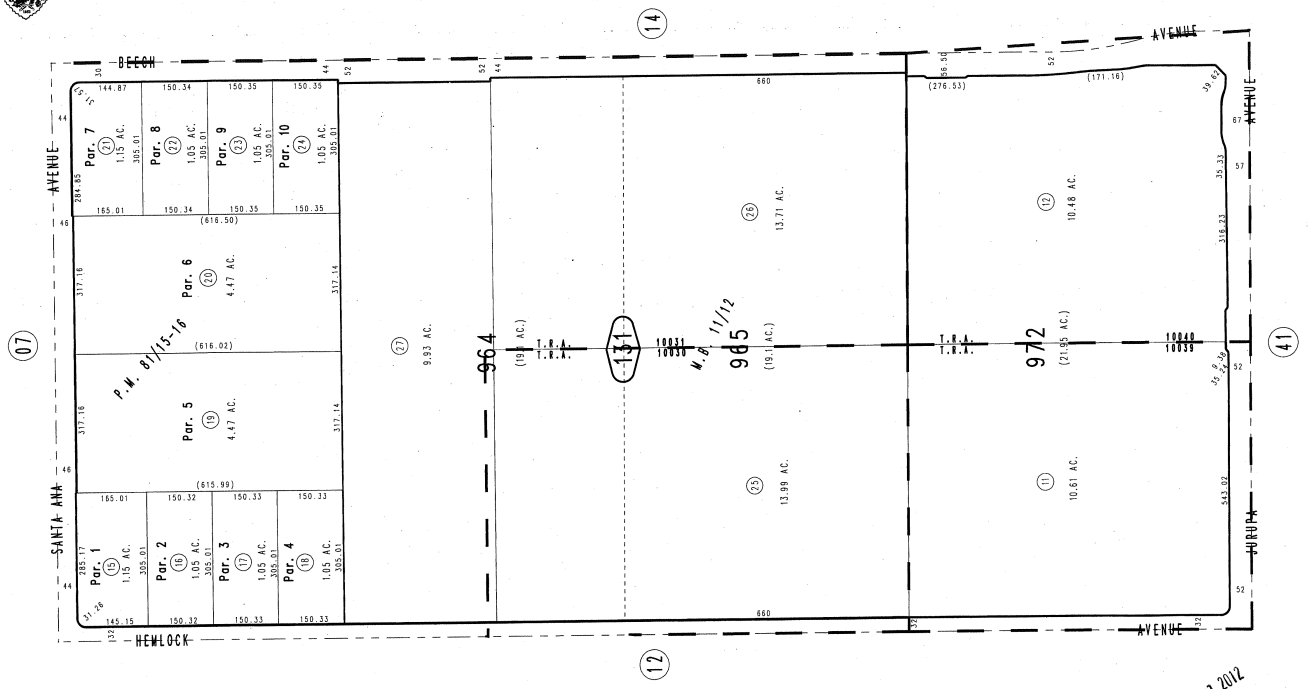
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THIS MAP IS FOR THE PURPOSE OF AD VALOREM TAXATION ONLY.

Ptn. Semi-Tropic Land & Water Co. Sub., S.B.L.
M.B. 11/12

City of Fontana 0237-13
Tax Rate Area
10039,10040,10030,10031

1"=200'



DEC 1 1 2012

REVISED
03/22/10 LH
11/02/12 RU

Assessor's Map
Book 0237 Page 13
San Bernardino County

Ptn. S.W.1/4, Sec. 25
T.1S., R.6W.

February 2004

Parcel Map No. 7739, P.M. 81/15-16

APPENDIX C: REGULATORY DATABASE REPORT

PARTNER

11115 Hemlock Avenue
11115 Hemlock Avenue
Fontana, CA 92337

Inquiry Number: 4363822.2s
July 24, 2015

The EDR Radius Map™ Report with GeoCheck®

EDR® Environmental Data Resources Inc

6 Armstrong Road, 4th floor
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Toll Free: 800.352.0050
www.edrnet.com

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Thank you for your business.
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with any questions or comments.

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

11115 HEMLOCK AVENUE
FONTANA, CA 92337

COORDINATES

Latitude (North):	34.0527000 - 34° 3' 9.72''
Longitude (West):	117.4752000 - 117° 28' 30.72''
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	456142.2
UTM Y (Meters):	3767906.5
Elevation:	982 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	5619058 FONTANA, CA
Version Date:	2012

AERIAL PHOTOGRAPHY IN THIS REPORT

Portions of Photo from:	20120428, 20120519
Source:	USDA

MAPPED SITES SUMMARY

Target Property Address:
11115 HEMLOCK AVENUE
FONTANA, CA 92337

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION
A1	MODULAR SPACE CORPOR	11115 HEMLOCK AVE	FINDS		TP
A2	GE MODULAR SPACE	11115 HEMLOCK AVE	HAZNET		TP
A3	MODSPACE	11115 HEMLOCK	San Bern. Co. Permit		TP
A4	MODULAR SPACE CORPOR	11115 HEMLOCK AVE	RCRA-SQG		TP
A5	MODULAR SPACE CORPOR	11115 HEMLOCK AVE	HAZNET		TP
A6		11115 HEMLOCK A VACA	CHMIRS		TP
7	AMICO CORP	11093 BEECH AVE	NPDES, San Bern. Co. Permit, EMI, WDS	Higher	141, 0.027, East
B8		11001 BEECH AVE	EDR US Hist Auto Stat	Higher	519, 0.098, ENE
B9	A.M. ORTEGA CONSTRUC	11001 BEECH AVE	San Bern. Co. Permit	Higher	519, 0.098, ENE
C10	CONTINENTAL COATINGS	10938 BEECH AVENUE	RCRA-LQG, WDS	Higher	592, 0.112, NE
C11	MUSASHI PAINT CALIFO	10938 BEECH AVE	RCRA NonGen / NLR	Higher	592, 0.112, NE
C12	CONTINENTAL COATING	10938 BEECH AVE	NPDES, San Bern. Co. Permit, EMI	Higher	592, 0.112, NE
13	MIZKAN AMERICAS INC	15101 SANTA ANA AVE	San Bern. Co. Permit	Higher	750, 0.142, NNE
14	AEP SPAN	10905 BEECH AVE	NPDES, San Bern. Co. Permit, WDS	Higher	806, 0.153, ENE
D15	INTERSTATE DIST CO	11128 HEMLOCK AVE	NPDES, San Bern. Co. Permit	Lower	808, 0.153, SW
D16	INTERSTATE DISTRIBUT	11128 HEMLOCK	AST	Lower	808, 0.153, SW
E17	MISSION CUSTOM EXTRU	10904 BEECH AVENUE	NPDES, San Bern. Co. Permit	Higher	952, 0.180, NE
18	JAMES HARDIE BUILDIN	15431 SANTA ANA AVE	San Bern. Co. Permit, WDS	Higher	993, 0.188, NE
E19	BRINE FACFONTANA-CLO	N.E. OF SANTA ANA &	WMUDS/SWAT, WDS	Higher	1006, 0.191, NE
E20	BRINE FAC,FONTANA		WMUDS/SWAT	Higher	1006, 0.191, NE
F21	GALLADE CHEMICAL INC	15120 SANTA ANA AVE	NPDES, San Bern. Co. Permit, EMI	Higher	1291, 0.245, NW
F22	GALLADE CHEMICAL, IN	15120 SANTA ANA AVEN	RCRA-SQG	Higher	1291, 0.245, NW
G23	HILLYARD ALUMINUM RE	10825 BEECH ST	CERC-NFRAP, RCRA-SQG, FINDS	Higher	1503, 0.285, NE
G24	BRINE FACILITY FONTA	10825 BEECH AVENUE	LDS, DEED, ENF, ENVIROSTOR	Higher	1503, 0.285, NE
H25	SOUTHERN CALIF. AUTO	10700 BEECH AVE	LUST	Higher	2267, 0.429, NNE
H26	SOUTHERN CALIFORNIA	10700 BEECH AV	HIST CORTESE, LUST, CA FID UST, San Bern. Co....	Higher	2267, 0.429, NNE
I27	CENTRAL REFRIGERATED	15816 SANTA ANA AVE	NPDES, LUST, San Bern. Co. Permit	Higher	2451, 0.464, ENE
I28	CENTRAL REFRIGERATIO	15816 SANTA ANA AVEN	LUST	Higher	2451, 0.464, ENE
J29	WESTERN STATES REFIN	10763 POPLAR AVE	CERC-NFRAP, RCRA-SQG, CONSENT, ICIS, FINDS, HIST...	Higher	3345, 0.634, ENE
J30	WESTERN STATES REFIN	10763 POPLAR AVENUE	CA BOND EXP. PLAN	Higher	3345, 0.634, ENE
31	TREON STEEL FABRICAT	10665 REDWOOD AV	San Bern. Co. Permit, EMI, ENVIROSTOR	Higher	3706, 0.702, NW
32	HANSON ROOF TILE INC	10650 POPLAR AVE	NPDES, San Bern. Co. Permit, EMI, HWP, WDS	Higher	3810, 0.722, NE

EXECUTIVE SUMMARY

TARGET PROPERTY SEARCH RESULTS

The target property was identified in the following records. For more information on this property see page 8 of the attached EDR Radius Map report:

Site	Database(s)	EPA ID
MODULAR SPACE CORPOR 11115 HEMLOCK AVE FONTANA, CA 92337	FINDS Registry ID:: 110039564557	N/A
GE MODULAR SPACE 11115 HEMLOCK AVE FONTANA, CA 92337	HAZNET GEPAID: CAL000277628	N/A
MODSPACE 11115 HEMLOCK FONTANA, CA 92337	San Bern. Co. Permit Facility Status: ACTIVE Facility Id: FA0003432	N/A
MODULAR SPACE CORPOR 11115 HEMLOCK AVE FONTANA, CA 92337	RCRA-SQG EPA ID:: CAR000201954	CAR000201954
MODULAR SPACE CORPOR 11115 HEMLOCK AVE FONTANA, CA 92337	HAZNET GEPAID: CAL000325730	N/A
11115 HEMLOCK A VACA 11115 HEMLOCK A VACA FONTANA, CA	CHMIRS OES Incident Number: 00-2789	N/A

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL ---------- National Priority List

EXECUTIVE SUMMARY

Proposed NPL ---------- Proposed National Priority List Sites
NPL LIENS ---------- Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL ---------- National Priority List Deletions

Federal CERCLIS list

CERCLIS ---------- Comprehensive Environmental Response, Compensation, and Liability Information System
FEDERAL FACILITY ---------- Federal Facility Site Information listing

Federal RCRA CORRACTS facilities list

CORRACTS ---------- Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF ---------- RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-CESQG ---------- RCRA - Conditionally Exempt Small Quantity Generator

Federal institutional controls / engineering controls registries

US ENG CONTROLS ---------- Engineering Controls Sites List
US INST CONTROL ---------- Sites with Institutional Controls
LUCIS ---------- Land Use Control Information System

Federal ERNS list

ERNS ---------- Emergency Response Notification System

State and tribal landfill and/or solid waste disposal site lists

SWF/LF ---------- Solid Waste Information System

State and tribal leaking storage tank lists

SLIC ---------- Statewide SLIC Cases
INDIAN LUST ---------- Leaking Underground Storage Tanks on Indian Land

State and tribal registered storage tank lists

UST ---------- Active UST Facilities
INDIAN UST ---------- Underground Storage Tanks on Indian Land
FEMA UST ---------- Underground Storage Tank Listing

State and tribal voluntary cleanup sites

INDIAN VCP ---------- Voluntary Cleanup Priority Listing
VCP ---------- Voluntary Cleanup Program Properties

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS ---------- A Listing of Brownfields Sites

EXECUTIVE SUMMARY

Local Lists of Landfill / Solid Waste Disposal Sites

DEBRIS REGION 9	Torres Martinez Reservation Illegal Dump Site Locations
ODI	Open Dump Inventory
SWRCY	Recycler Database
HAULERS	Registered Waste Tire Haulers Listing
INDIAN ODI	Report on the Status of Open Dumps on Indian Lands

Local Lists of Hazardous waste / Contaminated Sites

US CDL	Clandestine Drug Labs
SCH	School Property Evaluation Program
Toxic Pits	Toxic Pits Cleanup Act Sites
CDL	Clandestine Drug Labs
US HIST CDL	National Clandestine Laboratory Register

Local Lists of Registered Storage Tanks

CA FID UST	Facility Inventory Database
HIST UST	Hazardous Substance Storage Container Database
SWEEPS UST	SWEEPS UST Listing

Local Land Records

LIENS 2	CERCLA Lien Information
LIENS	Environmental Liens Listing

Records of Emergency Release Reports

HMIRS	Hazardous Materials Information Reporting System
LDS	Land Disposal Sites Listing
MCS	Military Cleanup Sites Listing
SPILLS 90	SPILLS 90 data from FirstSearch

Other Ascertainable Records

DOT OPS	Incident and Accident Data
DOD	Department of Defense Sites
FUDS	Formerly Used Defense Sites
ROD	Records Of Decision
UMTRA	Uranium Mill Tailings Sites
US MINES	Mines Master Index File
TRIS	Toxic Chemical Release Inventory System
TSCA	Toxic Substances Control Act
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
SSTS	Section 7 Tracking Systems
ICIS	Integrated Compliance Information System
PADS	PCB Activity Database System
MLTS	Material Licensing Tracking System
RADINFO	Radiation Information Database
RAATS	RCRA Administrative Action Tracking System
RMP	Risk Management Plans

NPDES ---- NPDES Permits Listing
UIC ---- UIC Listing
Cortese ---- "Cortese" Hazardous Waste & Substances Sites List
CUPA Listings ---- CUPA Resources List
Notify 65 ---- Proposition 65 Records
DRYCLEANERS ---- Cleaner Facilities
WIP ---- Well Investigation Program Case List
ENF ---- Enforcement Action Listing
EMI ---- Emissions Inventory Data
INDIAN RESERV ---- Indian Reservations
SCRD DRYCLEANERS ---- State Coalition for Remediation of Drycleaners Listing
WDS ---- Waste Discharge System
Financial Assurance ---- Financial Assurance Information Listing
PROC ---- Certified Processors Database
HWT ---- Registered Hazardous Waste Transporter Database
MWMP ---- Medical Waste Management Program Listing
LEAD SMELTERS ---- Lead Smelter Sites
US AIRS ---- Aerometric Information Retrieval System Facility Subsystem
EPA WATCH LIST ---- EPA WATCH LIST
US FIN ASSUR ---- Financial Assurance Information
COAL ASH EPA ---- Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER ---- PCB Transformer Registration Database
COAL ASH DOE ---- Steam-Electric Plant Operation Data
2020 COR ACTION ---- 2020 Corrective Action Program List
PRP ---- Potentially Responsible Parties

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP ---- EDR Proprietary Manufactured Gas Plants
EDR US Hist Cleaners ---- EDR Exclusive Historic Dry Cleaners

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LUST ---- Recovered Government Archive Leaking Underground Storage Tank
RGA LF ---- Recovered Government Archive Solid Waste Facilities List

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

EXECUTIVE SUMMARY

STANDARD ENVIRONMENTAL RECORDS

Federal CERCLIS NFRAP site List

CERC-NFRAP: Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

A review of the CERC-NFRAP list, as provided by EDR, and dated 10/25/2013 has revealed that there is 1 CERC-NFRAP site within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
HILLYARD ALUMINUM RE	***10825 BEECH ST***	***NE 1/4 - 1/2 (0.285 mi.)***	***G23***	***55***

Federal RCRA generators list

RCRA-LQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

A review of the RCRA-LQG list, as provided by EDR, and dated 03/10/2015 has revealed that there is 1 RCRA-LQG site within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
CONTINENTAL COATINGS	***10938 BEECH AVENUE***	***NE 0 - 1/8 (0.112 mi.)***	***C10***	***20***

RCRA-SQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

A review of the RCRA-SQG list, as provided by EDR, and dated 03/10/2015 has revealed that there is 1 RCRA-SQG site within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
GALLADE CHEMICAL, IN	15120 SANTA ANA AVEN	NW 1/8 - 1/4 (0.245 mi.)	F22	52

State- and tribal - equivalent NPL

RESPONSE: Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

A review of the RESPONSE list, as provided by EDR, and dated 05/04/2015 has revealed that there is 1 RESPONSE site within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
WESTERN STATES REFIN	***10763 POPLAR AVE***	***ENE 1/2 - 1 (0.634 mi.)***	***J29***	***84***
Status: Certified O&M - Land Use Restrictions Only Facility Id: 36290065				

State- and tribal - equivalent CERCLIS

ENVIROSTOR: The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

A review of the ENVIROSTOR list, as provided by EDR, and dated 05/04/2015 has revealed that there are 3 ENVIROSTOR sites within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
BRINE FACILITY FONTA	***10825 BEECH AVENUE***	***NE 1/4 - 1/2 (0.285 mi.)***	***G24***	***57***
Status: Refer: RWQCB Facility Id: 36330035				
WESTERN STATES REFIN	***10763 POPLAR AVE***	***ENE 1/2 - 1 (0.634 mi.)***	***J29***	***84***
Status: Certified O&M - Land Use Restrictions Only Facility Id: 36290065				
TREON STEEL FABRICAT	***10665 REDWOOD AV***	***NW 1/2 - 1 (0.702 mi.)***	***31***	***110***
Status: Refer: 1248 Local Agency Facility Id: 36340068				

State and tribal leaking storage tank lists

LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the State Water Resources Control Board Leaking Underground Storage Tank Information System.

A review of the LUST list, as provided by EDR, and dated 06/15/2015 has revealed that there are 4

LUST sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
SOUTHERN CALIF. AUTO Facility Status: Case Closed Global ID: T0607100316	10700 BEECH AVE	NNE 1/4 - 1/2 (0.429 mi.)	H25	73
SOUTHERN CALIFORNIA Status: Completed - Case Closed Global Id: T0607100316	***10700 BEECH AV***	***NNE 1/4 - 1/2 (0.429 mi.)***	***H26***	***75***
CENTRAL REFRIGERATED Status: Completed - Case Closed Global Id: T0607174577	***15816 SANTA ANA AVE***	***ENE 1/4 - 1/2 (0.464 mi.)***	***I27***	***78***
CENTRAL REFRIGERATIO Facility Status: Case Closed Global ID: T0607174577	15816 SANTA ANA AVEN	ENE 1/4 - 1/2 (0.464 mi.)	I28	82

State and tribal registered storage tank lists

AST: A listing of aboveground storage tank petroleum storage tank locations.

A review of the AST list, as provided by EDR, and dated 08/01/2009 has revealed that there is 1 AST site within approximately 0.25 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
INTERSTATE DISTRIBUT	11128 HEMLOCK	SW 1/8 - 1/4 (0.153 mi.)	D16	39

ADDITIONAL ENVIRONMENTAL RECORDS

Local Lists of Landfill / Solid Waste Disposal Sites

WMUDS/SWAT: The Waste Management Unit Database System is used for program tracking and inventory of waste management units. The source is the State Water Resources Control Board.

A review of the WMUDS/SWAT list, as provided by EDR, and dated 04/01/2000 has revealed that there are 2 WMUDS/SWAT sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
BRINE FACFONTANA-CLO BRINE FAC,FONTANA	***N.E. OF SANTA ANA &***	***NE 1/8 - 1/4 (0.191 mi.)*** NE 1/8 - 1/4 (0.191 mi.)	***E19*** E20	***44*** 46

Local Lists of Hazardous waste / Contaminated Sites

HIST Cal-Sites: Formerly known as ASPIS, this database contains both known and potential hazardous substance sites. The source is the California Department of Toxic Substance Control. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

A review of the HIST Cal-Sites list, as provided by EDR, and dated 08/08/2005 has revealed that there

is 1 HIST Cal-Sites site within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
WESTERN STATES REFIN	***10763 POPLAR AVE***	***ENE 1/2 - 1 (0.634 mi.)***	***J29***	***84***

Local Land Records

DEED: The use of recorded land use restrictions is one of the methods the DTSC uses to protect the public from unsafe exposures to hazardous substances and wastes .

A review of the DEED list, as provided by EDR, and dated 06/08/2015 has revealed that there is 1 DEED site within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
BRINE FACILITY FONTA	***10825 BEECH AVENUE***	***NE 1/4 - 1/2 (0.285 mi.)***	***G24***	***57***
Envirostor ID: L10007609502				

Other Ascertainable Records

RCRA NonGen / NLR: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

A review of the RCRA NonGen / NLR list, as provided by EDR, and dated 03/10/2015 has revealed that there is 1 RCRA NonGen / NLR site within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
MUSASHI PAINT CALIFO	10938 BEECH AVE	NE 0 - 1/8 (0.112 mi.)	C11	24

CONSENT: Major Legal settlements that establish responsibility and standards for cleanup at NPL (superfund) sites. Released periodically by U.S. District Courts after settlement by parties to litigation matters.

A review of the CONSENT list, as provided by EDR, and dated 12/31/2014 has revealed that there is 1 CONSENT site within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
WESTERN STATES REFIN	***10763 POPLAR AVE***	***ENE 1/2 - 1 (0.634 mi.)***	***J29***	***84***

CA BOND EXP. PLAN: Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

A review of the CA BOND EXP. PLAN list, as provided by EDR, and dated 01/01/1989 has revealed that there is 1 CA BOND EXP. PLAN site within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
WESTERN STATES REFIN	10763 POPLAR AVENUE	ENE 1/2 - 1 (0.634 mi.)	J30	109

HIST CORTESE: The sites for the list are designated by the State Water Resource Control Board [LUST], the Integrated Waste Board [SWF/LS], and the Department of Toxic Substances Control [CALSITES]. This listing is no longer updated by the state agency.

A review of the HIST CORTESE list, as provided by EDR, and dated 04/01/2001 has revealed that there is 1 HIST CORTESE site within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
SOUTHERN CALIFORNIA Reg Id: 083602426T	***10700 BEECH AV***	***NNE 1/4 - 1/2 (0.429 mi.)***	***H26***	***75***

San Bern. Co. Permit: San Bernardino County Fire Department Hazardous Materials Division.

A review of the San Bern. Co. Permit list, as provided by EDR, and dated 06/30/2015 has revealed that there are 9 San Bern. Co. Permit sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
AMICO CORP Facility Status: INACTIVE Facility Id: FA0000932	***11093 BEECH AVE***	***E 0 - 1/8 (0.027 mi.)***	***7***	***13***
A.M. ORTEGA CONSTRUC Facility Status: ACTIVE Facility Status: INACTIVE Facility Id: FA0012912 Facility Id: FA0009304 Facility Id: FA0007337	11001 BEECH AVE	ENE 0 - 1/8 (0.098 mi.)	B9	19
CONTINENTAL COATING Facility Status: ACTIVE Facility Status: INACTIVE Facility Id: FA0002486	***10938 BEECH AVE***	***NE 0 - 1/8 (0.112 mi.)***	***C12***	***25***
MIZKAN AMERICAS INC Facility Status: ACTIVE Facility Id: FA0012838	15101 SANTA ANA AVE	NNE 1/8 - 1/4 (0.142 mi.)	13	31
AEP SPAN Facility Status: ACTIVE Facility Id: FA0001447	***10905 BEECH AVE***	***ENE 1/8 - 1/4 (0.153 mi.)***	***14***	***32***
MISSION CUSTOM EXTRU Facility Status: INACTIVE Facility Id: FA0007332	***10904 BEECH AVENUE***	***NE 1/8 - 1/4 (0.180 mi.)***	***E17***	***39***
JAMES HARDIE BUILDIN Facility Status: ACTIVE Facility Status: INACTIVE Facility Id: FA0007980	***15431 SANTA ANA AVE***	***NE 1/8 - 1/4 (0.188 mi.)***	***18***	***42***
GALLADE CHEMICAL INC Facility Status: ACTIVE Facility Status: FEE EXEMPT Facility Status: INACTIVE Facility Id: FA0003402	***15120 SANTA ANA AVE***	***NW 1/8 - 1/4 (0.245 mi.)***	***F21***	***47***

Lower Elevation	Address	Direction / Distance	Map ID	Page
INTERSTATE DIST CO	***11128 HEMLOCK AVE***	***SW 1/8 - 1/4 (0.153 mi.)***	***D15***	***36***
Facility Status: ACTIVE				
Facility Status: INACTIVE				
Facility Id: FA0007941				

HWP: Detailed information on permitted hazardous waste facilities and corrective action ("cleanups") tracked in EnviroStor.

A review of the HWP list, as provided by EDR, and dated 05/26/2015 has revealed that there is 1 HWP site within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
HANSON ROOF TILE INC	***10650 POPLAR AVE***	***NE 1/2 - 1 (0.722 mi.)***	***32***	***112***
EPA Id: CAD981445422				
Cleanup Status: UNKNOWN				

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR US Hist Auto Stat: EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

A review of the EDR US Hist Auto Stat list, as provided by EDR, has revealed that there is 1 EDR US Hist Auto Stat site within approximately 0.25 miles of the target property.

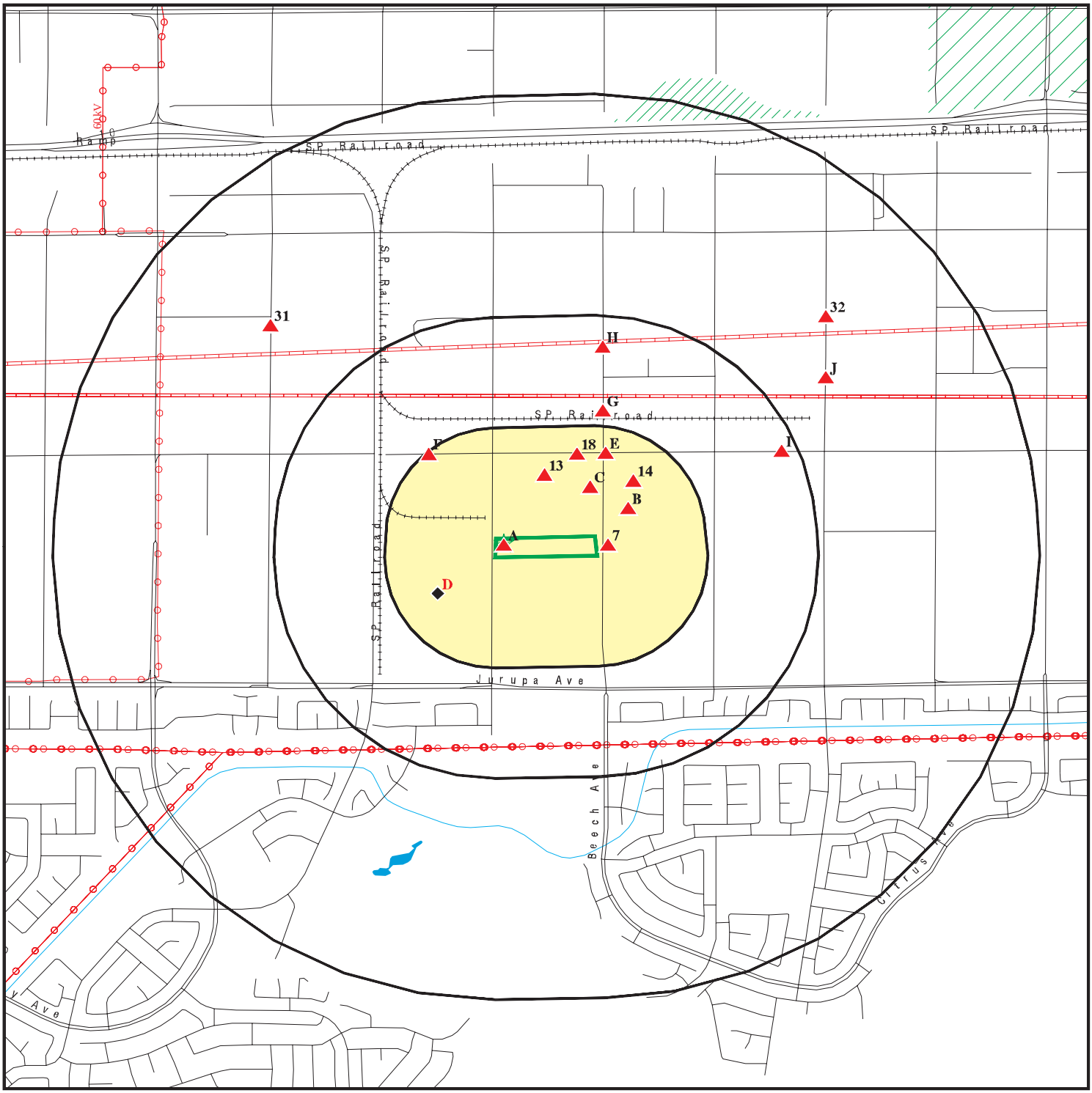
Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
Not reported	11001 BEECH AVE	ENE 0 - 1/8 (0.098 mi.)	B8	18

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 2 records.

Site Name	Database(s)
	CDL
	CDL

OVERVIEW MAP - 4363822.2S



Target Property

Sites at elevations higher than or equal to the target property

Sites at elevations lower than the target property

Manufactured Gas Plants

National Priority List Sites

Dept. Defense Sites

0 1/4 1/2 1 Miles

Indian Reservations BIA

Power transmission lines

Pipelines

100-year flood zone

500-year flood zone

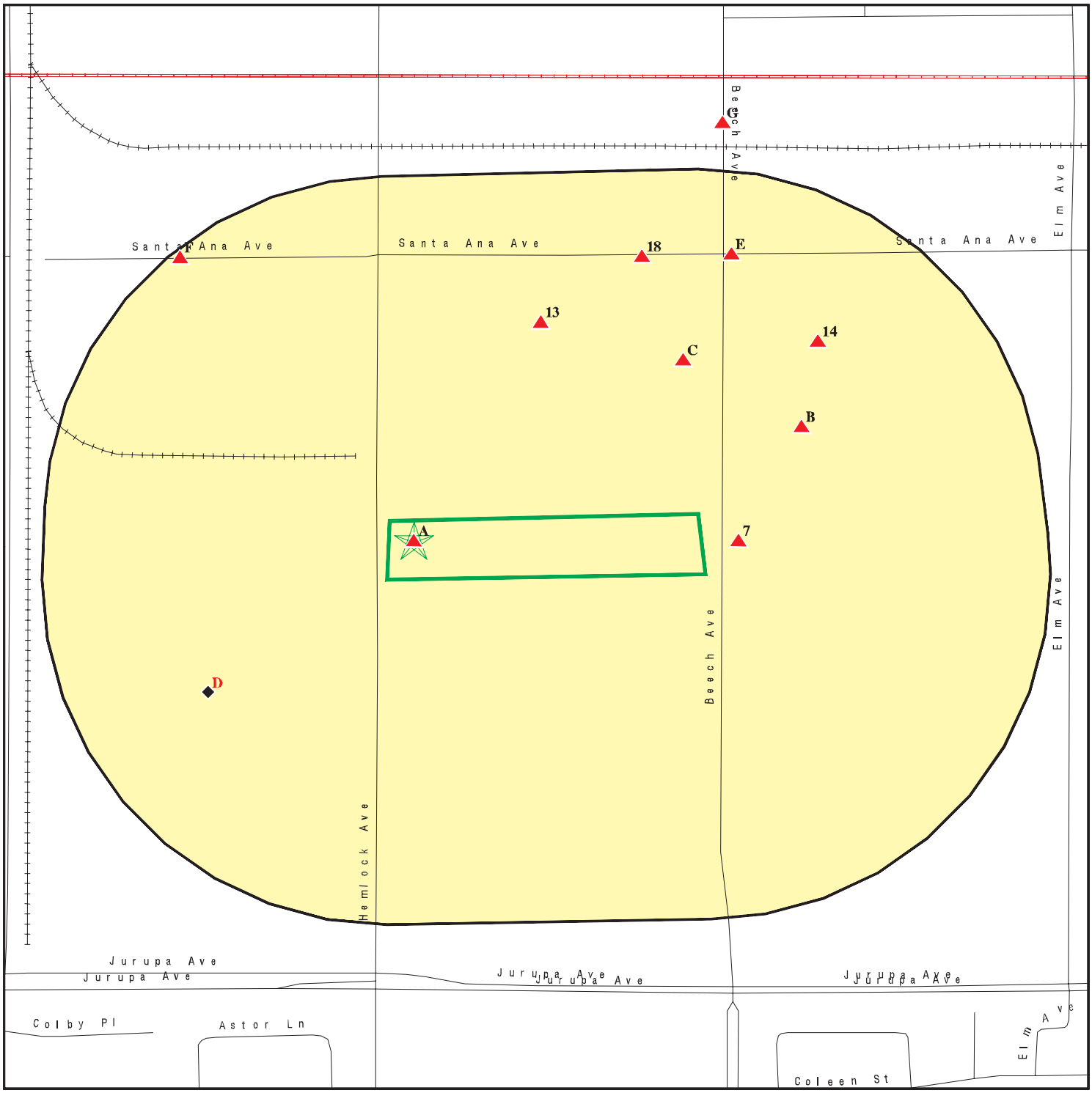
Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: 11115 Hemlock Avenue ADDRESS: 11115 Hemlock Avenue Fontana CA 92337 LAT/LONG: 34.0527 / 117.4752	CLIENT: Partner Engineering and Science, Inc. CONTACT: Colleen Tubridy INQUIRY #: 4363822.2s DATE: July 24, 2015 5:27 pm

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DETAIL MAP - 4363822.2S



0 1/16 1/8 1/4 Miles

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Pipelines
- 100-year flood zone
- 500-year flood zone
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: 11115 Hemlock Avenue	CLIENT: Partner Engineering and Science, Inc.
ADDRESS: 11115 Hemlock Avenue Fontana CA 92337	CONTACT: Colleen Tubridy
LAT/LONG: 34.0527 / 117.4752	INQUIRY #: 4363822.2s DATE: July 24, 2015 5:30 pm

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MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	TP		NR	NR	NR	NR	NR	0
Federal Delisted NPL site list								
Delisted NPL	1.000		0	0	0	0	NR	0
Federal CERCLIS list								
CERCLIS	0.500		0	0	0	NR	NR	0
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
Federal CERCLIS NFRAP site List								
CERC-NFRAP	0.500		0	0	1	NR	NR	1
Federal RCRA CORRACTS facilities list								
CORRACTS	1.000		0	0	0	0	NR	0
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
Federal RCRA generators list								
RCRA-LQG	0.250		1	0	NR	NR	NR	1
RCRA-SQG	0.250	1	0	1	NR	NR	NR	2
RCRA-CESQG	0.250		0	0	NR	NR	NR	0
Federal institutional controls / engineering controls registries								
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROL	0.500		0	0	0	NR	NR	0
LUCIS	0.500		0	0	0	NR	NR	0
Federal ERNS list								
ERNS	TP		NR	NR	NR	NR	NR	0
State- and tribal - equivalent NPL								
RESPONSE	1.000		0	0	0	1	NR	1
State- and tribal - equivalent CERCLIS								
ENVIROSTOR	1.000		0	0	1	2	NR	3
State and tribal landfill and/or solid waste disposal site lists								
SWF/LF	0.500		0	0	0	NR	NR	0
State and tribal leaking storage tank lists								
LUST	0.500		0	0	4	NR	NR	4

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
SLIC	0.500		0	0	0	NR	NR	0
INDIAN LUST	0.500		0	0	0	NR	NR	0
State and tribal registered storage tank lists								
UST	0.250		0	0	NR	NR	NR	0
AST	0.250		0	1	NR	NR	NR	1
INDIAN UST	0.250		0	0	NR	NR	NR	0
FEMA UST	0.250		0	0	NR	NR	NR	0
State and tribal voluntary cleanup sites								
INDIAN VCP	0.500		0	0	0	NR	NR	0
VCP	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
ODI	0.500		0	0	0	NR	NR	0
SWRCY	0.500		0	0	0	NR	NR	0
HAULERS	TP		NR	NR	NR	NR	NR	0
INDIAN ODI	0.500		0	0	0	NR	NR	0
WMUDS/SWAT	0.500		0	2	0	NR	NR	2
Local Lists of Hazardous waste / Contaminated Sites								
US CDL	TP		NR	NR	NR	NR	NR	0
HIST Cal-Sites	1.000		0	0	0	1	NR	1
SCH	0.250		0	0	NR	NR	NR	0
Toxic Pits	1.000		0	0	0	0	NR	0
CDL	TP		NR	NR	NR	NR	NR	0
US HIST CDL	TP		NR	NR	NR	NR	NR	0
Local Lists of Registered Storage Tanks								
CA FID UST	0.250		0	0	NR	NR	NR	0
HIST UST	0.250		0	0	NR	NR	NR	0
SWEEPS UST	0.250		0	0	NR	NR	NR	0
Local Land Records								
LIENS 2	TP		NR	NR	NR	NR	NR	0
LIENS	TP		NR	NR	NR	NR	NR	0
DEED	0.500		0	0	1	NR	NR	1
Records of Emergency Release Reports								
HMIRS	TP		NR	NR	NR	NR	NR	0
CHMIRS	TP	1	NR	NR	NR	NR	NR	1
LDS	TP		NR	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
MCS	TP		NR	NR	NR	NR	NR	0
SPILLS 90	TP		NR	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		1	0	NR	NR	NR	1
DOT OPS	TP		NR	NR	NR	NR	NR	0
DOD	1.000		0	0	0	0	NR	0
FUDS	1.000		0	0	0	0	NR	0
CONSENT	1.000		0	0	0	1	NR	1
ROD	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
TRIS	TP		NR	NR	NR	NR	NR	0
TSCA	TP		NR	NR	NR	NR	NR	0
FTTS	TP		NR	NR	NR	NR	NR	0
HIST FTTS	TP		NR	NR	NR	NR	NR	0
SSTS	TP		NR	NR	NR	NR	NR	0
ICIS	TP		NR	NR	NR	NR	NR	0
PADS	TP		NR	NR	NR	NR	NR	0
MLTS	TP		NR	NR	NR	NR	NR	0
RADINFO	TP		NR	NR	NR	NR	NR	0
FINDS	TP	1	NR	NR	NR	NR	NR	1
RAATS	TP		NR	NR	NR	NR	NR	0
RMP	TP		NR	NR	NR	NR	NR	0
CA BOND EXP. PLAN	1.000		0	0	0	1	NR	1
NPDES	TP		NR	NR	NR	NR	NR	0
UIC	TP		NR	NR	NR	NR	NR	0
Cortese	0.500		0	0	0	NR	NR	0
HIST CORTESE	0.500		0	0	1	NR	NR	1
CUPA Listings	0.250		0	0	NR	NR	NR	0
Notify 65	1.000		0	0	0	0	NR	0
DRYCLEANERS	0.250		0	0	NR	NR	NR	0
WIP	0.250		0	0	NR	NR	NR	0
ENF	TP		NR	NR	NR	NR	NR	0
San Bern. Co. Permit	0.250	1	3	6	NR	NR	NR	10
HAZNET	TP	2	NR	NR	NR	NR	NR	2
EMI	TP		NR	NR	NR	NR	NR	0
INDIAN RESERV	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
WDS	TP		NR	NR	NR	NR	NR	0
Financial Assurance	TP		NR	NR	NR	NR	NR	0
PROC	0.500		0	0	0	NR	NR	0
HWT	0.250		0	0	NR	NR	NR	0
HWP	1.000		0	0	0	1	NR	1
MWMP	0.250		0	0	NR	NR	NR	0
LEAD SMELTERS	TP		NR	NR	NR	NR	NR	0
US AIRS	TP		NR	NR	NR	NR	NR	0
EPA WATCH LIST	TP		NR	NR	NR	NR	NR	0
US FIN ASSUR	TP		NR	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	TP		NR	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
COAL ASH DOE	TP		NR	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
PRP	TP		NR	NR	NR	NR	NR	0
EDR HIGH RISK HISTORICAL RECORDS								
EDR Exclusive Records								
EDR MGP	1.000		0	0	0	0	NR	0
EDR US Hist Auto Stat	0.250		1	0	NR	NR	NR	1
EDR US Hist Cleaners	0.250		0	0	NR	NR	NR	0
EDR RECOVERED GOVERNMENT ARCHIVES								
Exclusive Recovered Govt. Archives								
RGA LUST	TP		NR	NR	NR	NR	NR	0
RGA LF	TP		NR	NR	NR	NR	NR	0
- Totals --		6	6	10	8	7	0	37

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

A1
Target Property
MODULAR SPACE CORPORATION BDA MODSPACE
11115 HEMLOCK AVE
FONTANA, CA 92337

FINDS **1012235657**
N/A

Site 1 of 6 in cluster A

Actual: 982 ft.

FINDS:

Registry ID: 110039564557

Environmental Interest/Information System
RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

A2
Target Property
GE MODULAR SPACE
11115 HEMLOCK AVE
FONTANA, CA 92337

HAZNET **S113129825**
N/A

Site 2 of 6 in cluster A

Actual: 982 ft.

HAZNET:

envid:	S113129825
Year:	2007
GEPAID:	CAL000277628
Contact:	PAUL VOLKMER EHS MANAGER
Telephone:	4842540357
Mailing Name:	Not reported
Mailing Address:	530 EAST SWEDESFORD RD
Mailing City,St,Zip:	WAYNE, PA 190870000
Gen County:	Not reported
TSD EPA ID:	TXD077603371
TSD County:	Not reported
Waste Category:	Other inorganic solid waste
Disposal Method:	Storage, Bulking, And/Or Transfer Off Site--No Treatment/Reovery (H010-H129) Or (H131-H135)
Tons:	0.03
Facility County:	San Bernardino

envid:	S113129825
Year:	2007
GEPAID:	CAL000277628
Contact:	PAUL VOLKMER EHS MANAGER
Telephone:	4842540357
Mailing Name:	Not reported
Mailing Address:	530 EAST SWEDESFORD RD
Mailing City,St,Zip:	WAYNE, PA 190870000
Gen County:	Not reported
TSD EPA ID:	NVT330010000
TSD County:	Not reported
Waste Category:	Off-specification, aged or surplus organics
Disposal Method:	Landfill Or Surface Impoundment That Will Be Closed As Landfill(To Include On-Site Treatment And/Or Stabilization)
Tons:	0.15
Facility County:	San Bernardino

A3 **MODSPACE** **San Bern. Co. Permit** **S105697513**
Target **11115 HEMLOCK** **N/A**
Property **FONTANA, CA 92337**

Site 3 of 6 in cluster A

Actual: 982 ft.

San Bern. Co. Permit:
Region: SAN BERNARDINO
Facility ID: FA0003432
Owner: MODULAR SPACE CORPORATION
Permit Number: PT0009880
Permit Category: CONDITIONALLY EXEMPT SM QTY GENERATOR
Facility Status: ACTIVE
Expiration Date: 08/31/2015

Region: SAN BERNARDINO
Facility ID: FA0003432
Owner: MODULAR SPACE CORPORATION
Permit Number: PT0009867
Permit Category: HAZARDOUS MATERIALS 1-3 CHEMICALS
Facility Status: ACTIVE
Expiration Date: 08/31/2015

A4 **MODULAR SPACE CORPORATION BDA MODSPACE** **RCRA-SQG** **1012176288**
Target **11115 HEMLOCK AVE** **CAR000201954**
Property **FONTANA, CA 92337**

Site 4 of 6 in cluster A

Actual: 982 ft.

RCRA-SQG:
Date form received by agency: 07/24/2009
Facility name: MODULAR SPACE CORPORATION BDA MODSPACE
Facility address: 11115 HEMLOCK AVE
FONTANA, CA 92337
EPA ID: CAR000201954
Mailing address: 1200 SWEDESFORD RD
BERWYN, PA 19312
Contact: PAUL E VOLKMER
Contact address: 1200 SWEDESFORD RD
BERWYN, PA 19312
Contact country: US
Contact telephone: 610-232-0838
Contact email: PAUL.VOLKMER@MODSPACE.COM
EPA Region: 09
Classification: Small Small Quantity Generator
Description: Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time

Owner/Operator Summary:
Owner/operator name: MODSPACE
Owner/operator address: 1200 SWEDESFORD RD
BERWYN, PA 19312
Owner/operator country: US
Owner/operator telephone: Not reported
Legal status: Private
Owner/Operator Type: Owner

MODULAR SPACE CORPORATION BDA MODSPACE (Continued) **1012176288**

Owner/Op start date: 04/01/2007
Owner/Op end date: Not reported

Owner/operator name: MODSPACE
Owner/operator address: Not reported
Not reported
Owner/operator country: Not reported
Owner/operator telephone: Not reported
Legal status: Private
Owner/Operator Type: Operator
Owner/Op start date: 04/01/2007
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: D005
. Waste name: BARIUM

. Waste code: D006
. Waste name: CADMIUM

. Waste code: D007
. Waste name: CHROMIUM

Violation Status: No violations found

A5 **MODULAR SPACE CORPORATION DBA MODSPACE** **HAZNET** **S113150174**
Target **11115 HEMLOCK AVE** **N/A**
Property **FONTANA, CA 92337**

Site 5 of 6 in cluster A

Actual: 982 ft.

HAZNET:
envid: S113150174
Year: 2012
GEPAID: CAL000325730
Contact: PAUL E. VOLKMER
Telephone: 6102320838
Mailing Name: Not reported
Mailing Address: 1200 SWEDESFORD RD

MODULAR SPACE CORPORATION DBA MODSPACE (Continued) **S113150174**

Mailing City,St,Zip:	BERWYN, PA 193120000
Gen County:	San Bernardino
TSD EPA ID:	CAT080013352
TSD County:	Los Angeles
Waste Category:	Not reported
Disposal Method:	Other Recovery Of Reclamation For Reuse Including Acid Regeneration, Organics Recovery Ect
Tons:	6.255
Facility County:	San Bernardino

envid:	S113150174
Year:	2011
GEPAID:	CAL000325730
Contact:	PAUL VOLKMER
Telephone:	6102320838
Mailing Name:	Not reported
Mailing Address:	1200 SWEDESFORD RD
Mailing City,St,Zip:	BERWYN, PA 193120000
Gen County:	Not reported
TSD EPA ID:	CAT080013352
TSD County:	Not reported
Waste Category:	Unspecified oil-containing waste
Disposal Method:	Other Recovery Of Reclamation For Reuse Including Acid Regeneration, Organics Recovery Ect
Tons:	6.255
Facility County:	San Bernardino

envid:	S113150174
Year:	2010
GEPAID:	CAL000325730
Contact:	PAUL E. VOLKMER
Telephone:	6102320838
Mailing Name:	Not reported
Mailing Address:	1200 SWEDESFORD RD
Mailing City,St,Zip:	BERWYN, PA 193120000
Gen County:	Not reported
TSD EPA ID:	CAD982411993
TSD County:	Not reported
Waste Category:	Other inorganic solid waste
Disposal Method:	Not reported
Tons:	0.05
Facility County:	San Bernardino

envid:	S113150174
Year:	2010
GEPAID:	CAL000325730
Contact:	PAUL E. VOLKMER
Telephone:	6102320838
Mailing Name:	Not reported
Mailing Address:	1200 SWEDESFORD RD
Mailing City,St,Zip:	BERWYN, PA 193120000
Gen County:	Not reported
TSD EPA ID:	TXD077603371
TSD County:	Not reported
Waste Category:	Not reported
Disposal Method:	Storage, Bulking, And/Or Transfer Off Site--No Treatment/Reovery (H010-H129) Or (H131-H135)

MODULAR SPACE CORPORATION DBA MODSPACE (Continued) **S113150174**

Tons:	0.075
Facility County:	San Bernardino
envid:	S113150174
Year:	2009
GEPAID:	CAL000325730
Contact:	PAUL VOLKMER
Telephone:	6102320838
Mailing Name:	Not reported
Mailing Address:	1200 SWEDESFORD RD
Mailing City,St,Zip:	BERWYN, PA 19312
Gen County:	Not reported
TSD EPA ID:	NVT330010000
TSD County:	Not reported
Waste Category:	Off-specification, aged or surplus inorganics
Disposal Method:	Landfill Or Surface Impoundment That Will Be Closed As Landfill(To Include On-Site Treatment And/Or Stabilization)
Tons:	0.025
Facility County:	San Bernardino

Click this hyperlink while viewing on your computer to access
9 additional CA_HAZNET: record(s) in the EDR Site Report.

A6 **CHMIRS** **S105666978**
Target Property **11115 HEMLOCK A VACANT PROPERTY** **N/A**
FONTANA, CA

Site 6 of 6 in cluster A

Actual: 982 ft.

CHMIRS:

OES Incident Number:	00-2789
OES notification:	06/22/2000
OES Date:	Not reported
OES Time:	Not reported
Incident Date:	Not reported
Date Completed:	**Not reported**
Property Use:	Not reported
Agency Id Number:	Not reported
Agency Incident Number:	Not reported
Time Notified:	Not reported
Time Completed:	Not reported
Surrounding Area:	Not reported
Estimated Temperature:	Not reported
Property Management:	Not reported
More Than Two Substances Involved?:	Not reported
Resp Agncy Personel # Of Decontaminated:	Not reported
Responding Agency Personel # Of Injuries:	Not reported
Responding Agency Personel # Of Fatalities:	Not reported
Others Number Of Decontaminated:	Not reported
Others Number Of Injuries:	Not reported
Others Number Of Fatalities:	Not reported
Vehicle Make/year:	Not reported
Vehicle License Number:	Not reported
Vehicle State:	Not reported
Vehicle Id Number:	Not reported
CA DOT PUC/ICC Number:	Not reported
Company Name:	Not reported
Reporting Officer Name/ID:	Not reported

(Continued) **S105666978**

Report Date:	Not reported
Facility Telephone:	Not reported
Waterway Involved:	No
Waterway:	Not reported
Spill Site:	Not reported
Cleanup By:	DDTSC
Containment:	Not reported
What Happened:	Not reported
Type:	Not reported
Measure:	Not reported
Other:	Not reported
Date/Time:	Not reported
Year:	2000
Agency:	SBDO FD/Hazmat
Incident Date:	6/22/200012:00:00 AM
Admin Agency:	San Bernardino County Health Department
Amount:	Not reported
Contained:	Yes
Site Type:	Other
E Date:	Not reported
Substance:	perchlorethylene
Gallons:	1100
Unknown:	0
Substance #2:	Not reported
Substance #3:	Not reported
Evacuations:	0
Number of Injuries:	0
Number of Fatalities:	0
#1 Pipeline:	Not reported
#2 Pipeline:	Not reported
#3 Pipeline:	Not reported
#1 Vessel >= 300 Tons:	Not reported
#2 Vessel >= 300 Tons:	Not reported
#3 Vessel >= 300 Tons:	Not reported
Evacs:	Not reported
Injuries:	Not reported
Fatals:	Not reported
Comments:	Not reported
Description:	about 5-10 gal of leakage from 27 drums of substance

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7 **AMICO CORP** **NPDES** **S104763607**
East **11093 BEECH AVE** **San Bern. Co. Permit** **N/A**
< 1/8 **FONTANA, CA 92337** **EMI**
0.027 mi. **WDS**
141 ft.

Relative:
Higher

Actual:
987 ft.

NPDES:

Npdes Number:	CAS000001
Facility Status:	Terminated
Agency Id:	0
Region:	8
Regulatory Measure Id:	213383
Order No:	97-03-DWQ
Regulatory Measure Type:	Enrollee
Place Id:	Not reported
WDID:	8 36I012642
Program Type:	Industrial

AMICO CORP (Continued) **S104763607**

Adoption Date Of Regulatory Measure:	Not reported
Effective Date Of Regulatory Measure:	11/12/1996
Expiration Date Of Regulatory Measure:	Not reported
Termination Date Of Regulatory Measure:	09/27/2013
Discharge Name:	Alabama Metal Industries Corporation
Discharge Address:	PO Box 3928
Discharge City:	Birmingham
Discharge State:	Alabama
Discharge Zip:	35208
RECEIVED DATE:	Not reported
PROCESSED DATE:	Not reported
STATUS CODE NAME:	Not reported
STATUS DATE:	Not reported
PLACE SIZE:	Not reported
PLACE SIZE UNIT:	Not reported
FACILITY CONTACT NAME:	Not reported
FACILITY CONTACT TITLE:	Not reported
FACILITY CONTACT PHONE:	Not reported
FACILITY CONTACT PHONE EXT:	Not reported
FACILITY CONTACT EMAIL:	Not reported
OPERATOR NAME:	Not reported
OPERATOR ADDRESS:	Not reported
OPERATOR CITY:	Not reported
OPERATOR STATE:	Not reported
OPERATOR ZIP:	Not reported
OPERATOR CONTACT NAME:	Not reported
OPERATOR CONTACT TITLE:	Not reported
OPERATOR CONTACT PHONE:	Not reported
OPERATOR CONTACT PHONE EXT:	Not reported
OPERATOR CONTACT EMAIL:	Not reported
OPERATOR TYPE:	Not reported
DEVELOPER NAME:	Not reported
DEVELOPER ADDRESS:	Not reported
DEVELOPER CITY:	Not reported
DEVELOPER STATE:	Not reported
DEVELOPER ZIP:	Not reported
DEVELOPER CONTACT NAME:	Not reported
DEVELOPER CONTACT TITLE:	Not reported
CONSTYPE LINEAR UTILITY IND:	Not reported
EMERGENCY PHONE NO:	Not reported
EMERGENCY PHONE EXT:	Not reported
CONSTYPE ABOVE GROUND IND:	Not reported
CONSTYPE BELOW GROUND IND:	Not reported
CONSTYPE CABLE LINE IND:	Not reported
CONSTYPE COMM LINE IND:	Not reported
CONSTYPE COMMERTIAL IND:	Not reported
CONSTYPE ELECTRICAL LINE IND:	Not reported
CONSTYPE GAS LINE IND:	Not reported
CONSTYPE INDUSTRIAL IND:	Not reported
CONSTYPE OTHER DESRIPTION:	Not reported
CONSTYPE OTHER IND:	Not reported
CONSTYPE RECONS IND:	Not reported
CONSTYPE RESIDENTIAL IND:	Not reported
CONSTYPE TRANSPORT IND:	Not reported
CONSTYPE UTILITY DESCRIPTION:	Not reported
CONSTYPE UTILITY IND:	Not reported
CONSTYPE WATER SEWER IND:	Not reported

AMICO CORP (Continued) **S104763607**

DIR DISCHARGE USWATER IND:	Not reported
RECEIVING WATER NAME:	Not reported
CERTIFIER NAME:	Not reported
CERTIFIER TITLE:	Not reported
CERTIFICATION DATE:	Not reported
PRIMARY SIC:	Not reported
SECONDARY SIC:	Not reported
TERTIARY SIC:	Not reported
Npdes Number:	Not reported
Facility Status:	Not reported
Agency Id:	Not reported
Region:	8
Regulatory Measure Id:	213383
Order No:	Not reported
Regulatory Measure Type:	Industrial
Place Id:	Not reported
WDID:	8 36I012642
Program Type:	Not reported
Adoption Date Of Regulatory Measure:	Not reported
Effective Date Of Regulatory Measure:	Not reported
Expiration Date Of Regulatory Measure:	Not reported
Termination Date Of Regulatory Measure:	09/27/2013
Discharge Name:	Not reported
Discharge Address:	Not reported
Discharge City:	Not reported
Discharge State:	Not reported
Discharge Zip:	Not reported
RECEIVED DATE:	05/09/2008
PROCESSED DATE:	11/12/1996
STATUS CODE NAME:	Terminated
STATUS DATE:	03/06/2014
PLACE SIZE:	227500
PLACE SIZE UNIT:	SqFt
FACILITY CONTACT NAME:	Mark Morlan
FACILITY CONTACT TITLE:	Not reported
FACILITY CONTACT PHONE:	909-350-9524
FACILITY CONTACT PHONE EXT:	3125
FACILITY CONTACT EMAIL:	mmorlan@gibraltar1.com
OPERATOR NAME:	Alabama Metal Industries Corporation
OPERATOR ADDRESS:	PO Box 3928
OPERATOR CITY:	Birmingham
OPERATOR STATE:	Alabama
OPERATOR ZIP:	35208
OPERATOR CONTACT NAME:	Paul Thurber
OPERATOR CONTACT TITLE:	Not reported
OPERATOR CONTACT PHONE:	205-783-6279
OPERATOR CONTACT PHONE EXT:	Not reported
OPERATOR CONTACT EMAIL:	pthurber@gibraltar1.com
OPERATOR TYPE:	Other
DEVELOPER NAME:	Not reported
DEVELOPER ADDRESS:	Not reported
DEVELOPER CITY:	Not reported
DEVELOPER STATE:	California
DEVELOPER ZIP:	Not reported
DEVELOPER CONTACT NAME:	Not reported
DEVELOPER CONTACT TITLE:	Not reported

AMICO CORP (Continued) **S104763607**

CONSTYPE LINEAR UTILITY IND:	Not reported
EMERGENCY PHONE NO:	909-350-9280
EMERGENCY PHONE EXT:	Not reported
CONSTYPE ABOVE GROUND IND:	Not reported
CONSTYPE BELOW GROUND IND:	Not reported
CONSTYPE CABLE LINE IND:	Not reported
CONSTYPE COMM LINE IND:	Not reported
CONSTYPE COMMERTIAL IND:	Not reported
CONSTYPE ELECTRICAL LINE IND:	Not reported
CONSTYPE GAS LINE IND:	Not reported
CONSTYPE INDUSTRIAL IND:	Not reported
CONSTYPE OTHER DESRIPTION:	Not reported
CONSTYPE OTHER IND:	Not reported
CONSTYPE RECONS IND:	Not reported
CONSTYPE RESIDENTIAL IND:	Not reported
CONSTYPE TRANSPORT IND:	Not reported
CONSTYPE UTILITY DESCRIPTION:	Not reported
CONSTYPE UTILITY IND:	Not reported
CONSTYPE WATER SEWER IND:	Not reported
DIR DISCHARGE USWATER IND:	Not reported
RECEIVING WATER NAME:	Not reported
CERTIFIER NAME:	Not reported
CERTIFIER TITLE:	Not reported
CERTIFICATION DATE:	Not reported
PRIMARY SIC:	3449-Miscellaneous Structural Metal Work
SECONDARY SIC:	Not reported
TERTIARY SIC:	Not reported

San Bern. Co. Permit:

Region:	SAN BERNARDINO
Facility ID:	FA0000932
Owner:	AMICO
Permit Number:	PT0004091
Permit Category:	HAZMAT HANDLER 26-50 EMPLOYEES
Facility Status:	INACTIVE
Expiration Date:	11/30/2012

Region:	SAN BERNARDINO
Facility ID:	FA0000932
Owner:	AMICO
Permit Number:	PT0004092
Permit Category:	SPECIAL GENERATOR
Facility Status:	INACTIVE
Expiration Date:	11/30/2012

EMI:

Year:	1987
County Code:	36
Air Basin:	SC
Facility ID:	56400
Air District Name:	SC
SIC Code:	3399
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	22

AMICO CORP (Continued) **S104763607**

Reactive Organic Gases Tons/Yr:	22
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0
Part. Matter 10 Micrometers & Smllr Tons/Yr:	0

Year:	1990
County Code:	36
Air Basin:	SC
Facility ID:	56400
Air District Name:	SC
SIC Code:	3399
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	2
Reactive Organic Gases Tons/Yr:	2
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0
Part. Matter 10 Micrometers & Smllr Tons/Yr:	0

WDS:

Facility ID:	Santa Ana River 36I012642
Facility Type:	Industrial - Facility that treats and/or disposes of liquid or semisolid wastes from any servicing, producing, manufacturing or processing operation of whatever nature, including mining, gravel washing, geothermal operations, air conditioning, ship building and repairing, oil production, storage and disposal operations, water pumping.
Facility Status:	Active - Any facility with a continuous or seasonal discharge that is under Waste Discharge Requirements.
NPDES Number:	CAS000001 The 1st 2 characters designate the state. The remaining 7 are assigned by the Regional Board
Subregion:	8
Facility Telephone:	Not reported
Facility Contact:	LILY MACDONALD
Agency Name:	ALABAMA METAL INDUSTRIES CORP
Agency Address:	PO BOX 3928
Agency City,St,Zip:	BIRMINGHAM 35208
Agency Contact:	ROBERT M CLARK
Agency Telephone:	2057872611
Agency Type:	Private
SIC Code:	3449
SIC Code 2:	Not reported
Primary Waste Type:	Not reported
Primary Waste:	Not reported
Waste Type2:	Not reported
Waste2:	Not reported
Primary Waste Type:	Not reported
Secondary Waste:	Not reported
Secondary Waste Type:	Not reported
Design Flow:	0
Baseline Flow:	0
Reclamation:	Not reported

AMICO CORP (Continued) **S104763607**

POTW: Not reported
Treat To Water: Minor Threat to Water Quality. A violation of a regional board order should cause a relatively minor impairment of beneficial uses compared to a major or minor threat. Not: All nurds without a TTWQ will be considered a minor threat to water quality unless coded at a higher Level. A Zero (0) may be used to code those NURDS that are found to represent no threat to water quality.
Complexity: Category C - Facilities having no waste treatment systems, such as cooling water dischargers or thosewho must comply through best management practices, facilities with passive waste treatment and disposal systems, such as septic systems with subsurface disposal, or dischargers having waste storage systems with land disposal such as dairy waste ponds.

B8 **EDR US Hist Auto Stat** **1015153159**
ENE **11001 BEECH AVE** **N/A**
< 1/8 **FONTANA, CA 92337**
0.098 mi.
519 ft. **Site 1 of 2 in cluster B**

Relative:
Higher

Actual:
999 ft.

EDR Historical Auto Stations:

Name: COMMERCIAL COLLISION CENT
Year: 2003
Address: 11001 BEECH AVE

Name: EUROPEAN AUTOMOBILE ENGRG
Year: 2004
Address: 11001 BEECH AVE

Name: EUROPEAN AUTOMOBILE ENGRG
Year: 2005
Address: 11001 BEECH AVE

Name: EUROPEAN AUTOMOBILE ENGRG
Year: 2006
Address: 11001 BEECH AVE

Name: EUROPEAN AUTOMOBILE ENGRG
Year: 2007
Address: 11001 BEECH AVE

Name: EUROPEAN AUTOMOBILE ENGINEERING INC
Year: 2008
Address: 11001 BEECH AVE

Name: COMMERCIAL COLLISION CENTER INC
Year: 2009
Address: 11001 BEECH AVE

B9 **A.M. ORTEGA CONSTRUCTION** **San Bern. Co. Permit** **S110071702**
ENE **11001 BEECH AVE** **N/A**
< 1/8 **FONTANA, CA 92337**
0.098 mi.
519 ft. **Site 2 of 2 in cluster B**

Relative:
Higher

Actual:
999 ft.

San Bern. Co. Permit:

Region: SAN BERNARDINO
Facility ID: FA0012912
Owner: A.M ORTEGA CONSTRUCTION
Permit Number: PT0022583
Permit Category: SMALL QUANTITY GENERATOR
Facility Status: ACTIVE
Expiration Date: 12/31/2015

Region: SAN BERNARDINO
Facility ID: FA0012912
Owner: A.M ORTEGA CONSTRUCTION
Permit Number: PT0022582
Permit Category: HAZARDOUS MATERIALS 4-10 CHEMICALS
Facility Status: ACTIVE
Expiration Date: 12/31/2015

Region: SAN BERNARDINO
Facility ID: FA0012912
Owner: A.M ORTEGA CONSTRUCTION
Permit Number: PT0022809
Permit Category: APSA 1,320-10,000 GAL FAC CAPACITY
Facility Status: INACTIVE
Expiration Date: 12/31/2013

Region: SAN BERNARDINO
Facility ID: FA0009304
Owner: LUGO MANUFACTURING, INC.
Permit Number: PT0015947
Permit Category: SPECIAL HANDLER
Facility Status: INACTIVE
Expiration Date: 11/30/2009

Region: SAN BERNARDINO
Facility ID: FA0009304
Owner: LUGO MANUFACTURING, INC.
Permit Number: PT0015948
Permit Category: SPECIAL GENERATOR
Facility Status: INACTIVE
Expiration Date: 11/30/2009

Region: SAN BERNARDINO
Facility ID: FA0007337
Owner: JACKSON, DAVID
Permit Number: PT0000578
Permit Category: HAZARDOUS WASTE GENERATOR - 0-10 EMPLOYEES
Facility Status: INACTIVE
Expiration Date: 04/30/2004

Region: SAN BERNARDINO
Facility ID: FA0007337
Owner: JACKSON, DAVID
Permit Number: PT0000581

A.M. ORTEGA CONSTRUCTION (Continued) **S110071702**

Permit Category: HAZMAT HANDLER 0-10 EMPLOYEES (W/GEN PRMT)
Facility Status: INACTIVE
Expiration Date: 04/30/2004

Region: SAN BERNARDINO
Facility ID: FA0007337
Owner: JACKSON, DAVID
Permit Number: PT0000584
Permit Category: ABOVEGROUND PETROLEUM STORAGE (AST) (SPCC)
Facility Status: INACTIVE
Expiration Date: 04/30/2004

C10 **CONTINENTAL COATINGS COMPANY, INC** **RCRA-LQG 1001023184**
NE **10938 BEECH AVENUE** **WDS CAR000005421**
< 1/8 **FONTANA, CA 92337**
0.112 mi.
592 ft. **Site 1 of 3 in cluster C**

Relative:
Higher

Actual:
1004 ft.

RCRA-LQG:
Date form received by agency: 07/09/2008
Facility name: CONTINENTAL COATINGS COMPANY, INC
Facility address: 10938 BEECH AVENUE
FONTANA, CA 92337
EPA ID: CAR000005421
Contact: ROBERT WANG
Contact address: Not reported
Not reported
Contact country: US
Contact telephone: (909) 355-1200
Telephone ext.: 204
Contact email: Not reported
EPA Region: 09
Land type: Private
Classification: Large Quantity Generator
Description: Handler: generates 1,000 kg or more of hazardous waste during any calendar month; or generates more than 1 kg of acutely hazardous waste during any calendar month; or generates more than 100 kg of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month; or generates 1 kg or less of acutely hazardous waste during any calendar month, and accumulates more than 1 kg of acutely hazardous waste at any time; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates more than 100 kg of that material at any time

Owner/Operator Summary:
Owner/operator name: CONTINENTAL COATINGS COMPANY, INC
Owner/operator address: Not reported
Not reported
Owner/operator country: US
Owner/operator telephone: Not reported
Legal status: Private
Owner/Operator Type: Operator
Owner/Op start date: 01/01/1978
Owner/Op end date: Not reported

CONTINENTAL COATINGS COMPANY, INC (Continued) **1001023184**

Owner/operator name: CONTINENTAL COATINGS COMPANY, INC.
Owner/operator address: 10938 BEECH AVENUE
FONTANA, CA 92337
Owner/operator country: US
Owner/operator telephone: Not reported
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: 01/01/1978
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: D035
. Waste name: METHYL ETHYL KETONE

. Waste code: F003
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NONHALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS, AND A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: F005
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Historical Generators:
Date form received by agency: 02/20/2006

CONTINENTAL COATINGS COMPANY, INC (Continued) **1001023184**

Site name: CONTINENTAL COATING, INC.
Classification: Large Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: D035
. Waste name: METHYL ETHYL KETONE

. Waste code: F003
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NONHALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS, AND A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: F005
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Date form received by agency: 02/20/2006
Site name: CONTINENTAL COATING, INC.
Classification: Small Quantity Generator

Date form received by agency: 05/02/2002
Site name: CONTINENTAL COATINGS CO INC
Classification: Large Quantity Generator

Date form received by agency: 10/12/2000
Site name: CONTINENTAL COATINGS COMPANY INC.
Classification: Large Quantity Generator

Date form received by agency: 03/04/1999
Site name: CONTINENTAL COATINGS COMPANY, INC.
Classification: Large Quantity Generator

Date form received by agency: 09/01/1996
Site name: CONTINENTAL COATINGS CO INC
Classification: Small Quantity Generator

Facility Has Received Notices of Violations:
Regulation violated: Not reported
Area of violation: Generators - General
Date violation determined: 06/17/2004
Date achieved compliance: 09/01/2004
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL

CONTINENTAL COATINGS COMPANY, INC (Continued) **1001023184**

Enforcement action date: 07/16/2004
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Evaluation Action Summary:
Evaluation date: 06/17/2004
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Generators - General
Date achieved compliance: 09/01/2004
Evaluation lead agency: State Contractor/Grantee

WDS:
Facility ID: Santa Ana River 36I011617
Facility Type: Industrial - Facility that treats and/or disposes of liquid or semisolid wastes from any servicing, producing, manufacturing or processing operation of whatever nature, including mining, gravel washing, geothermal operations, air conditioning, ship building and repairing, oil production, storage and disposal operations, water pumping.
Facility Status: Active - Any facility with a continuous or seasonal discharge that is under Waste Discharge Requirements.
NPDES Number: CAS000001 The 1st 2 characters designate the state. The remaining 7 are assigned by the Regional Board
Subregion: 8
Facility Telephone: 9093551288
Facility Contact: JOE T SEATON
Agency Name: WANG ROBERT S.
Agency Address: 10938 Beech Ave
Agency City,St,Zip: Fontana 923377260
Agency Contact: ROBERT S WANG
Agency Telephone: 9093551288
Agency Type: Private
SIC Code: 0
SIC Code 2: Not reported
Primary Waste Type: Not reported
Primary Waste: Not reported
Waste Type2: Not reported
Waste2: Not reported
Primary Waste Type: Not reported
Secondary Waste: Not reported
Secondary Waste Type: Not reported
Design Flow: 0
Baseline Flow: 0
Reclamation: Not reported
POTW: Not reported
Treat To Water: Minor Threat to Water Quality. A violation of a regional board order should cause a relatively minor impairment of beneficial uses compared to a major or minor threat. Not: All nurds without a TTWQ will be considered a minor threat to water quality unless coded at a higher Level. A Zero (0) may be used to code those NURDS that are found to represent no threat to water quality.
Complexity: Category C - Facilities having no waste treatment systems, such as cooling water dischargers or thosewho must comply through best

CONTINENTAL COATINGS COMPANY, INC (Continued) **1001023184**

management practices, facilities with passive waste treatment and disposal systems, such as septic systems with subsurface disposal, or dischargers having waste storage systems with land disposal such as dairy waste ponds.

C11 **MUSASHI PAINT CALIFORNIA CO LTD** **RCRA NonGen / NLR** **1014915674**
NE **10938 BEECH AVE** **CAR000221424**
< 1/8 **FONTANA, CA 92337**
0.112 mi.
592 ft. **Site 2 of 3 in cluster C**

Relative:
Higher

Actual:
1004 ft.

RCRA NonGen / NLR:

Date form received by agency:	01/30/2013
Facility name:	MUSASHI PAINT CALIFORNIA CO LTD
Facility address:	10938 BEECH AVE ROOM NO A FONTANA, CA 92337
EPA ID:	CAR000221424
Mailing address:	3400 INLAND EMPIRE BLVD STE 101 ONTARIO, CA 91764
Contact:	HIROKO MOHR
Contact address:	3400 INLAND EMPIRE BLVD STE 101 ONTARIO, CA 91764
Contact country:	US
Contact telephone:	909-476-3558
Contact email:	CA.GR.CALIFORNIA@MUSASHIPAINT.COM
EPA Region:	09
Classification:	Non-Generator
Description:	Handler: Non-Generators do not presently generate hazardous waste

Owner/Operator Summary:

Owner/operator name:	MUSASHI PAINT CALIFORNIA CA LTD
Owner/operator address:	Not reported Not reported
Owner/operator country:	US
Owner/operator telephone:	Not reported
Legal status:	Private
Owner/Operator Type:	Operator
Owner/Op start date:	08/01/2006
Owner/Op end date:	Not reported

Owner/operator name:	REP KOTE PRODUCTS INC
Owner/operator address:	10938 BEECH AVE FONTANA, CA 92377
Owner/operator country:	US
Owner/operator telephone:	909-355-1288
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	09/01/1986
Owner/Op end date:	Not reported

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	No
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No

MUSASHI PAINT CALIFORNIA CO LTD (Continued) **1014915674**

Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Historical Generators:
Date form received by agency: 08/29/2011
Site name: MUSASHI PAINT CALIFORNIA CO LTD
Classification: Small Quantity Generator

. Waste code: 331
. Waste name: 331

. Waste code: 343
. Waste name: 343

. Waste code: 352
. Waste name: 352

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: F003
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NONHALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS, AND A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Violation Status: No violations found

C12 **CONTINENTAL COATING** **NPDES** **S103622350**
NE **10938 BEECH AVE** **San Bern. Co. Permit** **N/A**
< 1/8 **FONTANA, CA 92337** **EMI**
0.112 mi.
592 ft. **Site 3 of 3 in cluster C**

Relative:
Higher

Actual:
1004 ft.

NPDES:
Npdes Number: Not reported
Facility Status: Not reported
Agency Id: Not reported
Region: 8
Regulatory Measure Id: 213328
Order No: Not reported
Regulatory Measure Type: Industrial
Place Id: Not reported

CONTINENTAL COATING (Continued) **S103622350**

WDID:	8 36I011617
Program Type:	Not reported
Adoption Date Of Regulatory Measure:	Not reported
Effective Date Of Regulatory Measure:	Not reported
Expiration Date Of Regulatory Measure:	Not reported
Termination Date Of Regulatory Measure:	Not reported
Discharge Name:	Not reported
Discharge Address:	Not reported
Discharge City:	Not reported
Discharge State:	Not reported
Discharge Zip:	Not reported
RECEIVED DATE:	05/09/2008
PROCESSED DATE:	05/30/1995
STATUS CODE NAME:	Active
STATUS DATE:	05/30/1995
PLACE SIZE:	91716
PLACE SIZE UNIT:	SqFt
FACILITY CONTACT NAME:	Robert Wang
FACILITY CONTACT TITLE:	Not reported
FACILITY CONTACT PHONE:	909-355-1200
FACILITY CONTACT PHONE EXT:	Not reported
FACILITY CONTACT EMAIL:	Not reported
OPERATOR NAME:	Continental Coatings Co Inc
OPERATOR ADDRESS:	10938 Beech Ave
OPERATOR CITY:	Fontana
OPERATOR STATE:	California
OPERATOR ZIP:	92337
OPERATOR CONTACT NAME:	Robert Wang
OPERATOR CONTACT TITLE:	Not reported
OPERATOR CONTACT PHONE:	909-355-1200
OPERATOR CONTACT PHONE EXT:	Not reported
OPERATOR CONTACT EMAIL:	Not reported
OPERATOR TYPE:	Private Business
DEVELOPER NAME:	Not reported
DEVELOPER ADDRESS:	Not reported
DEVELOPER CITY:	Not reported
DEVELOPER STATE:	California
DEVELOPER ZIP:	Not reported
DEVELOPER CONTACT NAME:	Not reported
DEVELOPER CONTACT TITLE:	Not reported
CONSTYPE LINEAR UTILITY IND:	Not reported
EMERGENCY PHONE NO:	909-355-1288
EMERGENCY PHONE EXT:	Not reported
CONSTYPE ABOVE GROUND IND:	Not reported
CONSTYPE BELOW GROUND IND:	Not reported
CONSTYPE CABLE LINE IND:	Not reported
CONSTYPE COMM LINE IND:	Not reported
CONSTYPE COMMERTIAL IND:	Not reported
CONSTYPE ELECTRICAL LINE IND:	Not reported
CONSTYPE GAS LINE IND:	Not reported
CONSTYPE INDUSTRIAL IND:	Not reported
CONSTYPE OTHER DESRIPTION:	Not reported
CONSTYPE OTHER IND:	Not reported
CONSTYPE RECONS IND:	Not reported
CONSTYPE RESIDENTIAL IND:	Not reported
CONSTYPE TRANSPORT IND:	Not reported
CONSTYPE UTILITY DESCRIPTION:	Not reported

CONTINENTAL COATING (Continued) **S103622350**

CONSTYPE UTILITY IND:	Not reported
CONSTYPE WATER SEWER IND:	Not reported
DIR DISCHARGE USWATER IND:	N
RECEIVING WATER NAME:	Not reported
CERTIFIER NAME:	Robert Wang
CERTIFIER TITLE:	President
CERTIFICATION DATE:	04-MAR-15
PRIMARY SIC:	2851-Paints, Varnishes, Lacquers, Enamels, and Allied Products
SECONDARY SIC:	Not reported
TERTIARY SIC:	Not reported
Npdes Number:	CAS000001
Facility Status:	Active
Agency Id:	0
Region:	8
Regulatory Measure Id:	213328
Order No:	97-03-DWQ
Regulatory Measure Type:	Enrollee
Place Id:	Not reported
WDID:	8 36I011617
Program Type:	Industrial
Adoption Date Of Regulatory Measure:	Not reported
Effective Date Of Regulatory Measure:	05/30/1995
Expiration Date Of Regulatory Measure:	Not reported
Termination Date Of Regulatory Measure:	Not reported
Discharge Name:	Continental Coatings Co Inc
Discharge Address:	10938 Beech Ave
Discharge City:	Fontana
Discharge State:	California
Discharge Zip:	92337
RECEIVED DATE:	Not reported
PROCESSED DATE:	Not reported
STATUS CODE NAME:	Not reported
STATUS DATE:	Not reported
PLACE SIZE:	Not reported
PLACE SIZE UNIT:	Not reported
FACILITY CONTACT NAME:	Not reported
FACILITY CONTACT TITLE:	Not reported
FACILITY CONTACT PHONE:	Not reported
FACILITY CONTACT PHONE EXT:	Not reported
FACILITY CONTACT EMAIL:	Not reported
OPERATOR NAME:	Not reported
OPERATOR ADDRESS:	Not reported
OPERATOR CITY:	Not reported
OPERATOR STATE:	Not reported
OPERATOR ZIP:	Not reported
OPERATOR CONTACT NAME:	Not reported
OPERATOR CONTACT TITLE:	Not reported
OPERATOR CONTACT PHONE:	Not reported
OPERATOR CONTACT PHONE EXT:	Not reported
OPERATOR CONTACT EMAIL:	Not reported
OPERATOR TYPE:	Not reported
DEVELOPER NAME:	Not reported
DEVELOPER ADDRESS:	Not reported
DEVELOPER CITY:	Not reported
DEVELOPER STATE:	Not reported
DEVELOPER ZIP:	Not reported

CONTINENTAL COATING (Continued) **S103622350**

DEVELOPER CONTACT NAME:	Not reported
DEVELOPER CONTACT TITLE:	Not reported
CONSTYPE LINEAR UTILITY IND:	Not reported
EMERGENCY PHONE NO:	Not reported
EMERGENCY PHONE EXT:	Not reported
CONSTYPE ABOVE GROUND IND:	Not reported
CONSTYPE BELOW GROUND IND:	Not reported
CONSTYPE CABLE LINE IND:	Not reported
CONSTYPE COMM LINE IND:	Not reported
CONSTYPE COMMERTIAL IND:	Not reported
CONSTYPE ELECTRICAL LINE IND:	Not reported
CONSTYPE GAS LINE IND:	Not reported
CONSTYPE INDUSTRIAL IND:	Not reported
CONSTYPE OTHER DESRIPTION:	Not reported
CONSTYPE OTHER IND:	Not reported
CONSTYPE RECONS IND:	Not reported
CONSTYPE RESIDENTIAL IND:	Not reported
CONSTYPE TRANSPORT IND:	Not reported
CONSTYPE UTILITY DESCRIPTION:	Not reported
CONSTYPE UTILITY IND:	Not reported
CONSTYPE WATER SEWER IND:	Not reported
DIR DISCHARGE USWATER IND:	Not reported
RECEIVING WATER NAME:	Not reported
CERTIFIER NAME:	Not reported
CERTIFIER TITLE:	Not reported
CERTIFICATION DATE:	Not reported
PRIMARY SIC:	Not reported
SECONDARY SIC:	Not reported
TERTIARY SIC:	Not reported

San Bern. Co. Permit:

Region:	SAN BERNARDINO
Facility ID:	FA0002486
Owner:	WANG, ROBERT S
Permit Number:	PT0022647
Permit Category:	WASTE-GENERATING RECYCLER (ONSITE)
Facility Status:	ACTIVE
Expiration Date:	12/31/2015

Region:	SAN BERNARDINO
Facility ID:	FA0002486
Owner:	WANG, ROBERT S
Permit Number:	PT0001401
Permit Category:	SMALL QUANTITY GENERATOR
Facility Status:	ACTIVE
Expiration Date:	12/31/2015

Region:	SAN BERNARDINO
Facility ID:	FA0002486
Owner:	WANG, ROBERT S
Permit Number:	PT0001404
Permit Category:	HAZARDOUS MATERIALS 51-70 CHEMICALS
Facility Status:	ACTIVE
Expiration Date:	12/31/2015

Region:	SAN BERNARDINO
Facility ID:	FA0002486

CONTINENTAL COATING (Continued) **S103622350**

Owner: WANG, ROBERT S
Permit Number: PT0001386
Permit Category: ABOVEGROUND PETROLEUM STORAGE (AST) (SPCC)
Facility Status: INACTIVE
Expiration Date: 12/31/2004

EMI:

Year:	1990
County Code:	36
Air Basin:	SC
Facility ID:	56346
Air District Name:	SC
SIC Code:	0
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	0
Reactive Organic Gases Tons/Yr:	0
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0
Part. Matter 10 Micrometers & Smllr Tons/Yr:	0

Year:	1997
County Code:	36
Air Basin:	SC
Facility ID:	56346
Air District Name:	SC
SIC Code:	9999
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	9
Reactive Organic Gases Tons/Yr:	6
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	1
Part. Matter 10 Micrometers & Smllr Tons/Yr:	1

Year:	1998
County Code:	36
Air Basin:	SC
Facility ID:	56346
Air District Name:	SC
SIC Code:	9999
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	9
Reactive Organic Gases Tons/Yr:	6
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	1
Part. Matter 10 Micrometers & Smllr Tons/Yr:	1

CONTINENTAL COATING (Continued) **S103622350**

Year:	1999
County Code:	36
Air Basin:	SC
Facility ID:	56346
Air District Name:	SC
SIC Code:	9999
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	9
Reactive Organic Gases Tons/Yr:	6
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	1
Part. Matter 10 Micrometers & Smllr Tons/Yr:	1

Year:	2000
County Code:	36
Air Basin:	SC
Facility ID:	56346
Air District Name:	SC
SIC Code:	9999
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	9
Reactive Organic Gases Tons/Yr:	6
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	1
Part. Matter 10 Micrometers & Smllr Tons/Yr:	1

Year:	2001
County Code:	36
Air Basin:	SC
Facility ID:	56346
Air District Name:	SC
SIC Code:	9999
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	6
Reactive Organic Gases Tons/Yr:	4
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0
Part. Matter 10 Micrometers & Smllr Tons/Yr:	0

Year:	2009
County Code:	36
Air Basin:	SC
Facility ID:	56346
Air District Name:	SC
SIC Code:	2851

CONTINENTAL COATING (Continued) **S103622350**

Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	4.7879340014171401
Reactive Organic Gases Tons/Yr:	4.7300000000000004
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0.55000000000000004
Part. Matter 10 Micrometers & Smllr Tons/Yr:	0.495

Year:	2010
County Code:	36
Air Basin:	SC
Facility ID:	56346
Air District Name:	SC
SIC Code:	2851
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	3.6125620002024399
Reactive Organic Gases Tons/Yr:	3.5688499999999999
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0.67784
Part. Matter 10 Micrometers & Smllr Tons/Yr:	0.61005600000000004

Year:	2011
County Code:	36
Air Basin:	SC
Facility ID:	56346
Air District Name:	SC
SIC Code:	2851
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	3.7978844013
Reactive Organic Gases Tons/Yr:	3.75193
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0.7944
Part. Matter 10 Micrometers & Smllr Tons/Yr:	0.71496

13
NNE
1/8-1/4
0.142 mi.
750 ft.

MIZKAN AMERICAS INC
15101 SANTA ANA AVE
FONTANA, CA 92337

San Bern. Co. Permit **S110071654**
N/A

Relative:
Higher

Actual:
1000 ft.

San Bern. Co. Permit:

Region:	SAN BERNARDINO
Facility ID:	FA0012838
Owner:	MIZKAN AMERICAS INC
Permit Number:	PT0022429
Permit Category:	HAZARDOUS MATERIALS 1-3 CHEMICALS SPECIAL
Facility Status:	ACTIVE

MIZKAN AMERICAS INC (Continued) **S110071654**

Expiration Date: 10/31/2015

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14 **AEP SPAN** **NPDES** **S105697472**
ENE **10905 BEECH AVE** **San Bern. Co. Permit** **N/A**
1/8-1/4 **FONTANA, CA 92337** **WDS**
0.153 mi.
806 ft.

Relative:
Higher

Actual:
1004 ft.

NPDES:

Npdes Number:	Not reported
Facility Status:	Not reported
Agency Id:	Not reported
Region:	8
Regulatory Measure Id:	213371
Order No:	Not reported
Regulatory Measure Type:	Industrial
Place Id:	Not reported
WDID:	8 36I012408
Program Type:	Not reported
Adoption Date Of Regulatory Measure:	Not reported
Effective Date Of Regulatory Measure:	Not reported
Expiration Date Of Regulatory Measure:	Not reported
Termination Date Of Regulatory Measure:	Not reported
Discharge Name:	Not reported
Discharge Address:	Not reported
Discharge City:	Not reported
Discharge State:	Not reported
Discharge Zip:	Not reported
RECEIVED DATE:	05/09/2008
PROCESSED DATE:	06/28/1996
STATUS CODE NAME:	Active
STATUS DATE:	06/28/1996
PLACE SIZE:	7
PLACE SIZE UNIT:	Acres
FACILITY CONTACT NAME:	Derrick Armstrong
FACILITY CONTACT TITLE:	Manufacturing Manager
FACILITY CONTACT PHONE:	909-429-6719
FACILITY CONTACT PHONE EXT:	Not reported
FACILITY CONTACT EMAIL:	darmstrong@aepspan.com
OPERATOR NAME:	AEP Span
OPERATOR ADDRESS:	10905 Beech Ave
OPERATOR CITY:	Fontana
OPERATOR STATE:	California
OPERATOR ZIP:	92337
OPERATOR CONTACT NAME:	Sherry Keough
OPERATOR CONTACT TITLE:	Not reported
OPERATOR CONTACT PHONE:	360-673-8687
OPERATOR CONTACT PHONE EXT:	Not reported
OPERATOR CONTACT EMAIL:	sherry.keough@steelscape.com
OPERATOR TYPE:	Private Business
DEVELOPER NAME:	Not reported
DEVELOPER ADDRESS:	Not reported
DEVELOPER CITY:	Not reported
DEVELOPER STATE:	California
DEVELOPER ZIP:	Not reported
DEVELOPER CONTACT NAME:	Not reported
DEVELOPER CONTACT TITLE:	Not reported
CONSTYPE LINEAR UTILITY IND:	Not reported

AEP SPAN (Continued) **S105697472**

EMERGENCY PHONE NO:	909-844-5711
EMERGENCY PHONE EXT:	Not reported
CONSTYPE ABOVE GROUND IND:	Not reported
CONSTYPE BELOW GROUND IND:	Not reported
CONSTYPE CABLE LINE IND:	Not reported
CONSTYPE COMM LINE IND:	Not reported
CONSTYPE COMMERTIAL IND:	Not reported
CONSTYPE ELECTRICAL LINE IND:	Not reported
CONSTYPE GAS LINE IND:	Not reported
CONSTYPE INDUSTRIAL IND:	Not reported
CONSTYPE OTHER DESRIPTION:	Not reported
CONSTYPE OTHER IND:	Not reported
CONSTYPE RECONS IND:	Not reported
CONSTYPE RESIDENTIAL IND:	Not reported
CONSTYPE TRANSPORT IND:	Not reported
CONSTYPE UTILITY DESCRIPTION:	Not reported
CONSTYPE UTILITY IND:	Not reported
CONSTYPE WATER SEWER IND:	Not reported
DIR DISCHARGE USWATER IND:	N
RECEIVING WATER NAME:	Santa Ana River
CERTIFIER NAME:	Derrick Armstrong
CERTIFIER TITLE:	Manaufacturing Manager
CERTIFICATION DATE:	28-JAN-15
PRIMARY SIC:	3446-Architectural and Ornamental Metal Work
SECONDARY SIC:	Not reported
TERTIARY SIC:	Not reported

Npdes Number:	CAS000001
Facility Status:	Active
Agency Id:	0
Region:	8
Regulatory Measure Id:	213371
Order No:	97-03-DWQ
Regulatory Measure Type:	Enrollee
Place Id:	Not reported
WDID:	8 36I012408
Program Type:	Industrial
Adoption Date Of Regulatory Measure:	Not reported
Effective Date Of Regulatory Measure:	06/28/1996
Expiration Date Of Regulatory Measure:	Not reported
Termination Date Of Regulatory Measure:	Not reported
Discharge Name:	AEP Span
Discharge Address:	10905 Beech Ave
Discharge City:	Fontana
Discharge State:	California
Discharge Zip:	92337
RECEIVED DATE:	Not reported
PROCESSED DATE:	Not reported
STATUS CODE NAME:	Not reported
STATUS DATE:	Not reported
PLACE SIZE:	Not reported
PLACE SIZE UNIT:	Not reported
FACILITY CONTACT NAME:	Not reported
FACILITY CONTACT TITLE:	Not reported
FACILITY CONTACT PHONE:	Not reported
FACILITY CONTACT PHONE EXT:	Not reported
FACILITY CONTACT EMAIL:	Not reported

AEP SPAN (Continued) **S105697472**

OPERATOR NAME:	Not reported
OPERATOR ADDRESS:	Not reported
OPERATOR CITY:	Not reported
OPERATOR STATE:	Not reported
OPERATOR ZIP:	Not reported
OPERATOR CONTACT NAME:	Not reported
OPERATOR CONTACT TITLE:	Not reported
OPERATOR CONTACT PHONE:	Not reported
OPERATOR CONTACT PHONE EXT:	Not reported
OPERATOR CONTACT EMAIL:	Not reported
OPERATOR TYPE:	Not reported
DEVELOPER NAME:	Not reported
DEVELOPER ADDRESS:	Not reported
DEVELOPER CITY:	Not reported
DEVELOPER STATE:	Not reported
DEVELOPER ZIP:	Not reported
DEVELOPER CONTACT NAME:	Not reported
DEVELOPER CONTACT TITLE:	Not reported
CONSTYPE LINEAR UTILITY IND:	Not reported
EMERGENCY PHONE NO:	Not reported
EMERGENCY PHONE EXT:	Not reported
CONSTYPE ABOVE GROUND IND:	Not reported
CONSTYPE BELOW GROUND IND:	Not reported
CONSTYPE CABLE LINE IND:	Not reported
CONSTYPE COMM LINE IND:	Not reported
CONSTYPE COMMERTIAL IND:	Not reported
CONSTYPE ELECTRICAL LINE IND:	Not reported
CONSTYPE GAS LINE IND:	Not reported
CONSTYPE INDUSTRIAL IND:	Not reported
CONSTYPE OTHER DESRIPTION:	Not reported
CONSTYPE OTHER IND:	Not reported
CONSTYPE RECONS IND:	Not reported
CONSTYPE RESIDENTIAL IND:	Not reported
CONSTYPE TRANSPORT IND:	Not reported
CONSTYPE UTILITY DESCRIPTION:	Not reported
CONSTYPE UTILITY IND:	Not reported
CONSTYPE WATER SEWER IND:	Not reported
DIR DISCHARGE USWATER IND:	Not reported
RECEIVING WATER NAME:	Not reported
CERTIFIER NAME:	Not reported
CERTIFIER TITLE:	Not reported
CERTIFICATION DATE:	Not reported
PRIMARY SIC:	Not reported
SECONDARY SIC:	Not reported
TERTIARY SIC:	Not reported

San Bern. Co. Permit:

Region:	SAN BERNARDINO
Facility ID:	FA0001447
Owner:	BLUESCOPE STEEL NRTH AMERICA
Permit Number:	PT0004185
Permit Category:	HAZARDOUS MATERIALS 11-30 CHEMICALS
Facility Status:	ACTIVE
Expiration Date:	08/31/2015

Region:	SAN BERNARDINO
Facility ID:	FA0001447

AEP SPAN (Continued) **S105697472**

Owner: BLUESCOPE STEEL NRTH AMERICA
Permit Number: PT0004186
Permit Category: SMALL QUANTITY GENERATOR
Facility Status: ACTIVE
Expiration Date: 08/31/2015

WDS:

Facility ID:	Santa Ana River 36I012408
Facility Type:	Not reported
Facility Status:	Active - Any facility with a continuous or seasonal discharge that is under Waste Discharge Requirements.
NPDES Number:	CAS000001 The 1st 2 characters designate the state. The remaining 7 are assigned by the Regional Board
Subregion:	8
Facility Telephone:	Not reported
Facility Contact:	Not reported
Agency Name:	BHP INCORPORATED
Agency Address:	Not reported
Agency City,St,Zip:	0
Agency Contact:	Not reported
Agency Telephone:	Not reported
Agency Type:	Not reported
SIC Code:	0
SIC Code 2:	Not reported
Primary Waste Type:	Not reported
Primary Waste:	Not reported
Waste Type2:	Not reported
Waste2:	Not reported
Primary Waste Type:	Not reported
Secondary Waste:	Not reported
Secondary Waste Type:	Not reported
Design Flow:	0
Baseline Flow:	0
Reclamation:	Not reported
POTW:	Not reported
Treat To Water:	Minor Threat to Water Quality. A violation of a regional board order should cause a relatively minor impairment of beneficial uses compared to a major or minor threat. Not: All nurds without a TTWQ will be considered a minor threat to water quality unless coded at a higher Level. A Zero (0) may be used to code those NURDS that are found to represent no threat to water quality.
Complexity:	Category C - Facilities having no waste treatment systems, such as cooling water dischargers or thosewho must comply through best management practices, facilities with passive waste treatment and disposal systems, such as septic systems with subsurface disposal, or dischargers having waste storage systems with land disposal such as dairy waste ponds.

D15 **INTERSTATE DIST CO** **NPDES** **S105974257**
SW **11128 HEMLOCK AVE** **San Bern. Co. Permit** **N/A**
1/8-1/4 **FONTANA, CA 92337**
0.153 mi.
808 ft. **Site 1 of 2 in cluster D**

Relative:
Lower

Actual:
972 ft.

NPDES:

Npdes Number:	Not reported
Facility Status:	Not reported
Agency Id:	Not reported
Region:	8
Regulatory Measure Id:	288840
Order No:	Not reported
Regulatory Measure Type:	Industrial
Place Id:	Not reported
WDID:	8 36I018396
Program Type:	Not reported
Adoption Date Of Regulatory Measure:	Not reported
Effective Date Of Regulatory Measure:	Not reported
Expiration Date Of Regulatory Measure:	Not reported
Termination Date Of Regulatory Measure:	Not reported
Discharge Name:	Not reported
Discharge Address:	Not reported
Discharge City:	Not reported
Discharge State:	Not reported
Discharge Zip:	Not reported
RECEIVED DATE:	05/09/2008
PROCESSED DATE:	10/09/2003
STATUS CODE NAME:	Active
STATUS DATE:	10/09/2003
PLACE SIZE:	Not reported
PLACE SIZE UNIT:	Not reported
FACILITY CONTACT NAME:	Jim Leonard
FACILITY CONTACT TITLE:	Not reported
FACILITY CONTACT PHONE:	909-349-3460
FACILITY CONTACT PHONE EXT:	Not reported
FACILITY CONTACT EMAIL:	jleonard@intd.com
OPERATOR NAME:	Interstate Distributor Co
OPERATOR ADDRESS:	11128 Hemlock Ave
OPERATOR CITY:	Fontana
OPERATOR STATE:	California
OPERATOR ZIP:	92337
OPERATOR CONTACT NAME:	Jim Leonard
OPERATOR CONTACT TITLE:	Not reported
OPERATOR CONTACT PHONE:	909-349-3460
OPERATOR CONTACT PHONE EXT:	Not reported
OPERATOR CONTACT EMAIL:	jleonard@intd.com
OPERATOR TYPE:	Private Business
DEVELOPER NAME:	Not reported
DEVELOPER ADDRESS:	Not reported
DEVELOPER CITY:	Not reported
DEVELOPER STATE:	California
DEVELOPER ZIP:	Not reported
DEVELOPER CONTACT NAME:	Not reported
DEVELOPER CONTACT TITLE:	Not reported
CONSTYPE LINEAR UTILITY IND:	Not reported
EMERGENCY PHONE NO:	909-349-3455
EMERGENCY PHONE EXT:	Not reported
CONSTYPE ABOVE GROUND IND:	Not reported

INTERSTATE DIST CO (Continued) **S105974257**

CONSTYPE BELOW GROUND IND:	Not reported
CONSTYPE CABLE LINE IND:	Not reported
CONSTYPE COMM LINE IND:	Not reported
CONSTYPE COMMERTIAL IND:	Not reported
CONSTYPE ELECTRICAL LINE IND:	Not reported
CONSTYPE GAS LINE IND:	Not reported
CONSTYPE INDUSTRIAL IND:	Not reported
CONSTYPE OTHER DESRIPTION:	Not reported
CONSTYPE OTHER IND:	Not reported
CONSTYPE RECONS IND:	Not reported
CONSTYPE RESIDENTIAL IND:	Not reported
CONSTYPE TRANSPORT IND:	Not reported
CONSTYPE UTILITY DESCRIPTION:	Not reported
CONSTYPE UTILITY IND:	Not reported
CONSTYPE WATER SEWER IND:	Not reported
DIR DISCHARGE USWATER IND:	N
RECEIVING WATER NAME:	Santa Ana River Watershed
CERTIFIER NAME:	James Leonard
CERTIFIER TITLE:	Manager
CERTIFICATION DATE:	27-JAN-15
PRIMARY SIC:	4231-Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation
SECONDARY SIC:	Not reported
TERTIARY SIC:	Not reported
Npdes Number:	CAS000001
Facility Status:	Active
Agency Id:	0
Region:	8
Regulatory Measure Id:	288840
Order No:	97-03-DWQ
Regulatory Measure Type:	Enrollee
Place Id:	Not reported
WDID:	8 36I018396
Program Type:	Industrial
Adoption Date Of Regulatory Measure:	Not reported
Effective Date Of Regulatory Measure:	10/09/2003
Expiration Date Of Regulatory Measure:	Not reported
Termination Date Of Regulatory Measure:	Not reported
Discharge Name:	Interstate Distributor Co
Discharge Address:	11128 Hemlock Ave
Discharge City:	Fontana
Discharge State:	California
Discharge Zip:	92337
RECEIVED DATE:	Not reported
PROCESSED DATE:	Not reported
STATUS CODE NAME:	Not reported
STATUS DATE:	Not reported
PLACE SIZE:	Not reported
PLACE SIZE UNIT:	Not reported
FACILITY CONTACT NAME:	Not reported
FACILITY CONTACT TITLE:	Not reported
FACILITY CONTACT PHONE:	Not reported
FACILITY CONTACT PHONE EXT:	Not reported
FACILITY CONTACT EMAIL:	Not reported
OPERATOR NAME:	Not reported
OPERATOR ADDRESS:	Not reported
OPERATOR CITY:	Not reported

INTERSTATE DIST CO (Continued) **S105974257**

OPERATOR STATE:	Not reported
OPERATOR ZIP:	Not reported
OPERATOR CONTACT NAME:	Not reported
OPERATOR CONTACT TITLE:	Not reported
OPERATOR CONTACT PHONE:	Not reported
OPERATOR CONTACT PHONE EXT:	Not reported
OPERATOR CONTACT EMAIL:	Not reported
OPERATOR TYPE:	Not reported
DEVELOPER NAME:	Not reported
DEVELOPER ADDRESS:	Not reported
DEVELOPER CITY:	Not reported
DEVELOPER STATE:	Not reported
DEVELOPER ZIP:	Not reported
DEVELOPER CONTACT NAME:	Not reported
DEVELOPER CONTACT TITLE:	Not reported
CONSTYPE LINEAR UTILITY IND:	Not reported
EMERGENCY PHONE NO:	Not reported
EMERGENCY PHONE EXT:	Not reported
CONSTYPE ABOVE GROUND IND:	Not reported
CONSTYPE BELOW GROUND IND:	Not reported
CONSTYPE CABLE LINE IND:	Not reported
CONSTYPE COMM LINE IND:	Not reported
CONSTYPE COMMERTIAL IND:	Not reported
CONSTYPE ELECTRICAL LINE IND:	Not reported
CONSTYPE GAS LINE IND:	Not reported
CONSTYPE INDUSTRIAL IND:	Not reported
CONSTYPE OTHER DESRIPTION:	Not reported
CONSTYPE OTHER IND:	Not reported
CONSTYPE RECONS IND:	Not reported
CONSTYPE RESIDENTIAL IND:	Not reported
CONSTYPE TRANSPORT IND:	Not reported
CONSTYPE UTILITY DESCRIPTION:	Not reported
CONSTYPE UTILITY IND:	Not reported
CONSTYPE WATER SEWER IND:	Not reported
DIR DISCHARGE USWATER IND:	Not reported
RECEIVING WATER NAME:	Not reported
CERTIFIER NAME:	Not reported
CERTIFIER TITLE:	Not reported
CERTIFICATION DATE:	Not reported
PRIMARY SIC:	Not reported
SECONDARY SIC:	Not reported
TERTIARY SIC:	Not reported

San Bern. Co. Permit:

Region:	SAN BERNARDINO
Facility ID:	FA0007941
Owner:	INTERSTATE DISTRIBUTOR CO
Permit Number:	PT0013873
Permit Category:	CONDITIONALLY EXEMPT SM QTY GENERATOR
Facility Status:	ACTIVE
Expiration Date:	08/31/2015

Region:	SAN BERNARDINO
Facility ID:	FA0007941
Owner:	INTERSTATE DISTRIBUTOR CO
Permit Number:	PT0013874
Permit Category:	HAZARDOUS MATERIALS 4-10 CHEMICALS

INTERSTATE DIST CO (Continued) **S105974257**

Facility Status: ACTIVE
Expiration Date: 08/31/2015

Region: SAN BERNARDINO
Facility ID: FA0007941
Owner: INTERSTATE DISTRIBUTOR CO
Permit Number: PT0018997
Permit Category: EPCRA FACILITY
Facility Status: INACTIVE
Expiration Date: 08/31/2013

Region: SAN BERNARDINO
Facility ID: FA0007941
Owner: INTERSTATE DISTRIBUTOR CO
Permit Number: PT0013875
Permit Category: APSA 10,001-100,000 GAL FAC CAPACITY
Facility Status: INACTIVE
Expiration Date: 08/31/2013

D16 **INTERSTATE DISTRIBUTOR CO.** **AST** **A100345832**
SW **11128 HEMLOCK** **N/A**
1/8-1/4 **FONTANA, CA 92337**
0.153 mi.
808 ft. **Site 2 of 2 in cluster D**

Relative:
Lower

Actual:
972 ft.

AST:
Certified Unified Program Agencies: San Bernardino
Owner: INTERSTATE DISTRIBUTOR CO.
Total Gallons: 20,110

E17 **MISSION CUSTOM EXTRUSION** **NPDES** **S106911194**
NE **10904 BEECH AVENUE** **San Bern. Co. Permit** **N/A**
1/8-1/4 **FONTANA, CA 92337**
0.180 mi.
952 ft. **Site 1 of 3 in cluster E**

Relative:
Higher

Actual:
1007 ft.

NPDES:
Npdes Number: Not reported
Facility Status: Not reported
Agency Id: Not reported
Region: 8
Regulatory Measure Id: 424075
Order No: Not reported
Regulatory Measure Type: Industrial
Place Id: Not reported
WDID: 8 36I023506
Program Type: Not reported
Adoption Date Of Regulatory Measure: Not reported
Effective Date Of Regulatory Measure: Not reported
Expiration Date Of Regulatory Measure: Not reported
Termination Date Of Regulatory Measure: Not reported
Discharge Name: Not reported
Discharge Address: Not reported
Discharge City: Not reported
Discharge State: Not reported
Discharge Zip: Not reported

MISSION CUSTOM EXTRUSION (Continued) **S106911194**

RECEIVED DATE:	02/07/2012
PROCESSED DATE:	02/07/2012
STATUS CODE NAME:	Active
STATUS DATE:	02/07/2012
PLACE SIZE:	1.15
PLACE SIZE UNIT:	Acres
FACILITY CONTACT NAME:	Rannie Mohabir
FACILITY CONTACT TITLE:	Not reported
FACILITY CONTACT PHONE:	909-822-1581
FACILITY CONTACT PHONE EXT:	Not reported
FACILITY CONTACT EMAIL:	Not reported
OPERATOR NAME:	Mission Custom Extrusion
OPERATOR ADDRESS:	10904 Beech Avenue
OPERATOR CITY:	Fontana
OPERATOR STATE:	California
OPERATOR ZIP:	92337
OPERATOR CONTACT NAME:	Rannie Mohabir
OPERATOR CONTACT TITLE:	Not reported
OPERATOR CONTACT PHONE:	909-822-1581
OPERATOR CONTACT PHONE EXT:	Not reported
OPERATOR CONTACT EMAIL:	Not reported
OPERATOR TYPE:	Private Business
DEVELOPER NAME:	Not reported
DEVELOPER ADDRESS:	Not reported
DEVELOPER CITY:	Not reported
DEVELOPER STATE:	California
DEVELOPER ZIP:	Not reported
DEVELOPER CONTACT NAME:	Not reported
DEVELOPER CONTACT TITLE:	Not reported
CONSTYPE LINEAR UTILITY IND:	Not reported
EMERGENCY PHONE NO:	Not reported
EMERGENCY PHONE EXT:	Not reported
CONSTYPE ABOVE GROUND IND:	Not reported
CONSTYPE BELOW GROUND IND:	Not reported
CONSTYPE CABLE LINE IND:	Not reported
CONSTYPE COMM LINE IND:	Not reported
CONSTYPE COMMERTIAL IND:	Not reported
CONSTYPE ELECTRICAL LINE IND:	Not reported
CONSTYPE GAS LINE IND:	Not reported
CONSTYPE INDUSTRIAL IND:	Not reported
CONSTYPE OTHER DESRIPTION:	Not reported
CONSTYPE OTHER IND:	Not reported
CONSTYPE RECONS IND:	Not reported
CONSTYPE RESIDENTIAL IND:	Not reported
CONSTYPE TRANSPORT IND:	Not reported
CONSTYPE UTILITY DESCRIPTION:	Not reported
CONSTYPE UTILITY IND:	Not reported
CONSTYPE WATER SEWER IND:	Not reported
DIR DISCHARGE USWATER IND:	N
RECEIVING WATER NAME:	Santa Ana River
CERTIFIER NAME:	Not reported
CERTIFIER TITLE:	Not reported
CERTIFICATION DATE:	Not reported
PRIMARY SIC:	3089-Plastics Products, NEC
SECONDARY SIC:	Not reported
TERTIARY SIC:	Not reported

MISSION CUSTOM EXTRUSION (Continued) **S106911194**

Npdes Number:	CAS000001
Facility Status:	Active
Agency Id:	0
Region:	8
Regulatory Measure Id:	424075
Order No:	97-03-DWQ
Regulatory Measure Type:	Enrollee
Place Id:	Not reported
WDID:	8 36I023506
Program Type:	Industrial
Adoption Date Of Regulatory Measure:	Not reported
Effective Date Of Regulatory Measure:	02/07/2012
Expiration Date Of Regulatory Measure:	Not reported
Termination Date Of Regulatory Measure:	Not reported
Discharge Name:	Mission Custom Extrusion
Discharge Address:	10904 Beech Avenue
Discharge City:	Fontana
Discharge State:	California
Discharge Zip:	92337
RECEIVED DATE:	Not reported
PROCESSED DATE:	Not reported
STATUS CODE NAME:	Not reported
STATUS DATE:	Not reported
PLACE SIZE:	Not reported
PLACE SIZE UNIT:	Not reported
FACILITY CONTACT NAME:	Not reported
FACILITY CONTACT TITLE:	Not reported
FACILITY CONTACT PHONE:	Not reported
FACILITY CONTACT PHONE EXT:	Not reported
FACILITY CONTACT EMAIL:	Not reported
OPERATOR NAME:	Not reported
OPERATOR ADDRESS:	Not reported
OPERATOR CITY:	Not reported
OPERATOR STATE:	Not reported
OPERATOR ZIP:	Not reported
OPERATOR CONTACT NAME:	Not reported
OPERATOR CONTACT TITLE:	Not reported
OPERATOR CONTACT PHONE:	Not reported
OPERATOR CONTACT PHONE EXT:	Not reported
OPERATOR CONTACT EMAIL:	Not reported
OPERATOR TYPE:	Not reported
DEVELOPER NAME:	Not reported
DEVELOPER ADDRESS:	Not reported
DEVELOPER CITY:	Not reported
DEVELOPER STATE:	Not reported
DEVELOPER ZIP:	Not reported
DEVELOPER CONTACT NAME:	Not reported
DEVELOPER CONTACT TITLE:	Not reported
CONSTYPE LINEAR UTILITY IND:	Not reported
EMERGENCY PHONE NO:	Not reported
EMERGENCY PHONE EXT:	Not reported
CONSTYPE ABOVE GROUND IND:	Not reported
CONSTYPE BELOW GROUND IND:	Not reported
CONSTYPE CABLE LINE IND:	Not reported
CONSTYPE COMM LINE IND:	Not reported
CONSTYPE COMMERTIAL IND:	Not reported
CONSTYPE ELECTRICAL LINE IND:	Not reported

MISSION CUSTOM EXTRUSION (Continued) **S106911194**

CONSTYPE GAS LINE IND:	Not reported
CONSTYPE INDUSTRIAL IND:	Not reported
CONSTYPE OTHER DESRIPTION:	Not reported
CONSTYPE OTHER IND:	Not reported
CONSTYPE RECONS IND:	Not reported
CONSTYPE RESIDENTIAL IND:	Not reported
CONSTYPE TRANSPORT IND:	Not reported
CONSTYPE UTILITY DESCRIPTION:	Not reported
CONSTYPE UTILITY IND:	Not reported
CONSTYPE WATER SEWER IND:	Not reported
DIR DISCHARGE USWATER IND:	Not reported
RECEIVING WATER NAME:	Not reported
CERTIFIER NAME:	Not reported
CERTIFIER TITLE:	Not reported
CERTIFICATION DATE:	Not reported
PRIMARY SIC:	Not reported
SECONDARY SIC:	Not reported
TERTIARY SIC:	Not reported

San Bern. Co. Permit:

Region:	SAN BERNARDINO
Facility ID:	FA0007332
Owner:	WOODBOND INC
Permit Number:	PT0006372
Permit Category:	HAZMAT HANDLER 0-10 EMPLOYEES
Facility Status:	INACTIVE
Expiration Date:	11/30/2004

18
NE
1/8-1/4
0.188 mi.
993 ft.

JAMES HARDIE BUILDING PRODUCTS **San Bern. Co. Permit** **1004675519**
15431 SANTA ANA AVE **WDS** **N/A**
FONTANA, CA 92337

Relative:
Higher

Actual:
1005 ft.

San Bern. Co. Permit:

Region:	SAN BERNARDINO
Facility ID:	FA0007980
Owner:	JAMES HARDIE BLDG PROD
Permit Number:	PT0020132
Permit Category:	HAZARDOUS MATERIALS 71+ CHEMICALS
Facility Status:	ACTIVE
Expiration Date:	10/31/2015

Region:	SAN BERNARDINO
Facility ID:	FA0007980
Owner:	JAMES HARDIE BLDG PROD
Permit Number:	PT0014237
Permit Category:	EPCRA FACILITY
Facility Status:	INACTIVE
Expiration Date:	10/31/2013

Region:	SAN BERNARDINO
Facility ID:	FA0007980
Owner:	JAMES HARDIE BLDG PROD
Permit Number:	PT0014027
Permit Category:	HAZMAT HANDLER 11-25 EMPLOYEES (W/GEN PRMT)
Facility Status:	INACTIVE

JAMES HARDIE BUILDING PRODUCTS (Continued) **1004675519**

Expiration Date: 10/31/2008

Region: SAN BERNARDINO
Facility ID: FA0007980
Owner: JAMES HARDIE BLDG PROD
Permit Number: PT0014026
Permit Category: HAZARDOUS WASTE GENERATOR - 11-25 EMPLOYEES
Facility Status: INACTIVE
Expiration Date: 10/31/2008

WDS:

Facility ID:	Santa Ana River 36I017800
Facility Type:	Industrial - Facility that treats and/or disposes of liquid or semisolid wastes from any servicing, producing, manufacturing or processing operation of whatever nature, including mining, gravel washing, geothermal operations, air conditioning, ship building and repairing, oil production, storage and disposal operations, water pumping.
Facility Status:	Active - Any facility with a continuous or seasonal discharge that is under Waste Discharge Requirements.
NPDES Number:	CAS000001 The 1st 2 characters designate the state. The remaining 7 are assigned by the Regional Board
Subregion:	8
Facility Telephone:	9094278369
Facility Contact:	LACEY TODD
Agency Name:	JHNC LLC
Agency Address:	15431 Santa Ana Ave
Agency City,St,Zip:	Fontana 923377244
Agency Contact:	LACEY TODD
Agency Telephone:	9094278369
Agency Type:	Private
SIC Code:	0
SIC Code 2:	Not reported
Primary Waste Type:	Not reported
Primary Waste:	Not reported
Waste Type2:	Not reported
Waste2:	Not reported
Primary Waste Type:	Not reported
Secondary Waste:	Not reported
Secondary Waste Type:	Not reported
Design Flow:	0
Baseline Flow:	0
Reclamation:	Not reported
POTW:	Not reported
Treat To Water:	Minor Threat to Water Quality. A violation of a regional board order should cause a relatively minor impairment of beneficial uses compared to a major or minor threat. Not: All nurds without a TTWQ will be considered a minor threat to water quality unless coded at a higher Level. A Zero (0) may be used to code those NURDS that are found to represent no threat to water quality.
Complexity:	Category C - Facilities having no waste treatment systems, such as cooling water dischargers or thosewho must comply through best management practices, facilities with passive waste treatment and disposal systems, such as septic systems with subsurface disposal, or dischargers having waste storage systems with land disposal such as dairy waste ponds.

E19 NE 1/8-1/4 0.191 mi. 1006 ft. **BRINE FACFONTANA-CLOSING**
N.E. OF SANTA ANA & BEACH
FONTANA, CA 0

Site 2 of 3 in cluster E

WMUDS/SWAT WDS **S103443310 N/A**

Relative: Higher

Actual: 1008 ft.

WMUDS/SWAT:

Edit Date:	Not reported
Complexity:	Category C - Facilities having no waste treatment systems, such as cooling water dischargers or thosewho must comply through best management practices, facilities with passive waste treatment and disposal systems, such as septic systems with subsurface disposal, or dischargers having waste storage systems with land disposal such as dairy waste ponds.
Primary Waste:	SLDWST
Primary Waste Type:	Designated/Influent or Solid Wastes that pose a significant threat to water quality because of their high concentrations (E.G., BOD, Hardness, TRF, Chloride). 'Manageable' hazardous wastes (E.G., inorganic salts and heavy metals) are included in this category.
Secondary Waste:	Not reported
Secondary Waste Type:	Not reported
Base Meridian:	Not reported
NPID:	Not reported
Tonnage:	0
Regional Board ID:	Not reported
Municipal Solid Waste:	False
Superorder:	False
Open To Public:	False
Waste List:	False
Agency Type:	Private
Agency Name:	ALUMAX INC.
Agency Department:	Not reported
Agency Address:	3424 PEACHTREE RD., N.E. #2100
Agency City,St,Zip:	ATLANTA GA 30326
Agency Contact:	CHUCK KUCERA
Agency Telephone:	4048464600
Land Owner Name:	Not reported
Land Owner Address:	Not reported
Land Owner City,St,Zip:	Not reported
Land Owner Contact:	Not reported
Land Owner Phone:	Not reported
Region:	8
Facility Type:	Industrial - Facility that treats and/or disposes of liquid or semisolid wastes from any servicing, producing, manufacturing or processing operation of whatever nature, including mining, gravel washing, geothermal operations, air conditioning, ship building and repairing, oil production, storage and disposal operations, water pumping.
Facility Description:	Not reported
Facility Telephone:	Not reported
SWAT Facility Name:	Not reported
Primary SIC:	3341
Secondary SIC:	Not reported
Comments:	Not reported
Last Facility Editors:	Not reported
Waste Discharge System:	True
Solid Waste Assessment Test Program:	False
Toxic Pits Cleanup Act Program:	False
Resource Conservation Recovery Act:	False

BRINE FACFONTANA-CLOSING (Continued) **S103443310**

Department of Defence:	False
Solid Waste Assessment Test Program:	Not reported
Threat to Water Quality:	Moderate Threat to Water Quality. A violation could have a major adverse impact on receiving biota, can cause aesthetic impairment to a significant human population, or render unusable a potential domestic or municipal water supply. Awsthetic impairment would include nuisance from a waste treatment facility.
Sub Chapter 15:	True
Regional Board Project Officer:	JPL
Number of WMUDS at Facility:	1
Section Range:	Not reported
RCRA Facility:	No
Waste Discharge Requirements:	A
Self-Monitoring Rept. Frequency:	Monthly Submittal
Waste Discharge System ID:	8 362169001
Solid Waste Information ID:	Not reported

WDS:

Facility ID:	Santa Ana River 362169001
Facility Type:	Industrial - Facility that treats and/or disposes of liquid or semisolid wastes from any servicing, producing, manufacturing or processing operation of whatever nature, including mining, gravel washing, geothermal operations, air conditioning, ship building and repairing, oil production, storage and disposal operations, water pumping.
Facility Status:	Active - Any facility with a continuous or seasonal discharge that is under Waste Discharge Requirements.
NPDES Number:	Not reported
Subregion:	8
Facility Telephone:	Not reported
Facility Contact:	PEGGY NOUACKY
Agency Name:	ALUMAX INC.
Agency Address:	3424 PEACHTREE RD. N.E. #2100
Agency City,St,Zip:	ATLANTA 30326
Agency Contact:	CHUCK KUCERA
Agency Telephone:	Not reported
Agency Type:	Private
SIC Code:	3341
SIC Code 2:	Not reported
Primary Waste Type:	Designated/Influent or Solid Wastes that pose a significant threat to water quality because of their high concentrations (E.G., BOD, Hardness, TRF, Chloride). 'Manageable' hazardous wastes (E.G., inorganic salts and heavy metals) are included in this category.
Primary Waste:	SLDWST
Waste Type2:	Not reported
Waste2:	Solid Wastes
Primary Waste Type:	Designated/Influent or Solid Wastes that pose a significant threat to water quality because of their high concentrations (E.G., BOD, Hardness, TRF, Chloride). 'Manageable' hazardous wastes (E.G., inorganic salts and heavy metals) are included in this category.
Secondary Waste:	Not reported
Secondary Waste Type:	Not reported
Design Flow:	0
Baseline Flow:	0
Reclamation:	No reclamation requirements associated with this facility.
POTW:	The facility is not a POTW.
Treat To Water:	Minor Threat to Water Quality. A violation of a regional board order

BRINE FACFONTANA-CLOSING (Continued) **S103443310**

should cause a relatively minor impairment of beneficial uses compared to a major or minor threat. Not: All nurds without a TTWQ will be considered a minor threat to water quality unless coded at a higher Level. A Zero (0) may be used to code those NURDS that are found to represent no threat to water quality.

Complexity: Category C - Facilities having no waste treatment systems, such as cooling water dischargers or thosewho must comply through best management practices, facilities with passive waste treatment and disposal systems, such as septic systems with subsurface disposal, or dischargers having waste storage systems with land disposal such as dairy waste ponds.

E20 **BRINE FAC,FONTANA** **WMUDS/SWAT** **S103443300**
NE **N/A**
1/8-1/4 **, CA**
0.191 mi.
1006 ft. **Site 3 of 3 in cluster E**

Relative:
Higher

Actual:
1008 ft.

WMUDS/SWAT:

Edit Date:	Not reported
Complexity:	Category C - Facilities having no waste treatment systems, such as cooling water dischargers or thosewho must comply through best management practices, facilities with passive waste treatment and disposal systems, such as septic systems with subsurface disposal, or dischargers having waste storage systems with land disposal such as dairy waste ponds.
Primary Waste:	PROCES
Primary Waste Type:	Designated/Influent or Solid Wastes that pose a significant threat to water quality because of their high concentrations (E.G., BOD, Hardness, TRF, Chloride). 'Manageable' hazardous wastes (E.G., inorganic salts and heavy metals) are included in this category.
Secondary Waste:	Not reported
Secondary Waste Type:	Not reported
Base Meridian:	Not reported
NPID:	Not reported
Tonnage:	0
Regional Board ID:	Not reported
Municipal Solid Waste:	False
Superorder:	False
Open To Public:	False
Waste List:	False
Agency Type:	Private
Agency Name:	FONTANA PAPER MILLS, INC
Agency Department:	Not reported
Agency Address:	13733 VALLEY BLVD.
Agency City,St,Zip:	FONTANA CA 92335
Agency Contact:	Not reported
Agency Telephone:	9098234100
Land Owner Name:	Not reported
Land Owner Address:	Not reported
Land Owner City,St,Zip:	Not reported
Land Owner Contact:	Not reported
Land Owner Phone:	Not reported
Region:	8
Facility Type:	Industrial - Facility that treats and/or disposes of liquid or semisolid wastes from any servicing, producing, manufacturing or processing operation of whatever nature, including mining, gravel washing, geothermal operations, air conditioning, ship building and

BRINE FAC,FONTANA (Continued) **S103443300**

repairing, oil production, storage and disposal operations, water pumping.

Facility Description:	Not reported
Facility Telephone:	Not reported
SWAT Facility Name:	Not reported
Primary SIC:	2621
Secondary SIC:	Not reported
Comments:	Not reported
Last Facility Editors:	Not reported
Waste Discharge System:	True
Solid Waste Assessment Test Program:	False
Toxic Pits Cleanup Act Program:	False
Resource Conservation Recovery Act:	False
Department of Defence:	False
Solid Waste Assessment Test Program:	Not reported
Threat to Water Quality:	Minor Threat to Water Quality. A violation of a regional board order should cause a relatively minor impairment of beneficial uses compared to a major or minor threat. Not: All nurds without a TTWQ will be considered a minor threat to water quality unless coded at a higher Level. A Zero (0) may be used to code those NURDS that are found to represent no threat to water quality.
Sub Chapter 15:	True
Regional Board Project Officer:	Not reported
Number of WMUDS at Facility:	1
Section Range:	Not reported
RCRA Facility:	No
Waste Discharge Requirements:	H
Self-Monitoring Rept. Frequency:	Bimonthly (Every two months)
Waste Discharge System ID:	8 362013002
Solid Waste Information ID:	Not reported

F21 **GALLADE CHEMICAL INC** **NPDES** **S104766449**
NW **15120 SANTA ANA AVE** **San Bern. Co. Permit** **N/A**
1/8-1/4 **FONTANA, CA 92337** **EMI**
0.245 mi.
1291 ft. **Site 1 of 2 in cluster F**

Relative:
Higher

Actual:
992 ft.

NPDES:

Npdes Number:	Not reported
Facility Status:	Not reported
Agency Id:	Not reported
Region:	8
Regulatory Measure Id:	213497
Order No:	Not reported
Regulatory Measure Type:	Industrial
Place Id:	Not reported
WDID:	8 36I015226
Program Type:	Not reported
Adoption Date Of Regulatory Measure:	Not reported
Effective Date Of Regulatory Measure:	Not reported
Expiration Date Of Regulatory Measure:	Not reported
Termination Date Of Regulatory Measure:	Not reported
Discharge Name:	Not reported
Discharge Address:	Not reported
Discharge City:	Not reported
Discharge State:	Not reported
Discharge Zip:	Not reported
RECEIVED DATE:	05/09/2008

GALLADE CHEMICAL INC (Continued) **S104766449**

PROCESSED DATE:	07/02/1999
STATUS CODE NAME:	Active
STATUS DATE:	07/02/1999
PLACE SIZE:	14
PLACE SIZE UNIT:	Acres
FACILITY CONTACT NAME:	Byron Gallade
FACILITY CONTACT TITLE:	Not reported
FACILITY CONTACT PHONE:	909-823-9638
FACILITY CONTACT PHONE EXT:	Not reported
FACILITY CONTACT EMAIL:	byron@galladechem.com
OPERATOR NAME:	Gallade Chemical Inc
OPERATOR ADDRESS:	15120 Santa Ana Ave
OPERATOR CITY:	Fontana
OPERATOR STATE:	California
OPERATOR ZIP:	92337
OPERATOR CONTACT NAME:	Byron Gallade
OPERATOR CONTACT TITLE:	Not reported
OPERATOR CONTACT PHONE:	909-823-9638
OPERATOR CONTACT PHONE EXT:	Not reported
OPERATOR CONTACT EMAIL:	byron@galladechem.com
OPERATOR TYPE:	Private Business
DEVELOPER NAME:	Not reported
DEVELOPER ADDRESS:	Not reported
DEVELOPER CITY:	Not reported
DEVELOPER STATE:	California
DEVELOPER ZIP:	Not reported
DEVELOPER CONTACT NAME:	Not reported
DEVELOPER CONTACT TITLE:	Not reported
CONSTYPE LINEAR UTILITY IND:	Not reported
EMERGENCY PHONE NO:	909-823-4873
EMERGENCY PHONE EXT:	Not reported
CONSTYPE ABOVE GROUND IND:	Not reported
CONSTYPE BELOW GROUND IND:	Not reported
CONSTYPE CABLE LINE IND:	Not reported
CONSTYPE COMM LINE IND:	Not reported
CONSTYPE COMMERTIAL IND:	Not reported
CONSTYPE ELECTRICAL LINE IND:	Not reported
CONSTYPE GAS LINE IND:	Not reported
CONSTYPE INDUSTRIAL IND:	Not reported
CONSTYPE OTHER DESRIPTION:	Not reported
CONSTYPE OTHER IND:	Not reported
CONSTYPE RECONS IND:	Not reported
CONSTYPE RESIDENTIAL IND:	Not reported
CONSTYPE TRANSPORT IND:	Not reported
CONSTYPE UTILITY DESCRIPTION:	Not reported
CONSTYPE UTILITY IND:	Not reported
CONSTYPE WATER SEWER IND:	Not reported
DIR DISCHARGE USWATER IND:	Not reported
RECEIVING WATER NAME:	Not reported
CERTIFIER NAME:	Not reported
CERTIFIER TITLE:	Not reported
CERTIFICATION DATE:	Not reported
PRIMARY SIC:	5169-Chemicals and Allied Products, NEC
SECONDARY SIC:	Not reported
TERTIARY SIC:	Not reported
Npdes Number:	CAS000001

GALLADE CHEMICAL INC (Continued) **S104766449**

Facility Status:	Active
Agency Id:	0
Region:	8
Regulatory Measure Id:	213497
Order No:	97-03-DWQ
Regulatory Measure Type:	Enrollee
Place Id:	Not reported
WDID:	8 36I015226
Program Type:	Industrial
Adoption Date Of Regulatory Measure:	Not reported
Effective Date Of Regulatory Measure:	07/02/1999
Expiration Date Of Regulatory Measure:	Not reported
Termination Date Of Regulatory Measure:	Not reported
Discharge Name:	Gallade Chemical Inc
Discharge Address:	15120 Santa Ana Ave
Discharge City:	Fontana
Discharge State:	California
Discharge Zip:	92337
RECEIVED DATE:	Not reported
PROCESSED DATE:	Not reported
STATUS CODE NAME:	Not reported
STATUS DATE:	Not reported
PLACE SIZE:	Not reported
PLACE SIZE UNIT:	Not reported
FACILITY CONTACT NAME:	Not reported
FACILITY CONTACT TITLE:	Not reported
FACILITY CONTACT PHONE:	Not reported
FACILITY CONTACT PHONE EXT:	Not reported
FACILITY CONTACT EMAIL:	Not reported
OPERATOR NAME:	Not reported
OPERATOR ADDRESS:	Not reported
OPERATOR CITY:	Not reported
OPERATOR STATE:	Not reported
OPERATOR ZIP:	Not reported
OPERATOR CONTACT NAME:	Not reported
OPERATOR CONTACT TITLE:	Not reported
OPERATOR CONTACT PHONE:	Not reported
OPERATOR CONTACT PHONE EXT:	Not reported
OPERATOR CONTACT EMAIL:	Not reported
OPERATOR TYPE:	Not reported
DEVELOPER NAME:	Not reported
DEVELOPER ADDRESS:	Not reported
DEVELOPER CITY:	Not reported
DEVELOPER STATE:	Not reported
DEVELOPER ZIP:	Not reported
DEVELOPER CONTACT NAME:	Not reported
DEVELOPER CONTACT TITLE:	Not reported
CONSTYPE LINEAR UTILITY IND:	Not reported
EMERGENCY PHONE NO:	Not reported
EMERGENCY PHONE EXT:	Not reported
CONSTYPE ABOVE GROUND IND:	Not reported
CONSTYPE BELOW GROUND IND:	Not reported
CONSTYPE CABLE LINE IND:	Not reported
CONSTYPE COMM LINE IND:	Not reported
CONSTYPE COMMERTIAL IND:	Not reported
CONSTYPE ELECTRICAL LINE IND:	Not reported
CONSTYPE GAS LINE IND:	Not reported

GALLADE CHEMICAL INC (Continued) **S104766449**

CONSTYPE INDUSTRIAL IND:	Not reported
CONSTYPE OTHER DESRIPTION:	Not reported
CONSTYPE OTHER IND:	Not reported
CONSTYPE RECONS IND:	Not reported
CONSTYPE RESIDENTIAL IND:	Not reported
CONSTYPE TRANSPORT IND:	Not reported
CONSTYPE UTILITY DESCRIPTION:	Not reported
CONSTYPE UTILITY IND:	Not reported
CONSTYPE WATER SEWER IND:	Not reported
DIR DISCHARGE USWATER IND:	Not reported
RECEIVING WATER NAME:	Not reported
CERTIFIER NAME:	Not reported
CERTIFIER TITLE:	Not reported
CERTIFICATION DATE:	Not reported
PRIMARY SIC:	Not reported
SECONDARY SIC:	Not reported
TERTIARY SIC:	Not reported

San Bern. Co. Permit:

Region:	SAN BERNARDINO
Facility ID:	FA0003402
Owner:	GALLADE, RICHARD A.
Permit Number:	PT0018716
Permit Category:	RISK MANAGEMENT PLAN - LEVEL II
Facility Status:	ACTIVE
Expiration Date:	09/30/2015

Region:	SAN BERNARDINO
Facility ID:	FA0003402
Owner:	GALLADE, RICHARD A.
Permit Number:	PT0024012
Permit Category:	HAZARDOUS MATERIALS 71+ CHEMICALS
Facility Status:	ACTIVE
Expiration Date:	09/30/2015

Region:	SAN BERNARDINO
Facility ID:	FA0003402
Owner:	GALLADE, RICHARD A.
Permit Number:	PT0018713
Permit Category:	RISK MANAGEMENT PLAN - LEVEL 2 (NB)
Facility Status:	FEE EXEMPT
Expiration Date:	09/30/2013

Region:	SAN BERNARDINO
Facility ID:	FA0003402
Owner:	GALLADE, RICHARD A.
Permit Number:	PT0018714
Permit Category:	RISK MANAGEMENT PLAN - LEVEL 2 (NB)
Facility Status:	FEE EXEMPT
Expiration Date:	09/30/2013

Region:	SAN BERNARDINO
Facility ID:	FA0003402
Owner:	GALLADE, RICHARD A.
Permit Number:	PT0018715
Permit Category:	RISK MANAGEMENT PLAN - LEVEL 2 (NB)
Facility Status:	FEE EXEMPT

GALLADE CHEMICAL INC (Continued) **S104766449**

Expiration Date: 09/30/2013

Region: SAN BERNARDINO
Facility ID: FA0003402
Owner: GALLADE, RICHARD A.
Permit Number: PT0015141
Permit Category: RISK MANAGEMENT PLAN - LEVEL 2 (NB)
Facility Status: FEE EXEMPT
Expiration Date: 09/30/2013

Region: SAN BERNARDINO
Facility ID: FA0003402
Owner: GALLADE, RICHARD A.
Permit Number: PT0018718
Permit Category: RISK MANAGEMENT PLAN - LEVEL 2 (NB)
Facility Status: FEE EXEMPT
Expiration Date: 09/30/2011

Region: SAN BERNARDINO
Facility ID: FA0003402
Owner: GALLADE, RICHARD A.
Permit Number: PT0015140
Permit Category: EPCRA FACILITY
Facility Status: INACTIVE
Expiration Date: 09/30/2013

Region: SAN BERNARDINO
Facility ID: FA0003402
Owner: GALLADE, RICHARD A.
Permit Number: PT0003287
Permit Category: HAZMAT HANDLER 0-10 EMPLOYEES
Facility Status: INACTIVE
Expiration Date: 09/30/2013

Region: SAN BERNARDINO
Facility ID: FA0003402
Owner: GALLADE, RICHARD A.
Permit Number: PT0003289
Permit Category: CALARP FACILITY PERMIT
Facility Status: INACTIVE
Expiration Date: 09/30/2013

Region: SAN BERNARDINO
Facility ID: FA0003402
Owner: GALLADE, RICHARD A.
Permit Number: PT0018717
Permit Category: RISK MANAGEMENT PLAN - LEVEL II
Facility Status: INACTIVE
Expiration Date: 09/30/2011

Region: SAN BERNARDINO
Facility ID: FA0003402
Owner: GALLADE, RICHARD A.
Permit Number: PT0018719
Permit Category: RISK MANAGEMENT PLAN - LEVEL II
Facility Status: INACTIVE
Expiration Date: 09/30/2011

GALLADE CHEMICAL INC (Continued) **S104766449**

EMI:

Year:	1987
County Code:	36
Air Basin:	SC
Facility ID:	48520
Air District Name:	SC
SIC Code:	2819
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	0
Reactive Organic Gases Tons/Yr:	0
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0
Part. Matter 10 Micrometers & Smllr Tons/Yr:	0

Year:	1990
County Code:	36
Air Basin:	SC
Facility ID:	48520
Air District Name:	SC
SIC Code:	5169
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	0
Reactive Organic Gases Tons/Yr:	0
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0
Part. Matter 10 Micrometers & Smllr Tons/Yr:	0

F22 **GALLADE CHEMICAL, INC.** **RCRA-SQG** **1010313064**
NW **15120 SANTA ANA AVENUE** **CAL000068399**
1/8-1/4 **FONTANA, CA 92337**
0.245 mi.
1291 ft. **Site 2 of 2 in cluster F**

Relative:
Higher

Actual:
992 ft.

RCRA-SQG:

Date form received by agency:	04/28/2006
Facility name:	GALLADE CHEMICAL, INC.
Facility address:	15120 SANTA ANA AVENUE FONTANA, CA 92337
EPA ID:	CAL000068399
Contact:	BRYON GALLADE
Contact address:	Not reported Not reported
Contact country:	US
Contact telephone:	(909) 823-4873
Contact email:	N/A
EPA Region:	09
Classification:	Small Small Quantity Generator
Description:	Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of

GALLADE CHEMICAL, INC. (Continued) **1010313064**

hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time

Owner/Operator Summary:
Owner/operator name: GALLADE CHEMICAL, INC.
Owner/operator address: Not reported
Not reported
Owner/operator country: US
Owner/operator telephone: Not reported
Legal status: Private
Owner/Operator Type: Operator
Owner/Op start date: 01/01/1982
Owner/Op end date: Not reported

Owner/operator name: GALLADE ENTERPRISES
Owner/operator address: 1230 EAST ST. GERTRUDE PLACE
SANTA ANA, CA 92707
Owner/operator country: US
Owner/operator telephone: Not reported
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: 01/01/1980
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Historical Generators:
Date form received by agency: 04/28/2006
Site name: GALLADE CHEMICAL, INC.
Classification: Large Quantity Generator

. Waste code: 141
. Waste name: 141

. Waste code: 331
. Waste name: 331

. Waste code: 352
. Waste name: 352

GALLADE CHEMICAL, INC. (Continued) **1010313064**

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: D002
. Waste name: CORROSIVE WASTE

. Waste code: D003
. Waste name: REACTIVE WASTE

. Waste code: D006
. Waste name: CADMIUM

. Waste code: D007
. Waste name: CHROMIUM

. Waste code: D009
. Waste name: MERCURY

. Waste code: D011
. Waste name: SILVER

. Waste code: F003
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NONHALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS, AND A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: F005
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: P106
. Waste name: SODIUM CYANIDE (OR) SODIUM CYANIDE NA(CN)

. Waste code: U154
. Waste name: METHANOL (I) (OR) METHYL ALCOHOL (I)

. Waste code: U188
. Waste name: PHENOL

Violation Status: No violations found

G23 **HILLYARD ALUMINUM RECOVERY CORP** **CERC-NFRAP** **1000293615**
NE **10825 BEECH ST** **RCRA-SQG** **CAT000618702**
1/4-1/2 **FONTANA, CA 92335** **FINDS**
0.285 mi.
1503 ft. **Site 1 of 2 in cluster G**

Relative:
Higher

Actual:
1012 ft.

CERC-NFRAP:
Site ID: 0903520
Federal Facility: Not a Federal Facility
NPL Status: Not on the NPL
Non NPL Status: NFRAP-Site does not qualify for the NPL based on existing information

CERCLIS-NFRAP Site Contact Details:
Contact Sequence ID: 13289337.00000
Person ID: 13003854.00000

Contact Sequence ID: 13294932.00000
Person ID: 13003858.00000

Contact Sequence ID: 13300790.00000
Person ID: 13004003.00000

CERCLIS-NFRAP Assessment History:
Action: DISCOVERY
Date Started: / /
Date Completed: 11/01/87
Priority Level: Not reported

Action: ARCHIVE SITE
Date Started: / /
Date Completed: 11/01/88
Priority Level: Not reported

Action: PRELIMINARY ASSESSMENT
Date Started: / /
Date Completed: 11/01/88
Priority Level: NFRAP-Site does not qualify for the NPL based on existing information

RCRA-SQG:
Date form received by agency: 09/01/1996
Facility name: HILLYARD ALUMINUM RECOVERY CORP
Facility address: 10825 BEECH ST
FONTANA, CA 92335
EPA ID: CAT000618702
Mailing address: PO BOX 1720
FONTANA, CA 92335
Contact: ENVIRONMENTAL MANAGER
Contact address: PO BOX 1720
FONTANA, CA 92335
Contact country: US
Contact telephone: Not reported
Contact email: Not reported
EPA Region: 09
Classification: Small Small Quantity Generator
Description: Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of

HILLYARD ALUMINUM RECOVERY CORP (Continued) **1000293615**

hazardous waste at any time

Owner/Operator Summary:
Owner/operator name: NOT REQUIRED
Owner/operator address: NOT REQUIRED
NOT REQUIRED, ME 99999
Owner/operator country: Not reported
Owner/operator telephone: (415) 555-1212
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Owner/operator name: NOT REQUIRED
Owner/operator address: NOT REQUIRED
NOT REQUIRED, ME 99999
Owner/operator country: Not reported
Owner/operator telephone: (415) 555-1212
Legal status: Private
Owner/Operator Type: Operator
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Historical Generators:
Date form received by agency: 08/18/1980
Site name: HILLYARD ALUMINUM RECOVERY CORP
Classification: Large Quantity Generator

Violation Status: No violations found

FINDS:

Registry ID: 110002943879

Environmental Interest/Information System
RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA

HILLYARD ALUMINUM RECOVERY CORP (Continued) **1000293615**

program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

G24 **BRINE FACILITY FONTANA-CLOSED** **LDS** **S109287855**
NE **10825 BEECH AVENUE** **DEED** **N/A**
1/4-1/2 **FONTANA, CA 92335** **ENF**
0.285 mi. **ENVIROSTOR**
1503 ft. **Site 2 of 2 in cluster G**

Relative: Higher

Actual: 1012 ft.

LDS:

Global Id:	L10007609502
Latitude:	34.05640
Longitude:	-117.4689
Case Type:	Land Disposal Site
Status:	Open - Closed/with Monitoring
Status Date:	01/01/2014
Lead Agency:	SANTA ANA RWQCB (REGION 8)
Caseworker:	JPL
Local Agency:	Not reported
RB Case Number:	8 362169001
LOC Case Number:	Not reported
File Location:	Regional Board
Potential Media Affect:	Not reported
EDR Link ID:	L10007609502
Potential Contaminants of Concern:	Other inorganic / salt
Site History:	1957-1977 - RCM Technologies, Inc. operated an aluminum recovery facility from 1957 to 1977 in the City of Fontana. The 18-acre facility was located on the northeast corner of Beech Boulevard and Santa Ana Boulevard. 1976 - The Regional Board adopted Waste Discharge Requirements, Order No. 76-238, for aluminum recycling operations conducted at the site by RCM Technologies, Inc. and Mr. Robert Sackett. Mr. Sackett, the Board Chairman and Chief Executive Officer of RCM Technologies, Inc., owned the property and the aluminum recovery facility until July 1977 when Hilly'ard Aluminum Recovery Corporation (HARC), a wholly-owned subsidiary of Alumax Inc., purchased certain assets, excluding the Fontana property. 1977-1982 - HARC operated the aluminum recovery facility in Fontana October 1977- The Regional Board adopted Board Order No. 77-200, which replaced Order No. 76-238, for the storage and handling of aluminum oxide wastes at the Alumax Fontana facility. Aluminum oxide was generated as a manufacturing by-product of the aluminum recovery process. These wastes were stockpiled at the site, partly on a concrete-paved storage pad located at the southwest corner of the site, and partly on native soil. The aluminum oxide waste contained high levels of soluble salts consisting almost entirely of sodium and potassium chloride. August 1985 - HARC purchased the Alumax Fontana property from RCM. January 1986 - The Regional Board adopted Cleanup and Abatement Order (CAO) No. 86-17. This Order required Alumax Inc., Robert Sackett, and RCM Technologies, Inc. to perform a subsurface investigation, and to propose remedial measures for mitigating any water quality degradation that may have resulted from the migration of soluble salts contained in the aluminum oxide wastes. In order to facilitate investigation at the site and to eliminate a likely source of groundwater contaminants, all aluminum oxide wastes were removed from the site by March of 1992. 1986-1989 - Alumax Inc. conducted two site investigations. April 1993 Alumax Inc. instituted a groundwater

BRINE FACILITY FONTANA-CLOSED (Continued) **S109287855**

monitoring program Initial groundwater monitoring indicated the presence of soluble salts in the groundwater downgradient of the site. July 1993 - Alumax Inc. prepared to initiate a site closure to prevent further groundwater degradation by soluble salts known to remain in the soils beneath the former waste pile storage areas. September 1994 - CAO No. 86-17 was replaced by CAO No. 94-44 to include time schedules for conducting additional groundwater investigations and for mitigating the impact of soluble salts on groundwater. July 1998 - Aluminum Company of America (Alcoa) acquired all assets and facilities, including the Fontana property, from Alumax Inc. May 1999 - The Regional Board adopted CAO No. 99-38, which replaced CAO No. 94-44, to require Alcoa to implement appropriate corrective measures and monitoring requirements. August 1999- Alcoa submitted a site closure and post-closure maintenance plan (SCPCMP). 1999-2000 - Alcoa installed four offsite monitoring wells, AOS #1 through #4, and began monitoring these wells in addition to the existing two on-site groundwater monitoring wells, MW-1 and MW-2. March 2000 - The Executive Officer of the Regional Board approved the SCPCMP May 2000 - Alcoa formally requested a site closure deferral from the December 31, 1999 closure date because the property was for sale, and the cap configuration would be dependent on the buyer's development of the property. March 2001 - The Executive Officer of the Regional Board conditionally approved a time extension for site closure until March 1, 2006. January 2004 - USF Reddaway Inc. (USFR) acquired the Alumax Fontana property from Alcoa and began plans for site development. Prior to USFR's final acquisition of the property, Board staff approved their tentative site development plans in September 2003. May 2005 - Yellow Roadway Corp. (YRC) acquired USFR and became directly involved in the property management, including development, of the Alumax Fontana site. November 2005 - YRC formally requested a time extension for site closure from March 1, 2006 to December 31, 2007 to allow time for a reassessment of the facility design, which may influence the design of the final closure cap. February 2006- The EO of the Regional Board granted YRC the requested time extension for site closure. June 2006 The Regional Board adopted CAO No. R8-2006-0035, which replaced CAO No. 99-38, to reflect the change in ownership of the Alumax Fontana property, and to require YRC to implement site closure. February 2008 - YRC completed the installation of the closure cap (~3" asphalt cap) in accordance with Cleanup & Abatement Order (CAO) No. R8-2006-0035, to minimize water infiltration and mobilization of salt-affected soils beneath the site. April 2008- Alcoa submitted a letter of intent to continue post-closure groundwater monitoring at the former Alumax site. June 2008 - The Executive Officer of the Regional Board approved Alcoa's commitment to continue postclosure groundwater monitoring at the site. December 2009 - Regional Board staff approved the final construction report for the installation of the asphalt concrete cap. June 2010 - CAO No. R8-2006-0035 was rescinded by Board Order No, R8-2010-0021. Alcoa, the previous property owner and the RP for groundwater monitoring, is continuing with post-closure groundwater monitoring at the site. October 2011 - Overton Moore Properties (OMP) acquired the former Alumax Fontana property from YRC. June 2012 An environmental restriction covenant was recorded by OMP for the salt-affected area with the San Bernardino County Recorder. The declaration of restrictions previously recorded for the salt-affected area was terminated by the EO of the Regional Board. April 2013 - OMP

BRINE FACILITY FONTANA-CLOSED (Continued) **S109287855**

completed the redevelopment of the 17-acre undeveloped site into a warehouse for storage and for use as a distribution center for dry goods. May 2013 - Coaster acquired the warehouse building and property, and is the current land owner of the former Alumax Fontana site. August 2013 A new environmental restriction covenant was recorded for the salt-affected area by Coaster with the San Bernardino County Recorder.

Click here to access the California GeoTracker records for this facility:

DEED:

Envirostor ID:	L10007609502
Area:	Not reported
Sub Area:	Not reported
Site Type:	LANDFILL
Status:	Not reported
Agency:	SWRCB
Covenant Uploaded:	Y
Deed Date(s):	08/06/2013

Envirostor ID:	L10007609502
Area:	Not reported
Sub Area:	Not reported
Site Type:	LANDFILL
Status:	Not reported
Agency:	SWRCB
Covenant Uploaded:	Y
Deed Date(s):	06/06/2012

ENF:

Region:	8
Facility Id:	210419
Agency Name:	Not reported
Place Type:	Waste Management Unit
Place Subtype:	Surface Impoundment
Facility Type:	Industrial
Agency Type:	Not reported
# Of Agencies:	Not reported
Place Latitude:	34.0563
Place Longitude:	-117.4705
SIC Code 1:	3341
SIC Desc 1:	Secondary Smelting and Refining of Nonferrous Metals
SIC Code 2:	Not reported
SIC Desc 2:	Not reported
SIC Code 3:	Not reported
SIC Desc 3:	Not reported
NAICS Code 1:	Not reported
NAICS Desc 1:	Not reported
NAICS Code 2:	Not reported
NAICS Desc 2:	Not reported
NAICS Code 3:	Not reported
NAICS Desc 3:	Not reported
# Of Places:	1
Source Of Facility:	Enf Action
Design Flow:	Not reported

BRINE FACILITY FONTANA-CLOSED (Continued) **S109287855**

Threat To Water Quality:	Not reported
Complexity:	Not reported
Pretreatment:	Not reported
Facility Waste Type:	Not reported
Facility Waste Type 2:	Not reported
Facility Waste Type 3:	Not reported
Facility Waste Type 4:	Not reported
Program:	Not reported
Program Category1:	Not reported
Program Category2:	LNDISP
# Of Programs:	Not reported
WDID:	Not reported
Reg Measure Id:	Not reported
Reg Measure Type:	Not reported
Region:	Not reported
Order #:	Not reported
Npdes# CA#:	Not reported
Major-Minor:	Not reported
Npdes Type:	Not reported
Reclamation:	Not reported
Dredge Fill Fee:	Not reported
301H:	Not reported
Application Fee Amt Received:	Not reported
Status:	Not reported
Status Date:	Not reported
Effective Date:	Not reported
Expiration/Review Date:	Not reported
Termination Date:	Not reported
WDR Review - Amend:	Not reported
WDR Review - Revise/Renew:	Not reported
WDR Review - Rescind:	Not reported
WDR Review - No Action Required:	Not reported
WDR Review - Pending:	Not reported
WDR Review - Planned:	Not reported
Status Enrollee:	Not reported
Individual/General:	Not reported
Fee Code:	Not reported
Direction/Voice:	Not reported
Enforcement Id(EID):	222853
Region:	8
Order / Resolution Number:	94-044
Enforcement Action Type:	Clean-up and Abatement Order
Effective Date:	09/19/1994
Adoption/Issuance Date:	Not reported
Achieve Date:	Not reported
Termination Date:	05/21/1999
ACL Issuance Date:	Not reported
EPL Issuance Date:	Not reported
Status:	Historical
Title:	Enforcement - 8 362169001
Description:	SOIL & GROUNWATER CLEANUP TIME SCHEDULE. CAO No. 94-044 was replaced by CAO No. 99-38 on May 21, 1999 to require Alcoa to initiate a site closure, and to install offsite groundwater wells for monitoring the salt plume.
Program:	LNDISP
Latest Milestone Completion Date:	Not reported
# Of Programs1:	1

BRINE FACILITY FONTANA-CLOSED (Continued) **S109287855**

Total Assessment Amount:	0.00
Initial Assessed Amount:	0.00
Liability $ Amount:	0.00
Project $ Amount:	0.00
Liability $ Paid:	0.00
Project $ Completed:	0.00
Total $ Paid/Completed Amount:	0.00
Region:	8
Facility Id:	210419
Agency Name:	Alcoa Remediation Services
Place Type:	Waste Management Unit
Place Subtype:	Surface Impoundment
Facility Type:	Industrial
Agency Type:	Privately-Owned Business
# Of Agencies:	1
Place Latitude:	34.0563
Place Longitude:	-117.4705
SIC Code 1:	3341
SIC Desc 1:	Secondary Smelting and Refining of Nonferrous Metals
SIC Code 2:	Not reported
SIC Desc 2:	Not reported
SIC Code 3:	Not reported
SIC Desc 3:	Not reported
NAICS Code 1:	Not reported
NAICS Desc 1:	Not reported
NAICS Code 2:	Not reported
NAICS Desc 2:	Not reported
NAICS Code 3:	Not reported
NAICS Desc 3:	Not reported
# Of Places:	1
Source Of Facility:	Reg Meas
Design Flow:	0.01
Threat To Water Quality:	3
Complexity:	C
Pretreatment:	X - Facility is not a POTW
Facility Waste Type:	Solid wastes, NEC
Facility Waste Type 2:	Not reported
Facility Waste Type 3:	Not reported
Facility Waste Type 4:	Not reported
Program:	LNDISP
Program Category1:	LNDISP
Program Category2:	LNDISP
# Of Programs:	1
WDID:	8 362169001
Reg Measure Id:	137495
Reg Measure Type:	WDR
Region:	8
Order #:	77-200
Npdes# CA#:	Not reported
Major-Minor:	Not reported
Npdes Type:	Not reported
Reclamation:	N - No
Dredge Fill Fee:	Not reported
301H:	Not reported
Application Fee Amt Received:	Not reported
Status:	Historical

BRINE FACILITY FONTANA-CLOSED (Continued) **S109287855**

Status Date:	03/28/2012
Effective Date:	10/14/1977
Expiration/Review Date:	03/01/2014
Termination Date:	03/16/2012
WDR Review - Amend:	Not reported
WDR Review - Revise/Renew:	Not reported
WDR Review - Rescind:	Not reported
WDR Review - No Action Required:	2004-03-17 00:00:00
WDR Review - Pending:	Not reported
WDR Review - Planned:	Not reported
Status Enrollee:	N
Individual/General:	I
Fee Code:	15 - WDRs pending rescission
Direction/Voice:	Passive
Enforcement Id(EID):	350589
Region:	8
Order / Resolution Number:	Not reported
Enforcement Action Type:	Staff Enforcement Letter
Effective Date:	06/08/2006
Adoption/Issuance Date:	Not reported
Achieve Date:	12/31/2007
Termination Date:	06/08/2006
ACL Issuance Date:	Not reported
EPL Issuance Date:	Not reported
Status:	Historical
Title:	SEL 6/8/06 for YRC Worldwide
Description:	CAO No. 99-38 was replaced by CAO No. R8-2006-0035 on June 8, 1006 to reflect the change in ownership of the Alumax Fontana property, and to require Yellow Roadway Corp. to implement site closure. Board staff issed a staff enforcement letter to require Alcoa, previous owner of the Alumax property, to continue groundwater beyond site closure, as agreed upon.
Program:	LNDISP
Latest Milestone Completion Date:	Not reported
# Of Programs1:	1
Total Assessment Amount:	0.00
Initial Assessed Amount:	0.00
Liability $ Amount:	0.00
Project $ Amount:	0.00
Liability $ Paid:	0.00
Project $ Completed:	0.00
Total $ Paid/Completed Amount:	0.00

Region:	8
Facility Id:	210419
Agency Name:	Alcoa Remediation Services
Place Type:	Waste Management Unit
Place Subtype:	Surface Impoundment
Facility Type:	Industrial
Agency Type:	Privately-Owned Business
# Of Agencies:	1
Place Latitude:	34.0563
Place Longitude:	-117.4705
SIC Code 1:	3341
SIC Desc 1:	Secondary Smelting and Refining of Nonferrous Metals
SIC Code 2:	Not reported

BRINE FACILITY FONTANA-CLOSED (Continued) **S109287855**

SIC Desc 2:	Not reported
SIC Code 3:	Not reported
SIC Desc 3:	Not reported
NAICS Code 1:	Not reported
NAICS Desc 1:	Not reported
NAICS Code 2:	Not reported
NAICS Desc 2:	Not reported
NAICS Code 3:	Not reported
NAICS Desc 3:	Not reported
# Of Places:	1
Source Of Facility:	Reg Meas
Design Flow:	0.01
Threat To Water Quality:	3
Complexity:	C
Pretreatment:	X - Facility is not a POTW
Facility Waste Type:	Solid wastes, NEC
Facility Waste Type 2:	Not reported
Facility Waste Type 3:	Not reported
Facility Waste Type 4:	Not reported
Program:	LNDISP
Program Category1:	LNDISP
Program Category2:	LNDISP
# Of Programs:	1
WDID:	8 362169001
Reg Measure Id:	137495
Reg Measure Type:	WDR
Region:	8
Order #:	77-200
Npdes# CA#:	Not reported
Major-Minor:	Not reported
Npdes Type:	Not reported
Reclamation:	N - No
Dredge Fill Fee:	Not reported
301H:	Not reported
Application Fee Amt Received:	Not reported
Status:	Historical
Status Date:	03/28/2012
Effective Date:	10/14/1977
Expiration/Review Date:	03/01/2014
Termination Date:	03/16/2012
WDR Review - Amend:	Not reported
WDR Review - Revise/Renew:	Not reported
WDR Review - Rescind:	Not reported
WDR Review - No Action Required:	2004-03-17 00:00:00
WDR Review - Pending:	Not reported
WDR Review - Planned:	Not reported
Status Enrollee:	N
Individual/General:	I
Fee Code:	15 - WDRs pending rescission
Direction/Voice:	Passive
Enforcement Id(EID):	340098
Region:	8
Order / Resolution Number:	R8-2006-0035
Enforcement Action Type:	Clean-up and Abatement Order
Effective Date:	06/08/2006
Adoption/Issuance Date:	06/08/2006
Achieve Date:	Not reported

BRINE FACILITY FONTANA-CLOSED (Continued) **S109287855**

Termination Date:	06/10/2010
ACL Issuance Date:	Not reported
EPL Issuance Date:	Not reported
Status:	Historical
Title:	CAO R8-2006-0035 for YRC Worldwide Inc USF Reddaway
Description:	CAO No. 99-38 was replaced by CAO No. R8-2006-0035 on June 8, 2006 to reflect the change in ownership of the Alumax Fontana property, and to require Yellow Roadway Corp. to implement site closure. Site closure completed in February 2008. CAO No. R8-2006-0035 was rescinded by Order No. R8-2010-0021.
Program:	LNDISP
Latest Milestone Completion Date:	Not reported
# Of Programs1:	1
Total Assessment Amount:	0.00
Initial Assessed Amount:	0.00
Liability $ Amount:	0.00
Project $ Amount:	0.00
Liability $ Paid:	0.00
Project $ Completed:	0.00
Total $ Paid/Completed Amount:	0.00
Region:	8
Facility Id:	210419
Agency Name:	Alcoa Remediation Services
Place Type:	Waste Management Unit
Place Subtype:	Surface Impoundment
Facility Type:	Industrial
Agency Type:	Privately-Owned Business
# Of Agencies:	1
Place Latitude:	34.0563
Place Longitude:	-117.4705
SIC Code 1:	3341
SIC Desc 1:	Secondary Smelting and Refining of Nonferrous Metals
SIC Code 2:	Not reported
SIC Desc 2:	Not reported
SIC Code 3:	Not reported
SIC Desc 3:	Not reported
NAICS Code 1:	Not reported
NAICS Desc 1:	Not reported
NAICS Code 2:	Not reported
NAICS Desc 2:	Not reported
NAICS Code 3:	Not reported
NAICS Desc 3:	Not reported
# Of Places:	1
Source Of Facility:	Reg Meas
Design Flow:	0.01
Threat To Water Quality:	3
Complexity:	C
Pretreatment:	X - Facility is not a POTW
Facility Waste Type:	Solid wastes, NEC
Facility Waste Type 2:	Not reported
Facility Waste Type 3:	Not reported
Facility Waste Type 4:	Not reported
Program:	LNDISP
Program Category1:	LNDISP
Program Category2:	LNDISP

BRINE FACILITY FONTANA-CLOSED (Continued) **S109287855**

# Of Programs:	1
WDID:	8 362169001
Reg Measure Id:	137495
Reg Measure Type:	WDR
Region:	8
Order #:	77-200
Npdes# CA#:	Not reported
Major-Minor:	Not reported
Npdes Type:	Not reported
Reclamation:	N - No
Dredge Fill Fee:	Not reported
301H:	Not reported
Application Fee Amt Received:	Not reported
Status:	Historical
Status Date:	03/28/2012
Effective Date:	10/14/1977
Expiration/Review Date:	03/01/2014
Termination Date:	03/16/2012
WDR Review - Amend:	Not reported
WDR Review - Revise/Renew:	Not reported
WDR Review - Rescind:	Not reported
WDR Review - No Action Required:	2004-03-17 00:00:00
WDR Review - Pending:	Not reported
WDR Review - Planned:	Not reported
Status Enrollee:	N
Individual/General:	I
Fee Code:	15 - WDRs pending rescission
Direction/Voice:	Passive
Enforcement Id(EID):	234020
Region:	8
Order / Resolution Number:	UNKNOWN
Enforcement Action Type:	Staff Enforcement Letter
Effective Date:	03/01/2001
Adoption/Issuance Date:	Not reported
Achieve Date:	Not reported
Termination Date:	03/01/2001
ACL Issuance Date:	Not reported
EPL Issuance Date:	Not reported
Status:	Historical
Title:	Enforcement - 8 362169001
Description:	Failure to comply with Item 2 of CAO 99-38 to provide a site cap by Dec. 31, 1999. On 4/19/00, Alcoa proposed a site cap deferral in light of the recent gw monitoring data. Not reported
Program:	LNDISP
Latest Milestone Completion Date:	Not reported
# Of Programs1:	1
Total Assessment Amount:	0.00
Initial Assessed Amount:	0.00
Liability $ Amount:	0.00
Project $ Amount:	0.00
Liability $ Paid:	0.00
Project $ Completed:	0.00
Total $ Paid/Completed Amount:	0.00
Region:	8
Facility Id:	210419

BRINE FACILITY FONTANA-CLOSED (Continued) **S109287855**

Agency Name:	Alcoa Remediation Services
Place Type:	Waste Management Unit
Place Subtype:	Surface Impoundment
Facility Type:	Industrial
Agency Type:	Privately-Owned Business
# Of Agencies:	1
Place Latitude:	34.0563
Place Longitude:	-117.4705
SIC Code 1:	3341
SIC Desc 1:	Secondary Smelting and Refining of Nonferrous Metals
SIC Code 2:	Not reported
SIC Desc 2:	Not reported
SIC Code 3:	Not reported
SIC Desc 3:	Not reported
NAICS Code 1:	Not reported
NAICS Desc 1:	Not reported
NAICS Code 2:	Not reported
NAICS Desc 2:	Not reported
NAICS Code 3:	Not reported
NAICS Desc 3:	Not reported
# Of Places:	1
Source Of Facility:	Reg Meas
Design Flow:	0.01
Threat To Water Quality:	3
Complexity:	C
Pretreatment:	X - Facility is not a POTW
Facility Waste Type:	Solid wastes, NEC
Facility Waste Type 2:	Not reported
Facility Waste Type 3:	Not reported
Facility Waste Type 4:	Not reported
Program:	LNDISP
Program Category1:	LNDISP
Program Category2:	LNDISP
# Of Programs:	1
WDID:	8 362169001
Reg Measure Id:	137495
Reg Measure Type:	WDR
Region:	8
Order #:	77-200
Npdes# CA#:	Not reported
Major-Minor:	Not reported
Npdes Type:	Not reported
Reclamation:	N - No
Dredge Fill Fee:	Not reported
301H:	Not reported
Application Fee Amt Received:	Not reported
Status:	Historical
Status Date:	03/28/2012
Effective Date:	10/14/1977
Expiration/Review Date:	03/01/2014
Termination Date:	03/16/2012
WDR Review - Amend:	Not reported
WDR Review - Revise/Renew:	Not reported
WDR Review - Rescind:	Not reported
WDR Review - No Action Required:	2004-03-17 00:00:00
WDR Review - Pending:	Not reported
WDR Review - Planned:	Not reported

BRINE FACILITY FONTANA-CLOSED (Continued) **S109287855**

Status Enrollee:	N
Individual/General:	I
Fee Code:	15 - WDRs pending rescission
Direction/Voice:	Passive
Enforcement Id(EID):	233226
Region:	8
Order / Resolution Number:	99-038
Enforcement Action Type:	Clean-up and Abatement Order
Effective Date:	08/23/1999
Adoption/Issuance Date:	Not reported
Achieve Date:	8/23/1999
Termination Date:	Not reported
ACL Issuance Date:	Not reported
EPL Issuance Date:	Not reported
Status:	Active
Title:	Enforcement - 8 362169001
Description:	CAO No. 94-44 has been replaced by CAO No. 99-38 to incorporate appropriate corrective measures, compliance time schedules, and monitoirng requirements.
Program:	LNDISP
Latest Milestone Completion Date:	8/23/1999
# Of Programs1:	1
Total Assessment Amount:	0.00
Initial Assessed Amount:	0.00
Liability $ Amount:	0.00
Project $ Amount:	0.00
Liability $ Paid:	0.00
Project $ Completed:	0.00
Total $ Paid/Completed Amount:	0.00

Region:	8
Facility Id:	210419
Agency Name:	Alcoa Remediation Services
Place Type:	Waste Management Unit
Place Subtype:	Surface Impoundment
Facility Type:	Industrial
Agency Type:	Privately-Owned Business
# Of Agencies:	1
Place Latitude:	34.0563
Place Longitude:	-117.4705
SIC Code 1:	3341
SIC Desc 1:	Secondary Smelting and Refining of Nonferrous Metals
SIC Code 2:	Not reported
SIC Desc 2:	Not reported
SIC Code 3:	Not reported
SIC Desc 3:	Not reported
NAICS Code 1:	Not reported
NAICS Desc 1:	Not reported
NAICS Code 2:	Not reported
NAICS Desc 2:	Not reported
NAICS Code 3:	Not reported
NAICS Desc 3:	Not reported
# Of Places:	1
Source Of Facility:	Reg Meas
Design Flow:	0.01
Threat To Water Quality:	3
Complexity:	C

BRINE FACILITY FONTANA-CLOSED (Continued) **S109287855**

Pretreatment:	X - Facility is not a POTW
Facility Waste Type:	Solid wastes, NEC
Facility Waste Type 2:	Not reported
Facility Waste Type 3:	Not reported
Facility Waste Type 4:	Not reported
Program:	LNDISP
Program Category1:	LNDISP
Program Category2:	LNDISP
# Of Programs:	1
WDID:	8 362169001
Reg Measure Id:	137495
Reg Measure Type:	WDR
Region:	8
Order #:	77-200
Npdes# CA#:	Not reported
Major-Minor:	Not reported
Npdes Type:	Not reported
Reclamation:	N - No
Dredge Fill Fee:	Not reported
301H:	Not reported
Application Fee Amt Received:	Not reported
Status:	Historical
Status Date:	03/28/2012
Effective Date:	10/14/1977
Expiration/Review Date:	03/01/2014
Termination Date:	03/16/2012
WDR Review - Amend:	Not reported
WDR Review - Revise/Renew:	Not reported
WDR Review - Rescind:	Not reported
WDR Review - No Action Required:	2004-03-17 00:00:00
WDR Review - Pending:	Not reported
WDR Review - Planned:	Not reported
Status Enrollee:	N
Individual/General:	I
Fee Code:	15 - WDRs pending rescission
Direction/Voice:	Passive
Enforcement Id(EID):	232627
Region:	8
Order / Resolution Number:	UNKNOWN
Enforcement Action Type:	Oral Communication
Effective Date:	08/16/2000
Adoption/Issuance Date:	Not reported
Achieve Date:	8/25/2000
Termination Date:	08/16/2000
ACL Issuance Date:	Not reported
EPL Issuance Date:	Not reported
Status:	Historical
Title:	Enforcement - 8 362169001
Description:	Alcoa, successor of Alumax, has failed to submit the semi-annually monitoring report that was due 7/31/00. The report will be submitted by the end of next week (8/25/00).
Program:	LNDISP
Latest Milestone Completion Date:	8/25/2000
# Of Programs1:	1
Total Assessment Amount:	0.00
Initial Assessed Amount:	0.00
Liability $ Amount:	0.00

BRINE FACILITY FONTANA-CLOSED (Continued) **S109287855**

Project $ Amount:	0.00
Liability $ Paid:	0.00
Project $ Completed:	0.00
Total $ Paid/Completed Amount:	0.00
Region:	8
Facility Id:	210419
Agency Name:	Alcoa Remediation Services
Place Type:	Waste Management Unit
Place Subtype:	Surface Impoundment
Facility Type:	Industrial
Agency Type:	Privately-Owned Business
# Of Agencies:	1
Place Latitude:	34.0563
Place Longitude:	-117.4705
SIC Code 1:	3341
SIC Desc 1:	Secondary Smelting and Refining of Nonferrous Metals
SIC Code 2:	Not reported
SIC Desc 2:	Not reported
SIC Code 3:	Not reported
SIC Desc 3:	Not reported
NAICS Code 1:	Not reported
NAICS Desc 1:	Not reported
NAICS Code 2:	Not reported
NAICS Desc 2:	Not reported
NAICS Code 3:	Not reported
NAICS Desc 3:	Not reported
# Of Places:	1
Source Of Facility:	Reg Meas
Design Flow:	0.01
Threat To Water Quality:	3
Complexity:	C
Pretreatment:	X - Facility is not a POTW
Facility Waste Type:	Solid wastes, NEC
Facility Waste Type 2:	Not reported
Facility Waste Type 3:	Not reported
Facility Waste Type 4:	Not reported
Program:	LNDISP
Program Category1:	LNDISP
Program Category2:	LNDISP
# Of Programs:	1
WDID:	8 362169001
Reg Measure Id:	137495
Reg Measure Type:	WDR
Region:	8
Order #:	77-200
Npdes# CA#:	Not reported
Major-Minor:	Not reported
Npdes Type:	Not reported
Reclamation:	N - No
Dredge Fill Fee:	Not reported
301H:	Not reported
Application Fee Amt Received:	Not reported
Status:	Historical
Status Date:	03/28/2012
Effective Date:	10/14/1977
Expiration/Review Date:	03/01/2014

BRINE FACILITY FONTANA-CLOSED (Continued) **S109287855**

Termination Date:	03/16/2012
WDR Review - Amend:	Not reported
WDR Review - Revise/Renew:	Not reported
WDR Review - Rescind:	Not reported
WDR Review - No Action Required:	2004-03-17 00:00:00
WDR Review - Pending:	Not reported
WDR Review - Planned:	Not reported
Status Enrollee:	N
Individual/General:	I
Fee Code:	15 - WDRs pending rescission
Direction/Voice:	Passive
Enforcement Id(EID):	224843
Region:	8
Order / Resolution Number:	86-017
Enforcement Action Type:	Clean-up and Abatement Order
Effective Date:	01/17/1986
Adoption/Issuance Date:	Not reported
Achieve Date:	Not reported
Termination Date:	Not reported
ACL Issuance Date:	Not reported
EPL Issuance Date:	Not reported
Status:	Historical
Title:	Enforcement - 8 362169001
Description:	PROPOSED TIME SCHEDULE DUE 2/18/86.
Program:	LNDISP
Latest Milestone Completion Date:	Not reported
# Of Programs1:	1
Total Assessment Amount:	0.00
Initial Assessed Amount:	0.00
Liability $ Amount:	0.00
Project $ Amount:	0.00
Liability $ Paid:	0.00
Project $ Completed:	0.00
Total $ Paid/Completed Amount:	0.00

Region:	8
Facility Id:	210419
Agency Name:	Not reported
Place Type:	Waste Management Unit
Place Subtype:	Surface Impoundment
Facility Type:	Industrial
Agency Type:	Not reported
# Of Agencies:	Not reported
Place Latitude:	34.0563
Place Longitude:	-117.4705
SIC Code 1:	3341
SIC Desc 1:	Secondary Smelting and Refining of Nonferrous Metals
SIC Code 2:	Not reported
SIC Desc 2:	Not reported
SIC Code 3:	Not reported
SIC Desc 3:	Not reported
NAICS Code 1:	Not reported
NAICS Desc 1:	Not reported
NAICS Code 2:	Not reported
NAICS Desc 2:	Not reported
NAICS Code 3:	Not reported
NAICS Desc 3:	Not reported

BRINE FACILITY FONTANA-CLOSED (Continued) **S109287855**

# Of Places:	1
Source Of Facility:	Enf Action
Design Flow:	Not reported
Threat To Water Quality:	Not reported
Complexity:	Not reported
Pretreatment:	Not reported
Facility Waste Type:	Not reported
Facility Waste Type 2:	Not reported
Facility Waste Type 3:	Not reported
Facility Waste Type 4:	Not reported
Program:	Not reported
Program Category1:	Not reported
Program Category2:	LNDISP
# Of Programs:	Not reported
WDID:	Not reported
Reg Measure Id:	Not reported
Reg Measure Type:	Not reported
Region:	Not reported
Order #:	Not reported
Npdes# CA#:	Not reported
Major-Minor:	Not reported
Npdes Type:	Not reported
Reclamation:	Not reported
Dredge Fill Fee:	Not reported
301H:	Not reported
Application Fee Amt Received:	Not reported
Status:	Not reported
Status Date:	Not reported
Effective Date:	Not reported
Expiration/Review Date:	Not reported
Termination Date:	Not reported
WDR Review - Amend:	Not reported
WDR Review - Revise/Renew:	Not reported
WDR Review - Rescind:	Not reported
WDR Review - No Action Required:	Not reported
WDR Review - Pending:	Not reported
WDR Review - Planned:	Not reported
Status Enrollee:	Not reported
Individual/General:	Not reported
Fee Code:	Not reported
Direction/Voice:	Not reported
Enforcement Id(EID):	361986
Region:	8
Order / Resolution Number:	Not reported
Enforcement Action Type:	13267 Letter
Effective Date:	06/10/2008
Adoption/Issuance Date:	Not reported
Achieve Date:	Not reported
Termination Date:	Not reported
ACL Issuance Date:	Not reported
EPL Issuance Date:	Not reported
Status:	Active
Title:	13267 Letter to Alcoa for Postclosure Groundwater Monitoring
Description:	On June 10, 2008, Board staff issued a staff enforcement letter, acknowledging Alcoa's committment to contine postclosure groundwater at the former Alumax Fontana site. YRC will not be responsible for groundater monitoring at

BRINE FACILITY FONTANA-CLOSED (Continued) **S109287855**

the former Alumax Fontana site under the conditions stipulated in the June 10, 2008 letter.

Program:	LNDISP
Latest Milestone Completion Date:	Not reported
# Of Programs1:	1
Total Assessment Amount:	0.00
Initial Assessed Amount:	0.00
Liability $ Amount:	0.00
Project $ Amount:	0.00
Liability $ Paid:	0.00
Project $ Completed:	0.00
Total $ Paid/Completed Amount:	0.00

ENVIROSTOR:

Facility ID:	36330035
Status:	Refer: RWQCB
Status Date:	05/12/1995
Site Code:	Not reported
Site Type:	Historical
Site Type Detailed:	* Historical
Acres:	Not reported
NPL:	NO
Regulatory Agencies:	NONE SPECIFIED
Lead Agency:	NONE SPECIFIED
Program Manager:	Not reported
Supervisor:	* Mmonroy
Division Branch:	Cleanup Cypress
Assembly:	47
Senate:	20
Special Program:	* CERC2
Restricted Use:	NO
Site Mgmt Req:	NONE SPECIFIED
Funding:	Not reported
Latitude:	34.05666
Longitude:	-117.4700
APN:	NONE SPECIFIED
Past Use:	NONE SPECIFIED
Potential COC:	* Metals - Other Inorganic Solid Waste * AQUEOUS SOLUTION WITH METALS Not reported
Confirmed COC:	NONE SPECIFIED
Potential Description:	NONE SPECIFIED
Alias Name:	CAD000618702
Alias Type:	EPA Identification Number
Alias Name:	36330035
Alias Type:	Envirostor ID Number

Completed Info:

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Site Screening
Completed Date:	05/12/1995
Comments:	NFA FOR DTSC.
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Site Screening
Completed Date:	09/26/1988

BRINE FACILITY FONTANA-CLOSED (Continued) **S109287855**

Comments:	SITE SCREENING DONE RWQCB LEAD AGENCY
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Preliminary Assessment Report
Completed Date:	09/28/1987
Comments:	PRELIM ASSESS DONE PENDING STATUS RWQCB IS CURRENTING DOING SITE CHARACTERIZATION
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Site Screening
Completed Date:	03/11/1987
Comments:	SITE SCREENING DONE RECORDS INDICATE WASTES DISPOSED ONSITE. FURTHER RECORD SEARCH NEEDED.
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	* Discovery
Completed Date:	03/14/1983
Comments:	FACILITY IDENTIFIED ID FROM RWQCB RECORD SEARCH PLANT SHUT DOWN 5/82 BUT MATERIAL STILL IN PONDING AREAS. OXIDE PONDS ON-SITE. CO. VIOLATED FLOW LIMIT OF DISCH. CO CHANGED HANDS FROM ALUMEX INC
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	* Discovery
Completed Date:	01/25/1983
Comments:	FACILITY IDENTIFIED ID VIA RWQCB INACTIVE FILES BOX #58 ALUMINUM RECYCLER.DISCH OVERLIES CHINOII GW BASIN. 1000GAL/D SALINE SLURRY TO EVAP POMDS 77
Future Area Name:	Not reported
Future Sub Area Name:	Not reported
Future Document Type:	Not reported
Future Due Date:	Not reported
Schedule Area Name:	Not reported
Schedule Sub Area Name:	Not reported
Schedule Document Type:	Not reported
Schedule Due Date:	Not reported
Schedule Revised Date:	Not reported

H25 **SOUTHERN CALIF. AUTO AUCTION** **LUST** **S101301143**
NNE **10700 BEECH AVE** **N/A**
1/4-1/2 **FONTANA, CA 92335**
0.429 mi.
2267 ft. **Site 1 of 2 in cluster H**

Relative:
Higher

Actual:
1023 ft.

LUST REG 8:

Region:	8
County:	San Bernardino
Regional Board:	Santa Ana Region
Facility Status:	Case Closed
Case Number:	083602426T
Local Case Num:	94004
Case Type:	Soil only
Substance:	Diesel
Qty Leaked:	Not reported

SOUTHERN CALIF. AUTO AUCTION (Continued) **S101301143**

Abate Method:	Not reported
Cross Street:	SLOVER
Enf Type:	CLOS
Funding:	Not reported
How Discovered:	Tank Closure
How Stopped:	Not reported
Leak Cause:	UNK
Leak Source:	Piping
Global ID:	T0607100316
How Stopped Date:	1/11/1994
Enter Date:	4/13/1994
Date Confirmation of Leak Began:	Not reported
Date Preliminary Assessment Began:	1/26/1994
Discover Date:	1/11/1994
Enforcement Date:	Not reported
Close Date:	7/26/1994
Date Prelim Assessment Workplan Submitted:	Not reported
Date Pollution Characterization Began:	Not reported
Date Remediation Plan Submitted:	Not reported
Date Remedial Action Underway:	Not reported
Date Post Remedial Action Monitoring:	Not reported
Enter Date:	4/13/1994
GW Qualifies:	Not reported
Soil Qualifies:	Not reported
Operator:	Not reported
Facility Contact:	Not reported
Interim:	Not reported
Oversite Program:	LUST
Latitude:	34.0541102
Longitude:	-117.4712233
MTBE Date:	Not reported
Max MTBE GW:	Not reported
MTBE Concentration:	1
Max MTBE Soil:	Not reported
MTBE Fuel:	0
MTBE Tested:	MTBE Detected. Site tested for MTBE & MTBE detected
MTBE Class:	*
Staff:	RS
Staff Initials:	BM7
Lead Agency:	Local Agency
Local Agency:	36000L
Hydr Basin #:	UPPER SANTA ANA VALL
Beneficial:	Not reported
Priority:	Not reported
Cleanup Fund Id:	Not reported
Work Suspended:	Not reported

Summary: Not reported

H26 **SOUTHERN CALIFORNIA AUTO AUCTI** **HIST CORTESE** **S101591254**
NNE **10700 BEECH AV** **LUST** **N/A**
1/4-1/2 **FONTANA, CA 92335** **CA FID UST**
0.429 mi. **San Bern. Co. Permit**
2267 ft. **Site 2 of 2 in cluster H** **EMI**

Relative:
Higher

Actual:
1023 ft.

HIST CORTESE:

Region:	CORTESE
Facility County Code:	36
Reg By:	LTNKA
Reg Id:	083602426T

LUST:

Region:	STATE
Global Id:	T0607100316
Latitude:	34.0541102
Longitude:	-117.4712233
Case Type:	Not reported
Status:	Completed - Case Closed
Status Date:	07/26/1994
Lead Agency:	Not reported
Case Worker:	Not reported
Local Agency:	Not reported
RB Case Number:	083602426T
LOC Case Number:	Not reported
File Location:	Local Agency
Potential Media Affect:	Soil
Potential Contaminants of Concern:	Diesel
Site History:	Not reported

Click here to access the California GeoTracker records for this facility:

Contact:

Global Id:	T0607100316
Contact Type:	Regional Board Caseworker
Contact Name:	ROSE SCOTT
Organization Name:	SANTA ANA RWQCB (REGION 8)
Address:	3737 MAIN STREET, SUITE 500
City:	RIVERSIDE
Email:	rscott@waterboards.ca.gov
Phone Number:	9513206375

Status History:

Global Id:	T0607100316
Status:	Completed - Case Closed
Status Date:	07/26/1994
Global Id:	T0607100316
Status:	Open - Case Begin Date
Status Date:	01/11/1994
Global Id:	T0607100316
Status:	Open - Site Assessment
Status Date:	01/26/1994

Regulatory Activities:

Global Id:	T0607100316
Action Type:	ENFORCEMENT

SOUTHERN CALIFORNIA AUTO AUCTI (Continued) **S101591254**

Date: 07/26/1994
Action: Closure/No Further Action Letter

Global Id: T0607100316
Action Type: Other
Date: 01/11/1994
Action: Leak Discovery

Global Id: T0607100316
Action Type: Other
Date: 01/26/1994
Action: Leak Reported

Global Id: T0607100316
Action Type: Other
Date: 01/11/1994
Action: Leak Stopped

Global Id: T0607100316
Action Type: REMEDIATION
Date: 01/11/1994
Action: Excavation

CA FID UST:
Facility ID: 36003152
Regulated By: UTNKA
Regulated ID: Not reported
Cortese Code: Not reported
SIC Code: Not reported
Facility Phone: Not reported
Mail To: Not reported
Mailing Address: 10700 BEECH AVE
Mailing Address 2: Not reported
Mailing City,St,Zip: FONTANA 92335
Contact: Not reported
Contact Phone: Not reported
DUNs Number: Not reported
NPDES Number: Not reported
EPA ID: Not reported
Comments: Not reported
Status: Active

San Bern. Co. Permit:
Region: SAN BERNARDINO
Facility ID: FA0006273
Owner: MANHEIM AUCTIONS INC
Permit Number: PT0005013
Permit Category: SMALL QUANTITY GENERATOR
Facility Status: ACTIVE
Expiration Date: 08/31/2015

Region: SAN BERNARDINO
Facility ID: FA0006273
Owner: MANHEIM AUCTIONS INC
Permit Number: PT0019464

SOUTHERN CALIFORNIA AUTO AUCTI (Continued) **S101591254**

Permit Category: APSA 1,320-10,000 GAL FAC CAPACITY
Facility Status: ACTIVE
Expiration Date: 08/31/2015

Region: SAN BERNARDINO
Facility ID: FA0006273
Owner: MANHEIM AUCTIONS INC
Permit Number: PT0005012
Permit Category: HAZARDOUS MATERIALS 4-10 CHEMICALS
Facility Status: ACTIVE
Expiration Date: 08/31/2015

Region: SAN BERNARDINO
Facility ID: FA0006273
Owner: MANHEIM AUCTIONS INC
Permit Number: PT0016853
Permit Category: AST OPERATING PERMIT
Facility Status: INACTIVE
Expiration Date: 08/31/2009

EMI:

Year:	1987
County Code:	36
Air Basin:	SC
Facility ID:	56299
Air District Name:	SC
SIC Code:	7538
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	0
Reactive Organic Gases Tons/Yr:	0
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0
Part. Matter 10 Micrometers & Smllr Tons/Yr:	0

Year:	1990
County Code:	36
Air Basin:	SC
Facility ID:	56299
Air District Name:	SC
SIC Code:	7538
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	0
Reactive Organic Gases Tons/Yr:	0
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0
Part. Matter 10 Micrometers & Smllr Tons/Yr:	0

I27 **CENTRAL REFRIGERATED TRUCKING** **NPDES S105697536**
ENE **15816 SANTA ANA AVE** **LUST N/A**
1/4-1/2 **FONTANA, CA 92337** **San Bern. Co. Permit**
0.464 mi.
2451 ft. **Site 1 of 2 in cluster I**

Relative:
Higher

Actual:
1019 ft.

NPDES:

Npdes Number:	Not reported
Facility Status:	Not reported
Agency Id:	Not reported
Region:	8
Regulatory Measure Id:	213251
Order No:	Not reported
Regulatory Measure Type:	Industrial
Place Id:	Not reported
WDID:	8 36I008025
Program Type:	Not reported
Adoption Date Of Regulatory Measure:	Not reported
Effective Date Of Regulatory Measure:	Not reported
Expiration Date Of Regulatory Measure:	Not reported
Termination Date Of Regulatory Measure:	09/18/2014
Discharge Name:	Not reported
Discharge Address:	Not reported
Discharge City:	Not reported
Discharge State:	Not reported
Discharge Zip:	Not reported
RECEIVED DATE:	05/09/2008
PROCESSED DATE:	01/06/1993
STATUS CODE NAME:	Terminated
STATUS DATE:	09/23/2014
PLACE SIZE:	5
PLACE SIZE UNIT:	Acres
FACILITY CONTACT NAME:	MANUEL Ocampo
FACILITY CONTACT TITLE:	Not reported
FACILITY CONTACT PHONE:	9093567220
FACILITY CONTACT PHONE EXT:	Not reported
FACILITY CONTACT EMAIL:	Not reported
OPERATOR NAME:	Central Refrigerated Trucking
OPERATOR ADDRESS:	15816 Santa Ana Ave
OPERATOR CITY:	Fontana
OPERATOR STATE:	California
OPERATOR ZIP:	92337
OPERATOR CONTACT NAME:	Manuel Ocampo
OPERATOR CONTACT TITLE:	Not reported
OPERATOR CONTACT PHONE:	801-924-7000
OPERATOR CONTACT PHONE EXT:	Not reported
OPERATOR CONTACT EMAIL:	Not reported
OPERATOR TYPE:	Private Business
DEVELOPER NAME:	Not reported
DEVELOPER ADDRESS:	Not reported
DEVELOPER CITY:	Not reported
DEVELOPER STATE:	California
DEVELOPER ZIP:	Not reported
DEVELOPER CONTACT NAME:	Not reported
DEVELOPER CONTACT TITLE:	Not reported
CONSTYPE LINEAR UTILITY IND:	Not reported
EMERGENCY PHONE NO:	909-356-7220
EMERGENCY PHONE EXT:	Not reported
CONSTYPE ABOVE GROUND IND:	Not reported

CENTRAL REFRIGERATED TRUCKING (Continued) **S105697536**

CONSTYPE BELOW GROUND IND:	Not reported
CONSTYPE CABLE LINE IND:	Not reported
CONSTYPE COMM LINE IND:	Not reported
CONSTYPE COMMERTIAL IND:	Not reported
CONSTYPE ELECTRICAL LINE IND:	Not reported
CONSTYPE GAS LINE IND:	Not reported
CONSTYPE INDUSTRIAL IND:	Not reported
CONSTYPE OTHER DESRIPTION:	Not reported
CONSTYPE OTHER IND:	Not reported
CONSTYPE RECONS IND:	Not reported
CONSTYPE RESIDENTIAL IND:	Not reported
CONSTYPE TRANSPORT IND:	Not reported
CONSTYPE UTILITY DESCRIPTION:	Not reported
CONSTYPE UTILITY IND:	Not reported
CONSTYPE WATER SEWER IND:	Not reported
DIR DISCHARGE USWATER IND:	Not reported
RECEIVING WATER NAME:	Not reported
CERTIFIER NAME:	Manuel Ocampo
CERTIFIER TITLE:	Not reported
CERTIFICATION DATE:	21-JUN-12
PRIMARY SIC:	4213-Trucking, Except Local
SECONDARY SIC:	Not reported
TERTIARY SIC:	Not reported

Npdes Number:	CAS000001
Facility Status:	Terminated
Agency Id:	0
Region:	8
Regulatory Measure Id:	213251
Order No:	97-03-DWQ
Regulatory Measure Type:	Enrollee
Place Id:	Not reported
WDID:	8 36I008025
Program Type:	Industrial
Adoption Date Of Regulatory Measure:	Not reported
Effective Date Of Regulatory Measure:	01/06/1993
Expiration Date Of Regulatory Measure:	Not reported
Termination Date Of Regulatory Measure:	09/18/2014
Discharge Name:	Central Refrigerated Trucking
Discharge Address:	15816 Santa Ana Ave
Discharge City:	Fontana
Discharge State:	California
Discharge Zip:	92337
RECEIVED DATE:	Not reported
PROCESSED DATE:	Not reported
STATUS CODE NAME:	Not reported
STATUS DATE:	Not reported
PLACE SIZE:	Not reported
PLACE SIZE UNIT:	Not reported
FACILITY CONTACT NAME:	Not reported
FACILITY CONTACT TITLE:	Not reported
FACILITY CONTACT PHONE:	Not reported
FACILITY CONTACT PHONE EXT:	Not reported
FACILITY CONTACT EMAIL:	Not reported
OPERATOR NAME:	Not reported
OPERATOR ADDRESS:	Not reported
OPERATOR CITY:	Not reported

CENTRAL REFRIGERATED TRUCKING (Continued) **S105697536**

OPERATOR STATE:	Not reported
OPERATOR ZIP:	Not reported
OPERATOR CONTACT NAME:	Not reported
OPERATOR CONTACT TITLE:	Not reported
OPERATOR CONTACT PHONE:	Not reported
OPERATOR CONTACT PHONE EXT:	Not reported
OPERATOR CONTACT EMAIL:	Not reported
OPERATOR TYPE:	Not reported
DEVELOPER NAME:	Not reported
DEVELOPER ADDRESS:	Not reported
DEVELOPER CITY:	Not reported
DEVELOPER STATE:	Not reported
DEVELOPER ZIP:	Not reported
DEVELOPER CONTACT NAME:	Not reported
DEVELOPER CONTACT TITLE:	Not reported
CONSTYPE LINEAR UTILITY IND:	Not reported
EMERGENCY PHONE NO:	Not reported
EMERGENCY PHONE EXT:	Not reported
CONSTYPE ABOVE GROUND IND:	Not reported
CONSTYPE BELOW GROUND IND:	Not reported
CONSTYPE CABLE LINE IND:	Not reported
CONSTYPE COMM LINE IND:	Not reported
CONSTYPE COMMERTIAL IND:	Not reported
CONSTYPE ELECTRICAL LINE IND:	Not reported
CONSTYPE GAS LINE IND:	Not reported
CONSTYPE INDUSTRIAL IND:	Not reported
CONSTYPE OTHER DESRIPTION:	Not reported
CONSTYPE OTHER IND:	Not reported
CONSTYPE RECONS IND:	Not reported
CONSTYPE RESIDENTIAL IND:	Not reported
CONSTYPE TRANSPORT IND:	Not reported
CONSTYPE UTILITY DESCRIPTION:	Not reported
CONSTYPE UTILITY IND:	Not reported
CONSTYPE WATER SEWER IND:	Not reported
DIR DISCHARGE USWATER IND:	Not reported
RECEIVING WATER NAME:	Not reported
CERTIFIER NAME:	Not reported
CERTIFIER TITLE:	Not reported
CERTIFICATION DATE:	Not reported
PRIMARY SIC:	Not reported
SECONDARY SIC:	Not reported
TERTIARY SIC:	Not reported

LUST:

Region:	STATE
Global Id:	T0607174577
Latitude:	34.055768
Longitude:	-117.464225
Case Type:	Not reported
Status:	Completed - Case Closed
Status Date:	12/04/2003
Lead Agency:	Not reported
Case Worker:	JC
Local Agency:	Not reported
RB Case Number:	Not reported
LOC Case Number:	Not reported
File Location:	Local Agency

CENTRAL REFRIGERATED TRUCKING (Continued) **S105697536**

Potential Media Affect: Soil
Potential Contaminants of Concern: Diesel
Site History: Not reported

Click here to access the California GeoTracker records for this facility:

Contact:
Global Id: T0607174577
Contact Type: Regional Board Caseworker
Contact Name: CARL BERNHARDT
Organization Name: SANTA ANA RWQCB (REGION 8)
Address: 3737 MAIN STREET, SUITE 500
City: RIVERSIDE
Email: cbernhardt@waterboards.ca.gov
Phone Number: 9517824495

Global Id: T0607174577
Contact Type: Local Agency Caseworker
Contact Name: JACKSON CRUTSINGER
Organization Name: SAN BERNARDINO COUNTY
Address: 620 SOUTH E STREET
City: SAN BERNARDINO
Email: jcrutsinger@sbcfire.org
Phone Number: Not reported

Status History:
Global Id: T0607174577
Status: Completed - Case Closed
Status Date: 12/04/2003

Global Id: T0607174577
Status: Open - Case Begin Date
Status Date: 07/10/2002

Global Id: T0607174577
Status: Open - Remediation
Status Date: 07/10/2002

Global Id: T0607174577
Status: Open - Site Assessment
Status Date: 03/25/2003

Regulatory Activities:
Global Id: T0607174577
Action Type: Other
Date: 07/29/2002
Action: Leak Discovery

Global Id: T0607174577
Action Type: Other
Date: 02/03/2003
Action: Leak Reported

Global Id: T0607174577
Action Type: ENFORCEMENT
Date: 12/04/2003
Action: Closure/No Further Action Letter

CENTRAL REFRIGERATED TRUCKING (Continued) **S105697536**

Global Id: T0607174577
Action Type: REMEDIATION
Date: 07/10/2002
Action: Excavation

San Bern. Co. Permit:
Region: SAN BERNARDINO
Facility ID: FA0002731
Owner: LB RV-COMPANY VII, LP
Permit Number: PT0020691
Permit Category: SMALL QUANTITY GENERATOR
Facility Status: INACTIVE
Expiration Date: 10/31/2015

Region: SAN BERNARDINO
Facility ID: FA0002731
Owner: LB RV-COMPANY VII, LP
Permit Number: PT0010783
Permit Category: UST OWNERSHIP/OPERATING PERMIT (PER UST)
Facility Status: INACTIVE
Expiration Date: 10/31/2015

Region: SAN BERNARDINO
Facility ID: FA0002731
Owner: LB RV-COMPANY VII, LP
Permit Number: PT0025811
Permit Category: APSA 1,320-10,000 GAL FAC CAPACITY
Facility Status: INACTIVE
Expiration Date: 10/31/2015

Region: SAN BERNARDINO
Facility ID: FA0002731
Owner: LB RV-COMPANY VII, LP
Permit Number: PT0005008
Permit Category: HAZARDOUS MATERIALS 4-10 CHEMICALS
Facility Status: INACTIVE
Expiration Date: 10/31/2015

I28 **CENTRAL REFRIGERATION/DICK SIMON TRUCKING** **LUST** **S106387378**
ENE **15816 SANTA ANA AVENUE** **N/A**
1/4-1/2 **FONTANA, CA 92335**
0.464 mi.
2451 ft. **Site 2 of 2 in cluster I**

Relative:
Higher

Actual:
1019 ft.

LUST REG 8:
Region: 8
County: San Bernardino
Regional Board: Santa Ana Region
Facility Status: Case Closed
Case Number: Not reported
Local Case Num: 2003011
Case Type: Soil only
Substance: Diesel
Qty Leaked: Not reported
Abate Method: Not reported
Cross Street: POPLAR

CENTRAL REFRIGERATION/DICK SIMON TRUCKING (Continued) **S106387378**

Enf Type:	Not reported
Funding:	Not reported
How Discovered:	UM
How Stopped:	Not reported
Leak Cause:	UNK
Leak Source:	Other Source
Global ID:	T0607174577
How Stopped Date:	Not reported
Enter Date:	Not reported
Date Confirmation of Leak Began:	Not reported
Date Preliminary Assessment Began:	Not reported
Discover Date:	7/29/2002
Enforcement Date:	Not reported
Close Date:	12/4/2003
Date Prelim Assessment Workplan Submitted:	Not reported
Date Pollution Characterization Began:	3/25/2003
Date Remediation Plan Submitted:	Not reported
Date Remedial Action Underway:	7/10/2002
Date Post Remedial Action Monitoring:	Not reported
Enter Date:	Not reported
GW Qualifies:	Not reported
Soil Qualifies:	Not reported
Operator:	Not reported
Facility Contact:	Not reported
Interim:	Not reported
Oversite Program:	LUST
Latitude:	0
Longitude:	0
MTBE Date:	Not reported
Max MTBE GW:	Not reported
MTBE Concentration:	0
Max MTBE Soil:	Not reported
MTBE Fuel:	0
MTBE Tested:	Not Required to be Tested.
MTBE Class:	*
Staff:	CAB
Staff Initials:	JC3
Lead Agency:	Local Agency
Local Agency:	36000L
Hydr Basin #:	Not reported
Beneficial:	NO
Priority:	Not reported
Cleanup Fund Id:	Not reported
Work Suspended:	Not reported

Summary: Not reported

J29 **WESTERN STATES REFINING** **CERC-NFRAP** **1000403001**
ENE **10763 POPLAR AVE** **RCRA-SQG** **CAD076080563**
1/2-1 **FONTANA, CA 92337** **CONSENT**
0.634 mi. **ICIS**
3345 ft. **Site 1 of 2 in cluster J** **FINDS**
HIST Cal-Sites
Relative: **NPDES**
Higher **DEED**
ENF
Actual: **RESPONSE**
1031 ft. **San Bern. Co. Permit**
ENVIROSTOR

CERC-NFRAP:
Site ID: 0901582
Federal Facility: Not a Federal Facility
NPL Status: Not on the NPL
Non NPL Status: NFRAP-Site does not qualify for the NPL based on existing information

CERCLIS-NFRAP Site Contact Details:
Contact Sequence ID: 13289666.00000
Person ID: 13003854.00000

Contact Sequence ID: 13295261.00000
Person ID: 13003858.00000

Contact Sequence ID: 13301119.00000
Person ID: 13004003.00000

CERCLIS-NFRAP Assessment History:
Action: PRELIMINARY ASSESSMENT
Date Started: 04/01/85
Date Completed: 08/01/85
Priority Level: Low priority for further assessment

Action: DISCOVERY
Date Started: / /
Date Completed: 01/01/81
Priority Level: Not reported

Action: PRELIMINARY ASSESSMENT
Date Started: / /
Date Completed: 12/02/88
Priority Level: Low priority for further assessment

Action: SITE INSPECTION
Date Started: / /
Date Completed: 09/08/89
Priority Level: NFRAP-Site does not qualify for the NPL based on existing information

Action: ARCHIVE SITE
Date Started: / /
Date Completed: 02/10/97
Priority Level: Not reported

Action: REMOVAL
Date Started: 05/28/86
Date Completed: 07/11/86

WESTERN STATES REFINING (Continued) **1000403001**

Priority Level: Cleaned up

Action: NON-NATIONAL PRIORITIES LIST POTENTIALLY RESPONSIBLE PARTY SEARCH
Date Started: / /
Date Completed: 05/15/86
Priority Level: Not reported

RCRA-SQG:
Date form received by agency: 09/01/1996
Facility name: WESTERN STATES REFINING
Facility address: 10763 POPLAR AVE
FONTANA, CA 92335
EPA ID: CAD076080563
Contact: Not reported
Contact address: Not reported
Not reported
Contact country: US
Contact telephone: Not reported
Contact email: Not reported
EPA Region: 09
Classification: Small Small Quantity Generator
Description: Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time

Owner/Operator Summary:
Owner/operator name: DON OPPEL
Owner/operator address: NOT REQUIRED
NOT REQUIRED, ME 99999
Owner/operator country: Not reported
Owner/operator telephone: (415) 555-1212
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Owner/operator name: NOT REQUIRED
Owner/operator address: NOT REQUIRED
NOT REQUIRED, ME 99999
Owner/operator country: Not reported
Owner/operator telephone: (415) 555-1212
Legal status: Private
Owner/Operator Type: Operator
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No

WESTERN STATES REFINING (Continued) **1000403001**

Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Historical Generators:
Date form received by agency: 01/15/1981
Site name: WESTERN STATES REFINING
Classification: Large Quantity Generator

Violation Status: No violations found

CONSENT:
EPA ID: CAD076080563
Site ID: Not reported
Case Title: IN RE: WESTERN STATES REFINING, INC. (FONTANA, CA)
Court Num: 85-02696
District: California, Cent
Entered Date: 19881129
Full-text of the consent decree for this site issued by the United States District Court is available from EDR. Contact your EDR Account Executive.

ICIS:
Enforcement Action ID: 09-1988-0001
FRS ID: 110002658017
Program ID: DTSC-ENVIROSTOR 36290065
Action Name: WESTERN STATES REFINING, INC.
Full Address: 10763 POPLAR AVE FONTANA CA 92337-7379
State: California
Facility Name: WESTERN STATES REFINING
Facility Address: 10763 POPLAR AVE
FONTANA, CA 92337-7379
Enforcement Action Type: Bankruptcy
Facility County: SAN BERNARDINO
EPA Region #: 9

Enforcement Action ID: 09-1988-0001
FRS ID: 110002658017
Program ID: RE-POWERING 36290065-12642
Action Name: WESTERN STATES REFINING, INC.
Full Address: 10763 POPLAR AVE FONTANA CA 92337-7379
State: California
Facility Name: WESTERN STATES REFINING
Facility Address: 10763 POPLAR AVE
FONTANA, CA 92337-7379
Enforcement Action Type: Bankruptcy
Facility County: SAN BERNARDINO
EPA Region #: 9

Enforcement Action ID: 09-1988-0001
FRS ID: 110002658017
Program ID: RCRAINFO CAD076080563

WESTERN STATES REFINING (Continued) **1000403001**

Action Name: WESTERN STATES REFINING, INC.
Full Address: 10763 POPLAR AVE FONTANA CA 92337-7379
State: California
Facility Name: WESTERN STATES REFINING
Facility Address: 10763 POPLAR AVE
FONTANA, CA 92337-7379
Enforcement Action Type: Bankruptcy
Facility County: SAN BERNARDINO
EPA Region #: 9

Enforcement Action ID: 09-1988-0001
FRS ID: 110002658017
Program ID: FRS 110002658017
Action Name: WESTERN STATES REFINING, INC.
Full Address: 10763 POPLAR AVE FONTANA CA 92337-7379
State: California
Facility Name: WESTERN STATES REFINING
Facility Address: 10763 POPLAR AVE
FONTANA, CA 92337-7379
Enforcement Action Type: Bankruptcy
Facility County: SAN BERNARDINO
EPA Region #: 9

Program ID: DTSC-ENVIROSTOR 36290065
Facility Name: WESTERN STATES REFINING
Address: 10763 POPLAR AVE
Tribal Indicator: N
Fed Facility: No
NAIC Code: Not reported
SIC Code: 3341

Program ID: FRS 110002658017
Facility Name: WESTERN STATES REFINING
Address: 10763 POPLAR AVE
Tribal Indicator: N
Fed Facility: No
NAIC Code: Not reported
SIC Code: 3341

Program ID: RCRAINFO CAD076080563
Facility Name: WESTERN STATES REFINING
Address: 10763 POPLAR AVE
Tribal Indicator: N
Fed Facility: No
NAIC Code: Not reported
SIC Code: 3341

Program ID: RE-POWERING 36290065-12642
Facility Name: WESTERN STATES REFINING
Address: 10763 POPLAR AVE
Tribal Indicator: N
Fed Facility: No
NAIC Code: Not reported
SIC Code: 3341

WESTERN STATES REFINING (Continued) **1000403001**

FINDS:

Registry ID: 110002658017

Environmental Interest/Information System

California Department of Toxic Substances Control EnviroStor System (DTSC-EnviroStor) is an online search and Geographic Information System (GIS) tool for identifying sites that have known contamination or sites for which there may be reasons to investigate further. The EnviroStor database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites.

RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

ICIS (Integrated Compliance Information System) is the Integrated Compliance Information System and provides a database that, when complete, will contain integrated Enforcement and Compliance information across most of EPA's programs. The vision for ICIS is to replace EPA's independent databases that contain Enforcement data with a single repository for that information. Currently, ICIS contains all Federal Administrative and Judicial enforcement actions. This information is maintained in ICIS by EPA in the Regional offices and it Headquarters. A future release of ICIS will replace the Permit Compliance System (PCS) which supports the NPDES and will integrate that information with Federal actions already in the system. ICIS also has the capability to track other activities occurring in the Region that support Compliance and Enforcement programs. These include; Incident Tracking, Compliance Assistance, and Compliance Monitoring.

Calsite:

Region:	CYPRESS
Facility ID:	36290065
Facility Type:	STATE
Type:	STATE FUNDED SITE
Branch:	SA
Branch Name:	SO CAL - GLENDALE
File Name:	PARCEL # 0237-101-24
State Senate District:	06301993
Status:	CERTIFIED AS HAVING BEEN REMEDIED SATISFACTORILY UNDER DTSC OVERSIGHT
Status Name:	CERTIFIED
Lead Agency:	DEPT OF TOXIC SUBSTANCES CONTROL
NPL:	Not Listed
SIC Code:	29
SIC Name:	MANU - PETROLEUM & COAL PRODUCTS
Access:	Controlled
Cortese:	Not reported
Hazardous Ranking Score:	Not reported
Date Site Hazard Ranked:	Not reported

WESTERN STATES REFINING (Continued) **1000403001**

Groundwater Contamination:	Unknown
Staff Member Responsible for Site:	Not reported
Supervisor Responsible for Site:	Not reported
Region Water Control Board:	SA
Region Water Control Board Name:	SANTA ANA
Lat/Long Direction:	Not reported
Lat/Long (dms):	0 0 0 / 0 0 0
Lat/long Method:	Not reported
Lat/Long Description:	Not reported
State Assembly District Code:	62
State Senate District Code:	32
Facility ID:	36290065
Activity:	DISC
Activity Name:	DISCOVERY
AWP Code:	Not reported
Proposed Budget:	0
AWP Completion Date:	Not reported
Revised Due Date:	Not reported
Comments Date:	12261980
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	CERT
Definition of Status:	CERTIFIED
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	36290065
Activity:	RA
Activity Name:	REMOVAL ACTION
AWP Code:	CYANI
Proposed Budget:	0
AWP Completion Date:	Not reported
Revised Due Date:	Not reported
Comments Date:	12311986
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	CERT
Definition of Status:	CERTIFIED
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0

WESTERN STATES REFINING (Continued) **1000403001**

For Residential Reuse:	0
Unknown Type:	0
Facility ID:	36290065
Activity:	ORDER
Activity Name:	I/SE, IORSE, FFA, FFSRA, VCA, EA
AWP Code:	RAO
Proposed Budget:	0
AWP Completion Date:	Not reported
Revised Due Date:	Not reported
Comments Date:	10301987
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	CERT
Definition of Status:	CERTIFIED
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	36290065
Activity:	SS
Activity Name:	SITE SCREENING
AWP Code:	Not reported
Proposed Budget:	0
AWP Completion Date:	Not reported
Revised Due Date:	Not reported
Comments Date:	11301987
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	CERT
Definition of Status:	CERTIFIED
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	36290065
Activity:	FDNC
Activity Name:	FINAL DETERMINATION OF NON-COMPLIANCE
AWP Code:	Not reported
Proposed Budget:	0
AWP Completion Date:	Not reported
Revised Due Date:	Not reported

WESTERN STATES REFINING (Continued) **1000403001**

Comments Date:	12301987
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	CERT
Definition of Status:	CERTIFIED
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	36290065
Activity:	PPP
Activity Name:	PUBLIC PARTICIPATION PLAN
AWP Code:	Not reported
Proposed Budget:	0
AWP Completion Date:	Not reported
Revised Due Date:	Not reported
Comments Date:	05301990
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	CERT
Definition of Status:	CERTIFIED
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	36290065
Activity:	RA
Activity Name:	REMOVAL ACTION
AWP Code:	ASBES
Proposed Budget:	0
AWP Completion Date:	Not reported
Revised Due Date:	Not reported
Comments Date:	03271992
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	CERT
Definition of Status:	CERTIFIED
Liquids Removed (Gals):	46
Liquids Treated (Gals):	0
Action Included Capping:	Not reported

WESTERN STATES REFINING (Continued) **1000403001**

Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	N
Activity Comments:	ASBESTOS WAS REMOVED FROM INSIDE THE WAREHOUSE, FROM 2 OUTSIDE TANKS,AND FROM THE SOIL AROUND THE OUTSIDE TANKS.
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	36290065
Activity:	RIFS
Activity Name:	REMEDIAL INVESTIGATION / FEASIBILITY STUDY
AWP Code:	Not reported
Proposed Budget:	0
AWP Completion Date:	Not reported
Revised Due Date:	Not reported
Comments Date:	11011992
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	CERT
Definition of Status:	CERTIFIED
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	36290065
Activity:	RAP
Activity Name:	REMEDIAL ACTION PLAN / RECORD OF DECISION
AWP Code:	NFA
Proposed Budget:	0
AWP Completion Date:	Not reported
Revised Due Date:	Not reported
Comments Date:	06181993
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	CERT
Definition of Status:	CERTIFIED
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0

WESTERN STATES REFINING (Continued) **1000403001**

Facility ID:	36290065
Activity:	CERT
Activity Name:	CERTIFICATION
AWP Code:	Not reported
Proposed Budget:	0
AWP Completion Date:	Not reported
Revised Due Date:	Not reported
Comments Date:	06301993
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	CERT
Definition of Status:	CERTIFIED
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	N
Activity Comments:	14 110-BARREL VACUUM TRUCKS OF CYANIDE RINSATE REMOVED. 65,000 GAL.CYANIDE SOLUTION TREATED.
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Alternate Address:	10763 POPLAR AVENUE
Alternate City,St,Zip:	FONTANA, CA 92335
Alternate Address:	10763 POPLAR AVE
Alternate City,St,Zip:	FONTANA, CA 92337

Background Info:

Western States Refining (WSR) was a metal recovery facility that operated from 1979 to 1984. Historical information concerning previous operations at the site are incomplete. WSR recovered precious metals from x-ray film and electronic circuit boards. A cyanide solution, among other chemicals, was used to strip the metals.

In 1985, the Department and the San Bernardino County Department of Health conducted a joint inspection of the site and identified hundreds of drums and containers in deteriorated condition. These drums and containers contained cyanide, sulfides, heavy metals, caustics, and acids. Six large storage tanks containing cyanides and heavy metals were observed leaking onto the cracked berm area and into a nearby trench. Extensive soil contamination was also discovered.

In 1986, EPA and the U.S. Coast Guard completed an emergency removal of the containers and residual cyanide contamination. Approximately 600 drums and containers were removed. The six leaking storage tanks were removed and two other 35,000 gallon storage tanks were emptied but not removed.

In 1987, DHS issued a remedial action order to WSR directing them to cleanup the facility. The company refused and filed for bankruptcy. DHS found WSR in noncompliance with the order and initiated legal action. A settlement agreement was reached in 1989. Under the settlement, the RPs will pay up to $750,000 towards cleanup costs. Any other costs incurred by the Department will be recovered from the proceeds of the sale of the property once the property is certified.

Phase I and Phase II RIs have been completed. Phase I confirm-

WESTERN STATES REFINING (Continued) **1000403001**

em cyanide, asbestos, and low level heavy metal contamination.
Comments Date: 01011981
Comments: drums behind the facility). Leaking drums of vinyl ester
Comments Date: 01011981
Comments: resin diposed in the ditch. Told to remove waste and
Comments Date: 01011981
Comments: contaminated soil to a Class I Landfill.
Comments Date: 01011981
Comments: SA RWQCB: Complaint follow-up inspection (dumping 55-gallon
Comments Date: 02031983
Comments: SA RWQCB: Discharge of gas scrubber wastes to the street
Comments Date: 02031983
Comments: (group I wastes). Company was told Group 1 wastes must go
Comments Date: 02031983
Comments: to a Class I landfill.
Comments Date: 04191983
Comments: Records Search: Site on EPA generator list. Tip from SB
Comments Date: 04191983
Comments: Environmental Health indicates drums of hazardous waste may
Comments Date: 04191983
Comments: be buried on site.
Comments Date: 04251985
Comments: County Health: Drums in warehouse corroded and leaking,
Comments Date: 04251985
Comments: suspected of containing cyanides, heavy metals, caustics,
Comments Date: 04251985
Comments: and acids. Containers of liquid/sludges without covers.
Comments Date: 04251985
Comments: Rooms with leaking drums, as well as materials spilled on
Comments Date: 04251985
Comments: floor and equipment. Lab has open buckets and unknown
Comments Date: 04251985
Comments: materials in cabinets. Drums in yard with unknown liquid/
Comments Date: 04251985
Comments: solids leaking onto ground. Piles of drums on east side
Comments Date: 04251985
Comments: are leaking a black tarry substance. Drums/spilled materials
Comments Date: 04251985
Comments: in the field surrounding the inner fence within the bermed
Comments Date: 04251985
Comments: area. Sixty-two large tanks suspected of containing cyanides
Comments Date: 04251985
Comments: and heavy metal solutions leaking onto the surface and in
Comments Date: 04251985
Comments: the trench. Notice of Violation issude (NOV Title 22
Comments Date: 04251985
Comments: CAC66041,66042). Required to submit a plan to characterize
Comments Date: 04251985
Comments: the extent of hazardous waste contamination.
Comments Date: 05281983
Comments: Facility Drive-By: Active site.
Comments Date: 06271984
Comments: Preliminary Assessment Done: Silver recovery using cyanide
Comments Date: 06271984
Comments: and water. Fifty or fewer drums of spent acid. Waste
Comments Date: 06271984
Comments: includes cyanide residual (800 lbs/m). In operation since

WESTERN STATES REFINING (Continued) **1000403001**

Comments Date:	06271984
Comments:	1979 at this location.
Comments Date:	06271984
Comments:	Preliminary Assessment submitted to EPA.
Comments Date:	06301993
Comments:	Approximately 65k gal of cyanide solution treated. Removed
Comments Date:	06301993
Comments:	approximately 14 110-barrel vacuum trucks of cyanide rinsate.
Comments Date:	06301993
Comments:	Western States Refining (WSR) was a former precious metals
Comments Date:	06301993
Comments:	recovery facility in Fontana, San Bernardino, CA. A two story
Comments Date:	06301993
Comments:	warehouse exists in the northwest quadrant of the site. The
Comments Date:	06301993
Comments:	warehouse included several tanks and vats which formerly
Comments Date:	06301993
Comments:	contained cyanide, several storage sheds and a former drum
Comments Date:	06301993
Comments:	staging area. Currently the site is abandoned. The Veta Grande
Comments Date:	06301993
Comments:	Companies, filed for bankruptcy and have reorganized under the
Comments Date:	06301993
Comments:	name "Forum Regroup. WSR began a silver and gold recovery
Comments Date:	06301993
Comments:	operation primarily from x-ray film, with a small recovery
Comments Date:	06301993
Comments:	percentage coming from electronic circuit boards. In the
Comments Date:	06301993
Comments:	process, cyanide solution was used to strip gold and silver from
Comments Date:	06301993
Comments:	x-ray film. Hazardous substances previously stored, handled and
Comments Date:	06301993
Comments:	disposed at the site include cyanide, oxidizers, heavy metals,
Comments Date:	06301993
Comments:	flammable liquids, ammonium hydroxide and organic solvents.
Comments Date:	07311991
Comments:	Removal Action: Asbestos and drummed waste.
Comments Date:	09081989
Comments:	EPA completed Screening Site Inspection and recommends
Comments Date:	09081989
Comments:	Listing Site Inspection. DHS is actively involved.
Comments Date:	09081989
Comments:	Not reported
Comments Date:	09081989
Comments:	Records Search: Former precious metals recovery facility.
Comments Date:	09081989
Comments:	Contaminants include heavy metals, cyanides, asbestos, and
Comments Date:	09081989
Comments:	abandoned drums containing cyanide, sulfides, heavy metals,
Comments Date:	09081989
Comments:	caustics, and acids.
Comments Date:	10011982
Comments:	SA RWQCB: Surface drums and spills noted. Wastes cleaned-up.
Comments Date:	10131982
Comments:	County Environmental Health Dept: Routine compliance
Comments Date:	10131982

WESTERN STATES REFINING (Continued) **1000403001**

Comments:	inspection: acid solution neutralized and discharged to
Comments Date:	10131982
Comments:	sewer. Several drains noted that could potetially discharge
Comments Date:	10131982
Comments:	spilled materials.
Comments Date:	11301987
Comments:	Site Screening Done: Site listed on expenditure plan.
Comments Date:	11301987
Comments:	Site reported for Proposition 65.
Comments Date:	12261980
Comments:	Facility identified. Complaints and calls to regional
Comments Date:	12261980
Comments:	agencies about buried drums, improper handling of cyanid and
Comments Date:	12261980
Comments:	disposal of containers (dumping 55-gallon drums behind
Comments Date:	12261980
Comments:	the facility).
Comments Date:	12311986
Comments:	Removal Action: Removal of residual cyanide.
ID Name:	BEP DATABASE PCODE
ID Value:	P42097
ID Name:	EPA IDENTIFICATION NUMBER
ID Value:	CAD076080563
Alternate Name:	WESTERN STATES REFININGPARCEL # 0237-101-24
Special Programs Code:	R3012
Special Programs Name:	RCRA 3012

NPDES:

Npdes Number:	Not reported
Facility Status:	Not reported
Agency Id:	Not reported
Region:	8
Regulatory Measure Id:	351554
Order No:	Not reported
Regulatory Measure Type:	Industrial
Place Id:	Not reported
WDID:	8 36I021808
Program Type:	Not reported
Adoption Date Of Regulatory Measure:	Not reported
Effective Date Of Regulatory Measure:	Not reported
Expiration Date Of Regulatory Measure:	Not reported
Termination Date Of Regulatory Measure:	Not reported
Discharge Name:	Not reported
Discharge Address:	Not reported
Discharge City:	Not reported
Discharge State:	Not reported
Discharge Zip:	Not reported
RECEIVED DATE:	09/02/2008
PROCESSED DATE:	09/15/2008
STATUS CODE NAME:	Active
STATUS DATE:	09/15/2008
PLACE SIZE:	5
PLACE SIZE UNIT:	Acres
FACILITY CONTACT NAME:	Steve Thompson
FACILITY CONTACT TITLE:	Operations Manager
FACILITY CONTACT PHONE:	877-246-4085
FACILITY CONTACT PHONE EXT:	Not reported

WESTERN STATES REFINING (Continued) **1000403001**

FACILITY CONTACT EMAIL:	sthompson@tprco.com
OPERATOR NAME:	Trench Plate Rental Co
OPERATOR ADDRESS:	Not reported
OPERATOR CITY:	Not reported
OPERATOR STATE:	Not reported
OPERATOR ZIP:	Not reported
OPERATOR CONTACT NAME:	Not reported
OPERATOR CONTACT TITLE:	Not reported
OPERATOR CONTACT PHONE:	Not reported
OPERATOR CONTACT PHONE EXT:	Not reported
OPERATOR CONTACT EMAIL:	Not reported
OPERATOR TYPE:	Private Individual
DEVELOPER NAME:	Not reported
DEVELOPER ADDRESS:	Not reported
DEVELOPER CITY:	Not reported
DEVELOPER STATE:	California
DEVELOPER ZIP:	Not reported
DEVELOPER CONTACT NAME:	Not reported
DEVELOPER CONTACT TITLE:	Not reported
CONSTYPE LINEAR UTILITY IND:	Not reported
EMERGENCY PHONE NO:	951-808-2590
EMERGENCY PHONE EXT:	Not reported
CONSTYPE ABOVE GROUND IND:	Not reported
CONSTYPE BELOW GROUND IND:	Not reported
CONSTYPE CABLE LINE IND:	Not reported
CONSTYPE COMM LINE IND:	Not reported
CONSTYPE COMMERTIAL IND:	Not reported
CONSTYPE ELECTRICAL LINE IND:	Not reported
CONSTYPE GAS LINE IND:	Not reported
CONSTYPE INDUSTRIAL IND:	Not reported
CONSTYPE OTHER DESRIPTION:	Not reported
CONSTYPE OTHER IND:	Not reported
CONSTYPE RECONS IND:	Not reported
CONSTYPE RESIDENTIAL IND:	Not reported
CONSTYPE TRANSPORT IND:	Not reported
CONSTYPE UTILITY DESCRIPTION:	Not reported
CONSTYPE UTILITY IND:	Not reported
CONSTYPE WATER SEWER IND:	Not reported
DIR DISCHARGE USWATER IND:	N
RECEIVING WATER NAME:	Not reported
CERTIFIER NAME:	Steve Thompson
CERTIFIER TITLE:	Operations Manager
CERTIFICATION DATE:	07-APR-15
PRIMARY SIC:	4212-Local Trucking Without Storage
SECONDARY SIC:	Not reported
TERTIARY SIC:	Not reported
Npdes Number:	CAS000001
Facility Status:	Active
Agency Id:	0
Region:	8
Regulatory Measure Id:	351554
Order No:	97-03-DWQ
Regulatory Measure Type:	Enrollee
Place Id:	Not reported
WDID:	8 36I021808
Program Type:	Industrial

WESTERN STATES REFINING (Continued) **1000403001**

Adoption Date Of Regulatory Measure:	Not reported
Effective Date Of Regulatory Measure:	09/15/2008
Expiration Date Of Regulatory Measure:	Not reported
Termination Date Of Regulatory Measure:	Not reported
Discharge Name:	Trench Plate Rental Co
Discharge Address:	10763 Poplar Ave
Discharge City:	Fontana
Discharge State:	California
Discharge Zip:	92337
RECEIVED DATE:	Not reported
PROCESSED DATE:	Not reported
STATUS CODE NAME:	Not reported
STATUS DATE:	Not reported
PLACE SIZE:	Not reported
PLACE SIZE UNIT:	Not reported
FACILITY CONTACT NAME:	Not reported
FACILITY CONTACT TITLE:	Not reported
FACILITY CONTACT PHONE:	Not reported
FACILITY CONTACT PHONE EXT:	Not reported
FACILITY CONTACT EMAIL:	Not reported
OPERATOR NAME:	Not reported
OPERATOR ADDRESS:	Not reported
OPERATOR CITY:	Not reported
OPERATOR STATE:	Not reported
OPERATOR ZIP:	Not reported
OPERATOR CONTACT NAME:	Not reported
OPERATOR CONTACT TITLE:	Not reported
OPERATOR CONTACT PHONE:	Not reported
OPERATOR CONTACT PHONE EXT:	Not reported
OPERATOR CONTACT EMAIL:	Not reported
OPERATOR TYPE:	Not reported
DEVELOPER NAME:	Not reported
DEVELOPER ADDRESS:	Not reported
DEVELOPER CITY:	Not reported
DEVELOPER STATE:	Not reported
DEVELOPER ZIP:	Not reported
DEVELOPER CONTACT NAME:	Not reported
DEVELOPER CONTACT TITLE:	Not reported
CONSTYPE LINEAR UTILITY IND:	Not reported
EMERGENCY PHONE NO:	Not reported
EMERGENCY PHONE EXT:	Not reported
CONSTYPE ABOVE GROUND IND:	Not reported
CONSTYPE BELOW GROUND IND:	Not reported
CONSTYPE CABLE LINE IND:	Not reported
CONSTYPE COMM LINE IND:	Not reported
CONSTYPE COMMERTIAL IND:	Not reported
CONSTYPE ELECTRICAL LINE IND:	Not reported
CONSTYPE GAS LINE IND:	Not reported
CONSTYPE INDUSTRIAL IND:	Not reported
CONSTYPE OTHER DESRIPTION:	Not reported
CONSTYPE OTHER IND:	Not reported
CONSTYPE RECONS IND:	Not reported
CONSTYPE RESIDENTIAL IND:	Not reported
CONSTYPE TRANSPORT IND:	Not reported
CONSTYPE UTILITY DESCRIPTION:	Not reported
CONSTYPE UTILITY IND:	Not reported
CONSTYPE WATER SEWER IND:	Not reported

WESTERN STATES REFINING (Continued) **1000403001**

DIR DISCHARGE USWATER IND:	Not reported
RECEIVING WATER NAME:	Not reported
CERTIFIER NAME:	Not reported
CERTIFIER TITLE:	Not reported
CERTIFICATION DATE:	Not reported
PRIMARY SIC:	Not reported
SECONDARY SIC:	Not reported
TERTIARY SIC:	Not reported

DEED:

Envirostor ID:	36290065
Area:	PROJECT WIDE
Sub Area:	Not reported
Site Type:	STATE RESPONSE
Status:	CERTIFIED O&M - LAND USE RESTRICTIONS ONLY
Agency:	Not reported
Covenant Uploaded:	Not reported
Deed Date(s):	12/10/1997

ENF:

Region:	8
Facility Id:	224771
Agency Name:	Not reported
Place Type:	Manufacturing
Place Subtype:	Petroleum Refinery
Facility Type:	Industrial
Agency Type:	Not reported
# Of Agencies:	Not reported
Place Latitude:	Not reported
Place Longitude:	Not reported
SIC Code 1:	2911
SIC Desc 1:	Petroleum Refining
SIC Code 2:	Not reported
SIC Desc 2:	Not reported
SIC Code 3:	Not reported
SIC Desc 3:	Not reported
NAICS Code 1:	Not reported
NAICS Desc 1:	Not reported
NAICS Code 2:	Not reported
NAICS Desc 2:	Not reported
NAICS Code 3:	Not reported
NAICS Desc 3:	Not reported
# Of Places:	1
Source Of Facility:	Enf Action
Design Flow:	Not reported
Threat To Water Quality:	Not reported
Complexity:	Not reported
Pretreatment:	Not reported
Facility Waste Type:	Not reported
Facility Waste Type 2:	Not reported
Facility Waste Type 3:	Not reported
Facility Waste Type 4:	Not reported
Program:	Not reported
Program Category1:	Not reported
Program Category2:	WDR
# Of Programs:	Not reported

WESTERN STATES REFINING (Continued) **1000403001**

WDID:	Not reported
Reg Measure Id:	Not reported
Reg Measure Type:	Not reported
Region:	Not reported
Order #:	Not reported
Npdes# CA#:	Not reported
Major-Minor:	Not reported
Npdes Type:	Not reported
Reclamation:	Not reported
Dredge Fill Fee:	Not reported
301H:	Not reported
Application Fee Amt Received:	Not reported
Status:	Not reported
Status Date:	Not reported
Effective Date:	Not reported
Expiration/Review Date:	Not reported
Termination Date:	Not reported
WDR Review - Amend:	Not reported
WDR Review - Revise/Renew:	Not reported
WDR Review - Rescind:	Not reported
WDR Review - No Action Required:	Not reported
WDR Review - Pending:	Not reported
WDR Review - Planned:	Not reported
Status Enrollee:	Not reported
Individual/General:	Not reported
Fee Code:	Not reported
Direction/Voice:	Not reported
Enforcement Id(EID):	222423
Region:	8
Order / Resolution Number:	86-079
Enforcement Action Type:	Clean-up and Abatement Order
Effective Date:	04/11/1986
Adoption/Issuance Date:	Not reported
Achieve Date:	9/1/1992
Termination Date:	Not reported
ACL Issuance Date:	Not reported
EPL Issuance Date:	Not reported
Status:	Historical
Title:	Enforcement - 8 362184001
Description:	CHARACTERIZATION PLAN REQUIRED BY 4/18/86.
Program:	WDR
Latest Milestone Completion Date:	9/1/1992
# Of Programs1:	1
Total Assessment Amount:	0.00
Initial Assessed Amount:	0.00
Liability $ Amount:	0.00
Project $ Amount:	0.00
Liability $ Paid:	0.00
Project $ Completed:	0.00
Total $ Paid/Completed Amount:	0.00

Region:	8
Facility Id:	224771
Agency Name:	Not reported
Place Type:	Manufacturing
Place Subtype:	Petroleum Refinery
Facility Type:	Industrial

WESTERN STATES REFINING (Continued) **1000403001**

Agency Type:	Not reported
# Of Agencies:	Not reported
Place Latitude:	Not reported
Place Longitude:	Not reported
SIC Code 1:	2911
SIC Desc 1:	Petroleum Refining
SIC Code 2:	Not reported
SIC Desc 2:	Not reported
SIC Code 3:	Not reported
SIC Desc 3:	Not reported
NAICS Code 1:	Not reported
NAICS Desc 1:	Not reported
NAICS Code 2:	Not reported
NAICS Desc 2:	Not reported
NAICS Code 3:	Not reported
NAICS Desc 3:	Not reported
# Of Places:	1
Source Of Facility:	Enf Action
Design Flow:	Not reported
Threat To Water Quality:	Not reported
Complexity:	Not reported
Pretreatment:	Not reported
Facility Waste Type:	Not reported
Facility Waste Type 2:	Not reported
Facility Waste Type 3:	Not reported
Facility Waste Type 4:	Not reported
Program:	Not reported
Program Category1:	Not reported
Program Category2:	WDR
# Of Programs:	Not reported
WDID:	Not reported
Reg Measure Id:	Not reported
Reg Measure Type:	Not reported
Region:	Not reported
Order #:	Not reported
Npdes# CA#:	Not reported
Major-Minor:	Not reported
Npdes Type:	Not reported
Reclamation:	Not reported
Dredge Fill Fee:	Not reported
301H:	Not reported
Application Fee Amt Received:	Not reported
Status:	Not reported
Status Date:	Not reported
Effective Date:	Not reported
Expiration/Review Date:	Not reported
Termination Date:	Not reported
WDR Review - Amend:	Not reported
WDR Review - Revise/Renew:	Not reported
WDR Review - Rescind:	Not reported
WDR Review - No Action Required:	Not reported
WDR Review - Pending:	Not reported
WDR Review - Planned:	Not reported
Status Enrollee:	Not reported
Individual/General:	Not reported
Fee Code:	Not reported
Direction/Voice:	Not reported

WESTERN STATES REFINING (Continued) **1000403001**

Enforcement Id(EID):	222422
Region:	8
Order / Resolution Number:	92-04806
Enforcement Action Type:	Clean-up and Abatement Order
Effective Date:	09/11/1992
Adoption/Issuance Date:	Not reported
Achieve Date:	Not reported
Termination Date:	Not reported
ACL Issuance Date:	Not reported
EPL Issuance Date:	Not reported
Status:	Historical
Title:	Enforcement - 8 362184001
Description:	RESCINDS CAO 86-79
Program:	WDR
Latest Milestone Completion Date:	Not reported
# Of Programs1:	1
Total Assessment Amount:	0.00
Initial Assessed Amount:	0.00
Liability $ Amount:	0.00
Project $ Amount:	0.00
Liability $ Paid:	0.00
Project $ Completed:	0.00
Total $ Paid/Completed Amount:	0.00

RESPONSE:

Facility ID:	36290065
Site Type:	State Response
Site Type Detail:	State Response or NPL
Acres:	4.66
National Priorities List:	NO
Cleanup Oversight Agencies:	SMBRP
Lead Agency Description:	DTSC - Site Cleanup Program
Project Manager:	Joseph Cully
Supervisor:	Douglas Bautista
Division Branch:	Cleanup Cypress
Site Code:	400168
Site Mgmt. Req.:	DAY, ELD, HOS, LUC, EX, NOWN, NUSE, NDEV, NSUB, SCH, RES
Assembly:	47
Senate:	20
Special Program Status:	Not reported
Status:	Certified O&M - Land Use Restrictions Only
Status Date:	12/10/1997
Restricted Use:	YES
Funding:	Not reported
Latitude:	34.05799
Longitude:	-117.4613
APN:	0237-101-24
Past Use:	METAL RECLAMATION
Potential COC :	* Photochemicals/Photoprocessing Waste * CONTAMINATED SOIL * ACID SOLUTION 2>PH WITH METALS Asbestos Containing Materials (ACM * GAS SCRUBBER WASTE Cadmium and compounds Cyanide (free Nickel
Confirmed COC:	NONE SPECIFIED
Potential Description:	SOIL
Alias Name:	PARCEL # 0237-101-24
Alias Type:	Alternate Name
Alias Name:	0237-101-24
Alias Type:	APN

WESTERN STATES REFINING (Continued) **1000403001**

Alias Name: CAD076080563
Alias Type: EPA Identification Number
Alias Name: 110002658017
Alias Type: EPA (FRS #)
Alias Name: P42097
Alias Type: PCode
Alias Name: 300168
Alias Type: Project Code (Site Code)
Alias Name: 400168
Alias Type: Project Code (Site Code)
Alias Name: 36290065
Alias Type: Envirostor ID Number

Completed Info:
Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Land Use Restriction - Site Inspection/Visit
Completed Date: 06/25/2007
Comments: Site visit on June 25, 2007. This site was the Trench Plate Rental Company, and had been so since March, 2007. Manny Castillo, Supervisor, conducted the site tour. The site was in full compliance with the deed restriction.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Remedial Action Plan
Completed Date: 06/18/1993
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Remedial Investigation / Feasibility Study
Completed Date: 11/01/1992
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Removal Action Completion Report
Completed Date: 03/27/1992
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Public Participation Plan / Community Relations Plan
Completed Date: 05/30/1990
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Site Screening
Completed Date: 11/30/1987
Comments: Site Screening Done: Site listed on expenditure plan. Site reported for Proposition 65.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Removal Action Completion Report
Completed Date: 12/31/1986

WESTERN STATES REFINING (Continued) **1000403001**

Comments: Removal Action: Removal of residual cyanide.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Assessment Report
Completed Date: 06/27/1984
Comments: Preliminary Assessment Done: Silver recovery using cyanide and water. Fifty or fewer drums of spent acid. Waste includes cyanide residual (800 lbs/m). In operation since 1979 at this location. Preliminary Assessment submitted to EPA.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: PRP Bankruptcy Filing
Completed Date: 10/09/2007
Comments: The DTSC attorney signed the NFCRA package on October 9, 2007.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Land Use Restriction - Site Inspection/Visit
Completed Date: 07/16/2009
Comments: Site was found to be in compliance with the Land Use Covenant Restriction.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Land Use Restriction - Site Inspection/Visit
Completed Date: 08/25/2011
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Land Use Restriction - Site Inspection/Visit
Completed Date: 09/03/2010
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Land Use Restriction - Site Inspection/Visit
Completed Date: 03/19/2014
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Consent Order
Completed Date: 08/08/1989
Comments: The agreement was signed on August 8, 1989.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Land Use Restriction
Completed Date: 12/10/1997
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Certification

WESTERN STATES REFINING (Continued) **1000403001**

Completed Date: 06/30/1993
Comments: Approximately 65k gal of cyanide solution treated. Removed approximately 14 110-barrel vacuum trucks of cyanide rinsate. Western States Refining (WSR) was a former precious metals recovery facility in Fontana, San Bernardino, CA. A two story warehouse exists in the northwest quadrant of the site. The warehouse included several tanks and vats which formerly contained cyanide, several storage sheds and a former drum staging area. Currently the site is abandoned. The Veta Grande Companies, filed for bankruptcy and have reorganized under the name "Forum Regroup. WSR began a silver and gold recovery operation primarily from x-ray film, with a small recovery percentage coming from electronic circuit boards. In the process, cyanide solution was used to strip gold and silver from x-ray film. Hazardous substances previously stored, handled and disposed at the site include cyanide, oxidizers, heavy metals, flammable liquids, ammonium hydroxide and organic solvents.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Final Determination of Non-Compliance
Completed Date: 12/30/1987
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Unilateral Order (I/SE, RAO, CAO, EPA AO)
Completed Date: 10/30/1987
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: * Discovery
Completed Date: 12/26/1980
Comments: Facility identified. Complaints and calls to regional agencies about buried drums, improper handling of cyanid and disposal of containers (dumping 55-gallon drums behind the facility).

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Land Use Restriction - Site Inspection/Visit
Completed Date: 09/12/2008
Comments: Annual Inspection was written and approved on 9/12/2008.

Future Area Name: Not reported
Future Sub Area Name: Not reported
Future Document Type: Not reported
Future Due Date: Not reported
Schedule Area Name: Not reported
Schedule Sub Area Name: Not reported
Schedule Document Type: Not reported
Schedule Due Date: Not reported
Schedule Revised Date: Not reported

San Bern. Co. Permit:
Region: SAN BERNARDINO
Facility ID: FA0005776
Owner: ROCK HARD TRANSPORTATION

WESTERN STATES REFINING (Continued) **1000403001**

Permit Number: PT0009917
Permit Category: SPECIAL GENERATOR
Facility Status: INACTIVE
Expiration Date: 10/31/2006

Region: SAN BERNARDINO
Facility ID: FA0005776
Owner: ROCK HARD TRANSPORTATION
Permit Number: PT0009918
Permit Category: SPECIAL HANDLER
Facility Status: INACTIVE
Expiration Date: 10/31/2006

ENVIROSTOR:
Facility ID: 36290065
Status: Certified O&M - Land Use Restrictions Only
Status Date: 12/10/1997
Site Code: 400168
Site Type: State Response
Site Type Detailed: State Response or NPL
Acres: 4.66
NPL: NO
Regulatory Agencies: SMBRP
Lead Agency: SMBRP
Program Manager: Joseph Cully
Supervisor: Douglas Bautista
Division Branch: Cleanup Cypress
Assembly: 47
Senate: 20
Special Program: Not reported
Restricted Use: YES
Site Mgmt Req: DAY, ELD, HOS, LUC, EX, NOWN, NUSE, NDEV, NSUB, SCH, RES
Funding: Not reported
Latitude: 34.05799
Longitude: -117.4613
APN: 0237-101-24
Past Use: METAL RECLAMATION
Potential COC: * Photochemicals/Photoprocessing Waste * CONTAMINATED SOIL * ACID SOLUTION 2>PH WITH METALS Asbestos Containing Materials (ACM * GAS SCRUBBER WASTE Cadmium and compounds Cyanide (free Nickel
Confirmed COC: NONE SPECIFIED
Potential Description: SOIL
Alias Name: PARCEL # 0237-101-24
Alias Type: Alternate Name
Alias Name: 0237-101-24
Alias Type: APN
Alias Name: CAD076080563
Alias Type: EPA Identification Number
Alias Name: 110002658017
Alias Type: EPA (FRS #)
Alias Name: P42097
Alias Type: PCode
Alias Name: 300168
Alias Type: Project Code (Site Code)
Alias Name: 400168
Alias Type: Project Code (Site Code)
Alias Name: 36290065

WESTERN STATES REFINING (Continued) **1000403001**

Alias Type: Envirostor ID Number

Completed Info:

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Land Use Restriction - Site Inspection/Visit
Completed Date: 06/25/2007
Comments: Site visit on June 25, 2007. This site was the Trench Plate Rental Company, and had been so since March, 2007. Manny Castillo, Supervisor, conducted the site tour. The site was in full compliance with the deed restriction.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Remedial Action Plan
Completed Date: 06/18/1993
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Remedial Investigation / Feasibility Study
Completed Date: 11/01/1992
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Removal Action Completion Report
Completed Date: 03/27/1992
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Public Participation Plan / Community Relations Plan
Completed Date: 05/30/1990
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Site Screening
Completed Date: 11/30/1987
Comments: Site Screening Done: Site listed on expenditure plan. Site reported for Proposition 65.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Removal Action Completion Report
Completed Date: 12/31/1986
Comments: Removal Action: Removal of residual cyanide.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Assessment Report
Completed Date: 06/27/1984
Comments: Preliminary Assessment Done: Silver recovery using cyanide and water. Fifty or fewer drums of spent acid. Waste includes cyanide residual (800 lbs/m). In operation since 1979 at this location. Preliminary Assessment submitted to EPA.

WESTERN STATES REFINING (Continued) **1000403001**

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: PRP Bankruptcy Filing
Completed Date: 10/09/2007
Comments: The DTSC attorney signed the NFCRA package on October 9, 2007.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Land Use Restriction - Site Inspection/Visit
Completed Date: 07/16/2009
Comments: Site was found to be in compliance with the Land Use Covenant Restriction.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Land Use Restriction - Site Inspection/Visit
Completed Date: 08/25/2011
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Land Use Restriction - Site Inspection/Visit
Completed Date: 09/03/2010
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Land Use Restriction - Site Inspection/Visit
Completed Date: 03/19/2014
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Consent Order
Completed Date: 08/08/1989
Comments: The agreement was signed on August 8, 1989.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Land Use Restriction
Completed Date: 12/10/1997
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Certification
Completed Date: 06/30/1993
Comments: Approximately 65k gal of cyanide solution treated. Removed approximately 14 110-barrel vacuum trucks of cyanide rinsate. Western States Refining (WSR) was a former precious metals recovery facility in Fontana, San Bernardino, CA. A two story warehouse exists in the northwest quadrant of the site. The warehouse included several tanks and vats which formerly contained cyanide, several storage sheds and a former drum staging area. Currently the site is abandoned. The Veta Grande Companies, filed for bankruptcy and have reorganized under the name "Forum Regroup. WSR began a silver and gold recovery operation primarily from x-ray film, with a small recovery percentage coming

WESTERN STATES REFINING (Continued) **1000403001**

from electronic circuit boards. In the process, cyanide solution was used to strip gold and silver from x-ray film. Hazardous substances previously stored, handled and disposed at the site include cyanide, oxidizers, heavy metals, flammable liquids, ammonium hydroxide and organic solvents.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Final Determination of Non-Compliance
Completed Date: 12/30/1987
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Unilateral Order (I/SE, RAO, CAO, EPA AO)
Completed Date: 10/30/1987
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: * Discovery
Completed Date: 12/26/1980
Comments: Facility identified. Complaints and calls to regional agencies about buried drums, improper handling of cyanid and disposal of containers (dumping 55-gallon drums behind the facility).

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Land Use Restriction - Site Inspection/Visit
Completed Date: 09/12/2008
Comments: Annual Inspection was written and approved on 9/12/2008.

Future Area Name: Not reported
Future Sub Area Name: Not reported
Future Document Type: Not reported
Future Due Date: Not reported
Schedule Area Name: Not reported
Schedule Sub Area Name: Not reported
Schedule Document Type: Not reported
Schedule Due Date: Not reported
Schedule Revised Date: Not reported

J30 **WESTERN STATES REFINING** **CA BOND EXP. PLAN** **S100833388**
ENE **10763 POPLAR AVENUE** **N/A**
1/2-1 **FONTANA, CA 92335**
0.634 mi.
3345 ft. **Site 2 of 2 in cluster J**

Relative:
Higher

Actual:
1031 ft.

CA BOND EXP. PLAN:
Reponsible Party: DETAILED SITE EXPENDITURE PLAN
Project Revenue Source Company: Not reported
Project Revenue Source Addr: Not reported
Project Revenue Source City,St,Zip: Not reported
Project Revenue Source Desc: The RP's have been found to be in noncompliance with an order issued by the Department. Therefore, it will be necessary to utilize Bond funds to remediate this site. DHS will undertake appropriate cost recovery actions. This site has not been identified as an NPL site, nor does it appear to be likely NPL candidate in the future. However, federal funds were made available for the

WESTERN STATES REFINING (Continued) **S100833388**

interim measures completed in 1986.

Site Description: This facility formerly recovered precious metals from photographic film using a cyanide and acid leaching process.

Hazardous Waste Desc: Hazardous substances were stored in various decomposing containers and tanks that resulted in soil contamination. The contaminants include cyanide solids and liquids, acids, metallic materials and volatile organic compounds.

Threat To Public Health & Env: There is threat of human exposure to toxic air emissions and contact with surface water runoff. There is a potential for contamination of the ground water which is used extensively as a domestic supply in the area. There is no known exposure at thistime.

Site Activity Status: Extensive soil contamination at the facility was discovered in 1985. In 1986, DHS and EPA initiated interim remedial measures consisting of drum repacking and provision of guard service. DHS directed Western States Refining to mitigate the contamination in an October, 1987 order. The company refused and filed for bankruptcy. DHS found Western States Refining in noncompliance with the order in December, 1987. DHS initiated RI/FS activities in October, 1988.

31
NW
1/2-1
0.702 mi.
3706 ft.

TREON STEEL FABRICATORS INC
10665 REDWOOD AV
FONTANA, CA 92335

San Bern. Co. Permit **S105047779**
EMI **N/A**
ENVIROSTOR

Relative:
Higher

Actual:
1002 ft.

San Bern. Co. Permit:

Region:	SAN BERNARDINO
Facility ID:	FA0002482
Owner:	ROUBEN P. BAGATOURIAN
Permit Number:	PT0000807
Permit Category:	HAZMAT HANDLER 11-25 EMPLOYEES
Facility Status:	INACTIVE
Expiration Date:	05/31/2012

EMI:

Year:	1987
County Code:	36
Air Basin:	SC
Facility ID:	52534
Air District Name:	SC
SIC Code:	3441
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	5
Reactive Organic Gases Tons/Yr:	5
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0
Part. Matter 10 Micrometers & Smllr Tons/Yr:	0

Year:	1990
County Code:	36
Air Basin:	SC
Facility ID:	52534
Air District Name:	SC
SIC Code:	3441
Air District Name:	SOUTH COAST AQMD

TREON STEEL FABRICATORS INC (Continued) **S105047779**

Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	3
Reactive Organic Gases Tons/Yr:	0
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0
Part. Matter 10 Micrometers & Smllr Tons/Yr:	0

ENVIROSTOR:

Facility ID:	36340068
Status:	Refer: 1248 Local Agency
Status Date:	07/03/2000
Site Code:	Not reported
Site Type:	Evaluation
Site Type Detailed:	Evaluation
Acres:	0
NPL:	NO
Regulatory Agencies:	SAN BERNARDINO COUNTY
Lead Agency:	SAN BERNARDINO COUNTY
Program Manager:	Not reported
Supervisor:	Referred - Not Assigned
Division Branch:	Cleanup Cypress
Assembly:	47
Senate:	20
Special Program:	Not reported
Restricted Use:	NO
Site Mgmt Req:	NONE SPECIFIED
Funding:	Not Applicable
Latitude:	34.05972
Longitude:	-117.4833
APN:	236141180000
Past Use:	NONE SPECIFIED
Potential COC:	NONE SPECIFIED
Confirmed COC:	NONE SPECIFIED
Potential Description:	NONE SPECIFIED
Alias Name:	236141180000
Alias Type:	APN
Alias Name:	36340068
Alias Type:	Envirostor ID Number

Completed Info:

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	SB 1248 Notification
Completed Date:	06/26/2000
Comments:	SB 1248 SAN BERNARDINO COUNTY
Future Area Name:	Not reported
Future Sub Area Name:	Not reported
Future Document Type:	Not reported
Future Due Date:	Not reported
Schedule Area Name:	Not reported
Schedule Sub Area Name:	Not reported
Schedule Document Type:	Not reported
Schedule Due Date:	Not reported

TREON STEEL FABRICATORS INC (Continued) **S105047779**

Schedule Revised Date: Not reported

32
NE
1/2-1
0.722 mi.
3810 ft.

HANSON ROOF TILE INC
10650 POPLAR AVE
FONTANA, CA 92337

NPDES **1001614095**
San Bern. Co. Permit **N/A**
EMI
HWP
WDS

Relative:
Higher

Actual:
1040 ft.

NPDES:

Npdes Number:	Not reported
Facility Status:	Not reported
Agency Id:	Not reported
Region:	8
Regulatory Measure Id:	213192
Order No:	Not reported
Regulatory Measure Type:	Industrial
Place Id:	Not reported
WDID:	8 36I004800
Program Type:	Not reported
Adoption Date Of Regulatory Measure:	Not reported
Effective Date Of Regulatory Measure:	Not reported
Expiration Date Of Regulatory Measure:	Not reported
Termination Date Of Regulatory Measure:	07/25/2011
Discharge Name:	Not reported
Discharge Address:	Not reported
Discharge City:	Not reported
Discharge State:	Not reported
Discharge Zip:	Not reported
RECEIVED DATE:	05/09/2008
PROCESSED DATE:	04/07/1992
STATUS CODE NAME:	Terminated
STATUS DATE:	08/03/2011
PLACE SIZE:	19
PLACE SIZE UNIT:	Acres
FACILITY CONTACT NAME:	Jae Boyd
FACILITY CONTACT TITLE:	Not reported
FACILITY CONTACT PHONE:	909-350-4238
FACILITY CONTACT PHONE EXT:	Not reported
FACILITY CONTACT EMAIL:	Not reported
OPERATOR NAME:	Hanson Roof Tile Inc
OPERATOR ADDRESS:	10650 Poplar Ave
OPERATOR CITY:	Fontana
OPERATOR STATE:	California
OPERATOR ZIP:	92337
OPERATOR CONTACT NAME:	Jae Boyd
OPERATOR CONTACT TITLE:	Not reported
OPERATOR CONTACT PHONE:	909-350-4238
OPERATOR CONTACT PHONE EXT:	Not reported
OPERATOR CONTACT EMAIL:	Not reported
OPERATOR TYPE:	Private Business
DEVELOPER NAME:	Not reported
DEVELOPER ADDRESS:	Not reported
DEVELOPER CITY:	Not reported
DEVELOPER STATE:	California
DEVELOPER ZIP:	Not reported
DEVELOPER CONTACT NAME:	Not reported
DEVELOPER CONTACT TITLE:	Not reported
CONSTYPE LINEAR UTILITY IND:	Not reported

HANSON ROOF TILE INC (Continued) **1001614095**

EMERGENCY PHONE NO:	909-350-4238
EMERGENCY PHONE EXT:	Not reported
CONSTYPE ABOVE GROUND IND:	Not reported
CONSTYPE BELOW GROUND IND:	Not reported
CONSTYPE CABLE LINE IND:	Not reported
CONSTYPE COMM LINE IND:	Not reported
CONSTYPE COMMERTIAL IND:	Not reported
CONSTYPE ELECTRICAL LINE IND:	Not reported
CONSTYPE GAS LINE IND:	Not reported
CONSTYPE INDUSTRIAL IND:	Not reported
CONSTYPE OTHER DESRIPTION:	Not reported
CONSTYPE OTHER IND:	Not reported
CONSTYPE RECONS IND:	Not reported
CONSTYPE RESIDENTIAL IND:	Not reported
CONSTYPE TRANSPORT IND:	Not reported
CONSTYPE UTILITY DESCRIPTION:	Not reported
CONSTYPE UTILITY IND:	Not reported
CONSTYPE WATER SEWER IND:	Not reported
DIR DISCHARGE USWATER IND:	Not reported
RECEIVING WATER NAME:	Santa Ana River
CERTIFIER NAME:	Not reported
CERTIFIER TITLE:	Not reported
CERTIFICATION DATE:	Not reported
PRIMARY SIC:	3272-Concrete Products, Except Block and Brick
SECONDARY SIC:	Not reported
TERTIARY SIC:	Not reported
Npdes Number:	Not reported
Facility Status:	Not reported
Agency Id:	Not reported
Region:	8
Regulatory Measure Id:	421858
Order No:	Not reported
Regulatory Measure Type:	Construction
Place Id:	Not reported
WDID:	8 36C362450
Program Type:	Not reported
Adoption Date Of Regulatory Measure:	Not reported
Effective Date Of Regulatory Measure:	Not reported
Expiration Date Of Regulatory Measure:	Not reported
Termination Date Of Regulatory Measure:	09/27/2012
Discharge Name:	Not reported
Discharge Address:	Not reported
Discharge City:	Not reported
Discharge State:	Not reported
Discharge Zip:	Not reported
RECEIVED DATE:	11/14/2011
PROCESSED DATE:	11/18/2011
STATUS CODE NAME:	Terminated
STATUS DATE:	10/29/2012
PLACE SIZE:	19
PLACE SIZE UNIT:	Acres
FACILITY CONTACT NAME:	Joely Swenson
FACILITY CONTACT TITLE:	Not reported
FACILITY CONTACT PHONE:	310-323-9100
FACILITY CONTACT PHONE EXT:	Not reported
FACILITY CONTACT EMAIL:	jswenson@omprop.com

HANSON ROOF TILE INC (Continued) **1001614095**

OPERATOR NAME:	OMP Fontana Distribution Center LLC
OPERATOR ADDRESS:	19300 South Hamilton Avenue
OPERATOR CITY:	Gardena
OPERATOR STATE:	California
OPERATOR ZIP:	90248
OPERATOR CONTACT NAME:	Joely Swenson
OPERATOR CONTACT TITLE:	Not reported
OPERATOR CONTACT PHONE:	310-323-9100
OPERATOR CONTACT PHONE EXT:	Not reported
OPERATOR CONTACT EMAIL:	jswenson@omprop.com
OPERATOR TYPE:	Private Business
DEVELOPER NAME:	OMP Fontana Distribution Center LLC
DEVELOPER ADDRESS:	19300 South Hamilton Avenue
DEVELOPER CITY:	Gardena
DEVELOPER STATE:	California
DEVELOPER ZIP:	90248
DEVELOPER CONTACT NAME:	Joely Swenson
DEVELOPER CONTACT TITLE:	Not reported
CONSTYPE LINEAR UTILITY IND:	N
EMERGENCY PHONE NO:	Not reported
EMERGENCY PHONE EXT:	Not reported
CONSTYPE ABOVE GROUND IND:	Not reported
CONSTYPE BELOW GROUND IND:	Not reported
CONSTYPE CABLE LINE IND:	Not reported
CONSTYPE COMM LINE IND:	Not reported
CONSTYPE COMMERTIAL IND:	Not reported
CONSTYPE ELECTRICAL LINE IND:	Not reported
CONSTYPE GAS LINE IND:	Not reported
CONSTYPE INDUSTRIAL IND:	Y
CONSTYPE OTHER DESRIPTION:	Not reported
CONSTYPE OTHER IND:	Not reported
CONSTYPE RECONS IND:	Not reported
CONSTYPE RESIDENTIAL IND:	Not reported
CONSTYPE TRANSPORT IND:	Not reported
CONSTYPE UTILITY DESCRIPTION:	Not reported
CONSTYPE UTILITY IND:	Not reported
CONSTYPE WATER SEWER IND:	Not reported
DIR DISCHARGE USWATER IND:	N
RECEIVING WATER NAME:	Declez Channel
CERTIFIER NAME:	Joely Swenson
CERTIFIER TITLE:	Not reported
CERTIFICATION DATE:	14-NOV-11
PRIMARY SIC:	Not reported
SECONDARY SIC:	Not reported
TERTIARY SIC:	Not reported
Npdes Number:	CAS000002
Facility Status:	Terminated
Agency Id:	0
Region:	8
Regulatory Measure Id:	421858
Order No:	2009-0009-DWQ
Regulatory Measure Type:	Enrollee
Place Id:	Not reported
WDID:	8 36C362450
Program Type:	Construction
Adoption Date Of Regulatory Measure:	Not reported

HANSON ROOF TILE INC (Continued) **1001614095**

Effective Date Of Regulatory Measure:	11/18/2011
Expiration Date Of Regulatory Measure:	Not reported
Termination Date Of Regulatory Measure:	09/27/2012
Discharge Name:	OMP Fontana Distribution Center LLC
Discharge Address:	19300 South Hamilton Avenue
Discharge City:	Gardena
Discharge State:	California
Discharge Zip:	90248
RECEIVED DATE:	Not reported
PROCESSED DATE:	Not reported
STATUS CODE NAME:	Not reported
STATUS DATE:	Not reported
PLACE SIZE:	Not reported
PLACE SIZE UNIT:	Not reported
FACILITY CONTACT NAME:	Not reported
FACILITY CONTACT TITLE:	Not reported
FACILITY CONTACT PHONE:	Not reported
FACILITY CONTACT PHONE EXT:	Not reported
FACILITY CONTACT EMAIL:	Not reported
OPERATOR NAME:	Not reported
OPERATOR ADDRESS:	Not reported
OPERATOR CITY:	Not reported
OPERATOR STATE:	Not reported
OPERATOR ZIP:	Not reported
OPERATOR CONTACT NAME:	Not reported
OPERATOR CONTACT TITLE:	Not reported
OPERATOR CONTACT PHONE:	Not reported
OPERATOR CONTACT PHONE EXT:	Not reported
OPERATOR CONTACT EMAIL:	Not reported
OPERATOR TYPE:	Not reported
DEVELOPER NAME:	Not reported
DEVELOPER ADDRESS:	Not reported
DEVELOPER CITY:	Not reported
DEVELOPER STATE:	Not reported
DEVELOPER ZIP:	Not reported
DEVELOPER CONTACT NAME:	Not reported
DEVELOPER CONTACT TITLE:	Not reported
CONSTYPE LINEAR UTILITY IND:	Not reported
EMERGENCY PHONE NO:	Not reported
EMERGENCY PHONE EXT:	Not reported
CONSTYPE ABOVE GROUND IND:	Not reported
CONSTYPE BELOW GROUND IND:	Not reported
CONSTYPE CABLE LINE IND:	Not reported
CONSTYPE COMM LINE IND:	Not reported
CONSTYPE COMMERTIAL IND:	Not reported
CONSTYPE ELECTRICAL LINE IND:	Not reported
CONSTYPE GAS LINE IND:	Not reported
CONSTYPE INDUSTRIAL IND:	Not reported
CONSTYPE OTHER DESRIPTION:	Not reported
CONSTYPE OTHER IND:	Not reported
CONSTYPE RECONS IND:	Not reported
CONSTYPE RESIDENTIAL IND:	Not reported
CONSTYPE TRANSPORT IND:	Not reported
CONSTYPE UTILITY DESCRIPTION:	Not reported
CONSTYPE UTILITY IND:	Not reported
CONSTYPE WATER SEWER IND:	Not reported
DIR DISCHARGE USWATER IND:	Not reported

HANSON ROOF TILE INC (Continued) **1001614095**

RECEIVING WATER NAME:	Not reported
CERTIFIER NAME:	Not reported
CERTIFIER TITLE:	Not reported
CERTIFICATION DATE:	Not reported
PRIMARY SIC:	Not reported
SECONDARY SIC:	Not reported
TERTIARY SIC:	Not reported

San Bern. Co. Permit:

Region:	SAN BERNARDINO
Facility ID:	FA0005332
Owner:	HANSON ROOF TILE INC.
Permit Number:	PT0002741
Permit Category:	HAZARDOUS WASTE GENERATOR - 26-50 EMPLOYEES
Facility Status:	INACTIVE
Expiration Date:	09/30/2011

Region:	SAN BERNARDINO
Facility ID:	FA0005332
Owner:	HANSON ROOF TILE INC.
Permit Number:	PT0002742
Permit Category:	HAZMAT HANDLER 26-50 EMPLOYEES (W/GEN PRMT)
Facility Status:	INACTIVE
Expiration Date:	09/30/2011

Region:	SAN BERNARDINO
Facility ID:	FA0005332
Owner:	HANSON ROOF TILE INC.
Permit Number:	PT0017178
Permit Category:	EPCRA FACILITY
Facility Status:	INACTIVE
Expiration Date:	09/30/2011

Region:	SAN BERNARDINO
Facility ID:	FA0005332
Owner:	HANSON ROOF TILE INC.
Permit Number:	PT0020261
Permit Category:	ABOVEGROUND PETROLEUM STORAGE (AST) (SPCC)
Facility Status:	INACTIVE
Expiration Date:	09/30/2010

Region:	SAN BERNARDINO
Facility ID:	FA0005332
Owner:	HANSON ROOF TILE INC.
Permit Number:	PT0019486
Permit Category:	AST OPERATING PERMIT
Facility Status:	INACTIVE
Expiration Date:	09/30/2009

EMI:

Year:	2005
County Code:	36
Air Basin:	SC
Facility ID:	65334
Air District Name:	SC
SIC Code:	3272

HANSON ROOF TILE INC (Continued) **1001614095**

Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	2.3123
Reactive Organic Gases Tons/Yr:	1.60223542
Carbon Monoxide Emissions Tons/Yr:	.381
NOX - Oxides of Nitrogen Tons/Yr:	1.41
SOX - Oxides of Sulphur Tons/Yr:	.00653
Particulate Matter Tons/Yr:	.6706
Part. Matter 10 Micrometers & Smllr Tons/Yr:	.3761

Year:	2006
County Code:	36
Air Basin:	SC
Facility ID:	65334
Air District Name:	SC
SIC Code:	3272
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	2.166163507362562982
Reactive Organic Gases Tons/Yr:	1.475
Carbon Monoxide Emissions Tons/Yr:	.321
NOX - Oxides of Nitrogen Tons/Yr:	1.191
SOX - Oxides of Sulphur Tons/Yr:	.005
Particulate Matter Tons/Yr:	.342
Part. Matter 10 Micrometers & Smllr Tons/Yr:	.22566

Year:	2007
County Code:	36
Air Basin:	SC
Facility ID:	65334
Air District Name:	SC
SIC Code:	3272
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	2.166163507362562982
Reactive Organic Gases Tons/Yr:	1.475
Carbon Monoxide Emissions Tons/Yr:	.321
NOX - Oxides of Nitrogen Tons/Yr:	1.191
SOX - Oxides of Sulphur Tons/Yr:	.005
Particulate Matter Tons/Yr:	.342
Part. Matter 10 Micrometers & Smllr Tons/Yr:	.22566

HWP:

EPA Id:	CAD981445422
Cleanup Status:	UNKNOWN
Latitude:	34.06024
Longitude:	-117.4625
Facility Type:	Historical - Non-Operating
Facility Size:	Not reported
Team:	Not reported
Supervisor:	Not reported
Site Code:	Not reported
Assembly District:	47
Senate District:	20

HANSON ROOF TILE INC (Continued) **1001614095**

Public Information Officer: Not reported

WDS:

Facility ID:	Santa Ana River 36I004800
Facility Type:	Industrial - Facility that treats and/or disposes of liquid or semisolid wastes from any servicing, producing, manufacturing or processing operation of whatever nature, including mining, gravel washing, geothermal operations, air conditioning, ship building and repairing, oil production, storage and disposal operations, water pumping.
Facility Status:	Active - Any facility with a continuous or seasonal discharge that is under Waste Discharge Requirements.
NPDES Number:	CAS000001 The 1st 2 characters designate the state. The remaining 7 are assigned by the Regional Board
Subregion:	8
Facility Telephone:	9093504238
Facility Contact:	JAE BOYD
Agency Name:	HANSON ROOF TILE INC
Agency Address:	10650 Poplar Ave
Agency City,St,Zip:	Fontana 923377334
Agency Contact:	JAE BOYD
Agency Telephone:	9093504238
Agency Type:	Private
SIC Code:	0
SIC Code 2:	Not reported
Primary Waste Type:	Not reported
Primary Waste:	Not reported
Waste Type2:	Not reported
Waste2:	Not reported
Primary Waste Type:	Not reported
Secondary Waste:	Not reported
Secondary Waste Type:	Not reported
Design Flow:	0
Baseline Flow:	0
Reclamation:	Not reported
POTW:	Not reported
Treat To Water:	Minor Threat to Water Quality. A violation of a regional board order should cause a relatively minor impairment of beneficial uses compared to a major or minor threat. Not: All nurds without a TTWQ will be considered a minor threat to water quality unless coded at a higher Level. A Zero (0) may be used to code those NURDS that are found to represent no threat to water quality.
Complexity:	Category C - Facilities having no waste treatment systems, such as cooling water dischargers or thosewho must comply through best management practices, facilities with passive waste treatment and disposal systems, such as septic systems with subsurface disposal, or dischargers having waste storage systems with land disposal such as dairy waste ponds.

Count: 2 records. ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
FONTANA	S107540586		SANTA ANA AVE, E OF HEMLOCK AV	92335	CDL
FONTANA	S107540060		ON SANTA ANA AVE, 200 YD W OF		CDL

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 03/26/2015
Date Data Arrived at EDR: 04/08/2015
Date Made Active in Reports: 06/22/2015
Number of Days to Update: 75

Source: EPA
Telephone: N/A
Last EDR Contact: 07/09/2015
Next Scheduled EDR Contact: 10/19/2015
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 6
Telephone: 214-655-6659

EPA Region 3
Telephone 215-814-5418

EPA Region 7
Telephone: 913-551-7247

EPA Region 4
Telephone 404-562-8033

EPA Region 8
Telephone: 303-312-6774

EPA Region 5
Telephone 312-886-6686

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 03/26/2015
Date Data Arrived at EDR: 04/08/2015
Date Made Active in Reports: 06/22/2015
Number of Days to Update: 75

Source: EPA
Telephone: N/A
Last EDR Contact: 07/09/2015
Next Scheduled EDR Contact: 10/19/2015
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Federal Delisted NPL site list

Delisted NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 03/26/2015
Date Data Arrived at EDR: 04/08/2015
Date Made Active in Reports: 06/22/2015
Number of Days to Update: 75

Source: EPA
Telephone: N/A
Last EDR Contact: 07/09/2015
Next Scheduled EDR Contact: 10/19/2015
Data Release Frequency: Quarterly

Federal CERCLIS list

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 11/11/2013
Date Made Active in Reports: 02/13/2014
Number of Days to Update: 94

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 05/29/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Quarterly

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 03/26/2015
Date Data Arrived at EDR: 04/08/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 64

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 07/10/2015
Next Scheduled EDR Contact: 10/19/2015
Data Release Frequency: Varies

Federal CERCLIS NFRAP site List

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned

Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 11/11/2013
Date Made Active in Reports: 02/13/2014
Number of Days to Update: 94

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 05/29/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 03/10/2015
Date Data Arrived at EDR: 03/31/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 72

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 06/26/2015
Next Scheduled EDR Contact: 10/12/2015
Data Release Frequency: Quarterly

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 03/10/2015
Date Data Arrived at EDR: 03/31/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 72

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 06/26/2015
Next Scheduled EDR Contact: 10/12/2015
Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 03/10/2015
Date Data Arrived at EDR: 03/31/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 72

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 06/26/2015
Next Scheduled EDR Contact: 10/12/2015
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 03/10/2015
Date Data Arrived at EDR: 03/31/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 72

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 06/26/2015
Next Scheduled EDR Contact: 10/12/2015
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 03/10/2015
Date Data Arrived at EDR: 03/31/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 72

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 06/26/2015
Next Scheduled EDR Contact: 10/12/2015
Data Release Frequency: Varies

Federal institutional controls / engineering controls registries

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 03/16/2015
Date Data Arrived at EDR: 03/17/2015
Date Made Active in Reports: 06/02/2015
Number of Days to Update: 77

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 06/01/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 03/16/2015
Date Data Arrived at EDR: 03/17/2015
Date Made Active in Reports: 06/02/2015
Number of Days to Update: 77

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 06/01/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: Varies

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 05/28/2015
Date Data Arrived at EDR: 05/29/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 13

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 05/18/2015
Next Scheduled EDR Contact: 08/31/2015
Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 03/30/2015
Date Data Arrived at EDR: 03/31/2015
Date Made Active in Reports: 06/02/2015
Number of Days to Update: 63

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 06/26/2015
Next Scheduled EDR Contact: 10/12/2015
Data Release Frequency: Annually

State- and tribal - equivalent NPL

RESPONSE: State Response Sites

Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

Date of Government Version: 05/04/2015
Date Data Arrived at EDR: 05/05/2015
Date Made Active in Reports: 05/14/2015
Number of Days to Update: 9

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/05/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Quarterly

State- and tribal - equivalent CERCLIS

ENVIROSTOR: EnviroStor Database

The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

Date of Government Version: 05/04/2015
Date Data Arrived at EDR: 05/05/2015
Date Made Active in Reports: 05/14/2015
Number of Days to Update: 9

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/05/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Quarterly

State and tribal landfill and/or solid waste disposal site lists

SWF/LF (SWIS): Solid Waste Information System

Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 05/18/2015
Date Data Arrived at EDR: 05/20/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 16

Source: Department of Resources Recycling and Recovery
Telephone: 916-341-6320
Last EDR Contact: 05/20/2015
Next Scheduled EDR Contact: 08/31/2015
Data Release Frequency: Quarterly

State and tribal leaking storage tank lists

LUST REG 6V: Leaking Underground Storage Tank Case Listing

Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005
Date Data Arrived at EDR: 06/07/2005
Date Made Active in Reports: 06/29/2005
Number of Days to Update: 22

Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-241-7365
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 7: Leaking Underground Storage Tank Case Listing

Leaking Underground Storage Tank locations. Imperial, Riverside, San Diego, Santa Barbara counties.

Date of Government Version: 02/26/2004
Date Data Arrived at EDR: 02/26/2004
Date Made Active in Reports: 03/24/2004
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-776-8943
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

LUST REG 6L: Leaking Underground Storage Tank Case Listing

For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/2003
Date Data Arrived at EDR: 09/10/2003
Date Made Active in Reports: 10/07/2003
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 530-542-5572
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 5: Leaking Underground Storage Tank Database

Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

Date of Government Version: 07/01/2008
Date Data Arrived at EDR: 07/22/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 9

Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-4834
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: No Update Planned

LUST REG 4: Underground Storage Tank Leak List

Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6710
Last EDR Contact: 09/06/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: No Update Planned

LUST REG 3: Leaking Underground Storage Tank Database

Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003
Date Data Arrived at EDR: 05/19/2003
Date Made Active in Reports: 06/02/2003
Number of Days to Update: 14

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-542-4786
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: No Update Planned

LUST REG 9: Leaking Underground Storage Tank Report

Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/2001
Date Data Arrived at EDR: 04/23/2001
Date Made Active in Reports: 05/21/2001
Number of Days to Update: 28

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-637-5595
Last EDR Contact: 09/26/2011
Next Scheduled EDR Contact: 01/09/2012
Data Release Frequency: No Update Planned

LUST REG 8: Leaking Underground Storage Tanks

California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/14/2005
Date Data Arrived at EDR: 02/15/2005
Date Made Active in Reports: 03/28/2005
Number of Days to Update: 41

Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-4496
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: Varies

LUST REG 2: Fuel Leak List

Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-622-2433
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

LUST REG 1: Active Toxic Site Investigation

Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001
Date Data Arrived at EDR: 02/28/2001
Date Made Active in Reports: 03/29/2001
Number of Days to Update: 29

Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-570-3769
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

LUST: Geotracker's Leaking Underground Fuel Tank Report

Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state. For more information on a particular leaking underground storage tank sites, please contact the appropriate regulatory agency.

Date of Government Version: 06/15/2015
Date Data Arrived at EDR: 06/17/2015
Date Made Active in Reports: 07/14/2015
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: see region list
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Quarterly

SLIC: Statewide SLIC Cases

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 06/15/2015
Date Data Arrived at EDR: 06/17/2015
Date Made Active in Reports: 07/14/2015
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Varies

SLIC REG 1: Active Toxic Site Investigations

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2003
Date Data Arrived at EDR: 04/07/2003
Date Made Active in Reports: 04/25/2003
Number of Days to Update: 18

Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/18/2006
Date Data Arrived at EDR: 05/18/2006
Date Made Active in Reports: 06/15/2006
Number of Days to Update: 28

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: Semi-Annually

SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/17/2004
Date Data Arrived at EDR: 11/18/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 47

Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: Varies

SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/01/2005
Date Data Arrived at EDR: 04/05/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 16

Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Semi-Annually

SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/24/2005
Date Data Arrived at EDR: 05/25/2005
Date Made Active in Reports: 06/16/2005
Number of Days to Update: 22

Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: Semi-Annually

SLIC REG 6L: SLIC Sites
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

SLIC REG 7: SLIC List
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/24/2004
Date Data Arrived at EDR: 11/29/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 36

Source: California Regional Quality Control Board, Colorado River Basin Region
Telephone: 760-346-7491
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2008
Date Data Arrived at EDR: 04/03/2008
Date Made Active in Reports: 04/14/2008
Number of Days to Update: 11

Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-3298
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Semi-Annually

SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/10/2007
Date Data Arrived at EDR: 09/11/2007
Date Made Active in Reports: 09/28/2007
Number of Days to Update: 17

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
Last EDR Contact: 08/08/2011
Next Scheduled EDR Contact: 11/21/2011
Data Release Frequency: Annually

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land
Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 04/30/2015
Date Data Arrived at EDR: 05/29/2015
Date Made Active in Reports: 06/22/2015
Number of Days to Update: 24

Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 09/30/2014
Date Data Arrived at EDR: 03/03/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 10

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
Data Release Frequency: Semi-Annually

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 02/03/2015
Date Data Arrived at EDR: 04/30/2015
Date Made Active in Reports: 06/22/2015
Number of Days to Update: 53

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 04/03/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 02/03/2015
Date Data Arrived at EDR: 02/12/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 29

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
Data Release Frequency: Quarterly

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 01/08/2015
Date Data Arrived at EDR: 01/08/2015
Date Made Active in Reports: 02/09/2015
Number of Days to Update: 32

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 01/08/2015
Next Scheduled EDR Contact: 05/11/2015
Data Release Frequency: Quarterly

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 03/17/2015
Date Data Arrived at EDR: 05/01/2015
Date Made Active in Reports: 06/22/2015
Number of Days to Update: 52

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
Data Release Frequency: Varies

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 03/30/2015
Date Data Arrived at EDR: 04/28/2015
Date Made Active in Reports: 06/22/2015
Number of Days to Update: 55

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 04/30/2015
Date Data Arrived at EDR: 05/05/2015
Date Made Active in Reports: 06/22/2015
Number of Days to Update: 48

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
Data Release Frequency: Quarterly

State and tribal registered storage tank lists

UST: Active UST Facilities
Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 06/15/2015
Date Data Arrived at EDR: 06/17/2015
Date Made Active in Reports: 07/06/2015
Number of Days to Update: 19

Source: SWRCB
Telephone: 916-341-5851
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Semi-Annually

AST: Aboveground Petroleum Storage Tank Facilities
A listing of aboveground storage tank petroleum storage tank locations.

Date of Government Version: 08/01/2009
Date Data Arrived at EDR: 09/10/2009
Date Made Active in Reports: 10/01/2009
Number of Days to Update: 21

Source: California Environmental Protection Agency
Telephone: 916-327-5092
Last EDR Contact: 07/13/2015
Next Scheduled EDR Contact: 10/12/2015
Data Release Frequency: Quarterly

INDIAN UST R10: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 05/06/2015
Date Data Arrived at EDR: 05/19/2015
Date Made Active in Reports: 06/22/2015
Number of Days to Update: 34

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
Data Release Frequency: Quarterly

INDIAN UST R1: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 02/03/2015
Date Data Arrived at EDR: 04/30/2015
Date Made Active in Reports: 06/22/2015
Number of Days to Update: 53

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 04/28/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 04/30/2015
Date Data Arrived at EDR: 05/05/2015
Date Made Active in Reports: 06/22/2015
Number of Days to Update: 48

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
Data Release Frequency: Quarterly

INDIAN UST R9: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 12/14/2014
Date Data Arrived at EDR: 02/13/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 28

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 01/26/2015
Next Scheduled EDR Contact: 05/11/2015
Data Release Frequency: Quarterly

INDIAN UST R7: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 09/23/2014
Date Data Arrived at EDR: 11/25/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 65

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 03/17/2015
Date Data Arrived at EDR: 05/01/2015
Date Made Active in Reports: 06/22/2015
Number of Days to Update: 52

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
Data Release Frequency: Semi-Annually

INDIAN UST R4: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 09/30/2014
Date Data Arrived at EDR: 03/03/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 10

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
Data Release Frequency: Semi-Annually

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 04/30/2015
Date Data Arrived at EDR: 05/26/2015
Date Made Active in Reports: 06/22/2015
Number of Days to Update: 27

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
Data Release Frequency: Varies

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/01/2010
Date Data Arrived at EDR: 02/16/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 55
Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 07/10/2015
Next Scheduled EDR Contact: 10/28/2015
Data Release Frequency: Varies

State and tribal voluntary cleanup sites

VCP: Voluntary Cleanup Program Properties
Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

Date of Government Version: 05/04/2015
Date Data Arrived at EDR: 05/05/2015
Date Made Active in Reports: 05/14/2015
Number of Days to Update: 9
Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/05/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Quarterly

INDIAN VCP R1: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 09/29/2014
Date Data Arrived at EDR: 10/01/2014
Date Made Active in Reports: 11/06/2014
Number of Days to Update: 36
Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 06/26/2015
Next Scheduled EDR Contact: 10/12/2015
Data Release Frequency: Varies

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng
A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27
Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites
Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 03/23/2015
Date Data Arrived at EDR: 03/24/2015
Date Made Active in Reports: 06/02/2015
Number of Days to Update: 70
Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 06/24/2015
Next Scheduled EDR Contact: 10/05/2015
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39
Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations
A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137
Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
Data Release Frequency: No Update Planned

SWRCY: Recycler Database
A listing of recycling facilities in California.

Date of Government Version: 03/16/2015
Date Data Arrived at EDR: 03/18/2015
Date Made Active in Reports: 03/26/2015
Number of Days to Update: 8
Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Quarterly

HAULERS: Registered Waste Tire Haulers Listing
A listing of registered waste tire haulers.

Date of Government Version: 05/26/2015
Date Data Arrived at EDR: 05/28/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 8
Source: Integrated Waste Management Board
Telephone: 916-341-6422
Last EDR Contact: 05/18/2015
Next Scheduled EDR Contact: 08/31/2015
Data Release Frequency: Varies

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52
Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 05/01/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Varies

WMUDS/SWAT: Waste Management Unit Database
Waste Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

Date of Government Version: 04/01/2000
Date Data Arrived at EDR: 04/10/2000
Date Made Active in Reports: 05/10/2000
Number of Days to Update: 30
Source: State Water Resources Control Board
Telephone: 916-227-4448
Last EDR Contact: 05/06/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: No Update Planned

Local Lists of Hazardous waste / Contaminated Sites

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 02/25/2015
Date Data Arrived at EDR: 03/10/2015
Date Made Active in Reports: 03/25/2015
Number of Days to Update: 15

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 05/29/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: Quarterly

HIST CAL-SITES: Calsites Database

The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

Date of Government Version: 08/08/2005
Date Data Arrived at EDR: 08/03/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 21

Source: Department of Toxic Substance Control
Telephone: 916-323-3400
Last EDR Contact: 02/23/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: No Update Planned

SCH: School Property Evaluation Program

This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.

Date of Government Version: 05/04/2015
Date Data Arrived at EDR: 05/05/2015
Date Made Active in Reports: 05/14/2015
Number of Days to Update: 9

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/05/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Quarterly

TOXIC PITS: Toxic Pits Cleanup Act Sites

Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/1995
Date Data Arrived at EDR: 08/30/1995
Date Made Active in Reports: 09/26/1995
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: 916-227-4364
Last EDR Contact: 01/26/2009
Next Scheduled EDR Contact: 04/27/2009
Data Release Frequency: No Update Planned

CDL: Clandestine Drug Labs

A listing of drug lab locations. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 03/10/2015
Date Made Active in Reports: 03/18/2015
Number of Days to Update: 8

Source: Department of Toxic Substances Control
Telephone: 916-255-6504
Last EDR Contact: 07/13/2015
Next Scheduled EDR Contact: 10/28/2015
Data Release Frequency: Varies

US HIST CDL: National Clandestine Laboratory Register

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 02/25/2015
Date Data Arrived at EDR: 03/10/2015
Date Made Active in Reports: 03/25/2015
Number of Days to Update: 15

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 05/29/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: No Update Planned

Local Lists of Registered Storage Tanks

CA FID UST: Facility Inventory Database

The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/1994
Date Data Arrived at EDR: 09/05/1995
Date Made Active in Reports: 09/29/1995
Number of Days to Update: 24

Source: California Environmental Protection Agency
Telephone: 916-341-5851
Last EDR Contact: 12/28/1998
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

UST MENDOCINO: Mendocino County UST Database

A listing of underground storage tank locations in Mendocino County.

Date of Government Version: 09/23/2009
Date Data Arrived at EDR: 09/23/2009
Date Made Active in Reports: 10/01/2009
Number of Days to Update: 8

Source: Department of Public Health
Telephone: 707-463-4466
Last EDR Contact: 06/01/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: Annually

HIST UST: Hazardous Substance Storage Container Database

The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/1990
Date Data Arrived at EDR: 01/25/1991
Date Made Active in Reports: 02/12/1991
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-341-5851
Last EDR Contact: 07/26/2001
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

SWEEPS UST: SWEEPS UST Listing

Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

Date of Government Version: 06/01/1994
Date Data Arrived at EDR: 07/07/2005
Date Made Active in Reports: 08/11/2005
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/03/2005
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Local Land Records

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 02/18/2014
Date Data Arrived at EDR: 03/18/2014
Date Made Active in Reports: 04/24/2014
Number of Days to Update: 37

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
Data Release Frequency: Varies

LIENS: Environmental Liens Listing

A listing of property locations with environmental liens for California where DTSC is a lien holder.

Date of Government Version: 06/11/2015
Date Data Arrived at EDR: 06/16/2015
Date Made Active in Reports: 07/14/2015
Number of Days to Update: 28

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 06/05/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Varies

DEED: Deed Restriction Listing

Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

Date of Government Version: 06/08/2015
Date Data Arrived at EDR: 06/09/2015
Date Made Active in Reports: 07/14/2015
Number of Days to Update: 35

Source: DTSC and SWRCB
Telephone: 916-323-3400
Last EDR Contact: 06/09/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Semi-Annually

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 03/30/2015
Date Data Arrived at EDR: 03/31/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 72

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 06/26/2015
Next Scheduled EDR Contact: 10/12/2015
Data Release Frequency: Annually

CHMIRS: California Hazardous Material Incident Report System

California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 04/14/2015
Date Data Arrived at EDR: 04/29/2015
Date Made Active in Reports: 05/21/2015
Number of Days to Update: 22

Source: Office of Emergency Services
Telephone: 916-845-8400
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

LDS: Land Disposal Sites Listing

The Land Disposal program regulates of waste discharge to land for treatment, storage and disposal in waste management units.

Date of Government Version: 06/15/2015
Date Data Arrived at EDR: 06/17/2015
Date Made Active in Reports: 07/14/2015
Number of Days to Update: 27

Source: State Water Qualilty Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Quarterly

MCS: Military Cleanup Sites Listing

The State Water Resources Control Board and nine Regional Water Quality Control Boards partner with the Department of Defense (DoD) through the Defense and State Memorandum of Agreement (DSMOA) to oversee the investigation and remediation of water quality issues at military facilities.

Date of Government Version: 06/15/2015
Date Data Arrived at EDR: 06/17/2015
Date Made Active in Reports: 07/14/2015
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Quarterly

SPILLS 90: SPILLS90 data from FirstSearch

Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills recorded after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.

Date of Government Version: 06/06/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/22/2013
Number of Days to Update: 50

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Other Ascertainable Records

RCRA NonGen / NLR: RCRA - Non Generators / No Longer Regulated

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 03/10/2015
Date Data Arrived at EDR: 03/31/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 72

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 06/26/2015
Next Scheduled EDR Contact: 10/12/2015
Data Release Frequency: Varies

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/07/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 42

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 05/05/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 07/14/2015
Next Scheduled EDR Contact: 10/28/2015
Data Release Frequency: Semi-Annually

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 06/06/2014
Date Data Arrived at EDR: 09/10/2014
Date Made Active in Reports: 09/18/2014
Number of Days to Update: 8

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 07/08/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 04/17/2015
Date Made Active in Reports: 06/02/2015
Number of Days to Update: 46

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 06/22/2015
Next Scheduled EDR Contact: 10/12/2015
Data Release Frequency: Varies

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 11/25/2013
Date Data Arrived at EDR: 12/12/2013
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 74

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 06/12/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Annually

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 09/14/2010
Date Data Arrived at EDR: 10/07/2011
Date Made Active in Reports: 03/01/2012
Number of Days to Update: 146

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 05/26/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

US MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 12/30/2014
Date Data Arrived at EDR: 12/31/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 29

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 06/03/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: Semi-Annually

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 02/12/2015
Date Made Active in Reports: 06/02/2015
Number of Days to Update: 110

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 01/29/2015
Next Scheduled EDR Contact: 06/08/2015
Data Release Frequency: Annually

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 01/15/2015
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 14

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 06/25/2015
Next Scheduled EDR Contact: 10/05/2015
Data Release Frequency: Every 4 Years

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 05/20/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 05/20/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing

A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing

A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 12/10/2010
Date Made Active in Reports: 02/25/2011
Number of Days to Update: 77

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 01/23/2015
Date Data Arrived at EDR: 02/06/2015
Date Made Active in Reports: 03/09/2015
Number of Days to Update: 31

Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 07/09/2015
Next Scheduled EDR Contact: 10/28/2015
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 07/01/2014
Date Data Arrived at EDR: 10/15/2014
Date Made Active in Reports: 11/17/2014
Number of Days to Update: 33

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 07/17/2015
Next Scheduled EDR Contact: 10/28/2015
Data Release Frequency: Annually

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 03/31/2015
Date Data Arrived at EDR: 04/09/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 63

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 06/04/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Quarterly

RADINFO: Radiation Information Database

The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 04/07/2015
Date Data Arrived at EDR: 04/09/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 63

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 07/09/2015
Next Scheduled EDR Contact: 10/19/2015
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 01/18/2015
Date Data Arrived at EDR: 02/27/2015
Date Made Active in Reports: 03/25/2015
Number of Days to Update: 26

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 06/10/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Quarterly

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 02/01/2015
Date Data Arrived at EDR: 02/13/2015
Date Made Active in Reports: 03/25/2015
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 02/26/2013
Date Made Active in Reports: 04/19/2013
Number of Days to Update: 52

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 05/29/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Biennially

CA BOND EXP. PLAN: Bond Expenditure Plan

Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/01/1989
Date Data Arrived at EDR: 07/27/1994
Date Made Active in Reports: 08/02/1994
Number of Days to Update: 6

Source: Department of Health Services
Telephone: 916-255-2118
Last EDR Contact: 05/31/1994
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

UIC: UIC Listing

A listing of wells identified as underground injection wells, in the California Oil and Gas Wells database.

Date of Government Version: 11/19/2014
Date Data Arrived at EDR: 12/15/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 45

Source: Deaprtment of Conservation
Telephone: 916-445-2408
Last EDR Contact: 06/19/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Varies

NPDES: NPDES Permits Listing
A listing of NPDES permits, including stormwater.

Date of Government Version: 05/18/2015
Date Data Arrived at EDR: 05/20/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 22
Source: State Water Resources Control Board
Telephone: 916-445-9379
Last EDR Contact: 05/20/2015
Next Scheduled EDR Contact: 08/31/2015
Data Release Frequency: Quarterly

CORTESE: "Cortese" Hazardous Waste & Substances Sites List
The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites).

Date of Government Version: 06/24/2015
Date Data Arrived at EDR: 06/26/2015
Date Made Active in Reports: 07/14/2015
Number of Days to Update: 18
Source: CAL EPA/Office of Emergency Information
Telephone: 916-323-3400
Last EDR Contact: 06/26/2015
Next Scheduled EDR Contact: 10/12/2015
Data Release Frequency: Quarterly

HIST CORTESE: Hazardous Waste & Substance Site List
The sites for the list are designated by the State Water Resource Control Board [LUST], the Integrated Waste Board [SWF/LS], and the Department of Toxic Substances Control [CALSITES]. This listing is no longer updated by the state agency.

Date of Government Version: 04/01/2001
Date Data Arrived at EDR: 01/22/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 76
Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/22/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

NOTIFY 65: Proposition 65 Records
Listings of all Proposition 65 incidents reported to counties by the State Water Resources Control Board and the Regional Water Quality Control Board. This database is no longer updated by the reporting agency.

Date of Government Version: 10/21/1993
Date Data Arrived at EDR: 11/01/1993
Date Made Active in Reports: 11/19/1993
Number of Days to Update: 18
Source: State Water Resources Control Board
Telephone: 916-445-3846
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 10/05/2015
Data Release Frequency: No Update Planned

DRYCLEANERS: Cleaner Facilities
A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaner's agents; linen supply; coin-operated laundries and cleaning; drycleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

Date of Government Version: 02/18/2015
Date Data Arrived at EDR: 02/20/2015
Date Made Active in Reports: 03/12/2015
Number of Days to Update: 20
Source: Department of Toxic Substance Control
Telephone: 916-327-4498
Last EDR Contact: 06/05/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Annually

WIP: Well Investigation Program Case List
Well Investigation Program case in the San Gabriel and San Fernando Valley area.

Date of Government Version: 07/03/2009
Date Data Arrived at EDR: 07/21/2009
Date Made Active in Reports: 08/03/2009
Number of Days to Update: 13
Source: Los Angeles Water Quality Control Board
Telephone: 213-576-6726
Last EDR Contact: 06/22/2015
Next Scheduled EDR Contact: 10/12/2015
Data Release Frequency: Varies

ENF: Enforcement Action Listing

A listing of Water Board Enforcement Actions. Formal is everything except Oral/Verbal Communication, Notice of Violation, Expedited Payment Letter, and Staff Enforcement Letter.

Date of Government Version: 04/30/2015
Date Data Arrived at EDR: 05/01/2015
Date Made Active in Reports: 05/13/2015
Number of Days to Update: 12

Source: State Water Resoruces Control Board
Telephone: 916-445-9379
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

HAZNET: Facility and Manifest Data

Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method. This database begins with calendar year 1993.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 10/15/2014
Date Made Active in Reports: 11/19/2014
Number of Days to Update: 35

Source: California Environmental Protection Agency
Telephone: 916-255-1136
Last EDR Contact: 07/17/2015
Next Scheduled EDR Contact: 10/28/2015
Data Release Frequency: Annually

EMI: Emissions Inventory Data

Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 03/25/2014
Date Made Active in Reports: 04/28/2014
Number of Days to Update: 34

Source: California Air Resources Board
Telephone: 916-322-2990
Last EDR Contact: 06/25/2015
Next Scheduled EDR Contact: 10/05/2015
Data Release Frequency: Varies

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 12/08/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 34

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 07/14/2015
Next Scheduled EDR Contact: 10/28/2015
Data Release Frequency: Semi-Annually

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 03/07/2011
Date Data Arrived at EDR: 03/09/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 54

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 05/21/2015
Next Scheduled EDR Contact: 08/31/2015
Data Release Frequency: Varies

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 02/06/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 339

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 07/14/2015
Next Scheduled EDR Contact: 10/28/2015
Data Release Frequency: N/A

WDS: Waste Discharge System

Sites which have been issued waste discharge requirements.

Date of Government Version: 06/19/2007
Date Data Arrived at EDR: 06/20/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 9

Source: State Water Resources Control Board
Telephone: 916-341-5227
Last EDR Contact: 05/20/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Quarterly

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 04/22/2013
Date Data Arrived at EDR: 03/03/2015
Date Made Active in Reports: 03/09/2015
Number of Days to Update: 6

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 05/14/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Varies

PRP: Potentially Responsible Parties

A listing of verified Potentially Responsible Parties

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 10/17/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 3

Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 05/14/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Quarterly

LEAD SMELTER 2: Lead Smelter Sites

A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

LEAD SMELTER 1: Lead Smelter Sites

A listing of former lead smelter site locations.

Date of Government Version: 11/25/2014
Date Data Arrived at EDR: 11/26/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 64

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 07/07/2015
Next Scheduled EDR Contact: 10/19/2015
Data Release Frequency: Varies

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 05/07/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Quarterly

PROC: Certified Processors Database
A listing of certified processors.

Date of Government Version: 06/15/2015
Date Data Arrived at EDR: 06/17/2015
Date Made Active in Reports: 07/14/2015
Number of Days to Update: 27

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Quarterly

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 02/01/2011
Date Data Arrived at EDR: 10/19/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 83

Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 05/01/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

Financial Assurance 1: Financial Assurance Information Listing
Financial Assurance information

Date of Government Version: 04/30/2015
Date Data Arrived at EDR: 05/01/2015
Date Made Active in Reports: 05/13/2015
Number of Days to Update: 12

Source: Department of Toxic Substances Control
Telephone: 916-255-3628
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)
The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/16/2014
Date Data Arrived at EDR: 10/31/2014
Date Made Active in Reports: 11/17/2014
Number of Days to Update: 17

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 06/22/2015
Next Scheduled EDR Contact: 10/05/2015
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data
A listing of minor source facilities.

Date of Government Version: 10/16/2014
Date Data Arrived at EDR: 10/31/2014
Date Made Active in Reports: 11/17/2014
Number of Days to Update: 17

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 06/22/2015
Next Scheduled EDR Contact: 10/22/2015
Data Release Frequency: Annually

HWP: EnviroStor Permitted Facilities Listing
Detailed information on permitted hazardous waste facilities and corrective action ("cleanups") tracked in EnviroStor.

Date of Government Version: 05/26/2015
Date Data Arrived at EDR: 05/28/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 8

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/28/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Quarterly

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List

A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 07/01/2014
Date Data Arrived at EDR: 09/10/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 06/12/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information

All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 03/09/2015
Date Data Arrived at EDR: 03/10/2015
Date Made Active in Reports: 03/25/2015
Number of Days to Update: 15

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 05/14/2015
Next Scheduled EDR Contact: 08/31/2015
Data Release Frequency: Quarterly

MWMP: Medical Waste Management Program Listing

The Medical Waste Management Program (MWMP) ensures the proper handling and disposal of medical waste by permitting and inspecting medical waste Offsite Treatment Facilities (PDF) and Transfer Stations (PDF) throughout the state. MWMP also oversees all Medical Waste Transporters.

Date of Government Version: 05/07/2015
Date Data Arrived at EDR: 06/09/2015
Date Made Active in Reports: 07/14/2015
Number of Days to Update: 35

Source: Department of Public Health
Telephone: 916-558-1784
Last EDR Contact: 06/09/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Varies

COAL ASH DOE: Steam-Electric Plant Operation Data

A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 07/13/2015
Next Scheduled EDR Contact: 10/28/2015
Data Release Frequency: Varies

HWT: Registered Hazardous Waste Transporter Database

A listing of hazardous waste transporters. In California, unless specifically exempted, it is unlawful for any person to transport hazardous wastes unless the person holds a valid registration issued by DTSC. A hazardous waste transporter registration is valid for one year and is assigned a unique registration number.

Date of Government Version: 04/13/2015
Date Data Arrived at EDR: 04/15/2015
Date Made Active in Reports: 04/23/2015
Number of Days to Update: 8

Source: Department of Toxic Substances Control
Telephone: 916-440-7145
Last EDR Contact: 07/14/2015
Next Scheduled EDR Contact: 10/28/2015
Data Release Frequency: Quarterly

Financial Assurance 2: Financial Assurance Information Listing

A listing of financial assurance information for solid waste facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 05/18/2015
Date Data Arrived at EDR: 05/22/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 14

Source: California Integrated Waste Management Board
Telephone: 916-341-6066
Last EDR Contact: 05/18/2015
Next Scheduled EDR Contact: 08/31/2015
Data Release Frequency: Varies

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR US Hist Auto Stat: EDR Exclusive Historic Gas Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR US Hist Cleaners: EDR Exclusive Historic Dry Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the State Water Resources Control Board in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 12/30/2013
Number of Days to Update: 182

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LF: Recovered Government Archive Solid Waste Facilities List

The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Resources Recycling and Recovery in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/13/2014
Number of Days to Update: 196

Source: Department of Resources Recycling and Recovery
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

COUNTY RECORDS

ALAMEDA COUNTY:

Contaminated Sites

A listing of contaminated sites overseen by the Toxic Release Program (oil and groundwater contamination from chemical releases and spills) and the Leaking Underground Storage Tank Program (soil and ground water contamination from leaking petroleum USTs).

Date of Government Version: 01/21/2015
Date Data Arrived at EDR: 01/28/2015
Date Made Active in Reports: 02/26/2015
Number of Days to Update: 29

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 08/10/2015
Next Scheduled EDR Contact: 10/28/2015
Data Release Frequency: Semi-Annually

Underground Tanks

Underground storage tank sites located in Alameda county.

Date of Government Version: 01/21/2015
Date Data Arrived at EDR: 01/28/2015
Date Made Active in Reports: 02/26/2015
Number of Days to Update: 29

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 07/13/2015
Next Scheduled EDR Contact: 10/28/2015
Data Release Frequency: Semi-Annually

AMADOR COUNTY:

CUPA Facility List

Cupa Facility List

Date of Government Version: 06/05/2015
Date Data Arrived at EDR: 06/09/2015
Date Made Active in Reports: 07/10/2015
Number of Days to Update: 31

Source: Amador County Environmental Health
Telephone: 209-223-6439
Last EDR Contact: 06/05/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Varies

BUTTE COUNTY:

CUPA Facility Listing
Cupa facility list.

Date of Government Version: 11/20/2014
Date Data Arrived at EDR: 11/24/2014
Date Made Active in Reports: 01/07/2015
Number of Days to Update: 44

Source: Public Health Department
Telephone: 530-538-7149
Last EDR Contact: 07/13/2015
Next Scheduled EDR Contact: 10/28/2015
Data Release Frequency: No Update Planned

CALVERAS COUNTY:

CUPA Facility Listing
Cupa Facility Listing

Date of Government Version: 04/17/2015
Date Data Arrived at EDR: 04/21/2015
Date Made Active in Reports: 05/07/2015
Number of Days to Update: 16

Source: Calveras County Environmental Health
Telephone: 209-754-6399
Last EDR Contact: 06/22/2015
Next Scheduled EDR Contact: 10/12/2015
Data Release Frequency: Quarterly

COLUSA COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 06/11/2014
Date Data Arrived at EDR: 06/13/2014
Date Made Active in Reports: 07/07/2014
Number of Days to Update: 24

Source: Health & Human Services
Telephone: 530-458-0396
Last EDR Contact: 06/12/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Varies

CONTRA COSTA COUNTY:

Site List
List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 05/26/2015
Date Data Arrived at EDR: 05/29/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 13

Source: Contra Costa Health Services Department
Telephone: 925-646-2286
Last EDR Contact: 05/04/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Semi-Annually

DEL NORTE COUNTY:

CUPA Facility List
Cupa Facility list

Date of Government Version: 05/19/2015
Date Data Arrived at EDR: 05/22/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 14

Source: Del Norte County Environmental Health Division
Telephone: 707-465-0426
Last EDR Contact: 05/18/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Varies

EL DORADO COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 05/26/2015
Date Data Arrived at EDR: 05/29/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 7

Source: El Dorado County Environmental Management Department
Telephone: 530-621-6623
Last EDR Contact: 05/04/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Varies

FRESNO COUNTY:

CUPA Resources List
Certified Unified Program Agency. CUPA's are responsible for implementing a unified hazardous materials and hazardous waste management regulatory program. The agency provides oversight of businesses that deal with hazardous materials, operate underground storage tanks or aboveground storage tanks.

Date of Government Version: 03/31/2015
Date Data Arrived at EDR: 04/15/2015
Date Made Active in Reports: 04/23/2015
Number of Days to Update: 8

Source: Dept. of Community Health
Telephone: 559-445-3271
Last EDR Contact: 07/06/2015
Next Scheduled EDR Contact: 10/19/2015
Data Release Frequency: Semi-Annually

HUMBOLDT COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 03/11/2015
Date Data Arrived at EDR: 03/13/2015
Date Made Active in Reports: 03/24/2015
Number of Days to Update: 11

Source: Humboldt County Environmental Health
Telephone: N/A
Last EDR Contact: 07/14/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

IMPERIAL COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 04/27/2015
Date Data Arrived at EDR: 04/28/2015
Date Made Active in Reports: 05/13/2015
Number of Days to Update: 15

Source: San Diego Border Field Office
Telephone: 760-339-2777
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

INYO COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 09/10/2013
Date Data Arrived at EDR: 09/11/2013
Date Made Active in Reports: 10/14/2013
Number of Days to Update: 33

Source: Inyo County Environmental Health Services
Telephone: 760-878-0238
Last EDR Contact: 05/21/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

KERN COUNTY:

Underground Storage Tank Sites & Tank Listing
Kern County Sites and Tanks Listing.

Date of Government Version: 05/19/2015
Date Data Arrived at EDR: 06/18/2015
Date Made Active in Reports: 07/22/2015
Number of Days to Update: 34

Source: Kern County Environment Health Services Department
Telephone: 661-862-8700
Last EDR Contact: 06/12/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Quarterly

KINGS COUNTY:

CUPA Facility List
A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 05/26/2015
Date Data Arrived at EDR: 05/28/2015
Date Made Active in Reports: 06/15/2015
Number of Days to Update: 18

Source: Kings County Department of Public Health
Telephone: 559-584-1411
Last EDR Contact: 05/21/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

LAKE COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 05/05/2015
Date Data Arrived at EDR: 05/07/2015
Date Made Active in Reports: 05/20/2015
Number of Days to Update: 13

Source: Lake County Environmental Health
Telephone: 707-263-1164
Last EDR Contact: 07/20/2015
Next Scheduled EDR Contact: 11/02/2015
Data Release Frequency: Varies

LOS ANGELES COUNTY:

San Gabriel Valley Areas of Concern
San Gabriel Valley areas where VOC contamination is at or above the MCL as designated by region 9 EPA office.

Date of Government Version: 03/30/2009
Date Data Arrived at EDR: 03/31/2009
Date Made Active in Reports: 10/23/2009
Number of Days to Update: 206

Source: EPA Region 9
Telephone: 415-972-3178
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 10/05/2015
Data Release Frequency: No Update Planned

HMS: Street Number List
Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 11/24/2014
Date Data Arrived at EDR: 01/30/2015
Date Made Active in Reports: 03/04/2015
Number of Days to Update: 33

Source: Department of Public Works
Telephone: 626-458-3517
Last EDR Contact: 07/10/2015
Next Scheduled EDR Contact: 10/28/2015
Data Release Frequency: Semi-Annually

List of Solid Waste Facilities
Solid Waste Facilities in Los Angeles County.

Date of Government Version: 04/20/2015
Date Data Arrived at EDR: 04/20/2015
Date Made Active in Reports: 05/07/2015
Number of Days to Update: 17

Source: La County Department of Public Works
Telephone: 818-458-5185
Last EDR Contact: 07/21/2015
Next Scheduled EDR Contact: 11/02/2015
Data Release Frequency: Varies

City of Los Angeles Landfills

Landfills owned and maintained by the City of Los Angeles.

Date of Government Version: 03/05/2009
Date Data Arrived at EDR: 03/10/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 29

Source: Engineering & Construction Division
Telephone: 213-473-7869
Last EDR Contact: 07/20/2015
Next Scheduled EDR Contact: 11/02/2015
Data Release Frequency: Varies

Site Mitigation List

Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 01/15/2015
Date Data Arrived at EDR: 01/29/2015
Date Made Active in Reports: 03/10/2015
Number of Days to Update: 40

Source: Community Health Services
Telephone: 323-890-7806
Last EDR Contact: 07/15/2015
Next Scheduled EDR Contact: 11/02/2015
Data Release Frequency: Annually

City of El Segundo Underground Storage Tank

Underground storage tank sites located in El Segundo city.

Date of Government Version: 03/30/2015
Date Data Arrived at EDR: 04/02/2015
Date Made Active in Reports: 04/13/2015
Number of Days to Update: 11

Source: City of El Segundo Fire Department
Telephone: 310-524-2236
Last EDR Contact: 07/17/2015
Next Scheduled EDR Contact: 11/02/2015
Data Release Frequency: Semi-Annually

City of Long Beach Underground Storage Tank

Underground storage tank sites located in the city of Long Beach.

Date of Government Version: 03/03/2015
Date Data Arrived at EDR: 05/26/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 16

Source: City of Long Beach Fire Department
Telephone: 562-570-2563
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Annually

City of Torrance Underground Storage Tank

Underground storage tank sites located in the city of Torrance.

Date of Government Version: 06/03/2015
Date Data Arrived at EDR: 06/04/2015
Date Made Active in Reports: 07/06/2015
Number of Days to Update: 32

Source: City of Torrance Fire Department
Telephone: 310-618-2973
Last EDR Contact: 06/04/2015
Next Scheduled EDR Contact: 10/28/2015
Data Release Frequency: Semi-Annually

MADERA COUNTY:

CUPA Facility List

A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 05/28/2015
Date Data Arrived at EDR: 05/29/2015
Date Made Active in Reports: 06/15/2015
Number of Days to Update: 17

Source: Madera County Environmental Health
Telephone: 559-675-7823
Last EDR Contact: 05/22/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

MARIN COUNTY:

Underground Storage Tank Sites
Currently permitted USTs in Marin County.

Date of Government Version: 10/08/2014
Date Data Arrived at EDR: 10/22/2014
Date Made Active in Reports: 12/15/2014
Number of Days to Update: 54

Source: Public Works Department Waste Management
Telephone: 415-499-6647
Last EDR Contact: 07/06/2015
Next Scheduled EDR Contact: 10/19/2015
Data Release Frequency: Semi-Annually

MERCED COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 05/22/2015
Date Data Arrived at EDR: 05/26/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 10

Source: Merced County Environmental Health
Telephone: 209-381-1094
Last EDR Contact: 05/22/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

MONO COUNTY:

CUPA Facility List
CUPA Facility List

Date of Government Version: 06/01/2015
Date Data Arrived at EDR: 06/03/2015
Date Made Active in Reports: 07/06/2015
Number of Days to Update: 33

Source: Mono County Health Department
Telephone: 760-932-5580
Last EDR Contact: 06/01/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: Varies

MONTEREY COUNTY:

CUPA Facility Listing
CUPA Program listing from the Environmental Health Division.

Date of Government Version: 06/30/2015
Date Data Arrived at EDR: 07/07/2015
Date Made Active in Reports: 07/16/2015
Number of Days to Update: 9

Source: Monterey County Health Department
Telephone: 831-796-1297
Last EDR Contact: 05/26/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

NAPA COUNTY:

Sites With Reported Contamination
A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 12/05/2011
Date Data Arrived at EDR: 12/06/2011
Date Made Active in Reports: 02/07/2012
Number of Days to Update: 63

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 06/01/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: No Update Planned

Closed and Operating Underground Storage Tank Sites
Underground storage tank sites located in Napa county.

Date of Government Version: 01/15/2008
Date Data Arrived at EDR: 01/16/2008
Date Made Active in Reports: 02/08/2008
Number of Days to Update: 23

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 06/01/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: No Update Planned

NEVADA COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 06/03/2015
Date Data Arrived at EDR: 06/04/2015
Date Made Active in Reports: 07/22/2015
Number of Days to Update: 48

Source: Community Development Agency
Telephone: 530-265-1467
Last EDR Contact: 05/04/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Varies

ORANGE COUNTY:

List of Industrial Site Cleanups
Petroleum and non-petroleum spills.

Date of Government Version: 05/01/2015
Date Data Arrived at EDR: 05/12/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 24

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/06/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Annually

List of Underground Storage Tank Cleanups
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 05/01/2015
Date Data Arrived at EDR: 05/12/2015
Date Made Active in Reports: 06/08/2015
Number of Days to Update: 27

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/06/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Quarterly

List of Underground Storage Tank Facilities
Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 05/01/2015
Date Data Arrived at EDR: 05/12/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 30

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/12/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Quarterly

PLACER COUNTY:

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Master List of Facilities
List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 03/10/2015
Date Data Arrived at EDR: 03/12/2015
Date Made Active in Reports: 03/18/2015
Number of Days to Update: 6
Source: Placer County Health and Human Services
Telephone: 530-745-2363
Last EDR Contact: 06/22/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Semi-Annually

RIVERSIDE COUNTY:

Listing of Underground Tank Cleanup Sites
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 04/28/2015
Date Data Arrived at EDR: 04/30/2015
Date Made Active in Reports: 05/13/2015
Number of Days to Update: 13
Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 06/22/2015
Next Scheduled EDR Contact: 10/05/2015
Data Release Frequency: Quarterly

Underground Storage Tank Tank List
Underground storage tank sites located in Riverside county.

Date of Government Version: 04/28/2015
Date Data Arrived at EDR: 04/30/2015
Date Made Active in Reports: 05/13/2015
Number of Days to Update: 13
Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 06/22/2015
Next Scheduled EDR Contact: 10/05/2015
Data Release Frequency: Quarterly

SACRAMENTO COUNTY:

Toxic Site Clean-Up List
List of sites where unauthorized releases of potentially hazardous materials have occurred.

Date of Government Version: 02/02/2015
Date Data Arrived at EDR: 04/08/2015
Date Made Active in Reports: 04/16/2015
Number of Days to Update: 8
Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 10/19/2015
Data Release Frequency: Quarterly

Master Hazardous Materials Facility List
Any business that has hazardous materials on site - hazardous material storage sites, underground storage tanks, waste generators.

Date of Government Version: 02/02/2015
Date Data Arrived at EDR: 04/08/2015
Date Made Active in Reports: 04/16/2015
Number of Days to Update: 8
Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 10/19/2015
Data Release Frequency: Quarterly

SAN BERNARDINO COUNTY:

Hazardous Material Permits
This listing includes underground storage tanks, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil generators/handlers.

Date of Government Version: 06/30/2015
Date Data Arrived at EDR: 07/07/2015
Date Made Active in Reports: 07/14/2015
Number of Days to Update: 7

Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
Last EDR Contact: 05/12/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Quarterly

SAN DIEGO COUNTY:

Hazardous Materials Management Division Database

The database includes: HE58 - This report contains the business name, site address, business phone number, establishment 'H' permit number, type of permit, and the business status. HE17 - In addition to providing the same information provided in the HE58 listing, HE17 provides inspection dates, violations received by the establishment, hazardous waste generated, the quantity, method of storage, treatment/disposal of waste and the hauler, and information on underground storage tanks. Unauthorized Release List - Includes a summary of environmental contamination cases in San Diego County (underground tank cases, non-tank cases, groundwater contamination, and soil contamination are included.)

Date of Government Version: 09/23/2013
Date Data Arrived at EDR: 09/24/2013
Date Made Active in Reports: 10/17/2013
Number of Days to Update: 23

Source: Hazardous Materials Management Division
Telephone: 619-338-2268
Last EDR Contact: 06/05/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Quarterly

Solid Waste Facilities

San Diego County Solid Waste Facilities.

Date of Government Version: 10/31/2014
Date Data Arrived at EDR: 11/21/2014
Date Made Active in Reports: 12/29/2014
Number of Days to Update: 38

Source: Department of Health Services
Telephone: 619-338-2209
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
Data Release Frequency: Varies

Environmental Case Listing

The listing contains all underground tank release cases and projects pertaining to properties contaminated with hazardous substances that are actively under review by the Site Assessment and Mitigation Program.

Date of Government Version: 03/23/2010
Date Data Arrived at EDR: 06/15/2010
Date Made Active in Reports: 07/09/2010
Number of Days to Update: 24

Source: San Diego County Department of Environmental Health
Telephone: 619-338-2371
Last EDR Contact: 06/03/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: No Update Planned

SAN FRANCISCO COUNTY:

Local Oversite Facilities

A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 10

Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
Last EDR Contact: 05/06/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Quarterly

Underground Storage Tank Information

Underground storage tank sites located in San Francisco county.

Date of Government Version: 11/29/2010
Date Data Arrived at EDR: 03/10/2011
Date Made Active in Reports: 03/15/2011
Number of Days to Update: 5

Source: Department of Public Health
Telephone: 415-252-3920
Last EDR Contact: 05/06/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Quarterly

SAN JOAQUIN COUNTY:

San Joaquin Co. UST
A listing of underground storage tank locations in San Joaquin county.

Date of Government Version: 06/22/2015
Date Data Arrived at EDR: 06/26/2015
Date Made Active in Reports: 07/06/2015
Number of Days to Update: 10

Source: Environmental Health Department
Telephone: N/A
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 10/05/2015
Data Release Frequency: Semi-Annually

SAN LUIS OBISPO COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 05/22/2015
Date Data Arrived at EDR: 05/26/2015
Date Made Active in Reports: 06/10/2015
Number of Days to Update: 15

Source: San Luis Obispo County Public Health Department
Telephone: 805-781-5596
Last EDR Contact: 05/20/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

SAN MATEO COUNTY:

Business Inventory
List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 04/13/2015
Date Data Arrived at EDR: 04/15/2015
Date Made Active in Reports: 04/23/2015
Number of Days to Update: 8

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 06/15/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Annually

Fuel Leak List
A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 06/10/2015
Date Data Arrived at EDR: 06/16/2015
Date Made Active in Reports: 07/14/2015
Number of Days to Update: 28

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 06/10/2015
Next Scheduled EDR Contact: 06/29/2015
Data Release Frequency: Semi-Annually

SANTA BARBARA COUNTY:

CUPA Facility Listing
CUPA Program Listing from the Environmental Health Services division.

Date of Government Version: 09/08/2011
Date Data Arrived at EDR: 09/09/2011
Date Made Active in Reports: 10/07/2011
Number of Days to Update: 28

Source: Santa Barbara County Public Health Department
Telephone: 805-686-8167
Last EDR Contact: 05/22/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

SANTA CLARA COUNTY:

Cupa Facility List
Cupa facility list

Date of Government Version: 06/10/2015
Date Data Arrived at EDR: 06/16/2015
Date Made Active in Reports: 07/10/2015
Number of Days to Update: 24

Source: Department of Environmental Health
Telephone: 408-918-1973
Last EDR Contact: 06/05/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

HIST LUST - Fuel Leak Site Activity Report
A listing of open and closed leaking underground storage tanks. This listing is no longer updated by the county. Leaking underground storage tanks are now handled by the Department of Environmental Health.

Date of Government Version: 03/29/2005
Date Data Arrived at EDR: 03/30/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 22

Source: Santa Clara Valley Water District
Telephone: 408-265-2600
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

LOP Listing
A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 03/03/2014
Date Data Arrived at EDR: 03/05/2014
Date Made Active in Reports: 03/18/2014
Number of Days to Update: 13

Source: Department of Environmental Health
Telephone: 408-918-3417
Last EDR Contact: 06/01/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: Annually

Hazardous Material Facilities
Hazardous material facilities, including underground storage tank sites.

Date of Government Version: 05/07/2015
Date Data Arrived at EDR: 05/12/2015
Date Made Active in Reports: 06/08/2015
Number of Days to Update: 27

Source: City of San Jose Fire Department
Telephone: 408-535-7694
Last EDR Contact: 05/07/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Annually

SANTA CRUZ COUNTY:

CUPA Facility List
CUPA facility listing.

Date of Government Version: 05/22/2015
Date Data Arrived at EDR: 05/26/2015
Date Made Active in Reports: 06/08/2015
Number of Days to Update: 13

Source: Santa Cruz County Environmental Health
Telephone: 831-464-2761
Last EDR Contact: 05/22/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

SHASTA COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 06/12/2015
Date Data Arrived at EDR: 06/16/2015
Date Made Active in Reports: 07/10/2015
Number of Days to Update: 24

Source: Shasta County Department of Resource Management
Telephone: 530-225-5789
Last EDR Contact: 05/26/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

SOLANO COUNTY:

Leaking Underground Storage Tanks
A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 06/19/2015
Date Data Arrived at EDR: 06/24/2015
Date Made Active in Reports: 07/14/2015
Number of Days to Update: 20

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 06/10/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Quarterly

Underground Storage Tanks
Underground storage tank sites located in Solano county.

Date of Government Version: 06/19/2015
Date Data Arrived at EDR: 06/30/2015
Date Made Active in Reports: 07/07/2015
Number of Days to Update: 7

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 06/10/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Quarterly

SONOMA COUNTY:

Cupa Facility List
Cupa Facility list

Date of Government Version: 06/22/2015
Date Data Arrived at EDR: 06/26/2015
Date Made Active in Reports: 07/14/2015
Number of Days to Update: 18

Source: County of Sonoma Fire & Emergency Services Department
Telephone: 707-565-1174
Last EDR Contact: 06/22/2015
Next Scheduled EDR Contact: 10/12/2015
Data Release Frequency: Varies

Leaking Underground Storage Tank Sites
A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 07/01/2015
Date Data Arrived at EDR: 07/07/2015
Date Made Active in Reports: 07/14/2015
Number of Days to Update: 7

Source: Department of Health Services
Telephone: 707-565-6565
Last EDR Contact: 06/22/2015
Next Scheduled EDR Contact: 10/12/2015
Data Release Frequency: Quarterly

SUTTER COUNTY:

Underground Storage Tanks
Underground storage tank sites located in Sutter county.

Date of Government Version: 06/05/2015
Date Data Arrived at EDR: 06/09/2015
Date Made Active in Reports: 07/06/2015
Number of Days to Update: 27

Source: Sutter County Department of Agriculture
Telephone: 530-822-7500
Last EDR Contact: 06/05/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Semi-Annually

TUOLUMNE COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 05/05/2015
Date Data Arrived at EDR: 05/07/2015
Date Made Active in Reports: 05/13/2015
Number of Days to Update: 6

Source: Divison of Environmental Health
Telephone: 209-533-5633
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

VENTURA COUNTY:

Business Plan, Hazardous Waste Producers, and Operating Underground Tanks

The BWT list indicates by site address whether the Environmental Health Division has Business Plan (B), Waste Producer (W), and/or Underground Tank (T) information.

Date of Government Version: 04/27/2015
Date Data Arrived at EDR: 05/22/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 14

Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 07/15/2015
Next Scheduled EDR Contact: 08/31/2015
Data Release Frequency: Quarterly

Inventory of Illegal Abandoned and Inactive Sites

Ventura County Inventory of Closed, Illegal Abandoned, and Inactive Sites.

Date of Government Version: 12/01/2011
Date Data Arrived at EDR: 12/01/2011
Date Made Active in Reports: 01/19/2012
Number of Days to Update: 49

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 06/26/2015
Next Scheduled EDR Contact: 10/19/2015
Data Release Frequency: Annually

Listing of Underground Tank Cleanup Sites

Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008
Date Data Arrived at EDR: 06/24/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 37

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 05/18/2015
Next Scheduled EDR Contact: 08/31/2015
Data Release Frequency: Quarterly

Medical Waste Program List

To protect public health and safety and the environment from potential exposure to disease causing agents, the Environmental Health Division Medical Waste Program regulates the generation, handling, storage, treatment and disposal of medical waste throughout the County.

Date of Government Version: 04/27/2015
Date Data Arrived at EDR: 04/29/2015
Date Made Active in Reports: 05/13/2015
Number of Days to Update: 14

Source: Ventura County Resource Management Agency
Telephone: 805-654-2813
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Quarterly

Underground Tank Closed Sites List

Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 05/27/2015
Date Data Arrived at EDR: 06/17/2015
Date Made Active in Reports: 07/06/2015
Number of Days to Update: 19

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Quarterly

YOLO COUNTY:

Underground Storage Tank Comprehensive Facility Report

Underground storage tank sites located in Yolo county.

Date of Government Version: 07/08/2015
Date Data Arrived at EDR: 07/13/2015
Date Made Active in Reports: 07/22/2015
Number of Days to Update: 9

Source: Yolo County Department of Health
Telephone: 530-666-8646
Last EDR Contact: 07/06/2015
Next Scheduled EDR Contact: 10/05/2015
Data Release Frequency: Annually

YUBA COUNTY:

CUPA Facility List
CUPA facility listing for Yuba County.

Date of Government Version: 05/18/2015
Date Data Arrived at EDR: 05/19/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 17

Source: Yuba County Environmental Health Department
Telephone: 530-749-7523
Last EDR Contact: 05/18/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data
Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 07/30/2013
Date Data Arrived at EDR: 08/19/2013
Date Made Active in Reports: 10/03/2013
Number of Days to Update: 45

Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 05/18/2015
Next Scheduled EDR Contact: 08/31/2015
Data Release Frequency: No Update Planned

NJ MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 04/29/2015
Date Made Active in Reports: 05/29/2015
Number of Days to Update: 30

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 07/13/2015
Next Scheduled EDR Contact: 10/28/2015
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data
Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 05/01/2015
Date Data Arrived at EDR: 05/06/2015
Date Made Active in Reports: 05/20/2015
Number of Days to Update: 14

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 05/06/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Annually

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 07/21/2014
Date Made Active in Reports: 08/25/2014
Number of Days to Update: 35

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 07/20/2015
Next Scheduled EDR Contact: 11/02/2015
Data Release Frequency: Annually

RI MANIFEST: Manifest information
Hazardous waste manifest information

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 06/19/2015
Date Made Active in Reports: 07/15/2015
Number of Days to Update: 26

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 05/26/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 03/19/2015
Date Made Active in Reports: 04/07/2015
Number of Days to Update: 19

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 06/11/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Annually

Oil/Gas Pipelines
Source: PennWell Corporation
Telephone: 281-546-1505
Petroleum Bundle (Crude Oil, Refined Products, Petrochemicals, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)) N = Natural Gas Bundle (Natural Gas, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)). This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Electric Power Transmission Line Data
Source: PennWell Corporation
Telephone: 800-823-6277
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Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Licensed Facilities
Source: Department of Social Services
Telephone: 916-657-4041

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

STREET AND ADDRESS INFORMATION

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GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

11115 HEMLOCK AVENUE
11115 HEMLOCK AVENUE
FONTANA, CA 92337

TARGET PROPERTY COORDINATES

Latitude (North):	34.0527 - 34° 3' 9.72''
Longitude (West):	117.4752 - 117° 28' 30.72''
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	456142.2
UTM Y (Meters):	3767906.5
Elevation:	982 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	5619058 FONTANA, CA
Version Date:	2012

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principal investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

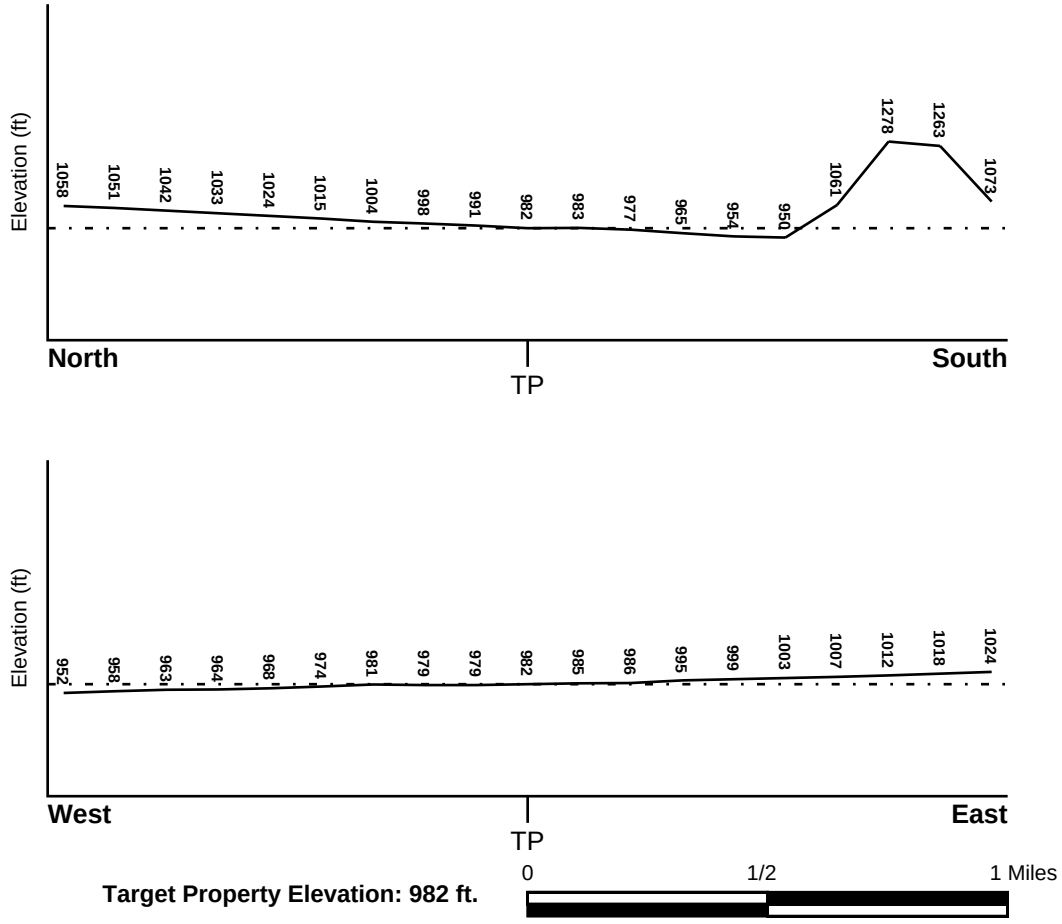
TOPOGRAPHIC INFORMATION

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General SSW

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Target Property Elevation: 982 ft.

Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Target Property County	FEMA Flood Electronic Data
SAN BERNARDINO, CA	YES - refer to the Overview Map and Detail Map

Flood Plain Panel at Target Property: 06071C - FEMA DFIRM Flood data

Additional Panels in search area: Not Reported

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
FONTANA	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Site-Specific Hydrogeological Data*:

Search Radius:	1.25 miles
Status:	Not found

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

* ©1996 Site−specific hydrogeological data gathered by CERCLIS Alerts, Inc., Bainbridge Island, WA. All rights reserved. All of the information and opinions presented are those of the cited EPA report(s), which were completed under a Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) investigation.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

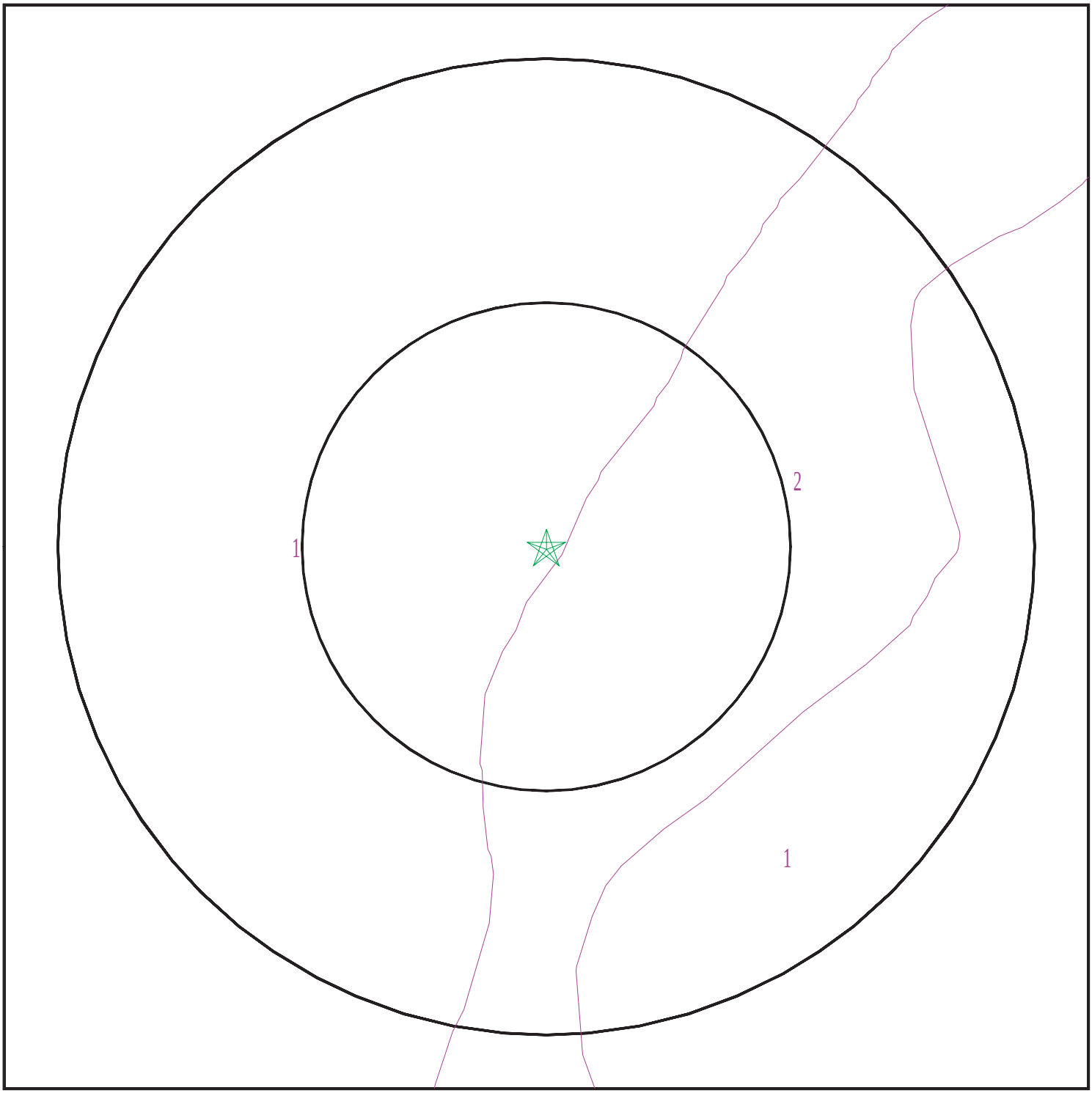
Era:	Cenozoic
System:	Quaternary
Series:	Quaternary
Code:	Q *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Stratifed Sequence

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 4363822.2s



Target Property
SSURGO Soil
Water

0 1/16 1/8 1/4 Miles

N

SITE NAME:	11115 Hemlock Avenue	CLIENT:	Partner Engineering and Science, Inc.
ADDRESS:	11115 Hemlock Avenue Fontana CA 92337	CONTACT:	Colleen Tubridy
LAT/LONG:	34.0527 / 117.4752	INQUIRY #:	4363822.2s
		DATE:	July 24, 2015 5:30 pm

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GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: TUJUNGA

Soil Surface Texture: gravelly loamy sand

Hydrologic Group: Class A - High infiltration rates. Soils are deep, well drained to excessively drained sands and gravels.

Soil Drainage Class: Somewhat excessively drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	18 inches	gravelly loamy sand	Granular materials (35 pct. or less passing No. 200), Stone Fragments, Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 42	Max: 7.3 Min: 6.1
2	18 inches	59 inches	loamy sand	Granular materials (35 pct. or less passing No. 200), Stone Fragments, Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 42	Max: 7.8 Min: 6.1

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Map ID: 2

Soil Component Name: TUJUNGA

Soil Surface Texture: gravelly loamy sand

Hydrologic Group: Class A - High infiltration rates. Soils are deep, well drained to excessively drained sands and gravels.

Soil Drainage Class: Somewhat excessively drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	35 inches	gravelly loamy sand	Granular materials (35 pct. or less passing No. 200), Stone Fragments, Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 42	Max: 7.3 Min: 6.1
2	35 inches	59 inches	gravelly sand	Granular materials (35 pct. or less passing No. 200), Stone Fragments, Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Poorly graded sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 42	Max: 7.3 Min: 6.1

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No Wells Found		

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

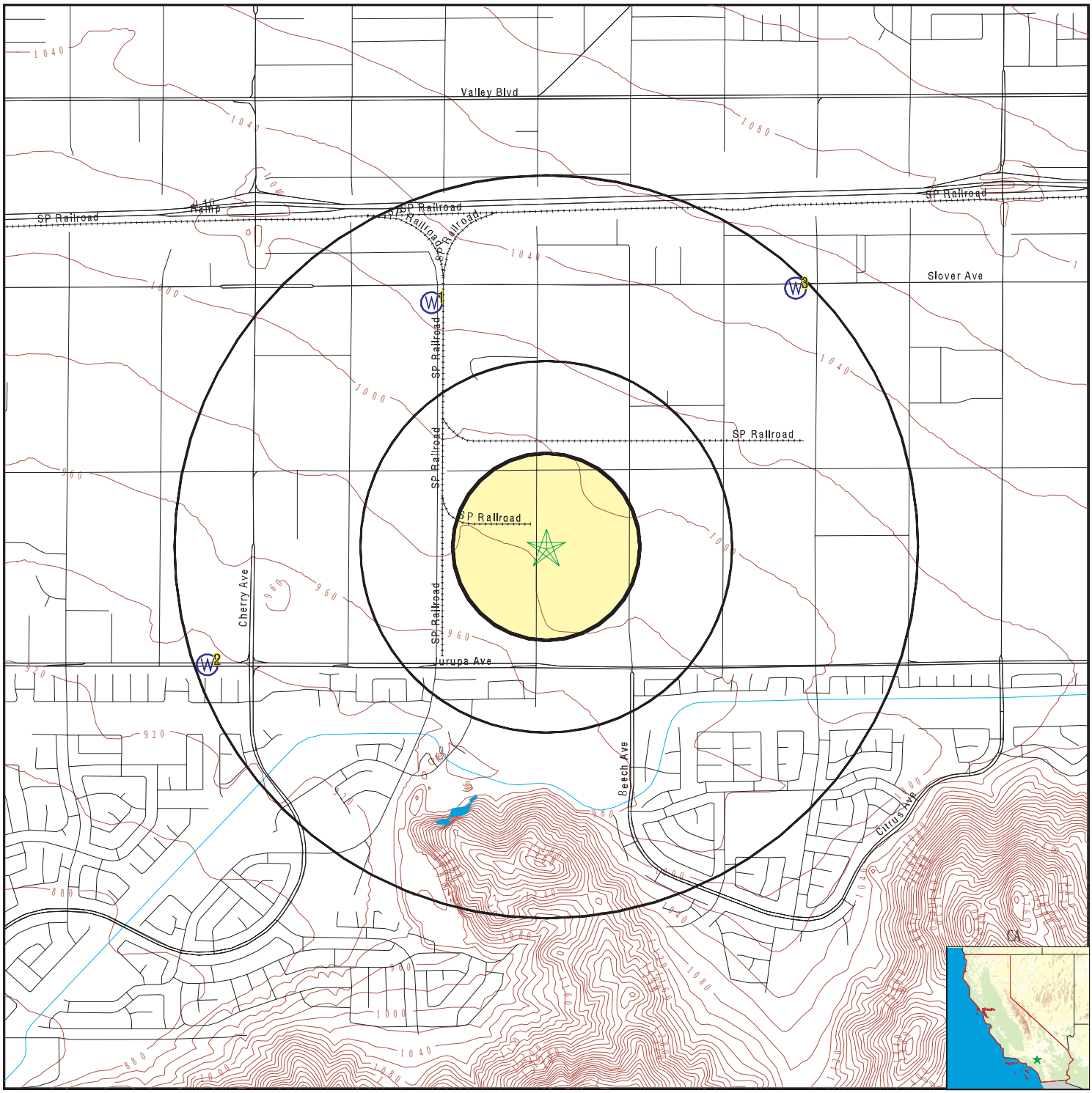
MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
1	1042	1/2 - 1 Mile NNW
2	CADW50000004053	1/2 - 1 Mile WSW
3	CADW50000004139	1/2 - 1 Mile NE

PHYSICAL SETTING SOURCE MAP - 4363822.2s



0 1/4 1/2 1 Miles

- County Boundary
- Major Roads
- Contour Lines
- Earthquake Fault Lines
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons
- Groundwater Flow Direction
- GI Indeterminate Groundwater Flow at Location
- GV Groundwater Flow Varies at Location
- HD Closest Hydrogeological Data
- Oil, gas or related wells

SITE NAME: 11115 Hemlock Avenue	CLIENT: Partner Engineering and Science, Inc.
ADDRESS: 11115 Hemlock Avenue Fontana CA 92337	CONTACT: Colleen Tubridy INQUIRY #: 4363822.2s
LAT/LONG: 34.0527 / 117.4752	DATE: July 24, 2015 5:30 pm

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GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID Direction Distance Elevation	Database	EDR ID Number
1 **NNW** **1/2 - 1 Mile** **Higher**	**CA WELLS**	**1042**

Water System Information:

Prime Station Code:	01S/06W-26C01 S	User ID:	TAN
FRDS Number:	3610041016	County:	San Beernardino
District Number:	13	Station Type:	WELL/AMBNT
Water Type:	Well/Groundwater	Well Status:	Active Untreated
Source Lat/Long:	340344.0 1172847.1	Precision:	100 Feet (one Second)
Source Name:	WELL 18		
System Number:	3610041		
System Name:	SAN GABRIEL VALLEY WC - FONTANA		
Organization That Operates System:			
	P.O. BOX 987		
	FONTANA, CA 92334		
Pop Served:	102599	Connections:	29314
Area Served:	FONTANA		
Sample Collected:	09-OCT-12	Findings:	38. MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	31-JAN-13	Findings:	31. MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	22-MAY-13	Findings:	33. MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	23-MAY-13	Findings:	420. US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	23-MAY-13	Findings:	7.83
Chemical:	PH, LABORATORY		
Sample Collected:	23-MAY-13	Findings:	150. MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	23-MAY-13	Findings:	190. MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	23-MAY-13	Findings:	160. MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	23-MAY-13	Findings:	56.8 MG/L
Chemical:	CALCIUM		
Sample Collected:	23-MAY-13	Findings:	5.21 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	23-MAY-13	Findings:	20. MG/L
Chemical:	SODIUM		
Sample Collected:	23-MAY-13	Findings:	2.2 MG/L
Chemical:	POTASSIUM		
Sample Collected:	23-MAY-13	Findings:	18. MG/L
Chemical:	CHLORIDE		

Sample Collected:	23-MAY-13	Findings:	0.22 MG/L
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)		
Sample Collected:	23-MAY-13	Findings:	260. MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	23-MAY-13	Findings:	0.873
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	23-MAY-13	Findings:	35. MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	23-MAY-13	Findings:	8000. UG/L
Chemical:	NITRATE + NITRITE (AS N)		
Sample Collected:	03-JUL-13	Findings:	31. MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	06-NOV-13	Findings:	430. US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	06-NOV-13	Findings:	7.78
Chemical:	PH, LABORATORY		
Sample Collected:	06-NOV-13	Findings:	150. MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	06-NOV-13	Findings:	190. MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	06-NOV-13	Findings:	170. MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	06-NOV-13	Findings:	57.6 MG/L
Chemical:	CALCIUM		
Sample Collected:	06-NOV-13	Findings:	5.73 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	06-NOV-13	Findings:	19. MG/L
Chemical:	SODIUM		
Sample Collected:	06-NOV-13	Findings:	2.1 MG/L
Chemical:	POTASSIUM		
Sample Collected:	06-NOV-13	Findings:	19. MG/L
Chemical:	CHLORIDE		
Sample Collected:	06-NOV-13	Findings:	0.23 MG/L
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)		
Sample Collected:	06-NOV-13	Findings:	4.8 UG/L
Chemical:	CHROMIUM, HEXAVALENT		
Sample Collected:	06-NOV-13	Findings:	280. MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	06-NOV-13	Findings:	0.822
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	06-NOV-13	Findings:	38. MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	06-NOV-13	Findings:	0.31 NTU
Chemical:	TURBIDITY, LABORATORY		

Sample Collected:	06-NOV-13	Findings:	8500. UG/L
Chemical:	NITRATE + NITRITE (AS N)		
Sample Collected:	06-NOV-13	Findings:	4.1 UG/L
Chemical:	PERCHLORATE		
Sample Collected:	14-JAN-14	Findings:	32. MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	24-APR-14	Findings:	. 31. MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	27-MAY-14	Findings:	. 390. US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	27-MAY-14	Findings:	. 7.86
Chemical:	PH, LABORATORY		
Sample Collected:	27-MAY-14	Findings:	. 140. MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	27-MAY-14	Findings:	. 170. MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	27-MAY-14	Findings:	. 150. MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	27-MAY-14	Findings:	. 50.1 MG/L
Chemical:	CALCIUM		
Sample Collected:	27-MAY-14	Findings:	. 6.15 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	27-MAY-14	Findings:	. 18. MG/L
Chemical:	SODIUM		
Sample Collected:	27-MAY-14	Findings:	. 2.3 MG/L
Chemical:	POTASSIUM		
Sample Collected:	27-MAY-14	Findings:	. 15. MG/L
Chemical:	CHLORIDE		
Sample Collected:	27-MAY-14	Findings:	. 0.13 MG/L
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)		
Sample Collected:	27-MAY-14	Findings:	. 3.1 UG/L
Chemical:	CHROMIUM, HEXAVALENT		
Sample Collected:	27-MAY-14	Findings:	. 230. MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	27-MAY-14	Findings:	. 0.829
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	27-MAY-14	Findings:	. 0.322
Chemical:	LANGELIER INDEX AT SOURCE TEMP.		
Sample Collected:	27-MAY-14	Findings:	. 26. MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	27-MAY-14	Findings:	. 0.14 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	27-MAY-14	Findings:	. 12.1
Chemical:	AGGRSSIVE INDEX (CORROSIVITY)		

Sample Collected:	27-MAY-14	Findings:	. 5900. UG/L
Chemical:	NITRATE + NITRITE (AS N)		
Sample Collected:	06-OCT-14	Findings:	. 31. MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	10-JAN-11	Findings:	20. MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	08-JUN-11	Findings:	310. US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	08-JUN-11	Findings:	7.78
Chemical:	PH, LABORATORY		
Sample Collected:	08-JUN-11	Findings:	140. MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	08-JUN-11	Findings:	170. MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	08-JUN-11	Findings:	140. MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	08-JUN-11	Findings:	47. MG/L
Chemical:	CALCIUM		
Sample Collected:	08-JUN-11	Findings:	5.7 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	08-JUN-11	Findings:	18. MG/L
Chemical:	SODIUM		
Sample Collected:	08-JUN-11	Findings:	2. MG/L
Chemical:	POTASSIUM		
Sample Collected:	08-JUN-11	Findings:	14. MG/L
Chemical:	CHLORIDE		
Sample Collected:	08-JUN-11	Findings:	0.19 MG/L
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)		
Sample Collected:	08-JUN-11	Findings:	57. UG/L
Chemical:	ZINC		
Sample Collected:	08-JUN-11	Findings:	220. MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	08-JUN-11	Findings:	0.716
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	08-JUN-11	Findings:	21. MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	08-JUN-11	Findings:	12.
Chemical:	AGGRSSIVE INDEX (CORROSIVITY)		
Sample Collected:	08-JUN-11	Findings:	4800. UG/L
Chemical:	NITRATE + NITRITE (AS N)		
Sample Collected:	13-JUN-11	Findings:	18. MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	11-JUL-11	Findings:	34. MG/L
Chemical:	NITRATE (AS NO3)		

Sample Collected:	11-OCT-11	Findings:	19. MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	09-JAN-12	Findings:	24. MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	09-APR-12	Findings:	21. MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	23-MAY-12	Findings:	420. US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	23-MAY-12	Findings:	7.72
Chemical:	PH, LABORATORY		
Sample Collected:	23-MAY-12	Findings:	160. MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	23-MAY-12	Findings:	190. MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	23-MAY-12	Findings:	160. MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	23-MAY-12	Findings:	56. MG/L
Chemical:	CALCIUM		
Sample Collected:	23-MAY-12	Findings:	4.9 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	23-MAY-12	Findings:	18. MG/L
Chemical:	SODIUM		
Sample Collected:	23-MAY-12	Findings:	2.2 MG/L
Chemical:	POTASSIUM		
Sample Collected:	23-MAY-12	Findings:	17. MG/L
Chemical:	CHLORIDE		
Sample Collected:	23-MAY-12	Findings:	0.23 MG/L
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)		
Sample Collected:	23-MAY-12	Findings:	5.5 PCI/L
Chemical:	GROSS ALPHA		
Sample Collected:	23-MAY-12	Findings:	0.743 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	23-MAY-12	Findings:	290. MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	23-MAY-12	Findings:	0.766
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	23-MAY-12	Findings:	37. MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	23-MAY-12	Findings:	12.1
Chemical:	AGGRSSIVE INDEX (CORROSIVITY)		
Sample Collected:	23-MAY-12	Findings:	8200. UG/L
Chemical:	NITRATE + NITRITE (AS N)		
Sample Collected:	23-MAY-12	Findings:	0.808 PCI/L
Chemical:	GROSS ALPHA MDA95		

Sample Collected:	09-JUL-12	Findings:	36. MG/L
Chemical:	NITRATE (AS NO3)		

2
WSW
1/2 - 1 Mile
Lower

CA WELLS **CADW50000004053**

Latitude :	34.048091		
Longitude :	117.491095		
Site code:	340481N1174911W001	Casgem sta:	Not Reported
Local well:	Chino-1207068	Casgem s 1:	Observation
County id:	36		
Basin cd:	8-2.01	Basin desc:	Chino
Org unit n:	Southern Region Office	Site id:	CADW50000004053

3
NE
1/2 - 1 Mile
Higher

CA WELLS **CADW50000004139**

Latitude :	34.0628		
Longitude :	117.4635		
Site code:	340628N1174635W001	Casgem sta:	01S06W25C001S
Local well:	Not Reported	Casgem s 1:	Unknown
County id:	36		
Basin cd:	8-2.01	Basin desc:	Chino
Org unit n:	Southern Region Office	Site id:	CADW50000004139

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

State Database: CA Radon

Radon Test Results

Zipcode	Num Tests	> 4 pCi/L
92337	3	0

Federal EPA Radon Zone for SAN BERNARDINO County: 2

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for SAN BERNARDINO COUNTY, CA

Number of sites tested: 18

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.678 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

HYDROLOGIC INFORMATION

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

HYDROGEOLOGIC INFORMATION

AQUIFLOW^{R} Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Services, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Water Well Database
Source: Department of Water Resources
Telephone: 916-651-9648

California Drinking Water Quality Database
Source: Department of Public Health
Telephone: 916-324-2319
The database includes all drinking water compliance and special studies monitoring for the state of California since 1984. It consists of over 3,200,000 individual analyses along with well and water system information.

OTHER STATE DATABASE INFORMATION

California Oil and Gas Well Locations
Source: Department of Conservation
Telephone: 916-323-1779
Oil and Gas well locations in the state.

RADON

State Database: CA Radon
Source: Department of Health Services
Telephone: 916-324-2208
Radon Database for California

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

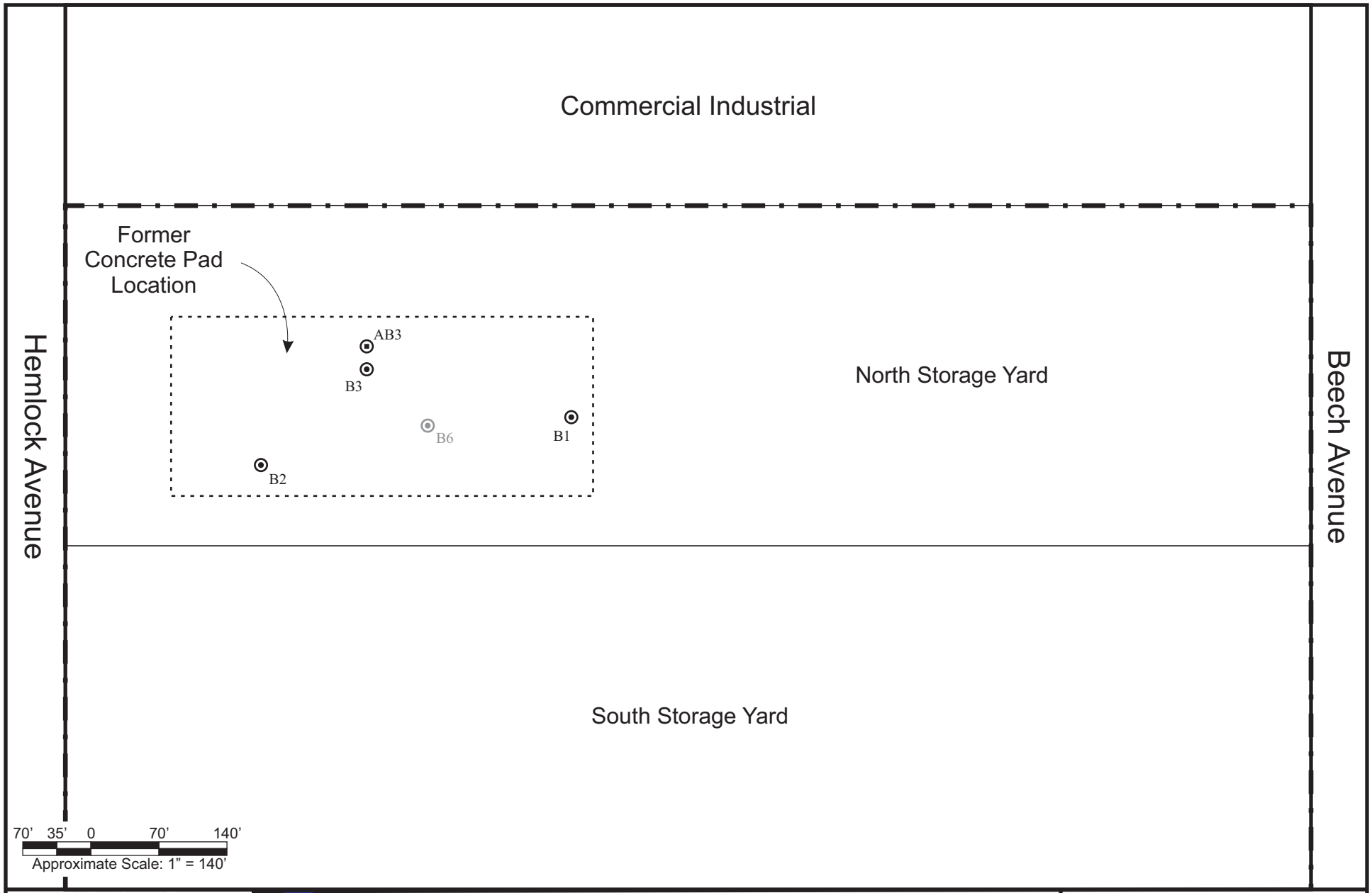
California Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary fault lines, prepared in 1975 by the United State Geological Survey. Additional information (also from 1975) regarding activity at specific fault lines comes from California's Preliminary Fault Activity Map prepared by the California Division of Mines and Geology.

STREET AND ADDRESS INFORMATION

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APPENDIX D: SUPPORTING INFORMATION
LIMITED SUBSURFACE INVESTIGATION

PARTNER



PARTNER
Engineering and Science, Inc.
2154 Torrance Boulevard, Suite 200
Torrance, California 90501

Project Number: 15-144194.2

Legend

- Subject Site
- Boring Location
- Attempted Boring Location
- Previous Boring Location

Sample Location Map

Figure	Prepared By	Date
1	I. Penney	September 2015

11115 Hemlock Avenue
Fontana, California 92337

Table 1: Summary of Investigation Scope
11115 Hemlock Avenue
Fontana, California 92337
Partner Project Number 15-144194.2
September 2015

Boring Identification	Location	Terminal Depth (feet bgs)	Matrix Sampled	Sampling Depths* (feet bgs)	Target Analytes
B1-1.5	Eastern Portion of Former Concrete Slab	1.5**	Soil	**1.5**	VOCs
B2-4.5	Southwestern Portion of Former Concrete Slab	4.5**	Soil	2, **4.5**	VOCs
B3-2	Northern Portion of Former Concrete Slab	2**	Soil	**2**	VOCs

Notes:

*Depths in **bold** analyzed for volatile organic compounds (VOCs) and Oxygenates in accordance with EPA Method 8260B.

**Refusal encountered at the terminal depth

bgs = below ground surface

Table 2: Summary of Investigation Scope
11115 Hemlock Avenue
Fontana, California 92337
Partner Project Number 15-144194.2
September 2015

EPA Method	VOCs via 8260B				
Units	(µg/kg)				
Select Analytes	Residential Soil RSL	Industrial Soil RSL	B1-1.5	B2-4.5	B3-2
PCE	**8.10**	**39**	< 2.0	< 2.0	< 2.0
TCE	**0.410**	**1.90**	< 2.0	< 2.0	< 2.0
Benzene	**1.2**	**5.1**	< 1.0	< 1.0	< 1.0
Toluene	**4,900**	**47,000**	< 1.0	< 1.0	< 1.0
Ethylbenzene	**5.8**	**25**	< 2.0	< 2.0	< 2.0
Xylenes	**650**	**2,800**	< 1.0	< 1.0	< 1.0
MTBE	**47**	**210**	< 2.0	< 2.0	< 2.0
Other VOCs	**NA**	**NA**	ND	ND	ND

Notes:

EPA = United States Environmental Protection Agency

VOCs = volatile organic compounds

MTBE = methyl tert-butyl ether

µg/kg = micrograms per kilogram

< = not detected above indicated laboratory Method Detection Limit (MDL)

ND = not detected above laboratory MDLs

RSL = Regional Screening Levels (EPA Region 9 - June 2015)

NA = not applicable

Boring Number:	B1		Page 1 of 1
Location:	Eastern Portion of Former Concrete Pad	Date Started:	9/4/2015
Site Address:	11115 Hemlock Avenue	Date Completed:	9/4/2015
	Fontana, California 92337	Depth to Groundwater:	NA
Project Number:	15-144194.2	Field Technician:	I. Penney
Drill Rig Type:	Hand Auger	Partner Engineering and Science	
Sampling Equipment:	Acetate liner, plastic syringes	2154 Torrance Boulevard, Suite 200	
Borehole Diameter:	2.0 inches	Torrance, California 90501	

Depth	Sample	PID	USCS	Description	Notes
1	B1-1.5	15.0	SP	Gravelly SAND: red brown, moist, loose, fine to medium sand, some fine gravel.	Gravel 0-5" bgs. Groundwater not encountered. Refusal at 1.5' bgs.
2					Boring terminated at 1.5 feet bgs. Borehole was backfilled with bentonite chips and capped with concrete upon completion of sampling.
3					
4					
5					
6					
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24					
25					

Boring Number:	B2				Page 1 of 1
Location:	Southwestern Portion of Former Conrete Pad			Date Started:	9/4/2015
Site Address:	11115 Hemlock Avenue			Date Completed:	9/4/2015
	Fontana, California 92337			Depth to Groundwater:	NA
Project Number:	15-144194.2			Field Technician:	I. Penney
Drill Rig Type:	Hand Auger			Partner Engineering and Science	
Sampling Equipment:	Acetate liner, plastic syringes			2154 Torrance Boulevard, Suite 200	
Borehole Diameter:	2.0 inches			Torrance, California 90501	

Depth	Sample	PID	USCS	Description	Notes
1					Asphalt at surface.
2	B2-2	0.5	SP	Gravelly SAND: red brown, moist, fine to medium sand, some fine gravel.	
3					
4					
	B2-4.5	0.4	SP	Gravelly SAND: red brown, moist, fine to medium sand, some fine gravel.	Groundwater not encountered. Refusal at 4.5' bgs.
5					
6					Boring terminated at 4.5 feet bgs. Borehole was backfilled with bentonite chips and capped with concrete upon completion of sampling.
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24					
25					

Boring Number:	B3				Page 1 of 1
Location:	Northern Portion of Former Concrete Pad			Date Started:	9/4/2015
Site Address:	11115 Hemlock Avenue			Date Completed:	9/4/2015
	Fontana, California 92337			Depth to Groundwater:	NA
Project Number:	15-144194.2			Field Technician:	I. Penney
Drill Rig Type:	Hand Auger			Partner Engineering and Science	
Sampling Equipment:	Acetate liner, plastic syringes			2154 Torrance Boulevard, Suite 200	
Borehole Diameter:	2.0 inches			Torrance, California 90501	

Depth	Sample	PID	USCS	Description	Notes
1					Asphalt at surface.
2	B3-2	7.1	SP	Gravelly SAND: red brown, moist, fine to medium sand, prevalent fine gravel.	Groundwater not encountered. Refusal at 2' bgs.
3					Boring terminated at 2 feet bgs. Borehole was backfilled with bentonite chips and capped with concrete upon completion of sampling.
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Alpha Scientific Corporation
Environmental Laboratories

09-08-2015

Mr. Ian Penney
Partner Engineering & Science
2154 Torrance Boulevard
Torrance, CA 90501

Project: Not Specified
Project Site: 11115 Hemlock Ave., Fontana, CA
Sample Date: 09-04-2015
Lab Job No.: PA509024

Dear Mr. Penney:

Enclosed please find the analytical report for the sample(s) received by Alpha Scientific Corporation on 09-04-2015 and analyzed by the following EPA methods:

EPA 8260B (VOCs & Oxygenates by GC/MS)

All analyses have met the QA/QC criteria of this laboratory.

The sample(s) arrived in good conditions (i.e., chilled, intact) and with a chain of custody record attached.

Alpha Scientific Corporation is a CA DHS certified laboratory (Certificate Number 2633). Thank you for giving us the opportunity to serve you. Please feel free to call me at (562) 809-8880 if our laboratory can be of further service to you.

Sincerely,

Roger Wang, Ph. D.
Laboratory Director

Enclosures

This cover letter is an integral part of this analytical report.

Client: Partner Engineering & Science | Lab Job No.: PA509024 | Date Reported: 09-08-2015
Project: Not Specified | Matrix: Soil | Date Sampled: 09-04-2015

EPA 8260B (VOCs by GC/MS, Page 1 of 2)
Reporting Unit: µg/kg(ppb)

DATE ANALYZED			09-04	09-04-15	09-04-15	09-04-15		
PREP METHOD			5035	5035	5035	5035		
DILUTION FACTOR (DF)			1	1	1	1		
LAB SAMPLE I.D.			MB	PA509024-1	PA509024-2	PA509024-3		
CLIENT SAMPLE I.D.				B1-1.5	B2-4.5	B3-2		
COMPOUND	**MDL**	**PQL**						
Dichlorodifluoromethane	2	5	ND	ND	ND	ND		
Chloromethane	2	5	ND	ND	ND	ND		
Vinyl Chloride	1	2	ND	ND	ND	ND		
Bromomethane	2	5	ND	ND	ND	ND		
Chloroethane	2	5	ND	ND	ND	ND		
Trichlorofluoromethane	2	5	ND	ND	ND	ND		
1,1-Dichloroethene	2	5	ND	ND	ND	ND		
Iodomethane	2	5	ND	ND	ND	ND		
Methylene Chloride	5	10	ND	ND	ND	ND		
trans-1,2-Dichloroethene	2	5	ND	ND	ND	ND		
1,1-Dichloroethane	2	5	ND	ND	ND	ND		
2,2-Dichloropropane	2	5	ND	ND	ND	ND		
cis-1,2-Dichloroethene	2	5	ND	ND	ND	ND		
Bromochloromethane	2	5	ND	ND	ND	ND		
Chloroform	2	5	ND	ND	ND	ND		
1,2-Dichloroethane	1	5	ND	ND	ND	ND		
1,1,1-Trichloroethane	2	5	ND	ND	ND	ND		
Carbon tetrachloride	1	5	ND	ND	ND	ND		
1,1-Dichloropropene	2	5	ND	ND	ND	ND		
Benzene	1	2	ND	ND	ND	ND		
Trichloroethene	2	4	ND	ND	ND	ND		
1,2-Dichloropropane	2	5	ND	ND	ND	ND		
Bromodichloromethane	2	5	ND	ND	ND	ND		
Dibromomethane	2	5	ND	ND	ND	ND		
Trans-1,3-Dichloropropene	2	5	ND	ND	ND	ND		
cis-1,3-Dichloropropene	2	5	ND	ND	ND	ND		
1,1,2-Trichloroethane	2	5	ND	ND	ND	ND		
1,3-Dichloropropane	1	5	ND	ND	ND	ND		
Dibromochloromethane	2	5	ND	ND	ND	ND		
2-Chloroethylvinyl ether	2	10	ND	ND	ND	ND		
Bromoform	2	5	ND	ND	ND	ND		
Isopropylbenzene	2	5	ND	ND	ND	ND		
Bromobenzene	2	5	ND	ND	ND	ND		

Client: Partner Engineering & Science | Lab Job No.: PA509024 | Date Reported: 09-08-2015
Project: Not Specified | Matrix: Soil | Date Sampled: 09-04-2015

EPA 8260B (VOCs & Oxygenates by GC/MS, Page 2 of 2) Reporting Unit: µg/kg(ppb)

COMPOUND	MDL	PQL	MB	B1-1.5	B2-4.5	B3-2		
Toluene	1	2	ND	ND	ND	ND		
Tetrachloroethene	2	4	ND	ND	ND	ND		
1,2-Dibromoethane(EDB)	2	5	ND	ND	ND	ND		
Chlorobenzene	2	5	ND	ND	ND	ND		
1,1,1,2-Tetrachloroethane	2	5	ND	ND	ND	ND		
Ethylbenzene	1	2	ND	ND	ND	ND		
Total Xylenes	1	4	ND	ND	ND	ND		
Styrene	2	5	ND	ND	ND	ND		
1,1,2,2-Tetrachloroethane	2	5	ND	ND	ND	ND		
1,2,3-Trichloropropane	2	5	ND	ND	ND	ND		
n-Propylbenzene	2	5	ND	ND	ND	ND		
2-Chlorotoluene	2	5	ND	ND	ND	ND		
4-Chlorotoluene	2	5	ND	ND	ND	ND		
1,3,5-Trimethylbenzene	2	5	ND	ND	ND	ND		
tert-Butylbenzene	2	5	ND	ND	ND	ND		
1,2,4-Trimethylbenzene	2	5	ND	ND	ND	ND		
Sec-Butylbenzene	2	5	ND	ND	ND	ND		
1,3-Dichlorobenzene	2	5	ND	ND	ND	ND		
p-Isopropyltoluene	2	5	ND	ND	ND	ND		
1,4-Dichlorobenzene	2	5	ND	ND	ND	ND		
1,2-Dichlorobenzene	2	5	ND	ND	ND	ND		
n-Butylbenzene	2	5	ND	ND	ND	ND		
1,2,4-Trichlorobenzene	2	5	ND	ND	ND	ND		
1,2-Dibromo-3-Chloropropane	2	5	ND	ND	ND	ND		
Hexachlorobutadiene	2	5	ND	ND	ND	ND		
Naphthalene	2	5	ND	ND	ND	ND		
1,2,3-Trichlorobenzene	2	5	ND	ND	ND	ND		
Acetone	50	100	ND	ND	ND	ND		
2-Butanone (MEK)	50	100	ND	ND	ND	ND		
4-Methyl-2-pentanone (MIBK)	50	100	ND	ND	ND	ND		
2-Hexanone	50	100	ND	ND	ND	ND		
Carbon disulfide	10	15	ND	ND	ND	ND		
Vinyl Acetate	10	15	ND	ND	ND	ND		
Ethanol	500	1000	ND	ND	ND	ND		
MTBE	2	5	ND	ND	ND	ND		
ETBE	2	5	ND	ND	ND	ND		
DIPE	2	5	ND	ND	ND	ND		
TAME	2	5	ND	ND	ND	ND		
T-Butyl Alcohol	20	50	ND	ND	ND	ND		

MDL=Method Detection Limit; PQL=Practical Quantitation Limit; MB=Method Blank; ND=Not Detected (below DF × MDL); * Obtained from a higher dilution analysis; J=Trace value (between DF × MDL & DF × PQL).

09-08-2015

EPA 8260B
Batch QA/QC Report

Client:	Partner Engineering & Science	Lab Job No.:	PA509024
Project:	Not Specified		
Matrix:	Soil	Lab Sample I.D.:	PA509024-1
Batch No:	0904-VOAS1	Date Analyzed:	09-04-2015

I. MS/MSD Report
Unit: ppb

Analyte	Sample Conc.	Spike Conc.	MS	MSD	MS %Rec.	MSD %Rec.	% RPD	%RPD Accept. Limit	%Rec Accept. Limit
1,1-Dichloroethene	ND	20	21.9	25.9	109.5	129.5	16.7	30	70-130
Benzene	ND	20	18.6	20.2	93.0	101.0	8.2	30	70-130
Trichloro-ethene	ND	20	17.8	19.6	89.0	98.0	9.6	30	70-130
Toluene	ND	20	17.7	20.4	88.5	102.0	14.2	30	70-130
Chlorobenzene	ND	20	18.0	20.4	90.0	102.0	12.5	30	70-130

II. LCS Result
Unit: ppb

Analyte	LCS Value	True Value	Rec.%	Accept. Limit
1,1-Dichloroethene	21.6	20.0	108.0	80-120
Benzene	17.8	20.0	89.0	80-120
Trichloro-ethene	18.4	20.0	92.0	80-120
Toluene	18.2	20.0	91.0	80-120
Chlorobenzene	19.4	20.0	97.0	80-120

ND: Not Detected (at the specified limit).

ALPHA SCIENTIFIC CORPORATION

CHAIN OF CUSTODY RECORD

Lab Job Number PA50902-4

Client: Partner ESI			
Address 2154 Torrance Blvd #200, Torrance, CA 90501			
Report Attention E. Penney	**Phone** 310-65-4500	**Fax** 310-65-4544	**Sampled by** E Penney
Project Name/No.	**Project Site** 11115 Hemlock Ave, Fontana, CA		

Client Sample ID	Lab Sample ID	Sample Collection Date	Sample Collection Time	Matrix Type	Sample Preserve	No.,type* & size of container	TPH-Gasoline	TPH-Diesel	8260B (BTEX, Oxygenates)	8260B (VOCs)	8270C (SVOCs)	CAM Metals	8082 (PCBs)	Remark
B1-1.5	PA50902-1	9/4/15	0930	Soil	Natural	5VOA/Jar				X				
B2-2	-4		1015											
B2-4.5	-2		1036							X				
B3-2	-3		1335							X				

Analyses Requested

T.A.T. Requested
☐ 8 hrs ☐ 24 hrs ☐ 48 hrs
☐ 3 days ☐ Normal

Sample Condition
☒ Chilled ☒ Intact
☐ Sample seals

Relinquished by	Company	Date	Time	Received by	Company	Date	Time
E Penney	Partner	9/4/15	1550	Melinda	ADL	9-4-15	15:30
Relinquished by	Company	Date	Time	Received by	Company	Date	Time

Container types: M=Metal Tube, P=Plastic bottle, A=Air Bag, G=Glass bottle, V=VOA vial

Alpha Scientific Corporation
16760 Gridley Road
Cerritos, CA 90703

Email: ascorp@verizon.net
Tel: (562) 809-8880
Fax: (562) 809-8801

Note: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client's expense.
Distribution: White with report, Yellow to courier.

APPENDIX E - QUALIFICATIONS

PARTNER

Robin Blanchard
Senior Assessor

Education
English Literature/Sociology – UC San Diego

Registrations
California Registered Environmental Assessor No. 07999

Training
OSHA Hazardous Waste Operator (HAZWOPER) 40 hour Certification
DOT Hazardous Materials Transport (DOT HM-126F)
Accredited Contract Supervisor-Competent Person
Transportation Worker Identification Credential
EDR Common Ground Environmental Site Assessment (ESA) Training
ASTM International Phase I ESA Practices for Commercial Real Estate: Transaction Screen and Phase I Site Assessment
Chevron Learning Management System
Port of Los Angeles Worker Screening/Training
Los Angeles World Airport Screening/Training
Metrolink/BNSF Safety Training.

Summary of Professional Experience
Ms. Blanchard has over 22 years of experience in the environmental service industry. She has significant experience in due diligence assessments for a variety of property types fulfilling the needs and requirements of a varied number of reporting standards including: ASTM, EPA's All Appropriate Inquiry (AAI), and customized client formats.

Ms. Blanchard's due diligence resume includes experience at multiple levels, advising lenders and real estate investors through the following product types:

- Phase I ESAs;
- Phase II Subsurface Investigations;
- Phase III Site Characterizations;
- Remedial Investigation/Feasibility Studies;
- Remedial Action/Remedial Design Studies;
- Third Party Environmental Evaluations ;
- Third Party Health and Safety Evaluations;
- Remedial Implementation;
- Demolition Oversight;
- Asbestos, Lead Paint, Mold Surveys; and
- Lead in Soil and Drinking Water Surveys.

Ms. Blanchard has served as an environmental assessor, field manager, project manager, health and safety officer, and public participation specialist on over 200 real estate transactions. Her knowledge and ability to manage multiple services associated with real estate due diligence allows Ms. Blanchard to provide her clients with comprehensive information and identification of risks in order to make sound financial investments.

At a previous firm, Ms. Blanchard was responsible for environmental due diligence and field implementation both locally and nationwide with emphasis on environmental site assessments related to property transactions, Phase II soil and groundwater investigations, due diligence audits, environmental compliance audits, hazardous waste management and corrective action implementation. She also served as project manager performing field staff supervision; subcontractor oversight; report review; and client management.

The clients Ms. Blanchard represented for these consulting services include portfolio lenders, private equity funds, insurance lenders, commercial and residential developers, retail companies, real estate brokers, mortgage brokers, property managers, private property owners, local and state government and attorneys.

Relevant Project Experience

Ms. Blanchard has conducted, managed and directed hundreds of ESAs throughout her career and has been project manager, lead assessor, health and safety and field office manager for dozens of site investigations, characterization studies and remediation projects throughout California and the US. The following select projects summarize her experience and due diligence background:

Transaction Due Diligence

- *Environmental Assessment, Southern California, The New Home Company* - For two years Ms. Blanchard performed due diligence services related to real estate transfers and property development for The New Home Company. She closely coordinated with property managers and representatives to provide a smooth exchange between client and lenders. She was also responsible for review of third party reports, asbestos and lead surveys, endangered and threatened species studies and subsurface investigations.

- *Environmental Assessment, Southern California, Jiffy Lube* – Ms. Blanchard performed and managed twelve environmental site assessments of vacant and operating vehicle fueling and repair stations proposed for redevelopment or sale. In addition, Ms. Blanchard was responsible for review of third party reports, asbestos and lead surveys, underground storage tank removals and other subsurface investigations.

- *Environmental Assessment, Southern California, Johnson & Johnson/DePuy* – Ms. Blanchard performed environmental site assessments and limited compliance evaluations of six medical device/equipment manufacturers. She evaluated the current environmental regulations applicable to the facilities and any deficiencies or omissions.

- *Project Manager/Coordinator/Team Leader, Nationwide, U.S.A. (Confidential Client)* – Ms. Blanchard coordinated and performed over 220 Phase I and II investigations, including lead paint, lead in water, asbestos and radon surveys, compliance audits, storage tank investigation/removal/ remediation, decommissioning and environmental permit transfers for psychiatric and acute care hospitals, medical clinics and offices, throughout the United States. Her responsibilities included investigatory and research activities, serving as a liaison between the client, client attorneys, the potential buyers, individual URS managers, staff, and subcontractors in many different offices. She also managed and projected budgets, performed Phase I and II investigations and compliance evaluations across the United States, and reviewed and technically edited all proposals and reports for those projects.

- *Project Office Manager/Project Coordinator/Sample Custodian, Two Delisted NPL Sites, Del Amo/Palo Alto, CA, Hewlett-Packard and Shell Oil/Dow Chemical* – Ms. Blanchard served as onsite field office manager, database coordinator, and sample custodian for remedial investigation/feasibility studies for two large-scale projects under the guidance of the US EPA and the California Regional Water Quality Control Board. She coordinated field, office, and database personnel, served as client, public and agency (Regional Water Quality Control Board) liaison, prepared monthly status reports as well as budget and labor projections, edited technical submittals to client and agencies, compiled and maintained an administrative public record and supervised five site and field office employees.

Subsurface Investigations/Demolition/Health & Safety

- *Health & Safety Third Party Oversight, Aircraft Engine Test and Repair Facility Demolition, Bob Hope Airport, Burbank, California, GE*: Provided third-party health and safety oversight and reporting for demolition of a historic, closed aircraft engine test and repair facility that had been in operation since the 1930s. Her responsibilities included daily task assessment, oversight, preparation of health and safety task assessment, and incident reporting forms for a high profile international company. She was also accountable for the coordination between multiple consultants, the client, the airport and local agencies.

- *Field Project Manager, Site Remediation, Brea, CA, Birch Hills Golf Course/Chevron, 2013* – Ms. Blanchard oversaw field operations, primarily large-scale soil excavations and health and safety of subcontractors for sampling and soil excavation at a former industrial plant that had been redeveloped as a golf course. Oversight of the project was provided by the US EPA and chemicals of concern included PCBs, metals, petroleum hydrocarbons and other volatile compounds.

- *Health & Safety Liason, Operating Resort Facility, Kapolei, HI, Disney Aulani Resort, 2012* – Ms. Blanchard identified and followed up on health and safety task items for operations and subcontractors at a ten-acre leisure resort. Her duties included assessment of chemical use, storage and disposal, construction punch lists, compliance training and documentation, as well as chemical release monitoring and systems installation.

- *Field Project Manager, Chemical Plant Demolition, Santa Fe Springs, CA, Pilot Chemical Company, 2011-2012* – Ms. Blanchard oversaw field operations and health and safety of subcontractors for demolition of a former industrial soap manufacturer under the guidance of the RWQCB. Her responsibilities included hazardous materials, lead, asbestos and mold abatement oversight, health and safety monitoring, as well as the removal of impacted soil, clarifiers, tanks, and unknown subsurface features encountered during demolition activities. Her ongoing activities included soil vapor and groundwater monitoring and reporting.

- *Assistant Project Manager, Former Research Laboratory Decommissioning, Montebello, CA, Chevron, 2005* – Ms. Blanchard assisted with hazardous materials and waste identification, collection, characterization and disposal. She was responsible for materials and equipment decommissioning, storage tank removal, clarifier and settling pond removal, as well as asbestos sampling and abatement, in preparation for demolition and/or conversion of a former research refinery and laboratory.

Municipal/State Contracts

- *Project and Field Project Manager, LAUSD Proposed School Sites, Los Angeles, CA, Los Angeles Unified School District (LAUSD), 1999-2014* – Ms. Blanchard participated on the on-call environmental services contract under the district's environmental health and safety branch, which focused on clearing new proposed school sites by the California Department of Toxic Substances Control (DTSC). Her responsibilities included fast-track preparation, implementation and documentation of preliminary environmental assessments, focused investigations, removal action plans, and removal action completion reports. The projects she worked on included facility demolition and construction activities, soil, soil gas and groundwater investigation and remediation, as well as health and safety and contractor oversight. Specific projects have included: South Region Elementary Schools 3 and 7; South Region High School No's 2,3,7 and 9: Central Los Angeles Learning Center No.1, Central Region Elementary Schools No's 13 and 17; Carson-Gore Learning Academy; Valley Region High School No. 13, and Bell Adult Education Center.

- *Field Sampling, Stormwater Sampling Program, (Orange County), CA, Caltrans, 2010-2011* – Ms. Blanchard provided on-call storm water sampling during rain events on local freeways under CALTRANS and RWQCB requirements.

- *Project Manager, Proposed Redevelopment Sites, Redwood City, CA, City of Redwood City Redevelopment Agency, 2000* – Ms. Blanchard performed and managed twelve Phase I ESAs and prepared work plans and managed Phase II soil and groundwater investigations at four sites for Redwood City. Two sites that she worked on had soil and groundwater impacted with gasoline and solvents from historic gas station and vehicle repair activities. Her investigation of these sites required coordination with the local Regional Water Quality Control Board and investigation and negotiation with other nearby sources of contamination.

Debra B. Stott, PG
Senior Project Manager

PARTNER Engineering and Science, Inc.

Education
BA Geology – The Ohio State University

Registrations
California Professional Geologist No. 6221

Training
OSHA, Hazardous Waste Operator (HAZWOPER) 40 hour Certification
Certified Project Manager

Summary of Professional Experience
Ms. Stott has over 25 years of experience in the environmental service industry. She has significant experience in due diligence assessments for a variety of property types fulfilling the needs and requirements of a varied number of reporting standards including: ASTM, EPA's All Appropriate Inquiry (AAI), and customized client formats. Ms. Stott has performed Phase I Environmental Site Assessments, Third Party Reviews, Due Diligence Audits, Record Search and Risk Assessments, Phase II and III Subsurface Investigations, Remedial Investigations, Radon Studies, Mold Assessments, Methane Surveys, Indoor Air Quality Assessments, and Lead-in-water sampling and analysis.

Ms. Stott has served as a geologist, field manager, project manager, reviewer, or senior author on over 2,500 real estate transactions. Her knowledge and ability to manage multiple services associated with real estate due diligence allows Ms. Stott to provide her clients with the comprehensive information and identification of risks in order to make sound financial investments. Ms. Stott's due diligence resume includes experience at all levels, advising lenders and real estate investors through the following product types:

- Phase I Environmental Site Assessments
- Phase II Subsurface Investigations
- Phase III Site Characterizations
- Remedial Investigation/Feasibility Studies
- Environmental Risk Evaluations
- Remedial Action/Remedial Design Studies
- Third Party Environmental Evaluations
- Remedial Cost Estimates
- Remedial Implementation
- Indoor Air Quality
- Property Condition Assessments
- Seismic PML
- Asbestos, Lead Paint, Mold Surveys
- Lead in Drinking Water Surveys

At a previous firm, Ms. Stott was responsible for environmental due diligence services nationwide with emphasis on environmental site assessments related to property transactions, Phase II soil and groundwater investigations, due diligence audits, environmental compliance audits, hazardous waste management, corrective action implementation, and pollution prevention. She also served as project manager or management oversight reviewer with duties that included staff supervision; employee training; report review; and client management.

Finally, Ms. Stott's diversity across residential, industrial, municipal, and commercial environments is a major contribution to Partner Engineering and Science's team across the United States.

Relevant Project Experience

Transaction Due Diligence

Project Manager, Western US and Southern California, LBA Realty - For over 12 years performed due diligence services related to real estate transfers as well as asset refinances for LBA Realty. Closely coordinated with property managers and representatives to provide a smooth process with client and lenders. Services have also included review of third party reports, asbestos surveys, subsurface investigations, and development of soil management plans. Many projects involved multiple locations in several states thus requiring coordination with other offices and client contacts.

Project and Client Manager, Northern and Southern CA, Lincoln Property Company - Conducted and managed multiple due diligence assessments related to potential property transfers. Bundled Property Condition Assessments and Seismic Assessments with the environmental assessment to provide a complete package for the client at many of the projects. Also has assisted Lincoln with environmental review, permitting and soil vapor investigations at their high-profile commercial building project at Playa Vista, CA.

Environmental Lead, West Coast, Cornerstone Real Estate Advisers (CREA) - Environmental due diligence and environmental actions associated with acquisitions, property development, joint venture developments, property divestments and finance group loan transactions. Environmental due diligence includes Phase I ESAs, Phase II ESAs, indoor air quality assessments, mold assessment and mitigation planning, providing third party review, asbestos investigations, asbestos abatement, operation and maintenance plan development, remedial action development and implementation, regulatory correspondence and permitting.

Project and Client Manager, Northern and Southern CA, Regency Centers - Conducted and managed several due diligence assessments for new construction and remodeling of retail shopping centers. The projects included Phase I Environmental Assessments, soil and groundwater sampling, methane surveys, asbestos and lead paint surveys, wetlands evaluations, soil remediation, and NEPA compliance. Each project involves constant client contact and development of relationships with both the financial and construction managers working for the client.

Subsurface Investigations/Vapor Intrusion

Project Manager, Whittier, CA, Confidential Client - Conducted several investigations to evaluate the potential for vapor intrusion associated with contaminated groundwater into client buildings. At one location a horizontal well system was installed to passively vent vapors. Site investigations involved the installation of multiple, multi-depth vapor probes through the property to map the plume and to assist in decision making for potential further investigation. Data collected from both soil vapor and indoor air monitoring was subjected to risk assessment in order to determine if indoor air quality had been negatively impacted and engineering controls needed to protect workers.

Project Manager and Environmental Lead, Berkeley, CA, LBA Realty - Evaluation of potential risks associated with the presence of trichloroethylene (TCE) and breakdown products cis 1,2- dichloroethene (cis 1,2-DCE) and vinyl chloride (VC), and methyl tert butyl ether (MTBE) in groundwater and ambient air at an existing building in Berkeley, CA. Worked with outside counsel to evaluate, summarize, and present the risks and potential risks of continued investment in the property.

Project Manager, Playa Vista, CA, Lincoln Property Company - Managed and completed VOC monitoring for Lincoln's commercial office buildings at Playa Vista. The development is located in a methane zone as well as over groundwater contaminated by the former industrial operations. This involved sampling VOCs from the methane mitigation system over a period of one to two years, creating reports that were reviewed by the client, attorneys, Playa Capital (the master developer), and the RWQCB-Los Angeles region. The goal of allowing tenant occupancy of the buildings by the RWQCB was achieved.

Project Manager, Central Valley, CA, CREA – Took over assessment and oversight of remedial actions for diesel fuel impacted agricultural site in Tulare County, California. Coordinated with remedial engineers to create feasibility study report and implement the remedial actions for impacts to groundwater at depths of 150-160 feet bgs. A Soil Vapor Extraction/Air Sparging system became operational in 2010. Reviewed progress reports and maintained relationship with the RWQCB-Central Valley Region project manager. Regulatory closure was received mid-2013 and the wells and system decommissioned.

Project Manager, Brea, CA, Chevron Land and Development – Starting with a Phase I Assessment and soil sampling to assist Chevron in planning for the redevelopment of the Brea public golf course, led to a long term investigation and remedial effort involving local and federal agencies. A portion of the golf course was identified as historically a part of a former chemical plant. As the golf course redevelopment proceeded, the data indicated a need for more investigation to evaluate potential impacts to soil on the southern portion from former operations and the railroad right of way crossing the property. Helped develop a workplan and a team to work with USEPA to manage the investigations as well as the soil excavations. Follow up soil vapor surveys on the northern portion indicated that ownership of this parcel could be transferred and the property redeveloped as planned.

Municipal/State Contracts

Project Manager, City of Los Angeles, Division of Recreation and Parks - Provided and managed multiple property acquisition and due diligence projects for Recreation and Parks personnel. As Project Manager and main client contact, provided over 15 Phase I ESAs within three months for client's application for a grant to fund pocket parks. Also assisted Recreation and Parks personnel with asbestos and lead paint surveys prior to renovations at various park locations.

Task Manager, California Department of Toxic Substances Control (DTSC) - To assist other project managers, provided review and summaries of historical documents and background information for multiple locations. The historical reviews supplemented existing projects by providing relevant background information related to former onsite operations and locations of concern.

Misty Vazquez, PE

Principal, National Client Manager,
Senior Project Manager

Education

M.S. Civil-Environmental Engineering, California State University, Fullerton
B.S. Environmental Engineering, University of California, Riverside
Coursework in Legal and Regulatory Framework for Environmental Management, University of California, Irvine
Coursework in Mold Inspection

Registrations

Professional Engineer, Colorado
Engineer-In-Training (EIT), California
State of California Registered Environmental Assessor (program canceled in July 2012)
LEED Green Associate (GA) Accredited Professional, United States Green Building Council
AHERA Certified Building Inspector for Asbestos

Training

OSHA 40-hour HAZWOPER, Operations Level Health and Safety Training
OSHA 10-hour Construction Safety Training
Trained/Certified - Hazardous Waste in California, US Department of Transportation Hazardous Materials Transportation, and USEPA Hazardous/Toxic Waste Management (LION)

Summary of Professional Experience

Ms. Vazquez is an environmental engineer with more than 15 years of experience in the environmental and engineering service industries. She has significant experience in the field of environmental due diligence, site assessment, remediation, and regulatory compliance. She provides environmental support to clients nationwide during the acquisition, disposition, development, and on-going management and operation of commercial, industrial, and multi-family residential properties.

She has considerable experience in Phase I and Phase II Environmental Site Assessments (ESAs) of commercial, agricultural, and industrial properties and projects involving water quality, soil quality, and regulatory compliance including hazardous and solid waste site characterization and remediation; remediation system design, installation, and operation; tank removals; asbestos surveys; lead-based paint surveys; radon Studies; mold assessments; lead-in-water sampling and analysis; and technical reporting.

She has been involved with feasibility and treatability studies associated with several remediation projects including soil and groundwater treatment systems, UST/LUST closures, and management of construction soils generated during redevelopment of agricultural and industrial properties.

Finally, Ms. Vazquez's diversity across residential, industrial, and commercial environments is a major contribution to Partner Engineering and Science's national team.

APPENDIX C: GEOTECHNICAL INVESTIGATION

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GEOTECHNICAL INVESTIGATION
PROPOSED COMMERCIAL/INDUSTRIAL BUILDING

11115 Hemlock Avenue
Fontana, California
for
ProLogis

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

September 4, 2015

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

ProLogis
2817 East Cedar Street, Suite 200
Ontario, California 91761

Attention: Mr. Scott Mulkay

Project No.: **15G177-1**

Subject: **Geotechnical Investigation**
Proposed Commercial/Industrial Building
11115 Hemlock Avenue
Fontana, California

Gentlemen:

In accordance with your request, we have conducted a geotechnical investigation at the subject site. We are pleased to present this report summarizing the conclusions and recommendations developed from our investigation.

We sincerely appreciate the opportunity to be of service on this project. We look forward to providing additional consulting services during the course of the project. If we may be of further assistance in any manner, please contact our office.

Respectfully Submitted,

SOUTHERN CALIFORNIA GEOTECHNICAL, INC.

Daniel W. Nielsen, RCE 77915
Project Engineer

REGISTERED PROFESSIONAL ENGINEER
DANIEL W. NIELSEN
No. 77915
CIVIL
STATE OF CALIFORNIA

John A. Seminara, GE 2294
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
JOHN A. SEMINARA
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Distribution: (2) Addressee

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1.0 EXECUTIVE SUMMARY

Presented below is a brief summary of the conclusions and recommendations of this investigation. Since this summary is not all inclusive, it should be read in complete context with the entire report.

Site Preparation

- Demolition of the existing structures and pavements will be required. Demolition of these structures and associated improvements should include all foundations, floor slabs, utilities, and any other subsurface improvements that will not remain in place for use with the new development. Concrete and asphalt debris may be crushed to a maximum 2-inch particle size, mixed well with the on-site soils, and incorporated into structural fills if desired. Alternatively, concrete and asphalt may be crushed into miscellaneous base (CMB).
- Stripping of the existing landscaped areas should include the removal of all vegetation, organic soils, and root masses.
- Undocumented fill soils were encountered at several of the boring locations, extending to depths of 2½± feet below the existing site grades.
- The near-surface native alluvial soils generally consist of variable strength silty sands and fine to medium sands. Laboratory testing indicates that some of the near surface soils possess a minor potential for collapse.
- Based on these conditions, remedial grading is recommended within the proposed building and improvement areas in order to remove all of the artificial fill materials and the upper portion of the near surface native alluvial soils. The existing soils within the proposed building area should be overexcavated to a depth of at least 3 feet below existing grade and to a depth of at least 3 feet below proposed pad grade. Within the building area, the proposed foundation influence zones should be overexcavated to a depth of 2 feet below proposed foundation bearing grade.
- After overexcavation has been completed, the resulting subgrade soils should be evaluated by the geotechnical engineer to identify any additional soils that should be overexcavated. The resulting subgrade should then be scarified to a depth of 12 inches. The overexcavation subgrade should be moisture conditioned to 2 to 4 percent above the optimum moisture content and recompacted. The previously excavated soils may then be replaced as compacted structural fill.
- The new parking area subgrade soils are recommended to be scarified to a depth of 12± inches, thoroughly moisture conditioned and recompacted to at least 90 percent of the ASTM D-1557 maximum dry density.

Building Foundations

- Conventional shallow foundations, supported in newly placed compacted fill.
- 3,000 lbs/ft^2 maximum allowable soil bearing pressure.
- Reinforcement consisting of at least two (2) No. 5 rebars (1 top and 1 bottom) in strip footings. Additional reinforcement may be necessary for structural considerations.

Building Floor Slabs

- Conventional slab-on-grade, at least 5 inches thick.
- Reinforcement is not required for geotechnical considerations. The actual floor slab reinforcement to be determined by the structural engineer, based on the proposed loading.

Pavements

ASPHALT PAVEMENTS (R =50)					
Materials	**Thickness (inches)**				
	Parking Stalls (TI = 4.0)	Auto Drive Lanes (TI = 5.0)	Light Truck Traffic (TI = 6.0)	Moderate Truck Traffic (TI = 7.0)	Heavy Truck Traffic (TI = 8.0)
Asphalt Concrete	3	3	3½	4	5
Aggregate Base	3	3	4	5	5
Compacted Subgrade	12	12	12	12	12

PORTLAND CEMENT CONCRETE PAVEMENTS (R=50)				
Materials	**Thickness (inches)**			
	Automobile Parking and Drive Areas	Light Truck Traffic Areas (TI =6.0)	Moderate Truck Traffic Areas (TI =7.0)	Heavy Truck Traffic Areas (TI =8.0)
PCC	5	5	6	7
Compacted Subgrade (95% minimum compaction)	12	12	12	12

2.0 SCOPE OF SERVICES

The scope of services performed for this project was in accordance with our Proposal No. 15P322, dated July 23, 2015. The scope of services included a visual site reconnaissance, subsurface exploration, field and laboratory testing, and geotechnical engineering analysis to provide criteria for preparing the design of the building foundations, building floor slab, and parking lot pavements along with site preparation recommendations and construction considerations for the proposed development. The evaluation of the environmental aspects of this site was beyond the scope of services for this geotechnical investigation.

3.0 SITE AND PROJECT DESCRIPTION

3.1 Site Conditions

The subject site is located on the east side of Hemlock Avenue, approximately 750 feet north of the intersection of Hemlock Avenue and Jurupa Avenue, at the street address of 11115 Hemlock Avenue in Fontana, California. The site is bounded to the north by existing commercial/industrial development, to the east by Beech Avenue, to the south by an existing commercial/industrial building, and to the west by Hemlock Avenue. The general location of the site is illustrated on the Site Location Map, included as Plate 1 in Appendix A of this report.

The site consists of a rectangular shaped parcel, 37.21± acres in size. The site is currently utilized as a mobile trailer storage yard, occupied by Modular Space Corporation. Two buildings are present in the west-central area of the site. These buildings are single-story structures, which are assumed to be supported on shallow foundations with concrete slab-on-grade floors. Ground surface cover throughout the majority of the site consists of crushed miscellaneous base (CMB) with areas of asphaltic concrete pavements surrounding the buildings and near the northwest corner of the site. The easternmost of the two buildings is immediately surrounded by Portland cement concrete. Landscape planters are present along the northern side of the westernmost building, and along the east and west property lines.

Detailed topographic information was not available at the time of this report. Based on visual observations, site grades appear to dip downwards toward the southwest at an estimated gradient of approximately 1 to 2± percent.

3.2 Proposed Development

A preliminary site plan, prepared by RGA, was provided to our office. Based on this plan, the site will be developed with one (1) commercial/industrial building. The proposed building will be located in the central portion of the site and will possess a footprint area of 775,200± ft^2. The building will be constructed in a cross-deck configuration with dock high doors on the east and west sides. We expect that the building will be surrounded by asphaltic concrete pavements in parking and drive areas and Portland cement concrete pavements in the truck court and loading dock areas. It is assumed that several landscape planters and concrete flatwork will be included throughout the site.

Detailed structural information has not been provided. It is assumed that the new building will be a single-story structure of tilt-up concrete construction, typically supported on a conventional shallow foundation system with a concrete slab-on-grade floor. The proposed construction may include second floor mezzanine office areas. Based on the assumed construction, maximum column and wall loads are expected to be on the order of 80 kips and 3 to 5 kips per linear foot, respectively.

No significant amounts of below grade construction, such as basements or crawl spaces, are expected to be included in the proposed development. Based on the assumed topography, cuts and fills of 3 to 4± feet are expected to be necessary to achieve the proposed site grades.

4.0 SUBSURFACE EXPLORATION

4.1 Scope of Exploration/Sampling Methods

The subsurface exploration conducted for this project consisted of ten (10) borings advanced to depths of 5 to 30± feet below existing site grades. All of the borings were logged during drilling by a member of our staff.

The borings were advanced with hollow-stem augers, by a conventional truck-mounted drilling rig. Representative bulk and relatively undisturbed soil samples were taken during drilling. Relatively undisturbed samples were taken with a split barrel "California Sampler" containing a series of one inch long, 2.416± inch diameter brass rings. This sampling method is described in ASTM Test Method D-3550. Samples were also taken using a 1.4± inch inside diameter split spoon sampler, in general accordance with ASTM D-1586. Both of these samplers are driven into the ground with successive blows of a 140-pound weight falling 30 inches. The blow counts obtained during driving are recorded for further analysis. Bulk samples were collected in plastic bags to retain their original moisture content. The relatively undisturbed ring samples were placed in molded plastic sleeves that were then sealed and transported to our laboratory.

The approximate locations of the borings are indicated on the Boring Location Plan, included as Plate 2 in Appendix A of this report. The Boring Logs, which illustrate the conditions encountered at the boring locations, as well as the results of some of the laboratory testing, are included in Appendix B.

4.2 Geotechnical Conditions

Pavements

Boring No. B-1 was drilled through existing asphaltic concrete pavements. The pavement section at Boring No. B-1 consists of 6½± inches of asphaltic concrete with no discernable underlying layer of aggregate base. The remaining borings were drilled in areas paved with crushed miscellaneous base (CMB). At Boring Nos. B-2 through B-10, the ground surface cover consists of a 3 to 4-inch thick CMB layer.

Artificial Fill

Artificial fill soils were encountered beneath the pavements at Boring No. B-1, and beneath the CMB layer at Boring Nos. B-2 and B-8. The artificial fill soils extend to depths of 2½ ± feet below the existing site grades and generally consist of medium dense to dense fine sands with varying amounts of fine to coarse gravel, medium to coarse sand, and silt. The fill soils possess a disturbed appearance, resulting in their classification as fill.

Alluvium

Native alluvium was encountered beneath pavements and/or the artificial fill soils at all of the boring locations, extending to at least the maximum depth explored of 30± feet below existing site grades. The alluvium generally consists of medium dense to very dense fine sands, silty fine sands, fine to coarse sands and fine sandy silts with varying amounts of silt, fine to coarse gravel and cobbles. Boring No. B-7 also encountered a layer of very dense gravelly fine to coarse sands between depths of 17 and 25± feet.

Groundwater

Groundwater was not encountered at any of the borings. Based on the lack of any water within the borings, and the moisture contents of the recovered soil samples, the static groundwater table is considered to have existed at a depth in excess of 30± feet below existing site grades, at the time of the subsurface investigation.

5.0 LABORATORY TESTING

The soil samples recovered from the subsurface exploration were returned to our laboratory for further testing to determine selected physical and engineering properties of the soils. The tests are briefly discussed below. It should be noted that the test results are specific to the actual samples tested, and variations could be expected at other locations and depths.

Classification

All recovered soil samples were classified using the Unified Soil Classification System (USCS), in accordance with ASTM D-2488. The field identifications were then supplemented with additional visual classifications and/or by laboratory testing. The USCS classifications are shown on the Boring Logs and are periodically referenced throughout this report.

Dry Density and Moisture Content

The density has been determined for selected relatively undisturbed ring samples. These densities were determined in general accordance with the method presented in ASTM D-2937. The results are recorded as dry unit weight in pounds per cubic foot. The moisture contents are determined in accordance with ASTM D-2216, and are expressed as a percentage of the dry weight. These test results are presented on the Boring Logs.

Consolidation

Selected soil samples were tested to determine their consolidation potential, in accordance with ASTM D-2435. The testing apparatus is designed to accept either natural or remolded samples in a one-inch high ring, approximately 2.416 inches in diameter. Each sample is then loaded incrementally in a geometric progression and the resulting deflection is recorded at selected time intervals. Porous stones are in contact with the top and bottom of the sample to permit the addition or release of pore water. The samples are typically inundated with water at an intermediate load to determine their potential for collapse or heave. The results of the consolidation testing are plotted on Plates C-1 through C-8 in Appendix C of this report.

Maximum Dry Density and Optimum Moisture Content

A representative bulk sample was tested for its maximum dry density and optimum moisture content. The results have been obtained using the Modified Proctor procedure, per ASTM D-1557. These tests are generally used to compare the in-situ densities of undisturbed field samples, and for later compaction testing. Additional testing of other soil type or soil mixes may be necessary at a later date. The results of the testing are plotted on Plate C-9 in Appendix C of this report.

Soluble Sulfates

Representative samples of the near-surface soils were submitted to a subcontracted analytical laboratory for determination of soluble sulfate content. Soluble sulfates are naturally present in soils, and if the concentration is high enough, can result in degradation of concrete which comes into contact with these soils. The results of the soluble sulfate testing are presented below, and are discussed further in a subsequent section of this report.

Sample Identification	**Soluble Sulfates (%)**	**ACI 318 Classification**
B-1 @ 0 to 5 feet	0.015	Negligible
B-8 @ 0 to 5 feet	0.012	Negligible

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our review, field exploration, laboratory testing and geotechnical analysis, the proposed development is considered feasible from a geotechnical standpoint. The recommendations contained in this report should be taken into the design, construction, and grading considerations. The recommendations are contingent upon all grading and foundation construction activities being monitored by the geotechnical engineer of record. The Grading Guide Specifications, included as Appendix D, should be considered part of this report, and should be incorporated into the project specifications. The contractor and/or owner of the development should bring to the attention of the geotechnical engineer any conditions that differ from those stated in this report, or which may be detrimental for the development.

6.1 Seismic Design Considerations

The subject site is located in an area which is subject to strong ground motions due to earthquakes. The performance of a site specific seismic hazards analysis was beyond the scope of this investigation. However, numerous faults capable of producing significant ground motions are located near the subject site. Due to economic considerations, it is not generally considered reasonable to design a structure that is not susceptible to earthquake damage. Therefore, significant damage to structures may be unavoidable during large earthquakes. The proposed structures should, however, be designed to resist structural collapse and thereby provide reasonable protection from serious injury, catastrophic property damage and loss of life.

Faulting and Seismicity

Research of available maps indicates that the subject site is not located within an Alquist-Priolo Earthquake Fault Zone. Therefore, the possibility of significant fault rupture on the site is considered to be low.

Seismic Design Parameters

Beginning January 1, 2014, the 2013 CBC was adopted by all municipalities within Southern California. The CBC provides procedures for earthquake resistant structural design that include considerations for on-site soil conditions, occupancy, and the configuration of the structure including the structural system and height. The seismic design parameters presented below are based on the soil profile and the proximity of known faults with respect to the subject site.

The 2013 CBC Seismic Design Parameters have been generated using U.S. Seismic Design Maps, a web-based software application developed by the United States Geological Survey. This software application, available at the USGS web site, calculates seismic design parameters in accordance with the 2013 CBC, utilizing a database of deterministic site accelerations at 0.01 degree intervals. The table below is a compilation of the data provided by the USGS application. A copy of the output generated from this program is included in Appendix E of this report. A copy of the Design Response Spectrum, as generated by the USGS application is also included

in Appendix E. Based on this output, the following parameters may be utilized for the subject site:

2013 CBC SEISMIC DESIGN PARAMETERS

Parameter		Value
Mapped Spectral Acceleration at 0.2 sec Period	S_S	1.500
Mapped Spectral Acceleration at 1.0 sec Period	S_1	0.600
Site Class	---	D
Site Modified Spectral Acceleration at 0.2 sec Period	S_{MS}	1.500
Site Modified Spectral Acceleration at 1.0 sec Period	S_{M1}	0.900
Design Spectral Acceleration at 0.2 sec Period	S_{DS}	1.000
Design Spectral Acceleration at 1.0 sec Period	S_{D1}	0.600

Liquefaction

Liquefaction is the loss of strength in generally cohesionless, saturated soils when the pore-water pressure induced in the soil by a seismic event becomes equal to or exceeds the overburden pressure. The primary factors which influence the potential for liquefaction include groundwater table elevation, soil type and grain size characteristics, relative density of the soil, initial confining pressure, and intensity and duration of ground shaking. The depth within which the occurrence of liquefaction may impact surface improvements is generally identified as the upper 50 feet below the existing ground surface. Liquefaction potential is greater in saturated, loose, poorly graded fine sands with a mean (d_{50}) grain size in the range of 0.075 to 0.2 mm (Seed and Idriss, 1971). Clayey (cohesive) soils or soils which possess clay particles (d<0.005mm) in excess of 20 percent (Seed and Idriss, 1982) are generally not considered to be susceptible to liquefaction, nor are those soils which are above the historic static groundwater table.

The California Geological Survey (CGS) has not yet conducted detailed seismic hazards mapping in the area of the subject site. The general liquefaction susceptibility of the site was determined by research of the San Bernardino County Official Land Use Plan, General Plan, Geologic Hazard Overlay map for the Fontana Quadrangle, which is identified as Map No. FH29. This map indicates that the subject site is not located within a liquefaction hazard zone. Based on the mapping performed by the county of San Bernardino and the subsurface conditions encountered at the boring locations, liquefaction is not considered to be a design concern for this project.

6.2 Geotechnical Design Considerations

General

Artificial fill soils were encountered at some of the boring locations extending to depths of 2½± feet below the existing site grades. These fill soils possess variable strengths and compositions,

and no documentation of the placement and compaction of these fill soils has been provided. The near-surface alluvium encountered at the boring locations generally possesses variable strengths and densities. Laboratory testing indicates that some of the near-surface alluvial soils possess a minor potential for collapse when inundated with water. The fill soils and near surface alluvium, in their present condition, are not considered suitable for the support of the new site improvements.

Based on these conditions, remedial grading is considered warranted within the proposed building area in order to remove all of the undocumented fill soils and the upper portion of the near surface, native alluvium.

Settlement

The proposed remedial grading will remove the existing undocumented fill soils and a portion of the near surface native alluvium from within the proposed building area. The native soils that will remain in place below the recommended depth of overexcavation will not be subject to significant load increases from the foundations of the new structure. Therefore, following completion of the recommended remedial grading, post-construction settlements are expected to be within tolerable limits.

Expansion

The on-site soils consist of fine to medium sands and silty sands, with varying gravel content. These materials have been visually classified as very low to non-expansive. Therefore, no design considerations related to expansive soils are considered warranted for this site.

Soluble Sulfates

The results of the soluble sulfate testing indicate that the selected samples of the on-site soils contain levels of soluble sulfates that are classified as having a negligible potential to attack concrete, in accordance with the American Concrete Institute (ACI) Publication 318-05 Building Code Requirements for Structural Concrete and Commentary, Section 4.3. Therefore, no specialized concrete mix designs are considered warranted, with regard to sulfate protection. We do, however, recommend that additional sulfate testing be conducted after the completion of rough grading.

Shrinkage/Subsidence

Based on the results of the laboratory testing, removal and recompaction of the near surface fill soils and native alluvium is estimated to result in an average shrinkage of 10 to 15 percent. Minor ground subsidence is expected to occur in the soils below the zone of removal, due to settlement and machinery working. The subsidence is estimated to be 0.1± feet. This estimate may be used for grading in areas that are underlain by native alluvial soils.

These estimates are based on previous experience with projects in the vicinity of the subject site and the subsurface conditions encountered at the boring locations. The actual amount of subsidence is expected to be variable and will be dependent on the type of machinery used, repetitions of use, and dynamic effects, all of which are difficult to assess precisely.

Foundation and Grading Plan Review

Foundation and grading plans were not available at the time of this report. It is therefore recommended that we be provided with copies of all future foundation and grading plans, when they become available, for review with regard to the conclusions, recommendations, and assumptions contained within this report.

6.3 Site Grading Recommendations

The grading recommendations presented below are based on the subsurface conditions encountered at the boring and trench locations and our understanding of the proposed development. We recommend that all grading activities be completed in accordance with the Grading Guide Specifications included as Appendix D of this report, unless superseded by site-specific recommendations presented below.

Site Stripping and Demolition

Demolition of two structures and pavements present in the western portion of the site will be required. Demolition should include all foundations, floor slabs, utilities and any other subsurface improvements that will not remain in place with the new development. Concrete and asphalt debris may be crushed to a maximum 2-inch particle size, mixed with the on-site soils, and reused as compacted structural fill. It may also be feasible to crush these materials for use as crushed miscellaneous base (CMB).

Some small areas of landscaping are present in the northwest portion of the site and along the east and west property lines. Site stripping should include the removal of all vegetation and organic materials. These materials should be disposed of offsite. Where trees are removed, the removal should include any associated root masses. The actual extent of site stripping should be determined in the field by the geotechnical engineer, based on the organic content and stability of the materials encountered.

Treatment of Existing Soils: Building Pad

Overexcavation should be performed within the proposed building area to remove all of the existing undocumented fill soils and a portion of the near-surface native alluvial soils. The fill soils were determined to extend to a depth of 2½± feet below existing site grades at the boring locations. The building pad overexcavation should also extend to a depth of at least 3 feet below existing grade and to a depth of at least 3 feet below proposed pad grade throughout the building areas. Within the foundation influence zones, the overexcavation should extend to depths of at least 2 feet below proposed foundation bearing grade.

The overexcavation areas should extend at least 5 feet beyond the building and foundation perimeters, and to an extent equal to the depth of fill below the new foundations. If the proposed structure incorporates any exterior columns (such as for a canopy or overhang) the overexcavations should also encompass these areas.

Following completion of the overexcavation, the subgrade soils within the building area should be evaluated by the geotechnical engineer to verify their suitability to serve as the structural fill subgrade, as well as to support the foundation loads of the new structure. This evaluation should include proofrolling with a heavy rubber-tired vehicle to identify any soft, loose or otherwise unstable soils that must be removed. Some localized areas of deeper excavation may be required if dry, loose, porous, low density or otherwise unsuitable materials are encountered at the base of the overexcavation.

After a suitable overexcavation subgrade has been achieved, the exposed soils should be scarified to a depth of at least 12 inches, moisture treated to 2 to 4 percent above the optimum moisture content, and compacted. The previously excavated soils may then be replaced as compacted structural fill.

Treatment of Existing Soils: Retaining Walls and Site Walls

The existing soils within the areas of any proposed retaining and site walls should be overexcavated to a depth of 2 feet below foundation bearing grade and replaced as compacted structural fill as discussed above for the proposed building pad. Any undocumented fill soils within any of these foundation areas should be removed in their entirety. The overexcavation subgrade soils should be evaluated by the geotechnical engineer prior to scarifying, moisture conditioning, and recompacting the upper 12 inches of exposed subgrade soils, as discussed for the building areas. The previously excavated soils may then be replaced as compacted structural fill.

Treatment of Existing Soils: Parking Areas

Based on economic considerations, removal and replacement of the undocumented fill and collapsible alluvium is not considered warranted within the proposed parking areas. Subgrade preparation in the new parking and drive areas should initially consist of removal of all soils disturbed during site stripping. The geotechnical engineer should then evaluate the subgrade to identify any areas of additional unsuitable soils. Based on the presence of undocumented fill soils at several boring locations, it is expected that some isolated areas of additional overexcavation may be required to remove zones of lower strength, unsuitable soils. The subgrade soils should then be scarified to a depth of 12± inches, moisture conditioned to 2 to 4 percent above optimum moisture content (to a depth of at least 24 inches) and recompacted to at least 90 percent of the ASTM D-1557 maximum dry density.

The grading recommendations presented above for the proposed parking and drive areas assume that the owner and/or developer can tolerate minor amounts of settlement within the proposed parking areas. The grading recommendations presented above do not completely mitigate the extent of collapsible native soils and undocumented fill in the parking areas. As such, settlement and associated pavement distress could occur. Typically, repair of such distressed areas involves significantly lower costs than completely mitigating these soils at the time of construction.

Fill Placement

- Fill soils should be placed in thin (6± inches), near-horizontal lifts, moisture conditioned to 2 to 4 percent above the optimum moisture content, and compacted.
- On-site soils may be used for fill provided they are cleaned of any debris to the satisfaction of the geotechnical engineer. The on-site soils, especially below depths of 8± feet, possess occasional quantities of oversized material, including cobbles. Some sorting and/or crushing of these materials may be required to generate soils that are suitable for reuse as compacted structural fill.
- All grading and fill placement activities should be completed in accordance with the requirements of the CBC and the grading code of the city of Fontana.
- All fill soils should be compacted to at least 90 percent of the ASTM D-1557 maximum dry density. Fill soils should be well mixed.
- Compaction tests should be performed periodically by the geotechnical engineer as random verification of compaction and moisture content. These tests are intended to aid the contractor. Since the tests are taken at discrete locations and depths, they may not be indicative of the entire fill and therefore should not relieve the contractor of his responsibility to meet the job specifications.

Selective Grading and Oversized Material Placement

Some of the soils encountered at the boring locations possess occasional cobble content, especially at depths greater than 8± feet below the existing site grades. If the proposed grading requires excavation of cobble containing soils, it may be desirable to selectively grade the proposed building pad area. The presence of particles greater than 3 inches in diameter within the upper 1 to 3 feet of the building pad subgrade will impact the utility and foundation excavations. Depending on the depths of fills required within the proposed parking areas, it may be feasible to sort the on-site soils, placing the materials greater than 3 inches in diameter within the lower depths of the fills, and limiting the upper 1 to 3 feet of soils to materials less than 3 inches in size. Oversized materials could also be placed within the lower depths of the recommended overexcavations. In order to achieve this grading, it would likely be necessary to use rock buckets and/or rock sieves to separate the oversized materials from the remaining soil. Although such selective grading will facilitate further construction activities, it is not considered mandatory and a suitable subgrade could be achieved without such extensive sorting. However, in any case, it is recommended that all materials greater than 6 inches in size be excluded from the upper 1 foot of the surface of any compacted fills.

Consideration should also be given to using a thin clean sand layer on the finished building pad and paved areas. During completion of fine grading of the building pad, any exposed cobbles could be hand-picked and replaced with clean sand in order to provide a level cobble free finished building pad. **The placement of any oversized materials should be performed in accordance with the Grading Guide Specifications included in Appendix D of this report**. If disposal of oversized materials is required, rock blankets or windrows should be used and such areas should be observed during construction and placement by a representative of the geotechnical engineer

Imported Structural Fill

All imported structural fill should consist of very low expansive (EI < 20), well graded soils possessing at least 10 percent fines (that portion of the sample passing the No. 200 sieve). As discussed previously, imported fill for use below new flatwork should consist of very low expansive (EI < 20) material. Additional specifications for structural fill are presented in the Grading Guide Specifications, included as Appendix D.

Utility Trench Backfill

In general, all utility trench backfill should be compacted to at least 90 percent of the ASTM D-1557 maximum dry density. Compacted trench backfill should conform to the requirements of the local grading code, and more restrictive requirements may be indicated by the city of Fontana. All utility trench backfills should be witnessed by the geotechnical engineer. The trench backfill soils should be compaction tested where possible; probed and visually evaluated elsewhere.

Utility trenches which parallel a footing, and extending below a 1h:1v plane projected from the outside edge of the footing should be backfilled with structural fill soils, compacted to at least 90 percent of the ASTM D-1557 standard. Pea gravel backfill should not be used for these trenches.

6.4 Construction Considerations

Excavation Considerations

The near surface soils generally consist of silty sands and fine to coarse sands with varying gravel content and occasional cobbles. Based on their composition, minor to moderate caving of shallow excavations may occur. Where caving occurs within shallow excavations, flattened excavation slopes may be sufficient to provide excavation stability. On a preliminary basis, temporary excavations should be laid back at a slope no steeper than 2h:1v. Deeper excavations may require some form of external stabilization such as shoring or bracing. Maintaining adequate moisture content within the near surface soils will improve excavation stability. All excavation activities on this site should be conducted in accordance with Cal-OSHA regulations.

Groundwater

The static groundwater table at this site is considered to exist at a depth in excess of 30± feet. Therefore, groundwater is not expected to impact the grading or foundation construction activities.

6.5 Foundation Design and Construction

Based on the preceding grading recommendations, it is assumed that the new building pad will be underlain by structural fill soils used to replace existing undocumented fill and variable

strength, collapsible native soils. The new structural fill soils are expected to extend to a depth of at least 2 feet below foundation bearing grade underlain by existing native soils that have been densified in place. Based on this subsurface profile, the proposed structure may be supported on shallow foundations.

Foundation Design Parameters

New square and rectangular footings may be designed as follows:

- Maximum, net allowable soil bearing pressure: 3,000 lbs/ft^2.
- Minimum wall/column footing width: 14 inches/24 inches.
- Minimum longitudinal steel reinforcement within strip footings: Two (2) No. 5 rebars (1 top and 1 bottom).
- Minimum foundation embedment: 12 inches into suitable structural fill soils, and at least 18 inches below adjacent exterior grade. Interior column footings may be placed immediately beneath the floor slab.
- It is recommended that the perimeter building foundations be continuous across all exterior doorways. Any flatwork adjacent to the exterior doors should be doweled into the perimeter foundations in a manner determined by the structural engineer.

The allowable bearing pressures presented above may be increased by one-third when considering short duration wind or seismic loads. The minimum steel reinforcement recommended above is based on standard geotechnical practice. The actual design of the foundations should be determined by the structural engineer.

Foundation Construction

The foundation subgrade soils should be evaluated at the time of overexcavation, as discussed in Section 6.3 of this report. It is further recommended that the foundation subgrade soils be evaluated by the geotechnical engineer immediately prior to steel or concrete placement. Soils suitable for direct foundation support should consist of newly placed structural fill, compacted to at least 90 percent of the ASTM D-1557 maximum dry density. Any unsuitable materials should be removed to a depth of suitable bearing compacted structural fill, with the resulting excavations backfilled with compacted fill soils. As an alternative, lean concrete slurry (500 to 1,500 psi) may be used to backfill such isolated overexcavations.

The foundation subgrade soils should also be properly moisture conditioned to 2 to 4 percent above the Modified Proctor optimum, to a depth of at least 12 inches below bearing grade. Since it is typically not feasible to increase the moisture content of the floor slab and foundation subgrade soils once rough grading has been completed, care should be taken to maintain the moisture content of the building pad subgrade soils throughout the construction process.

Estimated Foundation Settlements

Post-construction total and differential settlements of shallow foundations designed and constructed in accordance with the previously presented recommendations are estimated to be less than 1.0 and 0.5 inches, respectively, under static conditions. Differential movements are expected to occur over a 30-foot span, thereby resulting in an angular distortion of less than 0.002 inches per inch.

Lateral Load Resistance

Lateral load resistance will be developed by a combination of friction acting at the base of foundations and slabs and the passive earth pressure developed by footings below grade. The following friction and passive pressure may be used to resist lateral forces:

- Passive Earth Pressure: 300 lbs/ft^3
- Friction Coefficient: 0.30

These are allowable values, and include a factor of safety. When combining friction and passive resistance, the passive pressure component should be reduced by one-third. These values assume that footings will be poured directly against compacted structural fill. The maximum allowable passive pressure is 3000 lbs/ft^2.

6.6 Floor Slab Design and Construction

Subgrades which will support new floor slabs should be prepared in accordance with the recommendations contained in the ***Site Grading Recommendations*** section of this report. Based on the anticipated grading which will occur at this site, the floors of the proposed structures may be constructed as conventional slabs on grade supported on newly placed structural fill, extending to a depth of at least 3 feet below finished pad grade. Based on geotechnical considerations, the floor slabs may be designed as follows:

- Minimum slab thickness: 5 inches

- Minimum slab reinforcement: Not required for geotechnical considerations. The actual floor slab reinforcement should be determined by the structural engineer, based on the imposed loading.

- Modulus of subgrade reaction: 150 psi/inch

- Slab underlayment: If moisture sensitive floor coverings will be used, the minimum slab underlayment should consist of a moisture vapor barrier constructed below the entire area of the proposed slab where such moisture sensitive floor coverings are anticipated. The moisture vapor barrier should meet or exceed the Class A rating as defined by ASTM E 1745-97 and have a permeance rating less than 0.01 perms as described in ASTM E 96-95 and ASTM E 154-88. The moisture vapor barrier should be properly constructed in accordance with all applicable manufacturer specifications. Given that a rock free subgrade is anticipated and that a capillary break is not required, sand below

the barrier is not required. The need for sand and/or the amount of sand above the moisture vapor barrier should be specified by the structural engineer or concrete contractor. The selection of sand above the barrier is not a geotechnical engineering issue and hence outside our purview. Where moisture sensitive floor coverings are not anticipated, the vapor barrier may be eliminated.

- Moisture condition the floor slab subgrade soils to 2 to 4 percent above the Modified Proctor optimum moisture content, to a depth of 24 inches. The moisture content of the floor slab subgrade soils should be verified by the geotechnical engineer within 24 hours prior to concrete placement.

- Proper concrete curing techniques should be utilized to reduce the potential for slab curling or the formation of excessive shrinkage cracks.

The actual design of the floor slab should be completed by the structural engineer to verify adequate thickness and reinforcement.

6.7 Retaining Wall Design and Construction

Although not indicated on the site plan, some small (less than 3 to 5± feet in height) retaining walls may be required to facilitate the new site grades. It is also expected that some retaining walls will be required in the new loading dock areas. The parameters recommended for use in the design of these walls are presented below.

Retaining Wall Design Parameters

Based on the soil conditions encountered at the boring locations, the following parameters may be used in the design of new retaining walls for this site. We have provided parameters assuming the use of on-site soils for retaining wall backfill. The on-site soils generally consist of silty sands and fine to coarse sands with varying gravel content. Based on their classification, these materials are expected to possess a friction angle of at least 32 degrees.

If desired, SCG could provide design parameters for an alternative select backfill material behind the retaining walls. The use of select backfill material could result in lower lateral earth pressures. In order to use the design parameters for the imported select fill, this material must be placed within the entire active failure wedge. This wedge is defined as extending from the heel of the retaining wall upwards at an angle of approximately 60° from horizontal. If select backfill material behind the retaining wall is desired, SCG should be contacted for supplementary recommendations.

RETAINING WALL DESIGN PARAMETERS

Design Parameter		Soil Type
		On-site Sandy Soils
Internal Friction Angle (ϕ)		32°
Unit Weight		125 lbs/ft^3
Equivalent Fluid Pressure:	Active Condition (level backfill)	35 lbs/ft^3
	Active Condition (2h:1v backfill)	59 lbs/ft^3
	At-Rest Condition (level backfill)	59 lbs/ft^3

The walls should be designed using a soil-footing coefficient of friction of 0.30 and an equivalent passive pressure of 300 lbs/ft^3. The structural engineer should incorporate appropriate factors of safety in the design of the retaining walls.

The active earth pressure may be used for the design of retaining walls that do not directly support structures or support soils that in turn support structures and which will be allowed to deflect. The at-rest earth pressure should be used for walls that will not be allowed to deflect such as those which will support foundation bearing soils, or which will support foundation loads directly.

Where the soils on the toe side of the retaining wall are not covered by a "hard" surface such as a structure or pavement, the upper 1 foot of soil should be neglected when calculating passive resistance due to the potential for the material to become disturbed or degraded during the life of the structure.

Seismic Lateral Earth Pressures

In accordance with the 2013 CBC, any retaining walls more than 6 feet in height must be designed for seismic lateral earth pressures. If walls 6 feet or more are required for this site, the geotechnical engineer should be contacted for supplementary seismic lateral earth pressure recommendations.

Retaining Wall Foundation Design

The foundation subgrade soils for the new retaining should be prepared in accordance with the grading recommendations presented in Section 6.3 of this report.

Backfill Material

On-site soils may be used to backfill the retaining walls. However, all backfill material placed within 3 feet of the back wall face should have a particle size no greater than 3 inches. The retaining wall backfill materials should be well graded.

It is recommended that a properly installed prefabricated drainage composite such as the MiraDRAIN 6000XL (or approved equivalent), which is specifically designed for use behind retaining walls be used. If the drainage composite material is not covered by an impermeable surface, such as a structure or pavement, a 12-inch thick layer of a low permeability soil should be placed over the backfill to reduce surface water migration to the underlying soils. The drainage composite should be separated from the backfill soils by a suitable geotextile, approved by the geotechnical engineer.

All retaining wall backfill should be placed and compacted under engineering controlled conditions in the necessary layer thicknesses to ensure an in-place density between 90 and 93 percent of the maximum dry density as determined by the Modified Proctor test (ASTM D1557). Care should be taken to avoid over-compaction of the soils behind the retaining walls, and the use of heavy compaction equipment should be avoided.

Subsurface Drainage

As previously indicated, the retaining wall design parameters are based upon drained backfill conditions. Consequently, some form of permanent drainage system will be necessary in conjunction with the appropriate backfill material. Subsurface drainage may consist of either:

- A weep hole drainage system typically consisting of a series of 4-inch diameter holes in the wall situated slightly above the ground surface elevation on the exposed side of the wall and at an approximate 8-foot on-center spacing. The weep holes should include a 2 cubic foot pocket of open graded gravel, surrounded by an approved geotextile fabric, at each weep hole location.

- A 4-inch diameter perforated pipe surrounded by 2 cubic feet of gravel per linear foot of drain placed behind the wall, above the retaining wall footing. The gravel layer should be wrapped in a suitable geotextile fabric to reduce the potential for migration of fines. The footing drain should be extended to daylight or tied into a storm drainage system.

6.8 Pavement Design Parameters

Site preparation in the pavement area should be completed as previously recommended in the ***Site Grading Recommendations*** section of this report. The subsequent pavement recommendations assume proper drainage and construction monitoring, and are based on either PCA or CALTRANS design parameters for a twenty (20) year design period. However, these designs also assume a routine pavement maintenance program to obtain the anticipated 20-year pavement service life.

Pavement Subgrades

It is anticipated that the new pavements will be primarily supported on a layer of compacted structural fill, consisting of scarified, thoroughly moisture conditioned and recompacted existing soils. The on-site soils generally consist of silty sands and sands with varying gravel content. Based on the results of R-value testing, these materials to possess an R-value of 58. The

subsequent pavement design is based upon an R-value of 50. Any fill material imported to the site should have support characteristics equal to or greater than that of the on-site soils and be placed and compacted under engineering controlled conditions. It is recommended that additional R-value testing be performed after completion of rough grading to verify the pavement support characteristics of the pavement subgrades following site grading.

Asphaltic Concrete

Presented below are the recommended thicknesses for new flexible pavement structures consisting of asphaltic concrete over a granular base. The pavement designs are based on the traffic indices (TI's) indicated. The client and/or civil engineer should verify that these TI's are representative of the anticipated traffic volumes. If the client and/or civil engineer determine that the expected traffic volume will exceed the applicable traffic index, we should be contacted for supplementary recommendations. The design traffic indices equate to the following approximate daily traffic volumes over a 20 year design life, assuming six operational traffic days per week.

Traffic Index	No. of Heavy Trucks per Day
4.0	0
5.0	1
6.0	3
7.0	11
8.0	35

For the purpose of the traffic volumes indicated above, a truck is defined as a 5-axle tractor trailer unit with one 8-kip axle and two 32-kip tandem axles. All of the traffic indices allow for 1,000 automobiles per day.

ASPHALT PAVEMENTS (R = 50)					
Materials	**Thickness (inches)**				
	Parking Stalls (TI = 4.0)	Auto Drive Lanes (TI = 5.0)	Light Truck Traffic (TI = 6.0)	Moderate Truck Traffic (TI = 7.0)	Heavy Truck Traffic (TI = 8.0)
Asphalt Concrete	3	3	3½	4	5
Aggregate Base	3	3	4	5	5
Compacted Subgrade	12	12	12	12	12

The aggregate base course should be compacted to at least 95 percent of the ASTM D-1557 maximum dry density. The asphaltic concrete should be compacted to at least 95 percent of the Marshall maximum density, as determined by ASTM D-2726. The aggregate base course may consist of crushed aggregate base (CAB) or crushed miscellaneous base (CMB), which is a recycled gravel, asphalt and concrete material. The gradation, R-Value, Sand Equivalent, and Percentage Wear of the CAB or CMB should comply with appropriate specifications contained in the current edition of the "Greenbook" Standard Specifications for Public Works Construction.

Portland Cement Concrete

The preparation of the subgrade soils within Portland cement concrete pavement areas should be performed as previously described for proposed asphalt pavement areas. The minimum recommended thicknesses for the Portland Cement Concrete pavement sections are as follows:

PORTLAND CEMENT CONCRETE PAVEMENTS (R = 50)				
Materials	**Thickness (inches)**			
	Automobile Parking and Drive Areas	Light Truck Traffic Areas (TI =6.0)	Moderate Truck Traffic Areas (TI =7.0)	Heavy Truck Traffic Areas (TI =8.0)
PCC	5	5	6	7
Compacted Subgrade (95% minimum compaction)	12	12	12	12

The concrete should have a 28-day compressive strength of at least 3,000 psi. Reinforcing within all pavements should be designed by the structural engineer. The maximum joint spacing within all of the PCC pavements is recommended to be equal to or less than 30 times the pavement thickness. The actual joint spacing and reinforcing of the Portland cement concrete pavements should be determined by the structural engineer.

7.0 GENERAL COMMENTS

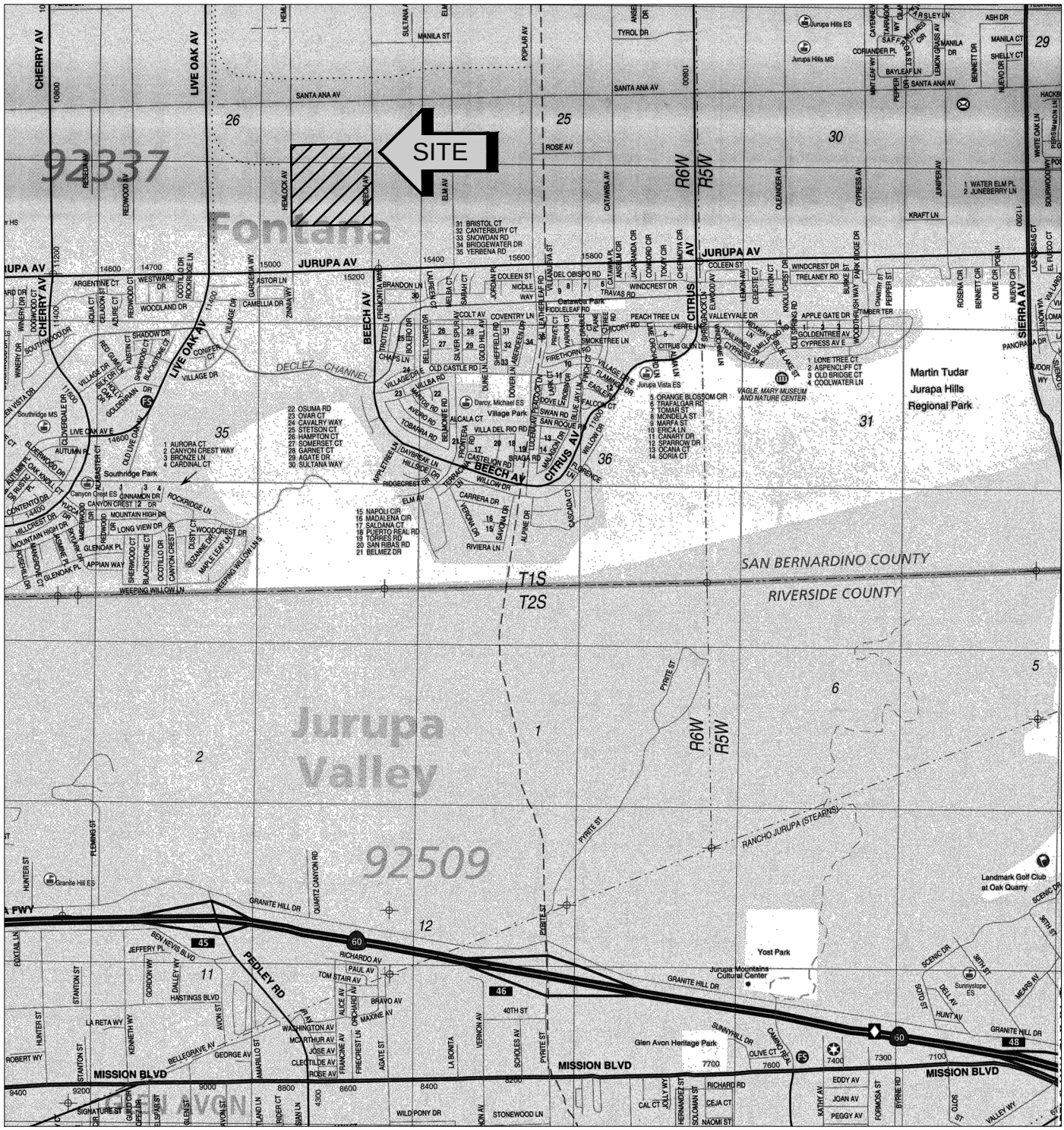
This report has been prepared as an instrument of service for use by the client, in order to aid in the evaluation of this property and to assist the architects and engineers in the design and preparation of the project plans and specifications. This report may be provided to the contractor(s) and other design consultants to disclose information relative to the project. However, this report is not intended to be utilized as a specification in and of itself, without appropriate interpretation by the project architect, civil engineer, and/or structural engineer. The reproduction and distribution of this report must be authorized by the client and Southern California Geotechnical, Inc. Furthermore, any reliance on this report by an unauthorized third party is at such party's sole risk, and we accept no responsibility for damage or loss which may occur. The client(s)' reliance upon this report is subject to the Engineering Services Agreement, incorporated into our proposal for this project.

The analysis of this site was based on a subsurface profile interpolated from limited discrete soil samples. While the materials encountered in the project area are considered to be representative of the total area, some variations should be expected between boring locations and sample depths. If the conditions encountered during construction vary significantly from those detailed herein, we should be contacted immediately to determine if the conditions alter the recommendations contained herein.

This report has been based on assumed or provided characteristics of the proposed development. It is recommended that the owner, client, architect, structural engineer, and civil engineer carefully review these assumptions to ensure that they are consistent with the characteristics of the proposed development. If discrepancies exist, they should be brought to our attention to verify that they do not affect the conclusions and recommendations contained herein. We also recommend that the project plans and specifications be submitted to our office for review to verify that our recommendations have been correctly interpreted.

The analysis, conclusions, and recommendations contained within this report have been promulgated in accordance with generally accepted professional geotechnical engineering practice. No other warranty is implied or expressed.

APPENDIX A



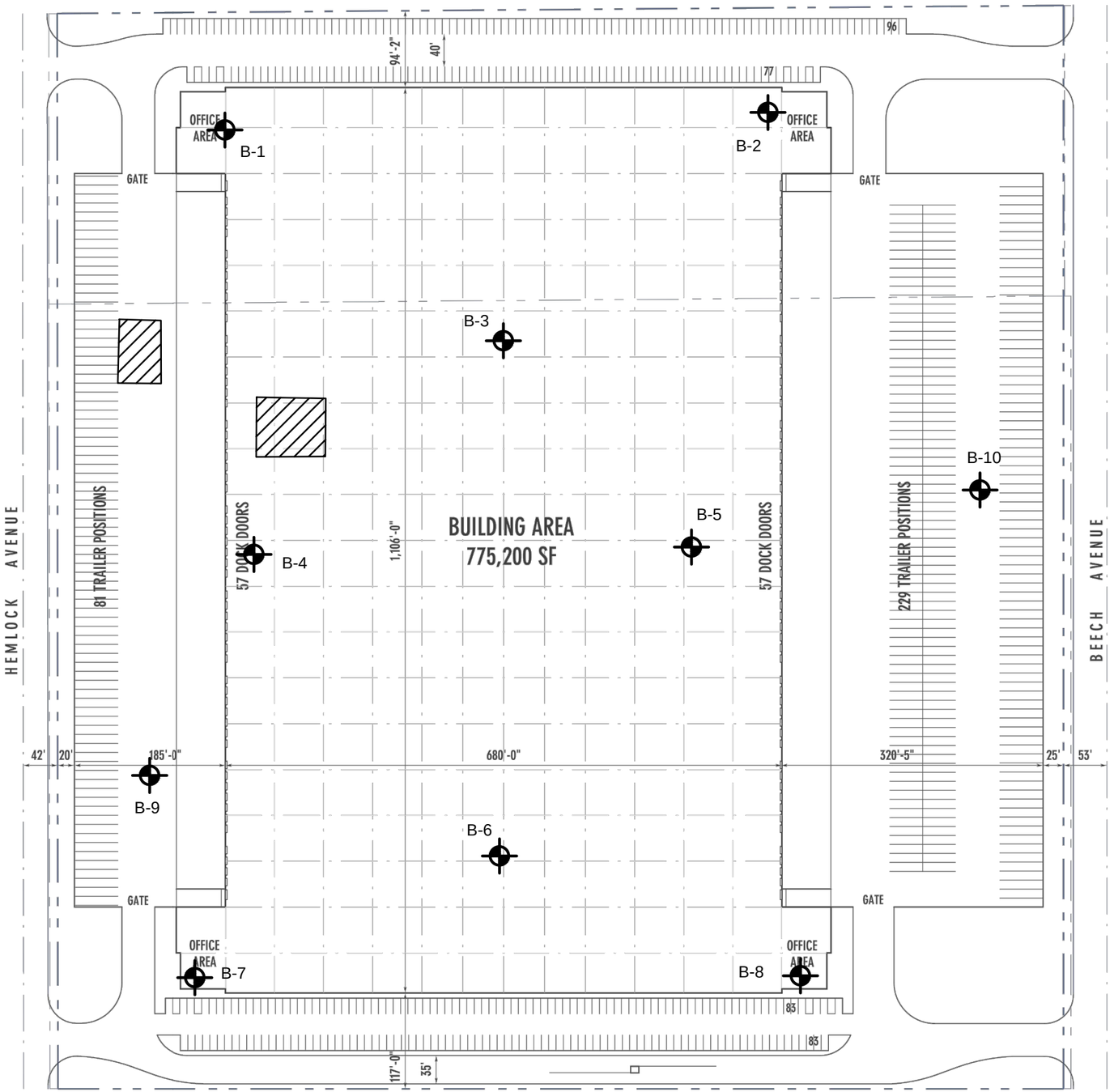
SOURCE: SAN BERNARDINO COUNTY
THOMAS GUIDE, 2013

SITE LOCATION MAP

PROPOSED COMMERCIAL/INDUSTRIAL BUILDING
FONTANA, CALIFORNIA

SCALE: 1" = 2400'	
DRAWN: JL CHKD: JAS	
SCG PROJECT 15G177-1	
PLATE 1	

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL



NORTH

SoCalGeo

GEOTECHNICAL LEGEND

APPROXIMATE BORING LOCATION

EXISTING BUILDING TO BE DEMOLISHED

NOTE: BASE MAP PREPARED BY RGA

BORING LOCATION PLAN

PROPOSED COMMERCIAL/INDUSTRIAL BUILDING

FONTANA, CALIFORNIA

SCALE: 1" = 150'

DRAWN: JL
CHKD: JAS

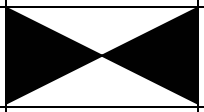
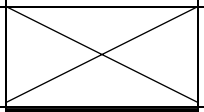
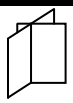
SCG PROJECT 15G177-1

PLATE 2

SOUTHERN CALIFORNIA GEOTECHNICAL

APPENDIX B

BORING LOG LEGEND

SAMPLE TYPE	GRAPHICAL SYMBOL	SAMPLE DESCRIPTION
AUGER		SAMPLE COLLECTED FROM AUGER CUTTINGS, NO FIELD MEASUREMENT OF SOIL STRENGTH. (DISTURBED)
CORE		ROCK CORE SAMPLE: TYPICALLY TAKEN WITH A DIAMOND-TIPPED CORE BARREL. TYPICALLY USED ONLY IN HIGHLY CONSOLIDATED BEDROCK.
GRAB		SOIL SAMPLE TAKEN WITH NO SPECIALIZED EQUIPMENT, SUCH AS FROM A STOCKPILE OR THE GROUND SURFACE. (DISTURBED)
CS		CALIFORNIA SAMPLER: 2-1/2 INCH I.D. SPLIT BARREL SAMPLER, LINED WITH 1-INCH HIGH BRASS RINGS. DRIVEN WITH SPT HAMMER. (RELATIVELY UNDISTURBED)
NSR		NO RECOVERY: THE SAMPLING ATTEMPT DID NOT RESULT IN RECOVERY OF ANY SIGNIFICANT SOIL OR ROCK MATERIAL.
SPT		STANDARD PENETRATION TEST: SAMPLER IS A 1.4 INCH INSIDE DIAMETER SPLIT BARREL, DRIVEN 18 INCHES WITH THE SPT HAMMER. (DISTURBED)
SH		SHELBY TUBE: TAKEN WITH A THIN WALL SAMPLE TUBE, PUSHED INTO THE SOIL AND THEN EXTRACTED. (UNDISTURBED)
VANE		VANE SHEAR TEST: SOIL STRENGTH OBTAINED USING A 4 BLADED SHEAR DEVICE. TYPICALLY USED IN SOFT CLAYS-NO SAMPLE RECOVERED.

COLUMN DESCRIPTIONS

DEPTH: Distance in feet below the ground surface.

SAMPLE: Sample Type as depicted above.

BLOW COUNT: Number of blows required to advance the sampler 12 inches using a 140 lb hammer with a 30-inch drop. 50/3" indicates penetration refusal (>50 blows) at 3 inches. WH indicates that the weight of the hammer was sufficient to push the sampler 6 inches or more.

POCKET PEN.: Approximate shear strength of a cohesive soil sample as measured by pocket penetrometer.

GRAPHIC LOG: Graphic Soil Symbol as depicted on the following page.

DRY DENSITY: Dry density of an undisturbed or relatively undisturbed sample in lbs/ft^3.

MOISTURE CONTENT: Moisture content of a soil sample, expressed as a percentage of the dry weight.

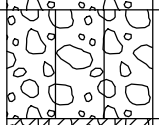
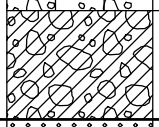
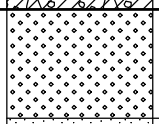
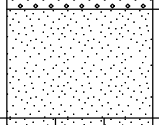
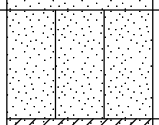
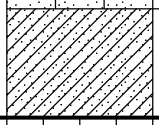
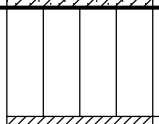
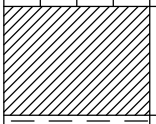
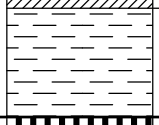
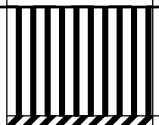
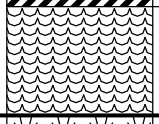
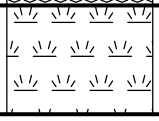
LIQUID LIMIT: The moisture content above which a soil behaves as a liquid.

PLASTIC LIMIT: The moisture content above which a soil behaves as a plastic.

PASSING #200 SIEVE: The percentage of the sample finer than the #200 standard sieve.

UNCONFINED SHEAR: The shear strength of a cohesive soil sample, as measured in the unconfined state.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-1

JOB NO.: 15G177 | DRILLING DATE: 8/6/15 | WATER DEPTH: Dry
PROJECT: Proposed Comm/Industrial Bldg | DRILLING METHOD: Hollow Stem Auger | CAVE DEPTH: 15 feet
LOCATION: Fontana, California | LOGGED BY: Matt Manni | READING TAKEN: At Completion

DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					6½ inches Asphaltic concrete, no discernible Aggregate base							
		35			FILL: Light Gray Brown fine Sand, trace Silt, trace fine Gravel, trace medium to coarse Sand, mottled, medium dense-damp	112	6					
		59			ALLUVIUM: Brown Silty fine Sand, trace medium to coarse Sand, trace fine to coarse Gravel, occasional Cobbles, dense-damp		6					Disturbed Sample
5		46			Gray Silty fine Sand, trace medium to coarse Sand, dense-moist	112	8					
					Light Gray fine to coarse Sand, trace Silt, trace fine Gravel, dense-dry to damp	101	2					
		48				100	2					
		19			Gray Brown Silty fine Sand, trace medium Sand, abundant Iron oxide staining, medium dense-moist	98	10					
10												
		13			@ 13½ to 15 feet, slightly porous, very moist		16					
15												
					Gray fine to coarse Sand, trace Silt, little fine to coarse Gravel, occasional Cobbles, dense-damp							
		69					3					
20												
					Gray Brown fine Sandy Silt, trace Clay, trace Iron oxide staining, dense-very moist							
		48					23					
25												
					Gray Brown fine Sand, trace medium to coarse Sand, trace fine Gravel, trace Silt, very dense-damp							
		70/10"					4					
30												
					Boring Terminated at 30'							

TBL 15G177.GPJ SOCALGEO.GDT 9/4/15

TEST BORING LOG **PLATE B-1**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-2

JOB NO.: 15G177 | DRILLING DATE: 8/6/15 | WATER DEPTH: Dry
PROJECT: Proposed Comm/Industrial Bldg | DRILLING METHOD: Hollow Stem Auger | CAVE DEPTH: 11 feet
LOCATION: Fontana, California | LOGGED BY: Matt Manni | READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					3 inches Crushed Miscellaneous base							
		62			FILL: Light Gray fine Sand, little Silt, trace medium to coarse Sand, trace fine Gravel, mottled, dense-dry to damp	110	2					
		42			ALLUVIUM: Gray Brown Silty fine Sand, trace medium to coarse Sand, trace Iron oxide staining, medium dense-damp	113	5					
5		54			Gray Silty fine Sand, trace medium to coarse Sand, dense-moist	108	7					
		76			Gray Brown Silty fine Sand, little medium to coarse Sand, trace fine Gravel, occasional Cobbles, very dense-damp to moist	121	5					
		50			@ 9 to 9½ feet, dense	107	7					
10					Brown fine to medium Sand, trace coarse Sand, trace fine Gravel, dense-damp	111	5					
		45			Light Gray fine to coarse Sand, trace fine to coarse Gravel, trace Silt, dense-dry		1					
15												
		15			Gray Brown fine Sandy Silt, trace calcareous veining, trace Iron oxide staining, medium dense-moist		13					
20												
		18			Brown Silty fine Sand, trace medium to coarse Sand, abundant Iron oxide staining, medium dense-moist		8					
25					Boring Terminated at 25'							

TBL 15G177.GPJ SOCALGEO.GDT 9/4/15

TEST BORING LOG **PLATE B-2**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-3

JOB NO.: 15G177 | DRILLING DATE: 8/6/15 | WATER DEPTH: Dry
PROJECT: Proposed Comm/Industrial Bldg | DRILLING METHOD: Hollow Stem Auger | CAVE DEPTH: 6 feet
LOCATION: Fontana, California | LOGGED BY: Matt Manni | READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					4 inches Crushed Miscellaneous base							
		50			ALLUVIUM: Light Gray Gravelly fine to coarse Sand, trace Silt, occasional Cobbles, dense-dry to damp		2					
		47			Gray fine to coarse Sand, trace Silt, trace fine to coarse Gravel, medium dense to dense-dry to damp		3					
5		45					2					
		25					2					
10					Gray Brown Silty fine Sand, trace calcareous veining, medium dense-moist		7					
					Gray fine to coarse Sand, trace calcareous veining, occasional Cobbles, medium dense-dry to damp							
		44					2					
15					Boring Terminated at 15'							

TBL 15G177.GPJ SOCALGEO.GDT 9/4/15

TEST BORING LOG **PLATE B-3**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-4

JOB NO.: 15G177 | DRILLING DATE: 8/6/15 | WATER DEPTH: Dry
PROJECT: Proposed Comm/Industrial Bldg | DRILLING METHOD: Hollow Stem Auger | CAVE DEPTH: 6 feet
LOCATION: Fontana, California | LOGGED BY: Matt Manni | READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					4 inches Crushed Miscellaneous base							
		49			ALLUVIUM: Light Gray fine to medium Sand, little coarse Sand little fine to coarse Gravel, trace Silt, dense-dry to damp		2					
		26			Light Gray Brown fine to coarse Sand, little fine to coarse Gravel, medium dense-dry		2					
5		17			Gray Brown fine Sand, trace Silt, medium dense-damp		4					
		34			Gray fine to medium Sand, little coarse Sand, trace Silt, trace fine to coarse Gravel, occasional Cobbles, dense-dry to damp		2					
10												
					Gray Brown fine Sandy Silt, abundant Iron oxide staining, medium dense-moist to very moist							
		16					14					
15												
		27					28					
					Gray Brown Silty fine Sand, abundant Iron oxide staining, medium dense-moist		7					
20												
					Boring Terminated at 20'							

TBL 15G177.GPJ SOCALGEO.GDT 9/4/15

TEST BORING LOG **PLATE B-4**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-5

JOB NO.: 15G177 | DRILLING DATE: 8/6/15 | WATER DEPTH: Dry
PROJECT: Proposed Comm/Industrial Bldg | DRILLING METHOD: Hollow Stem Auger | CAVE DEPTH: 8 feet
LOCATION: Fontana, California | LOGGED BY: Matt Manni | READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					3 inches Crushed Miscellaneous base							
		36			ALLUVIUM: Gray fine Sand, little Silt, trace medium to coarse Sand, dense-damp		5					
		13			Gray Brown Silty fine Sand, medium dense-very moist		17					
5					Gray fine Sand, trace Silt, medium dense-damp		4					
		12			Gray Brown Silty fine Sand, trace Iron oxide staining, medium dense-moist		9					
		14					8					
10												
		16					9					
15												
		29			Light Gray Brown Silty fine to medium Sand, little coarse Sand, trace fine to coarse Gravel, medium dense-damp to moist		6					
20					Boring Terminated at 20'							

TBL 15G177.GPJ SOCALGEO.GDT 9/4/15

TEST BORING LOG **PLATE B-5**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-6

JOB NO.: 15G177 | DRILLING DATE: 8/6/15 | WATER DEPTH: Dry
PROJECT: Proposed Comm/Industrial Bldg | DRILLING METHOD: Hollow Stem Auger | CAVE DEPTH: 5 feet
LOCATION: Fontana, California | LOGGED BY: Matt Manni | READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					3 inches Crushed Miscellaneous base							
		32			ALLUVIUM: Light Gray fine to medium Sand, little coarse Sand, trace fine to coarse Gravel, trace Silt, dense-dry		1					
		24			Gray Brown fine to medium Sand, trace coarse Sand, trace fine Gravel, medium dense-dry to damp		2					
5		25			@ 6 to 12 feet, little coarse Sand, trace fine to coarse Gravel		2					
		47			@ 8½ to 10 feet, occasional Cobbles		2					
10												
		19			Gray Brown fine Sand, little medium to coarse Sand, trace fine to coarse Gravel, trace Silt, medium dense-damp		4					
15					Boring Terminated at 15'							

TBL 15G177.GPJ SOCALGEO.GDT 9/4/15

TEST BORING LOG

PLATE B-6

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-7

JOB NO.: 15G177 | DRILLING DATE: 8/6/15 | WATER DEPTH: Dry
PROJECT: Proposed Comm/Industrial Bldg | DRILLING METHOD: Hollow Stem Auger | CAVE DEPTH: 12 feet
LOCATION: Fontana, California | LOGGED BY: Matt Manni | READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					4 inches Crushed Miscellaneous base							
		18			ALLUVIUM: Light Brown Silty fine Sand, medium dense-moist	100	7					
		22			Light Gray Brown fine Sand, trace Silt, medium dense-damp	110	4					
5		27			@ 5 to 6 feet, trace medium Sand	102	3					
		39			Gray fine to medium Sand, little coarse Sand, trace fine to coarse Gravel, trace Silt, occasional Cobbles, dense-damp	114	5					
		20			Light Gray fine Sand, trace Silt, medium dense-damp to moist	94	6					
10												
					Gray Brown fine to coarse Sand, trace Silt, little fine Gravel, medium dense-damp							
		28					3					
					Gray Brown Silty fine Sand, trace Iron oxide staining, trace medium Sand, medium dense-moist		9					
15												
					Light Gray Brown Gravelly fine to coarse Sand, trace Silt, occasional Cobbles, very dense-dry to damp							
		81					2					
20												
		57					3					
25												
					Boring Terminated at 25'							

TBL 15G177.GPJ SOCALGEO.GDT 9/4/15

TEST BORING LOG **PLATE B-7**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-8

JOB NO.: 15G177 | DRILLING DATE: 8/6/15 | WATER DEPTH: Dry
PROJECT: Proposed Comm/Industrial Bldg | DRILLING METHOD: Hollow Stem Auger | CAVE DEPTH: 12 feet
LOCATION: Fontana, California | LOGGED BY: Matt Manni | READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					3 inches Crushed Miscellaneous base							
		35			FILL: Gray Brown fine Sand, little Silt, trace medium to coarse Sand, trace fine to coarse Gravel, trace Iron oxide staining, mottled, medium dense-damp	108	5					
		29			ALLUVIUM: Gray Brown Silty fine Sand, trace medium to coarse Sand, abundant Iron oxide stianing, medium dense-moist	119	9					
5		20			Gray Silty fine Sand, trace medium to coarse Sand, trace Iron oxide staining, medium dense-damp to moist	111	6					
		25				113 106	4 7					
		44			Light Gray fine to coarse Sand, trace fine to coarse Gravel, trace Silt, occasional Cobbles, medium dense-dry to damp		2					
10												
		49			Gray Brown fine to medium Sand, trace fine Gravel, trace coarse Sand, dense-dry to damp		2					
15												
		84/10"			Light Gray Gravelly fine to coarse Sand, trace Silt, occasional Cobbles, very dense-damp		3					
20												
		79/11"					3					
25												
		70/11"			Light Gray Brown fine to coarse Sandy Gravel, trace Silt, occasional Cobbles, very dense-damp		4					
30												
					Boring Terminated at 30'							

TBL 15G177.GPJ SOCALGEO.GDT 9/4/15

TEST BORING LOG

PLATE B-8

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-9

JOB NO.: 15G177 | DRILLING DATE: 8/6/15 | WATER DEPTH: Dry
PROJECT: Proposed Comm/Industrial Bldg | DRILLING METHOD: Hollow Stem Auger | CAVE DEPTH: 2 feet
LOCATION: Fontana, California | LOGGED BY: Matt Manni | READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					4 inches Crushed Miscellaneous base							
		41			ALLUVIUM: Light Gray Gravelly fine to coarse Sand, trace Silt, dense-dry to damp		2					
		87/11"					2					
5					Boring Terminated at 5'							

TBL 15G177.GPJ SOCALGEO.GDT 9/4/15

TEST BORING LOG **PLATE B-9**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-10

JOB NO.: 15G177 | DRILLING DATE: 8/6/15 | WATER DEPTH: Dry
PROJECT: Proposed Comm/Industrial Bldg | DRILLING METHOD: Hollow Stem Auger | CAVE DEPTH: 2 feet
LOCATION: Fontana, California | LOGGED BY: Matt Manni | READING TAKEN: At Completion

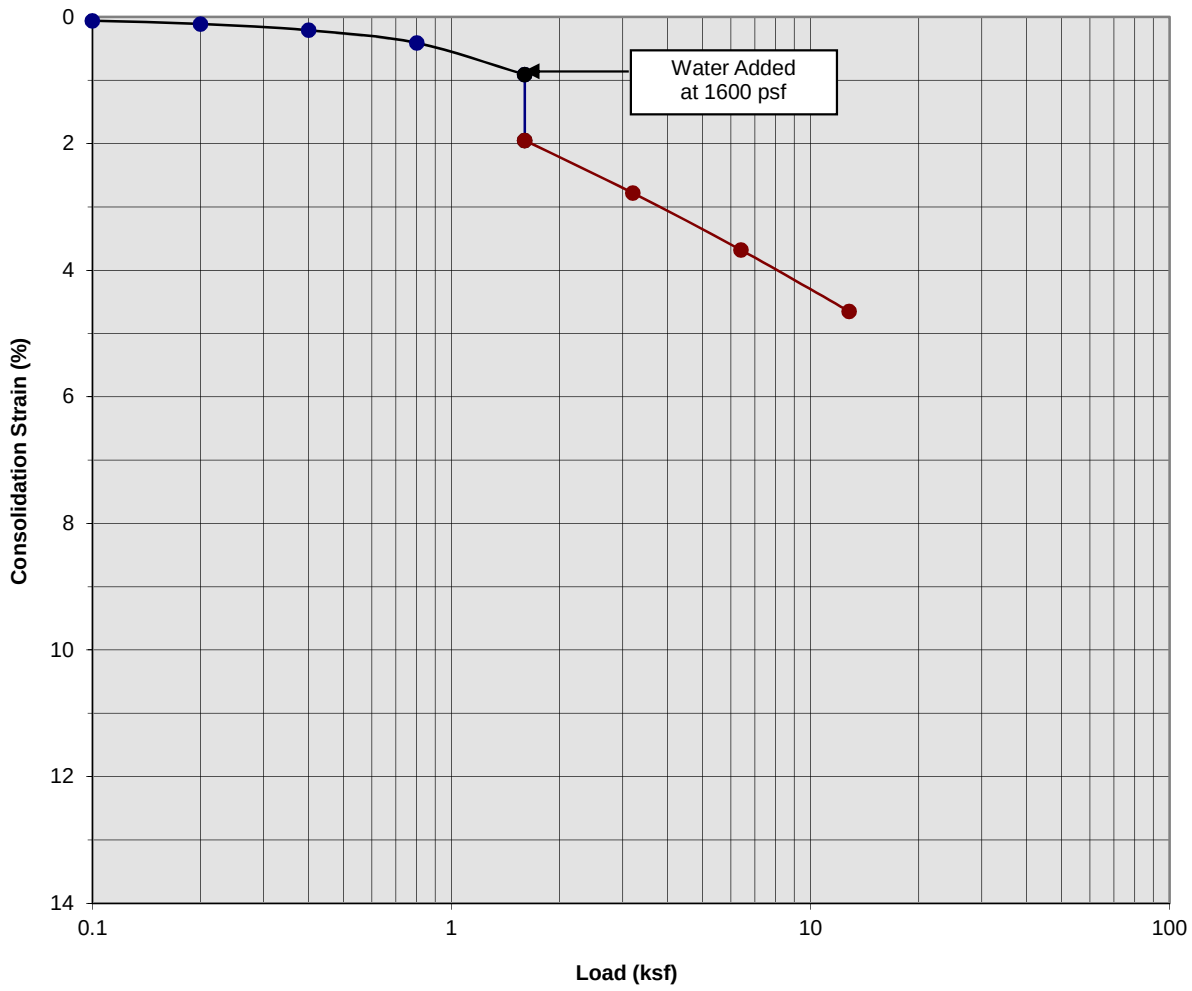
FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					4 inches Crushed Miscellaneous base							
		26			ALLUVIUM: Gray Brown Silty fine Sand, trace medium to coarse Sand, trace Iron oxide staining, medium dense-damp to moist		7					
		11					6					
5					Boring Terminated at 5'							

TBL 15G177.GPJ SOCALGEO.GDT 9/4/15

TEST BORING LOG **PLATE B-10**

APPENDIX C

Consolidation/Collapse Test Results



Classification: Gray Brown Silty fine Sand, trace medium to coarse Sand

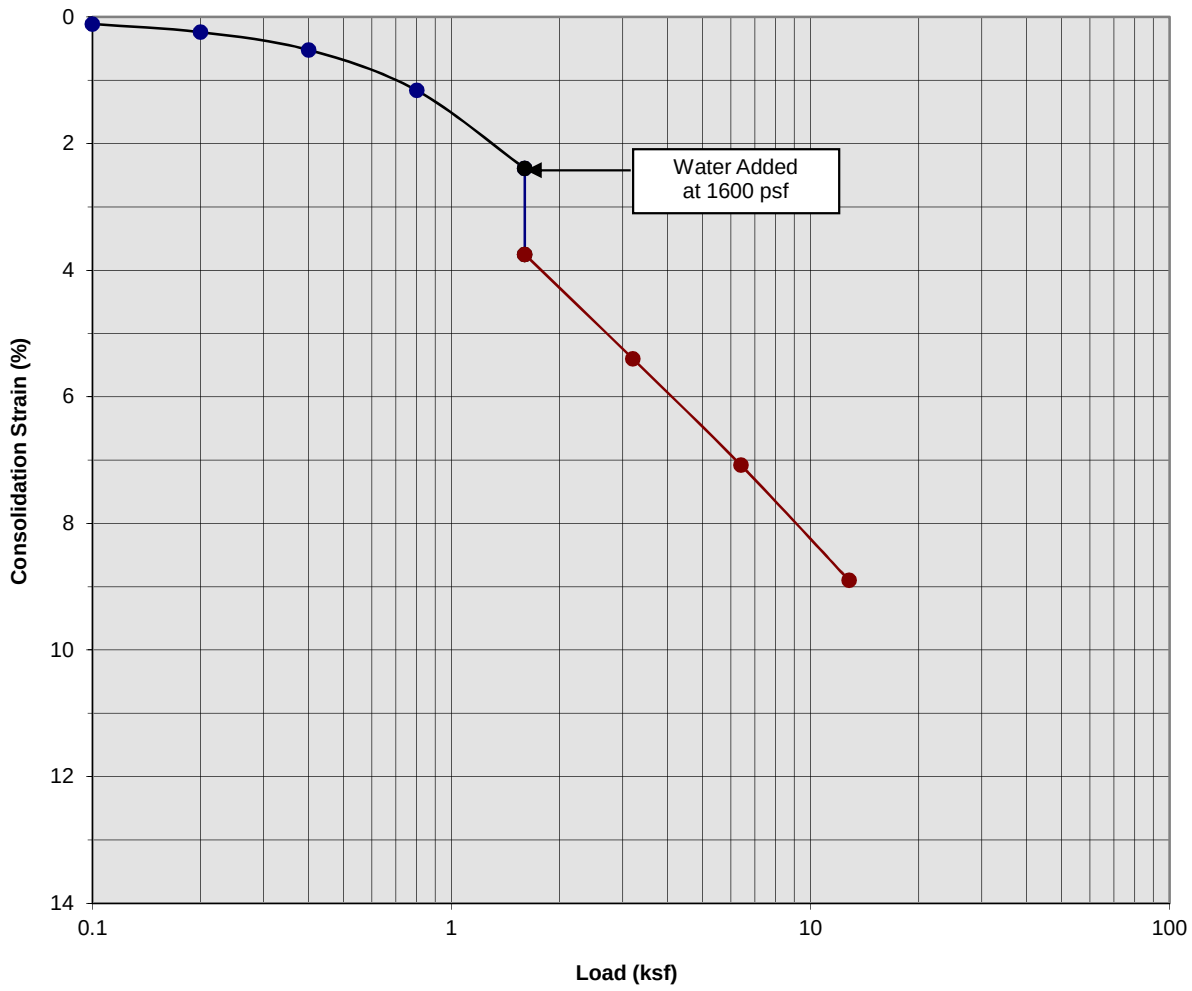
Boring Number:	B-2	Initial Moisture Content (%)	5
Sample Number:	---	Final Moisture Content (%)	12
Depth (ft)	3 to 4	Initial Dry Density (pcf)	113.8
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	118.4
Specimen Thickness (in)	1.0	Percent Collapse (%)	1.04

Proposed Comm/Industrial Bldg
Fontana, California
Project No. 15G177

PLATE C- 1

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Consolidation/Collapse Test Results



Classification: Gray Silty fine Sand, trace medium to coarse Sand

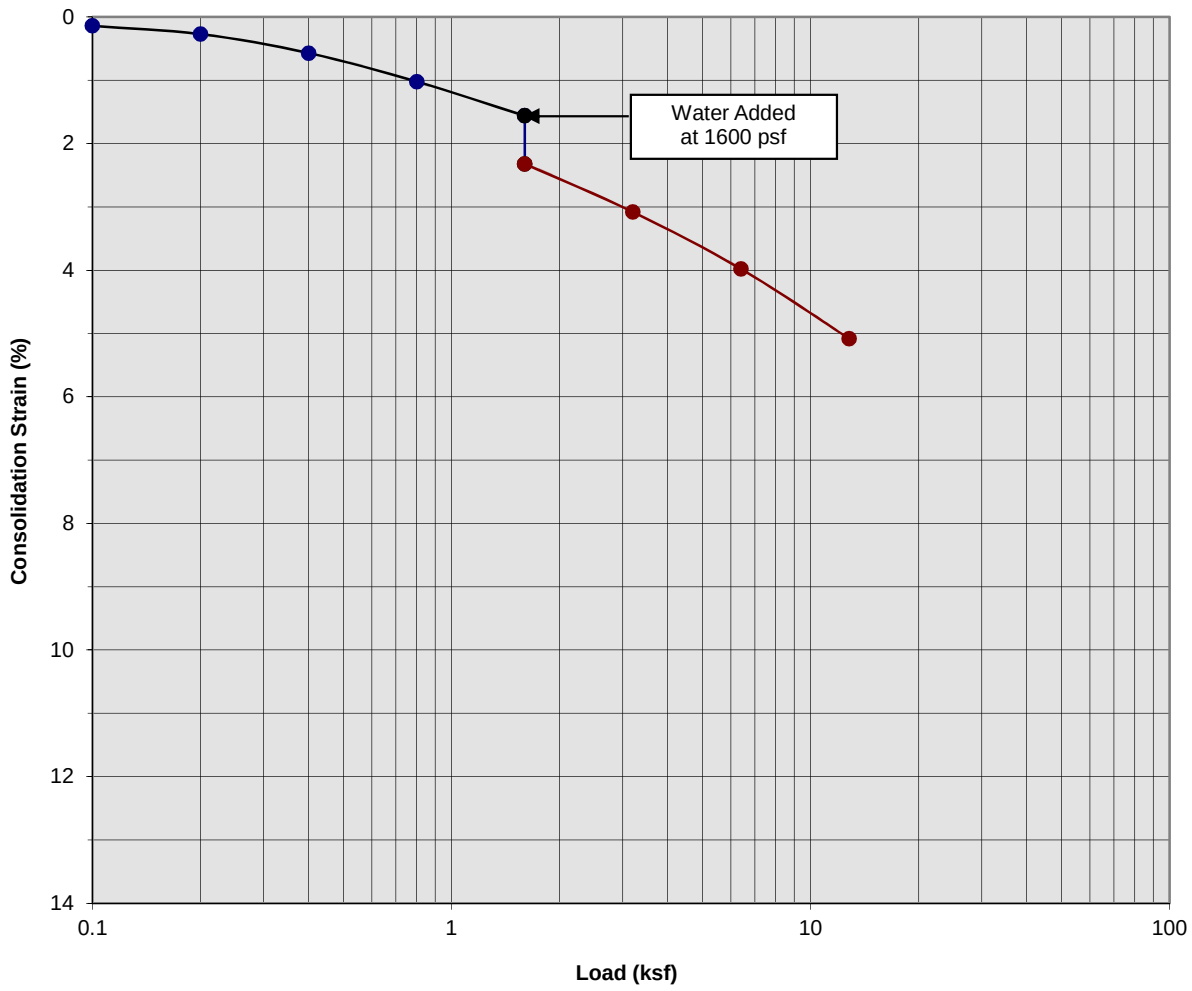
Boring Number:	B-2	Initial Moisture Content (%)	7
Sample Number:	---	Final Moisture Content (%)	14
Depth (ft)	5 to 6	Initial Dry Density (pcf)	108.0
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	119.5
Specimen Thickness (in)	1.0	Percent Collapse (%)	1.36

Proposed Comm/Industrial Bldg
Fontana, California
Project No. 15G177

PLATE C- 2

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Consolidation/Collapse Test Results



Classification: Gray Brown Silty fine Sand, little medium to coarse Sand

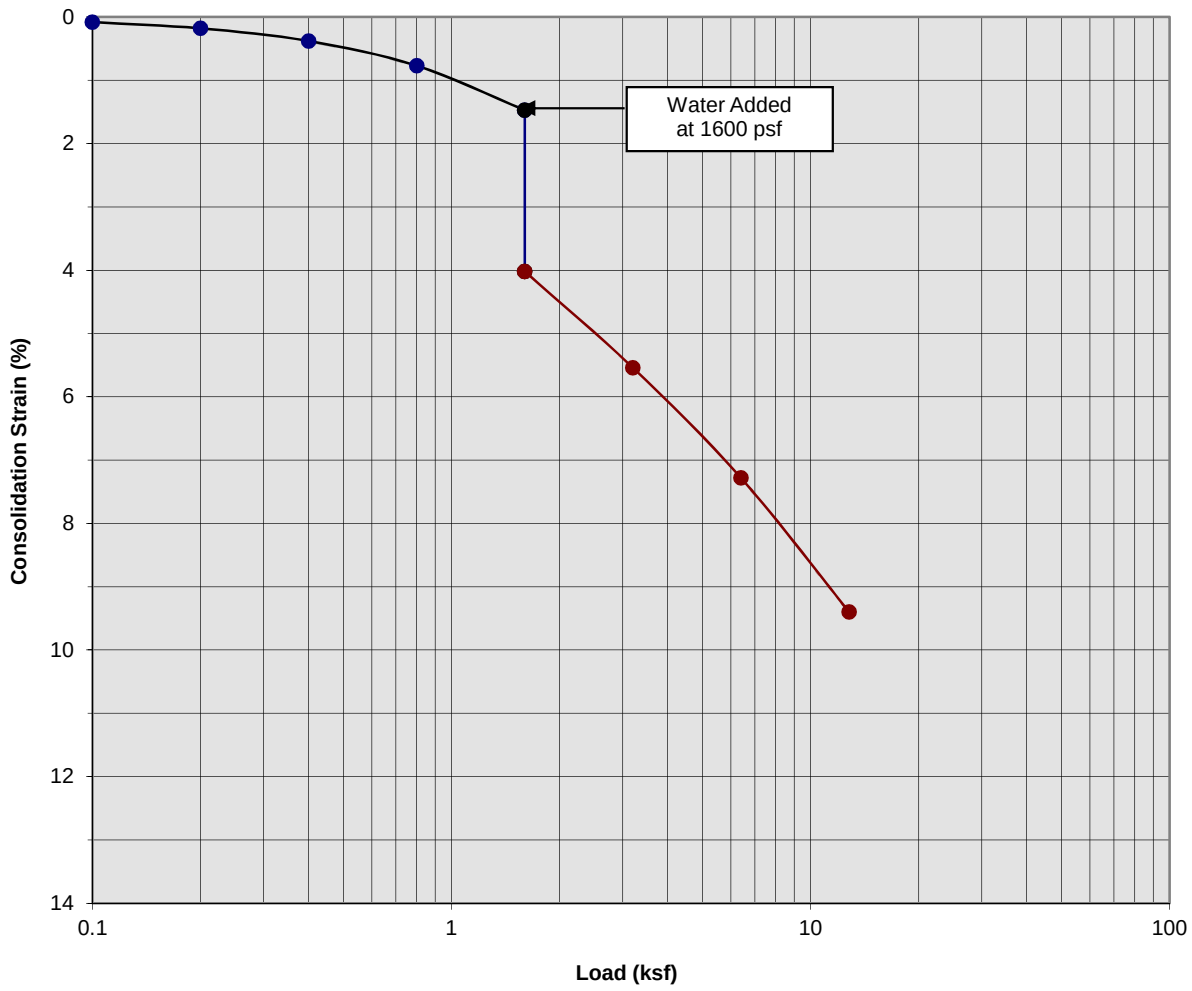
Boring Number:	B-2	Initial Moisture Content (%)	5
Sample Number:	---	Final Moisture Content (%)	11
Depth (ft)	7 to 8	Initial Dry Density (pcf)	121.3
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	127.1
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.76

Proposed Comm/Industrial Bldg
Fontana, California
Project No. 15G177

PLATE C- 3

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Consolidation/Collapse Test Results



Classification: Brown fine to medium Sand, trace coarse Sand, trace fine Gravel

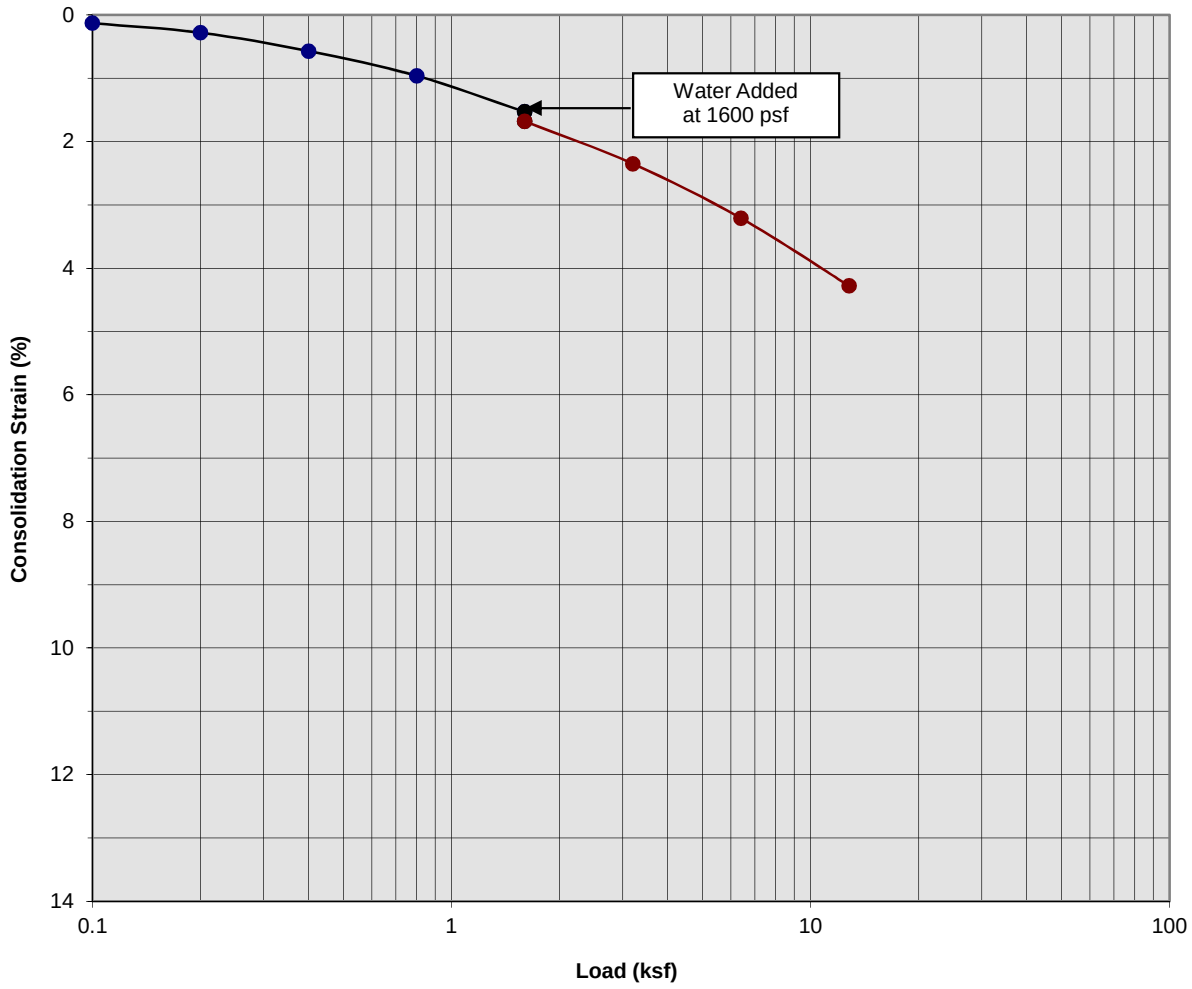
Boring Number:	B-2	Initial Moisture Content (%)	5
Sample Number:	---	Final Moisture Content (%)	14
Depth (ft)	9 to 10	Initial Dry Density (pcf)	111.5
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	122.2
Specimen Thickness (in)	1.0	Percent Collapse (%)	2.55

Proposed Comm/Industrial Bldg
Fontana, California
Project No. 15G177

PLATE C- 4

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Consolidation/Collapse Test Results



Classification: Light Gray Brown fine Sand, trace Silt

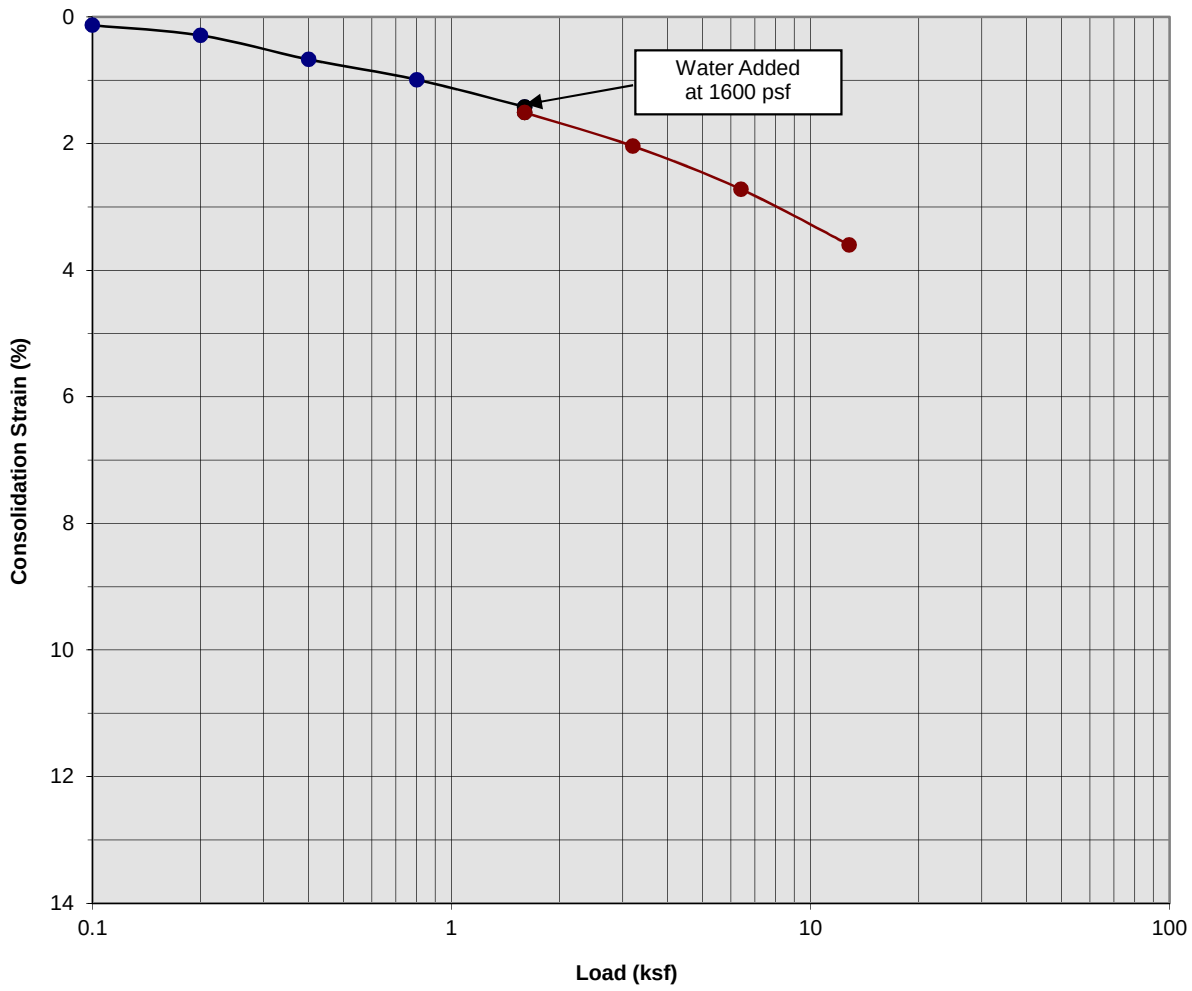
Boring Number:	B-7	Initial Moisture Content (%)	5
Sample Number:	---	Final Moisture Content (%)	19
Depth (ft)	3 to 4	Initial Dry Density (pcf)	110.7
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	116.0
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.15

Proposed Comm/Industrial Bldg
Fontana, California
Project No. 15G177

PLATE C- 5

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Consolidation/Collapse Test Results



Classification: Light Gray Brown fine Sand, trace Silt

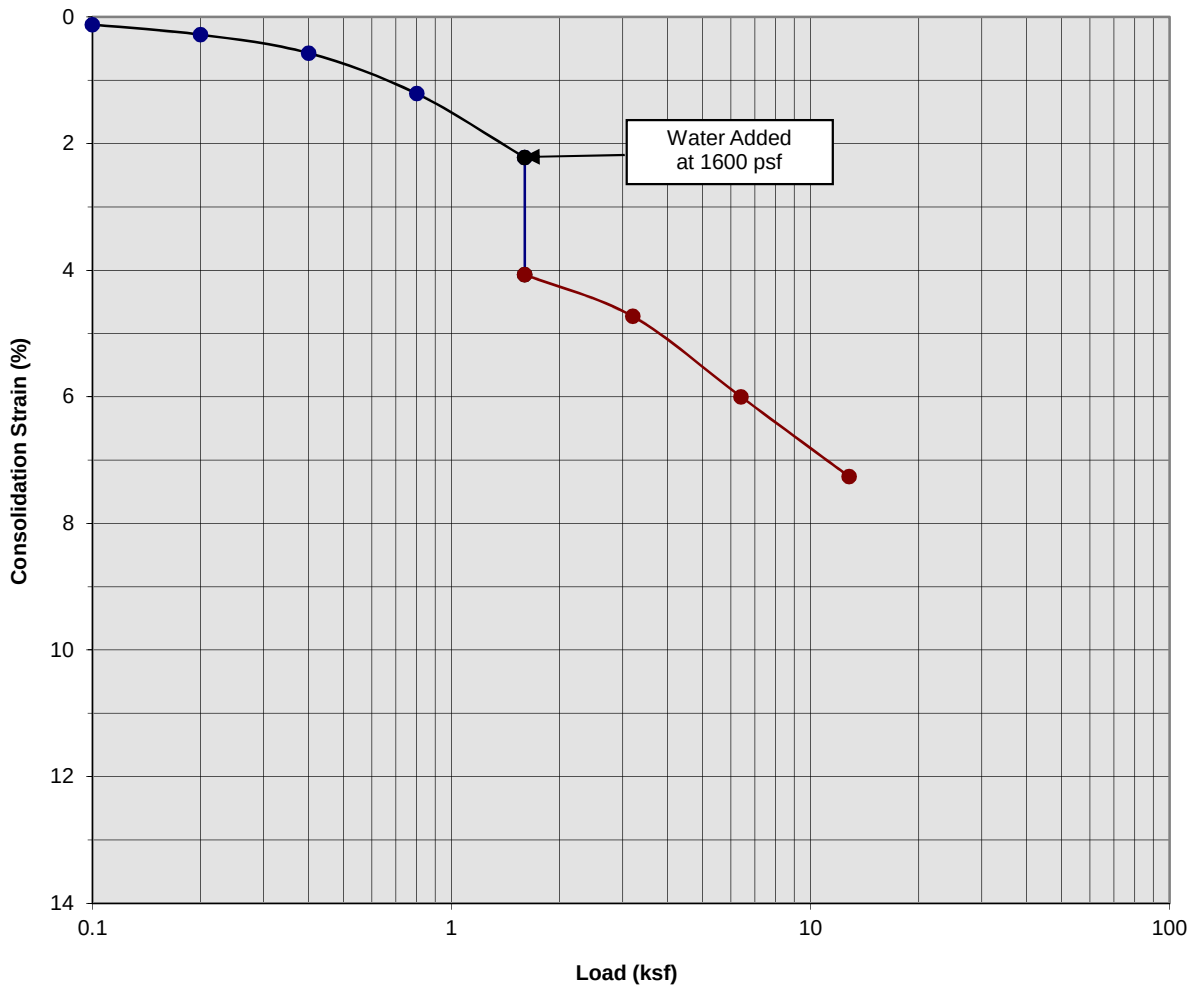
Boring Number:	B-7	Initial Moisture Content (%)	3
Sample Number:	---	Final Moisture Content (%)	19
Depth (ft)	5 to 6	Initial Dry Density (pcf)	102.7
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	106.5
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.09

Proposed Comm/Industrial Bldg
Fontana, California
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PLATE C- 6

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Consolidation/Collapse Test Results



Classification: Gray fine to medium Sand, little coarse Sand

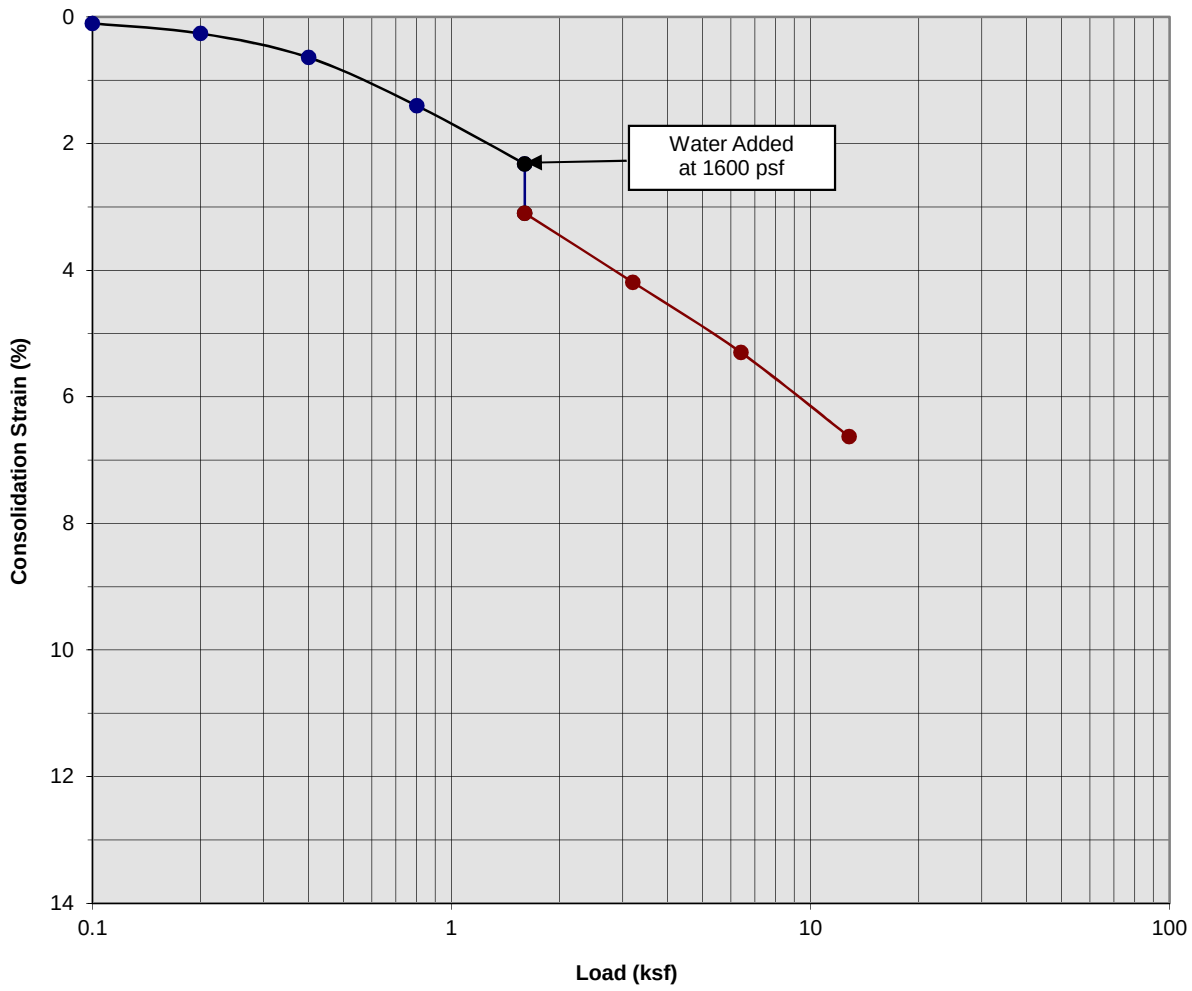
Boring Number:	B-7	Initial Moisture Content (%)	3
Sample Number:	---	Final Moisture Content (%)	15
Depth (ft)	7 to 8	Initial Dry Density (pcf)	101.5
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	110.0
Specimen Thickness (in)	1.0	Percent Collapse (%)	1.85

Proposed Comm/Industrial Bldg
Fontana, California
Project No. 15G177

PLATE C- 7

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Consolidation/Collapse Test Results



Classification: Light Gray fine Sand, trace Silt

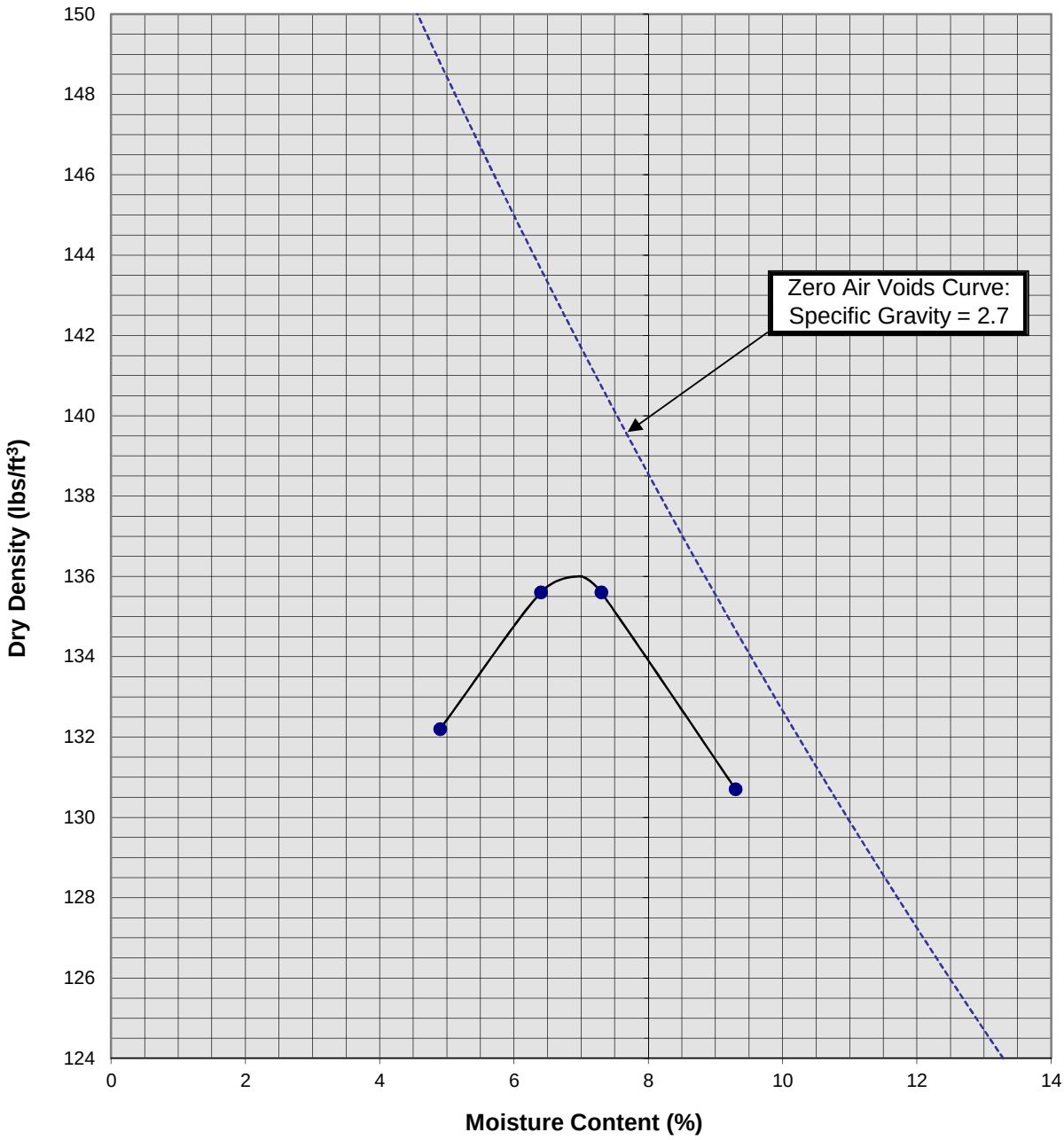
Boring Number:	B-7	Initial Moisture Content (%)	6
Sample Number:	---	Final Moisture Content (%)	20
Depth (ft)	9 to 10	Initial Dry Density (pcf)	93.9
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	100.6
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.78

Proposed Comm/Industrial Bldg
Fontana, California
Project No. 15G177

PLATE C- 8

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Moisture/Density Relationship
ASTM D-1557



Soil ID Number	B-1 @ 0 to 5'
Optimum Moisture (%)	7
Maximum Dry Density (pcf)	136
Soil Classification	Light Brown Silty fine to medium Sand, little fine to coarse Gravel

Proposed Comm/Industrial Bldg
Fontana, California
Project No. 15G177

PLATE C-9

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

APPENDIX D

GRADING GUIDE SPECIFICATIONS

These grading guide specifications are intended to provide typical procedures for grading operations. They are intended to supplement the recommendations contained in the geotechnical investigation report for this project. Should the recommendations in the geotechnical investigation report conflict with the grading guide specifications, the more site specific recommendations in the geotechnical investigation report will govern.

General

- The Earthwork Contractor is responsible for the satisfactory completion of all earthwork in accordance with the plans and geotechnical reports, and in accordance with city, county, and applicable building codes.

- The Geotechnical Engineer is the representative of the Owner/Builder for the purpose of implementing the report recommendations and guidelines. These duties are not intended to relieve the Earthwork Contractor of any responsibility to perform in a workman-like manner, nor is the Geotechnical Engineer to direct the grading equipment or personnel employed by the Contractor.

- The Earthwork Contractor is required to notify the Geotechnical Engineer of the anticipated work and schedule so that testing and inspections can be provided. If necessary, work may be stopped and redone if personnel have not been scheduled in advance.

- The Earthwork Contractor is required to have suitable and sufficient equipment on the job-site to process, moisture condition, mix and compact the amount of fill being placed to the approved compaction. In addition, suitable support equipment should be available to conform with recommendations and guidelines in this report.

- Canyon cleanouts, overexcavation areas, processed ground to receive fill, key excavations, subdrains and benches should be observed by the Geotechnical Engineer prior to placement of any fill. It is the Earthwork Contractor's responsibility to notify the Geotechnical Engineer of areas that are ready for inspection.

- Excavation, filling, and subgrade preparation should be performed in a manner and sequence that will provide drainage at all times and proper control of erosion. Precipitation, springs, and seepage water encountered shall be pumped or drained to provide a suitable working surface. The Geotechnical Engineer must be informed of springs or water seepage encountered during grading or foundation construction for possible revision to the recommended construction procedures and/or installation of subdrains.

Site Preparation

- The Earthwork Contractor is responsible for all clearing, grubbing, stripping and site preparation for the project in accordance with the recommendations of the Geotechnical Engineer.

- If any materials or areas are encountered by the Earthwork Contractor which are suspected of having toxic or environmentally sensitive contamination, the Geotechnical Engineer and Owner/Builder should be notified immediately.

- Major vegetation should be stripped and disposed of off-site. This includes trees, brush, heavy grasses and any materials considered unsuitable by the Geotechnical Engineer.

- Underground structures such as basements, cesspools or septic disposal systems, mining shafts, tunnels, wells and pipelines should be removed under the inspection of the Geotechnical Engineer and recommendations provided by the Geotechnical Engineer and/or city, county or state agencies. If such structures are known or found, the Geotechnical Engineer should be notified as soon as possible so that recommendations can be formulated.

- Any topsoil, slopewash, colluvium, alluvium and rock materials which are considered unsuitable by the Geotechnical Engineer should be removed prior to fill placement.

- Remaining voids created during site clearing caused by removal of trees, foundations basements, irrigation facilities, etc., should be excavated and filled with compacted fill.

- Subsequent to clearing and removals, areas to receive fill should be scarified to a depth of 10 to 12 inches, moisture conditioned and compacted

- The moisture condition of the processed ground should be at or slightly above the optimum moisture content as determined by the Geotechnical Engineer. Depending upon field conditions, this may require air drying or watering together with mixing and/or discing.

Compacted Fills

- Soil materials imported to or excavated on the property may be utilized in the fill, provided each material has been determined to be suitable in the opinion of the Geotechnical Engineer. Unless otherwise approved by the Geotechnical Engineer, all fill materials shall be free of deleterious, organic, or frozen matter, shall contain no chemicals that may result in the material being classified as “contaminated,” and shall be very low to non-expansive with a maximum expansion index (EI) of 50. The top 12 inches of the compacted fill should have a maximum particle size of 3 inches, and all underlying compacted fill material a maximum 6-inch particle size, except as noted below.

- All soils should be evaluated and tested by the Geotechnical Engineer. Materials with high expansion potential, low strength, poor gradation or containing organic materials may require removal from the site or selective placement and/or mixing to the satisfaction of the Geotechnical Engineer.

- Rock fragments or rocks less than 6 inches in their largest dimensions, or as otherwise determined by the Geotechnical Engineer, may be used in compacted fill, provided the distribution and placement is satisfactory in the opinion of the Geotechnical Engineer.

- Rock fragments or rocks greater than 12 inches should be taken off-site or placed in accordance with recommendations and in areas designated as suitable by the Geotechnical Engineer. These materials should be placed in accordance with Plate D-8 of these Grading Guide Specifications and in accordance with the following recommendations:

    - Rocks 12 inches or more in diameter should be placed in rows at least 15 feet apart, 15 feet from the edge of the fill, and 10 feet or more below subgrade. Spaces should be left between each rock fragment to provide for placement and compaction of soil around the fragments.

    - Fill materials consisting of soil meeting the minimum moisture content requirements and free of oversize material should be placed between and over the rows of rock or

concrete. Ample water and compactive effort should be applied to the fill materials as they are placed in order that all of the voids between each of the fragments are filled and compacted to the specified density.

- Subsequent rows of rocks should be placed such that they are not directly above a row placed in the previous lift of fill. A minimum 5-foot offset between rows is recommended.

- To facilitate future trenching, oversized material should not be placed within the range of foundation excavations, future utilities or other underground construction unless specifically approved by the soil engineer and the developer/owner representative.

- Fill materials approved by the Geotechnical Engineer should be placed in areas previously prepared to receive fill and in evenly placed, near horizontal layers at about 6 to 8 inches in loose thickness, or as otherwise determined by the Geotechnical Engineer for the project.

- Each layer should be moisture conditioned to optimum moisture content, or slightly above, as directed by the Geotechnical Engineer. After proper mixing and/or drying, to evenly distribute the moisture, the layers should be compacted to at least 90 percent of the maximum dry density in compliance with ASTM D-1557-78 unless otherwise indicated.

- Density and moisture content testing should be performed by the Geotechnical Engineer at random intervals and locations as determined by the Geotechnical Engineer. These tests are intended as an aid to the Earthwork Contractor, so he can evaluate his workmanship, equipment effectiveness and site conditions. The Earthwork Contractor is responsible for compaction as required by the Geotechnical Report(s) and governmental agencies.

- Fill areas unused for a period of time may require moisture conditioning, processing and recompaction prior to the start of additional filling. The Earthwork Contractor should notify the Geotechnical Engineer of his intent so that an evaluation can be made.

- Fill placed on ground sloping at a 5-to-1 inclination (horizontal-to-vertical) or steeper should be benched into bedrock or other suitable materials, as directed by the Geotechnical Engineer. Typical details of benching are illustrated on Plates D-2, D-4, and D-5.

- Cut/fill transition lots should have the cut portion overexcavated to a depth of at least 3 feet and rebuilt with fill (see Plate D-1), as determined by the Geotechnical Engineer.

- All cut lots should be inspected by the Geotechnical Engineer for fracturing and other bedrock conditions. If necessary, the pads should be overexcavated to a depth of 3 feet and rebuilt with a uniform, more cohesive soil type to impede moisture penetration.

- Cut portions of pad areas above buttresses or stabilizations should be overexcavated to a depth of 3 feet and rebuilt with uniform, more cohesive compacted fill to impede moisture penetration.

- Non-structural fill adjacent to structural fill should typically be placed in unison to provide lateral support. Backfill along walls must be placed and compacted with care to ensure that excessive unbalanced lateral pressures do not develop. The type of fill material placed adjacent to below grade walls must be properly tested and approved by the Geotechnical Engineer with consideration of the lateral earth pressure used in the design.

Foundations

- The foundation influence zone is defined as extending one foot horizontally from the outside edge of a footing, and proceeding downward at a ½ horizontal to 1 vertical (0.5:1) inclination.

- Where overexcavation beneath a footing subgrade is necessary, it should be conducted so as to encompass the entire foundation influence zone, as described above.

- Compacted fill adjacent to exterior footings should extend at least 12 inches above foundation bearing grade. Compacted fill within the interior of structures should extend to the floor subgrade elevation.

Fill Slopes

- The placement and compaction of fill described above applies to all fill slopes. Slope compaction should be accomplished by overfilling the slope, adequately compacting the fill in even layers, including the overfilled zone and cutting the slope back to expose the compacted core

- Slope compaction may also be achieved by backrolling the slope adequately every 2 to 4 vertical feet during the filling process as well as requiring the earth moving and compaction equipment to work close to the top of the slope. Upon completion of slope construction, the slope face should be compacted with a sheepsfoot connected to a sideboom and then grid rolled. This method of slope compaction should only be used if approved by the Geotechnical Engineer.

- Sandy soils lacking in adequate cohesion may be unstable for a finished slope condition and therefore should not be placed within 15 horizontal feet of the slope face.

- All fill slopes should be keyed into bedrock or other suitable material. Fill keys should be at least 15 feet wide and inclined at 2 percent into the slope. For slopes higher than 30 feet, the fill key width should be equal to one-half the height of the slope (see Plate D-5).

- All fill keys should be cleared of loose slough material prior to geotechnical inspection and should be approved by the Geotechnical Engineer and governmental agencies prior to filling.

- The cut portion of fill over cut slopes should be made first and inspected by the Geotechnical Engineer for possible stabilization requirements. The fill portion should be adequately keyed through all surficial soils and into bedrock or suitable material. Soils should be removed from the transition zone between the cut and fill portions (see Plate D-2).

Cut Slopes

- All cut slopes should be inspected by the Geotechnical Engineer to determine the need for stabilization. The Earthwork Contractor should notify the Geotechnical Engineer when slope cutting is in progress at intervals of 10 vertical feet. Failure to notify may result in a delay in recommendations.

- Cut slopes exposing loose, cohesionless sands should be reported to the Geotechnical Engineer for possible stabilization recommendations.

- All stabilization excavations should be cleared of loose slough material prior to geotechnical inspection. Stakes should be provided by the Civil Engineer to verify the location and dimensions of the key. A typical stabilization fill detail is shown on Plate D-5.

- Stabilization key excavations should be provided with subdrains. Typical subdrain details are shown on Plates D-6.

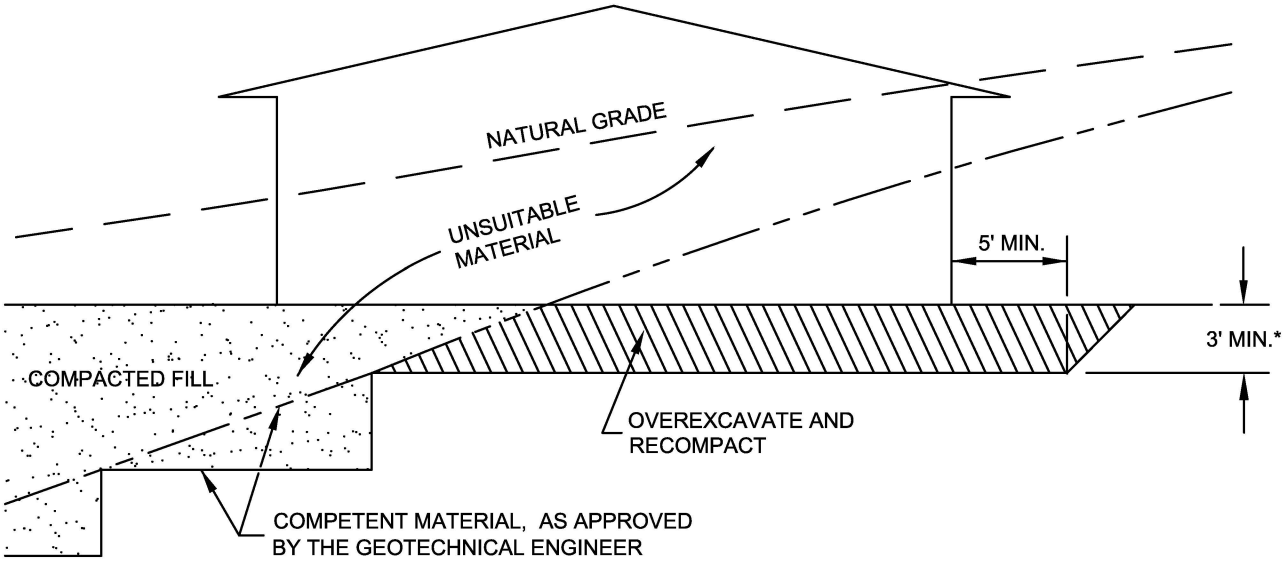
Subdrains

- Subdrains may be required in canyons and swales where fill placement is proposed. Typical subdrain details for canyons are shown on Plate D-3. Subdrains should be installed after approval of removals and before filling, as determined by the Soils Engineer.

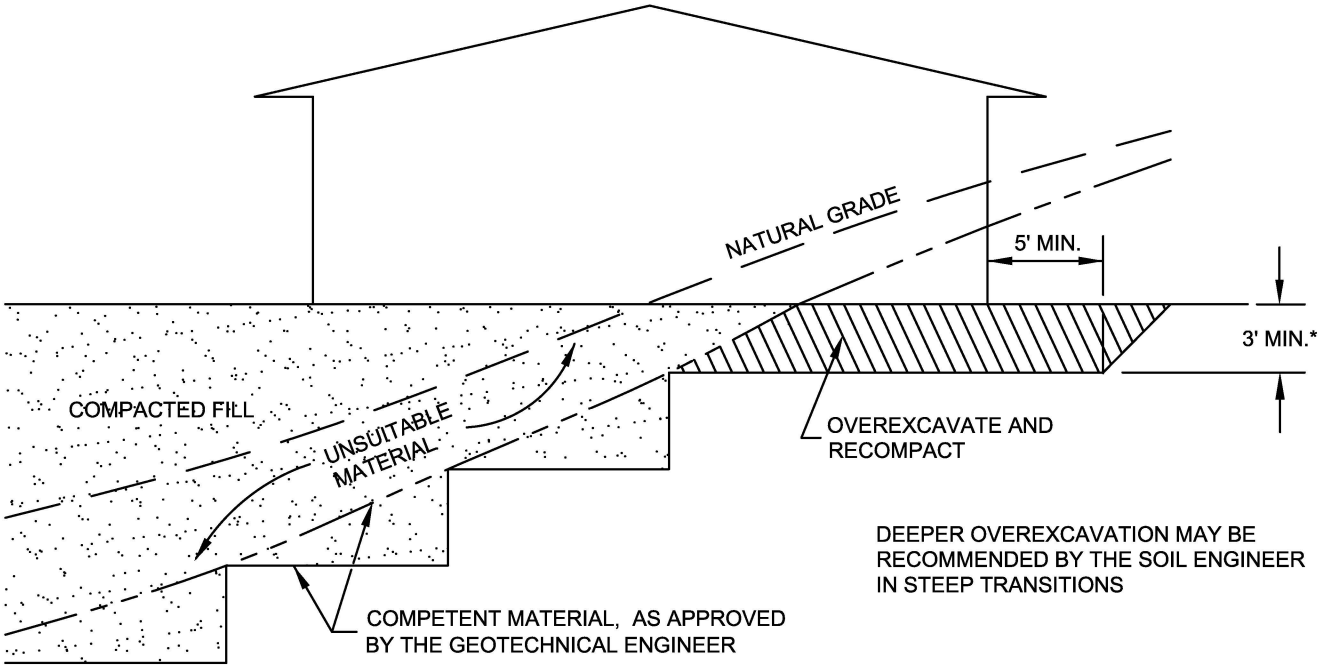
- Plastic pipe may be used for subdrains provided it is Schedule 40 or SDR 35 or equivalent. Pipe should be protected against breakage, typically by placement in a square-cut (backhoe) trench or as recommended by the manufacturer.

- Filter material for subdrains should conform to CALTRANS Specification 68-1.025 or as approved by the Geotechnical Engineer for the specific site conditions. Clean ¾-inch crushed rock may be used provided it is wrapped in an acceptable filter cloth and approved by the Geotechnical Engineer. Pipe diameters should be 6 inches for runs up to 500 feet and 8 inches for the downstream continuations of longer runs. Four-inch diameter pipe may be used in buttress and stabilization fills.

CUT LOT



CUT/FILL LOT (TRANSITION)



*SEE TEXT OF REPORT FOR SPECIFIC RECOMMENDATION. ACTUAL DEPTH OF OVEREXCAVATION MAY BE GREATER.

TRANSITION LOT DETAIL

GRADING GUIDE SPECIFICATIONS

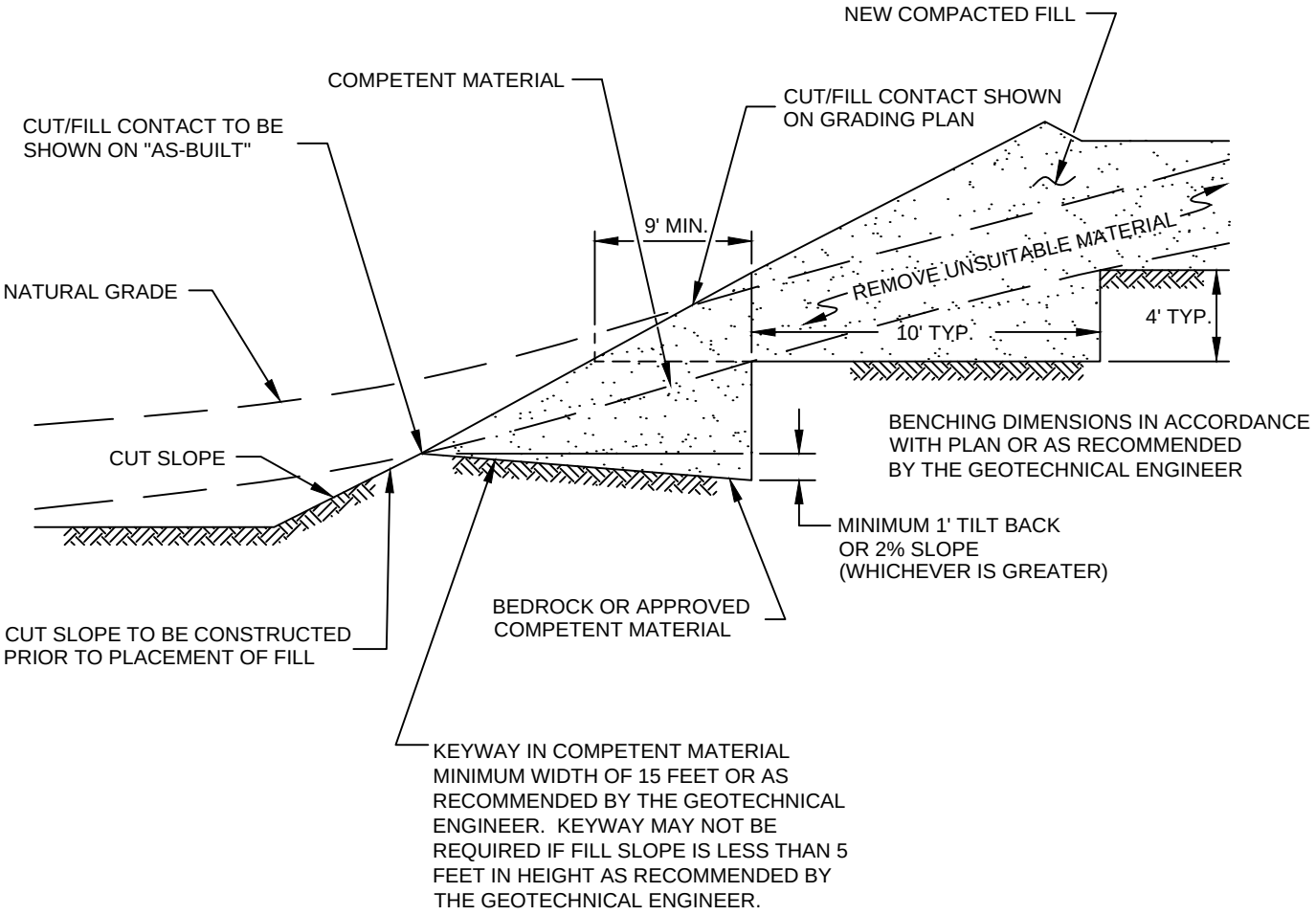
NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-1

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL



FILL ABOVE CUT SLOPE DETAIL

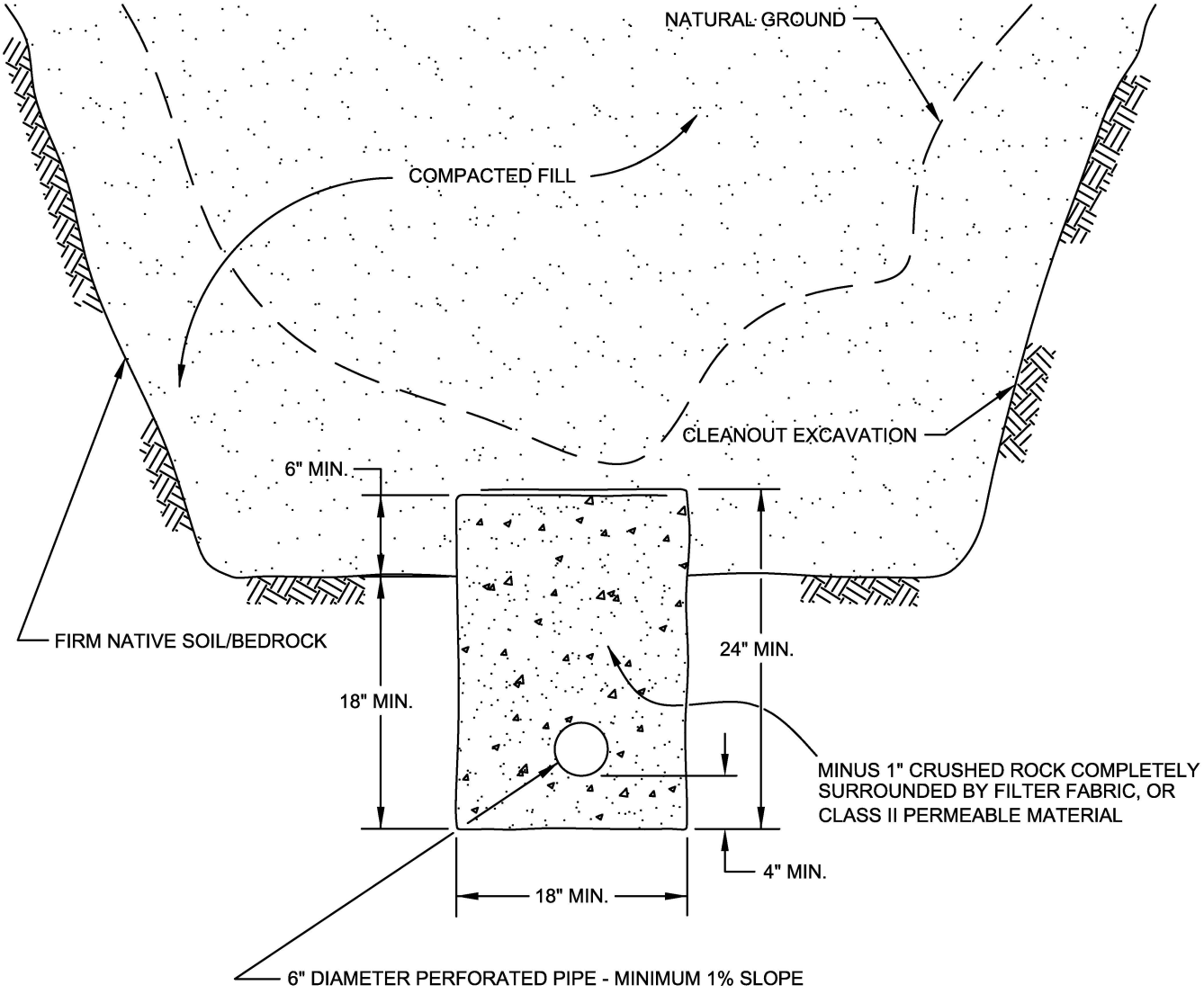
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-2

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL



PIPE MATERIAL	DEPTH OF FILL OVER SUBDRAIN
ADS (CORRUGATED POLETHYLENE)	8
TRANSITE UNDERDRAIN	20
PVC OR ABS: SDR 35	35
SDR 21	100

SCHEMATIC ONLY
NOT TO SCALE

CANYON SUBDRAIN DETAIL

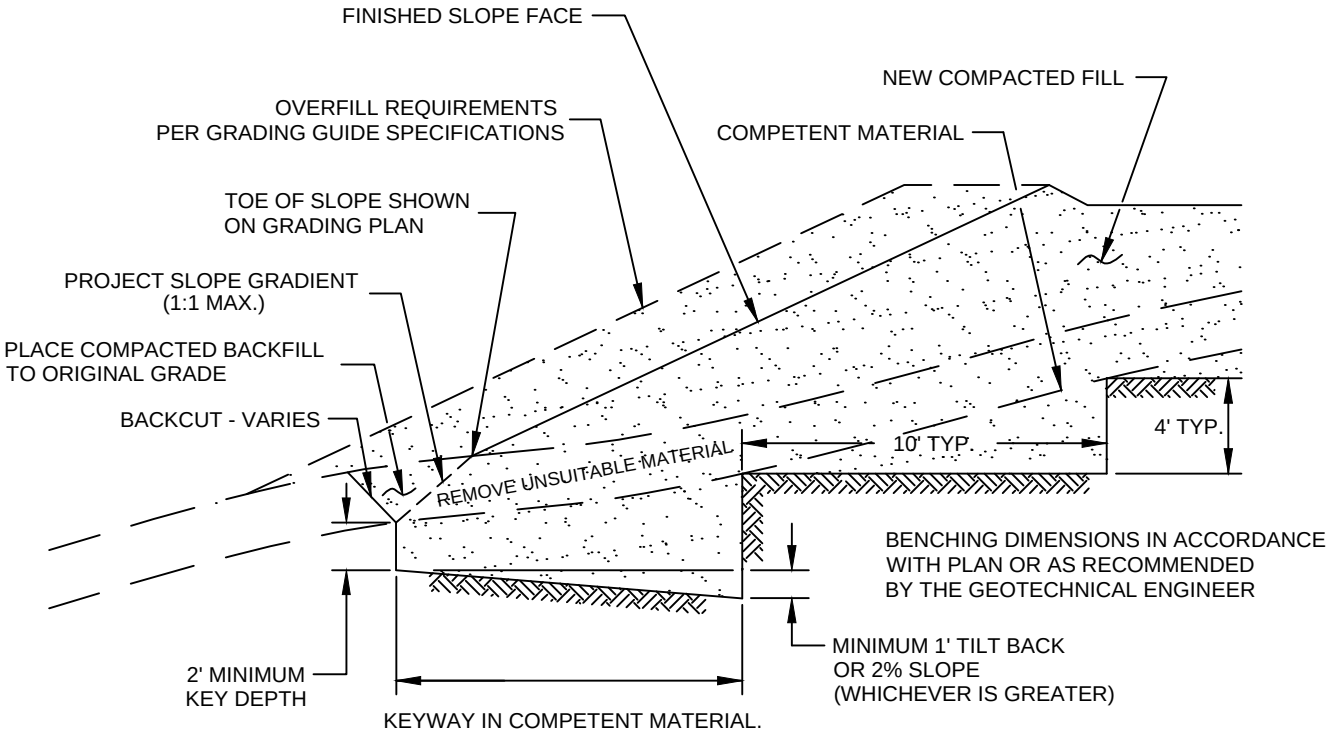
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-3

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL



NOTE:
BENCHING SHALL BE REQUIRED WHEN NATURAL SLOPES ARE EQUAL TO OR STEEPER THAN 5:1 OR WHEN RECOMMENDED BY THE GEOTECHNICAL ENGINEER.

FILL ABOVE NATURAL SLOPE DETAIL

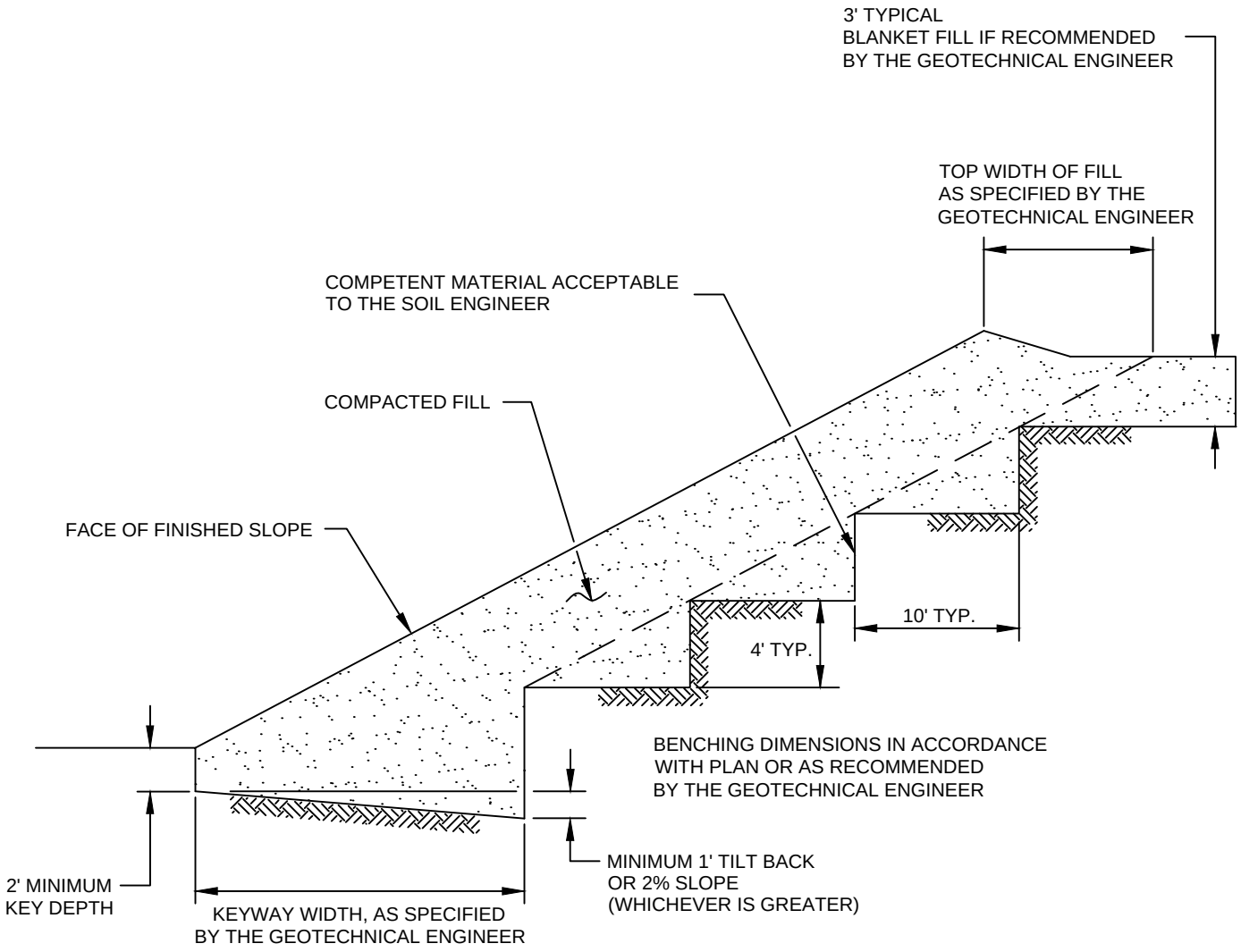
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-4

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL



STABILIZATION FILL DETAIL

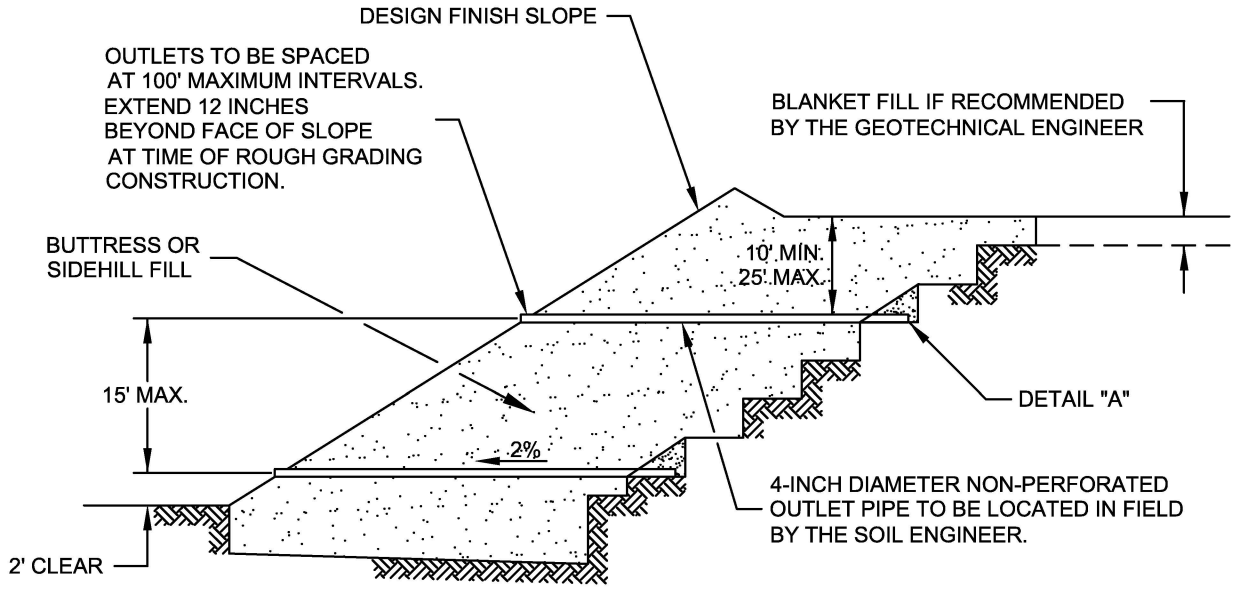
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-5

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL



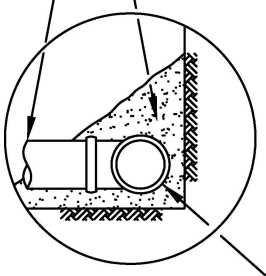
"FILTER MATERIAL" TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUIVALENT: (CONFORMS TO EMA STD. PLAN 323)

SIEVE SIZE	PERCENTAGE PASSING
1"	100
3/4"	90-100
3/8"	40-100
NO. 4	25-40
NO. 8	18-33
NO. 30	5-15
NO. 50	0-7
NO. 200	0-3

"GRAVEL" TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUIVALENT:

SIEVE SIZE	MAXIMUM PERCENTAGE PASSING
1 1/2"	100
NO. 4	50
NO. 200	8

SAND EQUIVALENT = MINIMUM OF 50



DETAIL "A"

NOTES:
1. TRENCH FOR OUTLET PIPES TO BE BACKFILLED WITH ON-SITE SOIL.

SLOPE FILL SUBDRAINS

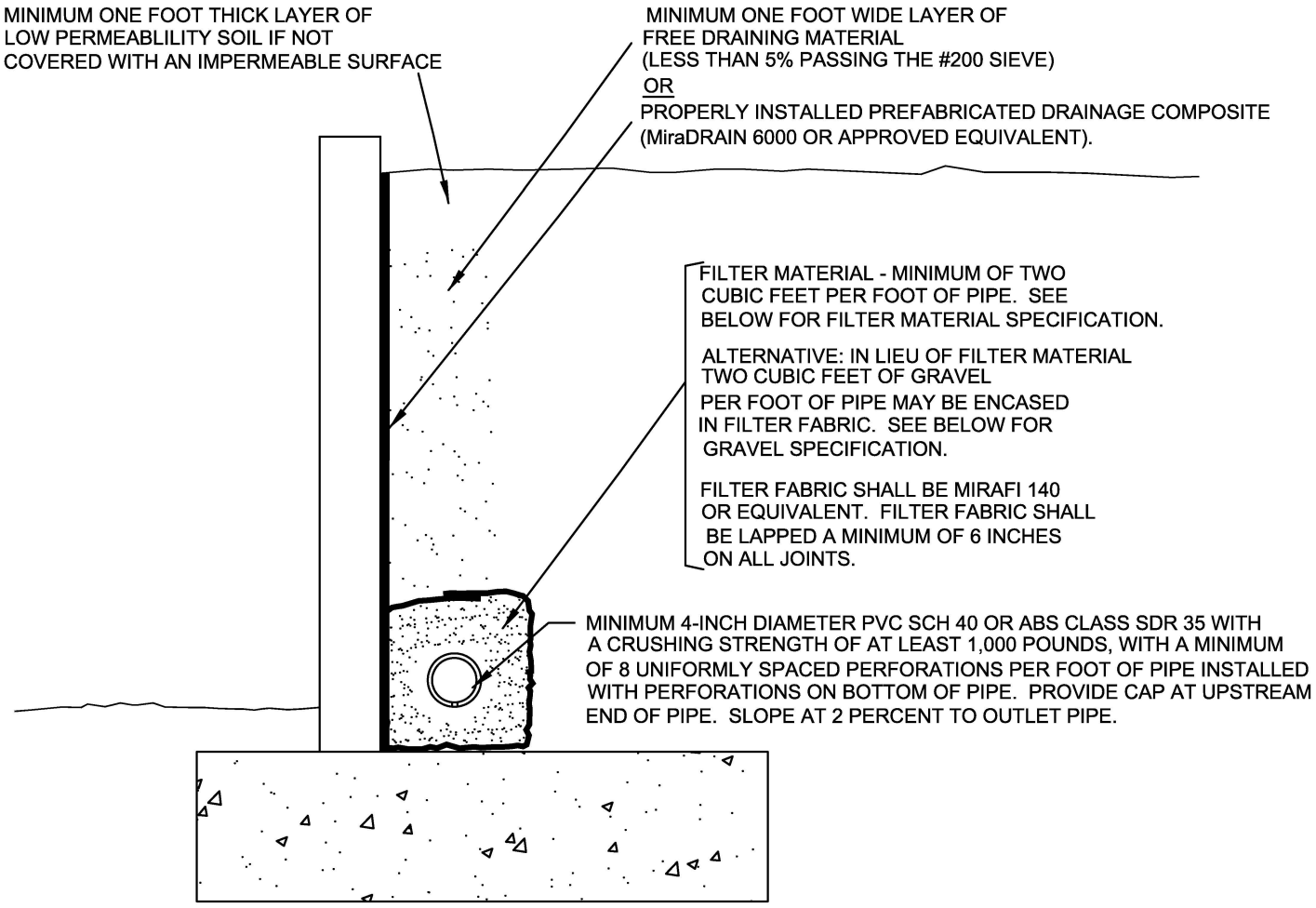
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-6

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL



"FILTER MATERIAL" TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUIVALENT: (CONFORMS TO EMA STD. PLAN 323)

SIEVE SIZE	PERCENTAGE PASSING
1"	100
3/4"	90-100
3/8"	40-100
NO. 4	25-40
NO. 8	18-33
NO. 30	5-15
NO. 50	0-7
NO. 200	0-3

"GRAVEL" TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUIVALENT:

SIEVE SIZE	MAXIMUM PERCENTAGE PASSING
1 1/2"	100
NO. 4	50
NO. 200	8

SAND EQUIVALENT = MINIMUM OF 50

RETAINING WALL BACKDRAINS

GRADING GUIDE SPECIFICATIONS

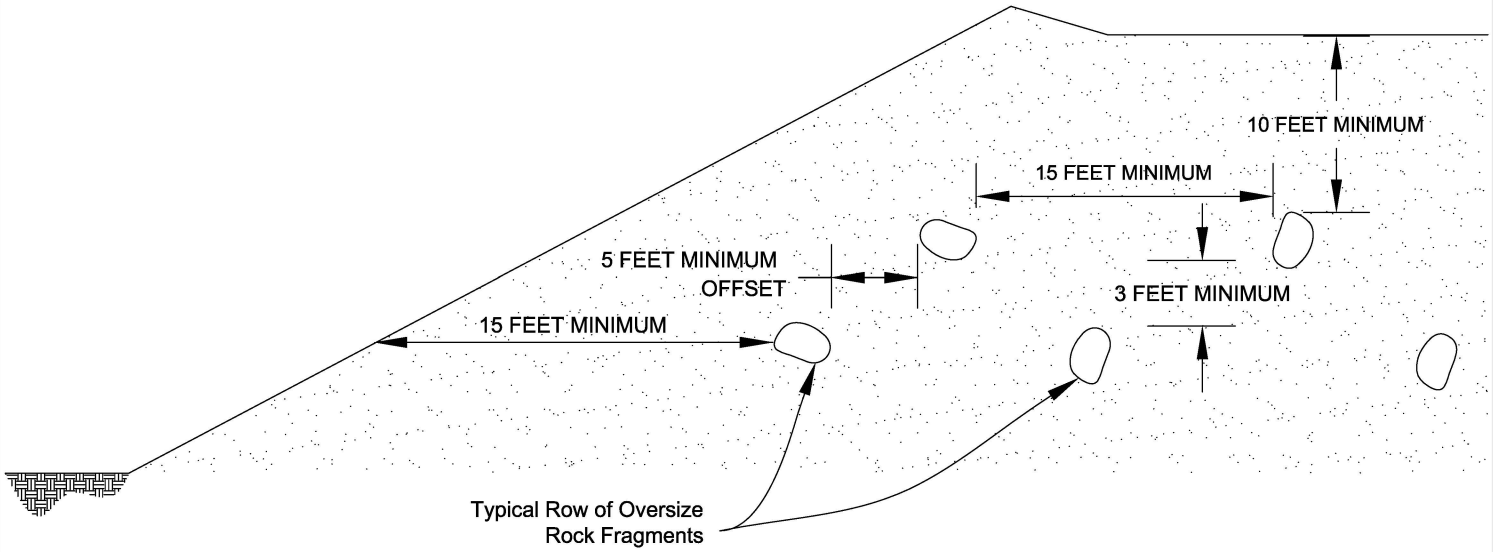
NOT TO SCALE

DRAWN: JAS
CHKD: GKM

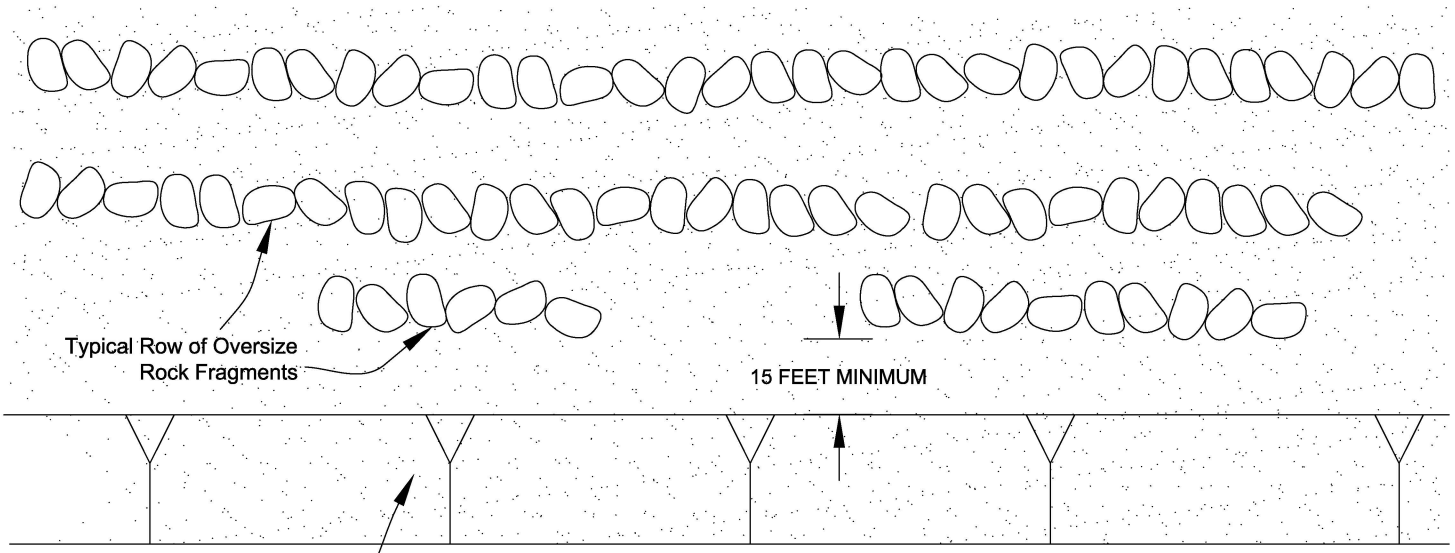
PLATE D-7

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL



Section View



Plan View

PLACEMENT OF OVERSIZED MATERIAL

GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: PM
CHKD: GKM

PLATE D-8

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL

APPENDIX E

USGS Design Maps Summary Report

User–Specified Input

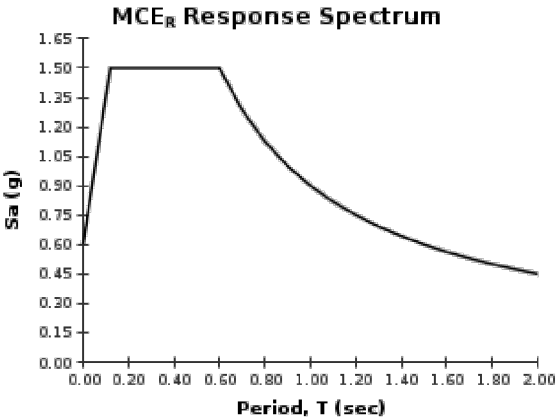
Building Code Reference Document	ASCE 7-10 Standard (which utilizes USGS hazard data available in 2008)
Site Coordinates	34.05222°N, 117.47341°W
Site Soil Classification	Site Class D – "Stiff Soil"
Risk Category	I/II/III

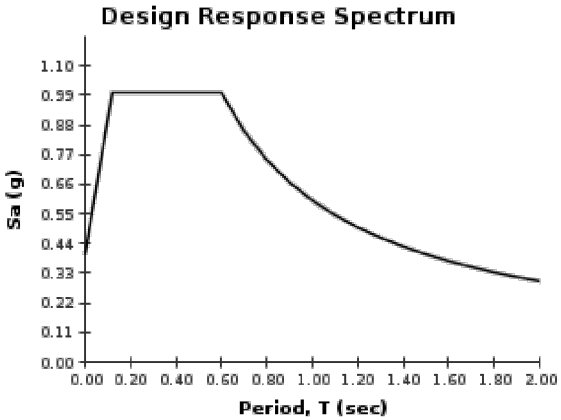


USGS–Provided Output

S_S =	1.500 g	S_{MS} =	1.500 g	S_{DS} =	1.000 g
S_1 =	0.600 g	S_{M1} =	0.900 g	S_{D1} =	0.600 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





SOURCE: U.S. GEOLOGICAL SURVEY (USGS)
<http://geohazards.usgs.gov/designmaps/us/application.php>

SEISMIC DESIGN PARAMETERS
PROPOSED COMMERCIAL/INDUSTRIAL BUILDING
FONTANA, CALIFORNIA

DRAWN: JL
CHKD: JAS
SCG PROJECT 15G177-1
PLATE E-1

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL

APPENDIX D: PALEONTOLOGICAL ASSESSMENT

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PALEONTOLOGICAL ASSESSMENT FOR THE 22-114 HEMLOCK AVENUE PROJECT

CITY OF FONTANA, SAN BERNARDINO COUNTY, CALIFORNIA

APNs 0237-131-25 to -27

Prepared for:

EPD Solutions
2355 Main Street, Suite 100
Irvine, California 92614

Submitted to:

City of Fontana
Community Development Department
8353 Sierra Avenue
Fontana, California 92335

Prepared by:

Brian F. Smith and Associates, Inc.
14010 Poway Road, Suite A
Poway, California 92064

October 20, 2022

Paleontological Database Information

Author:	Todd A. Wirths, M.S., Senior Paleontologist, California Professional Geologist No. 7588
Consulting Firm:	Brian F. Smith and Associates, Inc. 14010 Poway Road, Suite A Poway, California 92064 (858) 679-8218
Report Date:	October 20, 2022
Report Title:	Paleontological Assessment for the 22-114 Hemlock Avenue Project, City of Fontana, San Bernardino County, California
Prepared for:	EPD Solutions 2355 Main Street, Suite 100 Irvine, California 92614
Submitted to:	City of Fontana Community Development Department 8353 Sierra Avenue Fontana, California 92335
Prepared by:	Brian F. Smith and Associates, Inc. 14010 Poway Road, Suite A Poway, California 92064
USGS Quadrangle:	USGS *Fontana, California* (7.5-minute), Section 26, Township 1 South, Range 6 West
Assessor's Parcel Numbers:	0237-131-25 to -27
Study Area:	40.01 acres
Key Words:	Paleontological assessment; Pleistocene alluvial fan deposits; High sensitivity; City of Fontana.

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I. INTRODUCTION AND LOCATION

This paleontological resource assessment has been completed for the paleontological assessment for the 22-114 Hemlock Avenue Project located north of Jurupa Avenue and south of Santa Ana Avenue between Beech and Hemlock avenues in the city of Fontana, San Bernardino County, California (Figures 1 and 2). The project consists of three parcels (Assessor's Parcel Numbers [APNs] 0237-131-25 to -27) totaling 40.01 acres. On the U.S. Geological Survey 7.5-minute, 1:24,000-scale *Fontana, California* topographic quadrangle map, the project is situated within Section 26, Township 1 South, Range 6 West, of the San Bernardino Baseline and Meridian (see Figure 2). The parcels, currently existing mostly as a paved and gravel storage lot, are being considered for development as a commercial warehouse.

As the lead agency, the City of Fontana has required the preparation of a paleontological assessment to evaluate the project's potential to yield paleontological resources. The paleontological assessment of the project included a review of paleontological literature and fossil locality records for a previous project in the area; a review of the underlying geology; and recommendations to mitigate impacts to potential paleontological resources.

II. REGULATORY SETTING

The California Environmental Quality Act (CEQA), which is patterned after the National Environmental Policy Act, is the overriding environmental regulation that sets the requirement for protecting California's paleontological resources. CEQA mandates that governing permitting agencies (lead agencies) set their own guidelines for the protection of nonrenewable paleontological resources under their jurisdiction.

State of California

Under "Guidelines for Implementation of the California Environmental Quality Act," as amended in December 2018 (California Code of Regulations [CCR] Title 14, Division 6, Chapter 3, Sections 15000 et seq.), procedures define the types of activities, persons, and public agencies required to comply with CEQA. Section 15063 of the CCR provides a process by which a lead agency may review a project's potential impact to the environment, whether the impacts are significant, and provide recommendations, if necessary.

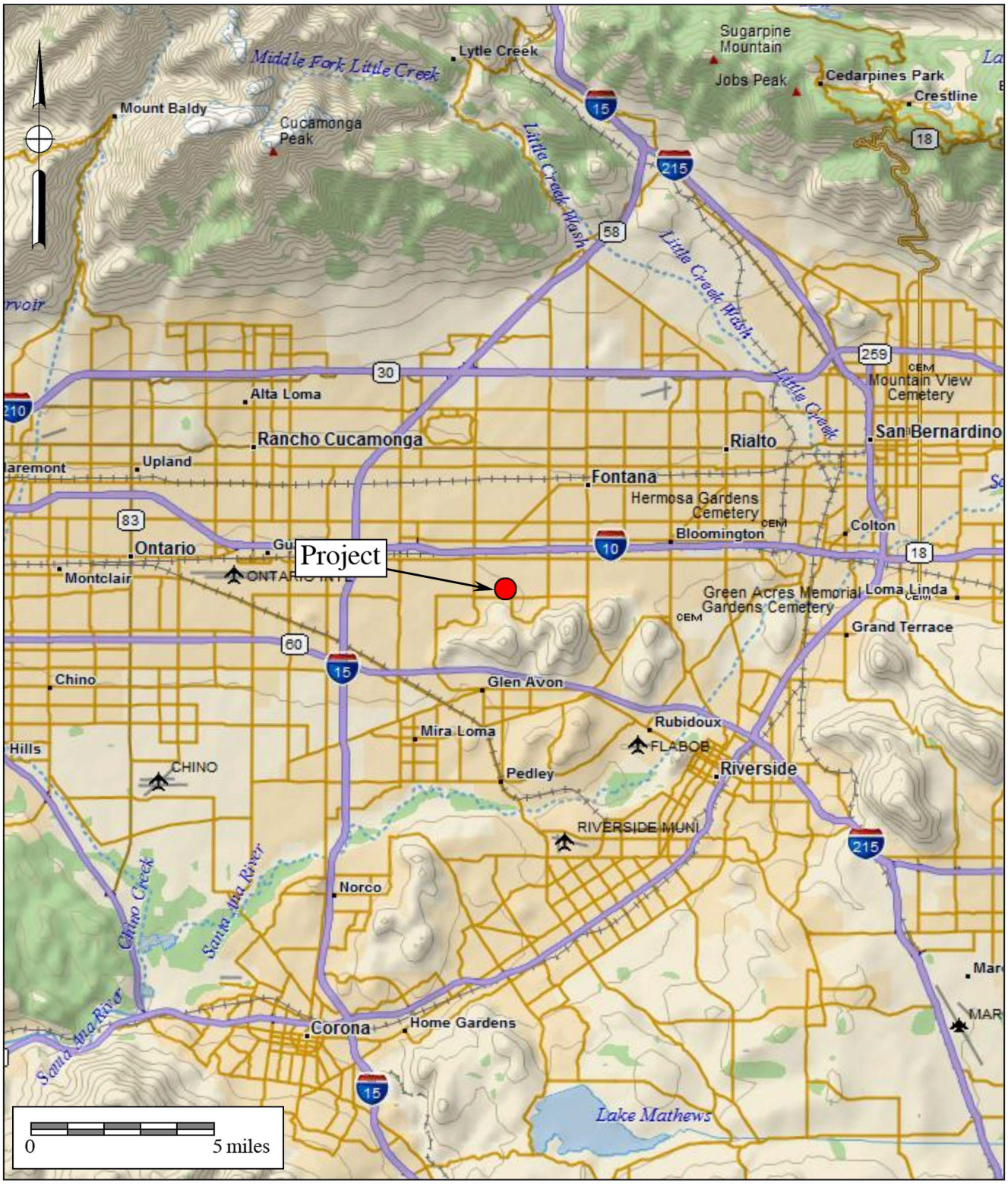


Figure 1

General Location Map

The 22-114 Hemlock Avenue Project

DeLorme World Base Map Service (1:250,000 series)

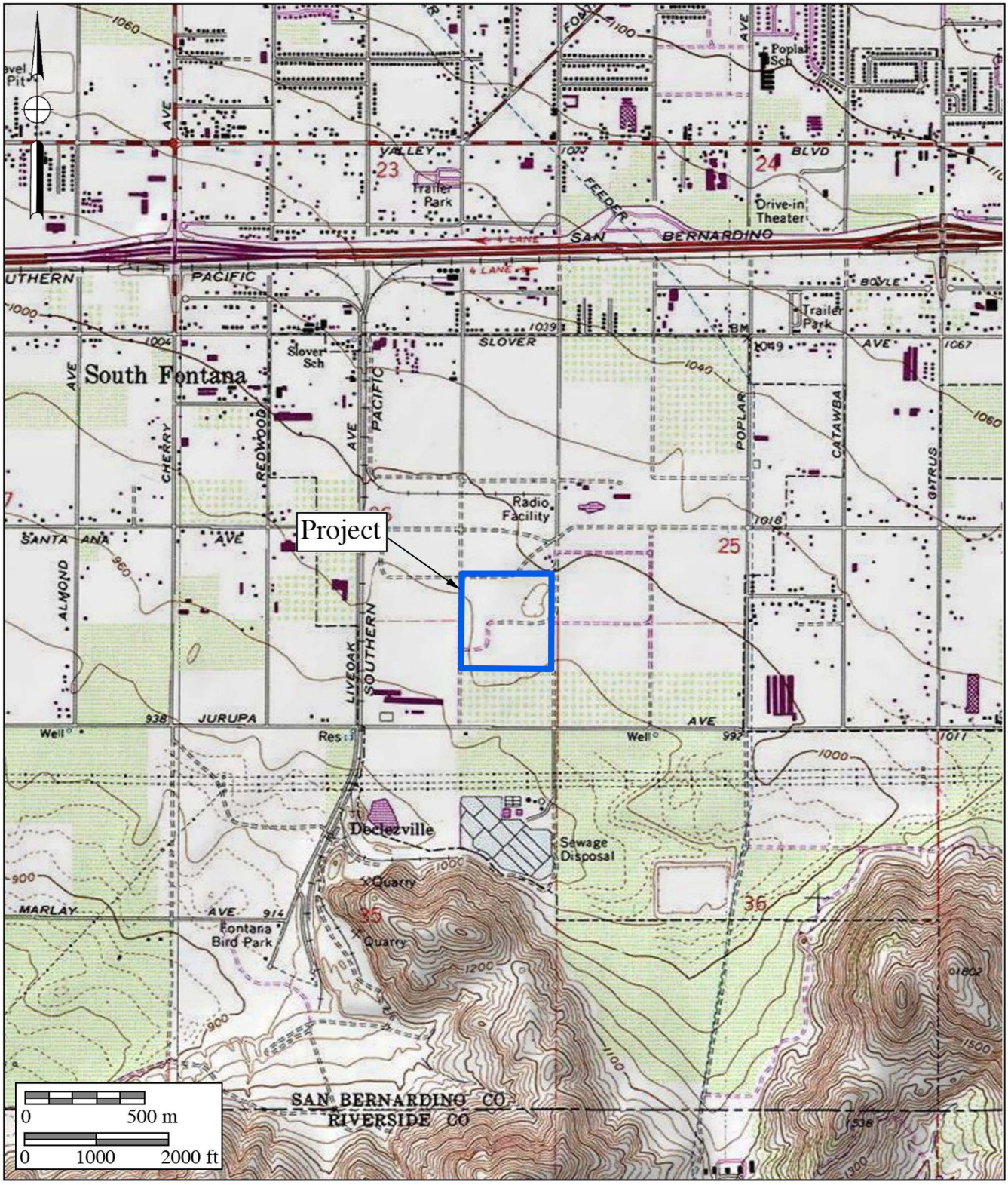


Figure 2

Project Location Map

The 22-114 Hemlock Avenue Project

USGS *Fontana* Quadrangle (7.5-minute series)

In CEQA's Environmental Checklist Form, one of the questions to answer is, "Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?" (Appendix G, Section VII, Part f). This is to ensure compliance with California Public Resources Code Section 5097.5, the law that protects nonrenewable resources, including fossils, which is paraphrased below:

a) A person shall not knowingly and willfully excavate upon, or remove, destroy, injure or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, rock art, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands.
b) As used in this section, "public lands" means lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority, or public corporation, or any agency thereof.
c) A violation of this section is a misdemeanor.

<u>*City of Fontana*</u>

In the Final Environmental Impact Report (FEIR) of the City of Fontana General Plan Update 2015-2035, two paleontological resource mitigation measures are specified, MM-CUL-4 and MM-CUL-5. The FEIR stipulates that MM-CUL-4 must be implemented before construction starts, while MM-CUL-5 must be implemented before, during, and after construction (City of Fontana 2018a). The same measures were previously established in Fontana's Southwest Industrial Park (SWIP) Specific Plan (2011). The measures are as follows:

MM-CUL-4 A qualified paleontologist shall conduct a pre-construction field survey of any project site within the Specific Plan Update area that is underlain by older alluvium. The paleontologist shall submit a report of findings that provide specific recommendations regarding further mitigation measures (*i.e.,* paleontological monitoring) that may be appropriate.

MM-CUL-5 Should mitigation monitoring of paleontological resources be recommended for a specific project within the project site, the program shall include, but not be limited to, the following measures:

- Assign a paleontological monitor, trained and equipped to allow the rapid removal of fossils with minimal construction delay, to the site full-time during the interval of earth-disturbing activities.
- Should fossils be found within an area being cleared or graded, earth-

disturbing activities shall be diverted elsewhere until the monitor has completed salvage. If construction personnel make the discovery, the grading contractor shall immediately divert construction and notify the monitor of the find.

- All recovered fossils shall be prepared, identified, and curated for documentation in the summary report and transferred to an appropriate depository (*i.e.,* San Bernardino County Museum).

A summary report shall be submitted to City of Fontana. Collected specimens shall be transferred with [a] copy of [the] report to [the] San Bernardino County Museum (City of Fontana 2018a).

III. GEOLOGY

The project is located at the western margin and distal southern end of the broad Lytle Creek alluvial fan that emanates from the San Gabriel Mountains approximately nine to 10 miles to the north as a result of uplift and dissection of the eastern San Gabriel Mountains. The main source of these sediments is from the Lytle Creek drainage, near where the northwest-southeast-trending San Andreas fault zone cuts across and separates the San Gabriel and San Bernardino mountain ranges (Morton and Miller 2006). Geomorphically, the project is relatively flat-lying, with a gentle slope to the southwest (see Figures 2 and 3). The project is underlain by late to middle Pleistocene (approximately 11,700 to 780,000 years ago [Cohen and Gibbard 2011]) old alluvial fan deposits (pale amber areas labeled "Qof_3" on Figure 3, after Morton 2003) that occur as slightly raised areas protruding through the surrounding young alluvial fan sediments. At the western and eastern edges of the project, the old alluvial fan deposits are buried by Holocene and late Pleistocene (present day to approximately 120,000 years ago [Cohen and Gibbard 2011]) young alluvial fan sediments (light yellow areas labeled "Qyfl" on Figure 3) of the Lytle Creek fan.

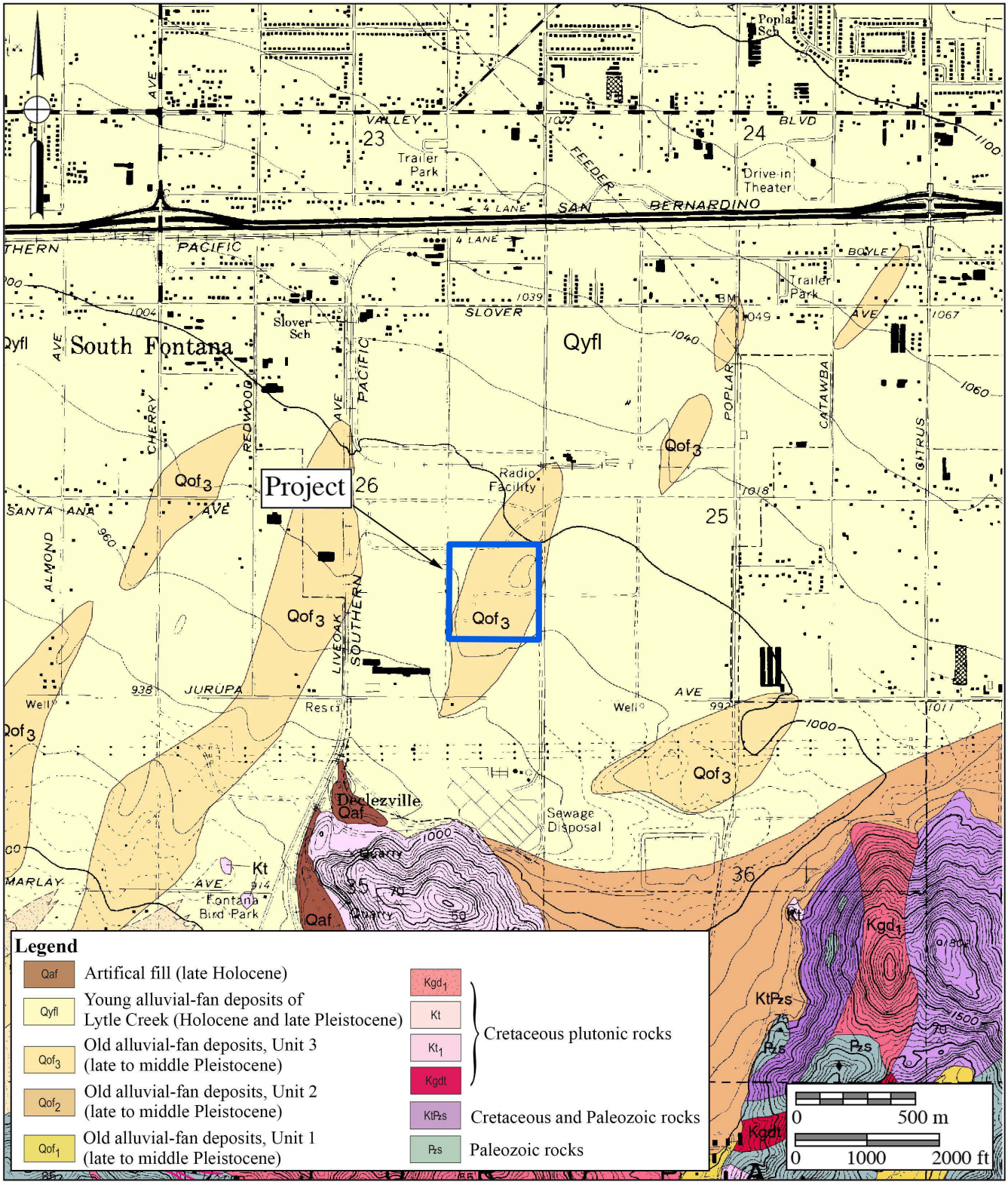


Figure 3

Geologic Map

The 22-114 Hemlock Avenue Project

Geology after Morton (2003)

IV. PALEONTOLOGICAL RESOURCES

Definition

Paleontological resources are the remains of prehistoric life that have been preserved in geologic strata. These remains are called fossils and include bones, shells, teeth, and plant remains (including their impressions, casts, and molds) in the sedimentary matrix, as well as trace fossils such as footprints and burrows. Fossils are considered older than 5,000 years of age (Society of Vertebrate Paleontology 2010) but may include younger remains (subfossils) when viewed in the context of local extinction of the organism or habitat, for example. Fossils are considered a nonrenewable resource under state and local guidelines (see Section II of this report).

Fossil Locality Search

A prior paleontological collections and locality records search was conducted for the nearby 14801 Slover Avenue Project by the Division of Geological Sciences at the San Bernardino County Museum (SBCM) in Redlands (Cortez 2021 [see Appendix B]). The 14801 Slover Avenue Project is located less than a mile northwest of the current project. The report identified seven localities (SBCM localities [locs.] 5.1.14 to 5.1.17 and 5.1.19 to 5.1.21) situated within two miles of the 22-114 Hemlock Avenue Project. The bones of large and small Pleistocene-age mammals and terrestrial snails and freshwater clams were recovered from these localities, mostly from clayey, silty sands from depths ranging from five to 21 feet below the surface, when recorded. Mammals from these localities include three species of rodent, cottontail rabbit, bison, western camel, horse, Pacific mastodon, and other unidentified large mammal remains. Based on another source, the saber-toothed cat (*Smilodon*) specimen (SBCM loc. 5.1.11) mentioned by Cortez (2021) was reportedly discovered in the Declezville neighborhood, just across Jurupa Avenue south of the subject project (Reynolds, *in* Aron et al. 2018)

Cortez (2021) indicates that the late Pleistocene alluvial fan deposits are considered to have a High paleontological sensitivity based on numerous fossil localities in the region. Fossils include the bones from extinct species such as mammoths, mastodons, giant ground sloths, dire wolves, saber-toothed cats, large and small horses, large and small camels, and bison (Cortez 2021).

Project Survey

On October 17, 2022, BFSA staff, under the supervision of Principal Investigator Todd A. Wirths, conducted an intuitive review of the property to determine if any paleontological resources were visible. The field methodology employed for the project included walking evenly spaced survey transects set approximately 15 to 20 meters apart while visually inspecting the ground surface, when possible. Buildings, hardscape, gravel, and commercial landscaping cover the entirety of the project. Due the existing development, the natural ground surface was not visible. All accessible potentially sensitive areas where paleontological resources might be located were closely inspected. No bedrock outcrops were exposed that might indicate the presence of fossils.

No paleontological resources, or evidence of paleontological resources, were observed during the survey.

V. PALEONTOLOGICAL SENSITIVITY

Overview

The degree of paleontological sensitivity of any particular area is based on a number of factors, including the documented presence of fossiliferous resources on a site or in nearby areas, the presence of documented fossils within a particular geologic formation or lithostratigraphic unit, and whether or not the original depositional environment of the sediments is one that might have been conducive to the accumulation of organic remains that might have become fossilized over time. Holocene alluvium is generally considered to be geologically too young to contain significant nonrenewable paleontological resources (*i.e.,* fossils) and is thus typically assigned a low paleontological sensitivity. Pleistocene (over 11,700 years old) alluvial and alluvial fan deposits in the Inland Empire, such as those at the project, often yield important terrestrial vertebrate fossils, such as extinct mammoths, mastodons, giant ground sloths, extinct species of horse, bison, camel, saber-toothed cats, and others (Cortez 2021 [see Appendix B]). These Pleistocene sediments are thus accorded a High paleontological resource sensitivity.

Professional Standards

The Society of Vertebrate Paleontology (2010) has drafted guidelines that include four categories of paleontological sensitivity for geologic units (formations) that might be impacted by a proposed project, as listed below:

- *High Potential:* Rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered.
- *Undetermined Potential:* Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment, and further study is needed to determine the potential of the rock unit.
- *Low Potential:* Rock units that are poorly represented by fossil specimens in institutional collections or based on a general scientific consensus that only preserve fossils in rare circumstances.
- *No Potential:* Rock units that have no potential to contain significant paleontological resources, such as high-grade metamorphic rocks and plutonic igneous rocks.

Using these criteria, based upon the presence of nearby significant fossil localities (SBCM locs. 5.1.11, 5.1.14 to 5.1.17, and 5.1.19 to 5.1.21) and the strong likelihood that the nearby fossil localities originated from the same geologic formation as that which underlies the project at depth, the Pleistocene old alluvial fan deposits can be considered to have a High potential to yield

significant paleontological resources.

City of Fontana Assessment of Paleontological Sensitivity

Section 5.4.1.5 of the City of Fontana's Draft EIR for the General Plan (City of Fontana 2018b) describes the paleontological sensitivity of the strata underlying the city. Based on Pleistocene vertebrate fossils recovered from the city's southwestern area (SBCM locs. 5.1.11, 5.1.14 to 5.1.17, and 5.1.19 to 5.1.21), the City of Fontana considers subsurface "older fan" Pleistocene deposits to have a high potential for yielding fossils. The City of Fontana considers the overlying "younger fan" deposits at the surface as having no potential to yield significant paleontological resources.

VI. CONCLUSIONS AND RECOMMENDATIONS

Research has confirmed the existence of potentially fossiliferous late to middle Pleistocene alluvial fan deposits ("Qof_3" on Figure 3) at the surface of the project. The occurrence of terrestrial vertebrate fossils at shallow depths from Pleistocene alluvial fan sediments across the Inland Empire is well documented. The presence of the saber-toothed cat (*Smilodon*) fossil just south of the project is particularly noteworthy. The "High" paleontological sensitivity rating typically assigned to Pleistocene alluvial fan sediments for yielding paleontological resources supports the recommendation that paleontological monitoring be implemented during mass grading and excavation activities in undisturbed Pleistocene alluvial fan sediments to mitigate any adverse impacts (loss or destruction) to potential nonrenewable paleontological resources. Full-time monitoring of undisturbed alluvial fan deposits at the project is warranted starting at the surface.

Based on the conclusions and recommendations outlined above, a Paleontological Resources Impact Mitigation Program (PRIMP) is recommended prior to approval of the grading permit. A suggested PRIMP is outlined below. When implemented with the provisions of CEQA, the City of Fontana (2018a), and the guidelines of the Society of Vertebrate Paleontology (2010), this PRIMP would mitigate any adverse impacts (loss or destruction) to potential nonrenewable paleontological resources (fossils), if present, to a level below significant:

1. Monitoring of mass grading and excavation activities in areas identified as likely to contain paleontological resources shall be performed by a qualified paleontologist or paleontological monitor. Starting at the surface, monitoring should be conducted full-time in areas of grading or excavation in undisturbed sediments of alluvial fan deposits.
2. Paleontological monitors will be equipped to salvage fossils as they are unearthed to avoid construction delays. The monitor must be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens in a timely manner. Monitoring may be reduced if the potentially fossiliferous units are not present in the subsurface, or, if present, are determined on exposure and examination by qualified

paleontological personnel to have low potential to contain fossil resources. The monitor shall notify the project paleontologist, who will then notify the concerned parties of the discovery.

3. Paleontological salvage during trenching and boring activities is typically from the generated spoils and does not delay the trenching or drilling activities. Fossils are collected and placed in cardboard flats or plastic buckets and identified by field number, collector, and date collected. Notes are taken on the map location and stratigraphy of the site, which is photographed before it is vacated, and the fossils are removed to a safe place. On mass grading projects, discovered fossil sites are protected by flagging to prevent them from being overrun by earthmovers (scrapers) before salvage begins. Fossils are collected in a similar manner, with notes and photographs being taken before removing the fossils. Precise location of the site is determined with the use of handheld GPS units. If the site involves remains from a large terrestrial vertebrate, such as large bone(s) or a mammoth tusk, that is/are too large to be easily removed by a single monitor, a fossil recovery crew shall excavate around the find, encase the find within a plaster and burlap jacket, and remove it after the plaster is set. For large fossils, use of the contractor's construction equipment may be solicited to help remove the jacket to a safe location.
4. Isolated fossils are collected by hand, wrapped in paper, and placed in temporary collecting flats or five-gallon buckets. Notes are taken on the map location and stratigraphy of the site, which is photographed before it is vacated, and the fossils are removed to a safe place.
5. In accordance with the "Microfossil Salvage" section of the Society of Vertebrate Paleontology guidelines (2010:7), bulk sampling and screening of fine-grained sedimentary deposits (including carbonate-rich paleosols) must be performed if the deposits are identified to possess indications of producing fossil "microvertebrates" to test the feasibility of the deposit to yield fossil bones and teeth.
6. In the laboratory, individual fossils are cleaned of extraneous matrix, any breaks are repaired, and the specimen, if needed, is stabilized by soaking in an archivally approved acrylic hardener (*e.g.,* a solution of acetone and Paraloid B-72).
7. Recovered specimens are prepared to a point of identification and permanent preservation (not display), including screen-washing sediments to recover small invertebrates and vertebrates. Preparation of individual vertebrate fossils is often more time-consuming than for accumulations of invertebrate fossils.
8. Identification and curation of specimens into a professional, accredited public museum repository with a commitment to archival conservation and permanent retrievable storage (*e.g.,* SBCM) shall be conducted. The paleontological program should include a written repository agreement prior to the initiation of mitigation activities. Prior to curation, the lead agency (*e.g.,* the City of Fontana) will be consulted on the

repository/museum to receive the fossil material.

9. A final report of findings and significance will be prepared, including lists of all fossils recovered and necessary maps and graphics to accurately record their original location(s). The report, when submitted to and accepted by the appropriate lead agency, will signify satisfactory completion of the project program to mitigate impacts to any potential nonrenewable paleontological resources (*i.e.,* fossils) that might have been lost or otherwise adversely affected without such a program in place.

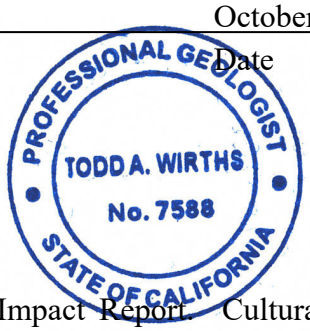
VII. CERTIFICATION

I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this paleontological report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief, and have been compiled in accordance with CEQA criteria.

October 20, 2022

Todd A. Wirths
Senior Paleontologist
California Professional Geologist No. 7588

Date



VIII. REFERENCES

City of Fontana. 2018a. Final Environmental Impact Report. Cultural Resources, Fontana Forward General Plan Update 2015-2035. State Clearinghouse #2016021099. Electronic document, https://www.fontana.org/DocumentCenter/View/29525/Final-Environmental-Impact-Report-for-the-General-Plan-Update, accessed June 6, 2022.

City of Fontana. 2018b. Draft Environmental Impact Report, Chapter 5.4. Cultural Resources, Fontana Forward General Plan Update 2015-2035. Electronic document, https://www.fontana.org/Document Center/View/26716/54-Cultural-Resources, accessed June 6, 2022.

Cohen, K.M. and Gibbard, P.L. 2011. Global chronostratigraphical correlation table for the last 2.7 million years. Subcommission on Quaternary Stratigraphy (International Commission on Stratigraphy), Cambridge, England.

Cortez, C. 2021. Paleontology records review for proposed 14801 Slover Avenue Project in San Bernardino County, California. Unpublished letter report prepared for Brian F. Smith and Associates, Inc., Poway, California, by the Division of Earth Sciences at the San Bernardino County Museum, Redlands, California.

DeLorme World Basemap. 2020. A seamless global data set with horizontal accuracy of +/- 50 meters. Electronic document, https://server.arcgisonline.com/ArcGIS/rest/services/ Specialty/DeLorme_World _Base_Map/MapServer.

Morton, D.M. 2003. Preliminary geologic map of the Fontana 7.5' Quadrangle, San Bernardino and Riverside Counties, California, Version 1.0: U.S. Geological Survey Open-File Report 03-418, scale 1:24,000.

Morton, D.M. and Miller, F.K. 2006. Geologic map of the San Bernardino and Santa Ana 30' x 60' quadrangles, California: U.S. Geological Survey Open-File Report 06-1217, scale 1:100,000.

Reynolds, R.E. 2018. West Valley Connector, Geology and Paleontological Resources, *in* Aron, G., Richards, C., and Webster, B., Paleontological Identification Report and Evaluation Report, West Valley Connector Project. Unpublished consulting report prepared for the San Bernardino County Transportation Authority, by Paleo Solutions, Inc., Monrovia, California.

Society of Vertebrate Paleontology. 2010. Standard procedures for the assessment and mitigation of adverse impacts to paleontological resources; by the SVP Impact Mitigation Guidelines Revision Committee. Electronic document, https://vertpaleo.org/wp-content/uploads/2021/01/SVP_Impact_Mitigation_Guidelines-1.pdf.

United States Geological Survey. 1980. *Fontana, California* (USGS 7.5' quadrangle series).

APPENDIX A

Qualifications of Key Personnel

Todd A. Wirths, MS, PG No. 7588

Senior Paleontologist

Brian F. Smith and Associates, Inc.
14010 Poway Road • Suite A •
Phone: (858) 679-8218 • Fax: (858) 679-9896 • E-Mail: twirths@bfsa-ca.com

Education

Master of Science, Geological Sciences, San Diego State University, California **1995**

Bachelor of Arts, Earth Sciences, University of California, Santa Cruz **1992**

Professional Certifications

California Professional Geologist #7588, 2003
Riverside County Approved Paleontologist
San Diego County Qualified Paleontologist
Orange County Certified Paleontologist
OSHA HAZWOPER 40-hour trained; current 8-hour annual refresher

Professional Memberships

Board member, San Diego Geological Society
San Diego Association of Geologists; past President (2012) and Vice President (2011)
South Coast Geological Society
Southern California Paleontological Society

Experience

Mr. Wirths has more than a dozen years of professional experience as a senior-level paleontologist throughout southern California. He is also a certified California Professional Geologist. At BFSA, Mr. Wirths conducts on-site paleontological monitoring, trains and supervises junior staff, and performs all research and reporting duties for locations throughout Los Angeles, Ventura, San Bernardino, Riverside, Orange, San Diego, and Imperial Counties. Mr. Wirths was formerly a senior project manager conducting environmental investigations and remediation projects for petroleum hydrocarbon-impacted sites across southern California.

Selected Recent Reports

2019 *Paleontological Assessment for the 10575 Foothill Boulevard Project, City of Rancho Cucamonga, San Bernardino County, California*. Prepared for T&B Planning, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2019 *Paleontological Assessment for the MorningStar Marguerite Project, Mission Viejo, Orange County, California.* Prepared for T&B Planning. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2019 *Paleontological Monitoring Report for the Nimitz Crossing Project, City of San Diego.* Prepared for Voltaire 24, LP. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2019 *Paleontological Resource Impact Mitigation Program (PRIMP) for the Jack Rabbit Trail Logistics Center Project, City of Beaumont, Riverside County, California.* Prepared for JRT BP 1, LLC. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Monitoring Report for the Oceanside Beachfront Resort Project, Oceanside, San California.* Prepared for S.D. Malkin Properties. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Resource Impact Mitigation Program for the Nakase Project, Lake Forest, Orange County, San California.* Prepared for Glenn Lukos Associates, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Resource Impact Mitigation Program for the Sunset Crossroads Project, Banning, Riverside County*. Prepared for NP Banning Industrial, LLC. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Assessment for the Ortega Plaza Project, Lake Elsinore, Riverside County*. Prepared for Empire Design Group. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Resource Record Search Update for the Green River Ranch III Project, Green River Ranch Specific Plan SP00-001, City of Corona, California*. Prepared for Western Realco. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Assessment for the Cypress/Slover Industrial Center Project, City of Fontana, San Bernardino County, California*. Prepared for T&B Planning, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Monitoring Report for the Imperial Landfill Expansion Project (Phase VI, Segment C-2), Imperial County, California*. Prepared for Republic Services, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2021 *Paleontological Assessment for the Manitou Court Logistics Center Project, City of Jurupa Valley, Riverside County, California*. Prepared for Link Industrial. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2021 *Paleontological Resource Impact Mitigation Program for the Del Oro (Tract 36852) Project, Menifee, Riverside County*. Prepared for D.R. Horton. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2021 *Paleontological Assessment for the Alessandro Corporate Center Project (Planning Case PR-2020-000519), City of Riverside, Riverside County, California*. Prepared for OZI Alessandro, LLC. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2021 *Paleontological Monitoring Report for the Boardwalk Project, La Jolla, City of San Diego*. Prepared for Project Management Advisors, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

APPENDIX B

Fossil Locality Search Report

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www.SBCounty.gov
Crystal Cortez
Curator of Earth Sciences
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SAN BERNARDINO COUNTY

San Bernardino County Museum

Division of Earth Sciences

29 June, 2021

Brian F. Smith and Associates, Inc.
Attn: Todd Wirths
14010 Poway Rd.,
Poway CA 92064

PALEONTOLOGY RECORDS REVIEW for proposed 14801 Slover Avenue Project in San Bernardino County, California

Dear Mr. Wirths,

The Division of Earth Sciences of the San Bernardino County Museum (SBCM) has completed a records search for the above-named project in San Bernardino County, California. The proposed Slover Avenue project is located near in the City of Fontana, California as shown on the United States Geological Survey (USGS) 7.5-minute Fontana, California quadrangles.

Previous geologic mapping (Morton, 2003) indicates that the study area is located entirely upon alluvial fan deposits of late Holocene age (= Qyf). These recent sediments have low potential to contain significant nonrenewable paleontologic resources. However, these Holocene sediments form a thin veneer overlying subsurface Pleistocene alluvial fan deposits (= Qof3). These older fan sediments have high potential to contain fossil resources. Pleistocene alluvium elsewhere in San Bernardino County and the Inland Empire has been repeatedly demonstrated to have high paleontologic sensitivity (Jefferson, 1991; Reynolds and Reynolds, 1991; Woodburne, 1991; Springer and Scott, 1994; Scott, 1997; Springer and others, 1998, 1999; Anderson and others, 2002). Fossils recovered from these Pleistocene sediments represent extinct taxa including mammoths, mastodons, ground sloths, dire wolves, sabretoothed cats, large and small horses, large and small camels, and bison (Jefferson, 1991; Reynolds and Reynolds, 1991; Woodburne, 1991; Springer and Scott, 1994; Scott, 1997; Springer and others, 1998, 1999).

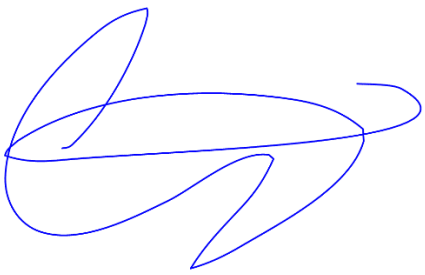
BOARD OF SUPERVISORS
Col. Paul Cook (Ret.) First District | Janice Rutherford Second District | Dawn Rowe Third District | Curt Hagman Chairman, Fourth District | Joe Baca, Jr. Fifth District
Leonard X. Hernandez Chief Executive Officer

For this review, I conducted a search of the Regional Paleontological Locality Inventory (RPLI) at the SBCM. The results of this search indicate that no paleontological resources have been discovered within the proposed project site; however, there are several sites within a 2 mile buffer. Located approximately 1.5 miles southwest of the proposed site are eight (8) SBCM localities from Pleistocene aged deposits; SBCM 5.1.11, 5.1.14, 5.1.15, 5.1.16, 5.1.17, 5.1.19, 5.1.20, and 5.1.21. Locality SBCM 5.1.11 uncovered a partial *Smilodon* skull at around a five (5) foot depth as estimated by trenching machine installing a pipeline. At SBCM 5.1.14 remains belonging to *Gyraulus* sp, *Stagnicola* sp, Gastropoda, Bivalvia, *Sylvilagus* sp, *Thomomys* sp, *Neotoma* sp, *Microtus californicus*, *Mammut pacificus* were discovered in very fine silty clayey sand with occasional pebbles. A single *Bison* sp. tooth was recovered from cemented clayey silty moderately sorted sand with small caliche rootlets at SBCM 5.1.15. Clayey silty fine sand with occasional larger subangular grains at locality SBCM 5.1.16 yielded bone fragments of *Camelops hesternus.* In the same type of sediment SBCM 5.1.17 and SBCM 5.1.19 unearthed remains of a large mammal along with fragmentary material of *Mammut pacificus*. SBCM 5.1.20 had a dry light olive gray subangular san that yielded fragments from *Camelops hesternus*, Artiodactyla, and a large mammal. SBCM locality 5.1.21 found fragmentary material from *Equus* sp. at an approximate 21 foot depth.

This records search covers only the paleontological records of the San Bernardino County Museum. It is not intended to be a thorough paleontological survey of the proposed project area covering other institutional records, a literature survey, or any potential on-site survey.

Please do not hesitate to contact us with any further questions that you may have.

Sincerely,



Crystal Cortez, Curator of Earth Sciences
Division of Earth Sciences
San Bernardino County Museum

APPENDIX E: PRELIMINARY HYDROLOGY REPORT

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Jan-2023
2022-318

11115 Hemlock Avenue

City of Fontana, CA
MCN22-000143
DRP22-000064

Preliminary Hydrology Report

2nd PC
Prelim Hydrology Study
D Hammer
February 16, 2023

Comments provided however, this report is acceptable for entitlements review. Please address the comments when submitting the final hydrology report with the offsite improvement plans.

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Prepared For:
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Prepared By:
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1. INTRODUCTION

The purpose of this study is to demonstrate that the proposed project site can be designed to provide adequate flood protection without adversely impacting existing off-site drainage systems or adjacent properties. The scope of this analysis includes the pre-developed and post-developed runoff analysis.

2. EXISTING SITE DESCRIPTION

2.1. EXISTING SITE TOPOGRAPHY & HYDROLOGIC PATTERNS

The project site is located on Hemlock Avenue, approximately 750-ft north of Jurupa Avenue in the City of Fontana, County of San Bernardino. The site is currently bounded to the north by existing commercial developments, to the east by Beech Avenue, to the south by an industrial development, and to the west by Hemlock Avenue.

The total area, after dedication, of the project site is 37.40 acres. The site was once utilized as a mobile trailer storage yard. The site is currently vacant with two existing buildings remaining to be demolished. Ground surface cover throughout the majority of the site consists of decomposed granite with areas of asphalt concrete pavements surrounding the existing buildings. Most of the northern side of the site consists of Portland cement concrete. Landscape planters are present along the west and east property lines of the site.

The site consists of two (2) drainage areas in the existing condition: Drainage Area A (DA-A) and Drainage Area B (DA-B). The natural drainage pattern for DA-A in the existing condition is northeast to southwest. Stormwater sheet flow towards an existing gutter adjacent to the existing screen wall along the west property line. There are two existing openings underneath the screen wall located at the west-central area and southwest corner of the site to allow stormwater to discharge onto Hemlock Avenue. Runoff ultimately is captured by the existing street catch basins, which is connected to an existing 66-inch public storm drain system in Hemlock Avenue.

The natural drainage pattern for DA-B in the existing condition is northwest to southeast. Stormwater sheet flow towards an existing gutter adjacent to the existing screen wall along the east property line. There is an opening underneath the screen wall located at southeast corner of the site to allow stormwater to discharge onto Beech Avenue. Runoff ultimately is captured by the existing street catch basins, which is connected to an existing 60-inch public storm drain system in Beech Avenue. See Figure 1 for the pre-development drainage map.

3. PROJECT SITE DESCRIPTION

3.1. PROJECT DESCRIPTION & HYDROLOGIC PATTERNS

The envisioned development is a proposed industrial facility with a proposed building of approximately 750,000 square feet. Proposed auto parking spaces are located south of the site, and trailer parking spaces are located west and east of the site. Docking areas are located west and east of the proposed building. Open landscape planter areas are proposed around the perimeter of the site.

The proposed development will alter the natural drainage pattern due to grading feasibility of the proposed development, however, the point of connection into the existing public storm system will be maintained. Surface runoff will be captured by a series of proposed on-site catch basins and into the proposed on-site storm drainage system. Stormwater from building roof areas will be captured by roof leaders and discharge onto the ground surface and into the proposed catch basins. The proposed on-site storm drain systems will convey the flows into two (2) proposed underground detention infiltration chambers. These chamber systems will be designed to meet the

project's water quality requirements and provide sufficient storage for the increase stormwater flow rate based on the proposed development of the site. The proposed chamber system will be designed to control the outflow discharge into the existing public storm drain systems. The west half of the site will ultimately discharge into the existing 66-inch public storm drain system in Hemlock Avenue. The east half of the site will ultimately discharge into the existing 60-inch public storm drain system in Beech Avenue.

4. RESULTS & ANALYSIS

4.1. METHODOLOGY

The proposed drainage areas were analyzed using the San Bernardino (SB) County Hydrology Manual and City of Fontana Master Storm Drainage Plan Study (FMDP). The main methods used for this project were the Rational Method, Synthetic Unit Hydrograph Method, and Basin Routing Analysis. Civil Design software was used to compute the data. Solving for the Rational Method returns the peak flow rate. Unit Hydrograph analysis will determine the total volume generated from a storm event. Basin Routing Analysis will analyze the storage volume and outflow discharge for the proposed underground infiltration chamber. Per the FMDP, the 2-, 10-, 25-, and 100-year storms were analyzed.

According to the City of Fontana Soils Map, the site is entirely composed of type A soil (See Appendix D). The proposed land use was analyzed as commercial for both the pre- and post-development condition. According to the county's manual, Antecedent Moisture Condition (AMC) I was used for the 2-year storm event. AMC II was used for the 10- and 25-year storm event. AMC III was used for the 100-year storm event in order to give more confidence to mitigate any increase runoff, if needed.

For the rational method analysis, the runoff coefficient is determined by the land use for each condition. The rainfall intensities are based on the time of concentration for each drainage area and the intensity-duration curves provided in the county's manual. The flow lengths and terrain elevations were determined using existing topography for the pre-development condition and the conceptual grading plans for the post-development condition.

The pre-development peak flow rates were calculated based on the guidelines on the FMDP, which differs from the SB County Hydrology Manual. The 10-year peak flow rates were calculated using the 5-year rainfall. The 25-year peak flow rates were calculated using the 10-year rainfall. The 100-year peak flow rates were calculated using the 25-year rainfall and AMC II

For the unit hydrograph analysis, the lag time was determined by using the time of concentration based on the rational method analysis. Rainfall depths were obtained from the National Oceanic and Atmospheric Administration (NOAA) Point Precipitation Frequency Estimates. The rainfall depth data are included in Appendix E. The rainfall used in the hydrology calculations are summarized on Table 4.1.

Table 4.1: Rainfall Depths

Duration	Storm Event				
	2-Year	5-year	10-year	25-year	100-year
1-hour	0.518	0.684	0.823	1.02	1.33
6-hour	1.36	1.76	2.07	2.49	3.11
24-hour	2.46	3.22	3.81	4.57	5.69

For the basin routing analysis, the results from the unit hydrograph analysis were used to determine the amount of stormwater entering and existing and exiting the proposed underground infiltration chamber at each time interval. Per the FMDP Detention Basin Criteria, the basin capacity and outlet size shall be such that the post-development

peak flow rate generated by the development shall be less than or equal to 90% of the pre-development peak flow rate from the site.

4.2. HYDROLOGY RESULTS & ANALYSIS

The complete rational method analysis and results are included in Appendix B. The complete unit hydrograph analysis and results are included in Appendix C. The tables below provide a summary of the peak flow rate and runoff volume for the pre-development and post-development condition.

Table 4.2.1: Pre-Development Hydrology Summary Table

Storm Event	Area (Acres)	Tc (min.)	Flow Rate (cfs) (Rational Method)	Volume (cf) (Unit Hydrograph)
Drainage Area A				
2-Year	29.19	13.85	11.44	101,782
10-Year			22.55	137,170
25-year			30.10	166,242
100-Year			40.48	205,146
Drainage Area B				
2-Year	8.22	18.19	1.18	9,583
10-Year			3.70	13,525
25-year			5.95	17,097
100-Year			8.93	22,220

Table 4.2.2: Post-Development Hydrology Summary Table

Storm Event	Area (Acres)	Tc (min.)	Flow Rate (cfs) (Rational Method)	Volume (cf) (Unit Hydrograph)
Drainage Area A				
2-Year	24.47	8.47	33.24	176,666
10-Year			54.11	283,436
25-year			67.58	344,085
100-Year			89.14	444,796
Drainage Area B				
2-Year	12.94	8.06	19.44	96,494
10-Year			31.34	152,939
25-year			38.99	187,683
100-Year			51.18	240,848

Based on the rational method analysis, the post-development flow rate increased compare to the pre-development flow rate. Furthermore, the post-development runoff volume increased compare to the pre-development runoff volume. The increase in flow rate and runoff volume was a result from increase in impervious area.

To mitigate the increase peak flow rate, two (2) underground detention infiltration chambers are proposed for the project. The size of these chambers and the outlet control structure were determined from the basin routing analysis. These chamber systems will reduce any potential impacts to the downstream off-site storm drain system and give more confidence to mitigate the increase in runoff. Furthermore, the proposed chamber system will mitigate the increase drainage area for Drainage Area B, which runoff ultimately discharge into the existing 60-inch

public storm drain system in Beech Avenue. The basin routing analysis are included in Appendix D. Table 4.2.3 shows the basin routing analysis summary table.

Table 4.2.3: Basin Routing Analysis Summary Table					
Storm Event	90% of Pre-Development Flow Rate (cfs)	Peak Flow Rate - In (cfs)	Peak Flow Rate - Out (cfs)	Storm Water Peak Depth (ft)	Freeboard (ft)
Drainage Area A – Chamber A					
2-Year	10.30	33.24	1.49	3.61	5.39
10-Year	20.29	54.11	11.20	4.96	4.04
25-year	27.09	67.58	17.49	5.67	3.33
100-Year	36.43	89.14	23.30	6.50	2.50
Drainage Area B – Chamber B					
2-Year	1.07	19.44	1.00	3.06	5.94
10-Year	3.33	31.34	2.90	4.52	4.48
25-year	5.35	38.99	5.29	5.37	3.63
100-Year	8.04	51.18	7.59	6.73	2.27

Table 4.2.4: Result Analysis Summary Table	
Hydrology Results & Analysis Summary Table:	**<u>Drainage Area A</u>** Total Area **= 1,065,855 SF (24.47 Acres)** $Q_{100,\ PRE}$ = **40.48 CFS (36.43 CFS – 90% of existing)** $Q_{100,\ POST}$ = **89.14 CFS** ΔQ_{100} = **+ 52.71 CFS** DCV = **93,857 CF** (See Water Quality Management Plan) **Volume Provided = 255,288 CF** (Underground Infiltration Chamber System A) $Q_{100,\ ATTENTUATED}$ = **23.30 CFS** $Q_{100,\ PRE} > Q_{100,\ ATTENTUATED}$ (Satisfied) **<u>Drainage Area B</u>** Total Area **= 563,558 (12.94 Acres)** $Q_{100,\ PRE}$ = **8.93 CFS (8.04 CFS – 90% of existing)** $Q_{100,\ POST}$ = **51.18 CFS** ΔQ_{100} = **+ 43.14 CFS** DCV = **52,687 CF** (See Water Quality Management Plan) **Volume Provided = 144,007 CF** (Underground Infiltration Chamber System B) $Q_{100,\ ATTENTUATED}$ = **7.59 CFS** $Q_{100,\ PRE} > Q_{100,\ ATTENTUATED}$ (Satisfied)

5. CONCLUSION

The proposed development would not create or contribute runoff that would exceed the capacity of the existing downstream storm drain system. Furthermore, the underground infiltration systems will be designed to accommodate the 100-year storm event and would not exceed the flow rates and runoff volumes generated by the existing condition. Once construction is complete, there would not be any substantial increase in flood boundaries, levels or frequencies in any areas outside the development. The hydrologic analyses and calculations were designed in accordance with the San Bernardino County Hydrology Manual and City of Fontana Master Storm Drainage Plan Study. The results from the analysis will be the basis for the grading and on-site storm-drain construction documents for the project.

Evaluation of the appropriateness of guidelines and the accuracy of County data was beyond the scope of this study. Usage of this report is limited to address the purpose and scope previously defined by the project owner. The contents of this report are professional opinion and as such, are not to be considered a guaranty or warranty.

6. REFERENCES

1. City of Fontana Water Quality Management Plan Handbook dated September 2016

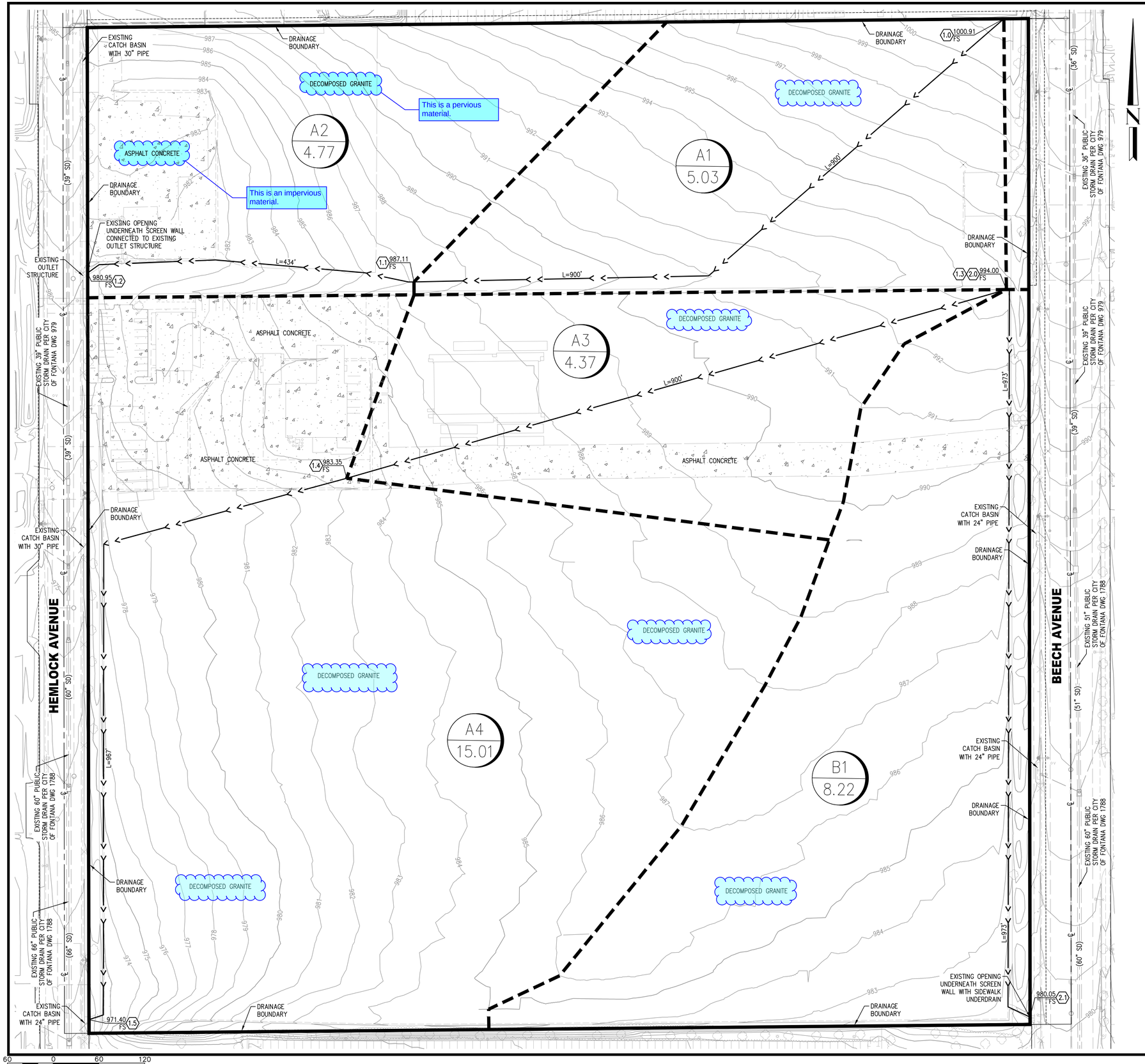
2. City of Fontana Master Storm Drainage Plan Study dated June 1992

3. National Oceanic and Atmospheric Administration (NOAA) Atlas 14 Point Precipitation Frequency Estimates

4. San Bernardino County Hydrology Manual dated August 1986

APPENDIX A

HYDROLOGY EXHIBITS



LEGEND

- PROJECT DRAINAGE BOUNDARY
- FLOW PATH
- SUB-DRAINAGE AREA ID
- SUB-DRAINAGE AREA IDENTIFIER
- SUB-DRAINAGE SURFACE AREA (ACRE)
- FLOW ARROW
- SURFACE FLOW NODE

ABBREVIATIONS

CF	CUBIC FEET
CL OR ℄	CENTERLINE
DA	DRAINAGE AREA
ES	EXISTING SURFACE ELEVATION
EX	EXISTING
HR	HOUR
IN	INCH/INCHES
INV	INVERT ELEVATION
L	LENGTH
R/W	RIGHT OF WAY
PL OR ℙ	PROPERTY LINE
PROP	PROPOSED
SD	STORM DRAIN
TYP	TYPICAL
ULT	ULTIMATE
V	VOLUME
W	WIDTH

PROJECT SITE SUMMARY

SITE AREA:	29.19 ACRE (AREA A) 8.22 ACRE (AREA B)	
SOIL GROUP:	A	(PER USDA WEB SOIL SURVEY)
IMPERVIOUS:	34%	(PRE-DEVELOPMENT)
ISOHYETALS:	0.518" 1.33"	(2-YEAR 1 HOUR) (100-YEAR 1 HOUR)
CN NUMBER:	32	(SOIL GROUP A)
FREQUENCY:	100 YEAR	(FOR STORM DRAIN DESIGN)
METHOD:	SAN BERNARDINO COUNTY HYDROLOGY MANUAL	

GENERAL NOTES

1. SEE PRELIMINARY HYDROLOGY REPORT, PREPARED BY WESTLAND GROUP, FOR THE COMPLETE PRE-DEVELOPMENT HYDROLOGY CALCULATIONS.
2. CALCULATIONS WERE BASED ON THE REQUIREMENTS ON THE SAN BERNARDINO HYDROLOGY MANUAL FOR 100 YEAR STORM.
3. ALL EXISTING ELEVATIONS AND INVERT ELEVATIONS ARE APPROXIMATE.
4. EXISTING TOPOGRAPHY INFORMATION AS SHOWN ON THIS DRAWING IS BASED ON THE TOPOGRAPHIC AERIAL SURVEY BY WESTLAND GROUP INC,. DATED AUGUST 10TH, 2022.

HYDROLOGY SUMMARY TABLE

AREA A

SUBAREAS ID	RUNOFF COEFFICIENT "C"	TIME OF CONC. "Tc" (MIN.)	RAINFALL INTENSITY "I" (INCH/HOUR)	DRAINAGE AREA (AC)	RUNOFF FLOW RATE "Q_{100}" (CFS)
A1	0.881	10.65	3.752	5.03	16.63
A2	0.879	12.51	3.407	4.77	12.73
A3	0.665	18.32	2.710	4.37	7.88
A4	0.651	20.20	2.556	15.01	24.37
TOTAL:	0.720	13.63	3.237	29.19	59.13

AREA B

SUBAREAS ID	RUNOFF COEFFICIENT "C"	TIME OF CONC. "Tc" (MIN.)	RAINFALL INTENSITY "I" (INCH/HOUR)	DRAINAGE AREA (AC)	RUNOFF FLOW RATE "Q_{100}" (CFS)
B1	0.666	18.19	2.722	8.22	14.91

PREPARED BY:
WestLAND Group, Inc. Engineering • Geospatial • Land Planning
4150 CONCOURS, ONTARIO, CA 91764
PHONE: (909) 989-9789 FAX: (909) 989-9660

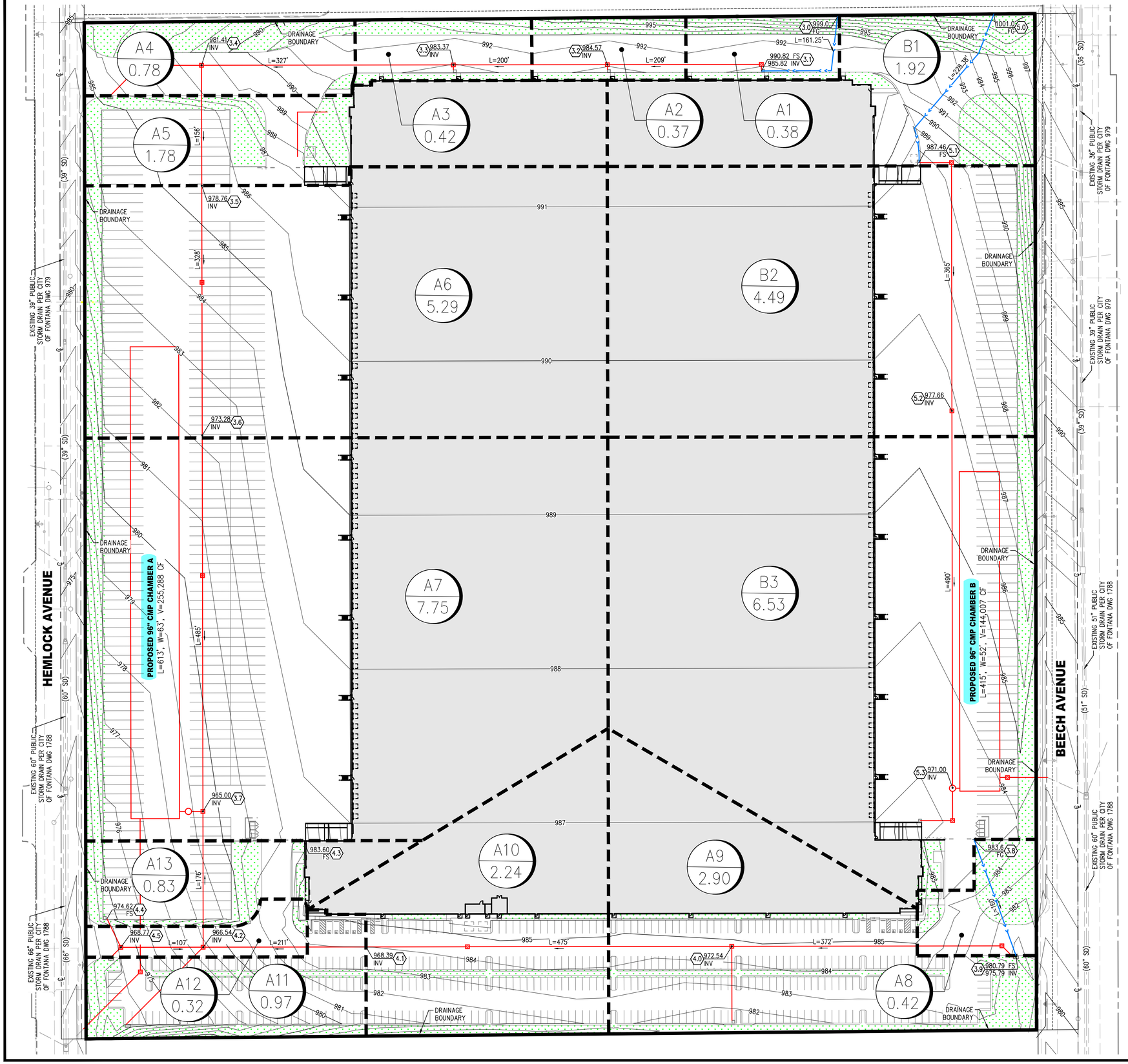
JOB NUMBER: 2022-318

CITY OF FONTANA, CALIFORNIA

11115 HEMLOCK AVENUE

SCALE: 1"=60'	**PRE - DEVELOPMENT DRAINAGE MAP**	FIGURE NO.: 1
DATE: 01/26/2023		
DRAWN BY: JL		

Drawing Name: P:\Year 2022\2022-318 Hemlock - Prologis - Moyra Romrez\06 Engineering\Reports\Hydrology\3 Exhibits\Preliminary\2022-318_EXH_HYD_PRE.dwg
Last Opened: Jan 26, 2023 - 10:39am By: Jleung



LEGEND

- PROJECT DRAINAGE BOUNDARY
- FLOW PATH
- STORM DRAIN
- SUB-DRAINAGE AREA ID
- X / X — SUB-DRAINAGE AREA IDENTIFIER
- SUB-DRAINAGE SURFACE AREA (ACRE)
- 3.0 — SURFACE FLOW NODE

ABBREVIATIONS

CF	CUBIC FEET
CL OR ℄	CENTERLINE
CMP	CORRUGATED METAL PIPE
DA	DRAINAGE AREA
EX	EXISTING
FS	FINISHED SURFACE ELEVATION
HR	HOUR
IN	INCH/INCHES
INV	INVERT ELEVATION
L	LENGTH
R/W	RIGHT OF WAY
PL OR ℙ	PROPERTY LINE
PROP	PROPOSED
SD	STORM DRAIN
TYP	TYPICAL
ULT	ULTIMATE
V	VOLUME
W	WIDTH

PROJECT SITE SUMMARY

SITE AREA:	24.46 ACRE (AREA A) 12.94 ACRE (AREA B)	
SOIL GROUP:	A	(PER USDA WEB SOIL SURVEY)
IMPERVIOUS:	89%	(POST-DEVELOPMENT)
ISOHYETALS:	0.518" 1.33"	(2-YEAR 1 HOUR) (100-YEAR 1 HOUR)
CN NUMBER:	32	(SOIL GROUP A)
FREQUENCY:	100 YEAR	(FOR STORM DRAIN DESIGN)
METHOD:	SAN BERNARDINO COUNTY HYDROLOGY MANUAL	

GENERAL NOTES

1. SEE PRELIMINARY HYDROLOGY REPORT, PREPARED BY WESTLAND GROUP, FOR THE COMPLETE POST-DEVELOPMENT HYDROLOGY CALCULATIONS.
2. CALCULATIONS WERE BASED ON THE REQUIREMENTS ON THE SAN BERNARDINO HYDROLOGY MANUAL FOR 100 YEAR STORM.
3. PROPOSED ON-SITE DRAINAGE SYSTEM LAYOUT IS PRELIMINARY.
4. ALL FINISH ELEVATIONS AND INVERT ELEVATIONS ARE APPROXIMATE.

HYDROLOGY SUMMARY TABLE

AREA A

SUBAREAS ID	RUNOFF COEFFICIENT "C"	TIME OF CONC. "Tc" (MIN.)	RAINFALL INTENSITY "I" (INCH/HOUR)	DRAINAGE AREA (AC)	RUNOFF FLOW RATE "Q_{100}" (CFS)
A1	0.851	5.17	5.787	0.38	1.87
A2	0.851	5.45	5.610	0.37	1.77
A3	0.850	5.78	5.416	0.42	1.94
A4	0.835	8.71	4.235	0.78	2.76
A5	0.873	7.42	4.661	1.78	7.24
A6	0.894	7.76	4.536	5.29	21.45
A7	0.893	8.76	4.221	7.75	29.22
A8	0.825	6.88	4.876	0.42	1.69
A9	0.876	9.28	4.076	2.90	10.35
A10	0.884	10.14	3.864	2.24	7.65
A11	0.858	7.83	4.513	0.97	3.79
A12	0.896	4.93	5.957	0.32	1.71
A13	0.866	6.98	4.837	0.83	3.48
TOTAL:	--	--	--	24.47	89.14

AREA B

SUBAREAS ID	RUNOFF COEFFICIENT "C"	TIME OF CONC. "Tc" (MIN.)	RAINFALL INTENSITY "I" (INCH/HOUR)	DRAINAGE AREA (AC)	RUNOFF FLOW RATE "Q_{100}" (CFS)
B1	0.861	5.42	5.627	1.92	9.30
B2	0.894	7.24	4.731	4.49	18.99
B3	0.892	8.78	4.215	6.53	24.54
TOTAL:	--	--	--	12.94	51.18

UNDERGROUND INFILTRATION CHAMBER SUMMARY

SUBAREAS ID	CHAMBER SYSTEM	24-HOUR RUNOFF VOLUME "V_{100}" (CF)	PROVIDED STORAGE VOLUME (CF)	MAXIMUM PONDING DEPTH (FT)	100-YEAR WSE DEPTH (FT)	ATTENUATED FLOW RATE (CFS)
A	SYSTEM A	444,796	255,288	9.0	6.50	23.30
B	SYSTEM B	240,848	144,007	9.0	6.73	7.59

60 0 60 120
scale 1"= 60' feet

PREPARED BY:
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PHONE: (909) 989-9789 FAX: (909) 989-9660

JOB NUMBER: 2022-318

CITY OF FONTANA, CALIFORNIA

11115 HEMLOCK AVENUE

SCALE: 1"=60'
DATE: 01/26/2023
DRAWN BY: JL

POST - DEVELOPMENT DRAINAGE MAP

FIGURE NO.: 2

Drawing Name: P:\Xref 2022\2022-318 Hemlock - Protogs - Mayra Ramirez\06 Engineering\Reports\Hydrology\3 Exhibits\Preliminary\2022-318_EXH_HYD_POST.dwg
Last Opened: Jan 26, 2023 - 10:36am By: jleung

PRE-DEVELOPMENT HYDROLOGY SUMMARY TABLE - 2, 10, 25, & 100-YEAR									
Subarea	Drainage Area (Ac)	2-YEAR		10-YEAR		25-YEAR		100-YEAR	
		Peak Flow Rate "Q" (cfs)	24-Hr Runoff Volume "V" (cu-ft)	Peak Flow Rate "Q" (cfs)	24-Hr Runoff Volume "V" (cu-ft)	Peak Flow Rate "Q" (cfs)	24-Hr Runoff Volume "V" (cu-ft)	Peak Flow Rate "Q" (cfs)	24-Hr Runoff Volume "V" (cu-ft)
A	29.19	11.44	101,782	22.55	137,170	30.10	166,242	40.48	205,146
B	8.22	1.18	9,583	3.70	13,525	5.95	17,097	8.93	22,220
TOTAL	37.40	12.63	111,365	26.24	150,696	36.05	183,340	49.41	227,366

POST-DEVELOPMENT HYDROLOGY SUMMARY TABLE - 2, 10, 25, & 100-YEAR									
Subarea	Drainage Area (Ac)	2-YEAR		10-YEAR		25-YEAR		100-YEAR	
		Peak Flow Rate "Q" (cfs)	24-Hr Runoff Volume "V" (cu-ft)	Peak Flow Rate "Q" (cfs)	24-Hr Runoff Volume "V" (cu-ft)	Peak Flow Rate "Q" (cfs)	24-Hr Runoff Volume "V" (cu-ft)	Peak Flow Rate "Q" (cfs)	24-Hr Runoff Volume "V" (cu-ft)
A	24.47	33.24	176,666	54.11	283,436	67.58	344,085	89.14	444,796
B	12.94	19.44	96,494	31.34	152,939	38.99	187,683	51.18	240,848
TOTAL	37.40	52.68	273,160	85.44	436,375	106.57	531,767	140.32	685,643

Check pervious area ratios for pre-developed condition calculations.

APPENDIX B

RATIONAL METHOD ANALYSIS

PRE-DEVELOPMENT HYDROLOGY SUMMARY TABLE - 100 YEAR					
Subarea	Runoff Coefficient "C"	Time of Conc. "Tc" (min)	Rainfall Intensity "I" (in/hr)	Drainage Area (Ac)	Peak Flow Rate "Q" (cfs)
AREA A					
A1	0.869	10.65	2.878	5.03	12.58
A2	0.866	12.65	2.596	4.77	9.45
A3	0.519	18.32	2.078	4.37	4.71
A4	0.490	20.67	1.933	15.01	13.66
SUBTOTAL	--	--	--	29.19	40.48
AREA B					
B1	0.521	18.19	2.087	8.22	8.93
TOTAL	--	--	--	37.40	49.41

POST-DEVELOPMENT HYDROLOGY SUMMARY TABLE - 100 YEAR					
Subarea	Runoff Coefficient "C"	Time of Conc. "Tc" (min)	Rainfall Intensity "I" (in/hr)	Drainage Area (Ac)	Peak Flow Rate "Q" (cfs)
AREA A					
A1	0.851	5.17	5.787	0.38	1.87
A2	0.851	5.45	5.610	0.37	1.77
A3	0.850	5.78	5.416	0.42	1.94
A4	0.835	8.71	4.235	0.78	2.76
A5	0.873	7.42	4.661	1.78	7.24
A6	0.894	7.76	4.536	5.29	21.45
A7	0.893	8.76	4.221	7.75	29.22
A8	0.825	6.88	4.876	0.42	1.69
A9	0.876	9.28	4.076	2.90	10.35
A10	0.884	10.14	3.864	2.24	7.65
A11	0.858	7.83	4.513	0.97	3.79
A12	0.896	4.93	5.957	0.32	1.71
A13	0.866	6.98	4.837	0.83	3.48
SUBTOTAL	--	--	--	24.47	89.14
AREA B					
B1	0.861	5.42	5.627	1.92	9.30
B2	0.894	7.24	4.731	4.49	18.99
B3	0.892	8.78	4.215	6.53	24.54
SUBTOTAL	--	--	--	12.94	51.18
TOTAL	--	--	--	37.40	140.32

APPENDIX B.1

RATIONAL METHOD ANALYSIS

PRE-DEVELOPMENT CONDITIONS – 2 YEAR

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 10/18/22

JOB NO. 2022-318
11115 HEMLOCK AVENUE
2 YEAR, RATIONAL METHOD
PRE-CONDITION, AREA A

Program License Serial Number 6277

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 2.0
Computed rainfall intensity:
Storm year = 2.00 1 hour rainfall = 0.518 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 1

++

Process from Point/Station 1.000 to Point/Station 1.100
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.100(In/Hr)
Initial subarea data:
Initial area flow distance = 900.000(Ft.)
Top (of initial area) elevation = 1000.910(Ft.)
Bottom (of initial area) elevation = 987.110(Ft.)
Difference in elevation = 13.800(Ft.)
Slope = 0.01533 s(%)= 1.53
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 10.652 min.
Rainfall intensity = 1.461(In/Hr) for a 2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.838
Subarea runoff = 6.163(CFS)
Total initial stream area = 5.030(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.100(In/Hr)

DG is a pervious material. Pervious fractions seems to be 1.00.

++

Process from Point/Station 1.100 to Point/Station 1.200
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 987.110(Ft.)

```
Downstream point elevation =   980.950(Ft.)
Channel length thru subarea  =   434.000(Ft.)
Channel base width      =   10.000(Ft.)
Slope or 'Z' of left channel bank = 100.000
Slope or 'Z' of right channel bank = 100.000
Estimated mean flow rate at midpoint of channel =      8.390(CFS)
Manning's 'N'    = 0.011
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      8.390(CFS)
Depth of flow =   0.125(Ft.), Average velocity =   2.993(Ft/s)
Channel flow top width =   34.946(Ft.)
Flow Velocity =    2.99(Ft/s)
Travel time  =    2.42 min.
Time of concentration =   13.07 min.
Critical depth =      0.170(Ft.)
 Adding area flow to channel
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.1000    Max loss rate(Fm)=     0.100(In/Hr)
Rainfall intensity =     1.293(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.830
Subarea runoff =      4.356(CFS) for    4.770(Ac.)
Total runoff =     10.519(CFS)
Effective area this stream =        9.80(Ac.)
Total Study Area (Main Stream No. 1) =        9.80(Ac.)
Area averaged Fm value =    0.100(In/Hr)
Depth of flow =   0.139(Ft.), Average velocity =   3.177(Ft/s)
Critical depth =      0.189(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.200 to Point/Station        1.500
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =   966.350(Ft.)
Downstream point/station elevation =   959.400(Ft.)
Pipe length  =   623.08(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    10.519(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    10.519(CFS)
Normal flow depth in pipe =   13.97(In.)
Flow top width inside pipe =   15.01(In.)
Critical Depth =   14.95(In.)
Pipe flow velocity =      7.14(Ft/s)
Travel time through pipe =    1.45 min.
Time of concentration (TC) =    14.52 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.200 to Point/Station        1.500
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      9.800(Ac.)
```

seems that this subarea is closer to 75% pervious.

```
Runoff from this stream =     10.519(CFS)
Time of concentration =   14.52 min.
Rainfall intensity =     1.213(In/Hr)
Area averaged loss rate (Fm) =    0.1000(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.300 to Point/Station        1.400
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.9000     Max loss rate(Fm)=     0.900(In/Hr)
Initial subarea data:
Initial area flow distance =   900.000(Ft.)
Top (of initial area) elevation =   994.000(Ft.)
Bottom (of initial area) elevation =   983.350(Ft.)
Difference in elevation =    10.650(Ft.)
Slope =    0.01183  s(%)=       1.18
TC = k(0.496)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   18.321 min.
Rainfall intensity =      1.055(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.133
Subarea runoff =      0.612(CFS)
Total initial stream area =        4.370(Ac.)
Pervious area fraction = 0.900
Initial area Fm value =    0.900(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.400 to Point/Station        1.500
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =   983.350(Ft.)
Downstream point elevation =   971.400(Ft.)
Channel length thru subarea  =   967.000(Ft.)
Channel base width      =    1.500(Ft.)
Slope or 'Z' of left channel bank =   0.000
Slope or 'Z' of right channel bank =   2.667
Estimated mean flow rate at midpoint of channel =      0.644(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    0.500(Ft.)
Flow(q) thru subarea =      0.644(CFS)
Depth of flow =   0.144(Ft.), Average velocity =   2.654(Ft/s)
Channel flow top width =    1.883(Ft.)
Flow Velocity =    2.65(Ft/s)
Travel time  =    6.07 min.
Time of concentration =   24.39 min.
Critical depth =      0.170(Ft.)
 Adding area flow to channel
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.9000     Max loss rate(Fm)=     0.900(In/Hr)
Rainfall intensity =      0.889(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area,(total area with modified
```

```
rational method)(Q=KCIA) is C = 0.090
Subarea runoff =      0.939(CFS) for   15.010(Ac.)
Total runoff =      1.550(CFS)
Effective area this stream =       19.38(Ac.)
Total Study Area (Main Stream No. 2) =       29.18(Ac.)
Area averaged Fm value =    0.900(In/Hr)
Depth of flow =   0.241(Ft.), Average velocity =   3.525(Ft/s)
Critical depth =      0.293(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.400 to Point/Station        1.500
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     19.380(Ac.)
Runoff from this stream =      1.550(CFS)
Time of concentration =   24.39 min.
Rainfall intensity =     0.889(In/Hr)
Area averaged loss rate (Fm) =    0.9000(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9000
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1     10.52     9.800     14.52    0.100      1.213
2      1.55    19.380     24.39    0.900      0.889
Qmax(1) =
           1.000 *    1.000 *    10.519) +
Fm Value exceeds Rainfall Intensity in one of the streams
Summing flow rates for conflunce solution
           1.000 *    0.595 *     1.550) + =      11.442
Qmax(2) =
           0.709 *    1.000 *    10.519) +
           1.000 *    1.000 *     1.550) + =       9.004

Total of 2 main streams to confluence:
Flow rates before confluence point:
      11.519       2.550
Maximum flow rates at confluence using above data:
       11.442        9.004
Area of streams before confluence:
        9.800       19.380
Effective area values after confluence:
       21.338       29.180


Results of confluence:
Total flow rate =     11.442(CFS)
Time of concentration =    14.523 min.
Effective stream area after confluence  =     21.338(Ac.)
Study area average Pervious fraction(Ap) =  0.631
Study area average soil loss rate(Fm) =    0.631(In/Hr)
Study area total =      29.18(Ac.)
End of computations, Total Study Area =           29.18 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
```

effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.631
Area averaged SCS curve number = 32.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 10/18/22

JOB NO. 2022-318
11115 HEMLOCK AVENUE
2 YEAR, RATIONAL METHOD
PRE-CONDITION, AREA B

Program License Serial Number 6277

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 2.0
Computed rainfall intensity:
Storm year = 2.00 1 hour rainfall = 0.518 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 1

++

Process from Point/Station 2.200 to Point/Station 2.300
**** INITIAL AREA EVALUATION ****

Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.9000 Max loss rate(Fm)= 0.900(In/Hr)
Initial subarea data:
Initial area flow distance = 973.000(Ft.)
Top (of initial area) elevation = 994.000(Ft.)
Bottom (of initial area) elevation = 980.050(Ft.)
Difference in elevation = 13.950(Ft.)
Slope = 0.01434 s(%)= 1.43
TC = k(0.496)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 18.189 min.
Rainfall intensity = 1.060(In/Hr) for a 2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.136
Subarea runoff = 1.184(CFS)
Total initial stream area = 8.220(Ac.)
Pervious area fraction = 0.900
Initial area Fm value = 0.900(In/Hr)
End of computations, Total Study Area = 8.22 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.900
Area averaged SCS curve number = 32.0

APPENDIX B.2

RATIONAL METHOD ANALYSIS

PRE-DEVELOPMENT CONDITIONS – 10 YEAR

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                San Bernardino County Rational Hydrology Program

                    (Hydrology Manual Date - August 1986)

 CIVILCADD/CIVILDESIGN  Engineering Software, (c) 1989-2005 Version 7.1
        Rational Hydrology Study        Date: 01/22/23
--------------------------------------------------------------------------
JOB NO. 2022-318
11115 HEMLOCK AVENUE
10 YEAR, RATIONAL METHOD
PRE-CONDITION, AREA A
--------------------------------------------------------------------------


Program License Serial Number 6277

--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------
Rational hydrology study storm event year is     5.0
Computed rainfall intensity:
Storm year =     5.00   1 hour rainfall =     0.684 (In.)
Slope used for rainfall intensity curve b =  0.6000
Soil antecedent moisture condition (AMC) = 1


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Process from Point/Station        1.000 to Point/Station        1.100
**** INITIAL AREA EVALUATION ****
__________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.1000      Max loss rate(Fm)=     0.100(In/Hr)
Initial subarea data:
Initial area flow distance =   900.000(Ft.)
Top (of initial area) elevation =  1000.910(Ft.)
Bottom (of initial area) elevation =   987.110(Ft.)
Difference in elevation =    13.800(Ft.)
Slope =    0.01533  s(%)=       1.53
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.652 min.
Rainfall intensity =      1.930(In/Hr) for a     5.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.853
Subarea runoff =      8.283(CFS)
Total initial stream area =        5.030(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.100(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.100 to Point/Station        1.200
**** IMPROVED CHANNEL TRAVEL TIME ****
__________________________________________________________________________
Upstream point elevation =   987.110(Ft.)
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Note: Per City of Fontana Master Storm Drain Plan, the 10-year pre-condition flow rates shall be calculated using 5-year rainfall

Seems to be 1.00. Check all existing condition pervious area ratios.

```
Downstream point elevation =   980.950(Ft.)
Channel length thru subarea  =   434.000(Ft.)
Channel base width      =   10.000(Ft.)
Slope or 'Z' of left channel bank = 100.000
Slope or 'Z' of right channel bank = 100.000
Estimated mean flow rate at midpoint of channel =     11.323(CFS)
Manning's 'N'    = 0.011
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =     11.323(CFS)
Depth of flow =   0.144(Ft.), Average velocity =   3.239(Ft/s)
Channel flow top width =   38.706(Ft.)
Flow Velocity =    3.24(Ft/s)
Travel time  =    2.23 min.
Time of concentration =   12.89 min.
Critical depth =      0.195(Ft.)
 Adding area flow to channel
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.100(In/Hr)
Rainfall intensity =      1.721(In/Hr) for a     5.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.848
Subarea runoff =      6.018(CFS) for    4.770(Ac.)
Total runoff =     14.301(CFS)
Effective area this stream =        9.80(Ac.)
Total Study Area (Main Stream No. 1) =        9.80(Ac.)
Area averaged Fm value =    0.100(In/Hr)
Depth of flow =   0.160(Ft.), Average velocity =   3.443(Ft/s)
Critical depth =      0.219(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.200 to Point/Station        1.500
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   966.350(Ft.)
Downstream point/station elevation =   959.400(Ft.)
Pipe length  =   623.08(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    14.301(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    14.301(CFS)
Normal flow depth in pipe =   14.93(In.)
Flow top width inside pipe =   19.04(In.)
Critical Depth =   16.85(In.)
Pipe flow velocity =      7.82(Ft/s)
Travel time through pipe =    1.33 min.
Time of concentration (TC) =    14.21 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.200 to Point/Station        1.500
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      9.800(Ac.)
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```
Runoff from this stream =     14.301(CFS)
Time of concentration =   14.21 min.
Rainfall intensity =     1.623(In/Hr)
Area averaged loss rate (Fm) =    0.1000(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.300 to Point/Station        1.400
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.9000     Max loss rate(Fm)=     0.900(In/Hr)
Initial subarea data:
Initial area flow distance =   900.000(Ft.)
Top (of initial area) elevation =   994.000(Ft.)
Bottom (of initial area) elevation =   983.350(Ft.)
Difference in elevation =    10.650(Ft.)
Slope =    0.01183  s(%)=       1.18
TC = k(0.496)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   18.321 min.
Rainfall intensity =      1.394(In/Hr) for a     5.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.319
Subarea runoff =      1.942(CFS)
Total initial stream area =        4.370(Ac.)
Pervious area fraction = 0.900
Initial area Fm value =    0.900(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.400 to Point/Station        1.500
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =   983.350(Ft.)
Downstream point elevation =   971.400(Ft.)
Channel length thru subarea  =   967.000(Ft.)
Channel base width      =    1.500(Ft.)
Slope or 'Z' of left channel bank =   0.000
Slope or 'Z' of right channel bank =   2.667
Estimated mean flow rate at midpoint of channel =      4.139(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    0.500(Ft.)
Flow(q) thru subarea =      4.139(CFS)
Depth of flow =   0.425(Ft.), Average velocity =   4.714(Ft/s)
Channel flow top width =    2.633(Ft.)
Flow Velocity =    4.71(Ft/s)
Travel time  =    3.42 min.
Time of concentration =   21.74 min.
Critical depth =      0.523(Ft.)
 Adding area flow to channel
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.9000     Max loss rate(Fm)=     0.900(In/Hr)
Rainfall intensity =      1.258(In/Hr) for a     5.0 year storm
Effective runoff coefficient used for area,(total area with modified
```

```
rational method)(Q=KCIA) is C = 0.256
Subarea runoff =      4.298(CFS) for   15.010(Ac.)
Total runoff =      6.240(CFS)
Effective area this stream =       19.38(Ac.)
Total Study Area (Main Stream No. 2) =       29.18(Ac.)
Area averaged Fm value =    0.900(In/Hr)
Depth of flow =   0.528(Ft.), Average velocity =   5.363(Ft/s)
!!Warning: Water is above left or right bank elevations
ERROR - Channel depth exceeds maximum allowable depth
Critical depth =      0.648(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.400 to Point/Station        1.500
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     19.380(Ac.)
Runoff from this stream =      6.240(CFS)
Time of concentration =   21.74 min.
Rainfall intensity =     1.258(In/Hr)
Area averaged loss rate (Fm) =    0.9000(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9000
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1     14.30     9.800     14.21    0.100      1.623
2      6.24    19.380     21.74    0.900      1.258
Qmax(1) =
           1.000 *    1.000 *    14.301) +
           2.021 *    0.654 *     6.240) + =      22.546
Qmax(2) =
           0.760 *    1.000 *    14.301) +
           1.000 *    1.000 *     6.240) + =      17.111

Total of 2 main streams to confluence:
Flow rates before confluence point:
      15.301       7.240
Maximum flow rates at confluence using above data:
       22.546       17.111
Area of streams before confluence:
        9.800       19.380
Effective area values after confluence:
       22.471       29.180


Results of confluence:
Total flow rate =     22.546(CFS)
Time of concentration =    14.214 min.
Effective stream area after confluence  =     22.471(Ac.)
Study area average Pervious fraction(Ap) =  0.631
Study area average soil loss rate(Fm) =    0.631(In/Hr)
Study area total =      29.18(Ac.)
End of computations, Total Study Area =           29.18 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
```

effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.631
Area averaged SCS curve number = 32.0

```
                San Bernardino County Rational Hydrology Program

                    (Hydrology Manual Date - August 1986)

 CIVILCADD/CIVILDESIGN  Engineering Software, (c) 1989-2005 Version 7.1
        Rational Hydrology Study        Date: 01/22/23
--------------------------------------------------------------------------
JOB NO. 2022-318
11115 HEMLOCK AVENUE
10 YEAR, RATIONAL METHOD
PRE-CONDITION, AREA B
--------------------------------------------------------------------------


Program License Serial Number 6277

--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------
Rational hydrology study storm event year is     5.0
Computed rainfall intensity:
Storm year =     5.00   1 hour rainfall =     0.684 (In.)
Slope used for rainfall intensity curve b =  0.6000
Soil antecedent moisture condition (AMC) = 1


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.200 to Point/Station        2.300
**** INITIAL AREA EVALUATION ****
__________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.9000     Max loss rate(Fm)=     0.900(In/Hr)
Initial subarea data:
Initial area flow distance =   973.000(Ft.)
Top (of initial area) elevation =   994.000(Ft.)
Bottom (of initial area) elevation =   980.050(Ft.)
Difference in elevation =    13.950(Ft.)
Slope =    0.01434  s(%)=       1.43
TC = k(0.496)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   18.189 min.
Rainfall intensity =      1.400(In/Hr) for a     5.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.321
Subarea runoff =      3.697(CFS)
Total initial stream area =        8.220(Ac.)
Pervious area fraction = 0.900
Initial area Fm value =    0.900(In/Hr)
End of computations, Total Study Area =            8.22 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.900
Area averaged SCS curve number =  32.0
```

Note: Per City of Fontana Master Storm Drain Plan, the 10-year pre-condition flow rates shall be calculated using 5-year rainfall

APPENDIX B.3

RATIONAL METHOD ANALYSIS

PRE-DEVELOPMENT CONDITIONS – 25 YEAR

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 01/22/23

JOB NO. 2022-318
11115 HEMLOCK AVENUE
25 YEAR, RATIONAL METHOD
PRE-CONDITION, AREA A

Program License Serial Number 6277

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.823 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

Note: Per City of Fontana Master Storm Drain Plan, the 25-year pre-condition flow rates shall be calculated using 10-year rainfall

++

Process from Point/Station 1.000 to Point/Station 1.100
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Initial subarea data:
Initial area flow distance = 900.000(Ft.)
Top (of initial area) elevation = 1000.910(Ft.)
Bottom (of initial area) elevation = 987.110(Ft.)
Difference in elevation = 13.800(Ft.)
Slope = 0.01533 s(%)= 1.53
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 10.652 min.
Rainfall intensity = 2.322(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.862
Subarea runoff = 10.068(CFS)
Total initial stream area = 5.030(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.098(In/Hr)

++

Process from Point/Station 1.100 to Point/Station 1.200
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 987.110(Ft.)
Downstream point elevation = 980.950(Ft.)

```
Channel length thru subarea  =   434.000(Ft.)
Channel base width      =   10.000(Ft.)
Slope or 'Z' of left channel bank = 100.000
Slope or 'Z' of right channel bank = 100.000
Estimated mean flow rate at midpoint of channel =     13.821(CFS)
Manning's 'N'    = 0.011
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =     13.821(CFS)
Depth of flow =   0.157(Ft.), Average velocity =   3.413(Ft/s)
Channel flow top width =   41.472(Ft.)
Flow Velocity =    3.41(Ft/s)
Travel time  =    2.12 min.
Time of concentration =   12.77 min.
Critical depth =      0.215(Ft.)
 Adding area flow to channel
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.098(In/Hr)
Rainfall intensity =      2.082(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.858
Subarea runoff =      7.435(CFS) for    4.770(Ac.)
Total runoff =     17.503(CFS)
Effective area this stream =        9.80(Ac.)
Total Study Area (Main Stream No. 1) =        9.80(Ac.)
Area averaged Fm value =    0.098(In/Hr)
Depth of flow =   0.175(Ft.), Average velocity =   3.629(Ft/s)
Critical depth =      0.240(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.200 to Point/Station        1.500
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   966.350(Ft.)
Downstream point/station elevation =   959.400(Ft.)
Pipe length  =   623.08(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    17.503(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    17.503(CFS)
Normal flow depth in pipe =   15.26(In.)
Flow top width inside pipe =   23.10(In.)
Critical Depth =   18.09(In.)
Pipe flow velocity =      8.31(Ft/s)
Travel time through pipe =    1.25 min.
Time of concentration (TC) =    14.02 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.200 to Point/Station        1.500
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      9.800(Ac.)
Runoff from this stream =     17.503(CFS)
Time of concentration =   14.02 min.
```

```
Rainfall intensity =     1.969(In/Hr)
Area averaged loss rate (Fm) =    0.0978(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.300 to Point/Station        1.400
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.9000     Max loss rate(Fm)=     0.880(In/Hr)
Initial subarea data:
Initial area flow distance =   900.000(Ft.)
Top (of initial area) elevation =   994.000(Ft.)
Bottom (of initial area) elevation =   983.350(Ft.)
Difference in elevation =    10.650(Ft.)
Slope =    0.01183  s(%)=       1.18
TC = k(0.496)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   18.321 min.
Rainfall intensity =      1.677(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.428
Subarea runoff =      3.134(CFS)
Total initial stream area =        4.370(Ac.)
Pervious area fraction = 0.900
Initial area Fm value =    0.880(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.400 to Point/Station        1.500
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =   983.350(Ft.)
Downstream point elevation =   971.400(Ft.)
Channel length thru subarea  =   967.000(Ft.)
Channel base width      =    1.500(Ft.)
Slope or 'Z' of left channel bank =   0.000
Slope or 'Z' of right channel bank =   2.667
Estimated mean flow rate at midpoint of channel =      7.363(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    0.500(Ft.)
Flow(q) thru subarea =      7.363(CFS)
Depth of flow =   0.571(Ft.), Average velocity =   5.730(Ft/s)
!!Warning: Water is above left or right bank elevations
Channel flow top width =    2.834(Ft.)
Flow Velocity =    5.73(Ft/s)
Travel time  =    2.81 min.
Time of concentration =   21.13 min.
Critical depth =      0.711(Ft.)
ERROR - Channel depth exceeds maximum allowable depth
 Adding area flow to channel
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.9000     Max loss rate(Fm)=     0.880(In/Hr)
Rainfall intensity =      1.539(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.385
Subarea runoff =      8.364(CFS) for   15.010(Ac.)
```

```
Total runoff =     11.498(CFS)
Effective area this stream =       19.38(Ac.)
Total Study Area (Main Stream No. 2) =       29.18(Ac.)
Area averaged Fm value =    0.880(In/Hr)
Depth of flow =   0.710(Ft.), Average velocity =   6.848(Ft/s)
!!Warning: Water is above left or right bank elevations
ERROR - Channel depth exceeds maximum allowable depth
Critical depth =      0.922(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.400 to Point/Station        1.500
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     19.380(Ac.)
Runoff from this stream =     11.498(CFS)
Time of concentration =   21.13 min.
Rainfall intensity =     1.539(In/Hr)
Area averaged loss rate (Fm) =    0.8800(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9000
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1     17.50     9.800     14.02    0.098      1.969
2     11.50    19.380     21.13    0.880      1.539
Qmax(1) =
           1.000 *    1.000 *    17.503) +
           1.652 *    0.663 *    11.498) + =      30.103
Qmax(2) =
           0.770 *    1.000 *    17.503) +
           1.000 *    1.000 *    11.498) + =      24.983

Total of 2 main streams to confluence:
Flow rates before confluence point:
      18.503      12.498
Maximum flow rates at confluence using above data:
       30.103       24.983
Area of streams before confluence:
        9.800       19.380
Effective area values after confluence:
       22.658       29.180


Results of confluence:
Total flow rate =     30.103(CFS)
Time of concentration =    14.022 min.
Effective stream area after confluence  =     22.658(Ac.)
Study area average Pervious fraction(Ap) =  0.631
Study area average soil loss rate(Fm) =    0.617(In/Hr)
Study area total =      29.18(Ac.)
End of computations, Total Study Area =           29.18 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.
```

```
Area averaged pervious area fraction(Ap) = 0.631
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 01/22/23

JOB NO. 2022-318
11115 HEMLOCK AVENUE
25 YEAR, RATIONAL METHOD
PRE-CONDITION, AREA B

Program License Serial Number 6277

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.823 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

Note: Per City of Fontana Master Storm Drain Plan, the 25-year pre-condition flow rates shall be calculated using 10-year rainfall

++
Process from Point/Station 2.200 to Point/Station 2.300
**** INITIAL AREA EVALUATION ****

Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.9000 Max loss rate(Fm)= 0.880(In/Hr)
Initial subarea data:
Initial area flow distance = 973.000(Ft.)
Top (of initial area) elevation = 994.000(Ft.)
Bottom (of initial area) elevation = 980.050(Ft.)
Difference in elevation = 13.950(Ft.)
Slope = 0.01434 s(%)= 1.43
TC = k(0.496)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 18.189 min.
Rainfall intensity = 1.684(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.430
Subarea runoff = 5.949(CFS)
Total initial stream area = 8.220(Ac.)
Pervious area fraction = 0.900
Initial area Fm value = 0.880(In/Hr)
End of computations, Total Study Area = 8.22 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.900
Area averaged SCS curve number = 32.0

APPENDIX B.4

RATIONAL METHOD ANALYSIS

PRE-DEVELOPMENT CONDITIONS – 100 YEAR

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 01/22/23

JOB NO. 2022-318
11115 HEMLOCK AVENUE
100 YEAR, RATIONAL METHOD
PRE-CONDITION, AREA A

Program License Serial Number 6277

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 25.0
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 1.020 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

Note: Per City of Fontana Master Storm Drain Plan, the 100-year pre-condition flow rates shall be calculated using 25-year rainfall

++
Process from Point/Station 1.000 to Point/Station 1.100
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Initial subarea data:
Initial area flow distance = 900.000(Ft.)
Top (of initial area) elevation = 1000.910(Ft.)
Bottom (of initial area) elevation = 987.110(Ft.)
Difference in elevation = 13.800(Ft.)
Slope = 0.01533 s(%)= 1.53
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 10.652 min.
Rainfall intensity = 2.878(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.869
Subarea runoff = 12.584(CFS)
Total initial stream area = 5.030(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.098(In/Hr)

++
Process from Point/Station 1.100 to Point/Station 1.200
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 987.110(Ft.)
Downstream point elevation = 980.950(Ft.)

```
Channel length thru subarea  =   434.000(Ft.)
Channel base width      =   10.000(Ft.)
Slope or 'Z' of left channel bank = 100.000
Slope or 'Z' of right channel bank = 100.000
Estimated mean flow rate at midpoint of channel =     17.349(CFS)
Manning's 'N'    = 0.011
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =     17.349(CFS)
Depth of flow =   0.175(Ft.), Average velocity =   3.620(Ft/s)
Channel flow top width =   44.908(Ft.)
Flow Velocity =    3.62(Ft/s)
Travel time  =    2.00 min.
Time of concentration =   12.65 min.
Critical depth =      0.240(Ft.)
 Adding area flow to channel
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.098(In/Hr)
Rainfall intensity =      2.596(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.866
Subarea runoff =      9.446(CFS) for    4.770(Ac.)
Total runoff =     22.031(CFS)
Effective area this stream =        9.80(Ac.)
Total Study Area (Main Stream No. 1) =        9.80(Ac.)
Area averaged Fm value =    0.098(In/Hr)
Depth of flow =   0.194(Ft.), Average velocity =   3.851(Ft/s)
Critical depth =      0.268(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.200 to Point/Station        1.500
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   966.350(Ft.)
Downstream point/station elevation =   959.400(Ft.)
Pipe length  =   623.08(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    22.031(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    22.031(CFS)
Normal flow depth in pipe =   18.19(In.)
Flow top width inside pipe =   20.56(In.)
Critical Depth =   20.12(In.)
Pipe flow velocity =      8.63(Ft/s)
Travel time through pipe =    1.20 min.
Time of concentration (TC) =    13.85 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.200 to Point/Station        1.500
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      9.800(Ac.)
Runoff from this stream =     22.031(CFS)
Time of concentration =   13.85 min.
```

```
Rainfall intensity =     2.458(In/Hr)
Area averaged loss rate (Fm) =    0.0978(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.300 to Point/Station        1.400
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.9000     Max loss rate(Fm)=     0.880(In/Hr)
Initial subarea data:
Initial area flow distance =   900.000(Ft.)
Top (of initial area) elevation =   994.000(Ft.)
Bottom (of initial area) elevation =   983.350(Ft.)
Difference in elevation =    10.650(Ft.)
Slope =    0.01183  s(%)=       1.18
TC = k(0.496)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   18.321 min.
Rainfall intensity =      2.078(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.519
Subarea runoff =      4.713(CFS)
Total initial stream area =        4.370(Ac.)
Pervious area fraction = 0.900
Initial area Fm value =    0.880(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.400 to Point/Station        1.500
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =   983.350(Ft.)
Downstream point elevation =   971.400(Ft.)
Channel length thru subarea  =   967.000(Ft.)
Channel base width      =    1.500(Ft.)
Slope or 'Z' of left channel bank =   0.000
Slope or 'Z' of right channel bank =   2.667
Estimated mean flow rate at midpoint of channel =     11.589(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    0.500(Ft.)
Flow(q) thru subarea =     11.589(CFS)
Depth of flow =   0.713(Ft.), Average velocity =   6.870(Ft/s)
!!Warning: Water is above left or right bank elevations
Channel flow top width =    2.834(Ft.)
Flow Velocity =    6.87(Ft/s)
Travel time  =    2.35 min.
Time of concentration =   20.67 min.
Critical depth =      0.922(Ft.)
ERROR - Channel depth exceeds maximum allowable depth
 Adding area flow to channel
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.9000     Max loss rate(Fm)=     0.880(In/Hr)
Rainfall intensity =      1.933(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.490
Subarea runoff =     13.660(CFS) for   15.010(Ac.)
```

```
Total runoff =     18.373(CFS)
Effective area this stream =       19.38(Ac.)
Total Study Area (Main Stream No. 2) =       29.18(Ac.)
Area averaged Fm value =    0.880(In/Hr)
Depth of flow =   0.903(Ft.), Average velocity =   8.260(Ft/s)
!!Warning: Water is above left or right bank elevations
ERROR - Channel depth exceeds maximum allowable depth
Critical depth =      1.211(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.400 to Point/Station        1.500
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     19.380(Ac.)
Runoff from this stream =     18.373(CFS)
Time of concentration =   20.67 min.
Rainfall intensity =     1.933(In/Hr)
Area averaged loss rate (Fm) =    0.8800(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9000
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1     22.03     9.800     13.85    0.098      2.458
2     18.37    19.380     20.67    0.880      1.933
Qmax(1) =
           1.000 *    1.000 *    22.031) +
           1.498 *    0.670 *    18.373) + =      40.478
Qmax(2) =
           0.778 *    1.000 *    22.031) +
           1.000 *    1.000 *    18.373) + =      35.508

Total of 2 main streams to confluence:
Flow rates before confluence point:
      23.031      19.373
Maximum flow rates at confluence using above data:
       40.478       35.508
Area of streams before confluence:
        9.800       19.380
Effective area values after confluence:
       22.791       29.180


Results of confluence:
Total flow rate =     40.478(CFS)
Time of concentration =    13.853 min.
Effective stream area after confluence  =     22.791(Ac.)
Study area average Pervious fraction(Ap) =  0.631
Study area average soil loss rate(Fm) =    0.617(In/Hr)
Study area total =      29.18(Ac.)
End of computations, Total Study Area =           29.18 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.
```

```
Area averaged pervious area fraction(Ap) = 0.631
Area averaged SCS curve number =  32.0
```

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San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 01/22/23

JOB NO. 2022-318
11115 HEMLOCK AVENUE
100 YEAR, RATIONAL METHOD
PRE-CONDITION, AREA B

Program License Serial Number 6277

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 25.0
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 1.020 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

Note: Per City of Fontana Master Storm Drain Plan, the 100-year pre-condition flow rates shall be calculated using 25-year rainfall

++
Process from Point/Station 2.200 to Point/Station 2.300
**** INITIAL AREA EVALUATION ****

Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.9000 Max loss rate(Fm)= 0.880(In/Hr)
Initial subarea data:
Initial area flow distance = 973.000(Ft.)
Top (of initial area) elevation = 994.000(Ft.)
Bottom (of initial area) elevation = 980.050(Ft.)
Difference in elevation = 13.950(Ft.)
Slope = 0.01434 s(%)= 1.43
TC = k(0.496)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 18.189 min.
Rainfall intensity = 2.087(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.521
Subarea runoff = 8.932(CFS)
Total initial stream area = 8.220(Ac.)
Pervious area fraction = 0.900
Initial area Fm value = 0.880(In/Hr)
End of computations, Total Study Area = 8.22 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.900
Area averaged SCS curve number = 32.0

APPENDIX B.5

RATIONAL METHOD ANALYSIS

POST-DEVELOPMENT CONDITIONS – 2 YEAR

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 01/22/23

JOB NO. 2022-318
11115 HEMLOCK AVE
2 YEAR. RATIONAL METHOD
POST-CONDITION, AREA A

Program License Serial Number 6277

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 2.0
Computed rainfall intensity:
Storm year = 2.00 1 hour rainfall = 0.518 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 1

++

Process from Point/Station 3.000 to Point/Station 3.100
**** INITIAL AREA EVALUATION ****

Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.4000 Max loss rate(Fm)= 0.400(In/Hr)
Initial subarea data:
Initial area flow distance = 161.250(Ft.)
Top (of initial area) elevation = 999.000(Ft.)
Bottom (of initial area) elevation = 990.820(Ft.)
Difference in elevation = 8.180(Ft.)
Slope = 0.05073 s(%)= 5.07
TC = k(0.373)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 5.174 min.
Rainfall intensity = 2.254(In/Hr) for a 2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.740
Subarea runoff = 0.634(CFS)
Total initial stream area = 0.380(Ac.)
Pervious area fraction = 0.400
Initial area Fm value = 0.400(In/Hr)

++

Process from Point/Station 3.100 to Point/Station 3.200
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 985.820(Ft.)
Downstream point/station elevation = 984.570(Ft.)
Pipe length = 209.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 0.634(CFS)

```
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     0.634(CFS)
Normal flow depth in pipe =    4.48(In.)
Flow top width inside pipe =    9.00(In.)
Critical Depth =    4.34(In.)
Pipe flow velocity =      2.89(Ft/s)
Travel time through pipe =    1.21 min.
Time of concentration (TC) =     6.38 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.100 to Point/Station        3.200
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      0.380(Ac.)
Runoff from this stream =      0.634(CFS)
Time of concentration =    6.38 min.
Rainfall intensity =     1.988(In/Hr)
Area averaged loss rate (Fm) =    0.4000(In/Hr)
Area averaged Pervious ratio (Ap) = 0.4000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.200 to Point/Station        3.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.3900     Max loss rate(Fm)=     0.390(In/Hr)
Initial subarea data:
Initial area flow distance =   163.100(Ft.)
Top (of initial area) elevation =   997.080(Ft.)
Bottom (of initial area) elevation =   990.760(Ft.)
Difference in elevation =     6.320(Ft.)
Slope =    0.03875  s(%)=       3.87
TC = k(0.371)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    5.449 min.
Rainfall intensity =      2.185(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.739
Subarea runoff =      0.598(CFS)
Total initial stream area =        0.370(Ac.)
Pervious area fraction = 0.390
Initial area Fm value =    0.390(In/Hr)


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Process from Point/Station        3.200 to Point/Station        3.200
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.370(Ac.)
Runoff from this stream =      0.598(CFS)
Time of concentration =    5.45 min.
Rainfall intensity =     2.185(In/Hr)
Area averaged loss rate (Fm) =    0.3900(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3900
Summary of stream data:
```

```
Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1      0.63     0.380      6.38    0.400      1.988
2      0.60     0.370      5.45    0.390      2.185
Qmax(1) =
           1.000 *    1.000 *     0.634) +
           0.890 *    1.000 *     0.598) + =       1.166
Qmax(2) =
           1.124 *    0.854 *     0.634) +
           1.000 *    1.000 *     0.598) + =       1.207

Total of 2 streams to confluence:
Flow rates before confluence point:
       0.634       0.598
Maximum flow rates at confluence using above data:
        1.166        1.207
Area of streams before confluence:
        0.380        0.370
Effective area values after confluence:
        0.750        0.695
Results of confluence:
Total flow rate =      1.207(CFS)
Time of concentration =     5.449 min.
Effective stream area after confluence =      0.695(Ac.)
Study area average Pervious fraction(Ap) =  0.395
Study area average soil loss rate(Fm) =    0.395(In/Hr)
Study area total (this main stream) =       0.75(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.200 to Point/Station        3.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   984.570(Ft.)
Downstream point/station elevation =   983.370(Ft.)
Pipe length  =   200.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.207(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     1.207(CFS)
Normal flow depth in pipe =    6.95(In.)
Flow top width inside pipe =    7.55(In.)
Critical Depth =    6.07(In.)
Pipe flow velocity =      3.30(Ft/s)
Travel time through pipe =    1.01 min.
Time of concentration (TC) =     6.46 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.200 to Point/Station        3.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      0.695(Ac.)
Runoff from this stream =      1.207(CFS)
Time of concentration =    6.46 min.
Rainfall intensity =     1.973(In/Hr)
Area averaged loss rate (Fm) =    0.3951(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3951
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.300 to Point/Station        3.300
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.3800     Max loss rate(Fm)=     0.380(In/Hr)
Initial subarea data:
Initial area flow distance =   161.380(Ft.)
Top (of initial area) elevation =   995.070(Ft.)
Bottom (of initial area) elevation =   990.650(Ft.)
Difference in elevation =     4.420(Ft.)
Slope =    0.02739  s(%)=       2.74
TC = k(0.368)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    5.777 min.
Rainfall intensity =      2.110(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.738
Subarea runoff =      0.654(CFS)
Total initial stream area =        0.420(Ac.)
Pervious area fraction = 0.380
Initial area Fm value =    0.380(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.300 to Point/Station        3.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.420(Ac.)
Runoff from this stream =      0.654(CFS)
Time of concentration =    5.78 min.
Rainfall intensity =     2.110(In/Hr)
Area averaged loss rate (Fm) =    0.3800(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3800
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1      1.21     0.695      6.46    0.395      1.973
2      0.65     0.420      5.78    0.380      2.110
Qmax(1) =
           1.000 *    1.000 *     1.207) +
           0.921 *    1.000 *     0.654) + =       1.809
Qmax(2) =
           1.087 *    0.894 *     1.207) +
           1.000 *    1.000 *     0.654) + =       1.826

Total of 2 streams to confluence:
Flow rates before confluence point:
       1.207       0.654
Maximum flow rates at confluence using above data:
        1.809        1.826
Area of streams before confluence:
        0.695        0.420
Effective area values after confluence:
        1.115        1.041
```

```
Results of confluence:
Total flow rate =      1.826(CFS)
Time of concentration =     5.777 min.
Effective stream area after confluence =      1.041(Ac.)
Study area average Pervious fraction(Ap) =  0.389
Study area average soil loss rate(Fm) =    0.389(In/Hr)
Study area total (this main stream) =       1.11(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.300 to Point/Station        3.400
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   983.370(Ft.)
Downstream point/station elevation =   981.410(Ft.)
Pipe length  =   327.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.826(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     1.826(CFS)
Normal flow depth in pipe =    7.13(In.)
Flow top width inside pipe =   11.78(In.)
Critical Depth =    6.91(In.)
Pipe flow velocity =      3.75(Ft/s)
Travel time through pipe =    1.45 min.
Time of concentration (TC) =     7.23 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.300 to Point/Station        3.400
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      1.041(Ac.)
Runoff from this stream =      1.826(CFS)
Time of concentration =    7.23 min.
Rainfall intensity =     1.844(In/Hr)
Area averaged loss rate (Fm) =    0.3894(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3894


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.400 to Point/Station        3.400
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.3900     Max loss rate(Fm)=     0.390(In/Hr)
Initial subarea data:
Initial area flow distance =   346.050(Ft.)
Top (of initial area) elevation =   991.360(Ft.)
Bottom (of initial area) elevation =   985.560(Ft.)
Difference in elevation =     5.800(Ft.)
Slope =    0.01676  s(%)=       1.68
TC = k(0.371)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.705 min.
Rainfall intensity =      1.649(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.687
Subarea runoff =      0.884(CFS)
Total initial stream area =        0.780(Ac.)
```

```
Pervious area fraction = 0.390
Initial area Fm value =    0.390(In/Hr)


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Process from Point/Station        3.400 to Point/Station        3.400
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.780(Ac.)
Runoff from this stream =      0.884(CFS)
Time of concentration =    8.71 min.
Rainfall intensity =     1.649(In/Hr)
Area averaged loss rate (Fm) =    0.3900(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3900
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1      1.83     1.041      7.23    0.389      1.844
2      0.88     0.780      8.71    0.390      1.649
Qmax(1) =
           1.000 *    1.000 *     1.826) +
           1.154 *    0.830 *     0.884) + =       2.674
Qmax(2) =
           0.866 *    1.000 *     1.826) +
           1.000 *    1.000 *     0.884) + =       2.466

Total of 2 streams to confluence:
Flow rates before confluence point:
       1.826       0.884
Maximum flow rates at confluence using above data:
        2.674        2.466
Area of streams before confluence:
        1.041        0.780
Effective area values after confluence:
        1.689        1.821
Results of confluence:
Total flow rate =      2.674(CFS)
Time of concentration =     7.229 min.
Effective stream area after confluence =      1.689(Ac.)
Study area average Pervious fraction(Ap) =  0.390
Study area average soil loss rate(Fm) =    0.390(In/Hr)
Study area total (this main stream) =       1.82(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.400 to Point/Station        3.500
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   981.410(Ft.)
Downstream point/station elevation =   978.760(Ft.)
Pipe length  =   156.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.674(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.674(CFS)
Normal flow depth in pipe =    6.53(In.)
Flow top width inside pipe =   11.95(In.)
Critical Depth =    8.41(In.)
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```
Pipe flow velocity =      6.12(Ft/s)
Travel time through pipe =    0.42 min.
Time of concentration (TC) =     7.65 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.400 to Point/Station        3.500
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      1.689(Ac.)
Runoff from this stream =      2.674(CFS)
Time of concentration =    7.65 min.
Rainfall intensity =     1.782(In/Hr)
Area averaged loss rate (Fm) =    0.3897(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3897


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.500 to Point/Station        3.500
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.1800     Max loss rate(Fm)=     0.180(In/Hr)
Initial subarea data:
Initial area flow distance =   370.380(Ft.)
Top (of initial area) elevation =   991.730(Ft.)
Bottom (of initial area) elevation =   984.280(Ft.)
Difference in elevation =     7.450(Ft.)
Slope =    0.02011  s(%)=       2.01
TC = k(0.319)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.420 min.
Rainfall intensity =      1.815(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.811
Subarea runoff =      2.620(CFS)
Total initial stream area =        1.780(Ac.)
Pervious area fraction = 0.180
Initial area Fm value =    0.180(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.500 to Point/Station        3.500
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      1.780(Ac.)
Runoff from this stream =      2.620(CFS)
Time of concentration =    7.42 min.
Rainfall intensity =     1.815(In/Hr)
Area averaged loss rate (Fm) =    0.1800(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1800
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1      2.67     1.689      7.65    0.390      1.782
```

```
2      2.62     1.780      7.42    0.180      1.815
Qmax(1) =
           1.000 *    1.000 *     2.674) +
           0.980 *    1.000 *     2.620) + =       5.240
Qmax(2) =
           1.024 *    0.969 *     2.674) +
           1.000 *    1.000 *     2.620) + =       5.275

Total of 2 streams to confluence:
Flow rates before confluence point:
       2.674       2.620
Maximum flow rates at confluence using above data:
        5.240        5.275
Area of streams before confluence:
        1.689        1.780
Effective area values after confluence:
        3.469        3.417
Results of confluence:
Total flow rate =      5.275(CFS)
Time of concentration =     7.420 min.
Effective stream area after confluence =      3.417(Ac.)
Study area average Pervious fraction(Ap) =  0.282
Study area average soil loss rate(Fm) =    0.282(In/Hr)
Study area total (this main stream) =       3.47(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.500 to Point/Station        3.600
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   978.760(Ft.)
Downstream point/station elevation =   973.280(Ft.)
Pipe length  =   328.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.275(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     5.275(CFS)
Normal flow depth in pipe =    8.65(In.)
Flow top width inside pipe =   14.82(In.)
Critical Depth =   11.17(In.)
Pipe flow velocity =      7.20(Ft/s)
Travel time through pipe =    0.76 min.
Time of concentration (TC) =     8.18 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.500 to Point/Station        3.600
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      3.417(Ac.)
Runoff from this stream =      5.275(CFS)
Time of concentration =    8.18 min.
Rainfall intensity =     1.712(In/Hr)
Area averaged loss rate (Fm) =    0.2821(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2821


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.600 to Point/Station        3.600
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
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Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.0400     Max loss rate(Fm)=     0.040(In/Hr)
Initial subarea data:
Initial area flow distance =   456.790(Ft.)
Top (of initial area) elevation =   987.140(Ft.)
Bottom (of initial area) elevation =   980.860(Ft.)
Difference in elevation =     6.280(Ft.)
Slope =    0.01375  s(%)=       1.37
TC = k(0.284)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.764 min.
Rainfall intensity =      1.767(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.880
Subarea runoff =      8.221(CFS)
Total initial stream area =        5.290(Ac.)
Pervious area fraction = 0.040
Initial area Fm value =    0.040(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.600 to Point/Station        3.600
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      5.290(Ac.)
Runoff from this stream =      8.221(CFS)
Time of concentration =    7.76 min.
Rainfall intensity =     1.767(In/Hr)
Area averaged loss rate (Fm) =    0.0400(In/Hr)
Area averaged Pervious ratio (Ap) = 0.0400
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1      5.27     3.417      8.18    0.282      1.712
2      8.22     5.290      7.76    0.040      1.767
Qmax(1) =
           1.000 *    1.000 *     5.275) +
           0.969 *    1.000 *     8.221) + =      13.236
Qmax(2) =
           1.038 *    0.949 *     5.275) +
           1.000 *    1.000 *     8.221) + =      13.418

Total of 2 streams to confluence:
Flow rates before confluence point:
       5.275       8.221
Maximum flow rates at confluence using above data:
       13.236       13.418
Area of streams before confluence:
        3.417        5.290
Effective area values after confluence:
        8.707        8.534
Results of confluence:
Total flow rate =     13.418(CFS)
Time of concentration =     7.764 min.
Effective stream area after confluence =      8.534(Ac.)
Study area average Pervious fraction(Ap) =  0.135
```

```
Study area average soil loss rate(Fm) =    0.135(In/Hr)
Study area total (this main stream) =       8.71(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.600 to Point/Station        3.700
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   973.280(Ft.)
Downstream point/station elevation =   965.000(Ft.)
Pipe length  =   485.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    13.418(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    13.418(CFS)
Normal flow depth in pipe =   14.39(In.)
Flow top width inside pipe =   14.41(In.)
Critical Depth =   16.38(In.)
Pipe flow velocity =      8.85(Ft/s)
Travel time through pipe =    0.91 min.
Time of concentration (TC) =     8.68 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.600 to Point/Station        3.700
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      8.534(Ac.)
Runoff from this stream =     13.418(CFS)
Time of concentration =    8.68 min.
Rainfall intensity =     1.653(In/Hr)
Area averaged loss rate (Fm) =    0.1350(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1350


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Process from Point/Station        3.700 to Point/Station        3.700
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.0400     Max loss rate(Fm)=     0.040(In/Hr)
Initial subarea data:
Initial area flow distance =   653.410(Ft.)
Top (of initial area) elevation =   985.500(Ft.)
Bottom (of initial area) elevation =   975.420(Ft.)
Difference in elevation =    10.080(Ft.)
Slope =    0.01543  s(%)=       1.54
TC = k(0.284)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.756 min.
Rainfall intensity =      1.644(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.878
Subarea runoff =     11.186(CFS)
Total initial stream area =        7.750(Ac.)
Pervious area fraction = 0.040
Initial area Fm value =    0.040(In/Hr)


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Process from Point/Station        3.700 to Point/Station        3.700
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      7.750(Ac.)
Runoff from this stream =     11.186(CFS)
Time of concentration =    8.76 min.
Rainfall intensity =     1.644(In/Hr)
Area averaged loss rate (Fm) =    0.0400(In/Hr)
Area averaged Pervious ratio (Ap) = 0.0400
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1     13.42     8.534      8.68    0.135      1.653
2     11.19     7.750      8.76    0.040      1.644
Qmax(1) =
           1.000 *    1.000 *    13.418) +
           1.006 *    0.991 *    11.186) + =      24.566
Qmax(2) =
           0.994 *    1.000 *    13.418) +
           1.000 *    1.000 *    11.186) + =      24.526

Total of 2 streams to confluence:
Flow rates before confluence point:
      13.418      11.186
Maximum flow rates at confluence using above data:
       24.566       24.526
Area of streams before confluence:
        8.534        7.750
Effective area values after confluence:
       16.215       16.284
Results of confluence:
Total flow rate =     24.566(CFS)
Time of concentration =     8.678 min.
Effective stream area after confluence =     16.215(Ac.)
Study area average Pervious fraction(Ap) =  0.090
Study area average soil loss rate(Fm) =    0.090(In/Hr)
Study area total (this main stream) =      16.28(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.700 to Point/Station        3.700
**** CONFLUENCE OF MAIN STREAMS ****
____________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     16.215(Ac.)
Runoff from this stream =     24.566(CFS)
Time of concentration =    8.68 min.
Rainfall intensity =     1.653(In/Hr)
Area averaged loss rate (Fm) =    0.0898(In/Hr)
Area averaged Pervious ratio (Ap) = 0.0898
Program is now starting with Main Stream No. 2


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Process from Point/Station        3.800 to Point/Station        3.900
**** INITIAL AREA EVALUATION ****
```

```
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.5200     Max loss rate(Fm)=     0.520(In/Hr)
Initial subarea data:
Initial area flow distance =   160.000(Ft.)
Top (of initial area) elevation =   983.600(Ft.)
Bottom (of initial area) elevation =   980.790(Ft.)
Difference in elevation =     2.810(Ft.)
Slope =    0.01756  s(%)=       1.76
TC = k(0.403)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.883 min.
Rainfall intensity =      1.899(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.654
Subarea runoff =      0.521(CFS)
Total initial stream area =        0.420(Ac.)
Pervious area fraction = 0.520
Initial area Fm value =    0.520(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.900 to Point/Station        4.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =   975.790(Ft.)
Downstream point/station elevation =   972.540(Ft.)
Pipe length  =   372.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     0.521(CFS)
Nearest computed pipe diameter  =      6.00(In.)
Calculated individual pipe flow  =     0.521(CFS)
Normal flow depth in pipe =    4.89(In.)
Flow top width inside pipe =    4.66(In.)
Critical Depth =    4.42(In.)
Pipe flow velocity =      3.05(Ft/s)
Travel time through pipe =    2.04 min.
Time of concentration (TC) =     8.92 min.


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Process from Point/Station        3.900 to Point/Station        4.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      0.420(Ac.)
Runoff from this stream =      0.521(CFS)
Time of concentration =    8.92 min.
Rainfall intensity =     1.626(In/Hr)
Area averaged loss rate (Fm) =    0.5200(In/Hr)
Area averaged Pervious ratio (Ap) = 0.5200


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.000 to Point/Station        4.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
```

```
Pervious ratio(Ap) = 0.1400     Max loss rate(Fm)=     0.140(In/Hr)
Initial subarea data:
Initial area flow distance =   534.460(Ft.)
Top (of initial area) elevation =   987.610(Ft.)
Bottom (of initial area) elevation =   981.360(Ft.)
Difference in elevation =     6.250(Ft.)
Slope =    0.01169  s(%)=       1.17
TC = k(0.309)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.280 min.
Rainfall intensity =      1.587(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.821
Subarea runoff =      3.778(CFS)
Total initial stream area =        2.900(Ac.)
Pervious area fraction = 0.140
Initial area Fm value =    0.140(In/Hr)


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Process from Point/Station        4.000 to Point/Station        4.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      2.900(Ac.)
Runoff from this stream =      3.778(CFS)
Time of concentration =    9.28 min.
Rainfall intensity =     1.587(In/Hr)
Area averaged loss rate (Fm) =    0.1400(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1400
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1      0.52     0.420      8.92    0.520      1.626
2      3.78     2.900      9.28    0.140      1.587
Qmax(1) =
           1.000 *    1.000 *     0.521) +
           1.026 *    0.961 *     3.778) + =       4.248
Qmax(2) =
           0.965 *    1.000 *     0.521) +
           1.000 *    1.000 *     3.778) + =       4.281

Total of 2 streams to confluence:
Flow rates before confluence point:
       0.521       3.778
Maximum flow rates at confluence using above data:
        4.248        4.281
Area of streams before confluence:
        0.420        2.900
Effective area values after confluence:
        3.207        3.320
Results of confluence:
Total flow rate =      4.281(CFS)
Time of concentration =     9.280 min.
Effective stream area after confluence =      3.320(Ac.)
Study area average Pervious fraction(Ap) =  0.188
Study area average soil loss rate(Fm) =    0.188(In/Hr)
Study area total (this main stream) =       3.32(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.000 to Point/Station        4.100
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   972.540(Ft.)
Downstream point/station elevation =   968.390(Ft.)
Pipe length  =   475.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.281(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     4.281(CFS)
Normal flow depth in pipe =    9.33(In.)
Flow top width inside pipe =   14.55(In.)
Critical Depth =   10.05(In.)
Pipe flow velocity =      5.34(Ft/s)
Travel time through pipe =    1.48 min.
Time of concentration (TC) =    10.76 min.


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Process from Point/Station        4.000 to Point/Station        4.100
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      3.320(Ac.)
Runoff from this stream =      4.281(CFS)
Time of concentration =   10.76 min.
Rainfall intensity =     1.452(In/Hr)
Area averaged loss rate (Fm) =    0.1881(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1881


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Process from Point/Station        4.100 to Point/Station        4.100
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.0900     Max loss rate(Fm)=     0.090(In/Hr)
Initial subarea data:
Initial area flow distance =   689.460(Ft.)
Top (of initial area) elevation =   987.610(Ft.)
Bottom (of initial area) elevation =   980.590(Ft.)
Difference in elevation =     7.020(Ft.)
Slope =    0.01018  s(%)=       1.02
TC = k(0.297)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.143 min.
Rainfall intensity =      1.505(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.846
Subarea runoff =      2.853(CFS)
Total initial stream area =        2.240(Ac.)
Pervious area fraction = 0.090
Initial area Fm value =    0.090(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.100 to Point/Station        4.100
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
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Stream flow area =      2.240(Ac.)
Runoff from this stream =      2.853(CFS)
Time of concentration =   10.14 min.
Rainfall intensity =     1.505(In/Hr)
Area averaged loss rate (Fm) =    0.0900(In/Hr)
Area averaged Pervious ratio (Ap) = 0.0900
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1      4.28     3.320     10.76    0.188      1.452
2      2.85     2.240     10.14    0.090      1.505
Qmax(1) =
           1.000 *    1.000 *     4.281) +
           0.963 *    1.000 *     2.853) + =       7.027
Qmax(2) =
           1.042 *    0.942 *     4.281) +
           1.000 *    1.000 *     2.853) + =       7.055

Total of 2 streams to confluence:
Flow rates before confluence point:
       4.281       2.853
Maximum flow rates at confluence using above data:
        7.027        7.055
Area of streams before confluence:
        3.320        2.240
Effective area values after confluence:
        5.560        5.368
Results of confluence:
Total flow rate =      7.055(CFS)
Time of concentration =    10.143 min.
Effective stream area after confluence =      5.368(Ac.)
Study area average Pervious fraction(Ap) =  0.149
Study area average soil loss rate(Fm) =    0.149(In/Hr)
Study area total (this main stream) =       5.56(Ac.)


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Process from Point/Station        4.100 to Point/Station        4.200
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
____________________________________________________________________________
Upstream point/station elevation =   968.390(Ft.)
Downstream point/station elevation =   966.540(Ft.)
Pipe length  =   211.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.055(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     7.055(CFS)
Normal flow depth in pipe =   11.27(In.)
Flow top width inside pipe =   17.42(In.)
Critical Depth =   12.33(In.)
Pipe flow velocity =      6.05(Ft/s)
Travel time through pipe =    0.58 min.
Time of concentration (TC) =    10.72 min.


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Process from Point/Station        4.100 to Point/Station        4.200
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________________
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Along Main Stream number: 2 in normal stream number 1
Stream flow area =      5.368(Ac.)
Runoff from this stream =      7.055(CFS)
Time of concentration =   10.72 min.
Rainfall intensity =     1.456(In/Hr)
Area averaged loss rate (Fm) =    0.1486(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1486


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Process from Point/Station        4.200 to Point/Station        4.200
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.2700     Max loss rate(Fm)=     0.270(In/Hr)
Initial subarea data:
Initial area flow distance =   436.910(Ft.)
Top (of initial area) elevation =   986.380(Ft.)
Bottom (of initial area) elevation =   973.310(Ft.)
Difference in elevation =    13.070(Ft.)
Slope =    0.02991  s(%)=       2.99
TC = k(0.341)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.831 min.
Rainfall intensity =      1.758(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.762
Subarea runoff =      1.312(CFS)
Total initial stream area =        0.980(Ac.)
Pervious area fraction = 0.270
Initial area Fm value =    0.270(In/Hr)


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Process from Point/Station        4.200 to Point/Station        4.200
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      0.980(Ac.)
Runoff from this stream =      1.312(CFS)
Time of concentration =    7.83 min.
Rainfall intensity =     1.758(In/Hr)
Area averaged loss rate (Fm) =    0.2700(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2700
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1      7.05     5.368     10.72    0.149      1.456
2      1.31     0.980      7.83    0.270      1.758
Qmax(1) =
           1.000 *    1.000 *     7.055) +
           0.797 *    1.000 *     1.312) + =       8.100
Qmax(2) =
           1.231 *    0.730 *     7.055) +
           1.000 *    1.000 *     1.312) + =       7.655

Total of 2 streams to confluence:
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Flow rates before confluence point:
       7.055       1.312
Maximum flow rates at confluence using above data:
        8.100        7.655
Area of streams before confluence:
        5.368        0.980
Effective area values after confluence:
        6.348        4.901
Results of confluence:
Total flow rate =      8.100(CFS)
Time of concentration =    10.724 min.
Effective stream area after confluence =      6.348(Ac.)
Study area average Pervious fraction(Ap) =  0.167
Study area average soil loss rate(Fm) =    0.167(In/Hr)
Study area total (this main stream) =       6.35(Ac.)


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Process from Point/Station        4.200 to Point/Station        4.200
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      6.348(Ac.)
Runoff from this stream =      8.100(CFS)
Time of concentration =   10.72 min.
Rainfall intensity =     1.456(In/Hr)
Area averaged loss rate (Fm) =    0.1673(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1673


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Process from Point/Station        4.200 to Point/Station        4.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.0300     Max loss rate(Fm)=     0.030(In/Hr)
Initial subarea data:
Initial area flow distance =   276.950(Ft.)
Top (of initial area) elevation =   986.510(Ft.)
Bottom (of initial area) elevation =   973.530(Ft.)
Difference in elevation =    12.980(Ft.)
Slope =    0.04687  s(%)=       4.69
TC = k(0.282)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    4.930 min.
Rainfall intensity =      2.320(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.888
Subarea runoff =      0.660(CFS)
Total initial stream area =        0.320(Ac.)
Pervious area fraction = 0.030
Initial area Fm value =    0.030(In/Hr)


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Process from Point/Station        4.200 to Point/Station        4.200
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      0.320(Ac.)
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Runoff from this stream =      0.660(CFS)
Time of concentration =    4.93 min.
Rainfall intensity =     2.320(In/Hr)
Area averaged loss rate (Fm) =    0.0300(In/Hr)
Area averaged Pervious ratio (Ap) = 0.0300
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1      8.10     6.348     10.72    0.167      1.456
2      0.66     0.320      4.93    0.030      2.320
Qmax(1) =
           1.000 *    1.000 *     8.100) +
           0.622 *    1.000 *     0.660) + =       8.511
Qmax(2) =
           1.671 *    0.460 *     8.100) +
           1.000 *    1.000 *     0.660) + =       6.883

Total of 2 streams to confluence:
Flow rates before confluence point:
       8.100       0.660
Maximum flow rates at confluence using above data:
        8.511        6.883
Area of streams before confluence:
        6.348        0.320
Effective area values after confluence:
        6.668        3.239
Results of confluence:
Total flow rate =      8.511(CFS)
Time of concentration =    10.724 min.
Effective stream area after confluence =      6.668(Ac.)
Study area average Pervious fraction(Ap) =  0.161
Study area average soil loss rate(Fm) =    0.161(In/Hr)
Study area total (this main stream) =       6.67(Ac.)


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Process from Point/Station        4.200 to Point/Station        4.200
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      6.668(Ac.)
Runoff from this stream =      8.511(CFS)
Time of concentration =   10.72 min.
Rainfall intensity =     1.456(In/Hr)
Area averaged loss rate (Fm) =    0.1607(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1607


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Process from Point/Station        4.200 to Point/Station        4.200
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.2300     Max loss rate(Fm)=     0.230(In/Hr)
Initial subarea data:
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Initial area flow distance =   333.920(Ft.)
Top (of initial area) elevation =   983.600(Ft.)
Bottom (of initial area) elevation =   974.620(Ft.)
Difference in elevation =     8.980(Ft.)
Slope =    0.02689  s(%)=       2.69
TC = k(0.331)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.977 min.
Rainfall intensity =      1.884(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.790
Subarea runoff =      1.235(CFS)
Total initial stream area =        0.830(Ac.)
Pervious area fraction = 0.230
Initial area Fm value =    0.230(In/Hr)


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Process from Point/Station        4.200 to Point/Station        4.200
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      0.830(Ac.)
Runoff from this stream =      1.235(CFS)
Time of concentration =    6.98 min.
Rainfall intensity =     1.884(In/Hr)
Area averaged loss rate (Fm) =    0.2300(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2300
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1      8.51     6.668     10.72    0.161      1.456
2      1.24     0.830      6.98    0.230      1.884
Qmax(1) =
           1.000 *    1.000 *     8.511) +
           0.741 *    1.000 *     1.235) + =       9.426
Qmax(2) =
           1.331 *    0.651 *     8.511) +
           1.000 *    1.000 *     1.235) + =       8.604

Total of 2 streams to confluence:
Flow rates before confluence point:
       8.511       1.235
Maximum flow rates at confluence using above data:
        9.426        8.604
Area of streams before confluence:
        6.668        0.830
Effective area values after confluence:
        7.498        5.168
Results of confluence:
Total flow rate =      9.426(CFS)
Time of concentration =    10.724 min.
Effective stream area after confluence =      7.498(Ac.)
Study area average Pervious fraction(Ap) =  0.168
Study area average soil loss rate(Fm) =    0.168(In/Hr)
Study area total (this main stream) =       7.50(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.200 to Point/Station        3.700
```

```
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________
Upstream point/station elevation =   966.540(Ft.)
Downstream point/station elevation =   965.000(Ft.)
Pipe length  =   176.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.426(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     9.426(CFS)
Normal flow depth in pipe =   14.13(In.)
Flow top width inside pipe =   14.79(In.)
Critical Depth =   14.23(In.)
Pipe flow velocity =      6.33(Ft/s)
Travel time through pipe =    0.46 min.
Time of concentration (TC) =    11.19 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.200 to Point/Station        3.700
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      7.498(Ac.)
Runoff from this stream =      9.426(CFS)
Time of concentration =   11.19 min.
Rainfall intensity =     1.419(In/Hr)
Area averaged loss rate (Fm) =    0.1684(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1684
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1     24.57    16.215      8.68    0.090      1.653
2      9.43     7.498     11.19    0.168      1.419
Qmax(1) =
           1.000 *    1.000 *    24.566) +
           1.187 *    0.776 *     9.426) + =      33.243
Qmax(2) =
           0.851 *    1.000 *    24.566) +
           1.000 *    1.000 *     9.426) + =      30.320

Total of 2 main streams to confluence:
Flow rates before confluence point:
      25.566      10.426
Maximum flow rates at confluence using above data:
       33.243       30.320
Area of streams before confluence:
       16.215        7.498
Effective area values after confluence:
       22.031       23.713


Results of confluence:
Total flow rate =     33.243(CFS)
Time of concentration =     8.678 min.
Effective stream area after confluence  =     22.031(Ac.)
Study area average Pervious fraction(Ap) =  0.115
Study area average soil loss rate(Fm) =    0.115(In/Hr)
Study area total =      23.71(Ac.)
```

End of computations, Total Study Area = 24.46 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.118
Area averaged SCS curve number = 32.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 01/22/23

JOB NO. 2022-318
11115 HEMLOCK AVE
2 YEAR, RATIONAL METHOD
POST-CONDITION, AREA B

Program License Serial Number 6277

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 2.0
Computed rainfall intensity:
Storm year = 2.00 1 hour rainfall = 0.518 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 1

++

Process from Point/Station 5.000 to Point/Station 5.100
**** INITIAL AREA EVALUATION ****

Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.3100 Max loss rate(Fm)= 0.310(In/Hr)
Initial subarea data:
Initial area flow distance = 228.380(Ft.)
Top (of initial area) elevation = 1001.000(Ft.)
Bottom (of initial area) elevation = 987.460(Ft.)
Difference in elevation = 13.540(Ft.)
Slope = 0.05929 s(%)= 5.93
TC = k(0.351)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 5.421 min.
Rainfall intensity = 2.192(In/Hr) for a 2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.773
Subarea runoff = 3.251(CFS)
Total initial stream area = 1.920(Ac.)
Pervious area fraction = 0.310
Initial area Fm value = 0.310(In/Hr)

++

Process from Point/Station 5.100 to Point/Station 5.200
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 982.460(Ft.)
Downstream point/station elevation = 977.660(Ft.)
Pipe length = 365.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 3.251(CFS)

```
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     3.251(CFS)
Normal flow depth in pipe =    8.09(In.)
Flow top width inside pipe =   11.25(In.)
Critical Depth =    9.26(In.)
Pipe flow velocity =      5.77(Ft/s)
Travel time through pipe =    1.05 min.
Time of concentration (TC) =     6.48 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.100 to Point/Station        5.200
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      1.920(Ac.)
Runoff from this stream =      3.251(CFS)
Time of concentration =    6.48 min.
Rainfall intensity =     1.970(In/Hr)
Area averaged loss rate (Fm) =    0.3100(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3100
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.200 to Point/Station        5.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.0400     Max loss rate(Fm)=     0.040(In/Hr)
Initial subarea data:
Initial area flow distance =   487.230(Ft.)
Top (of initial area) elevation =   996.020(Ft.)
Bottom (of initial area) elevation =   985.200(Ft.)
Difference in elevation =    10.820(Ft.)
Slope =    0.02221  s(%)=       2.22
TC = k(0.284)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.239 min.
Rainfall intensity =      1.843(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.880
Subarea runoff =      7.284(CFS)
Total initial stream area =        4.490(Ac.)
Pervious area fraction = 0.040
Initial area Fm value =    0.040(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.200 to Point/Station        5.200
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      4.490(Ac.)
Runoff from this stream =      7.284(CFS)
Time of concentration =    7.24 min.
Rainfall intensity =     1.843(In/Hr)
Area averaged loss rate (Fm) =    0.0400(In/Hr)
```

```
Area averaged Pervious ratio (Ap) = 0.0400
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1      3.25     1.920      6.48    0.310      1.970
2      7.28     4.490      7.24    0.040      1.843
Qmax(1) =
           1.000 *    1.000 *     3.251) +
           1.071 *    0.894 *     7.284) + =      10.228
Qmax(2) =
           0.923 *    1.000 *     3.251) +
           1.000 *    1.000 *     7.284) + =      10.286

Total of 2 main streams to confluence:
Flow rates before confluence point:
       4.251       8.284
Maximum flow rates at confluence using above data:
       10.228       10.286
Area of streams before confluence:
        1.920        4.490
Effective area values after confluence:
        5.936        6.410


Results of confluence:
Total flow rate =     10.286(CFS)
Time of concentration =     7.239 min.
Effective stream area after confluence  =      6.410(Ac.)
Study area average Pervious fraction(Ap) =  0.121
Study area average soil loss rate(Fm) =    0.121(In/Hr)
Study area total =       6.41(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.200 to Point/Station        5.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
____________________________________________________________________________
Upstream point/station elevation =   977.660(Ft.)
Downstream point/station elevation =   971.000(Ft.)
Pipe length  =   490.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    10.286(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    10.286(CFS)
Normal flow depth in pipe =   12.63(In.)
Flow top width inside pipe =   16.47(In.)
Critical Depth =   14.81(In.)
Pipe flow velocity =      7.76(Ft/s)
Travel time through pipe =    1.05 min.
Time of concentration (TC) =     8.29 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.200 to Point/Station        5.300
**** CONFLUENCE OF MAIN STREAMS ****
____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      6.410(Ac.)
```

```
Runoff from this stream =     10.286(CFS)
Time of concentration =    8.29 min.
Rainfall intensity =     1.699(In/Hr)
Area averaged loss rate (Fm) =    0.1209(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1209
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.300 to Point/Station        5.300
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 1 = 16.60
Pervious ratio(Ap) = 0.0500     Max loss rate(Fm)=     0.050(In/Hr)
Initial subarea data:
Initial area flow distance =   590.460(Ft.)
Top (of initial area) elevation =   990.390(Ft.)
Bottom (of initial area) elevation =   982.710(Ft.)
Difference in elevation =     7.680(Ft.)
Slope =    0.01301  s(%)=       1.30
TC = k(0.287)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.775 min.
Rainfall intensity =      1.642(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.873
Subarea runoff =      9.354(CFS)
Total initial stream area =        6.530(Ac.)
Pervious area fraction = 0.050
Initial area Fm value =    0.050(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.300 to Point/Station        5.300
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      6.530(Ac.)
Runoff from this stream =      9.354(CFS)
Time of concentration =    8.78 min.
Rainfall intensity =     1.642(In/Hr)
Area averaged loss rate (Fm) =    0.0500(In/Hr)
Area averaged Pervious ratio (Ap) = 0.0500
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1     10.29     6.410      8.29    0.121      1.699
2      9.35     6.530      8.78    0.050      1.642
Qmax(1) =
           1.000 *    1.000 *    10.286) +
           1.036 *    0.945 *     9.354) + =      19.439
Qmax(2) =
           0.964 *    1.000 *    10.286) +
           1.000 *    1.000 *     9.354) + =      19.268

Total of 2 main streams to confluence:
```

```
Flow rates before confluence point:
      11.286      10.354
Maximum flow rates at confluence using above data:
       19.439       19.268
Area of streams before confluence:
        6.410        6.530
Effective area values after confluence:
       12.579       12.940


Results of confluence:
Total flow rate =      19.439(CFS)
Time of concentration =     8.291 min.
Effective stream area after confluence  =     12.579(Ac.)
Study area average Pervious fraction(Ap) =  0.085
Study area average soil loss rate(Fm) =    0.085(In/Hr)
Study area total =      12.94(Ac.)
End of computations, Total Study Area =           12.94 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.085
Area averaged SCS curve number =  32.0
```

APPENDIX B.6

RATIONAL METHOD ANALYSIS

POST-DEVELOPMENT CONDITIONS – 10 YEAR

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 01/22/23

JOB NO. 2022-318
11115 HEMLOCK AVE
10 YEAR, RATIONAL METHOD
POST-CONDITION, AREA A

Program License Serial Number 6277

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.823 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

++

Process from Point/Station 3.000 to Point/Station 3.100
**** INITIAL AREA EVALUATION ****

Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.4000 Max loss rate(Fm)= 0.391(In/Hr)
Initial subarea data:
Initial area flow distance = 161.250(Ft.)
Top (of initial area) elevation = 999.000(Ft.)
Bottom (of initial area) elevation = 990.820(Ft.)
Difference in elevation = 8.180(Ft.)
Slope = 0.05073 s(%)= 5.07
TC = k(0.373)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 5.174 min.
Rainfall intensity = 3.581(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.802
Subarea runoff = 1.091(CFS)
Total initial stream area = 0.380(Ac.)
Pervious area fraction = 0.400
Initial area Fm value = 0.391(In/Hr)

++

Process from Point/Station 3.100 to Point/Station 3.200
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 985.820(Ft.)
Downstream point/station elevation = 984.570(Ft.)
Pipe length = 209.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 1.091(CFS)
Nearest computed pipe diameter = 9.00(In.)

```
Calculated individual pipe flow  =     1.091(CFS)
Normal flow depth in pipe =    6.39(In.)
Flow top width inside pipe =    8.17(In.)
Critical Depth =    5.76(In.)
Pipe flow velocity =      3.25(Ft/s)
Travel time through pipe =    1.07 min.
Time of concentration (TC) =     6.25 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.100 to Point/Station        3.200
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      0.380(Ac.)
Runoff from this stream =      1.091(CFS)
Time of concentration =    6.25 min.
Rainfall intensity =     3.199(In/Hr)
Area averaged loss rate (Fm) =    0.3911(In/Hr)
Area averaged Pervious ratio (Ap) = 0.4000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.200 to Point/Station        3.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.3900     Max loss rate(Fm)=     0.381(In/Hr)
Initial subarea data:
Initial area flow distance =   163.100(Ft.)
Top (of initial area) elevation =   997.080(Ft.)
Bottom (of initial area) elevation =   990.760(Ft.)
Difference in elevation =     6.320(Ft.)
Slope =    0.03875  s(%)=       3.87
TC = k(0.371)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    5.449 min.
Rainfall intensity =      3.471(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.801
Subarea runoff =      1.029(CFS)
Total initial stream area =        0.370(Ac.)
Pervious area fraction = 0.390
Initial area Fm value =    0.381(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.200 to Point/Station        3.200
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.370(Ac.)
Runoff from this stream =      1.029(CFS)
Time of concentration =    5.45 min.
Rainfall intensity =     3.471(In/Hr)
Area averaged loss rate (Fm) =    0.3813(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3900
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)
```

```
1      1.09     0.380      6.25    0.391      3.199
2      1.03     0.370      5.45    0.381      3.471
Qmax(1) =
           1.000 *    1.000 *     1.091) +
           0.912 *    1.000 *     1.029) + =       2.029
Qmax(2) =
           1.097 *    0.873 *     1.091) +
           1.000 *    1.000 *     1.029) + =       2.073

Total of 2 streams to confluence:
Flow rates before confluence point:
       1.091       1.029
Maximum flow rates at confluence using above data:
        2.029        2.073
Area of streams before confluence:
        0.380        0.370
Effective area values after confluence:
        0.750        0.702
Results of confluence:
Total flow rate =      2.073(CFS)
Time of concentration =     5.449 min.
Effective stream area after confluence =      0.702(Ac.)
Study area average Pervious fraction(Ap) =  0.395
Study area average soil loss rate(Fm) =    0.386(In/Hr)
Study area total (this main stream) =       0.75(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.200 to Point/Station        3.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   984.570(Ft.)
Downstream point/station elevation =   983.370(Ft.)
Pipe length  =   200.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.073(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.073(CFS)
Normal flow depth in pipe =    7.76(In.)
Flow top width inside pipe =   11.47(In.)
Critical Depth =    7.38(In.)
Pipe flow velocity =      3.86(Ft/s)
Travel time through pipe =    0.86 min.
Time of concentration (TC) =     6.31 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.200 to Point/Station        3.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      0.702(Ac.)
Runoff from this stream =      2.073(CFS)
Time of concentration =    6.31 min.
Rainfall intensity =     3.178(In/Hr)
Area averaged loss rate (Fm) =    0.3863(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3951


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```

```
Process from Point/Station        3.300 to Point/Station        3.300
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.3800     Max loss rate(Fm)=     0.372(In/Hr)
Initial subarea data:
Initial area flow distance =   161.380(Ft.)
Top (of initial area) elevation =   995.070(Ft.)
Bottom (of initial area) elevation =   990.650(Ft.)
Difference in elevation =     4.420(Ft.)
Slope =    0.02739  s(%)=       2.74
TC = k(0.368)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    5.777 min.
Rainfall intensity =      3.352(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.800
Subarea runoff =      1.126(CFS)
Total initial stream area =        0.420(Ac.)
Pervious area fraction = 0.380
Initial area Fm value =    0.372(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.300 to Point/Station        3.300
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.420(Ac.)
Runoff from this stream =      1.126(CFS)
Time of concentration =    5.78 min.
Rainfall intensity =     3.352(In/Hr)
Area averaged loss rate (Fm) =    0.3716(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3800
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1      2.07     0.702      6.31    0.386      3.178
2      1.13     0.420      5.78    0.372      3.352
Qmax(1) =
           1.000 *    1.000 *     2.073) +
           0.942 *    1.000 *     1.126) + =       3.134
Qmax(2) =
           1.062 *    0.915 *     2.073) +
           1.000 *    1.000 *     1.126) + =       3.142

Total of 2 streams to confluence:
Flow rates before confluence point:
       2.073       1.126
Maximum flow rates at confluence using above data:
        3.134        3.142
Area of streams before confluence:
        0.702        0.420
Effective area values after confluence:
        1.122        1.062
Results of confluence:
Total flow rate =      3.142(CFS)
Time of concentration =     5.777 min.
```

```
Effective stream area after confluence =      1.062(Ac.)
Study area average Pervious fraction(Ap) =  0.389
Study area average soil loss rate(Fm) =    0.381(In/Hr)
Study area total (this main stream) =       1.12(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.300 to Point/Station        3.400
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   983.370(Ft.)
Downstream point/station elevation =   981.410(Ft.)
Pipe length  =   327.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.142(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     3.142(CFS)
Normal flow depth in pipe =    8.63(In.)
Flow top width inside pipe =   14.83(In.)
Critical Depth =    8.57(In.)
Pipe flow velocity =      4.31(Ft/s)
Travel time through pipe =    1.27 min.
Time of concentration (TC) =     7.04 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.300 to Point/Station        3.400
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      1.062(Ac.)
Runoff from this stream =      3.142(CFS)
Time of concentration =    7.04 min.
Rainfall intensity =     2.976(In/Hr)
Area averaged loss rate (Fm) =    0.3808(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3894


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.400 to Point/Station        3.400
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.3900     Max loss rate(Fm)=     0.381(In/Hr)
Initial subarea data:
Initial area flow distance =   346.050(Ft.)
Top (of initial area) elevation =   991.360(Ft.)
Bottom (of initial area) elevation =   985.560(Ft.)
Difference in elevation =     5.800(Ft.)
Slope =    0.01676  s(%)=       1.68
TC = k(0.371)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.705 min.
Rainfall intensity =      2.621(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.769
Subarea runoff =      1.572(CFS)
Total initial stream area =        0.780(Ac.)
Pervious area fraction = 0.390
Initial area Fm value =    0.381(In/Hr)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.400 to Point/Station        3.400
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.780(Ac.)
Runoff from this stream =      1.572(CFS)
Time of concentration =    8.71 min.
Rainfall intensity =     2.621(In/Hr)
Area averaged loss rate (Fm) =    0.3813(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3900
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1      3.14     1.062      7.04    0.381      2.976
2      1.57     0.780      8.71    0.381      2.621
Qmax(1) =
           1.000 *    1.000 *     3.142) +
           1.159 *    0.809 *     1.572) + =       4.615
Qmax(2) =
           0.863 *    1.000 *     3.142) +
           1.000 *    1.000 *     1.572) + =       4.284

Total of 2 streams to confluence:
Flow rates before confluence point:
       3.142       1.572
Maximum flow rates at confluence using above data:
        4.615        4.284
Area of streams before confluence:
        1.062        0.780
Effective area values after confluence:
        1.693        1.842
Results of confluence:
Total flow rate =      4.615(CFS)
Time of concentration =     7.043 min.
Effective stream area after confluence =      1.693(Ac.)
Study area average Pervious fraction(Ap) =  0.390
Study area average soil loss rate(Fm) =    0.381(In/Hr)
Study area total (this main stream) =       1.84(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.400 to Point/Station        3.500
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   981.410(Ft.)
Downstream point/station elevation =   978.760(Ft.)
Pipe length  =   156.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.615(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     4.615(CFS)
Normal flow depth in pipe =    9.77(In.)
Flow top width inside pipe =    9.33(In.)
Critical Depth =   10.73(In.)
Pipe flow velocity =      6.74(Ft/s)
Travel time through pipe =    0.39 min.
Time of concentration (TC) =     7.43 min.
```

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Process from Point/Station        3.400 to Point/Station        3.500
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      1.693(Ac.)
Runoff from this stream =      4.615(CFS)
Time of concentration =    7.43 min.
Rainfall intensity =     2.882(In/Hr)
Area averaged loss rate (Fm) =    0.3810(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3897


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Process from Point/Station        3.500 to Point/Station        3.500
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1800     Max loss rate(Fm)=     0.176(In/Hr)
Initial subarea data:
Initial area flow distance =   370.380(Ft.)
Top (of initial area) elevation =   991.730(Ft.)
Bottom (of initial area) elevation =   984.280(Ft.)
Difference in elevation =     7.450(Ft.)
Slope =    0.02011  s(%)=       2.01
TC = k(0.319)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.420 min.
Rainfall intensity =      2.884(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.845
Subarea runoff =      4.339(CFS)
Total initial stream area =        1.780(Ac.)
Pervious area fraction = 0.180
Initial area Fm value =    0.176(In/Hr)


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Process from Point/Station        3.500 to Point/Station        3.500
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      1.780(Ac.)
Runoff from this stream =      4.339(CFS)
Time of concentration =    7.42 min.
Rainfall intensity =     2.884(In/Hr)
Area averaged loss rate (Fm) =    0.1760(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1800
Summary of stream data:

Stream Flow rate    Area     TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1      4.62     1.693      7.43    0.381      2.882
2      4.34     1.780      7.42    0.176      2.884
Qmax(1) =
           1.000 *    1.000 *     4.615) +
           0.999 *    1.000 *     4.339) + =       8.951
Qmax(2) =
```

```
          1.001 *    0.999 *     4.615) +
          1.000 *    1.000 *     4.339) + =       8.953

Total of 2 streams to confluence:
Flow rates before confluence point:
       4.615       4.339
Maximum flow rates at confluence using above data:
        8.951        8.953
Area of streams before confluence:
        1.693        1.780
Effective area values after confluence:
        3.473        3.471
Results of confluence:
Total flow rate =      8.953(CFS)
Time of concentration =     7.420 min.
Effective stream area after confluence =      3.471(Ac.)
Study area average Pervious fraction(Ap) =  0.282
Study area average soil loss rate(Fm) =    0.276(In/Hr)
Study area total (this main stream) =       3.47(Ac.)


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Process from Point/Station        3.500 to Point/Station        3.600
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   978.760(Ft.)
Downstream point/station elevation =   973.280(Ft.)
Pipe length  =   328.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.953(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     8.953(CFS)
Normal flow depth in pipe =   10.66(In.)
Flow top width inside pipe =   17.69(In.)
Critical Depth =   13.89(In.)
Pipe flow velocity =      8.20(Ft/s)
Travel time through pipe =    0.67 min.
Time of concentration (TC) =     8.09 min.


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Process from Point/Station        3.500 to Point/Station        3.600
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      3.471(Ac.)
Runoff from this stream =      8.953(CFS)
Time of concentration =    8.09 min.
Rainfall intensity =     2.739(In/Hr)
Area averaged loss rate (Fm) =    0.2759(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2822


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Process from Point/Station        3.600 to Point/Station        3.600
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.0400     Max loss rate(Fm)=     0.039(In/Hr)
Initial subarea data:
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Initial area flow distance =   456.790(Ft.)
Top (of initial area) elevation =   987.140(Ft.)
Bottom (of initial area) elevation =   980.860(Ft.)
Difference in elevation =     6.280(Ft.)
Slope =    0.01375  s(%)=       1.37
TC = k(0.284)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.764 min.
Rainfall intensity =      2.807(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.887
Subarea runoff =     13.177(CFS)
Total initial stream area =        5.290(Ac.)
Pervious area fraction = 0.040
Initial area Fm value =    0.039(In/Hr)


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Process from Point/Station        3.600 to Point/Station        3.600
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      5.290(Ac.)
Runoff from this stream =     13.177(CFS)
Time of concentration =    7.76 min.
Rainfall intensity =     2.807(In/Hr)
Area averaged loss rate (Fm) =    0.0391(In/Hr)
Area averaged Pervious ratio (Ap) = 0.0400
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1      8.95     3.471      8.09    0.276      2.739
2     13.18     5.290      7.76    0.039      2.807
Qmax(1) =
           1.000 *    1.000 *     8.953) +
           0.976 *    1.000 *    13.177) + =      21.808
Qmax(2) =
           1.027 *    0.960 *     8.953) +
           1.000 *    1.000 *    13.177) + =      22.009

Total of 2 streams to confluence:
Flow rates before confluence point:
       8.953      13.177
Maximum flow rates at confluence using above data:
       21.808       22.009
Area of streams before confluence:
        3.471        5.290
Effective area values after confluence:
        8.761        8.623
Results of confluence:
Total flow rate =     22.009(CFS)
Time of concentration =     7.764 min.
Effective stream area after confluence =      8.623(Ac.)
Study area average Pervious fraction(Ap) =  0.136
Study area average soil loss rate(Fm) =    0.133(In/Hr)
Study area total (this main stream) =       8.76(Ac.)


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Process from Point/Station        3.600 to Point/Station        3.700
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**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 973.280(Ft.)
Downstream point/station elevation = 965.000(Ft.)
Pipe length = 485.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 22.009(CFS)
Nearest computed pipe diameter = 24.00(In.)
Calculated individual pipe flow = 22.009(CFS)
Normal flow depth in pipe = 15.42(In.)
Flow top width inside pipe = 23.00(In.)
Critical Depth = 20.10(In.)
Pipe flow velocity = 10.31(Ft/s)
Travel time through pipe = 0.78 min.
Time of concentration (TC) = 8.55 min.

++
Process from Point/Station 3.600 to Point/Station 3.700
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area = 8.623(Ac.)
Runoff from this stream = 22.009(CFS)
Time of concentration = 8.55 min.
Rainfall intensity = 2.649(In/Hr)
Area averaged loss rate (Fm) = 0.1329(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1360

++
Process from Point/Station 3.700 to Point/Station 3.700
**** INITIAL AREA EVALUATION ****

Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.0400 Max loss rate(Fm)= 0.039(In/Hr)
Initial subarea data:
Initial area flow distance = 653.410(Ft.)
Top (of initial area) elevation = 985.500(Ft.)
Bottom (of initial area) elevation = 975.420(Ft.)
Difference in elevation = 10.080(Ft.)
Slope = 0.01543 s(%)= 1.54
TC = k(0.284)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 8.756 min.
Rainfall intensity = 2.612(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.887
Subarea runoff = 17.943(CFS)
Total initial stream area = 7.750(Ac.)
Pervious area fraction = 0.040
Initial area Fm value = 0.039(In/Hr)

++
Process from Point/Station 3.700 to Point/Station 3.700
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2
Stream flow area = 7.750(Ac.)
Runoff from this stream = 17.943(CFS)
Time of concentration = 8.76 min.

```
Rainfall intensity =     2.612(In/Hr)
Area averaged loss rate (Fm) =    0.0391(In/Hr)
Area averaged Pervious ratio (Ap) = 0.0400
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1     22.01     8.623      8.55    0.133      2.649
2     17.94     7.750      8.76    0.039      2.612
Qmax(1) =
           1.000 *    1.000 *    22.009) +
           1.015 *    0.976 *    17.943) + =      39.786
Qmax(2) =
           0.985 *    1.000 *    22.009) +
           1.000 *    1.000 *    17.943) + =      39.622

Total of 2 streams to confluence:
Flow rates before confluence point:
      22.009      17.943
Maximum flow rates at confluence using above data:
       39.786       39.622
Area of streams before confluence:
        8.623        7.750
Effective area values after confluence:
       16.190       16.373
Results of confluence:
Total flow rate =     39.786(CFS)
Time of concentration =     8.549 min.
Effective stream area after confluence =     16.190(Ac.)
Study area average Pervious fraction(Ap) =  0.091
Study area average soil loss rate(Fm) =    0.089(In/Hr)
Study area total (this main stream) =      16.37(Ac.)


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Process from Point/Station        3.700 to Point/Station        3.700
**** CONFLUENCE OF MAIN STREAMS ****
____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     16.190(Ac.)
Runoff from this stream =     39.786(CFS)
Time of concentration =    8.55 min.
Rainfall intensity =     2.649(In/Hr)
Area averaged loss rate (Fm) =    0.0885(In/Hr)
Area averaged Pervious ratio (Ap) = 0.0905
Program is now starting with Main Stream No. 2


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Process from Point/Station        3.800 to Point/Station        3.900
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.5200     Max loss rate(Fm)=     0.508(In/Hr)
Initial subarea data:
Initial area flow distance =   160.000(Ft.)
```

```
Top (of initial area) elevation =   983.600(Ft.)
Bottom (of initial area) elevation =   980.790(Ft.)
Difference in elevation =     2.810(Ft.)
Slope =    0.01756  s(%)=       1.76
TC = k(0.403)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.883 min.
Rainfall intensity =      3.017(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.748
Subarea runoff =      0.948(CFS)
Total initial stream area =        0.420(Ac.)
Pervious area fraction = 0.520
Initial area Fm value =    0.508(In/Hr)


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Process from Point/Station        3.900 to Point/Station        4.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   975.790(Ft.)
Downstream point/station elevation =   972.540(Ft.)
Pipe length  =   372.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     0.948(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     0.948(CFS)
Normal flow depth in pipe =    5.09(In.)
Flow top width inside pipe =    8.92(In.)
Critical Depth =    5.35(In.)
Pipe flow velocity =      3.68(Ft/s)
Travel time through pipe =    1.69 min.
Time of concentration (TC) =     8.57 min.


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Process from Point/Station        3.900 to Point/Station        4.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      0.420(Ac.)
Runoff from this stream =      0.948(CFS)
Time of concentration =    8.57 min.
Rainfall intensity =     2.646(In/Hr)
Area averaged loss rate (Fm) =    0.5085(In/Hr)
Area averaged Pervious ratio (Ap) = 0.5200


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Process from Point/Station        4.000 to Point/Station        4.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1400     Max loss rate(Fm)=     0.137(In/Hr)
Initial subarea data:
Initial area flow distance =   534.460(Ft.)
Top (of initial area) elevation =   987.610(Ft.)
Bottom (of initial area) elevation =   981.360(Ft.)
Difference in elevation =     6.250(Ft.)
Slope =    0.01169  s(%)=       1.17
TC = k(0.309)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.280 min.
```

```
Rainfall intensity =      2.522(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.851
Subarea runoff =      6.225(CFS)
Total initial stream area =        2.900(Ac.)
Pervious area fraction = 0.140
Initial area Fm value =    0.137(In/Hr)


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Process from Point/Station        4.000 to Point/Station        4.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      2.900(Ac.)
Runoff from this stream =      6.225(CFS)
Time of concentration =    9.28 min.
Rainfall intensity =     2.522(In/Hr)
Area averaged loss rate (Fm) =    0.1369(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1400
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1      0.95     0.420      8.57    0.508      2.646
2      6.23     2.900      9.28    0.137      2.522
Qmax(1) =
           1.000 *    1.000 *     0.948) +
           1.052 *    0.923 *     6.225) + =       6.994
Qmax(2) =
           0.942 *    1.000 *     0.948) +
           1.000 *    1.000 *     6.225) + =       7.119

Total of 2 streams to confluence:
Flow rates before confluence point:
       0.948       6.225
Maximum flow rates at confluence using above data:
        6.994        7.119
Area of streams before confluence:
        0.420        2.900
Effective area values after confluence:
        3.098        3.320
Results of confluence:
Total flow rate =      7.119(CFS)
Time of concentration =     9.280 min.
Effective stream area after confluence =      3.320(Ac.)
Study area average Pervious fraction(Ap) =  0.188
Study area average soil loss rate(Fm) =    0.184(In/Hr)
Study area total (this main stream) =       3.32(Ac.)


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Process from Point/Station        4.000 to Point/Station        4.100
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   972.540(Ft.)
Downstream point/station elevation =   968.390(Ft.)
Pipe length  =   475.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.119(CFS)
Nearest computed pipe diameter  =     18.00(In.)
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Calculated individual pipe flow  =     7.119(CFS)
Normal flow depth in pipe =   11.37(In.)
Flow top width inside pipe =   17.37(In.)
Critical Depth =   12.39(In.)
Pipe flow velocity =      6.06(Ft/s)
Travel time through pipe =    1.31 min.
Time of concentration (TC) =    10.59 min.


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Process from Point/Station        4.000 to Point/Station        4.100
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      3.320(Ac.)
Runoff from this stream =      7.119(CFS)
Time of concentration =   10.59 min.
Rainfall intensity =     2.330(In/Hr)
Area averaged loss rate (Fm) =    0.1839(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1881


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Process from Point/Station        4.100 to Point/Station        4.100
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.0900     Max loss rate(Fm)=     0.088(In/Hr)
Initial subarea data:
Initial area flow distance =   689.460(Ft.)
Top (of initial area) elevation =   987.610(Ft.)
Bottom (of initial area) elevation =   980.590(Ft.)
Difference in elevation =     7.020(Ft.)
Slope =    0.01018  s(%)=       1.02
TC = k(0.297)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.143 min.
Rainfall intensity =      2.391(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.867
Subarea runoff =      4.643(CFS)
Total initial stream area =        2.240(Ac.)
Pervious area fraction = 0.090
Initial area Fm value =    0.088(In/Hr)


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Process from Point/Station        4.100 to Point/Station        4.100
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      2.240(Ac.)
Runoff from this stream =      4.643(CFS)
Time of concentration =   10.14 min.
Rainfall intensity =     2.391(In/Hr)
Area averaged loss rate (Fm) =    0.0880(In/Hr)
Area averaged Pervious ratio (Ap) = 0.0900
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)
```

```
1      7.12     3.320     10.59    0.184      2.330
2      4.64     2.240     10.14    0.088      2.391
Qmax(1) =
           1.000 *    1.000 *     7.119) +
           0.974 *    1.000 *     4.643) + =      11.639
Qmax(2) =
           1.028 *    0.958 *     7.119) +
           1.000 *    1.000 *     4.643) + =      11.656

Total of 2 streams to confluence:
Flow rates before confluence point:
       7.119       4.643
Maximum flow rates at confluence using above data:
       11.639       11.656
Area of streams before confluence:
        3.320        2.240
Effective area values after confluence:
        5.560        5.420
Results of confluence:
Total flow rate =     11.656(CFS)
Time of concentration =    10.143 min.
Effective stream area after confluence =      5.420(Ac.)
Study area average Pervious fraction(Ap) =  0.149
Study area average soil loss rate(Fm) =    0.145(In/Hr)
Study area total (this main stream) =       5.56(Ac.)


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Process from Point/Station        4.100 to Point/Station        4.200
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   968.390(Ft.)
Downstream point/station elevation =   966.540(Ft.)
Pipe length  =   211.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    11.656(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    11.656(CFS)
Normal flow depth in pipe =   14.02(In.)
Flow top width inside pipe =   19.79(In.)
Critical Depth =   15.27(In.)
Pipe flow velocity =      6.83(Ft/s)
Travel time through pipe =    0.51 min.
Time of concentration (TC) =    10.66 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.100 to Point/Station        4.200
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      5.420(Ac.)
Runoff from this stream =     11.656(CFS)
Time of concentration =   10.66 min.
Rainfall intensity =     2.321(In/Hr)
Area averaged loss rate (Fm) =    0.1453(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1486


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
```

```
Process from Point/Station        4.200 to Point/Station        4.200
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.2700     Max loss rate(Fm)=     0.264(In/Hr)
Initial subarea data:
Initial area flow distance =   436.910(Ft.)
Top (of initial area) elevation =   986.380(Ft.)
Bottom (of initial area) elevation =   973.310(Ft.)
Difference in elevation =    13.070(Ft.)
Slope =    0.02991  s(%)=       2.99
TC = k(0.341)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.831 min.
Rainfall intensity =      2.792(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.815
Subarea runoff =      2.230(CFS)
Total initial stream area =        0.980(Ac.)
Pervious area fraction = 0.270
Initial area Fm value =    0.264(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.200 to Point/Station        4.200
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      0.980(Ac.)
Runoff from this stream =      2.230(CFS)
Time of concentration =    7.83 min.
Rainfall intensity =     2.792(In/Hr)
Area averaged loss rate (Fm) =    0.2640(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2700
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1     11.66     5.420     10.66    0.145      2.321
2      2.23     0.980      7.83    0.264      2.792
Qmax(1) =
           1.000 *    1.000 *    11.656) +
           0.814 *    1.000 *     2.230) + =      13.470
Qmax(2) =
           1.217 *    0.735 *    11.656) +
           1.000 *    1.000 *     2.230) + =      12.651

Total of 2 streams to confluence:
Flow rates before confluence point:
      11.656       2.230
Maximum flow rates at confluence using above data:
       13.470       12.651
Area of streams before confluence:
        5.420        0.980
Effective area values after confluence:
        6.400        4.963
Results of confluence:
Total flow rate =     13.470(CFS)
Time of concentration =    10.657 min.
```

```
Effective stream area after confluence =      6.400(Ac.)
Study area average Pervious fraction(Ap) =  0.167
Study area average soil loss rate(Fm) =    0.163(In/Hr)
Study area total (this main stream) =       6.40(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.200 to Point/Station        4.200
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      6.400(Ac.)
Runoff from this stream =     13.470(CFS)
Time of concentration =   10.66 min.
Rainfall intensity =     2.321(In/Hr)
Area averaged loss rate (Fm) =    0.1634(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1672


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.200 to Point/Station        4.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.0300     Max loss rate(Fm)=     0.029(In/Hr)
Initial subarea data:
Initial area flow distance =   276.950(Ft.)
Top (of initial area) elevation =   986.510(Ft.)
Bottom (of initial area) elevation =   973.530(Ft.)
Difference in elevation =    12.980(Ft.)
Slope =    0.04687  s(%)=       4.69
TC = k(0.282)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    4.930 min.
Rainfall intensity =      3.686(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.893
Subarea runoff =      1.053(CFS)
Total initial stream area =        0.320(Ac.)
Pervious area fraction = 0.030
Initial area Fm value =    0.029(In/Hr)


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Process from Point/Station        4.200 to Point/Station        4.200
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      0.320(Ac.)
Runoff from this stream =      1.053(CFS)
Time of concentration =    4.93 min.
Rainfall intensity =     3.686(In/Hr)
Area averaged loss rate (Fm) =    0.0293(In/Hr)
Area averaged Pervious ratio (Ap) = 0.0300
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1     13.47     6.400     10.66    0.163      2.321
```

```
2      1.05     0.320      4.93    0.029      3.686
Qmax(1) =
           1.000 *    1.000 *    13.470) +
           0.627 *    1.000 *     1.053) + =      14.130
Qmax(2) =
           1.633 *    0.463 *    13.470) +
           1.000 *    1.000 *     1.053) + =      11.227

Total of 2 streams to confluence:
Flow rates before confluence point:
      13.470       1.053
Maximum flow rates at confluence using above data:
       14.130       11.227
Area of streams before confluence:
        6.400        0.320
Effective area values after confluence:
        6.720        3.281
Results of confluence:
Total flow rate =     14.130(CFS)
Time of concentration =    10.657 min.
Effective stream area after confluence =      6.720(Ac.)
Study area average Pervious fraction(Ap) =  0.161
Study area average soil loss rate(Fm) =    0.157(In/Hr)
Study area total (this main stream) =       6.72(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.200 to Point/Station        4.200
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      6.720(Ac.)
Runoff from this stream =     14.130(CFS)
Time of concentration =   10.66 min.
Rainfall intensity =     2.321(In/Hr)
Area averaged loss rate (Fm) =    0.1571(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1606


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.200 to Point/Station        4.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.2300     Max loss rate(Fm)=     0.225(In/Hr)
Initial subarea data:
Initial area flow distance =   333.920(Ft.)
Top (of initial area) elevation =   983.600(Ft.)
Bottom (of initial area) elevation =   974.620(Ft.)
Difference in elevation =     8.980(Ft.)
Slope =    0.02689  s(%)=       2.69
TC = k(0.331)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.977 min.
Rainfall intensity =      2.993(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.832
Subarea runoff =      2.068(CFS)
Total initial stream area =        0.830(Ac.)
Pervious area fraction = 0.230
Initial area Fm value =    0.225(In/Hr)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.200 to Point/Station        4.200
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      0.830(Ac.)
Runoff from this stream =      2.068(CFS)
Time of concentration =    6.98 min.
Rainfall intensity =     2.993(In/Hr)
Area averaged loss rate (Fm) =    0.2249(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2300
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1     14.13     6.720     10.66    0.157      2.321
2      2.07     0.830      6.98    0.225      2.993
Qmax(1) =
           1.000 *    1.000 *    14.130) +
           0.757 *    1.000 *     2.068) + =      15.696
Qmax(2) =
           1.310 *    0.655 *    14.130) +
           1.000 *    1.000 *     2.068) + =      14.190

Total of 2 streams to confluence:
Flow rates before confluence point:
      14.130       2.068
Maximum flow rates at confluence using above data:
       15.696       14.190
Area of streams before confluence:
        6.720        0.830
Effective area values after confluence:
        7.550        5.229
Results of confluence:
Total flow rate =     15.696(CFS)
Time of concentration =    10.657 min.
Effective stream area after confluence =      7.550(Ac.)
Study area average Pervious fraction(Ap) =  0.168
Study area average soil loss rate(Fm) =    0.165(In/Hr)
Study area total (this main stream) =       7.55(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.200 to Point/Station        3.700
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
____________________________________________________________________________
Upstream point/station elevation =   966.540(Ft.)
Downstream point/station elevation =   965.000(Ft.)
Pipe length  =   176.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    15.696(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    15.696(CFS)
Normal flow depth in pipe =   15.40(In.)
Flow top width inside pipe =   23.02(In.)
Critical Depth =   17.14(In.)
Pipe flow velocity =      7.38(Ft/s)
Travel time through pipe =    0.40 min.
```

```
Time of concentration (TC) =    11.06 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.200 to Point/Station        3.700
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      7.550(Ac.)
Runoff from this stream =     15.696(CFS)
Time of concentration =   11.06 min.
Rainfall intensity =     2.271(In/Hr)
Area averaged loss rate (Fm) =    0.1645(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1683
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1     39.79    16.190      8.55    0.089      2.649
2     15.70     7.550     11.06    0.165      2.271
Qmax(1) =
           1.000 *    1.000 *    39.786) +
           1.180 *    0.773 *    15.696) + =      54.106
Qmax(2) =
           0.852 *    1.000 *    39.786) +
           1.000 *    1.000 *    15.696) + =      49.597

Total of 2 main streams to confluence:
Flow rates before confluence point:
      40.786      16.696
Maximum flow rates at confluence using above data:
       54.106       49.597
Area of streams before confluence:
       16.190        7.550
Effective area values after confluence:
       22.028       23.740


Results of confluence:
Total flow rate =      54.106(CFS)
Time of concentration =     8.549 min.
Effective stream area after confluence  =     22.028(Ac.)
Study area average Pervious fraction(Ap) =  0.115
Study area average soil loss rate(Fm) =    0.113(In/Hr)
Study area total =      23.74(Ac.)
End of computations, Total Study Area =           24.46 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.118
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 01/22/23

JOB NO. 2022-318
11115 HEMLOCK AVE
10 YEAR, RATIONAL METHOD
POST-CONDITION, AREA B

Program License Serial Number 6277

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.823 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

++

Process from Point/Station 5.000 to Point/Station 5.100
**** INITIAL AREA EVALUATION ****

Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.3100 Max loss rate(Fm)= 0.303(In/Hr)
Initial subarea data:
Initial area flow distance = 228.380(Ft.)
Top (of initial area) elevation = 1001.000(Ft.)
Bottom (of initial area) elevation = 987.460(Ft.)
Difference in elevation = 13.540(Ft.)
Slope = 0.05929 s(%)= 5.93
TC = k(0.351)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 5.421 min.
Rainfall intensity = 3.482(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.822
Subarea runoff = 5.493(CFS)
Total initial stream area = 1.920(Ac.)
Pervious area fraction = 0.310
Initial area Fm value = 0.303(In/Hr)

++

Process from Point/Station 5.100 to Point/Station 5.200
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 982.460(Ft.)
Downstream point/station elevation = 977.660(Ft.)
Pipe length = 365.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 5.493(CFS)
Nearest computed pipe diameter = 15.00(In.)

```
Calculated individual pipe flow  =     5.493(CFS)
Normal flow depth in pipe =    9.62(In.)
Flow top width inside pipe =   14.39(In.)
Critical Depth =   11.40(In.)
Pipe flow velocity =      6.61(Ft/s)
Travel time through pipe =    0.92 min.
Time of concentration (TC) =     6.34 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.100 to Point/Station        5.200
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      1.920(Ac.)
Runoff from this stream =      5.493(CFS)
Time of concentration =    6.34 min.
Rainfall intensity =     3.169(In/Hr)
Area averaged loss rate (Fm) =    0.3031(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3100
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.200 to Point/Station        5.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.0400     Max loss rate(Fm)=     0.039(In/Hr)
Initial subarea data:
Initial area flow distance =   487.230(Ft.)
Top (of initial area) elevation =   996.020(Ft.)
Bottom (of initial area) elevation =   985.200(Ft.)
Difference in elevation =    10.820(Ft.)
Slope =    0.02221  s(%)=       2.22
TC = k(0.284)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.239 min.
Rainfall intensity =      2.927(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.888
Subarea runoff =     11.672(CFS)
Total initial stream area =        4.490(Ac.)
Pervious area fraction = 0.040
Initial area Fm value =    0.039(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.200 to Point/Station        5.200
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      4.490(Ac.)
Runoff from this stream =     11.672(CFS)
Time of concentration =    7.24 min.
Rainfall intensity =     2.927(In/Hr)
Area averaged loss rate (Fm) =    0.0391(In/Hr)
Area averaged Pervious ratio (Ap) = 0.0400
Summary of stream data:
```

```
Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1      5.49     1.920      6.34    0.303      3.169
2     11.67     4.490      7.24    0.039      2.927
Qmax(1) =
           1.000 *    1.000 *     5.493) +
           1.084 *    0.876 *    11.672) + =      16.574
Qmax(2) =
           0.916 *    1.000 *     5.493) +
           1.000 *    1.000 *    11.672) + =      16.701

Total of 2 main streams to confluence:
Flow rates before confluence point:
       6.493      12.672
Maximum flow rates at confluence using above data:
       16.574       16.701
Area of streams before confluence:
        1.920        4.490
Effective area values after confluence:
        5.853        6.410


Results of confluence:
Total flow rate =     16.701(CFS)
Time of concentration =     7.239 min.
Effective stream area after confluence  =      6.410(Ac.)
Study area average Pervious fraction(Ap) =  0.121
Study area average soil loss rate(Fm) =    0.118(In/Hr)
Study area total =       6.41(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.200 to Point/Station        5.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
____________________________________________________________________________
Upstream point/station elevation =   977.660(Ft.)
Downstream point/station elevation =   971.000(Ft.)
Pipe length  =   490.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    16.701(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    16.701(CFS)
Normal flow depth in pipe =   15.63(In.)
Flow top width inside pipe =   18.32(In.)
Critical Depth =   18.01(In.)
Pipe flow velocity =      8.70(Ft/s)
Travel time through pipe =    0.94 min.
Time of concentration (TC) =     8.18 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.200 to Point/Station        5.300
**** CONFLUENCE OF MAIN STREAMS ****
____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      6.410(Ac.)
Runoff from this stream =     16.701(CFS)
Time of concentration =    8.18 min.
```

```
Rainfall intensity =     2.721(In/Hr)
Area averaged loss rate (Fm) =    0.1182(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1209
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.300 to Point/Station        5.300
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.0500     Max loss rate(Fm)=     0.049(In/Hr)
Initial subarea data:
Initial area flow distance =   590.460(Ft.)
Top (of initial area) elevation =   990.390(Ft.)
Bottom (of initial area) elevation =   982.710(Ft.)
Difference in elevation =     7.680(Ft.)
Slope =    0.01301  s(%)=       1.30
TC = k(0.287)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.775 min.
Rainfall intensity =      2.608(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.883
Subarea runoff =     15.041(CFS)
Total initial stream area =        6.530(Ac.)
Pervious area fraction = 0.050
Initial area Fm value =    0.049(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.300 to Point/Station        5.300
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      6.530(Ac.)
Runoff from this stream =     15.041(CFS)
Time of concentration =    8.78 min.
Rainfall intensity =     2.608(In/Hr)
Area averaged loss rate (Fm) =    0.0489(In/Hr)
Area averaged Pervious ratio (Ap) = 0.0500
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1     16.70     6.410      8.18    0.118      2.721
2     15.04     6.530      8.78    0.049      2.608
Qmax(1) =
           1.000 *    1.000 *    16.701) +
           1.044 *    0.932 *    15.041) + =      31.335
Qmax(2) =
           0.957 *    1.000 *    16.701) +
           1.000 *    1.000 *    15.041) + =      31.019

Total of 2 main streams to confluence:
Flow rates before confluence point:
      17.701      16.041
Maximum flow rates at confluence using above data:
```

```
       31.335       31.019
Area of streams before confluence:
        6.410        6.530
Effective area values after confluence:
       12.495       12.940


Results of confluence:
Total flow rate =      31.335(CFS)
Time of concentration =     8.178 min.
Effective stream area after confluence  =     12.495(Ac.)
Study area average Pervious fraction(Ap) =  0.085
Study area average soil loss rate(Fm) =    0.083(In/Hr)
Study area total =      12.94(Ac.)
End of computations, Total Study Area =           12.94 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.085
Area averaged SCS curve number =  32.0
```

APPENDIX B.7

RATIONAL METHOD ANALYSIS

POST-DEVELOPMENT CONDITIONS – 25 YEAR

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 01/22/23

JOB NO. 2022-318
11115 HEMLOCK AVE
25 YEAR, RATIONAL METHOD
POST-CONDITION, AREA A

Program License Serial Number 6277

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 25.0
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 1.020 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

++

Process from Point/Station 3.000 to Point/Station 3.100
**** INITIAL AREA EVALUATION ****

Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.4000 Max loss rate(Fm)= 0.391(In/Hr)
Initial subarea data:
Initial area flow distance = 161.250(Ft.)
Top (of initial area) elevation = 999.000(Ft.)
Bottom (of initial area) elevation = 990.820(Ft.)
Difference in elevation = 8.180(Ft.)
Slope = 0.05073 s(%)= 5.07
TC = k(0.373)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 5.174 min.
Rainfall intensity = 4.438(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.821
Subarea runoff = 1.384(CFS)
Total initial stream area = 0.380(Ac.)
Pervious area fraction = 0.400
Initial area Fm value = 0.391(In/Hr)

++

Process from Point/Station 3.100 to Point/Station 3.200
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 985.820(Ft.)
Downstream point/station elevation = 984.570(Ft.)
Pipe length = 209.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 1.384(CFS)
Nearest computed pipe diameter = 12.00(In.)

```
Calculated individual pipe flow  =     1.384(CFS)
Normal flow depth in pipe =    6.02(In.)
Flow top width inside pipe =   12.00(In.)
Critical Depth =    5.97(In.)
Pipe flow velocity =      3.51(Ft/s)
Travel time through pipe =    0.99 min.
Time of concentration (TC) =     6.17 min.


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Process from Point/Station        3.100 to Point/Station        3.200
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      0.380(Ac.)
Runoff from this stream =      1.384(CFS)
Time of concentration =    6.17 min.
Rainfall intensity =     3.995(In/Hr)
Area averaged loss rate (Fm) =    0.3911(In/Hr)
Area averaged Pervious ratio (Ap) = 0.4000


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Process from Point/Station        3.200 to Point/Station        3.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.3900     Max loss rate(Fm)=     0.381(In/Hr)
Initial subarea data:
Initial area flow distance =   163.100(Ft.)
Top (of initial area) elevation =   997.080(Ft.)
Bottom (of initial area) elevation =   990.760(Ft.)
Difference in elevation =     6.320(Ft.)
Slope =    0.03875  s(%)=       3.87
TC = k(0.371)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    5.449 min.
Rainfall intensity =      4.302(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.820
Subarea runoff =      1.306(CFS)
Total initial stream area =        0.370(Ac.)
Pervious area fraction = 0.390
Initial area Fm value =    0.381(In/Hr)


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Process from Point/Station        3.200 to Point/Station        3.200
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.370(Ac.)
Runoff from this stream =      1.306(CFS)
Time of concentration =    5.45 min.
Rainfall intensity =     4.302(In/Hr)
Area averaged loss rate (Fm) =    0.3813(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3900
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)
```

```
1      1.38     0.380      6.17    0.391      3.995
2      1.31     0.370      5.45    0.381      4.302
Qmax(1) =
           1.000 *    1.000 *     1.384) +
           0.922 *    1.000 *     1.306) + =       2.587
Qmax(2) =
           1.085 *    0.884 *     1.384) +
           1.000 *    1.000 *     1.306) + =       2.633

Total of 2 streams to confluence:
Flow rates before confluence point:
       1.384       1.306
Maximum flow rates at confluence using above data:
        2.587        2.633
Area of streams before confluence:
        0.380        0.370
Effective area values after confluence:
        0.750        0.706
Results of confluence:
Total flow rate =      2.633(CFS)
Time of concentration =     5.449 min.
Effective stream area after confluence =      0.706(Ac.)
Study area average Pervious fraction(Ap) =  0.395
Study area average soil loss rate(Fm) =    0.386(In/Hr)
Study area total (this main stream) =       0.75(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.200 to Point/Station        3.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   984.570(Ft.)
Downstream point/station elevation =   983.370(Ft.)
Pipe length  =   200.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.633(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.633(CFS)
Normal flow depth in pipe =    9.38(In.)
Flow top width inside pipe =    9.92(In.)
Critical Depth =    8.34(In.)
Pipe flow velocity =      4.00(Ft/s)
Travel time through pipe =    0.83 min.
Time of concentration (TC) =     6.28 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.200 to Point/Station        3.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      0.706(Ac.)
Runoff from this stream =      2.633(CFS)
Time of concentration =    6.28 min.
Rainfall intensity =     3.950(In/Hr)
Area averaged loss rate (Fm) =    0.3863(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3951


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Process from Point/Station        3.300 to Point/Station        3.300
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.3800     Max loss rate(Fm)=     0.372(In/Hr)
Initial subarea data:
Initial area flow distance =   161.380(Ft.)
Top (of initial area) elevation =   995.070(Ft.)
Bottom (of initial area) elevation =   990.650(Ft.)
Difference in elevation =     4.420(Ft.)
Slope =    0.02739  s(%)=       2.74
TC = k(0.368)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    5.777 min.
Rainfall intensity =      4.154(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.819
Subarea runoff =      1.430(CFS)
Total initial stream area =        0.420(Ac.)
Pervious area fraction = 0.380
Initial area Fm value =    0.372(In/Hr)


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Process from Point/Station        3.300 to Point/Station        3.300
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.420(Ac.)
Runoff from this stream =      1.430(CFS)
Time of concentration =    5.78 min.
Rainfall intensity =     4.154(In/Hr)
Area averaged loss rate (Fm) =    0.3716(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3800
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1      2.63     0.706      6.28    0.386      3.950
2      1.43     0.420      5.78    0.372      4.154
Qmax(1) =
           1.000 *    1.000 *     2.633) +
           0.946 *    1.000 *     1.430) + =       3.986
Qmax(2) =
           1.057 *    0.920 *     2.633) +
           1.000 *    1.000 *     1.430) + =       3.990

Total of 2 streams to confluence:
Flow rates before confluence point:
       2.633       1.430
Maximum flow rates at confluence using above data:
        3.986        3.990
Area of streams before confluence:
        0.706        0.420
Effective area values after confluence:
        1.126        1.069
Results of confluence:
Total flow rate =      3.990(CFS)
Time of concentration =     5.777 min.
```

```
Effective stream area after confluence =      1.069(Ac.)
Study area average Pervious fraction(Ap) =  0.389
Study area average soil loss rate(Fm) =    0.381(In/Hr)
Study area total (this main stream) =       1.13(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.300 to Point/Station        3.400
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   983.370(Ft.)
Downstream point/station elevation =   981.410(Ft.)
Pipe length  =   327.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.990(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     3.990(CFS)
Normal flow depth in pipe =   10.13(In.)
Flow top width inside pipe =   14.05(In.)
Critical Depth =    9.69(In.)
Pipe flow velocity =      4.53(Ft/s)
Travel time through pipe =    1.20 min.
Time of concentration (TC) =     6.98 min.


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Process from Point/Station        3.300 to Point/Station        3.400
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      1.069(Ac.)
Runoff from this stream =      3.990(CFS)
Time of concentration =    6.98 min.
Rainfall intensity =     3.708(In/Hr)
Area averaged loss rate (Fm) =    0.3808(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3894


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Process from Point/Station        3.400 to Point/Station        3.400
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.3900     Max loss rate(Fm)=     0.381(In/Hr)
Initial subarea data:
Initial area flow distance =   346.050(Ft.)
Top (of initial area) elevation =   991.360(Ft.)
Bottom (of initial area) elevation =   985.560(Ft.)
Difference in elevation =     5.800(Ft.)
Slope =    0.01676  s(%)=       1.68
TC = k(0.371)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.705 min.
Rainfall intensity =      3.248(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.794
Subarea runoff =      2.012(CFS)
Total initial stream area =        0.780(Ac.)
Pervious area fraction = 0.390
Initial area Fm value =    0.381(In/Hr)
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Process from Point/Station        3.400 to Point/Station        3.400
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.780(Ac.)
Runoff from this stream =      2.012(CFS)
Time of concentration =    8.71 min.
Rainfall intensity =     3.248(In/Hr)
Area averaged loss rate (Fm) =    0.3813(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3900
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1      3.99     1.069      6.98    0.381      3.708
2      2.01     0.780      8.71    0.381      3.248
Qmax(1) =
           1.000 *    1.000 *     3.990) +
           1.160 *    0.802 *     2.012) + =       5.862
Qmax(2) =
           0.862 *    1.000 *     3.990) +
           1.000 *    1.000 *     2.012) + =       5.451

Total of 2 streams to confluence:
Flow rates before confluence point:
       3.990       2.012
Maximum flow rates at confluence using above data:
        5.862        5.451
Area of streams before confluence:
        1.069        0.780
Effective area values after confluence:
        1.695        1.849
Results of confluence:
Total flow rate =      5.862(CFS)
Time of concentration =     6.982 min.
Effective stream area after confluence =      1.695(Ac.)
Study area average Pervious fraction(Ap) =  0.390
Study area average soil loss rate(Fm) =    0.381(In/Hr)
Study area total (this main stream) =       1.85(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.400 to Point/Station        3.500
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
____________________________________________________________________________
Upstream point/station elevation =   981.410(Ft.)
Downstream point/station elevation =   978.760(Ft.)
Pipe length  =   156.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.862(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     5.862(CFS)
Normal flow depth in pipe =    9.21(In.)
Flow top width inside pipe =   14.60(In.)
Critical Depth =   11.75(In.)
Pipe flow velocity =      7.41(Ft/s)
Travel time through pipe =    0.35 min.
Time of concentration (TC) =     7.33 min.
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Process from Point/Station        3.400 to Point/Station        3.500
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      1.695(Ac.)
Runoff from this stream =      5.862(CFS)
Time of concentration =    7.33 min.
Rainfall intensity =     3.600(In/Hr)
Area averaged loss rate (Fm) =    0.3810(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3897


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Process from Point/Station        3.500 to Point/Station        3.500
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1800     Max loss rate(Fm)=     0.176(In/Hr)
Initial subarea data:
Initial area flow distance =   370.380(Ft.)
Top (of initial area) elevation =   991.730(Ft.)
Bottom (of initial area) elevation =   984.280(Ft.)
Difference in elevation =     7.450(Ft.)
Slope =    0.02011  s(%)=       2.01
TC = k(0.319)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.420 min.
Rainfall intensity =      3.575(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.856
Subarea runoff =      5.445(CFS)
Total initial stream area =        1.780(Ac.)
Pervious area fraction = 0.180
Initial area Fm value =    0.176(In/Hr)


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Process from Point/Station        3.500 to Point/Station        3.500
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      1.780(Ac.)
Runoff from this stream =      5.445(CFS)
Time of concentration =    7.42 min.
Rainfall intensity =     3.575(In/Hr)
Area averaged loss rate (Fm) =    0.1760(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1800
Summary of stream data:

Stream Flow rate    Area     TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1      5.86     1.695      7.33    0.381      3.600
2      5.44     1.780      7.42    0.176      3.575
Qmax(1) =
           1.000 *    1.000 *     5.862) +
           1.008 *    0.988 *     5.445) + =      11.284
Qmax(2) =
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```
          0.992 *    1.000 *     5.862) +
          1.000 *    1.000 *     5.445) + =      11.261

Total of 2 streams to confluence:
Flow rates before confluence point:
       5.862       5.445
Maximum flow rates at confluence using above data:
       11.284       11.261
Area of streams before confluence:
        1.695        1.780
Effective area values after confluence:
        3.454        3.475
Results of confluence:
Total flow rate =     11.284(CFS)
Time of concentration =     7.332 min.
Effective stream area after confluence =      3.454(Ac.)
Study area average Pervious fraction(Ap) =  0.282
Study area average soil loss rate(Fm) =    0.276(In/Hr)
Study area total (this main stream) =       3.47(Ac.)


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Process from Point/Station        3.500 to Point/Station        3.600
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   978.760(Ft.)
Downstream point/station elevation =   973.280(Ft.)
Pipe length  =   328.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    11.284(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    11.284(CFS)
Normal flow depth in pipe =   12.53(In.)
Flow top width inside pipe =   16.56(In.)
Critical Depth =   15.40(In.)
Pipe flow velocity =      8.59(Ft/s)
Travel time through pipe =    0.64 min.
Time of concentration (TC) =     7.97 min.


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Process from Point/Station        3.500 to Point/Station        3.600
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      3.454(Ac.)
Runoff from this stream =     11.284(CFS)
Time of concentration =    7.97 min.
Rainfall intensity =     3.425(In/Hr)
Area averaged loss rate (Fm) =    0.2760(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2823


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Process from Point/Station        3.600 to Point/Station        3.600
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.0400     Max loss rate(Fm)=     0.039(In/Hr)
Initial subarea data:
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Initial area flow distance =   456.790(Ft.)
Top (of initial area) elevation =   987.140(Ft.)
Bottom (of initial area) elevation =   980.860(Ft.)
Difference in elevation =     6.280(Ft.)
Slope =    0.01375  s(%)=       1.37
TC = k(0.284)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.764 min.
Rainfall intensity =      3.479(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.890
Subarea runoff =     16.376(CFS)
Total initial stream area =        5.290(Ac.)
Pervious area fraction = 0.040
Initial area Fm value =    0.039(In/Hr)


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Process from Point/Station        3.600 to Point/Station        3.600
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      5.290(Ac.)
Runoff from this stream =     16.376(CFS)
Time of concentration =    7.76 min.
Rainfall intensity =     3.479(In/Hr)
Area averaged loss rate (Fm) =    0.0391(In/Hr)
Area averaged Pervious ratio (Ap) = 0.0400
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1     11.28     3.454      7.97    0.276      3.425
2     16.38     5.290      7.76    0.039      3.479
Qmax(1) =
           1.000 *    1.000 *    11.284) +
           0.984 *    1.000 *    16.376) + =      27.404
Qmax(2) =
           1.017 *    0.974 *    11.284) +
           1.000 *    1.000 *    16.376) + =      27.558

Total of 2 streams to confluence:
Flow rates before confluence point:
      11.284      16.376
Maximum flow rates at confluence using above data:
       27.404       27.558
Area of streams before confluence:
        3.454        5.290
Effective area values after confluence:
        8.744        8.655
Results of confluence:
Total flow rate =     27.558(CFS)
Time of concentration =     7.764 min.
Effective stream area after confluence =      8.655(Ac.)
Study area average Pervious fraction(Ap) =  0.136
Study area average soil loss rate(Fm) =    0.133(In/Hr)
Study area total (this main stream) =       8.74(Ac.)


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Process from Point/Station        3.600 to Point/Station        3.700
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**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 973.280(Ft.)
Downstream point/station elevation = 965.000(Ft.)
Pipe length = 485.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 27.558(CFS)
Nearest computed pipe diameter = 24.00(In.)
Calculated individual pipe flow = 27.558(CFS)
Normal flow depth in pipe = 18.35(In.)
Flow top width inside pipe = 20.36(In.)
Critical Depth = 21.84(In.)
Pipe flow velocity = 10.69(Ft/s)
Travel time through pipe = 0.76 min.
Time of concentration (TC) = 8.52 min.

++
Process from Point/Station 3.600 to Point/Station 3.700
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area = 8.655(Ac.)
Runoff from this stream = 27.558(CFS)
Time of concentration = 8.52 min.
Rainfall intensity = 3.290(In/Hr)
Area averaged loss rate (Fm) = 0.1327(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1357

++
Process from Point/Station 3.700 to Point/Station 3.700
**** INITIAL AREA EVALUATION ****

Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.0400 Max loss rate(Fm)= 0.039(In/Hr)
Initial subarea data:
Initial area flow distance = 653.410(Ft.)
Top (of initial area) elevation = 985.500(Ft.)
Bottom (of initial area) elevation = 975.420(Ft.)
Difference in elevation = 10.080(Ft.)
Slope = 0.01543 s(%)= 1.54
TC = k(0.284)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 8.756 min.
Rainfall intensity = 3.237(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.889
Subarea runoff = 22.304(CFS)
Total initial stream area = 7.750(Ac.)
Pervious area fraction = 0.040
Initial area Fm value = 0.039(In/Hr)

++
Process from Point/Station 3.700 to Point/Station 3.700
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2
Stream flow area = 7.750(Ac.)
Runoff from this stream = 22.304(CFS)
Time of concentration = 8.76 min.

```
Rainfall intensity =     3.237(In/Hr)
Area averaged loss rate (Fm) =    0.0391(In/Hr)
Area averaged Pervious ratio (Ap) = 0.0400
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1     27.56     8.655      8.52    0.133      3.290
2     22.30     7.750      8.76    0.039      3.237
Qmax(1) =
           1.000 *    1.000 *    27.558) +
           1.017 *    0.973 *    22.304) + =      49.625
Qmax(2) =
           0.983 *    1.000 *    27.558) +
           1.000 *    1.000 *    22.304) + =      49.397

Total of 2 streams to confluence:
Flow rates before confluence point:
      27.558      22.304
Maximum flow rates at confluence using above data:
       49.625       49.397
Area of streams before confluence:
        8.655        7.750
Effective area values after confluence:
       16.197       16.405
Results of confluence:
Total flow rate =     49.625(CFS)
Time of concentration =     8.521 min.
Effective stream area after confluence =     16.197(Ac.)
Study area average Pervious fraction(Ap) =  0.090
Study area average soil loss rate(Fm) =    0.088(In/Hr)
Study area total (this main stream) =      16.41(Ac.)


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Process from Point/Station        3.700 to Point/Station        3.700
**** CONFLUENCE OF MAIN STREAMS ****
____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     16.197(Ac.)
Runoff from this stream =     49.625(CFS)
Time of concentration =    8.52 min.
Rainfall intensity =     3.290(In/Hr)
Area averaged loss rate (Fm) =    0.0885(In/Hr)
Area averaged Pervious ratio (Ap) = 0.0905
Program is now starting with Main Stream No. 2


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Process from Point/Station        3.800 to Point/Station        3.900
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.5200     Max loss rate(Fm)=     0.508(In/Hr)
Initial subarea data:
Initial area flow distance =   160.000(Ft.)
```

```
Top (of initial area) elevation =   983.600(Ft.)
Bottom (of initial area) elevation =   980.790(Ft.)
Difference in elevation =     2.810(Ft.)
Slope =    0.01756  s(%)=       1.76
TC = k(0.403)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.883 min.
Rainfall intensity =      3.740(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.778
Subarea runoff =      1.221(CFS)
Total initial stream area =        0.420(Ac.)
Pervious area fraction = 0.520
Initial area Fm value =    0.508(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.900 to Point/Station        4.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   975.790(Ft.)
Downstream point/station elevation =   972.540(Ft.)
Pipe length  =   372.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.221(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     1.221(CFS)
Normal flow depth in pipe =    6.04(In.)
Flow top width inside pipe =    8.46(In.)
Critical Depth =    6.10(In.)
Pipe flow velocity =      3.88(Ft/s)
Travel time through pipe =    1.60 min.
Time of concentration (TC) =     8.48 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.900 to Point/Station        4.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      0.420(Ac.)
Runoff from this stream =      1.221(CFS)
Time of concentration =    8.48 min.
Rainfall intensity =     3.299(In/Hr)
Area averaged loss rate (Fm) =    0.5085(In/Hr)
Area averaged Pervious ratio (Ap) = 0.5200


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.000 to Point/Station        4.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1400     Max loss rate(Fm)=     0.137(In/Hr)
Initial subarea data:
Initial area flow distance =   534.460(Ft.)
Top (of initial area) elevation =   987.610(Ft.)
Bottom (of initial area) elevation =   981.360(Ft.)
Difference in elevation =     6.250(Ft.)
Slope =    0.01169  s(%)=       1.17
TC = k(0.309)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.280 min.
```

```
Rainfall intensity =      3.126(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.861
Subarea runoff =      7.801(CFS)
Total initial stream area =        2.900(Ac.)
Pervious area fraction = 0.140
Initial area Fm value =    0.137(In/Hr)


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Process from Point/Station        4.000 to Point/Station        4.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      2.900(Ac.)
Runoff from this stream =      7.801(CFS)
Time of concentration =    9.28 min.
Rainfall intensity =     3.126(In/Hr)
Area averaged loss rate (Fm) =    0.1369(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1400
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1      1.22     0.420      8.48    0.508      3.299
2      7.80     2.900      9.28    0.137      3.126
Qmax(1) =
           1.000 *    1.000 *     1.221) +
           1.058 *    0.914 *     7.801) + =       8.764
Qmax(2) =
           0.938 *    1.000 *     1.221) +
           1.000 *    1.000 *     7.801) + =       8.946

Total of 2 streams to confluence:
Flow rates before confluence point:
       1.221       7.801
Maximum flow rates at confluence using above data:
        8.764        8.946
Area of streams before confluence:
        0.420        2.900
Effective area values after confluence:
        3.070        3.320
Results of confluence:
Total flow rate =      8.946(CFS)
Time of concentration =     9.280 min.
Effective stream area after confluence =      3.320(Ac.)
Study area average Pervious fraction(Ap) =  0.188
Study area average soil loss rate(Fm) =    0.184(In/Hr)
Study area total (this main stream) =       3.32(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.000 to Point/Station        4.100
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   972.540(Ft.)
Downstream point/station elevation =   968.390(Ft.)
Pipe length  =   475.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.946(CFS)
Nearest computed pipe diameter  =     18.00(In.)
```

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Calculated individual pipe flow  =     8.946(CFS)
Normal flow depth in pipe =   13.50(In.)
Flow top width inside pipe =   15.59(In.)
Critical Depth =   13.88(In.)
Pipe flow velocity =      6.30(Ft/s)
Travel time through pipe =    1.26 min.
Time of concentration (TC) =    10.54 min.


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Process from Point/Station        4.000 to Point/Station        4.100
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      3.320(Ac.)
Runoff from this stream =      8.946(CFS)
Time of concentration =   10.54 min.
Rainfall intensity =     2.896(In/Hr)
Area averaged loss rate (Fm) =    0.1839(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1881


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Process from Point/Station        4.100 to Point/Station        4.100
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.0900     Max loss rate(Fm)=     0.088(In/Hr)
Initial subarea data:
Initial area flow distance =   689.460(Ft.)
Top (of initial area) elevation =   987.610(Ft.)
Bottom (of initial area) elevation =   980.590(Ft.)
Difference in elevation =     7.020(Ft.)
Slope =    0.01018  s(%)=       1.02
TC = k(0.297)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.143 min.
Rainfall intensity =      2.963(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.873
Subarea runoff =      5.797(CFS)
Total initial stream area =        2.240(Ac.)
Pervious area fraction = 0.090
Initial area Fm value =    0.088(In/Hr)


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Process from Point/Station        4.100 to Point/Station        4.100
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      2.240(Ac.)
Runoff from this stream =      5.797(CFS)
Time of concentration =   10.14 min.
Rainfall intensity =     2.963(In/Hr)
Area averaged loss rate (Fm) =    0.0880(In/Hr)
Area averaged Pervious ratio (Ap) = 0.0900
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)
```

```
1      8.95     3.320     10.54    0.184      2.896
2      5.80     2.240     10.14    0.088      2.963
Qmax(1) =
           1.000 *    1.000 *     8.946) +
           0.977 *    1.000 *     5.797) + =      14.608
Qmax(2) =
           1.025 *    0.963 *     8.946) +
           1.000 *    1.000 *     5.797) + =      14.621

Total of 2 streams to confluence:
Flow rates before confluence point:
       8.946       5.797
Maximum flow rates at confluence using above data:
       14.608       14.621
Area of streams before confluence:
        3.320        2.240
Effective area values after confluence:
        5.560        5.436
Results of confluence:
Total flow rate =     14.621(CFS)
Time of concentration =    10.143 min.
Effective stream area after confluence =      5.436(Ac.)
Study area average Pervious fraction(Ap) =  0.149
Study area average soil loss rate(Fm) =    0.145(In/Hr)
Study area total (this main stream) =       5.56(Ac.)


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Process from Point/Station        4.100 to Point/Station        4.200
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   968.390(Ft.)
Downstream point/station elevation =   966.540(Ft.)
Pipe length  =   211.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    14.621(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    14.621(CFS)
Normal flow depth in pipe =   16.95(In.)
Flow top width inside pipe =   16.58(In.)
Critical Depth =   17.01(In.)
Pipe flow velocity =      7.03(Ft/s)
Travel time through pipe =    0.50 min.
Time of concentration (TC) =    10.64 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.100 to Point/Station        4.200
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      5.436(Ac.)
Runoff from this stream =     14.621(CFS)
Time of concentration =   10.64 min.
Rainfall intensity =     2.879(In/Hr)
Area averaged loss rate (Fm) =    0.1453(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1486


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Process from Point/Station        4.200 to Point/Station        4.200
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.2700     Max loss rate(Fm)=     0.264(In/Hr)
Initial subarea data:
Initial area flow distance =   436.910(Ft.)
Top (of initial area) elevation =   986.380(Ft.)
Bottom (of initial area) elevation =   973.310(Ft.)
Difference in elevation =    13.070(Ft.)
Slope =    0.02991  s(%)=       2.99
TC = k(0.341)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.831 min.
Rainfall intensity =      3.461(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.831
Subarea runoff =      2.820(CFS)
Total initial stream area =        0.980(Ac.)
Pervious area fraction = 0.270
Initial area Fm value =    0.264(In/Hr)


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Process from Point/Station        4.200 to Point/Station        4.200
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      0.980(Ac.)
Runoff from this stream =      2.820(CFS)
Time of concentration =    7.83 min.
Rainfall intensity =     3.461(In/Hr)
Area averaged loss rate (Fm) =    0.2640(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2700
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1     14.62     5.436     10.64    0.145      2.879
2      2.82     0.980      7.83    0.264      3.461
Qmax(1) =
           1.000 *    1.000 *    14.621) +
           0.818 *    1.000 *     2.820) + =      16.928
Qmax(2) =
           1.213 *    0.736 *    14.621) +
           1.000 *    1.000 *     2.820) + =      15.868

Total of 2 streams to confluence:
Flow rates before confluence point:
      14.621       2.820
Maximum flow rates at confluence using above data:
       16.928       15.868
Area of streams before confluence:
        5.436        0.980
Effective area values after confluence:
        6.416        4.980
Results of confluence:
Total flow rate =     16.928(CFS)
Time of concentration =    10.643 min.
```

```
Effective stream area after confluence =      6.416(Ac.)
Study area average Pervious fraction(Ap) =  0.167
Study area average soil loss rate(Fm) =    0.163(In/Hr)
Study area total (this main stream) =       6.42(Ac.)


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Process from Point/Station        4.200 to Point/Station        4.200
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      6.416(Ac.)
Runoff from this stream =     16.928(CFS)
Time of concentration =   10.64 min.
Rainfall intensity =     2.879(In/Hr)
Area averaged loss rate (Fm) =    0.1634(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1671


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Process from Point/Station        4.200 to Point/Station        4.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.0300     Max loss rate(Fm)=     0.029(In/Hr)
Initial subarea data:
Initial area flow distance =   276.950(Ft.)
Top (of initial area) elevation =   986.510(Ft.)
Bottom (of initial area) elevation =   973.530(Ft.)
Difference in elevation =    12.980(Ft.)
Slope =    0.04687  s(%)=       4.69
TC = k(0.282)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    4.930 min.
Rainfall intensity =      4.568(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.894
Subarea runoff =      1.307(CFS)
Total initial stream area =        0.320(Ac.)
Pervious area fraction = 0.030
Initial area Fm value =    0.029(In/Hr)


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Process from Point/Station        4.200 to Point/Station        4.200
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      0.320(Ac.)
Runoff from this stream =      1.307(CFS)
Time of concentration =    4.93 min.
Rainfall intensity =     4.568(In/Hr)
Area averaged loss rate (Fm) =    0.0293(In/Hr)
Area averaged Pervious ratio (Ap) = 0.0300
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1     16.93     6.416     10.64    0.163      2.879
```

```
2      1.31     0.320      4.93    0.029      4.568
Qmax(1) =
           1.000 *    1.000 *    16.928) +
           0.628 *    1.000 *     1.307) + =      17.748
Qmax(2) =
           1.622 *    0.463 *    16.928) +
           1.000 *    1.000 *     1.307) + =      14.027

Total of 2 streams to confluence:
Flow rates before confluence point:
      16.928       1.307
Maximum flow rates at confluence using above data:
       17.748       14.027
Area of streams before confluence:
        6.416        0.320
Effective area values after confluence:
        6.736        3.292
Results of confluence:
Total flow rate =     17.748(CFS)
Time of concentration =    10.643 min.
Effective stream area after confluence =      6.736(Ac.)
Study area average Pervious fraction(Ap) =  0.161
Study area average soil loss rate(Fm) =    0.157(In/Hr)
Study area total (this main stream) =       6.74(Ac.)


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Process from Point/Station        4.200 to Point/Station        4.200
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      6.736(Ac.)
Runoff from this stream =     17.748(CFS)
Time of concentration =   10.64 min.
Rainfall intensity =     2.879(In/Hr)
Area averaged loss rate (Fm) =    0.1570(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1606


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Process from Point/Station        4.200 to Point/Station        4.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.2300     Max loss rate(Fm)=     0.225(In/Hr)
Initial subarea data:
Initial area flow distance =   333.920(Ft.)
Top (of initial area) elevation =   983.600(Ft.)
Bottom (of initial area) elevation =   974.620(Ft.)
Difference in elevation =     8.980(Ft.)
Slope =    0.02689  s(%)=       2.69
TC = k(0.331)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.977 min.
Rainfall intensity =      3.709(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.845
Subarea runoff =      2.603(CFS)
Total initial stream area =        0.830(Ac.)
Pervious area fraction = 0.230
Initial area Fm value =    0.225(In/Hr)
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Process from Point/Station        4.200 to Point/Station        4.200
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      0.830(Ac.)
Runoff from this stream =      2.603(CFS)
Time of concentration =    6.98 min.
Rainfall intensity =     3.709(In/Hr)
Area averaged loss rate (Fm) =    0.2249(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2300
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1     17.75     6.736     10.64    0.157      2.879
2      2.60     0.830      6.98    0.225      3.709
Qmax(1) =
           1.000 *    1.000 *    17.748) +
           0.762 *    1.000 *     2.603) + =      19.731
Qmax(2) =
           1.305 *    0.656 *    17.748) +
           1.000 *    1.000 *     2.603) + =      17.786

Total of 2 streams to confluence:
Flow rates before confluence point:
      17.748       2.603
Maximum flow rates at confluence using above data:
       19.731       17.786
Area of streams before confluence:
        6.736        0.830
Effective area values after confluence:
        7.566        5.245
Results of confluence:
Total flow rate =     19.731(CFS)
Time of concentration =    10.643 min.
Effective stream area after confluence =      7.566(Ac.)
Study area average Pervious fraction(Ap) =  0.168
Study area average soil loss rate(Fm) =    0.164(In/Hr)
Study area total (this main stream) =       7.57(Ac.)


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Process from Point/Station        4.200 to Point/Station        3.700
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
____________________________________________________________________________
Upstream point/station elevation =   966.540(Ft.)
Downstream point/station elevation =   965.000(Ft.)
Pipe length  =   176.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    19.731(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    19.731(CFS)
Normal flow depth in pipe =   18.35(In.)
Flow top width inside pipe =   20.36(In.)
Critical Depth =   19.14(In.)
Pipe flow velocity =      7.65(Ft/s)
Travel time through pipe =    0.38 min.
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Time of concentration (TC) =    11.03 min.


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Process from Point/Station        4.200 to Point/Station        3.700
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      7.566(Ac.)
Runoff from this stream =     19.731(CFS)
Time of concentration =   11.03 min.
Rainfall intensity =     2.819(In/Hr)
Area averaged loss rate (Fm) =    0.1645(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1682
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1     49.62    16.197      8.52    0.088      3.290
2     19.73     7.566     11.03    0.164      2.819
Qmax(1) =
           1.000 *    1.000 *    49.625) +
           1.178 *    0.773 *    19.731) + =      67.581
Qmax(2) =
           0.853 *    1.000 *    49.625) +
           1.000 *    1.000 *    19.731) + =      62.049

Total of 2 main streams to confluence:
Flow rates before confluence point:
      50.625      20.731
Maximum flow rates at confluence using above data:
       67.581       62.049
Area of streams before confluence:
       16.197        7.566
Effective area values after confluence:
       22.044       23.763


Results of confluence:
Total flow rate =     67.581(CFS)
Time of concentration =     8.521 min.
Effective stream area after confluence  =     22.044(Ac.)
Study area average Pervious fraction(Ap) =  0.115
Study area average soil loss rate(Fm) =    0.113(In/Hr)
Study area total =      23.76(Ac.)
End of computations, Total Study Area =           24.46 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.118
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 01/22/23

JOB NO. 2022-318
11115 HEMLOCK AVE
25 YEAR, RATIONAL METHOD
POST-CONDITION, AREA B

Program License Serial Number 6277

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 25.0
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 1.020 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

++

Process from Point/Station 5.000 to Point/Station 5.100
**** INITIAL AREA EVALUATION ****

Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.3100 Max loss rate(Fm)= 0.303(In/Hr)
Initial subarea data:
Initial area flow distance = 228.380(Ft.)
Top (of initial area) elevation = 1001.000(Ft.)
Bottom (of initial area) elevation = 987.460(Ft.)
Difference in elevation = 13.540(Ft.)
Slope = 0.05929 s(%)= 5.93
TC = k(0.351)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 5.421 min.
Rainfall intensity = 4.315(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.837
Subarea runoff = 6.933(CFS)
Total initial stream area = 1.920(Ac.)
Pervious area fraction = 0.310
Initial area Fm value = 0.303(In/Hr)

++

Process from Point/Station 5.100 to Point/Station 5.200
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 982.460(Ft.)
Downstream point/station elevation = 977.660(Ft.)
Pipe length = 365.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 6.933(CFS)
Nearest computed pipe diameter = 15.00(In.)

```
Calculated individual pipe flow  =     6.933(CFS)
Normal flow depth in pipe =   11.51(In.)
Flow top width inside pipe =   12.68(In.)
Critical Depth =   12.67(In.)
Pipe flow velocity =      6.86(Ft/s)
Travel time through pipe =    0.89 min.
Time of concentration (TC) =     6.31 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.100 to Point/Station        5.200
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      1.920(Ac.)
Runoff from this stream =      6.933(CFS)
Time of concentration =    6.31 min.
Rainfall intensity =     3.940(In/Hr)
Area averaged loss rate (Fm) =    0.3031(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3100
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.200 to Point/Station        5.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.0400     Max loss rate(Fm)=     0.039(In/Hr)
Initial subarea data:
Initial area flow distance =   487.230(Ft.)
Top (of initial area) elevation =   996.020(Ft.)
Bottom (of initial area) elevation =   985.200(Ft.)
Difference in elevation =    10.820(Ft.)
Slope =    0.02221  s(%)=       2.22
TC = k(0.284)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.239 min.
Rainfall intensity =      3.628(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.890
Subarea runoff =     14.503(CFS)
Total initial stream area =        4.490(Ac.)
Pervious area fraction = 0.040
Initial area Fm value =    0.039(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.200 to Point/Station        5.200
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      4.490(Ac.)
Runoff from this stream =     14.503(CFS)
Time of concentration =    7.24 min.
Rainfall intensity =     3.628(In/Hr)
Area averaged loss rate (Fm) =    0.0391(In/Hr)
Area averaged Pervious ratio (Ap) = 0.0400
Summary of stream data:
```

```
Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1      6.93     1.920      6.31    0.303      3.940
2     14.50     4.490      7.24    0.039      3.628
Qmax(1) =
           1.000 *    1.000 *     6.933) +
           1.087 *    0.871 *    14.503) + =      20.672
Qmax(2) =
           0.914 *    1.000 *     6.933) +
           1.000 *    1.000 *    14.503) + =      20.841

Total of 2 main streams to confluence:
Flow rates before confluence point:
       7.933      15.503
Maximum flow rates at confluence using above data:
       20.672       20.841
Area of streams before confluence:
        1.920        4.490
Effective area values after confluence:
        5.833        6.410


Results of confluence:
Total flow rate =     20.841(CFS)
Time of concentration =     7.239 min.
Effective stream area after confluence  =      6.410(Ac.)
Study area average Pervious fraction(Ap) =  0.121
Study area average soil loss rate(Fm) =    0.118(In/Hr)
Study area total =       6.41(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.200 to Point/Station        5.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
____________________________________________________________________________
Upstream point/station elevation =   977.660(Ft.)
Downstream point/station elevation =   971.000(Ft.)
Pipe length  =   490.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    20.841(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    20.841(CFS)
Normal flow depth in pipe =   16.10(In.)
Flow top width inside pipe =   22.55(In.)
Critical Depth =   19.63(In.)
Pipe flow velocity =      9.31(Ft/s)
Travel time through pipe =    0.88 min.
Time of concentration (TC) =     8.12 min.


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Process from Point/Station        5.200 to Point/Station        5.300
**** CONFLUENCE OF MAIN STREAMS ****
____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      6.410(Ac.)
Runoff from this stream =     20.841(CFS)
Time of concentration =    8.12 min.
```

```
Rainfall intensity =     3.387(In/Hr)
Area averaged loss rate (Fm) =    0.1182(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1209
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.300 to Point/Station        5.300
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.0500     Max loss rate(Fm)=     0.049(In/Hr)
Initial subarea data:
Initial area flow distance =   590.460(Ft.)
Top (of initial area) elevation =   990.390(Ft.)
Bottom (of initial area) elevation =   982.710(Ft.)
Difference in elevation =     7.680(Ft.)
Slope =    0.01301  s(%)=       1.30
TC = k(0.287)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.775 min.
Rainfall intensity =      3.232(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.886
Subarea runoff =     18.710(CFS)
Total initial stream area =        6.530(Ac.)
Pervious area fraction = 0.050
Initial area Fm value =    0.049(In/Hr)


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Process from Point/Station        5.300 to Point/Station        5.300
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      6.530(Ac.)
Runoff from this stream =     18.710(CFS)
Time of concentration =    8.78 min.
Rainfall intensity =     3.232(In/Hr)
Area averaged loss rate (Fm) =    0.0489(In/Hr)
Area averaged Pervious ratio (Ap) = 0.0500
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1     20.84     6.410      8.12    0.118      3.387
2     18.71     6.530      8.78    0.049      3.232
Qmax(1) =
           1.000 *    1.000 *    20.841) +
           1.049 *    0.925 *    18.710) + =      38.989
Qmax(2) =
           0.953 *    1.000 *    20.841) +
           1.000 *    1.000 *    18.710) + =      38.563

Total of 2 main streams to confluence:
Flow rates before confluence point:
      21.841      19.710
Maximum flow rates at confluence using above data:
```

```
       38.989       38.563
Area of streams before confluence:
        6.410        6.530
Effective area values after confluence:
       12.450       12.940


Results of confluence:
Total flow rate =      38.989(CFS)
Time of concentration =     8.116 min.
Effective stream area after confluence  =     12.450(Ac.)
Study area average Pervious fraction(Ap) =  0.085
Study area average soil loss rate(Fm) =    0.083(In/Hr)
Study area total =      12.94(Ac.)
End of computations, Total Study Area =           12.94 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.085
Area averaged SCS curve number =  32.0
```

APPENDIX B.8

RATIONAL METHOD ANALYSIS

POST-DEVELOPMENT CONDITIONS – 100 YEAR

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 01/22/23

JOB NO. 2022-318
11115 HEMLOCK AVE
100 YEAR, RATIONAL METHOD
POST-CONDITION, AREA A

Program License Serial Number 6277

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.330 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

++

Process from Point/Station 3.000 to Point/Station 3.100
**** INITIAL AREA EVALUATION ****

Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.4000 Max loss rate(Fm)= 0.314(In/Hr)
Initial subarea data:
Initial area flow distance = 161.250(Ft.)
Top (of initial area) elevation = 999.000(Ft.)
Bottom (of initial area) elevation = 990.820(Ft.)
Difference in elevation = 8.180(Ft.)
Slope = 0.05073 s(%)= 5.07
TC = k(0.373)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 5.174 min.
Rainfall intensity = 5.787(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.851
Subarea runoff = 1.872(CFS)
Total initial stream area = 0.380(Ac.)
Pervious area fraction = 0.400
Initial area Fm value = 0.314(In/Hr)

++

Process from Point/Station 3.100 to Point/Station 3.200
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 985.820(Ft.)
Downstream point/station elevation = 984.570(Ft.)
Pipe length = 209.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 1.872(CFS)

```
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     1.872(CFS)
Normal flow depth in pipe =    7.25(In.)
Flow top width inside pipe =   11.74(In.)
Critical Depth =    6.99(In.)
Pipe flow velocity =      3.77(Ft/s)
Travel time through pipe =    0.92 min.
Time of concentration (TC) =     6.10 min.


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Process from Point/Station        3.100 to Point/Station        3.200
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      0.380(Ac.)
Runoff from this stream =      1.872(CFS)
Time of concentration =    6.10 min.
Rainfall intensity =     5.244(In/Hr)
Area averaged loss rate (Fm) =    0.3141(In/Hr)
Area averaged Pervious ratio (Ap) = 0.4000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.200 to Point/Station        3.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.3900     Max loss rate(Fm)=     0.306(In/Hr)
Initial subarea data:
Initial area flow distance =   163.100(Ft.)
Top (of initial area) elevation =   997.080(Ft.)
Bottom (of initial area) elevation =   990.760(Ft.)
Difference in elevation =     6.320(Ft.)
Slope =    0.03875  s(%)=       3.87
TC = k(0.371)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    5.449 min.
Rainfall intensity =      5.610(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.851
Subarea runoff =      1.766(CFS)
Total initial stream area =        0.370(Ac.)
Pervious area fraction = 0.390
Initial area Fm value =    0.306(In/Hr)


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Process from Point/Station        3.200 to Point/Station        3.200
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.370(Ac.)
Runoff from this stream =      1.766(CFS)
Time of concentration =    5.45 min.
Rainfall intensity =     5.610(In/Hr)
Area averaged loss rate (Fm) =    0.3062(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3900
Summary of stream data:
```

```
Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1      1.87     0.380      6.10    0.314      5.244
2      1.77     0.370      5.45    0.306      5.610
Qmax(1) =
           1.000 *    1.000 *     1.872) +
           0.931 *    1.000 *     1.766) + =       3.516
Qmax(2) =
           1.074 *    0.894 *     1.872) +
           1.000 *    1.000 *     1.766) + =       3.563

Total of 2 streams to confluence:
Flow rates before confluence point:
       1.872       1.766
Maximum flow rates at confluence using above data:
        3.516        3.563
Area of streams before confluence:
        0.380        0.370
Effective area values after confluence:
        0.750        0.710
Results of confluence:
Total flow rate =      3.563(CFS)
Time of concentration =     5.449 min.
Effective stream area after confluence =      0.710(Ac.)
Study area average Pervious fraction(Ap) =  0.395
Study area average soil loss rate(Fm) =    0.310(In/Hr)
Study area total (this main stream) =       0.75(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.200 to Point/Station        3.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   984.570(Ft.)
Downstream point/station elevation =   983.370(Ft.)
Pipe length  =   200.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.563(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     3.563(CFS)
Normal flow depth in pipe =    9.35(In.)
Flow top width inside pipe =   14.54(In.)
Critical Depth =    9.15(In.)
Pipe flow velocity =      4.43(Ft/s)
Travel time through pipe =    0.75 min.
Time of concentration (TC) =     6.20 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.200 to Point/Station        3.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      0.710(Ac.)
Runoff from this stream =      3.563(CFS)
Time of concentration =    6.20 min.
Rainfall intensity =     5.191(In/Hr)
Area averaged loss rate (Fm) =    0.3102(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3951
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.300 to Point/Station        3.300
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.3800     Max loss rate(Fm)=     0.298(In/Hr)
Initial subarea data:
Initial area flow distance =   161.380(Ft.)
Top (of initial area) elevation =   995.070(Ft.)
Bottom (of initial area) elevation =   990.650(Ft.)
Difference in elevation =     4.420(Ft.)
Slope =    0.02739  s(%)=       2.74
TC = k(0.368)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    5.777 min.
Rainfall intensity =      5.416(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.850
Subarea runoff =      1.935(CFS)
Total initial stream area =        0.420(Ac.)
Pervious area fraction = 0.380
Initial area Fm value =    0.298(In/Hr)


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Process from Point/Station        3.300 to Point/Station        3.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.420(Ac.)
Runoff from this stream =      1.935(CFS)
Time of concentration =    5.78 min.
Rainfall intensity =     5.416(In/Hr)
Area averaged loss rate (Fm) =    0.2984(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3800
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1      3.56     0.710      6.20    0.310      5.191
2      1.93     0.420      5.78    0.298      5.416
Qmax(1) =
           1.000 *    1.000 *     3.563) +
           0.956 *    1.000 *     1.935) + =       5.412
Qmax(2) =
           1.046 *    0.932 *     3.563) +
           1.000 *    1.000 *     1.935) + =       5.407

Total of 2 streams to confluence:
Flow rates before confluence point:
       3.563       1.935
Maximum flow rates at confluence using above data:
        5.412        5.407
Area of streams before confluence:
        0.710        0.420
Effective area values after confluence:
        1.130        1.081
```

```
Results of confluence:
Total flow rate =      5.412(CFS)
Time of concentration =     6.202 min.
Effective stream area after confluence =      1.130(Ac.)
Study area average Pervious fraction(Ap) =  0.389
Study area average soil loss rate(Fm) =    0.306(In/Hr)
Study area total (this main stream) =       1.13(Ac.)


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Process from Point/Station        3.300 to Point/Station        3.400
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   983.370(Ft.)
Downstream point/station elevation =   981.410(Ft.)
Pipe length  =   327.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.412(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     5.412(CFS)
Normal flow depth in pipe =   10.73(In.)
Flow top width inside pipe =   17.66(In.)
Critical Depth =   10.76(In.)
Pipe flow velocity =      4.93(Ft/s)
Travel time through pipe =    1.11 min.
Time of concentration (TC) =     7.31 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.300 to Point/Station        3.400
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      1.130(Ac.)
Runoff from this stream =      5.412(CFS)
Time of concentration =    7.31 min.
Rainfall intensity =     4.704(In/Hr)
Area averaged loss rate (Fm) =    0.3058(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3895


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Process from Point/Station        3.400 to Point/Station        3.400
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.3900     Max loss rate(Fm)=     0.306(In/Hr)
Initial subarea data:
Initial area flow distance =   346.050(Ft.)
Top (of initial area) elevation =   991.360(Ft.)
Bottom (of initial area) elevation =   985.560(Ft.)
Difference in elevation =     5.800(Ft.)
Slope =    0.01676  s(%)=       1.68
TC = k(0.371)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.705 min.
Rainfall intensity =      4.235(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.835
Subarea runoff =      2.758(CFS)
Total initial stream area =        0.780(Ac.)
```

```
Pervious area fraction = 0.390
Initial area Fm value =    0.306(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.400 to Point/Station        3.400
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.780(Ac.)
Runoff from this stream =      2.758(CFS)
Time of concentration =    8.71 min.
Rainfall intensity =     4.235(In/Hr)
Area averaged loss rate (Fm) =    0.3062(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3900
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1      5.41     1.130      7.31    0.306      4.704
2      2.76     0.780      8.71    0.306      4.235
Qmax(1) =
           1.000 *    1.000 *     5.412) +
           1.119 *    0.840 *     2.758) + =       8.004
Qmax(2) =
           0.893 *    1.000 *     5.412) +
           1.000 *    1.000 *     2.758) + =       7.594

Total of 2 streams to confluence:
Flow rates before confluence point:
       5.412       2.758
Maximum flow rates at confluence using above data:
        8.004        7.594
Area of streams before confluence:
        1.130        0.780
Effective area values after confluence:
        1.784        1.910
Results of confluence:
Total flow rate =      8.004(CFS)
Time of concentration =     7.309 min.
Effective stream area after confluence =      1.784(Ac.)
Study area average Pervious fraction(Ap) =  0.390
Study area average soil loss rate(Fm) =    0.306(In/Hr)
Study area total (this main stream) =       1.91(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.400 to Point/Station        3.500
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   981.410(Ft.)
Downstream point/station elevation =   978.760(Ft.)
Pipe length  =   156.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.004(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     8.004(CFS)
Normal flow depth in pipe =   11.67(In.)
Flow top width inside pipe =   12.47(In.)
Critical Depth =   13.37(In.)
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Pipe flow velocity =      7.81(Ft/s)
Travel time through pipe =    0.33 min.
Time of concentration (TC) =     7.64 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.400 to Point/Station        3.500
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      1.784(Ac.)
Runoff from this stream =      8.004(CFS)
Time of concentration =    7.64 min.
Rainfall intensity =     4.580(In/Hr)
Area averaged loss rate (Fm) =    0.3060(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3897


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Process from Point/Station        3.500 to Point/Station        3.500
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1800     Max loss rate(Fm)=     0.141(In/Hr)
Initial subarea data:
Initial area flow distance =   370.380(Ft.)
Top (of initial area) elevation =   991.730(Ft.)
Bottom (of initial area) elevation =   984.280(Ft.)
Difference in elevation =     7.450(Ft.)
Slope =    0.02011  s(%)=       2.01
TC = k(0.319)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.420 min.
Rainfall intensity =      4.661(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.873
Subarea runoff =      7.241(CFS)
Total initial stream area =        1.780(Ac.)
Pervious area fraction = 0.180
Initial area Fm value =    0.141(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.500 to Point/Station        3.500
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      1.780(Ac.)
Runoff from this stream =      7.241(CFS)
Time of concentration =    7.42 min.
Rainfall intensity =     4.661(In/Hr)
Area averaged loss rate (Fm) =    0.1413(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1800
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1      8.00     1.784      7.64    0.306      4.580
```

```
2      7.24     1.780      7.42    0.141      4.661
Qmax(1) =
           1.000 *    1.000 *     8.004) +
           0.982 *    1.000 *     7.241) + =      15.114
Qmax(2) =
           1.019 *    0.971 *     8.004) +
           1.000 *    1.000 *     7.241) + =      15.161

Total of 2 streams to confluence:
Flow rates before confluence point:
       8.004       7.241
Maximum flow rates at confluence using above data:
       15.114       15.161
Area of streams before confluence:
        1.784        1.780
Effective area values after confluence:
        3.564        3.513
Results of confluence:
Total flow rate =     15.161(CFS)
Time of concentration =     7.420 min.
Effective stream area after confluence =      3.513(Ac.)
Study area average Pervious fraction(Ap) =  0.285
Study area average soil loss rate(Fm) =    0.224(In/Hr)
Study area total (this main stream) =       3.56(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.500 to Point/Station        3.600
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   978.760(Ft.)
Downstream point/station elevation =   973.280(Ft.)
Pipe length  =   328.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    15.161(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    15.161(CFS)
Normal flow depth in pipe =   13.45(In.)
Flow top width inside pipe =   20.15(In.)
Critical Depth =   17.31(In.)
Pipe flow velocity =      9.32(Ft/s)
Travel time through pipe =    0.59 min.
Time of concentration (TC) =     8.01 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.500 to Point/Station        3.600
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      3.513(Ac.)
Runoff from this stream =     15.161(CFS)
Time of concentration =    8.01 min.
Rainfall intensity =     4.453(In/Hr)
Area averaged loss rate (Fm) =    0.2237(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2850


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Process from Point/Station        3.600 to Point/Station        3.600
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
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Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.0400     Max loss rate(Fm)=     0.031(In/Hr)
Initial subarea data:
Initial area flow distance =   456.790(Ft.)
Top (of initial area) elevation =   987.140(Ft.)
Bottom (of initial area) elevation =   980.860(Ft.)
Difference in elevation =     6.280(Ft.)
Slope =    0.01375  s(%)=       1.37
TC = k(0.284)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.764 min.
Rainfall intensity =      4.536(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.894
Subarea runoff =     21.446(CFS)
Total initial stream area =        5.290(Ac.)
Pervious area fraction = 0.040
Initial area Fm value =    0.031(In/Hr)


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Process from Point/Station        3.600 to Point/Station        3.600
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      5.290(Ac.)
Runoff from this stream =     21.446(CFS)
Time of concentration =    7.76 min.
Rainfall intensity =     4.536(In/Hr)
Area averaged loss rate (Fm) =    0.0314(In/Hr)
Area averaged Pervious ratio (Ap) = 0.0400
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1     15.16     3.513      8.01    0.224      4.453
2     21.45     5.290      7.76    0.031      4.536
Qmax(1) =
           1.000 *    1.000 *    15.161) +
           0.982 *    1.000 *    21.446) + =      36.214
Qmax(2) =
           1.020 *    0.970 *    15.161) +
           1.000 *    1.000 *    21.446) + =      36.437

Total of 2 streams to confluence:
Flow rates before confluence point:
      15.161      21.446
Maximum flow rates at confluence using above data:
       36.214       36.437
Area of streams before confluence:
        3.513        5.290
Effective area values after confluence:
        8.803        8.697
Results of confluence:
Total flow rate =     36.437(CFS)
Time of concentration =     7.764 min.
Effective stream area after confluence =      8.697(Ac.)
Study area average Pervious fraction(Ap) =  0.138
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```
Study area average soil loss rate(Fm) =    0.108(In/Hr)
Study area total (this main stream) =       8.80(Ac.)


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Process from Point/Station        3.600 to Point/Station        3.700
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   973.280(Ft.)
Downstream point/station elevation =   965.000(Ft.)
Pipe length  =   485.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    36.437(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    36.437(CFS)
Normal flow depth in pipe =   20.04(In.)
Flow top width inside pipe =   23.62(In.)
Critical Depth =   24.45(In.)
Pipe flow velocity =     11.52(Ft/s)
Travel time through pipe =    0.70 min.
Time of concentration (TC) =     8.47 min.


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Process from Point/Station        3.600 to Point/Station        3.700
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      8.697(Ac.)
Runoff from this stream =     36.437(CFS)
Time of concentration =    8.47 min.
Rainfall intensity =     4.307(In/Hr)
Area averaged loss rate (Fm) =    0.1082(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1378


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Process from Point/Station        3.700 to Point/Station        3.700
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.0400     Max loss rate(Fm)=     0.031(In/Hr)
Initial subarea data:
Initial area flow distance =   653.410(Ft.)
Top (of initial area) elevation =   985.500(Ft.)
Bottom (of initial area) elevation =   975.420(Ft.)
Difference in elevation =    10.080(Ft.)
Slope =    0.01543  s(%)=       1.54
TC = k(0.284)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.756 min.
Rainfall intensity =      4.221(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.893
Subarea runoff =     29.219(CFS)
Total initial stream area =        7.750(Ac.)
Pervious area fraction = 0.040
Initial area Fm value =    0.031(In/Hr)


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Process from Point/Station        3.700 to Point/Station        3.700
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      7.750(Ac.)
Runoff from this stream =     29.219(CFS)
Time of concentration =    8.76 min.
Rainfall intensity =     4.221(In/Hr)
Area averaged loss rate (Fm) =    0.0314(In/Hr)
Area averaged Pervious ratio (Ap) = 0.0400
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1     36.44     8.697      8.47    0.108      4.307
2     29.22     7.750      8.76    0.031      4.221
Qmax(1) =
           1.000 *    1.000 *    36.437) +
           1.021 *    0.967 *    29.219) + =      65.270
Qmax(2) =
           0.980 *    1.000 *    36.437) +
           1.000 *    1.000 *    29.219) + =      64.910

Total of 2 streams to confluence:
Flow rates before confluence point:
      36.437      29.219
Maximum flow rates at confluence using above data:
       65.270       64.910
Area of streams before confluence:
        8.697        7.750
Effective area values after confluence:
       16.190       16.447
Results of confluence:
Total flow rate =     65.270(CFS)
Time of concentration =     8.466 min.
Effective stream area after confluence =     16.190(Ac.)
Study area average Pervious fraction(Ap) =  0.092
Study area average soil loss rate(Fm) =    0.072(In/Hr)
Study area total (this main stream) =      16.45(Ac.)


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Process from Point/Station        3.700 to Point/Station        3.700
**** CONFLUENCE OF MAIN STREAMS ****
____________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     16.190(Ac.)
Runoff from this stream =     65.270(CFS)
Time of concentration =    8.47 min.
Rainfall intensity =     4.307(In/Hr)
Area averaged loss rate (Fm) =    0.0720(In/Hr)
Area averaged Pervious ratio (Ap) = 0.0917
Program is now starting with Main Stream No. 2


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Process from Point/Station        3.800 to Point/Station        3.900
**** INITIAL AREA EVALUATION ****
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------------------------------------------------------------------------
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.5200     Max loss rate(Fm)=     0.408(In/Hr)
Initial subarea data:
Initial area flow distance =   160.000(Ft.)
Top (of initial area) elevation =   983.600(Ft.)
Bottom (of initial area) elevation =   980.790(Ft.)
Difference in elevation =     2.810(Ft.)
Slope =    0.01756  s(%)=       1.76
TC = k(0.403)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.883 min.
Rainfall intensity =      4.876(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.825
Subarea runoff =      1.689(CFS)
Total initial stream area =        0.420(Ac.)
Pervious area fraction = 0.520
Initial area Fm value =    0.408(In/Hr)


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Process from Point/Station        3.900 to Point/Station        4.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   975.790(Ft.)
Downstream point/station elevation =   972.540(Ft.)
Pipe length  =   372.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.689(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     1.689(CFS)
Normal flow depth in pipe =    6.05(In.)
Flow top width inside pipe =   12.00(In.)
Critical Depth =    6.63(In.)
Pipe flow velocity =      4.26(Ft/s)
Travel time through pipe =    1.46 min.
Time of concentration (TC) =     8.34 min.


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Process from Point/Station        3.900 to Point/Station        4.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      0.420(Ac.)
Runoff from this stream =      1.689(CFS)
Time of concentration =    8.34 min.
Rainfall intensity =     4.346(In/Hr)
Area averaged loss rate (Fm) =    0.4083(In/Hr)
Area averaged Pervious ratio (Ap) = 0.5200


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.000 to Point/Station        4.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
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Pervious ratio(Ap) = 0.1400     Max loss rate(Fm)=     0.110(In/Hr)
Initial subarea data:
Initial area flow distance =   534.460(Ft.)
Top (of initial area) elevation =   987.610(Ft.)
Bottom (of initial area) elevation =   981.360(Ft.)
Difference in elevation =     6.250(Ft.)
Slope =    0.01169  s(%)=       1.17
TC = k(0.309)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.280 min.
Rainfall intensity =      4.076(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.876
Subarea runoff =     10.351(CFS)
Total initial stream area =        2.900(Ac.)
Pervious area fraction = 0.140
Initial area Fm value =    0.110(In/Hr)


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Process from Point/Station        4.000 to Point/Station        4.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      2.900(Ac.)
Runoff from this stream =     10.351(CFS)
Time of concentration =    9.28 min.
Rainfall intensity =     4.076(In/Hr)
Area averaged loss rate (Fm) =    0.1099(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1400
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1      1.69     0.420      8.34    0.408      4.346
2     10.35     2.900      9.28    0.110      4.076
Qmax(1) =
           1.000 *    1.000 *     1.689) +
           1.068 *    0.899 *    10.351) + =      11.623
Qmax(2) =
           0.931 *    1.000 *     1.689) +
           1.000 *    1.000 *    10.351) + =      11.924

Total of 2 streams to confluence:
Flow rates before confluence point:
       1.689      10.351
Maximum flow rates at confluence using above data:
       11.623       11.924
Area of streams before confluence:
        0.420        2.900
Effective area values after confluence:
        3.026        3.320
Results of confluence:
Total flow rate =     11.924(CFS)
Time of concentration =     9.280 min.
Effective stream area after confluence =      3.320(Ac.)
Study area average Pervious fraction(Ap) =  0.188
Study area average soil loss rate(Fm) =    0.148(In/Hr)
Study area total (this main stream) =       3.32(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.000 to Point/Station        4.100
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   972.540(Ft.)
Downstream point/station elevation =   968.390(Ft.)
Pipe length  =   475.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    11.924(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    11.924(CFS)
Normal flow depth in pipe =   14.27(In.)
Flow top width inside pipe =   19.60(In.)
Critical Depth =   15.44(In.)
Pipe flow velocity =      6.85(Ft/s)
Travel time through pipe =    1.16 min.
Time of concentration (TC) =    10.44 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.000 to Point/Station        4.100
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      3.320(Ac.)
Runoff from this stream =     11.924(CFS)
Time of concentration =   10.44 min.
Rainfall intensity =     3.799(In/Hr)
Area averaged loss rate (Fm) =    0.1477(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1881


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Process from Point/Station        4.100 to Point/Station        4.100
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.0900     Max loss rate(Fm)=     0.071(In/Hr)
Initial subarea data:
Initial area flow distance =   689.460(Ft.)
Top (of initial area) elevation =   987.610(Ft.)
Bottom (of initial area) elevation =   980.590(Ft.)
Difference in elevation =     7.020(Ft.)
Slope =    0.01018  s(%)=       1.02
TC = k(0.297)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.143 min.
Rainfall intensity =      3.864(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.884
Subarea runoff =      7.648(CFS)
Total initial stream area =        2.240(Ac.)
Pervious area fraction = 0.090
Initial area Fm value =    0.071(In/Hr)


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Process from Point/Station        4.100 to Point/Station        4.100
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
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```
Stream flow area =      2.240(Ac.)
Runoff from this stream =      7.648(CFS)
Time of concentration =   10.14 min.
Rainfall intensity =     3.864(In/Hr)
Area averaged loss rate (Fm) =    0.0707(In/Hr)
Area averaged Pervious ratio (Ap) = 0.0900
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1     11.92     3.320     10.44    0.148      3.799
2      7.65     2.240     10.14    0.071      3.864
Qmax(1) =
           1.000 *    1.000 *    11.924) +
           0.983 *    1.000 *     7.648) + =      19.439
Qmax(2) =
           1.018 *    0.972 *    11.924) +
           1.000 *    1.000 *     7.648) + =      19.444

Total of 2 streams to confluence:
Flow rates before confluence point:
      11.924       7.648
Maximum flow rates at confluence using above data:
       19.439       19.444
Area of streams before confluence:
        3.320        2.240
Effective area values after confluence:
        5.560        5.467
Results of confluence:
Total flow rate =     19.444(CFS)
Time of concentration =    10.143 min.
Effective stream area after confluence =      5.467(Ac.)
Study area average Pervious fraction(Ap) =  0.149
Study area average soil loss rate(Fm) =    0.117(In/Hr)
Study area total (this main stream) =       5.56(Ac.)


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Process from Point/Station        4.100 to Point/Station        4.200
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   968.390(Ft.)
Downstream point/station elevation =   966.540(Ft.)
Pipe length  =   211.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    19.444(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    19.444(CFS)
Normal flow depth in pipe =   18.09(In.)
Flow top width inside pipe =   20.68(In.)
Critical Depth =   19.03(In.)
Pipe flow velocity =      7.65(Ft/s)
Travel time through pipe =    0.46 min.
Time of concentration (TC) =    10.60 min.


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Process from Point/Station        4.100 to Point/Station        4.200
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
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```
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      5.467(Ac.)
Runoff from this stream =     19.444(CFS)
Time of concentration =   10.60 min.
Rainfall intensity =     3.763(In/Hr)
Area averaged loss rate (Fm) =    0.1166(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1486


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Process from Point/Station        4.200 to Point/Station        4.200
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.2700     Max loss rate(Fm)=     0.212(In/Hr)
Initial subarea data:
Initial area flow distance =   436.910(Ft.)
Top (of initial area) elevation =   986.380(Ft.)
Bottom (of initial area) elevation =   973.310(Ft.)
Difference in elevation =    13.070(Ft.)
Slope =    0.02991  s(%)=       2.99
TC = k(0.341)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.831 min.
Rainfall intensity =      4.513(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.858
Subarea runoff =      3.793(CFS)
Total initial stream area =        0.980(Ac.)
Pervious area fraction = 0.270
Initial area Fm value =    0.212(In/Hr)


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Process from Point/Station        4.200 to Point/Station        4.200
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      0.980(Ac.)
Runoff from this stream =      3.793(CFS)
Time of concentration =    7.83 min.
Rainfall intensity =     4.513(In/Hr)
Area averaged loss rate (Fm) =    0.2120(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2700
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1     19.44     5.467     10.60    0.117      3.763
2      3.79     0.980      7.83    0.212      4.513
Qmax(1) =
           1.000 *    1.000 *    19.444) +
           0.826 *    1.000 *     3.793) + =      22.576
Qmax(2) =
           1.206 *    0.739 *    19.444) +
           1.000 *    1.000 *     3.793) + =      21.110

Total of 2 streams to confluence:
```

```
Flow rates before confluence point:
      19.444       3.793
Maximum flow rates at confluence using above data:
       22.576       21.110
Area of streams before confluence:
        5.467        0.980
Effective area values after confluence:
        6.447        5.018
Results of confluence:
Total flow rate =     22.576(CFS)
Time of concentration =    10.602 min.
Effective stream area after confluence =      6.447(Ac.)
Study area average Pervious fraction(Ap) =  0.167
Study area average soil loss rate(Fm) =    0.131(In/Hr)
Study area total (this main stream) =       6.45(Ac.)


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Process from Point/Station        4.200 to Point/Station        4.200
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      6.447(Ac.)
Runoff from this stream =     22.576(CFS)
Time of concentration =   10.60 min.
Rainfall intensity =     3.763(In/Hr)
Area averaged loss rate (Fm) =    0.1311(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1670


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Process from Point/Station        4.200 to Point/Station        4.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.0300     Max loss rate(Fm)=     0.024(In/Hr)
Initial subarea data:
Initial area flow distance =   276.950(Ft.)
Top (of initial area) elevation =   986.510(Ft.)
Bottom (of initial area) elevation =   973.530(Ft.)
Difference in elevation =    12.980(Ft.)
Slope =    0.04687  s(%)=       4.69
TC = k(0.282)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    4.930 min.
Rainfall intensity =      5.957(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.896
Subarea runoff =      1.709(CFS)
Total initial stream area =        0.320(Ac.)
Pervious area fraction = 0.030
Initial area Fm value =    0.024(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.200 to Point/Station        4.200
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      0.320(Ac.)
```

```
Runoff from this stream =      1.709(CFS)
Time of concentration =    4.93 min.
Rainfall intensity =     5.957(In/Hr)
Area averaged loss rate (Fm) =    0.0236(In/Hr)
Area averaged Pervious ratio (Ap) = 0.0300
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1     22.58     6.447     10.60    0.131      3.763
2      1.71     0.320      4.93    0.024      5.957
Qmax(1) =
           1.000 *    1.000 *    22.576) +
           0.630 *    1.000 *     1.709) + =      23.653
Qmax(2) =
           1.604 *    0.465 *    22.576) +
           1.000 *    1.000 *     1.709) + =      18.550

Total of 2 streams to confluence:
Flow rates before confluence point:
      22.576       1.709
Maximum flow rates at confluence using above data:
       23.653       18.550
Area of streams before confluence:
        6.447        0.320
Effective area values after confluence:
        6.767        3.318
Results of confluence:
Total flow rate =     23.653(CFS)
Time of concentration =    10.602 min.
Effective stream area after confluence =      6.767(Ac.)
Study area average Pervious fraction(Ap) =  0.161
Study area average soil loss rate(Fm) =    0.126(In/Hr)
Study area total (this main stream) =       6.77(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.200 to Point/Station        4.200
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      6.767(Ac.)
Runoff from this stream =     23.653(CFS)
Time of concentration =   10.60 min.
Rainfall intensity =     3.763(In/Hr)
Area averaged loss rate (Fm) =    0.1260(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1605


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.200 to Point/Station        4.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.2300     Max loss rate(Fm)=     0.181(In/Hr)
Initial subarea data:
```

```
Initial area flow distance =   333.920(Ft.)
Top (of initial area) elevation =   983.600(Ft.)
Bottom (of initial area) elevation =   974.620(Ft.)
Difference in elevation =     8.980(Ft.)
Slope =    0.02689  s(%)=       2.69
TC = k(0.331)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.977 min.
Rainfall intensity =      4.837(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.866
Subarea runoff =      3.478(CFS)
Total initial stream area =        0.830(Ac.)
Pervious area fraction = 0.230
Initial area Fm value =    0.181(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.200 to Point/Station        4.200
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      0.830(Ac.)
Runoff from this stream =      3.478(CFS)
Time of concentration =    6.98 min.
Rainfall intensity =     4.837(In/Hr)
Area averaged loss rate (Fm) =    0.1806(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2300
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1     23.65     6.767     10.60    0.126      3.763
2      3.48     0.830      6.98    0.181      4.837
Qmax(1) =
           1.000 *    1.000 *    23.653) +
           0.769 *    1.000 *     3.478) + =      26.329
Qmax(2) =
           1.295 *    0.658 *    23.653) +
           1.000 *    1.000 *     3.478) + =      23.639

Total of 2 streams to confluence:
Flow rates before confluence point:
      23.653       3.478
Maximum flow rates at confluence using above data:
       26.329       23.639
Area of streams before confluence:
        6.767        0.830
Effective area values after confluence:
        7.597        5.283
Results of confluence:
Total flow rate =     26.329(CFS)
Time of concentration =    10.602 min.
Effective stream area after confluence =      7.597(Ac.)
Study area average Pervious fraction(Ap) =  0.168
Study area average soil loss rate(Fm) =    0.132(In/Hr)
Study area total (this main stream) =       7.60(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.200 to Point/Station        3.700
```

```
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________
Upstream point/station elevation =   966.540(Ft.)
Downstream point/station elevation =   965.000(Ft.)
Pipe length  =   176.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    26.329(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    26.329(CFS)
Normal flow depth in pipe =   20.20(In.)
Flow top width inside pipe =   23.44(In.)
Critical Depth =   21.49(In.)
Pipe flow velocity =      8.26(Ft/s)
Travel time through pipe =    0.36 min.
Time of concentration (TC) =    10.96 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.200 to Point/Station        3.700
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      7.597(Ac.)
Runoff from this stream =     26.329(CFS)
Time of concentration =   10.96 min.
Rainfall intensity =     3.689(In/Hr)
Area averaged loss rate (Fm) =    0.1320(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1681
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1     65.27    16.190      8.47    0.072      4.307
2     26.33     7.597     10.96    0.132      3.689
Qmax(1) =
           1.000 *    1.000 *    65.270) +
           1.174 *    0.773 *    26.329) + =      89.144
Qmax(2) =
           0.854 *    1.000 *    65.270) +
           1.000 *    1.000 *    26.329) + =      82.081

Total of 2 main streams to confluence:
Flow rates before confluence point:
      66.270      27.329
Maximum flow rates at confluence using above data:
       89.144       82.081
Area of streams before confluence:
       16.190        7.597
Effective area values after confluence:
       22.060       23.787


Results of confluence:
Total flow rate =     89.144(CFS)
Time of concentration =     8.466 min.
Effective stream area after confluence  =     22.060(Ac.)
Study area average Pervious fraction(Ap) =  0.116
Study area average soil loss rate(Fm) =    0.091(In/Hr)
Study area total =      23.79(Ac.)
```

End of computations, Total Study Area = 24.46 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.118
Area averaged SCS curve number = 32.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 01/22/23

JOB NO. 2022-318
11115 HEMLOCK AVE
100 YEAR, RATIONAL METHOD
POST-CONDITION, AREA B

Program License Serial Number 6277

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.330 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

++

Process from Point/Station 5.000 to Point/Station 5.100
**** INITIAL AREA EVALUATION ****

Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.3100 Max loss rate(Fm)= 0.243(In/Hr)
Initial subarea data:
Initial area flow distance = 228.380(Ft.)
Top (of initial area) elevation = 1001.000(Ft.)
Bottom (of initial area) elevation = 987.460(Ft.)
Difference in elevation = 13.540(Ft.)
Slope = 0.05929 s(%)= 5.93
TC = k(0.351)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 5.421 min.
Rainfall intensity = 5.627(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.861
Subarea runoff = 9.303(CFS)
Total initial stream area = 1.920(Ac.)
Pervious area fraction = 0.310
Initial area Fm value = 0.243(In/Hr)

++

Process from Point/Station 5.100 to Point/Station 5.200
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 982.460(Ft.)
Downstream point/station elevation = 977.660(Ft.)
Pipe length = 365.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 9.303(CFS)

```
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     9.303(CFS)
Normal flow depth in pipe =   11.87(In.)
Flow top width inside pipe =   17.06(In.)
Critical Depth =   14.15(In.)
Pipe flow velocity =      7.52(Ft/s)
Travel time through pipe =    0.81 min.
Time of concentration (TC) =     6.23 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.100 to Point/Station        5.200
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      1.920(Ac.)
Runoff from this stream =      9.303(CFS)
Time of concentration =    6.23 min.
Rainfall intensity =     5.177(In/Hr)
Area averaged loss rate (Fm) =    0.2434(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3100
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.200 to Point/Station        5.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.0400     Max loss rate(Fm)=     0.031(In/Hr)
Initial subarea data:
Initial area flow distance =   487.230(Ft.)
Top (of initial area) elevation =   996.020(Ft.)
Bottom (of initial area) elevation =   985.200(Ft.)
Difference in elevation =    10.820(Ft.)
Slope =    0.02221  s(%)=       2.22
TC = k(0.284)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.239 min.
Rainfall intensity =      4.731(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.894
Subarea runoff =     18.991(CFS)
Total initial stream area =        4.490(Ac.)
Pervious area fraction = 0.040
Initial area Fm value =    0.031(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.200 to Point/Station        5.200
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      4.490(Ac.)
Runoff from this stream =     18.991(CFS)
Time of concentration =    7.24 min.
Rainfall intensity =     4.731(In/Hr)
Area averaged loss rate (Fm) =    0.0314(In/Hr)
```

```
Area averaged Pervious ratio (Ap) = 0.0400
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1      9.30     1.920      6.23    0.243      5.177
2     18.99     4.490      7.24    0.031      4.731
Qmax(1) =
           1.000 *    1.000 *     9.303) +
           1.095 *    0.861 *    18.991) + =      27.197
Qmax(2) =
           0.910 *    1.000 *     9.303) +
           1.000 *    1.000 *    18.991) + =      27.453

Total of 2 main streams to confluence:
Flow rates before confluence point:
      10.303      19.991
Maximum flow rates at confluence using above data:
       27.197       27.453
Area of streams before confluence:
        1.920        4.490
Effective area values after confluence:
        5.784        6.410


Results of confluence:
Total flow rate =     27.453(CFS)
Time of concentration =     7.239 min.
Effective stream area after confluence  =      6.410(Ac.)
Study area average Pervious fraction(Ap) =  0.121
Study area average soil loss rate(Fm) =    0.095(In/Hr)
Study area total =       6.41(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.200 to Point/Station        5.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
____________________________________________________________________________
Upstream point/station elevation =   977.660(Ft.)
Downstream point/station elevation =   971.000(Ft.)
Pipe length  =   490.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    27.453(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    27.453(CFS)
Normal flow depth in pipe =   17.63(In.)
Flow top width inside pipe =   25.71(In.)
Critical Depth =   21.90(In.)
Pipe flow velocity =      9.99(Ft/s)
Travel time through pipe =    0.82 min.
Time of concentration (TC) =     8.06 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.200 to Point/Station        5.300
**** CONFLUENCE OF MAIN STREAMS ****
____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      6.410(Ac.)
```

```
Runoff from this stream =     27.453(CFS)
Time of concentration =    8.06 min.
Rainfall intensity =     4.437(In/Hr)
Area averaged loss rate (Fm) =    0.0949(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1209
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.300 to Point/Station        5.300
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.0500     Max loss rate(Fm)=     0.039(In/Hr)
Initial subarea data:
Initial area flow distance =   590.460(Ft.)
Top (of initial area) elevation =   990.390(Ft.)
Bottom (of initial area) elevation =   982.710(Ft.)
Difference in elevation =     7.680(Ft.)
Slope =    0.01301  s(%)=       1.30
TC = k(0.287)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.775 min.
Rainfall intensity =      4.215(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.892
Subarea runoff =     24.540(CFS)
Total initial stream area =        6.530(Ac.)
Pervious area fraction = 0.050
Initial area Fm value =    0.039(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.300 to Point/Station        5.300
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      6.530(Ac.)
Runoff from this stream =     24.540(CFS)
Time of concentration =    8.78 min.
Rainfall intensity =     4.215(In/Hr)
Area averaged loss rate (Fm) =    0.0393(In/Hr)
Area averaged Pervious ratio (Ap) = 0.0500
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)       (min) (In/Hr)     (In/Hr)


1     27.45     6.410      8.06    0.095      4.437
2     24.54     6.530      8.78    0.039      4.215
Qmax(1) =
           1.000 *    1.000 *    27.453) +
           1.053 *    0.918 *    24.540) + =      51.178
Qmax(2) =
           0.949 *    1.000 *    27.453) +
           1.000 *    1.000 *    24.540) + =      50.589

Total of 2 main streams to confluence:
```

```
Flow rates before confluence point:
      28.453      25.540
Maximum flow rates at confluence using above data:
       51.178       50.589
Area of streams before confluence:
        6.410        6.530
Effective area values after confluence:
       12.405       12.940


Results of confluence:
Total flow rate =      51.178(CFS)
Time of concentration =     8.056 min.
Effective stream area after confluence  =     12.405(Ac.)
Study area average Pervious fraction(Ap) =  0.085
Study area average soil loss rate(Fm) =    0.067(In/Hr)
Study area total =      12.94(Ac.)
End of computations, Total Study Area =           12.94 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.085
Area averaged SCS curve number =  32.0
```

APPENDIX C

UNIT HYDROGRAPH ANALYSIS

APPENDIX C.1

UNIT HYDROGRAPH ANALYSIS

PRE-DEVELOPMENT CONDITIONS – 2 YEAR

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2004, Version 7.0

Study date 01/22/23

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San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6277

JOB NO 2022-318
11115 HEMLOCK AVENUE
2 YEAR, UNIT HYDROGRAPH
POST-CONDITION, AREA A

Storm Event Year = 2

Antecedent Moisture Condition = 1

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2		
24.47	1	0.52
Rainfall data for year 2		
24.47	6	1.36
Rainfall data for year 2		
24.47	24	2.46

++

******** Area-averaged max loss rate, Fm ********

SCS curve No.(AMCII)	SCS curve NO.(AMC 1)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
32.0	16.6	24.47	1.000	1.000	0.120	0.120

Area-averaged adjusted loss rate Fm (In/Hr) = 0.120

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC1)	S	Pervious Yield Fr
2.94	0.120	32.0	16.6	12.30	0.000
21.53	0.880	98.0	98.0	0.20	0.907

Area-averaged catchment yield fraction, Y = 0.798
Area-averaged low loss fraction, Yb = 0.202
User entry of time of concentration = 0.145 (hours)

++

Watershed area = 24.47(Ac.)
Catchment Lag time = 0.116 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 72.0212
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.120(In/Hr)
Average low loss rate fraction (Yb) = 0.202 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.192(In)
Computed peak 30-minute rainfall = 0.393(In)
Specified peak 1-hour rainfall = 0.518(In)
Computed peak 3-hour rainfall = 0.936(In)
Specified peak 6-hour rainfall = 1.360(In)
Specified peak 24-hour rainfall = 2.460(In)

Rainfall depth area reduction factors:
Using a total area of 24.47(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.191(In)
30-minute factor = 0.999 Adjusted rainfall = 0.392(In)
1-hour factor = 0.999 Adjusted rainfall = 0.517(In)
3-hour factor = 1.000 Adjusted rainfall = 0.936(In)
6-hour factor = 1.000 Adjusted rainfall = 1.360(In)
24-hour factor = 1.000 Adjusted rainfall = 2.460(In)

U n i t H y d r o g r a p h

++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
	(K = 295.93 (CFS))	
1	9.266	27.422
2	55.659	137.291
3	90.486	103.067
4	98.166	22.727
5	100.000	5.428

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.1915	0.1915
2	0.2527	0.0612
3	0.2972	0.0445
4	0.3334	0.0362
5	0.3645	0.0311
6	0.3921	0.0276
7	0.4171	0.0249
8	0.4399	0.0229
9	0.4612	0.0212

10	0.4810	0.0199
11	0.4997	0.0187
12	0.5174	0.0177
13	0.5402	0.0228
14	0.5623	0.0220
15	0.5836	0.0213
16	0.6043	0.0207
17	0.6244	0.0201
18	0.6440	0.0196
19	0.6630	0.0191
20	0.6816	0.0186
21	0.6998	0.0182
22	0.7176	0.0178
23	0.7350	0.0174
24	0.7521	0.0171
25	0.7689	0.0168
26	0.7853	0.0164
27	0.8015	0.0162
28	0.8173	0.0159
29	0.8330	0.0156
30	0.8483	0.0154
31	0.8635	0.0151
32	0.8784	0.0149
33	0.8931	0.0147
34	0.9076	0.0145
35	0.9219	0.0143
36	0.9361	0.0141
37	0.9500	0.0139
38	0.9637	0.0137
39	0.9773	0.0136
40	0.9907	0.0134
41	1.0040	0.0133
42	1.0171	0.0131
43	1.0301	0.0130
44	1.0429	0.0128
45	1.0557	0.0127
46	1.0682	0.0126
47	1.0807	0.0125
48	1.0930	0.0123
49	1.1052	0.0122
50	1.1173	0.0121
51	1.1293	0.0120
52	1.1412	0.0119
53	1.1530	0.0118
54	1.1646	0.0117
55	1.1762	0.0116
56	1.1877	0.0115
57	1.1991	0.0114
58	1.2103	0.0113
59	1.2215	0.0112
60	1.2327	0.0111
61	1.2437	0.0110
62	1.2546	0.0109
63	1.2655	0.0109
64	1.2763	0.0108
65	1.2870	0.0107
66	1.2976	0.0106
67	1.3082	0.0106
68	1.3187	0.0105
69	1.3291	0.0104
70	1.3394	0.0103

71	1.3497	0.0103
72	1.3599	0.0102
73	1.3679	0.0080
74	1.3759	0.0080
75	1.3838	0.0079
76	1.3917	0.0079
77	1.3995	0.0078
78	1.4072	0.0077
79	1.4149	0.0077
80	1.4226	0.0076
81	1.4301	0.0076
82	1.4377	0.0075
83	1.4451	0.0075
84	1.4525	0.0074
85	1.4599	0.0074
86	1.4672	0.0073
87	1.4745	0.0073
88	1.4817	0.0072
89	1.4889	0.0072
90	1.4960	0.0071
91	1.5031	0.0071
92	1.5102	0.0070
93	1.5172	0.0070
94	1.5241	0.0070
95	1.5310	0.0069
96	1.5379	0.0069
97	1.5447	0.0068
98	1.5515	0.0068
99	1.5583	0.0067
100	1.5650	0.0067
101	1.5716	0.0067
102	1.5783	0.0066
103	1.5849	0.0066
104	1.5914	0.0066
105	1.5980	0.0065
106	1.6044	0.0065
107	1.6109	0.0065
108	1.6173	0.0064
109	1.6237	0.0064
110	1.6301	0.0064
111	1.6364	0.0063
112	1.6427	0.0063
113	1.6489	0.0063
114	1.6551	0.0062
115	1.6613	0.0062
116	1.6675	0.0062
117	1.6736	0.0061
118	1.6797	0.0061
119	1.6858	0.0061
120	1.6918	0.0060
121	1.6979	0.0060
122	1.7038	0.0060
123	1.7098	0.0060
124	1.7157	0.0059
125	1.7216	0.0059
126	1.7275	0.0059
127	1.7334	0.0058
128	1.7392	0.0058
129	1.7450	0.0058
130	1.7507	0.0058
131	1.7565	0.0057

132	1.7622	0.0057
133	1.7679	0.0057
134	1.7736	0.0057
135	1.7792	0.0056
136	1.7848	0.0056
137	1.7904	0.0056
138	1.7960	0.0056
139	1.8016	0.0056
140	1.8071	0.0055
141	1.8126	0.0055
142	1.8181	0.0055
143	1.8236	0.0055
144	1.8290	0.0054
145	1.8344	0.0054
146	1.8398	0.0054
147	1.8452	0.0054
148	1.8506	0.0054
149	1.8559	0.0053
150	1.8612	0.0053
151	1.8665	0.0053
152	1.8718	0.0053
153	1.8770	0.0053
154	1.8823	0.0052
155	1.8875	0.0052
156	1.8927	0.0052
157	1.8979	0.0052
158	1.9030	0.0052
159	1.9082	0.0051
160	1.9133	0.0051
161	1.9184	0.0051
162	1.9235	0.0051
163	1.9285	0.0051
164	1.9336	0.0050
165	1.9386	0.0050
166	1.9436	0.0050
167	1.9486	0.0050
168	1.9536	0.0050
169	1.9586	0.0050
170	1.9635	0.0049
171	1.9684	0.0049
172	1.9734	0.0049
173	1.9783	0.0049
174	1.9831	0.0049
175	1.9880	0.0049
176	1.9929	0.0048
177	1.9977	0.0048
178	2.0025	0.0048
179	2.0073	0.0048
180	2.0121	0.0048
181	2.0169	0.0048
182	2.0216	0.0048
183	2.0264	0.0047
184	2.0311	0.0047
185	2.0358	0.0047
186	2.0405	0.0047
187	2.0452	0.0047
188	2.0499	0.0047
189	2.0545	0.0047
190	2.0592	0.0046
191	2.0638	0.0046
192	2.0684	0.0046

193	2.0730	0.0046
194	2.0776	0.0046
195	2.0821	0.0046
196	2.0867	0.0046
197	2.0913	0.0045
198	2.0958	0.0045
199	2.1003	0.0045
200	2.1048	0.0045
201	2.1093	0.0045
202	2.1138	0.0045
203	2.1182	0.0045
204	2.1227	0.0045
205	2.1271	0.0044
206	2.1316	0.0044
207	2.1360	0.0044
208	2.1404	0.0044
209	2.1448	0.0044
210	2.1492	0.0044
211	2.1535	0.0044
212	2.1579	0.0044
213	2.1623	0.0043
214	2.1666	0.0043
215	2.1709	0.0043
216	2.1752	0.0043
217	2.1795	0.0043
218	2.1838	0.0043
219	2.1881	0.0043
220	2.1924	0.0043
221	2.1966	0.0043
222	2.2009	0.0042
223	2.2051	0.0042
224	2.2093	0.0042
225	2.2135	0.0042
226	2.2177	0.0042
227	2.2219	0.0042
228	2.2261	0.0042
229	2.2303	0.0042
230	2.2344	0.0042
231	2.2386	0.0041
232	2.2427	0.0041
233	2.2468	0.0041
234	2.2510	0.0041
235	2.2551	0.0041
236	2.2592	0.0041
237	2.2632	0.0041
238	2.2673	0.0041
239	2.2714	0.0041
240	2.2754	0.0041
241	2.2795	0.0040
242	2.2835	0.0040
243	2.2876	0.0040
244	2.2916	0.0040
245	2.2956	0.0040
246	2.2996	0.0040
247	2.3036	0.0040
248	2.3076	0.0040
249	2.3115	0.0040
250	2.3155	0.0040
251	2.3195	0.0040
252	2.3234	0.0039
253	2.3274	0.0039

254	2.3313	0.0039
255	2.3352	0.0039
256	2.3391	0.0039
257	2.3430	0.0039
258	2.3469	0.0039
259	2.3508	0.0039
260	2.3547	0.0039
261	2.3585	0.0039
262	2.3624	0.0039
263	2.3662	0.0039
264	2.3701	0.0038
265	2.3739	0.0038
266	2.3778	0.0038
267	2.3816	0.0038
268	2.3854	0.0038
269	2.3892	0.0038
270	2.3930	0.0038
271	2.3968	0.0038
272	2.4005	0.0038
273	2.4043	0.0038
274	2.4081	0.0038
275	2.4118	0.0038
276	2.4156	0.0037
277	2.4193	0.0037
278	2.4230	0.0037
279	2.4268	0.0037
280	2.4305	0.0037
281	2.4342	0.0037
282	2.4379	0.0037
283	2.4416	0.0037
284	2.4453	0.0037
285	2.4489	0.0037
286	2.4526	0.0037
287	2.4563	0.0037
288	2.4599	0.0037

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0037	0.0007	0.0029
2	0.0037	0.0007	0.0029
3	0.0037	0.0007	0.0029
4	0.0037	0.0007	0.0029
5	0.0037	0.0007	0.0030
6	0.0037	0.0007	0.0030
7	0.0037	0.0008	0.0030
8	0.0037	0.0008	0.0030
9	0.0037	0.0008	0.0030
10	0.0038	0.0008	0.0030
11	0.0038	0.0008	0.0030
12	0.0038	0.0008	0.0030
13	0.0038	0.0008	0.0030
14	0.0038	0.0008	0.0030
15	0.0038	0.0008	0.0030
16	0.0038	0.0008	0.0031
17	0.0038	0.0008	0.0031
18	0.0039	0.0008	0.0031
19	0.0039	0.0008	0.0031
20	0.0039	0.0008	0.0031
21	0.0039	0.0008	0.0031

22	0.0039	0.0008	0.0031
23	0.0039	0.0008	0.0031
24	0.0039	0.0008	0.0031
25	0.0039	0.0008	0.0031
26	0.0040	0.0008	0.0032
27	0.0040	0.0008	0.0032
28	0.0040	0.0008	0.0032
29	0.0040	0.0008	0.0032
30	0.0040	0.0008	0.0032
31	0.0040	0.0008	0.0032
32	0.0040	0.0008	0.0032
33	0.0041	0.0008	0.0032
34	0.0041	0.0008	0.0032
35	0.0041	0.0008	0.0033
36	0.0041	0.0008	0.0033
37	0.0041	0.0008	0.0033
38	0.0041	0.0008	0.0033
39	0.0041	0.0008	0.0033
40	0.0042	0.0008	0.0033
41	0.0042	0.0008	0.0033
42	0.0042	0.0008	0.0033
43	0.0042	0.0009	0.0034
44	0.0042	0.0009	0.0034
45	0.0042	0.0009	0.0034
46	0.0043	0.0009	0.0034
47	0.0043	0.0009	0.0034
48	0.0043	0.0009	0.0034
49	0.0043	0.0009	0.0034
50	0.0043	0.0009	0.0035
51	0.0043	0.0009	0.0035
52	0.0044	0.0009	0.0035
53	0.0044	0.0009	0.0035
54	0.0044	0.0009	0.0035
55	0.0044	0.0009	0.0035
56	0.0044	0.0009	0.0035
57	0.0045	0.0009	0.0036
58	0.0045	0.0009	0.0036
59	0.0045	0.0009	0.0036
60	0.0045	0.0009	0.0036
61	0.0045	0.0009	0.0036
62	0.0045	0.0009	0.0036
63	0.0046	0.0009	0.0036
64	0.0046	0.0009	0.0037
65	0.0046	0.0009	0.0037
66	0.0046	0.0009	0.0037
67	0.0047	0.0009	0.0037
68	0.0047	0.0009	0.0037
69	0.0047	0.0009	0.0037
70	0.0047	0.0010	0.0038
71	0.0047	0.0010	0.0038
72	0.0048	0.0010	0.0038
73	0.0048	0.0010	0.0038
74	0.0048	0.0010	0.0038
75	0.0048	0.0010	0.0039
76	0.0048	0.0010	0.0039
77	0.0049	0.0010	0.0039
78	0.0049	0.0010	0.0039
79	0.0049	0.0010	0.0039
80	0.0049	0.0010	0.0039
81	0.0050	0.0010	0.0040
82	0.0050	0.0010	0.0040

83	0.0050	0.0010	0.0040
84	0.0050	0.0010	0.0040
85	0.0051	0.0010	0.0041
86	0.0051	0.0010	0.0041
87	0.0051	0.0010	0.0041
88	0.0052	0.0010	0.0041
89	0.0052	0.0010	0.0041
90	0.0052	0.0011	0.0042
91	0.0053	0.0011	0.0042
92	0.0053	0.0011	0.0042
93	0.0053	0.0011	0.0042
94	0.0053	0.0011	0.0043
95	0.0054	0.0011	0.0043
96	0.0054	0.0011	0.0043
97	0.0054	0.0011	0.0043
98	0.0055	0.0011	0.0044
99	0.0055	0.0011	0.0044
100	0.0055	0.0011	0.0044
101	0.0056	0.0011	0.0045
102	0.0056	0.0011	0.0045
103	0.0056	0.0011	0.0045
104	0.0057	0.0011	0.0045
105	0.0057	0.0012	0.0046
106	0.0057	0.0012	0.0046
107	0.0058	0.0012	0.0046
108	0.0058	0.0012	0.0046
109	0.0059	0.0012	0.0047
110	0.0059	0.0012	0.0047
111	0.0060	0.0012	0.0048
112	0.0060	0.0012	0.0048
113	0.0060	0.0012	0.0048
114	0.0061	0.0012	0.0048
115	0.0061	0.0012	0.0049
116	0.0062	0.0012	0.0049
117	0.0062	0.0013	0.0050
118	0.0063	0.0013	0.0050
119	0.0063	0.0013	0.0050
120	0.0064	0.0013	0.0051
121	0.0064	0.0013	0.0051
122	0.0065	0.0013	0.0052
123	0.0065	0.0013	0.0052
124	0.0066	0.0013	0.0052
125	0.0066	0.0013	0.0053
126	0.0067	0.0013	0.0053
127	0.0067	0.0014	0.0054
128	0.0068	0.0014	0.0054
129	0.0069	0.0014	0.0055
130	0.0069	0.0014	0.0055
131	0.0070	0.0014	0.0056
132	0.0070	0.0014	0.0056
133	0.0071	0.0014	0.0057
134	0.0072	0.0014	0.0057
135	0.0073	0.0015	0.0058
136	0.0073	0.0015	0.0058
137	0.0074	0.0015	0.0059
138	0.0075	0.0015	0.0060
139	0.0076	0.0015	0.0060
140	0.0076	0.0015	0.0061
141	0.0077	0.0016	0.0062
142	0.0078	0.0016	0.0062
143	0.0079	0.0016	0.0063

144	0.0080	0.0016	0.0064
145	0.0102	0.0021	0.0081
146	0.0103	0.0021	0.0082
147	0.0104	0.0021	0.0083
148	0.0105	0.0021	0.0084
149	0.0106	0.0021	0.0085
150	0.0107	0.0022	0.0085
151	0.0109	0.0022	0.0087
152	0.0109	0.0022	0.0087
153	0.0111	0.0022	0.0089
154	0.0112	0.0023	0.0089
155	0.0114	0.0023	0.0091
156	0.0115	0.0023	0.0092
157	0.0117	0.0024	0.0093
158	0.0118	0.0024	0.0094
159	0.0120	0.0024	0.0096
160	0.0121	0.0024	0.0097
161	0.0123	0.0025	0.0098
162	0.0125	0.0025	0.0099
163	0.0127	0.0026	0.0101
164	0.0128	0.0026	0.0102
165	0.0131	0.0026	0.0105
166	0.0133	0.0027	0.0106
167	0.0136	0.0027	0.0108
168	0.0137	0.0028	0.0110
169	0.0141	0.0029	0.0113
170	0.0143	0.0029	0.0114
171	0.0147	0.0030	0.0117
172	0.0149	0.0030	0.0119
173	0.0154	0.0031	0.0123
174	0.0156	0.0032	0.0125
175	0.0162	0.0033	0.0129
176	0.0164	0.0033	0.0131
177	0.0171	0.0034	0.0136
178	0.0174	0.0035	0.0139
179	0.0182	0.0037	0.0145
180	0.0186	0.0038	0.0149
181	0.0196	0.0039	0.0156
182	0.0201	0.0041	0.0160
183	0.0213	0.0043	0.0170
184	0.0220	0.0045	0.0176
185	0.0177	0.0036	0.0141
186	0.0187	0.0038	0.0149
187	0.0212	0.0043	0.0169
188	0.0229	0.0046	0.0183
189	0.0276	0.0056	0.0220
190	0.0311	0.0063	0.0248
191	0.0445	0.0090	0.0355
192	0.0612	0.0100	0.0512
193	0.1915	0.0100	0.1815
194	0.0362	0.0073	0.0289
195	0.0249	0.0050	0.0199
196	0.0199	0.0040	0.0158
197	0.0228	0.0046	0.0182
198	0.0207	0.0042	0.0165
199	0.0191	0.0038	0.0152
200	0.0178	0.0036	0.0142
201	0.0168	0.0034	0.0134
202	0.0159	0.0032	0.0127
203	0.0151	0.0031	0.0121
204	0.0145	0.0029	0.0116

205	0.0139	0.0028	0.0111
206	0.0134	0.0027	0.0107
207	0.0130	0.0026	0.0104
208	0.0126	0.0025	0.0100
209	0.0122	0.0025	0.0097
210	0.0119	0.0024	0.0095
211	0.0116	0.0023	0.0092
212	0.0113	0.0023	0.0090
213	0.0110	0.0022	0.0088
214	0.0108	0.0022	0.0086
215	0.0106	0.0021	0.0084
216	0.0103	0.0021	0.0083
217	0.0080	0.0016	0.0064
218	0.0079	0.0016	0.0063
219	0.0077	0.0016	0.0061
220	0.0075	0.0015	0.0060
221	0.0074	0.0015	0.0059
222	0.0072	0.0015	0.0058
223	0.0071	0.0014	0.0057
224	0.0070	0.0014	0.0055
225	0.0068	0.0014	0.0055
226	0.0067	0.0014	0.0054
227	0.0066	0.0013	0.0053
228	0.0065	0.0013	0.0052
229	0.0064	0.0013	0.0051
230	0.0063	0.0013	0.0050
231	0.0062	0.0013	0.0049
232	0.0061	0.0012	0.0049
233	0.0060	0.0012	0.0048
234	0.0059	0.0012	0.0047
235	0.0058	0.0012	0.0047
236	0.0058	0.0012	0.0046
237	0.0057	0.0012	0.0045
238	0.0056	0.0011	0.0045
239	0.0056	0.0011	0.0044
240	0.0055	0.0011	0.0044
241	0.0054	0.0011	0.0043
242	0.0054	0.0011	0.0043
243	0.0053	0.0011	0.0042
244	0.0052	0.0011	0.0042
245	0.0052	0.0010	0.0041
246	0.0051	0.0010	0.0041
247	0.0051	0.0010	0.0040
248	0.0050	0.0010	0.0040
249	0.0050	0.0010	0.0040
250	0.0049	0.0010	0.0039
251	0.0049	0.0010	0.0039
252	0.0048	0.0010	0.0038
253	0.0048	0.0010	0.0038
254	0.0047	0.0010	0.0038
255	0.0047	0.0009	0.0037
256	0.0046	0.0009	0.0037
257	0.0046	0.0009	0.0037
258	0.0046	0.0009	0.0036
259	0.0045	0.0009	0.0036
260	0.0045	0.0009	0.0036
261	0.0044	0.0009	0.0035
262	0.0044	0.0009	0.0035
263	0.0044	0.0009	0.0035
264	0.0043	0.0009	0.0035
265	0.0043	0.0009	0.0034

266	0.0043	0.0009	0.0034
267	0.0042	0.0009	0.0034
268	0.0042	0.0008	0.0034
269	0.0042	0.0008	0.0033
270	0.0041	0.0008	0.0033
271	0.0041	0.0008	0.0033
272	0.0041	0.0008	0.0033
273	0.0040	0.0008	0.0032
274	0.0040	0.0008	0.0032
275	0.0040	0.0008	0.0032
276	0.0040	0.0008	0.0032
277	0.0039	0.0008	0.0031
278	0.0039	0.0008	0.0031
279	0.0039	0.0008	0.0031
280	0.0039	0.0008	0.0031
281	0.0038	0.0008	0.0031
282	0.0038	0.0008	0.0030
283	0.0038	0.0008	0.0030
284	0.0038	0.0008	0.0030
285	0.0037	0.0008	0.0030
286	0.0037	0.0008	0.0030
287	0.0037	0.0007	0.0029
288	0.0037	0.0007	0.0029

Total soil rain loss = 0.47(In)
Total effective rainfall = 1.99(In)
Peak flow rate in flood hydrograph = 31.93(CFS)

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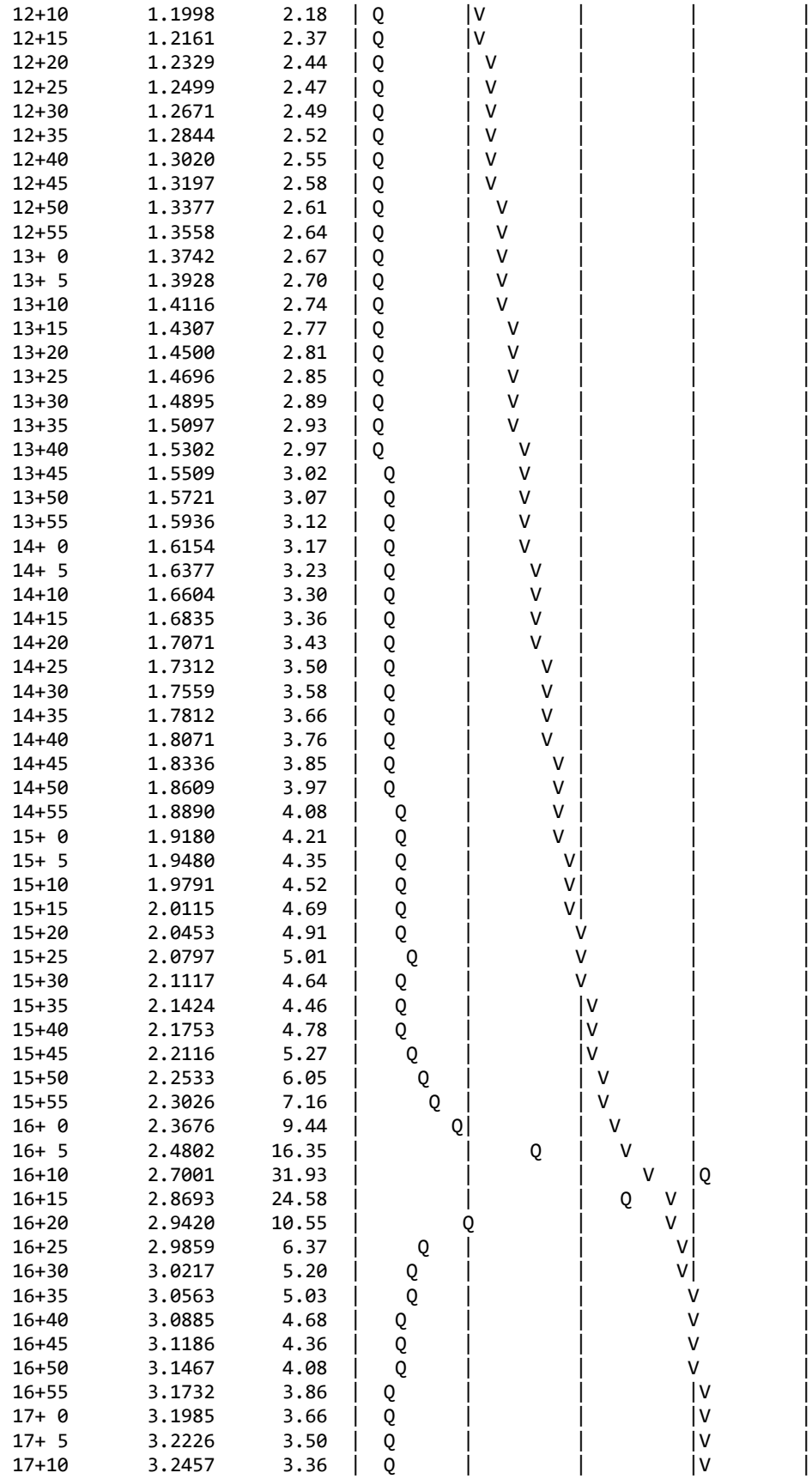
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0006	0.08	Q	|	|	|	|
0+10	0.0039	0.48	Q	|	|	|	|
0+15	0.0093	0.78	Q	|	|	|	|
0+20	0.0151	0.85	Q	|	|	|	|
0+25	0.0211	0.87	Q	|	|	|	|
0+30	0.0271	0.87	Q	|	|	|	|
0+35	0.0331	0.87	Q	|	|	|	|
0+40	0.0392	0.88	Q	|	|	|	|
0+45	0.0452	0.88	Q	|	|	|	|
0+50	0.0513	0.88	Q	|	|	|	|
0+55	0.0574	0.89	Q	|	|	|	|
1+ 0	0.0635	0.89	Q	|	|	|	|
1+ 5	0.0697	0.89	Q	|	|	|	|
1+10	0.0758	0.89	Q	|	|	|	|
1+15	0.0820	0.90	Q	|	|	|	|
1+20	0.0882	0.90	Q	|	|	|	|
1+25	0.0944	0.90	Q	|	|	|	|
1+30	0.1007	0.91	Q	|	|	|	|
1+35	0.1069	0.91	QV	|	|	|	|
1+40	0.1132	0.91	QV	|	|	|	|
1+45	0.1195	0.91	QV	|	|	|	|
1+50	0.1258	0.92	QV	|	|	|	|
1+55	0.1322	0.92	QV	|	|	|	|

2+ 0	0.1385	0.92	QV	|	|	|	|
2+ 5	0.1449	0.93	QV	|	|	|	|
2+10	0.1513	0.93	QV	|	|	|	|
2+15	0.1577	0.93	QV	|	|	|	|
2+20	0.1642	0.94	QV	|	|	|	|
2+25	0.1707	0.94	QV	|	|	|	|
2+30	0.1772	0.94	QV	|	|	|	|
2+35	0.1837	0.95	QV	|	|	|	|
2+40	0.1902	0.95	QV	|	|	|	|
2+45	0.1968	0.95	QV	|	|	|	|
2+50	0.2034	0.96	Q V	|	|	|	|
2+55	0.2100	0.96	Q V	|	|	|	|
3+ 0	0.2166	0.96	Q V	|	|	|	|
3+ 5	0.2233	0.97	Q V	|	|	|	|
3+10	0.2300	0.97	Q V	|	|	|	|
3+15	0.2367	0.97	Q V	|	|	|	|
3+20	0.2434	0.98	Q V	|	|	|	|
3+25	0.2501	0.98	Q V	|	|	|	|
3+30	0.2569	0.98	Q V	|	|	|	|
3+35	0.2637	0.99	Q V	|	|	|	|
3+40	0.2706	0.99	Q V	|	|	|	|
3+45	0.2774	1.00	Q V	|	|	|	|
3+50	0.2843	1.00	|QV	|	|	|	|
3+55	0.2912	1.00	|QV	|	|	|	|
4+ 0	0.2982	1.01	|QV	|	|	|	|
4+ 5	0.3051	1.01	|Q V	|	|	|	|
4+10	0.3121	1.02	|Q V	|	|	|	|
4+15	0.3192	1.02	|Q V	|	|	|	|
4+20	0.3262	1.02	|Q V	|	|	|	|
4+25	0.3333	1.03	|Q V	|	|	|	|
4+30	0.3404	1.03	|Q V	|	|	|	|
4+35	0.3475	1.04	|Q V	|	|	|	|
4+40	0.3547	1.04	|Q V	|	|	|	|
4+45	0.3619	1.04	|Q V	|	|	|	|
4+50	0.3691	1.05	|Q V	|	|	|	|
4+55	0.3764	1.05	|Q V	|	|	|	|
5+ 0	0.3837	1.06	|Q V	|	|	|	|
5+ 5	0.3910	1.06	|Q V	|	|	|	|
5+10	0.3983	1.07	|Q V	|	|	|	|
5+15	0.4057	1.07	|Q V	|	|	|	|
5+20	0.4131	1.08	|Q V	|	|	|	|
5+25	0.4206	1.08	|Q V	|	|	|	|
5+30	0.4281	1.09	|Q V	|	|	|	|
5+35	0.4356	1.09	|Q V	|	|	|	|
5+40	0.4431	1.10	|Q V	|	|	|	|
5+45	0.4507	1.10	|Q V	|	|	|	|
5+50	0.4583	1.11	|Q V	|	|	|	|
5+55	0.4660	1.11	|Q V	|	|	|	|
6+ 0	0.4737	1.12	|Q V	|	|	|	|
6+ 5	0.4814	1.12	|Q V	|	|	|	|
6+10	0.4892	1.13	|Q V	|	|	|	|
6+15	0.4970	1.13	|Q V	|	|	|	|
6+20	0.5048	1.14	|Q V	|	|	|	|
6+25	0.5127	1.14	|Q V	|	|	|	|
6+30	0.5206	1.15	|Q V	|	|	|	|
6+35	0.5286	1.15	|Q V	|	|	|	|
6+40	0.5366	1.16	|Q V	|	|	|	|
6+45	0.5446	1.17	|Q V	|	|	|	|
6+50	0.5527	1.17	|Q V	|	|	|	|
6+55	0.5608	1.18	|Q V	|	|	|	|
7+ 0	0.5689	1.18	|Q V	|	|	|	|

```
 7+ 5       0.5771      1.19  |Q   V    |         |         |         |
 7+10       0.5854      1.20  |Q   V    |         |         |         |
 7+15       0.5937      1.20  |Q   V    |         |         |         |
 7+20       0.6020      1.21  |Q   V    |         |         |         |
 7+25       0.6104      1.22  |Q    V   |         |         |         |
 7+30       0.6188      1.22  |Q    V   |         |         |         |
 7+35       0.6273      1.23  |Q    V   |         |         |         |
 7+40       0.6358      1.24  |Q    V   |         |         |         |
 7+45       0.6444      1.24  |Q    V   |         |         |         |
 7+50       0.6530      1.25  |Q    V   |         |         |         |
 7+55       0.6616      1.26  |Q    V   |         |         |         |
 8+ 0       0.6704      1.27  |Q    V   |         |         |         |
 8+ 5       0.6791      1.27  |Q    V   |         |         |         |
 8+10       0.6879      1.28  |Q    V   |         |         |         |
 8+15       0.6968      1.29  |Q    V   |         |         |         |
 8+20       0.7057      1.30  |Q    V   |         |         |         |
 8+25       0.7147      1.30  |Q     V  |         |         |         |
 8+30       0.7238      1.31  |Q     V  |         |         |         |
 8+35       0.7328      1.32  |Q     V  |         |         |         |
 8+40       0.7420      1.33  |Q     V  |         |         |         |
 8+45       0.7512      1.34  |Q     V  |         |         |         |
 8+50       0.7605      1.35  |Q     V  |         |         |         |
 8+55       0.7698      1.35  |Q     V  |         |         |         |
 9+ 0       0.7792      1.36  |Q     V  |         |         |         |
 9+ 5       0.7886      1.37  |Q     V  |         |         |         |
 9+10       0.7982      1.38  |Q     V  |         |         |         |
 9+15       0.8077      1.39  |Q     V  |         |         |         |
 9+20       0.8174      1.40  |Q      V |         |         |         |
 9+25       0.8271      1.41  |Q      V |         |         |         |
 9+30       0.8369      1.42  |Q      V |         |         |         |
 9+35       0.8467      1.43  |Q      V |         |         |         |
 9+40       0.8567      1.44  |Q      V |         |         |         |
 9+45       0.8667      1.45  |Q      V |         |         |         |
 9+50       0.8767      1.46  |Q      V |         |         |         |
 9+55       0.8869      1.47  |Q      V |         |         |         |
10+ 0       0.8971      1.49  |Q      V |         |         |         |
10+ 5       0.9074      1.50  |Q      V |         |         |         |
10+10       0.9178      1.51  |Q       V|         |         |         |
10+15       0.9283      1.52  |Q       V|         |         |         |
10+20       0.9389      1.53  |Q       V|         |         |         |
10+25       0.9495      1.55  |Q       V|         |         |         |
10+30       0.9602      1.56  |Q       V|         |         |         |
10+35       0.9711      1.57  |Q       V|         |         |         |
10+40       0.9820      1.59  |Q       V|         |         |         |
10+45       0.9930      1.60  |Q       V|         |         |         |
10+50       1.0041      1.61  |Q       V|         |         |         |
10+55       1.0153      1.63  |Q       V|         |         |         |
11+ 0       1.0266      1.64  |Q        V         |         |         |
11+ 5       1.0381      1.66  |Q        V         |         |         |
11+10       1.0496      1.67  |Q        V         |         |         |
11+15       1.0612      1.69  |Q        V         |         |         |
11+20       1.0730      1.71  |Q        V         |         |         |
11+25       1.0848      1.72  |Q        V         |         |         |
11+30       1.0968      1.74  |Q        V         |         |         |
11+35       1.1090      1.76  |Q        V         |         |         |
11+40       1.1212      1.78  |Q        |V        |         |         |
11+45       1.1336      1.80  |Q        |V        |         |         |
11+50       1.1461      1.82  |Q        |V        |         |         |
11+55       1.1587      1.84  |Q        |V        |         |         |
12+ 0       1.1715      1.86  |Q        |V        |         |         |
12+ 5       1.1848      1.92  |Q        |V        |         |         |
```



17+15	3.2679	3.23	| Q	|	|	| V |
17+20	3.2894	3.12	| Q	|	|	| V |
17+25	3.3101	3.02	| Q	|	|	| V |
17+30	3.3303	2.93	| Q	|	|	| V |
17+35	3.3499	2.84	| Q	|	|	| V |
17+40	3.3689	2.77	| Q	|	|	| V |
17+45	3.3875	2.70	| Q	|	|	| V |
17+50	3.4057	2.63	| Q	|	|	| V |
17+55	3.4234	2.57	| Q	|	|	| V |
18+ 0	3.4408	2.52	| Q	|	|	| V |
18+ 5	3.4574	2.42	| Q	|	|	| V |
18+10	3.4722	2.14	| Q	|	|	| V |
18+15	3.4854	1.92	|Q	|	|	| V |
18+20	3.4981	1.84	|Q	|	|	| V |
18+25	3.5105	1.80	|Q	|	|	| V |
18+30	3.5226	1.76	|Q	|	|	| V |
18+35	3.5345	1.72	|Q	|	|	| V |
18+40	3.5461	1.69	|Q	|	|	| V |
18+45	3.5575	1.66	|Q	|	|	| V |
18+50	3.5687	1.63	|Q	|	|	| V |
18+55	3.5797	1.60	|Q	|	|	| V |
19+ 0	3.5905	1.57	|Q	|	|	| V |
19+ 5	3.6012	1.54	|Q	|	|	| V |
19+10	3.6116	1.52	|Q	|	|	| V |
19+15	3.6219	1.50	|Q	|	|	| V |
19+20	3.6321	1.47	|Q	|	|	| V |
19+25	3.6421	1.45	|Q	|	|	| V |
19+30	3.6519	1.43	|Q	|	|	| V |
19+35	3.6616	1.41	|Q	|	|	| V |
19+40	3.6712	1.39	|Q	|	|	| V |
19+45	3.6807	1.37	|Q	|	|	| V |
19+50	3.6900	1.35	|Q	|	|	| V |
19+55	3.6992	1.34	|Q	|	|	| V |
20+ 0	3.7083	1.32	|Q	|	|	| V |
20+ 5	3.7172	1.30	|Q	|	|	| V |
20+10	3.7261	1.29	|Q	|	|	| V |
20+15	3.7349	1.27	|Q	|	|	| V |
20+20	3.7435	1.26	|Q	|	|	| V |
20+25	3.7521	1.24	|Q	|	|	| V |
20+30	3.7606	1.23	|Q	|	|	| V |
20+35	3.7689	1.22	|Q	|	|	| V |
20+40	3.7772	1.20	|Q	|	|	| V |
20+45	3.7854	1.19	|Q	|	|	| V |
20+50	3.7935	1.18	|Q	|	|	| V |
20+55	3.8016	1.17	|Q	|	|	| V |
21+ 0	3.8095	1.15	|Q	|	|	| V |
21+ 5	3.8174	1.14	|Q	|	|	| V |
21+10	3.8252	1.13	|Q	|	|	| V |
21+15	3.8329	1.12	|Q	|	|	| V |
21+20	3.8406	1.11	|Q	|	|	| V |
21+25	3.8481	1.10	|Q	|	|	| V |
21+30	3.8556	1.09	|Q	|	|	| V |
21+35	3.8631	1.08	|Q	|	|	| V |
21+40	3.8705	1.07	|Q	|	|	| V |
21+45	3.8778	1.06	|Q	|	|	| V |
21+50	3.8850	1.05	|Q	|	|	| V |
21+55	3.8922	1.04	|Q	|	|	| V |
22+ 0	3.8994	1.04	|Q	|	|	| V |
22+ 5	3.9065	1.03	|Q	|	|	| V |
22+10	3.9135	1.02	|Q	|	|	| V |
22+15	3.9204	1.01	|Q	|	|	| V |

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22+20       3.9273      1.00  |Q       |         |         |       V |
22+25       3.9342      1.00  Q        |         |         |       V |
22+30       3.9410      0.99  Q        |         |         |       V |
22+35       3.9478      0.98  Q        |         |         |       V |
22+40       3.9545      0.97  Q        |         |         |       V |
22+45       3.9611      0.97  Q        |         |         |       V |
22+50       3.9677      0.96  Q        |         |         |        V|
22+55       3.9743      0.95  Q        |         |         |        V|
23+ 0       3.9808      0.95  Q        |         |         |        V|
23+ 5       3.9873      0.94  Q        |         |         |        V|
23+10       3.9937      0.93  Q        |         |         |        V|
23+15       4.0001      0.93  Q        |         |         |        V|
23+20       4.0064      0.92  Q        |         |         |        V|
23+25       4.0127      0.91  Q        |         |         |        V|
23+30       4.0190      0.91  Q        |         |         |        V|
23+35       4.0252      0.90  Q        |         |         |        V|
23+40       4.0314      0.90  Q        |         |         |        V|
23+45       4.0375      0.89  Q        |         |         |        V|
23+50       4.0436      0.89  Q        |         |         |        V|
23+55       4.0497      0.88  Q        |         |         |        V|
24+ 0       4.0557      0.87  Q        |         |         |        V|
```

U n i t H y d r o g r a p h A n a l y s i s

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Study date 01/22/23

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San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6277

JOB NO 2022-318
11115 HEMLOCK AVENUE
2 YEAR, UNIT HYDROGRAPH
POST-CONDITION, AREA B

Storm Event Year = 2

Antecedent Moisture Condition = 1

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2		
12.94	1	0.52
Rainfall data for year 2		
12.94	6	1.36
Rainfall data for year 2		
12.94	24	2.46

++

******** Area-averaged max loss rate, Fm ********

SCS curve No.(AMCII)	SCS curve NO.(AMC 1)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
32.0	16.6	12.94	1.000	1.000	0.090	0.090

Area-averaged adjusted loss rate Fm (In/Hr) = 0.090

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC1)	S	Pervious Yield Fr
1.16	0.090	32.0	16.6	12.30	0.000
11.78	0.910	98.0	98.0	0.20	0.907

Area-averaged catchment yield fraction, Y = 0.825
Area-averaged low loss fraction, Yb = 0.175
User entry of time of concentration = 0.138 (hours)
++
Watershed area = 12.94(Ac.)
Catchment Lag time = 0.111 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 75.3830
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.090(In/Hr)
Average low loss rate fraction (Yb) = 0.175 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.192(In)
Computed peak 30-minute rainfall = 0.393(In)
Specified peak 1-hour rainfall = 0.518(In)
Computed peak 3-hour rainfall = 0.936(In)
Specified peak 6-hour rainfall = 1.360(In)
Specified peak 24-hour rainfall = 2.460(In)

Rainfall depth area reduction factors:
Using a total area of 12.94(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.192(In)
30-minute factor = 0.999 Adjusted rainfall = 0.392(In)
1-hour factor = 0.999 Adjusted rainfall = 0.518(In)
3-hour factor = 1.000 Adjusted rainfall = 0.936(In)
6-hour factor = 1.000 Adjusted rainfall = 1.360(In)
24-hour factor = 1.000 Adjusted rainfall = 2.460(In)

U n i t H y d r o g r a p h
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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
	(K = 156.49 (CFS))	
1	10.105	15.813
2	59.170	76.784
3	92.172	51.646
4	98.501	9.904
5	100.000	2.347

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.1916	0.1916
2	0.2528	0.0612
3	0.2973	0.0445
4	0.3336	0.0363
5	0.3647	0.0311
6	0.3923	0.0276
7	0.4173	0.0250
8	0.4402	0.0229
9	0.4614	0.0212

10	0.4813	0.0199
11	0.5000	0.0187
12	0.5177	0.0177
13	0.5405	0.0228
14	0.5626	0.0220
15	0.5839	0.0213
16	0.6046	0.0207
17	0.6246	0.0201
18	0.6442	0.0196
19	0.6632	0.0191
20	0.6818	0.0186
21	0.7000	0.0182
22	0.7178	0.0178
23	0.7352	0.0174
24	0.7523	0.0171
25	0.7690	0.0167
26	0.7855	0.0164
27	0.8016	0.0161
28	0.8175	0.0159
29	0.8331	0.0156
30	0.8485	0.0154
31	0.8636	0.0151
32	0.8785	0.0149
33	0.8932	0.0147
34	0.9077	0.0145
35	0.9220	0.0143
36	0.9361	0.0141
37	0.9500	0.0139
38	0.9638	0.0137
39	0.9774	0.0136
40	0.9908	0.0134
41	1.0041	0.0133
42	1.0172	0.0131
43	1.0302	0.0130
44	1.0430	0.0128
45	1.0557	0.0127
46	1.0683	0.0126
47	1.0807	0.0125
48	1.0931	0.0123
49	1.1053	0.0122
50	1.1174	0.0121
51	1.1294	0.0120
52	1.1412	0.0119
53	1.1530	0.0118
54	1.1647	0.0117
55	1.1763	0.0116
56	1.1877	0.0115
57	1.1991	0.0114
58	1.2104	0.0113
59	1.2216	0.0112
60	1.2327	0.0111
61	1.2437	0.0110
62	1.2547	0.0109
63	1.2655	0.0109
64	1.2763	0.0108
65	1.2870	0.0107
66	1.2977	0.0106
67	1.3082	0.0106
68	1.3187	0.0105
69	1.3291	0.0104
70	1.3395	0.0103

71	1.3497	0.0103
72	1.3599	0.0102
73	1.3680	0.0080
74	1.3760	0.0080
75	1.3839	0.0079
76	1.3917	0.0079
77	1.3995	0.0078
78	1.4073	0.0077
79	1.4150	0.0077
80	1.4226	0.0076
81	1.4302	0.0076
82	1.4377	0.0075
83	1.4452	0.0075
84	1.4526	0.0074
85	1.4600	0.0074
86	1.4673	0.0073
87	1.4746	0.0073
88	1.4818	0.0072
89	1.4889	0.0072
90	1.4961	0.0071
91	1.5032	0.0071
92	1.5102	0.0070
93	1.5172	0.0070
94	1.5242	0.0070
95	1.5311	0.0069
96	1.5379	0.0069
97	1.5448	0.0068
98	1.5516	0.0068
99	1.5583	0.0067
100	1.5650	0.0067
101	1.5717	0.0067
102	1.5783	0.0066
103	1.5849	0.0066
104	1.5915	0.0066
105	1.5980	0.0065
106	1.6045	0.0065
107	1.6109	0.0065
108	1.6174	0.0064
109	1.6238	0.0064
110	1.6301	0.0064
111	1.6364	0.0063
112	1.6427	0.0063
113	1.6490	0.0063
114	1.6552	0.0062
115	1.6614	0.0062
116	1.6675	0.0062
117	1.6737	0.0061
118	1.6798	0.0061
119	1.6858	0.0061
120	1.6919	0.0060
121	1.6979	0.0060
122	1.7039	0.0060
123	1.7098	0.0060
124	1.7158	0.0059
125	1.7217	0.0059
126	1.7276	0.0059
127	1.7334	0.0058
128	1.7392	0.0058
129	1.7450	0.0058
130	1.7508	0.0058
131	1.7565	0.0057

132	1.7623	0.0057
133	1.7679	0.0057
134	1.7736	0.0057
135	1.7793	0.0056
136	1.7849	0.0056
137	1.7905	0.0056
138	1.7961	0.0056
139	1.8016	0.0056
140	1.8071	0.0055
141	1.8127	0.0055
142	1.8181	0.0055
143	1.8236	0.0055
144	1.8290	0.0054
145	1.8345	0.0054
146	1.8399	0.0054
147	1.8452	0.0054
148	1.8506	0.0054
149	1.8559	0.0053
150	1.8612	0.0053
151	1.8665	0.0053
152	1.8718	0.0053
153	1.8771	0.0053
154	1.8823	0.0052
155	1.8875	0.0052
156	1.8927	0.0052
157	1.8979	0.0052
158	1.9031	0.0052
159	1.9082	0.0051
160	1.9133	0.0051
161	1.9184	0.0051
162	1.9235	0.0051
163	1.9286	0.0051
164	1.9336	0.0050
165	1.9387	0.0050
166	1.9437	0.0050
167	1.9487	0.0050
168	1.9537	0.0050
169	1.9586	0.0050
170	1.9636	0.0049
171	1.9685	0.0049
172	1.9734	0.0049
173	1.9783	0.0049
174	1.9832	0.0049
175	1.9880	0.0049
176	1.9929	0.0048
177	1.9977	0.0048
178	2.0025	0.0048
179	2.0074	0.0048
180	2.0121	0.0048
181	2.0169	0.0048
182	2.0217	0.0048
183	2.0264	0.0047
184	2.0311	0.0047
185	2.0358	0.0047
186	2.0405	0.0047
187	2.0452	0.0047
188	2.0499	0.0047
189	2.0546	0.0047
190	2.0592	0.0046
191	2.0638	0.0046
192	2.0684	0.0046

193	2.0730	0.0046
194	2.0776	0.0046
195	2.0822	0.0046
196	2.0867	0.0046
197	2.0913	0.0045
198	2.0958	0.0045
199	2.1003	0.0045
200	2.1049	0.0045
201	2.1093	0.0045
202	2.1138	0.0045
203	2.1183	0.0045
204	2.1227	0.0045
205	2.1272	0.0044
206	2.1316	0.0044
207	2.1360	0.0044
208	2.1404	0.0044
209	2.1448	0.0044
210	2.1492	0.0044
211	2.1536	0.0044
212	2.1579	0.0044
213	2.1623	0.0043
214	2.1666	0.0043
215	2.1709	0.0043
216	2.1753	0.0043
217	2.1796	0.0043
218	2.1838	0.0043
219	2.1881	0.0043
220	2.1924	0.0043
221	2.1966	0.0043
222	2.2009	0.0042
223	2.2051	0.0042
224	2.2093	0.0042
225	2.2136	0.0042
226	2.2178	0.0042
227	2.2220	0.0042
228	2.2261	0.0042
229	2.2303	0.0042
230	2.2345	0.0042
231	2.2386	0.0041
232	2.2427	0.0041
233	2.2469	0.0041
234	2.2510	0.0041
235	2.2551	0.0041
236	2.2592	0.0041
237	2.2633	0.0041
238	2.2674	0.0041
239	2.2714	0.0041
240	2.2755	0.0041
241	2.2795	0.0040
242	2.2836	0.0040
243	2.2876	0.0040
244	2.2916	0.0040
245	2.2956	0.0040
246	2.2996	0.0040
247	2.3036	0.0040
248	2.3076	0.0040
249	2.3116	0.0040
250	2.3156	0.0040
251	2.3195	0.0040
252	2.3235	0.0039
253	2.3274	0.0039

254	2.3313	0.0039
255	2.3352	0.0039
256	2.3392	0.0039
257	2.3431	0.0039
258	2.3469	0.0039
259	2.3508	0.0039
260	2.3547	0.0039
261	2.3586	0.0039
262	2.3624	0.0039
263	2.3663	0.0039
264	2.3701	0.0038
265	2.3740	0.0038
266	2.3778	0.0038
267	2.3816	0.0038
268	2.3854	0.0038
269	2.3892	0.0038
270	2.3930	0.0038
271	2.3968	0.0038
272	2.4006	0.0038
273	2.4043	0.0038
274	2.4081	0.0038
275	2.4119	0.0038
276	2.4156	0.0037
277	2.4193	0.0037
278	2.4231	0.0037
279	2.4268	0.0037
280	2.4305	0.0037
281	2.4342	0.0037
282	2.4379	0.0037
283	2.4416	0.0037
284	2.4453	0.0037
285	2.4490	0.0037
286	2.4526	0.0037
287	2.4563	0.0037
288	2.4600	0.0037

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0037	0.0006	0.0030
2	0.0037	0.0006	0.0030
3	0.0037	0.0006	0.0030
4	0.0037	0.0006	0.0030
5	0.0037	0.0006	0.0031
6	0.0037	0.0006	0.0031
7	0.0037	0.0007	0.0031
8	0.0037	0.0007	0.0031
9	0.0037	0.0007	0.0031
10	0.0038	0.0007	0.0031
11	0.0038	0.0007	0.0031
12	0.0038	0.0007	0.0031
13	0.0038	0.0007	0.0031
14	0.0038	0.0007	0.0031
15	0.0038	0.0007	0.0032
16	0.0038	0.0007	0.0032
17	0.0038	0.0007	0.0032
18	0.0039	0.0007	0.0032
19	0.0039	0.0007	0.0032
20	0.0039	0.0007	0.0032
21	0.0039	0.0007	0.0032

22	0.0039	0.0007	0.0032
23	0.0039	0.0007	0.0032
24	0.0039	0.0007	0.0032
25	0.0039	0.0007	0.0033
26	0.0040	0.0007	0.0033
27	0.0040	0.0007	0.0033
28	0.0040	0.0007	0.0033
29	0.0040	0.0007	0.0033
30	0.0040	0.0007	0.0033
31	0.0040	0.0007	0.0033
32	0.0040	0.0007	0.0033
33	0.0041	0.0007	0.0033
34	0.0041	0.0007	0.0034
35	0.0041	0.0007	0.0034
36	0.0041	0.0007	0.0034
37	0.0041	0.0007	0.0034
38	0.0041	0.0007	0.0034
39	0.0041	0.0007	0.0034
40	0.0042	0.0007	0.0034
41	0.0042	0.0007	0.0034
42	0.0042	0.0007	0.0035
43	0.0042	0.0007	0.0035
44	0.0042	0.0007	0.0035
45	0.0042	0.0007	0.0035
46	0.0043	0.0007	0.0035
47	0.0043	0.0007	0.0035
48	0.0043	0.0007	0.0035
49	0.0043	0.0008	0.0036
50	0.0043	0.0008	0.0036
51	0.0043	0.0008	0.0036
52	0.0044	0.0008	0.0036
53	0.0044	0.0008	0.0036
54	0.0044	0.0008	0.0036
55	0.0044	0.0008	0.0036
56	0.0044	0.0008	0.0037
57	0.0045	0.0008	0.0037
58	0.0045	0.0008	0.0037
59	0.0045	0.0008	0.0037
60	0.0045	0.0008	0.0037
61	0.0045	0.0008	0.0037
62	0.0045	0.0008	0.0038
63	0.0046	0.0008	0.0038
64	0.0046	0.0008	0.0038
65	0.0046	0.0008	0.0038
66	0.0046	0.0008	0.0038
67	0.0047	0.0008	0.0038
68	0.0047	0.0008	0.0039
69	0.0047	0.0008	0.0039
70	0.0047	0.0008	0.0039
71	0.0047	0.0008	0.0039
72	0.0048	0.0008	0.0039
73	0.0048	0.0008	0.0040
74	0.0048	0.0008	0.0040
75	0.0048	0.0008	0.0040
76	0.0048	0.0008	0.0040
77	0.0049	0.0009	0.0040
78	0.0049	0.0009	0.0040
79	0.0049	0.0009	0.0041
80	0.0049	0.0009	0.0041
81	0.0050	0.0009	0.0041
82	0.0050	0.0009	0.0041

83	0.0050	0.0009	0.0042
84	0.0050	0.0009	0.0042
85	0.0051	0.0009	0.0042
86	0.0051	0.0009	0.0042
87	0.0051	0.0009	0.0042
88	0.0052	0.0009	0.0043
89	0.0052	0.0009	0.0043
90	0.0052	0.0009	0.0043
91	0.0053	0.0009	0.0043
92	0.0053	0.0009	0.0044
93	0.0053	0.0009	0.0044
94	0.0053	0.0009	0.0044
95	0.0054	0.0009	0.0044
96	0.0054	0.0009	0.0045
97	0.0054	0.0010	0.0045
98	0.0055	0.0010	0.0045
99	0.0055	0.0010	0.0045
100	0.0055	0.0010	0.0046
101	0.0056	0.0010	0.0046
102	0.0056	0.0010	0.0046
103	0.0056	0.0010	0.0047
104	0.0057	0.0010	0.0047
105	0.0057	0.0010	0.0047
106	0.0057	0.0010	0.0047
107	0.0058	0.0010	0.0048
108	0.0058	0.0010	0.0048
109	0.0059	0.0010	0.0048
110	0.0059	0.0010	0.0049
111	0.0060	0.0010	0.0049
112	0.0060	0.0010	0.0049
113	0.0060	0.0011	0.0050
114	0.0061	0.0011	0.0050
115	0.0061	0.0011	0.0051
116	0.0062	0.0011	0.0051
117	0.0062	0.0011	0.0051
118	0.0063	0.0011	0.0052
119	0.0063	0.0011	0.0052
120	0.0064	0.0011	0.0052
121	0.0064	0.0011	0.0053
122	0.0065	0.0011	0.0053
123	0.0065	0.0011	0.0054
124	0.0066	0.0011	0.0054
125	0.0066	0.0012	0.0055
126	0.0067	0.0012	0.0055
127	0.0067	0.0012	0.0056
128	0.0068	0.0012	0.0056
129	0.0069	0.0012	0.0057
130	0.0069	0.0012	0.0057
131	0.0070	0.0012	0.0058
132	0.0070	0.0012	0.0058
133	0.0071	0.0012	0.0059
134	0.0072	0.0013	0.0059
135	0.0073	0.0013	0.0060
136	0.0073	0.0013	0.0060
137	0.0074	0.0013	0.0061
138	0.0075	0.0013	0.0062
139	0.0076	0.0013	0.0063
140	0.0076	0.0013	0.0063
141	0.0077	0.0014	0.0064
142	0.0078	0.0014	0.0064
143	0.0079	0.0014	0.0065

144	0.0080	0.0014	0.0066
145	0.0102	0.0018	0.0084
146	0.0103	0.0018	0.0085
147	0.0104	0.0018	0.0086
148	0.0105	0.0018	0.0087
149	0.0106	0.0019	0.0088
150	0.0107	0.0019	0.0088
151	0.0109	0.0019	0.0090
152	0.0109	0.0019	0.0090
153	0.0111	0.0019	0.0092
154	0.0112	0.0020	0.0092
155	0.0114	0.0020	0.0094
156	0.0115	0.0020	0.0095
157	0.0117	0.0020	0.0096
158	0.0118	0.0021	0.0097
159	0.0120	0.0021	0.0099
160	0.0121	0.0021	0.0100
161	0.0123	0.0022	0.0102
162	0.0125	0.0022	0.0103
163	0.0127	0.0022	0.0105
164	0.0128	0.0022	0.0106
165	0.0131	0.0023	0.0108
166	0.0133	0.0023	0.0110
167	0.0136	0.0024	0.0112
168	0.0137	0.0024	0.0113
169	0.0141	0.0025	0.0116
170	0.0143	0.0025	0.0118
171	0.0147	0.0026	0.0121
172	0.0149	0.0026	0.0123
173	0.0154	0.0027	0.0127
174	0.0156	0.0027	0.0129
175	0.0161	0.0028	0.0133
176	0.0164	0.0029	0.0136
177	0.0171	0.0030	0.0141
178	0.0174	0.0030	0.0144
179	0.0182	0.0032	0.0150
180	0.0186	0.0032	0.0154
181	0.0196	0.0034	0.0161
182	0.0201	0.0035	0.0166
183	0.0213	0.0037	0.0176
184	0.0220	0.0039	0.0182
185	0.0177	0.0031	0.0146
186	0.0187	0.0033	0.0154
187	0.0212	0.0037	0.0175
188	0.0229	0.0040	0.0189
189	0.0276	0.0048	0.0228
190	0.0311	0.0054	0.0257
191	0.0445	0.0075	0.0370
192	0.0612	0.0075	0.0537
193	0.1916	0.0075	0.1841
194	0.0363	0.0063	0.0299
195	0.0250	0.0044	0.0206
196	0.0199	0.0035	0.0164
197	0.0228	0.0040	0.0188
198	0.0207	0.0036	0.0171
199	0.0191	0.0033	0.0157
200	0.0178	0.0031	0.0147
201	0.0167	0.0029	0.0138
202	0.0159	0.0028	0.0131
203	0.0151	0.0026	0.0125
204	0.0145	0.0025	0.0120

205	0.0139	0.0024	0.0115
206	0.0134	0.0023	0.0111
207	0.0130	0.0023	0.0107
208	0.0126	0.0022	0.0104
209	0.0122	0.0021	0.0101
210	0.0119	0.0021	0.0098
211	0.0116	0.0020	0.0095
212	0.0113	0.0020	0.0093
213	0.0110	0.0019	0.0091
214	0.0108	0.0019	0.0089
215	0.0106	0.0018	0.0087
216	0.0103	0.0018	0.0085
217	0.0080	0.0014	0.0066
218	0.0079	0.0014	0.0065
219	0.0077	0.0013	0.0063
220	0.0075	0.0013	0.0062
221	0.0074	0.0013	0.0061
222	0.0072	0.0013	0.0060
223	0.0071	0.0012	0.0058
224	0.0070	0.0012	0.0057
225	0.0068	0.0012	0.0056
226	0.0067	0.0012	0.0055
227	0.0066	0.0012	0.0054
228	0.0065	0.0011	0.0054
229	0.0064	0.0011	0.0053
230	0.0063	0.0011	0.0052
231	0.0062	0.0011	0.0051
232	0.0061	0.0011	0.0050
233	0.0060	0.0011	0.0050
234	0.0059	0.0010	0.0049
235	0.0058	0.0010	0.0048
236	0.0058	0.0010	0.0048
237	0.0057	0.0010	0.0047
238	0.0056	0.0010	0.0046
239	0.0056	0.0010	0.0046
240	0.0055	0.0010	0.0045
241	0.0054	0.0009	0.0045
242	0.0054	0.0009	0.0044
243	0.0053	0.0009	0.0044
244	0.0052	0.0009	0.0043
245	0.0052	0.0009	0.0043
246	0.0051	0.0009	0.0042
247	0.0051	0.0009	0.0042
248	0.0050	0.0009	0.0041
249	0.0050	0.0009	0.0041
250	0.0049	0.0009	0.0041
251	0.0049	0.0009	0.0040
252	0.0048	0.0008	0.0040
253	0.0048	0.0008	0.0039
254	0.0047	0.0008	0.0039
255	0.0047	0.0008	0.0039
256	0.0046	0.0008	0.0038
257	0.0046	0.0008	0.0038
258	0.0046	0.0008	0.0038
259	0.0045	0.0008	0.0037
260	0.0045	0.0008	0.0037
261	0.0044	0.0008	0.0037
262	0.0044	0.0008	0.0036
263	0.0044	0.0008	0.0036
264	0.0043	0.0008	0.0036
265	0.0043	0.0008	0.0035

266	0.0043	0.0007	0.0035
267	0.0042	0.0007	0.0035
268	0.0042	0.0007	0.0035
269	0.0042	0.0007	0.0034
270	0.0041	0.0007	0.0034
271	0.0041	0.0007	0.0034
272	0.0041	0.0007	0.0034
273	0.0040	0.0007	0.0033
274	0.0040	0.0007	0.0033
275	0.0040	0.0007	0.0033
276	0.0040	0.0007	0.0033
277	0.0039	0.0007	0.0032
278	0.0039	0.0007	0.0032
279	0.0039	0.0007	0.0032
280	0.0039	0.0007	0.0032
281	0.0038	0.0007	0.0032
282	0.0038	0.0007	0.0031
283	0.0038	0.0007	0.0031
284	0.0038	0.0007	0.0031
285	0.0037	0.0007	0.0031
286	0.0037	0.0006	0.0031
287	0.0037	0.0006	0.0030
288	0.0037	0.0006	0.0030

Total soil rain loss = 0.40(In)
Total effective rainfall = 2.06(In)
Peak flow rate in flood hydrograph = 17.81(CFS)

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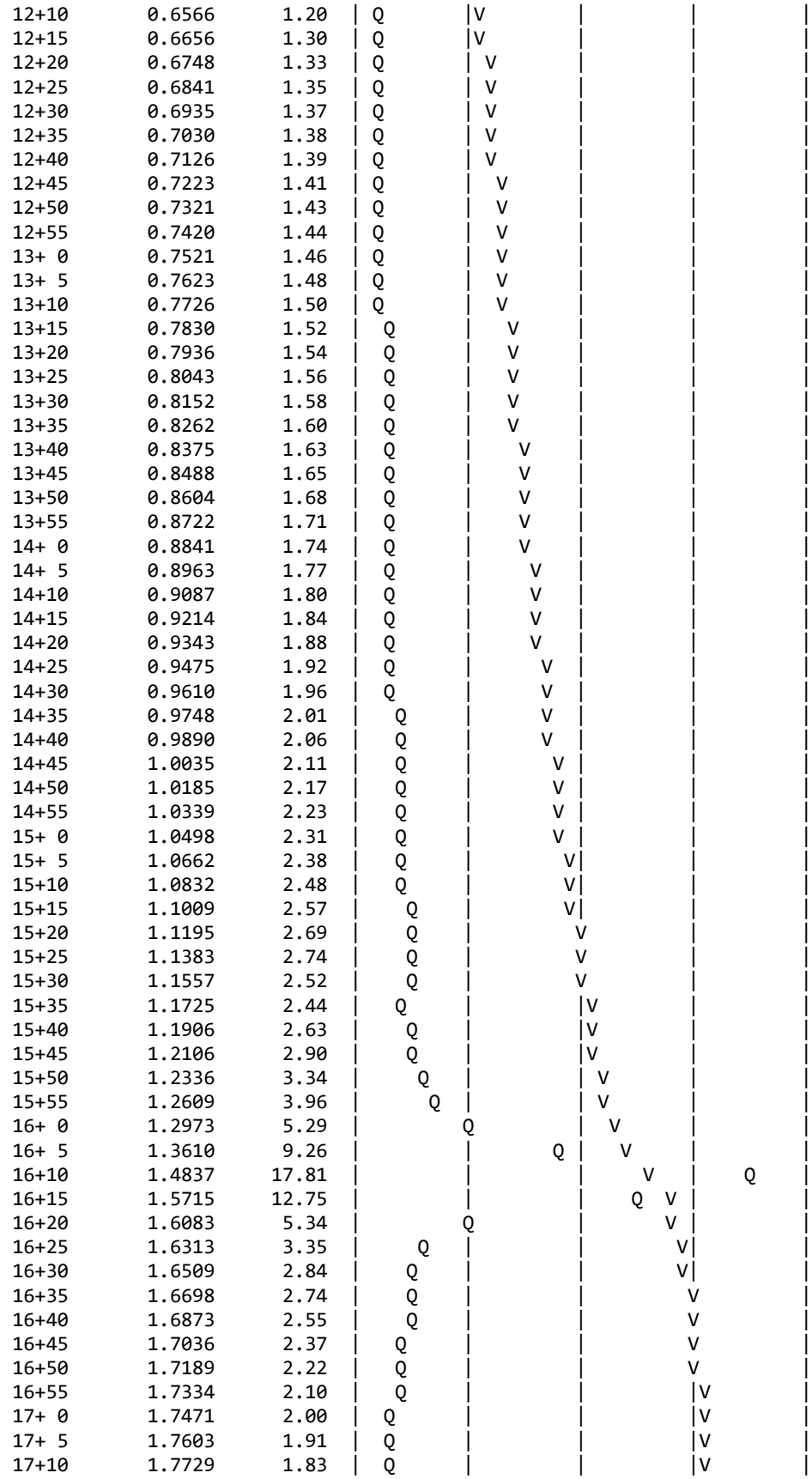
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0003	0.05	Q	|	|	|	|
0+10	0.0023	0.28	Q	|	|	|	|
0+15	0.0053	0.44	Q	|	|	|	|
0+20	0.0085	0.47	Q	|	|	|	|
0+25	0.0117	0.48	Q	|	|	|	|
0+30	0.0150	0.48	Q	|	|	|	|
0+35	0.0183	0.48	Q	|	|	|	|
0+40	0.0216	0.48	Q	|	|	|	|
0+45	0.0249	0.48	Q	|	|	|	|
0+50	0.0283	0.48	Q	|	|	|	|
0+55	0.0316	0.48	Q	|	|	|	|
1+ 0	0.0350	0.49	Q	|	|	|	|
1+ 5	0.0383	0.49	Q	|	|	|	|
1+10	0.0417	0.49	Q	|	|	|	|
1+15	0.0451	0.49	Q	|	|	|	|
1+20	0.0485	0.49	Q	|	|	|	|
1+25	0.0519	0.49	Q	|	|	|	|
1+30	0.0553	0.50	Q	|	|	|	|
1+35	0.0587	0.50	QV	|	|	|	|
1+40	0.0621	0.50	QV	|	|	|	|
1+45	0.0656	0.50	|Q	|	|	|	|
1+50	0.0690	0.50	|Q	|	|	|	|
1+55	0.0725	0.50	|Q	|	|	|	|

2+ 0	0.0760	0.51	Q				
2+ 5	0.0795	0.51	Q				
2+10	0.0830	0.51	Q				
2+15	0.0865	0.51	Q				
2+20	0.0900	0.51	Q				
2+25	0.0935	0.51	Q				
2+30	0.0971	0.52	Q				
2+35	0.1007	0.52	Q				
2+40	0.1042	0.52	Q				
2+45	0.1078	0.52	Q				
2+50	0.1114	0.52	QV				
2+55	0.1151	0.52	QV				
3+ 0	0.1187	0.53	QV				
3+ 5	0.1223	0.53	QV				
3+10	0.1260	0.53	QV				
3+15	0.1296	0.53	QV				
3+20	0.1333	0.53	QV				
3+25	0.1370	0.54	QV				
3+30	0.1407	0.54	QV				
3+35	0.1445	0.54	QV				
3+40	0.1482	0.54	QV				
3+45	0.1519	0.54	QV				
3+50	0.1557	0.55	QV				
3+55	0.1595	0.55	QV				
4+ 0	0.1633	0.55	QV				
4+ 5	0.1671	0.55	Q V				
4+10	0.1709	0.56	Q V				
4+15	0.1748	0.56	Q V				
4+20	0.1786	0.56	Q V				
4+25	0.1825	0.56	Q V				
4+30	0.1864	0.56	Q V				
4+35	0.1903	0.57	Q V				
4+40	0.1942	0.57	Q V				
4+45	0.1981	0.57	Q V				
4+50	0.2021	0.57	Q V				
4+55	0.2061	0.58	Q V				
5+ 0	0.2101	0.58	Q V				
5+ 5	0.2141	0.58	Q V				
5+10	0.2181	0.58	Q V				
5+15	0.2221	0.59	Q V				
5+20	0.2262	0.59	Q V				
5+25	0.2303	0.59	Q V				
5+30	0.2343	0.59	Q V				
5+35	0.2385	0.60	Q V				
5+40	0.2426	0.60	Q V				
5+45	0.2467	0.60	Q V				
5+50	0.2509	0.61	Q V				
5+55	0.2551	0.61	Q V				
6+ 0	0.2593	0.61	Q V				
6+ 5	0.2635	0.61	Q V				
6+10	0.2678	0.62	Q V				
6+15	0.2720	0.62	Q V				
6+20	0.2763	0.62	Q V				
6+25	0.2806	0.63	Q V				
6+30	0.2850	0.63	Q V				
6+35	0.2893	0.63	Q V				
6+40	0.2937	0.63	Q V				
6+45	0.2981	0.64	Q V				
6+50	0.3025	0.64	Q V				
6+55	0.3069	0.64	Q V				
7+ 0	0.3114	0.65	Q V				

```
 7+ 5       0.3159      0.65  |Q   V    |         |         |         |
 7+10       0.3204      0.65  |Q   V    |         |         |         |
 7+15       0.3249      0.66  |Q   V    |         |         |         |
 7+20       0.3295      0.66  |Q   V    |         |         |         |
 7+25       0.3341      0.67  |Q    V   |         |         |         |
 7+30       0.3387      0.67  |Q    V   |         |         |         |
 7+35       0.3433      0.67  |Q    V   |         |         |         |
 7+40       0.3480      0.68  |Q    V   |         |         |         |
 7+45       0.3527      0.68  |Q    V   |         |         |         |
 7+50       0.3574      0.68  |Q    V   |         |         |         |
 7+55       0.3621      0.69  |Q    V   |         |         |         |
 8+ 0       0.3669      0.69  |Q    V   |         |         |         |
 8+ 5       0.3717      0.70  |Q    V   |         |         |         |
 8+10       0.3765      0.70  |Q    V   |         |         |         |
 8+15       0.3813      0.70  |Q    V   |         |         |         |
 8+20       0.3862      0.71  |Q    V   |         |         |         |
 8+25       0.3911      0.71  |Q     V  |         |         |         |
 8+30       0.3961      0.72  |Q     V  |         |         |         |
 8+35       0.4011      0.72  |Q     V  |         |         |         |
 8+40       0.4061      0.73  |Q     V  |         |         |         |
 8+45       0.4111      0.73  |Q     V  |         |         |         |
 8+50       0.4162      0.74  |Q     V  |         |         |         |
 8+55       0.4213      0.74  |Q     V  |         |         |         |
 9+ 0       0.4264      0.75  |Q     V  |         |         |         |
 9+ 5       0.4316      0.75  |Q     V  |         |         |         |
 9+10       0.4368      0.76  |Q     V  |         |         |         |
 9+15       0.4420      0.76  |Q     V  |         |         |         |
 9+20       0.4473      0.77  |Q      V |         |         |         |
 9+25       0.4526      0.77  |Q      V |         |         |         |
 9+30       0.4580      0.78  |Q      V |         |         |         |
 9+35       0.4634      0.78  |Q      V |         |         |         |
 9+40       0.4688      0.79  |Q      V |         |         |         |
 9+45       0.4743      0.79  |Q      V |         |         |         |
 9+50       0.4798      0.80  |Q      V |         |         |         |
 9+55       0.4853      0.81  |Q      V |         |         |         |
10+ 0       0.4909      0.81  |Q      V |         |         |         |
10+ 5       0.4966      0.82  |Q      V |         |         |         |
10+10       0.5023      0.83  |Q       V|         |         |         |
10+15       0.5080      0.83  |Q       V|         |         |         |
10+20       0.5138      0.84  |Q       V|         |         |         |
10+25       0.5196      0.85  |Q       V|         |         |         |
10+30       0.5255      0.85  |Q       V|         |         |         |
10+35       0.5314      0.86  |Q       V|         |         |         |
10+40       0.5374      0.87  |Q       V|         |         |         |
10+45       0.5434      0.87  |Q       V|         |         |         |
10+50       0.5495      0.88  |Q       V|         |         |         |
10+55       0.5556      0.89  |Q        V         |         |         |
11+ 0       0.5618      0.90  |Q        V         |         |         |
11+ 5       0.5680      0.91  |Q        V         |         |         |
11+10       0.5743      0.92  |Q        V         |         |         |
11+15       0.5807      0.92  |Q        V         |         |         |
11+20       0.5871      0.93  |Q        V         |         |         |
11+25       0.5936      0.94  |Q        V         |         |         |
11+30       0.6002      0.95  |Q        V         |         |         |
11+35       0.6068      0.96  |Q        V         |         |         |
11+40       0.6135      0.97  |Q        |V        |         |         |
11+45       0.6203      0.98  |Q        |V        |         |         |
11+50       0.6271      0.99  |Q        |V        |         |         |
11+55       0.6341      1.00  | Q       |V        |         |         |
12+ 0       0.6411      1.02  | Q       |V        |         |         |
12+ 5       0.6483      1.06  | Q       |V        |         |         |
```



17+15	1.7850	1.76	Q			V
17+20	1.7967	1.70	Q			V
17+25	1.8080	1.65	Q			V
17+30	1.8190	1.60	Q			V
17+35	1.8297	1.55	Q			V
17+40	1.8401	1.51	Q			V
17+45	1.8503	1.47	Q			V
17+50	1.8602	1.44	Q			V
17+55	1.8699	1.41	Q			V
18+ 0	1.8793	1.38	Q			V
18+ 5	1.8884	1.32	Q			V
18+10	1.8964	1.16	Q			V
18+15	1.9036	1.05	Q			V
18+20	1.9106	1.01	Q			V
18+25	1.9173	0.98	Q			V
18+30	1.9239	0.96	Q			V
18+35	1.9304	0.94	Q			V
18+40	1.9367	0.92	Q			V
18+45	1.9430	0.91	Q			V
18+50	1.9491	0.89	Q			V
18+55	1.9551	0.87	Q			V
19+ 0	1.9610	0.86	Q			V
19+ 5	1.9668	0.84	Q			V
19+10	1.9725	0.83	Q			V
19+15	1.9782	0.82	Q			V
19+20	1.9837	0.80	Q			V
19+25	1.9892	0.79	Q			V
19+30	1.9946	0.78	Q			V
19+35	1.9999	0.77	Q			V
19+40	2.0051	0.76	Q			V
19+45	2.0103	0.75	Q			V
19+50	2.0153	0.74	Q			V
19+55	2.0204	0.73	Q			V
20+ 0	2.0253	0.72	Q			V
20+ 5	2.0302	0.71	Q			V
20+10	2.0351	0.70	Q			V
20+15	2.0399	0.70	Q			V
20+20	2.0446	0.69	Q			V
20+25	2.0493	0.68	Q			V
20+30	2.0539	0.67	Q			V
20+35	2.0585	0.66	Q			V
20+40	2.0630	0.66	Q			V
20+45	2.0675	0.65	Q			V
20+50	2.0719	0.64	Q			V
20+55	2.0763	0.64	Q			V
21+ 0	2.0807	0.63	Q			V
21+ 5	2.0850	0.62	Q			V
21+10	2.0892	0.62	Q			V
21+15	2.0934	0.61	Q			V
21+20	2.0976	0.61	Q			V
21+25	2.1018	0.60	Q			V
21+30	2.1059	0.60	Q			V
21+35	2.1099	0.59	Q			V
21+40	2.1140	0.59	Q			V
21+45	2.1180	0.58	Q			V
21+50	2.1219	0.58	Q			V
21+55	2.1259	0.57	Q			V
22+ 0	2.1298	0.57	Q			V
22+ 5	2.1336	0.56	Q			V
22+10	2.1375	0.56	Q			V
22+15	2.1413	0.55	Q			V

```
22+20       2.1451      0.55  |Q        |         |         |       V |
22+25       2.1488      0.54  |Q        |         |         |       V |
22+30       2.1525      0.54  |Q        |         |         |       V |
22+35       2.1562      0.54  |Q        |         |         |       V |
22+40       2.1599      0.53  |Q        |         |         |       V |
22+45       2.1635      0.53  |Q        |         |         |       V |
22+50       2.1671      0.52  |Q        |         |         |        V|
22+55       2.1707      0.52  |Q        |         |         |        V|
23+ 0       2.1743      0.52  |Q        |         |         |        V|
23+ 5       2.1778      0.51  |Q        |         |         |        V|
23+10       2.1813      0.51  |Q        |         |         |        V|
23+15       2.1848      0.51  |Q        |         |         |        V|
23+20       2.1883      0.50  |Q        |         |         |        V|
23+25       2.1917      0.50  Q         |         |         |        V|
23+30       2.1951      0.50  Q         |         |         |        V|
23+35       2.1985      0.49  Q         |         |         |        V|
23+40       2.2019      0.49  Q         |         |         |        V|
23+45       2.2053      0.49  Q         |         |         |        V|
23+50       2.2086      0.48  Q         |         |         |        V|
23+55       2.2119      0.48  Q         |         |         |        V|
24+ 0       2.2152      0.48  Q         |         |         |        V|
```

APPENDIX C.2

UNIT HYDROGRAPH ANALYSIS

PRE-DEVELOPMENT CONDITIONS – 10 YEAR

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2004, Version 7.0

Study date 01/23/23

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San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6277

JOB NO 2022-318
11115 HEMLOCK AVENUE
10 YEAR, UNIT HYDROGRAPH
PRE-CONDITION, AREA A

Storm Event Year = 10

Antecedent Moisture Condition = 2

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 5		
29.19	1	0.68
Rainfall data for year 5		
29.19	6	1.76
Rainfall data for year 5		
29.19	24	3.22

Note: Per City of Fontana Master Storm Drain Plan, the 10-year pre-condition flow rates shall be calculated using 5-year rainfall

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++

******** Area-averaged max loss rate, Fm ********

SCS curve No.(AMCII)	SCS curve NO.(AMC 2)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
32.0	32.0	29.19	1.000	0.978	0.600	0.587

Area-averaged adjusted loss rate Fm (In/Hr) = 0.587

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
17.51	0.600	32.0	32.0	16.10	0.000
11.68	0.400	98.0	98.0	0.20	0.928

Area-averaged catchment yield fraction, Y = 0.371
Area-averaged low loss fraction, Yb = 0.629
User entry of time of concentration = 0.237 (hours)
++
Watershed area = 29.19(Ac.)
Catchment Lag time = 0.190 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 43.9707
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.587(In/Hr)
Average low loss rate fraction (Yb) = 0.629 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.253(In)
Computed peak 30-minute rainfall = 0.518(In)
Specified peak 1-hour rainfall = 0.684(In)
Computed peak 3-hour rainfall = 1.221(In)
Specified peak 6-hour rainfall = 1.760(In)
Specified peak 24-hour rainfall = 3.220(In)

Rainfall depth area reduction factors:
Using a total area of 29.19(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.253(In)
30-minute factor = 0.999 Adjusted rainfall = 0.518(In)
1-hour factor = 0.999 Adjusted rainfall = 0.683(In)
3-hour factor = 1.000 Adjusted rainfall = 1.221(In)
6-hour factor = 1.000 Adjusted rainfall = 1.760(In)
24-hour factor = 1.000 Adjusted rainfall = 3.220(In)

U n i t H y d r o g r a p h
++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
	(K = 353.02 (CFS))	
1	3.593	12.685
2	23.409	69.954
3	58.071	122.361
4	83.637	90.253
5	94.177	37.206
6	97.961	13.360
7	98.945	3.472
8	100.000	1.736

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.2528	0.2528
2	0.3336	0.0808
3	0.3923	0.0587
4	0.4402	0.0478
5	0.4813	0.0411
6	0.5177	0.0364

7	0.5506	0.0329
8	0.5808	0.0302
9	0.6088	0.0280
10	0.6350	0.0262
11	0.6597	0.0247
12	0.6831	0.0234
13	0.7126	0.0295
14	0.7410	0.0285
15	0.7686	0.0275
16	0.7952	0.0267
17	0.8211	0.0259
18	0.8463	0.0252
19	0.8709	0.0245
20	0.8948	0.0239
21	0.9182	0.0234
22	0.9410	0.0229
23	0.9634	0.0224
24	0.9853	0.0219
25	1.0068	0.0215
26	1.0279	0.0211
27	1.0486	0.0207
28	1.0690	0.0204
29	1.0890	0.0200
30	1.1087	0.0197
31	1.1280	0.0194
32	1.1471	0.0191
33	1.1659	0.0188
34	1.1845	0.0185
35	1.2028	0.0183
36	1.2208	0.0180
37	1.2386	0.0178
38	1.2561	0.0176
39	1.2735	0.0173
40	1.2906	0.0171
41	1.3075	0.0169
42	1.3243	0.0167
43	1.3408	0.0165
44	1.3572	0.0164
45	1.3733	0.0162
46	1.3894	0.0160
47	1.4052	0.0159
48	1.4209	0.0157
49	1.4365	0.0155
50	1.4519	0.0154
51	1.4671	0.0152
52	1.4822	0.0151
53	1.4972	0.0150
54	1.5120	0.0148
55	1.5267	0.0147
56	1.5413	0.0146
57	1.5558	0.0145
58	1.5701	0.0143
59	1.5843	0.0142
60	1.5984	0.0141
61	1.6124	0.0140
62	1.6263	0.0139
63	1.6401	0.0138
64	1.6538	0.0137
65	1.6674	0.0136
66	1.6809	0.0135
67	1.6943	0.0134

68	1.7076	0.0133
69	1.7208	0.0132
70	1.7339	0.0131
71	1.7469	0.0130
72	1.7598	0.0129
73	1.7704	0.0106
74	1.7810	0.0105
75	1.7914	0.0104
76	1.8018	0.0104
77	1.8121	0.0103
78	1.8223	0.0102
79	1.8325	0.0101
80	1.8425	0.0101
81	1.8525	0.0100
82	1.8625	0.0099
83	1.8723	0.0099
84	1.8821	0.0098
85	1.8919	0.0097
86	1.9015	0.0097
87	1.9111	0.0096
88	1.9207	0.0095
89	1.9301	0.0095
90	1.9396	0.0094
91	1.9489	0.0094
92	1.9582	0.0093
93	1.9675	0.0092
94	1.9767	0.0092
95	1.9858	0.0091
96	1.9949	0.0091
97	2.0039	0.0090
98	2.0129	0.0090
99	2.0218	0.0089
100	2.0307	0.0089
101	2.0395	0.0088
102	2.0483	0.0088
103	2.0570	0.0087
104	2.0657	0.0087
105	2.0743	0.0086
106	2.0829	0.0086
107	2.0915	0.0085
108	2.1000	0.0085
109	2.1084	0.0085
110	2.1168	0.0084
111	2.1252	0.0084
112	2.1335	0.0083
113	2.1418	0.0083
114	2.1500	0.0082
115	2.1582	0.0082
116	2.1664	0.0082
117	2.1745	0.0081
118	2.1826	0.0081
119	2.1906	0.0080
120	2.1986	0.0080
121	2.2066	0.0080
122	2.2145	0.0079
123	2.2224	0.0079
124	2.2303	0.0079
125	2.2381	0.0078
126	2.2459	0.0078
127	2.2536	0.0078
128	2.2613	0.0077

129	2.2690	0.0077
130	2.2767	0.0076
131	2.2843	0.0076
132	2.2919	0.0076
133	2.2994	0.0076
134	2.3069	0.0075
135	2.3144	0.0075
136	2.3219	0.0075
137	2.3293	0.0074
138	2.3367	0.0074
139	2.3441	0.0074
140	2.3514	0.0073
141	2.3587	0.0073
142	2.3660	0.0073
143	2.3732	0.0072
144	2.3804	0.0072
145	2.3876	0.0072
146	2.3948	0.0072
147	2.4019	0.0071
148	2.4090	0.0071
149	2.4161	0.0071
150	2.4232	0.0071
151	2.4302	0.0070
152	2.4372	0.0070
153	2.4442	0.0070
154	2.4511	0.0069
155	2.4580	0.0069
156	2.4649	0.0069
157	2.4718	0.0069
158	2.4787	0.0068
159	2.4855	0.0068
160	2.4923	0.0068
161	2.4991	0.0068
162	2.5058	0.0068
163	2.5125	0.0067
164	2.5192	0.0067
165	2.5259	0.0067
166	2.5326	0.0067
167	2.5392	0.0066
168	2.5458	0.0066
169	2.5524	0.0066
170	2.5590	0.0066
171	2.5656	0.0065
172	2.5721	0.0065
173	2.5786	0.0065
174	2.5851	0.0065
175	2.5915	0.0065
176	2.5980	0.0064
177	2.6044	0.0064
178	2.6108	0.0064
179	2.6172	0.0064
180	2.6235	0.0064
181	2.6299	0.0063
182	2.6362	0.0063
183	2.6425	0.0063
184	2.6488	0.0063
185	2.6551	0.0063
186	2.6613	0.0062
187	2.6675	0.0062
188	2.6737	0.0062
189	2.6799	0.0062

190	2.6861	0.0062
191	2.6922	0.0062
192	2.6984	0.0061
193	2.7045	0.0061
194	2.7106	0.0061
195	2.7167	0.0061
196	2.7227	0.0061
197	2.7288	0.0060
198	2.7348	0.0060
199	2.7408	0.0060
200	2.7468	0.0060
201	2.7528	0.0060
202	2.7587	0.0060
203	2.7647	0.0059
204	2.7706	0.0059
205	2.7765	0.0059
206	2.7824	0.0059
207	2.7883	0.0059
208	2.7942	0.0059
209	2.8000	0.0058
210	2.8058	0.0058
211	2.8117	0.0058
212	2.8175	0.0058
213	2.8232	0.0058
214	2.8290	0.0058
215	2.8348	0.0058
216	2.8405	0.0057
217	2.8462	0.0057
218	2.8519	0.0057
219	2.8576	0.0057
220	2.8633	0.0057
221	2.8690	0.0057
222	2.8746	0.0057
223	2.8802	0.0056
224	2.8859	0.0056
225	2.8915	0.0056
226	2.8971	0.0056
227	2.9027	0.0056
228	2.9082	0.0056
229	2.9138	0.0056
230	2.9193	0.0055
231	2.9248	0.0055
232	2.9303	0.0055
233	2.9358	0.0055
234	2.9413	0.0055
235	2.9468	0.0055
236	2.9523	0.0055
237	2.9577	0.0054
238	2.9631	0.0054
239	2.9685	0.0054
240	2.9740	0.0054
241	2.9793	0.0054
242	2.9847	0.0054
243	2.9901	0.0054
244	2.9955	0.0054
245	3.0008	0.0053
246	3.0061	0.0053
247	3.0114	0.0053
248	3.0168	0.0053
249	3.0220	0.0053
250	3.0273	0.0053

251	3.0326	0.0053
252	3.0379	0.0053
253	3.0431	0.0052
254	3.0483	0.0052
255	3.0536	0.0052
256	3.0588	0.0052
257	3.0640	0.0052
258	3.0692	0.0052
259	3.0744	0.0052
260	3.0795	0.0052
261	3.0847	0.0052
262	3.0898	0.0051
263	3.0950	0.0051
264	3.1001	0.0051
265	3.1052	0.0051
266	3.1103	0.0051
267	3.1154	0.0051
268	3.1205	0.0051
269	3.1255	0.0051
270	3.1306	0.0051
271	3.1356	0.0050
272	3.1407	0.0050
273	3.1457	0.0050
274	3.1507	0.0050
275	3.1557	0.0050
276	3.1607	0.0050
277	3.1657	0.0050
278	3.1707	0.0050
279	3.1756	0.0050
280	3.1806	0.0050
281	3.1855	0.0049
282	3.1905	0.0049
283	3.1954	0.0049
284	3.2003	0.0049
285	3.2052	0.0049
286	3.2101	0.0049
287	3.2150	0.0049
288	3.2199	0.0049

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0049	0.0031	0.0018
2	0.0049	0.0031	0.0018
3	0.0049	0.0031	0.0018
4	0.0049	0.0031	0.0018
5	0.0049	0.0031	0.0018
6	0.0049	0.0031	0.0018
7	0.0050	0.0031	0.0018
8	0.0050	0.0031	0.0018
9	0.0050	0.0031	0.0019
10	0.0050	0.0031	0.0019
11	0.0050	0.0032	0.0019
12	0.0050	0.0032	0.0019
13	0.0051	0.0032	0.0019
14	0.0051	0.0032	0.0019
15	0.0051	0.0032	0.0019
16	0.0051	0.0032	0.0019
17	0.0051	0.0032	0.0019
18	0.0051	0.0032	0.0019

19	0.0052	0.0032	0.0019
20	0.0052	0.0032	0.0019
21	0.0052	0.0033	0.0019
22	0.0052	0.0033	0.0019
23	0.0052	0.0033	0.0019
24	0.0052	0.0033	0.0019
25	0.0053	0.0033	0.0020
26	0.0053	0.0033	0.0020
27	0.0053	0.0033	0.0020
28	0.0053	0.0033	0.0020
29	0.0053	0.0034	0.0020
30	0.0053	0.0034	0.0020
31	0.0054	0.0034	0.0020
32	0.0054	0.0034	0.0020
33	0.0054	0.0034	0.0020
34	0.0054	0.0034	0.0020
35	0.0054	0.0034	0.0020
36	0.0055	0.0034	0.0020
37	0.0055	0.0034	0.0020
38	0.0055	0.0035	0.0020
39	0.0055	0.0035	0.0021
40	0.0055	0.0035	0.0021
41	0.0056	0.0035	0.0021
42	0.0056	0.0035	0.0021
43	0.0056	0.0035	0.0021
44	0.0056	0.0035	0.0021
45	0.0057	0.0036	0.0021
46	0.0057	0.0036	0.0021
47	0.0057	0.0036	0.0021
48	0.0057	0.0036	0.0021
49	0.0057	0.0036	0.0021
50	0.0058	0.0036	0.0021
51	0.0058	0.0036	0.0021
52	0.0058	0.0036	0.0022
53	0.0058	0.0037	0.0022
54	0.0058	0.0037	0.0022
55	0.0059	0.0037	0.0022
56	0.0059	0.0037	0.0022
57	0.0059	0.0037	0.0022
58	0.0059	0.0037	0.0022
59	0.0060	0.0038	0.0022
60	0.0060	0.0038	0.0022
61	0.0060	0.0038	0.0022
62	0.0060	0.0038	0.0022
63	0.0061	0.0038	0.0023
64	0.0061	0.0038	0.0023
65	0.0061	0.0039	0.0023
66	0.0062	0.0039	0.0023
67	0.0062	0.0039	0.0023
68	0.0062	0.0039	0.0023
69	0.0062	0.0039	0.0023
70	0.0063	0.0039	0.0023
71	0.0063	0.0040	0.0023
72	0.0063	0.0040	0.0023
73	0.0064	0.0040	0.0024
74	0.0064	0.0040	0.0024
75	0.0064	0.0040	0.0024
76	0.0064	0.0041	0.0024
77	0.0065	0.0041	0.0024
78	0.0065	0.0041	0.0024
79	0.0065	0.0041	0.0024

80	0.0066	0.0041	0.0024
81	0.0066	0.0042	0.0025
82	0.0066	0.0042	0.0025
83	0.0067	0.0042	0.0025
84	0.0067	0.0042	0.0025
85	0.0068	0.0042	0.0025
86	0.0068	0.0043	0.0025
87	0.0068	0.0043	0.0025
88	0.0068	0.0043	0.0025
89	0.0069	0.0043	0.0026
90	0.0069	0.0044	0.0026
91	0.0070	0.0044	0.0026
92	0.0070	0.0044	0.0026
93	0.0071	0.0044	0.0026
94	0.0071	0.0045	0.0026
95	0.0071	0.0045	0.0026
96	0.0072	0.0045	0.0027
97	0.0072	0.0045	0.0027
98	0.0072	0.0046	0.0027
99	0.0073	0.0046	0.0027
100	0.0073	0.0046	0.0027
101	0.0074	0.0047	0.0027
102	0.0074	0.0047	0.0028
103	0.0075	0.0047	0.0028
104	0.0075	0.0047	0.0028
105	0.0076	0.0048	0.0028
106	0.0076	0.0048	0.0028
107	0.0077	0.0048	0.0029
108	0.0077	0.0049	0.0029
109	0.0078	0.0049	0.0029
110	0.0078	0.0049	0.0029
111	0.0079	0.0050	0.0029
112	0.0079	0.0050	0.0029
113	0.0080	0.0050	0.0030
114	0.0080	0.0051	0.0030
115	0.0081	0.0051	0.0030
116	0.0082	0.0051	0.0030
117	0.0082	0.0052	0.0031
118	0.0083	0.0052	0.0031
119	0.0084	0.0053	0.0031
120	0.0084	0.0053	0.0031
121	0.0085	0.0053	0.0032
122	0.0085	0.0054	0.0032
123	0.0086	0.0054	0.0032
124	0.0087	0.0055	0.0032
125	0.0088	0.0055	0.0033
126	0.0088	0.0055	0.0033
127	0.0089	0.0056	0.0033
128	0.0090	0.0056	0.0033
129	0.0091	0.0057	0.0034
130	0.0091	0.0057	0.0034
131	0.0092	0.0058	0.0034
132	0.0093	0.0059	0.0035
133	0.0094	0.0059	0.0035
134	0.0095	0.0060	0.0035
135	0.0096	0.0060	0.0036
136	0.0097	0.0061	0.0036
137	0.0098	0.0062	0.0036
138	0.0099	0.0062	0.0037
139	0.0100	0.0063	0.0037
140	0.0101	0.0063	0.0037

141	0.0102	0.0064	0.0038
142	0.0103	0.0065	0.0038
143	0.0104	0.0066	0.0039
144	0.0105	0.0066	0.0039
145	0.0129	0.0081	0.0048
146	0.0130	0.0082	0.0048
147	0.0132	0.0083	0.0049
148	0.0133	0.0084	0.0049
149	0.0135	0.0085	0.0050
150	0.0136	0.0085	0.0050
151	0.0138	0.0087	0.0051
152	0.0139	0.0087	0.0052
153	0.0141	0.0089	0.0052
154	0.0142	0.0089	0.0053
155	0.0145	0.0091	0.0054
156	0.0146	0.0092	0.0054
157	0.0148	0.0093	0.0055
158	0.0150	0.0094	0.0056
159	0.0152	0.0096	0.0057
160	0.0154	0.0097	0.0057
161	0.0157	0.0099	0.0058
162	0.0159	0.0100	0.0059
163	0.0162	0.0102	0.0060
164	0.0164	0.0103	0.0061
165	0.0167	0.0105	0.0062
166	0.0169	0.0106	0.0063
167	0.0173	0.0109	0.0064
168	0.0176	0.0110	0.0065
169	0.0180	0.0113	0.0067
170	0.0183	0.0115	0.0068
171	0.0188	0.0118	0.0070
172	0.0191	0.0120	0.0071
173	0.0197	0.0124	0.0073
174	0.0200	0.0126	0.0074
175	0.0207	0.0130	0.0077
176	0.0211	0.0133	0.0078
177	0.0219	0.0138	0.0081
178	0.0224	0.0141	0.0083
179	0.0234	0.0147	0.0087
180	0.0239	0.0151	0.0089
181	0.0252	0.0158	0.0093
182	0.0259	0.0163	0.0096
183	0.0275	0.0173	0.0102
184	0.0285	0.0179	0.0106
185	0.0234	0.0147	0.0087
186	0.0247	0.0155	0.0092
187	0.0280	0.0176	0.0104
188	0.0302	0.0190	0.0112
189	0.0364	0.0229	0.0135
190	0.0411	0.0258	0.0153
191	0.0587	0.0369	0.0218
192	0.0808	0.0489	0.0319
193	0.2528	0.0489	0.2039
194	0.0478	0.0301	0.0178
195	0.0329	0.0207	0.0122
196	0.0262	0.0165	0.0097
197	0.0295	0.0186	0.0110
198	0.0267	0.0168	0.0099
199	0.0245	0.0154	0.0091
200	0.0229	0.0144	0.0085
201	0.0215	0.0135	0.0080

202	0.0204	0.0128	0.0076
203	0.0194	0.0122	0.0072
204	0.0185	0.0117	0.0069
205	0.0178	0.0112	0.0066
206	0.0171	0.0108	0.0064
207	0.0165	0.0104	0.0061
208	0.0160	0.0101	0.0059
209	0.0155	0.0098	0.0058
210	0.0151	0.0095	0.0056
211	0.0147	0.0093	0.0055
212	0.0143	0.0090	0.0053
213	0.0140	0.0088	0.0052
214	0.0137	0.0086	0.0051
215	0.0134	0.0084	0.0050
216	0.0131	0.0082	0.0049
217	0.0106	0.0067	0.0039
218	0.0104	0.0065	0.0038
219	0.0101	0.0064	0.0038
220	0.0099	0.0062	0.0037
221	0.0097	0.0061	0.0036
222	0.0095	0.0060	0.0035
223	0.0094	0.0059	0.0035
224	0.0092	0.0058	0.0034
225	0.0090	0.0057	0.0034
226	0.0089	0.0056	0.0033
227	0.0087	0.0055	0.0032
228	0.0086	0.0054	0.0032
229	0.0085	0.0053	0.0031
230	0.0083	0.0052	0.0031
231	0.0082	0.0052	0.0030
232	0.0081	0.0051	0.0030
233	0.0080	0.0050	0.0030
234	0.0079	0.0049	0.0029
235	0.0078	0.0049	0.0029
236	0.0076	0.0048	0.0028
237	0.0076	0.0047	0.0028
238	0.0075	0.0047	0.0028
239	0.0074	0.0046	0.0027
240	0.0073	0.0046	0.0027
241	0.0072	0.0045	0.0027
242	0.0071	0.0045	0.0026
243	0.0070	0.0044	0.0026
244	0.0069	0.0044	0.0026
245	0.0069	0.0043	0.0026
246	0.0068	0.0043	0.0025
247	0.0067	0.0042	0.0025
248	0.0067	0.0042	0.0025
249	0.0066	0.0041	0.0024
250	0.0065	0.0041	0.0024
251	0.0065	0.0041	0.0024
252	0.0064	0.0040	0.0024
253	0.0063	0.0040	0.0024
254	0.0063	0.0040	0.0023
255	0.0062	0.0039	0.0023
256	0.0062	0.0039	0.0023
257	0.0061	0.0038	0.0023
258	0.0061	0.0038	0.0022
259	0.0060	0.0038	0.0022
260	0.0060	0.0037	0.0022
261	0.0059	0.0037	0.0022
262	0.0059	0.0037	0.0022

263	0.0058	0.0037	0.0022
264	0.0058	0.0036	0.0021
265	0.0057	0.0036	0.0021
266	0.0057	0.0036	0.0021
267	0.0056	0.0035	0.0021
268	0.0056	0.0035	0.0021
269	0.0056	0.0035	0.0021
270	0.0055	0.0035	0.0020
271	0.0055	0.0034	0.0020
272	0.0054	0.0034	0.0020
273	0.0054	0.0034	0.0020
274	0.0054	0.0034	0.0020
275	0.0053	0.0033	0.0020
276	0.0053	0.0033	0.0020
277	0.0052	0.0033	0.0019
278	0.0052	0.0033	0.0019
279	0.0052	0.0033	0.0019
280	0.0051	0.0032	0.0019
281	0.0051	0.0032	0.0019
282	0.0051	0.0032	0.0019
283	0.0050	0.0032	0.0019
284	0.0050	0.0032	0.0019
285	0.0050	0.0031	0.0019
286	0.0050	0.0031	0.0018
287	0.0049	0.0031	0.0018
288	0.0049	0.0031	0.0018

Total soil rain loss = 1.91(In)
Total effective rainfall = 1.31(In)
Peak flow rate in flood hydrograph = 30.31(CFS)

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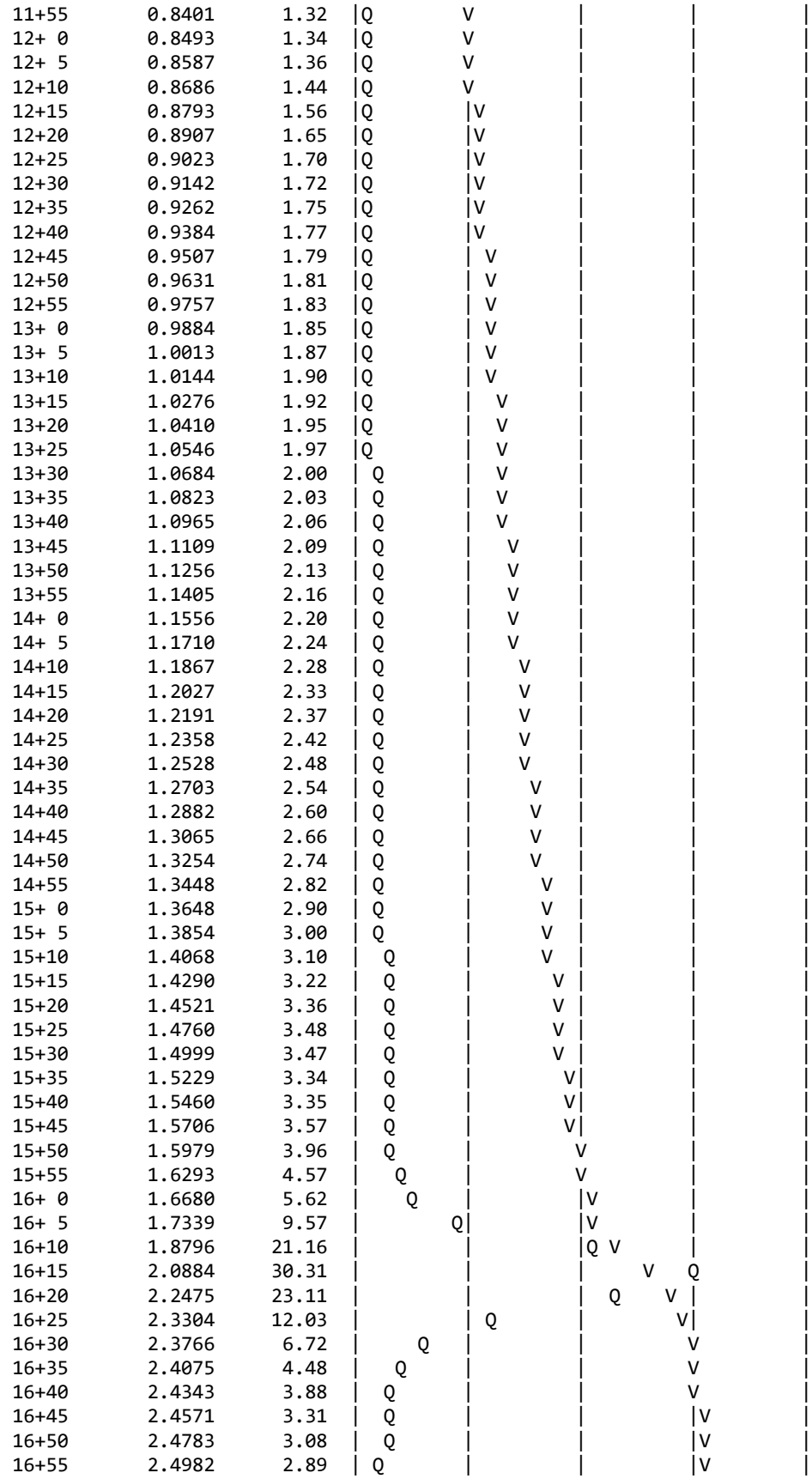
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0002	0.02	Q	|	|	|	|
0+10	0.0012	0.15	Q	|	|	|	|
0+15	0.0037	0.37	Q	|	|	|	|
0+20	0.0074	0.54	Q	|	|	|	|
0+25	0.0116	0.60	Q	|	|	|	|
0+30	0.0159	0.63	Q	|	|	|	|
0+35	0.0203	0.64	Q	|	|	|	|
0+40	0.0248	0.64	Q	|	|	|	|
0+45	0.0292	0.65	Q	|	|	|	|
0+50	0.0337	0.65	Q	|	|	|	|
0+55	0.0382	0.65	Q	|	|	|	|
1+ 0	0.0426	0.65	Q	|	|	|	|
1+ 5	0.0471	0.65	Q	|	|	|	|
1+10	0.0517	0.66	Q	|	|	|	|
1+15	0.0562	0.66	Q	|	|	|	|
1+20	0.0607	0.66	Q	|	|	|	|
1+25	0.0653	0.66	Q	|	|	|	|
1+30	0.0699	0.66	Q	|	|	|	|
1+35	0.0745	0.67	Q	|	|	|	|
1+40	0.0791	0.67	QV	|	|	|	|

1+45	0.0837	0.67	QV	|	|	|	|
1+50	0.0883	0.67	QV	|	|	|	|
1+55	0.0930	0.67	QV	|	|	|	|
2+ 0	0.0976	0.68	QV	|	|	|	|
2+ 5	0.1023	0.68	QV	|	|	|	|
2+10	0.1070	0.68	QV	|	|	|	|
2+15	0.1117	0.68	QV	|	|	|	|
2+20	0.1164	0.69	QV	|	|	|	|
2+25	0.1212	0.69	QV	|	|	|	|
2+30	0.1259	0.69	QV	|	|	|	|
2+35	0.1307	0.69	QV	|	|	|	|
2+40	0.1355	0.70	QV	|	|	|	|
2+45	0.1403	0.70	QV	|	|	|	|
2+50	0.1451	0.70	QV	|	|	|	|
2+55	0.1500	0.70	QV	|	|	|	|
3+ 0	0.1548	0.71	QV	|	|	|	|
3+ 5	0.1597	0.71	Q V	|	|	|	|
3+10	0.1646	0.71	Q V	|	|	|	|
3+15	0.1695	0.71	Q V	|	|	|	|
3+20	0.1744	0.72	Q V	|	|	|	|
3+25	0.1794	0.72	Q V	|	|	|	|
3+30	0.1843	0.72	Q V	|	|	|	|
3+35	0.1893	0.72	Q V	|	|	|	|
3+40	0.1943	0.73	Q V	|	|	|	|
3+45	0.1994	0.73	Q V	|	|	|	|
3+50	0.2044	0.73	Q V	|	|	|	|
3+55	0.2095	0.73	Q V	|	|	|	|
4+ 0	0.2145	0.74	Q V	|	|	|	|
4+ 5	0.2196	0.74	Q V	|	|	|	|
4+10	0.2247	0.74	Q V	|	|	|	|
4+15	0.2299	0.75	Q V	|	|	|	|
4+20	0.2350	0.75	Q V	|	|	|	|
4+25	0.2402	0.75	Q V	|	|	|	|
4+30	0.2454	0.75	Q V	|	|	|	|
4+35	0.2506	0.76	Q V	|	|	|	|
4+40	0.2559	0.76	Q V	|	|	|	|
4+45	0.2611	0.76	Q V	|	|	|	|
4+50	0.2664	0.77	Q V	|	|	|	|
4+55	0.2717	0.77	Q V	|	|	|	|
5+ 0	0.2771	0.77	Q V	|	|	|	|
5+ 5	0.2824	0.78	Q V	|	|	|	|
5+10	0.2878	0.78	Q V	|	|	|	|
5+15	0.2932	0.78	Q V	|	|	|	|
5+20	0.2986	0.79	Q V	|	|	|	|
5+25	0.3040	0.79	Q V	|	|	|	|
5+30	0.3095	0.79	Q V	|	|	|	|
5+35	0.3150	0.80	Q V	|	|	|	|
5+40	0.3205	0.80	Q V	|	|	|	|
5+45	0.3260	0.80	Q V	|	|	|	|
5+50	0.3316	0.81	Q V	|	|	|	|
5+55	0.3372	0.81	Q V	|	|	|	|
6+ 0	0.3428	0.82	Q V	|	|	|	|
6+ 5	0.3485	0.82	Q V	|	|	|	|
6+10	0.3541	0.82	Q V	|	|	|	|
6+15	0.3598	0.83	Q V	|	|	|	|
6+20	0.3655	0.83	Q V	|	|	|	|
6+25	0.3713	0.83	Q V	|	|	|	|
6+30	0.3771	0.84	Q V	|	|	|	|
6+35	0.3829	0.84	Q V	|	|	|	|
6+40	0.3887	0.85	Q V	|	|	|	|
6+45	0.3945	0.85	Q V	|	|	|	|

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 6+50       0.4004      0.86  Q    V    |         |         |         |
 6+55       0.4064      0.86  Q    V    |         |         |         |
 7+ 0       0.4123      0.86  Q    V    |         |         |         |
 7+ 5       0.4183      0.87  Q    V    |         |         |         |
 7+10       0.4243      0.87  Q    V    |         |         |         |
 7+15       0.4303      0.88  Q    V    |         |         |         |
 7+20       0.4364      0.88  Q    V    |         |         |         |
 7+25       0.4425      0.89  Q    V    |         |         |         |
 7+30       0.4487      0.89  Q    V    |         |         |         |
 7+35       0.4548      0.90  Q    V    |         |         |         |
 7+40       0.4610      0.90  Q    V    |         |         |         |
 7+45       0.4673      0.91  Q    V    |         |         |         |
 7+50       0.4735      0.91  Q    V    |         |         |         |
 7+55       0.4798      0.92  Q     V   |         |         |         |
 8+ 0       0.4862      0.92  Q     V   |         |         |         |
 8+ 5       0.4926      0.93  Q     V   |         |         |         |
 8+10       0.4990      0.93  Q     V   |         |         |         |
 8+15       0.5054      0.94  Q     V   |         |         |         |
 8+20       0.5119      0.94  Q     V   |         |         |         |
 8+25       0.5185      0.95  Q     V   |         |         |         |
 8+30       0.5250      0.95  Q     V   |         |         |         |
 8+35       0.5317      0.96  Q     V   |         |         |         |
 8+40       0.5383      0.97  Q     V   |         |         |         |
 8+45       0.5450      0.97  Q     V   |         |         |         |
 8+50       0.5517      0.98  Q     V   |         |         |         |
 8+55       0.5585      0.98  Q      V  |         |         |         |
 9+ 0       0.5653      0.99  Q      V  |         |         |         |
 9+ 5       0.5722      1.00  Q      V  |         |         |         |
 9+10       0.5791      1.00  |Q     V  |         |         |         |
 9+15       0.5861      1.01  |Q     V  |         |         |         |
 9+20       0.5931      1.02  |Q     V  |         |         |         |
 9+25       0.6001      1.02  |Q     V  |         |         |         |
 9+30       0.6073      1.03  |Q     V  |         |         |         |
 9+35       0.6144      1.04  |Q     V  |         |         |         |
 9+40       0.6216      1.05  |Q     V  |         |         |         |
 9+45       0.6289      1.05  |Q     V  |         |         |         |
 9+50       0.6362      1.06  |Q      V |         |         |         |
 9+55       0.6435      1.07  |Q      V |         |         |         |
10+ 0       0.6510      1.08  |Q      V |         |         |         |
10+ 5       0.6584      1.09  |Q      V |         |         |         |
10+10       0.6660      1.09  |Q      V |         |         |         |
10+15       0.6736      1.10  |Q      V |         |         |         |
10+20       0.6812      1.11  |Q      V |         |         |         |
10+25       0.6889      1.12  |Q      V |         |         |         |
10+30       0.6967      1.13  |Q      V |         |         |         |
10+35       0.7045      1.14  |Q      V |         |         |         |
10+40       0.7124      1.15  |Q       V|         |         |         |
10+45       0.7204      1.16  |Q       V|         |         |         |
10+50       0.7284      1.17  |Q       V|         |         |         |
10+55       0.7366      1.18  |Q       V|         |         |         |
11+ 0       0.7447      1.19  |Q       V|         |         |         |
11+ 5       0.7530      1.20  |Q       V|         |         |         |
11+10       0.7613      1.21  |Q       V|         |         |         |
11+15       0.7697      1.22  |Q       V|         |         |         |
11+20       0.7782      1.23  |Q       V|         |         |         |
11+25       0.7868      1.24  |Q       V|         |         |         |
11+30       0.7955      1.26  |Q        V         |         |         |
11+35       0.8042      1.27  |Q        V         |         |         |
11+40       0.8130      1.28  |Q        V         |         |         |
11+45       0.8220      1.30  |Q        V         |         |         |
11+50       0.8310      1.31  |Q        V         |         |         |
```


11+55 0.8401 1.32
12+ 0 0.8493 1.34
12+ 5 0.8587 1.36
12+10 0.8686 1.44
12+15 0.8793 1.56
12+20 0.8907 1.65
12+25 0.9023 1.70
12+30 0.9142 1.72
12+35 0.9262 1.75
12+40 0.9384 1.77
12+45 0.9507 1.79
12+50 0.9631 1.81
12+55 0.9757 1.83
13+ 0 0.9884 1.85
13+ 5 1.0013 1.87
13+10 1.0144 1.90
13+15 1.0276 1.92
13+20 1.0410 1.95
13+25 1.0546 1.97
13+30 1.0684 2.00
13+35 1.0823 2.03
13+40 1.0965 2.06
13+45 1.1109 2.09
13+50 1.1256 2.13
13+55 1.1405 2.16
14+ 0 1.1556 2.20
14+ 5 1.1710 2.24
14+10 1.1867 2.28
14+15 1.2027 2.33
14+20 1.2191 2.37
14+25 1.2358 2.42
14+30 1.2528 2.48
14+35 1.2703 2.54
14+40 1.2882 2.60
14+45 1.3065 2.66
14+50 1.3254 2.74
14+55 1.3448 2.82
15+ 0 1.3648 2.90
15+ 5 1.3854 3.00
15+10 1.4068 3.10
15+15 1.4290 3.22
15+20 1.4521 3.36
15+25 1.4760 3.48
15+30 1.4999 3.47
15+35 1.5229 3.34
15+40 1.5460 3.35
15+45 1.5706 3.57
15+50 1.5979 3.96
15+55 1.6293 4.57
16+ 0 1.6680 5.62
16+ 5 1.7339 9.57
16+10 1.8796 21.16
16+15 2.0884 30.31
16+20 2.2475 23.11
16+25 2.3304 12.03
16+30 2.3766 6.72
16+35 2.4075 4.48
16+40 2.4343 3.88
16+45 2.4571 3.31
16+50 2.4783 3.08
16+55 2.4982 2.89

17+ 0	2.5170	2.73	Q			V
17+ 5	2.5348	2.59	Q			V
17+10	2.5518	2.47	Q			V
17+15	2.5680	2.36	Q			V
17+20	2.5837	2.27	Q			V
17+25	2.5987	2.19	Q			V
17+30	2.6133	2.12	Q			V
17+35	2.6274	2.05	Q			V
17+40	2.6412	1.99	Q			V
17+45	2.6545	1.94	Q			V
17+50	2.6675	1.89	Q			V
17+55	2.6802	1.84	Q			V
18+ 0	2.6926	1.80	Q			V
18+ 5	2.7047	1.75	Q			V
18+10	2.7161	1.65	Q			V
18+15	2.7265	1.52	Q			V
18+20	2.7362	1.41	Q			V
18+25	2.7455	1.35	Q			V
18+30	2.7545	1.31	Q			V
18+35	2.7634	1.28	Q			V
18+40	2.7720	1.25	Q			V
18+45	2.7804	1.23	Q			V
18+50	2.7888	1.21	Q			V
18+55	2.7969	1.18	Q			V
19+ 0	2.8049	1.16	Q			V
19+ 5	2.8128	1.14	Q			V
19+10	2.8206	1.13	Q			V
19+15	2.8282	1.11	Q			V
19+20	2.8357	1.09	Q			V
19+25	2.8431	1.07	Q			V
19+30	2.8504	1.06	Q			V
19+35	2.8576	1.04	Q			V
19+40	2.8647	1.03	Q			V
19+45	2.8717	1.02	Q			V
19+50	2.8786	1.00	Q			V
19+55	2.8854	0.99	Q			V
20+ 0	2.8921	0.98	Q			V
20+ 5	2.8987	0.96	Q			V
20+10	2.9053	0.95	Q			V
20+15	2.9118	0.94	Q			V
20+20	2.9182	0.93	Q			V
20+25	2.9245	0.92	Q			V
20+30	2.9308	0.91	Q			V
20+35	2.9370	0.90	Q			V
20+40	2.9431	0.89	Q			V
20+45	2.9492	0.88	Q			V
20+50	2.9552	0.87	Q			V
20+55	2.9611	0.86	Q			V
21+ 0	2.9670	0.85	Q			V
21+ 5	2.9728	0.85	Q			V
21+10	2.9786	0.84	Q			V
21+15	2.9843	0.83	Q			V
21+20	2.9899	0.82	Q			V
21+25	2.9955	0.81	Q			V
21+30	3.0011	0.81	Q			V
21+35	3.0066	0.80	Q			V
21+40	3.0121	0.79	Q			V
21+45	3.0175	0.79	Q			V
21+50	3.0228	0.78	Q			V
21+55	3.0282	0.77	Q			V
22+ 0	3.0334	0.77	Q			V

22+ 5	3.0387	0.76	Q	|	|	|	V |
22+10	3.0439	0.75	Q	|	|	|	V |
22+15	3.0490	0.75	Q	|	|	|	V |
22+20	3.0541	0.74	Q	|	|	|	V |
22+25	3.0592	0.74	Q	|	|	|	V |
22+30	3.0642	0.73	Q	|	|	|	V |
22+35	3.0692	0.73	Q	|	|	|	V |
22+40	3.0742	0.72	Q	|	|	|	V |
22+45	3.0791	0.71	Q	|	|	|	V |
22+50	3.0840	0.71	Q	|	|	|	V|
22+55	3.0888	0.70	Q	|	|	|	V|
23+ 0	3.0937	0.70	Q	|	|	|	V|
23+ 5	3.0984	0.69	Q	|	|	|	V|
23+10	3.1032	0.69	Q	|	|	|	V|
23+15	3.1079	0.69	Q	|	|	|	V|
23+20	3.1126	0.68	Q	|	|	|	V|
23+25	3.1173	0.68	Q	|	|	|	V|
23+30	3.1219	0.67	Q	|	|	|	V|
23+35	3.1265	0.67	Q	|	|	|	V|
23+40	3.1311	0.66	Q	|	|	|	V|
23+45	3.1356	0.66	Q	|	|	|	V|
23+50	3.1401	0.66	Q	|	|	|	V|
23+55	3.1446	0.65	Q	|	|	|	V|
24+ 0	3.1490	0.65	Q	|	|	|	V|

U n i t H y d r o g r a p h A n a l y s i s

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Study date 01/23/23

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San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6277

JOB NO 2022-318
11115 HEMLOCK AVENUE
10 YEAR, UNIT HYDROGRAPH
PRE-CONDITION, AREA B

Storm Event Year = 10

Antecedent Moisture Condition = 2

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)	
8.22	1	0.68	Rainfall data for year 5
8.22	6	1.76	Rainfall data for year 5
8.22	24	3.22	Rainfall data for year 5

Note: Per City of Fontana Master Storm Drain Plan, the 10-year pre-condition flow rates shall be calculated using 5-year rainfall

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******** Area-averaged max loss rate, Fm ********

SCS curve No.(AMCII)	SCS curve NO.(AMC 2)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
32.0	32.0	8.22	1.000	0.978	0.900	0.880

Area-averaged adjusted loss rate Fm (In/Hr) = 0.880

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
7.40	0.900	32.0	32.0	16.10	0.000
0.82	0.100	98.0	98.0	0.20	0.928

Area-averaged catchment yield fraction, Y = 0.093
Area-averaged low loss fraction, Yb = 0.907
User entry of time of concentration = 0.303 (hours)
++
Watershed area = 8.22(Ac.)
Catchment Lag time = 0.243 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 34.3614
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.880(In/Hr)
Average low loss rate fraction (Yb) = 0.907 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.253(In)
Computed peak 30-minute rainfall = 0.518(In)
Specified peak 1-hour rainfall = 0.684(In)
Computed peak 3-hour rainfall = 1.221(In)
Specified peak 6-hour rainfall = 1.760(In)
Specified peak 24-hour rainfall = 3.220(In)

Rainfall depth area reduction factors:
Using a total area of 8.22(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.253(In)
30-minute factor = 1.000 Adjusted rainfall = 0.518(In)
1-hour factor = 1.000 Adjusted rainfall = 0.684(In)
3-hour factor = 1.000 Adjusted rainfall = 1.221(In)
6-hour factor = 1.000 Adjusted rainfall = 1.760(In)
24-hour factor = 1.000 Adjusted rainfall = 3.220(In)

U n i t H y d r o g r a p h
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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
	(K = 99.41 (CFS))	
1	2.380	2.366
2	14.565	12.114
3	37.668	22.967
4	66.447	28.609
5	84.161	17.610
6	92.859	8.646
7	97.015	4.132
8	98.439	1.416
9	99.057	0.615
10	99.673	0.612
11	100.000	0.325

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.2531	0.2531
2	0.3339	0.0809
3	0.3927	0.0588

4	0.4406	0.0479
5	0.4817	0.0411
6	0.5182	0.0364
7	0.5511	0.0330
8	0.5814	0.0302
9	0.6094	0.0280
10	0.6356	0.0262
11	0.6603	0.0247
12	0.6837	0.0234
13	0.7132	0.0295
14	0.7417	0.0284
15	0.7692	0.0275
16	0.7958	0.0267
17	0.8217	0.0259
18	0.8469	0.0252
19	0.8714	0.0245
20	0.8953	0.0239
21	0.9187	0.0234
22	0.9415	0.0228
23	0.9639	0.0223
24	0.9858	0.0219
25	1.0072	0.0215
26	1.0283	0.0211
27	1.0490	0.0207
28	1.0693	0.0203
29	1.0893	0.0200
30	1.1090	0.0197
31	1.1283	0.0194
32	1.1474	0.0191
33	1.1662	0.0188
34	1.1847	0.0185
35	1.2030	0.0183
36	1.2210	0.0180
37	1.2387	0.0178
38	1.2563	0.0175
39	1.2736	0.0173
40	1.2908	0.0171
41	1.3077	0.0169
42	1.3244	0.0167
43	1.3409	0.0165
44	1.3573	0.0164
45	1.3735	0.0162
46	1.3895	0.0160
47	1.4054	0.0159
48	1.4211	0.0157
49	1.4366	0.0155
50	1.4520	0.0154
51	1.4672	0.0152
52	1.4823	0.0151
53	1.4973	0.0150
54	1.5122	0.0148
55	1.5269	0.0147
56	1.5414	0.0146
57	1.5559	0.0145
58	1.5702	0.0143
59	1.5845	0.0142
60	1.5986	0.0141
61	1.6126	0.0140
62	1.6265	0.0139
63	1.6403	0.0138
64	1.6539	0.0137

65	1.6675	0.0136
66	1.6810	0.0135
67	1.6944	0.0134
68	1.7077	0.0133
69	1.7209	0.0132
70	1.7340	0.0131
71	1.7470	0.0130
72	1.7600	0.0129
73	1.7706	0.0106
74	1.7811	0.0105
75	1.7915	0.0104
76	1.8019	0.0104
77	1.8122	0.0103
78	1.8224	0.0102
79	1.8326	0.0101
80	1.8426	0.0101
81	1.8526	0.0100
82	1.8626	0.0099
83	1.8724	0.0099
84	1.8822	0.0098
85	1.8920	0.0097
86	1.9016	0.0097
87	1.9112	0.0096
88	1.9208	0.0095
89	1.9303	0.0095
90	1.9397	0.0094
91	1.9490	0.0094
92	1.9583	0.0093
93	1.9676	0.0092
94	1.9768	0.0092
95	1.9859	0.0091
96	1.9950	0.0091
97	2.0040	0.0090
98	2.0130	0.0090
99	2.0219	0.0089
100	2.0308	0.0089
101	2.0396	0.0088
102	2.0484	0.0088
103	2.0571	0.0087
104	2.0658	0.0087
105	2.0744	0.0086
106	2.0830	0.0086
107	2.0916	0.0085
108	2.1001	0.0085
109	2.1085	0.0085
110	2.1169	0.0084
111	2.1253	0.0084
112	2.1336	0.0083
113	2.1419	0.0083
114	2.1501	0.0082
115	2.1583	0.0082
116	2.1665	0.0082
117	2.1746	0.0081
118	2.1827	0.0081
119	2.1907	0.0080
120	2.1987	0.0080
121	2.2067	0.0080
122	2.2146	0.0079
123	2.2225	0.0079
124	2.2304	0.0079
125	2.2382	0.0078

126	2.2460	0.0078
127	2.2537	0.0078
128	2.2614	0.0077
129	2.2691	0.0077
130	2.2768	0.0076
131	2.2844	0.0076
132	2.2920	0.0076
133	2.2995	0.0076
134	2.3070	0.0075
135	2.3145	0.0075
136	2.3220	0.0075
137	2.3294	0.0074
138	2.3368	0.0074
139	2.3442	0.0074
140	2.3515	0.0073
141	2.3588	0.0073
142	2.3661	0.0073
143	2.3733	0.0072
144	2.3805	0.0072
145	2.3877	0.0072
146	2.3949	0.0072
147	2.4020	0.0071
148	2.4091	0.0071
149	2.4162	0.0071
150	2.4233	0.0071
151	2.4303	0.0070
152	2.4373	0.0070
153	2.4443	0.0070
154	2.4512	0.0069
155	2.4581	0.0069
156	2.4650	0.0069
157	2.4719	0.0069
158	2.4788	0.0068
159	2.4856	0.0068
160	2.4924	0.0068
161	2.4992	0.0068
162	2.5059	0.0068
163	2.5126	0.0067
164	2.5193	0.0067
165	2.5260	0.0067
166	2.5327	0.0067
167	2.5393	0.0066
168	2.5459	0.0066
169	2.5525	0.0066
170	2.5591	0.0066
171	2.5657	0.0065
172	2.5722	0.0065
173	2.5787	0.0065
174	2.5852	0.0065
175	2.5916	0.0065
176	2.5981	0.0064
177	2.6045	0.0064
178	2.6109	0.0064
179	2.6173	0.0064
180	2.6236	0.0064
181	2.6300	0.0063
182	2.6363	0.0063
183	2.6426	0.0063
184	2.6489	0.0063
185	2.6552	0.0063
186	2.6614	0.0062

187	2.6676	0.0062
188	2.6738	0.0062
189	2.6800	0.0062
190	2.6862	0.0062
191	2.6923	0.0062
192	2.6985	0.0061
193	2.7046	0.0061
194	2.7107	0.0061
195	2.7168	0.0061
196	2.7228	0.0061
197	2.7289	0.0060
198	2.7349	0.0060
199	2.7409	0.0060
200	2.7469	0.0060
201	2.7529	0.0060
202	2.7588	0.0060
203	2.7648	0.0059
204	2.7707	0.0059
205	2.7766	0.0059
206	2.7825	0.0059
207	2.7884	0.0059
208	2.7943	0.0059
209	2.8001	0.0058
210	2.8059	0.0058
211	2.8118	0.0058
212	2.8175	0.0058
213	2.8233	0.0058
214	2.8291	0.0058
215	2.8349	0.0058
216	2.8406	0.0057
217	2.8463	0.0057
218	2.8520	0.0057
219	2.8577	0.0057
220	2.8634	0.0057
221	2.8691	0.0057
222	2.8747	0.0056
223	2.8803	0.0056
224	2.8860	0.0056
225	2.8916	0.0056
226	2.8972	0.0056
227	2.9027	0.0056
228	2.9083	0.0056
229	2.9139	0.0056
230	2.9194	0.0055
231	2.9249	0.0055
232	2.9304	0.0055
233	2.9359	0.0055
234	2.9414	0.0055
235	2.9469	0.0055
236	2.9523	0.0055
237	2.9578	0.0054
238	2.9632	0.0054
239	2.9686	0.0054
240	2.9740	0.0054
241	2.9794	0.0054
242	2.9848	0.0054
243	2.9902	0.0054
244	2.9955	0.0054
245	3.0009	0.0053
246	3.0062	0.0053
247	3.0115	0.0053

248	3.0168	0.0053
249	3.0221	0.0053
250	3.0274	0.0053
251	3.0327	0.0053
252	3.0380	0.0053
253	3.0432	0.0052
254	3.0484	0.0052
255	3.0537	0.0052
256	3.0589	0.0052
257	3.0641	0.0052
258	3.0693	0.0052
259	3.0744	0.0052
260	3.0796	0.0052
261	3.0848	0.0052
262	3.0899	0.0051
263	3.0950	0.0051
264	3.1002	0.0051
265	3.1053	0.0051
266	3.1104	0.0051
267	3.1155	0.0051
268	3.1205	0.0051
269	3.1256	0.0051
270	3.1307	0.0051
271	3.1357	0.0050
272	3.1408	0.0050
273	3.1458	0.0050
274	3.1508	0.0050
275	3.1558	0.0050
276	3.1608	0.0050
277	3.1658	0.0050
278	3.1708	0.0050
279	3.1757	0.0050
280	3.1807	0.0050
281	3.1856	0.0049
282	3.1906	0.0049
283	3.1955	0.0049
284	3.2004	0.0049
285	3.2053	0.0049
286	3.2102	0.0049
287	3.2151	0.0049
288	3.2200	0.0049

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0049	0.0044	0.0005
2	0.0049	0.0044	0.0005
3	0.0049	0.0045	0.0005
4	0.0049	0.0045	0.0005
5	0.0049	0.0045	0.0005
6	0.0049	0.0045	0.0005
7	0.0050	0.0045	0.0005
8	0.0050	0.0045	0.0005
9	0.0050	0.0045	0.0005
10	0.0050	0.0045	0.0005
11	0.0050	0.0046	0.0005
12	0.0050	0.0046	0.0005
13	0.0051	0.0046	0.0005
14	0.0051	0.0046	0.0005
15	0.0051	0.0046	0.0005

16	0.0051	0.0046	0.0005
17	0.0051	0.0046	0.0005
18	0.0051	0.0047	0.0005
19	0.0052	0.0047	0.0005
20	0.0052	0.0047	0.0005
21	0.0052	0.0047	0.0005
22	0.0052	0.0047	0.0005
23	0.0052	0.0047	0.0005
24	0.0052	0.0047	0.0005
25	0.0053	0.0048	0.0005
26	0.0053	0.0048	0.0005
27	0.0053	0.0048	0.0005
28	0.0053	0.0048	0.0005
29	0.0053	0.0048	0.0005
30	0.0053	0.0048	0.0005
31	0.0054	0.0049	0.0005
32	0.0054	0.0049	0.0005
33	0.0054	0.0049	0.0005
34	0.0054	0.0049	0.0005
35	0.0054	0.0049	0.0005
36	0.0055	0.0050	0.0005
37	0.0055	0.0050	0.0005
38	0.0055	0.0050	0.0005
39	0.0055	0.0050	0.0005
40	0.0055	0.0050	0.0005
41	0.0056	0.0050	0.0005
42	0.0056	0.0051	0.0005
43	0.0056	0.0051	0.0005
44	0.0056	0.0051	0.0005
45	0.0056	0.0051	0.0005
46	0.0057	0.0051	0.0005
47	0.0057	0.0052	0.0005
48	0.0057	0.0052	0.0005
49	0.0057	0.0052	0.0005
50	0.0058	0.0052	0.0005
51	0.0058	0.0052	0.0005
52	0.0058	0.0053	0.0005
53	0.0058	0.0053	0.0005
54	0.0058	0.0053	0.0005
55	0.0059	0.0053	0.0005
56	0.0059	0.0053	0.0005
57	0.0059	0.0054	0.0005
58	0.0059	0.0054	0.0006
59	0.0060	0.0054	0.0006
60	0.0060	0.0054	0.0006
61	0.0060	0.0055	0.0006
62	0.0060	0.0055	0.0006
63	0.0061	0.0055	0.0006
64	0.0061	0.0055	0.0006
65	0.0061	0.0056	0.0006
66	0.0062	0.0056	0.0006
67	0.0062	0.0056	0.0006
68	0.0062	0.0056	0.0006
69	0.0062	0.0057	0.0006
70	0.0063	0.0057	0.0006
71	0.0063	0.0057	0.0006
72	0.0063	0.0057	0.0006
73	0.0064	0.0058	0.0006
74	0.0064	0.0058	0.0006
75	0.0064	0.0058	0.0006
76	0.0064	0.0058	0.0006

77	0.0065	0.0059	0.0006
78	0.0065	0.0059	0.0006
79	0.0065	0.0059	0.0006
80	0.0066	0.0060	0.0006
81	0.0066	0.0060	0.0006
82	0.0066	0.0060	0.0006
83	0.0067	0.0061	0.0006
84	0.0067	0.0061	0.0006
85	0.0068	0.0061	0.0006
86	0.0068	0.0061	0.0006
87	0.0068	0.0062	0.0006
88	0.0068	0.0062	0.0006
89	0.0069	0.0063	0.0006
90	0.0069	0.0063	0.0006
91	0.0070	0.0063	0.0006
92	0.0070	0.0064	0.0006
93	0.0071	0.0064	0.0007
94	0.0071	0.0064	0.0007
95	0.0071	0.0065	0.0007
96	0.0072	0.0065	0.0007
97	0.0072	0.0065	0.0007
98	0.0072	0.0066	0.0007
99	0.0073	0.0066	0.0007
100	0.0073	0.0067	0.0007
101	0.0074	0.0067	0.0007
102	0.0074	0.0067	0.0007
103	0.0075	0.0068	0.0007
104	0.0075	0.0068	0.0007
105	0.0076	0.0069	0.0007
106	0.0076	0.0069	0.0007
107	0.0077	0.0070	0.0007
108	0.0077	0.0070	0.0007
109	0.0078	0.0071	0.0007
110	0.0078	0.0071	0.0007
111	0.0079	0.0072	0.0007
112	0.0079	0.0072	0.0007
113	0.0080	0.0073	0.0007
114	0.0080	0.0073	0.0007
115	0.0081	0.0074	0.0008
116	0.0082	0.0074	0.0008
117	0.0082	0.0075	0.0008
118	0.0083	0.0075	0.0008
119	0.0084	0.0076	0.0008
120	0.0084	0.0076	0.0008
121	0.0085	0.0077	0.0008
122	0.0085	0.0077	0.0008
123	0.0086	0.0078	0.0008
124	0.0087	0.0079	0.0008
125	0.0088	0.0080	0.0008
126	0.0088	0.0080	0.0008
127	0.0089	0.0081	0.0008
128	0.0090	0.0081	0.0008
129	0.0091	0.0082	0.0008
130	0.0091	0.0083	0.0008
131	0.0092	0.0084	0.0009
132	0.0093	0.0084	0.0009
133	0.0094	0.0085	0.0009
134	0.0095	0.0086	0.0009
135	0.0096	0.0087	0.0009
136	0.0097	0.0088	0.0009
137	0.0098	0.0089	0.0009

138	0.0099	0.0089	0.0009
139	0.0100	0.0091	0.0009
140	0.0101	0.0091	0.0009
141	0.0102	0.0093	0.0009
142	0.0103	0.0093	0.0010
143	0.0104	0.0095	0.0010
144	0.0105	0.0096	0.0010
145	0.0129	0.0117	0.0012
146	0.0130	0.0118	0.0012
147	0.0132	0.0120	0.0012
148	0.0133	0.0121	0.0012
149	0.0135	0.0122	0.0013
150	0.0136	0.0123	0.0013
151	0.0138	0.0125	0.0013
152	0.0139	0.0126	0.0013
153	0.0141	0.0128	0.0013
154	0.0142	0.0129	0.0013
155	0.0145	0.0131	0.0013
156	0.0146	0.0132	0.0014
157	0.0148	0.0135	0.0014
158	0.0150	0.0136	0.0014
159	0.0152	0.0138	0.0014
160	0.0154	0.0140	0.0014
161	0.0157	0.0142	0.0015
162	0.0159	0.0144	0.0015
163	0.0162	0.0147	0.0015
164	0.0164	0.0148	0.0015
165	0.0167	0.0152	0.0016
166	0.0169	0.0154	0.0016
167	0.0173	0.0157	0.0016
168	0.0175	0.0159	0.0016
169	0.0180	0.0163	0.0017
170	0.0183	0.0166	0.0017
171	0.0188	0.0170	0.0017
172	0.0191	0.0173	0.0018
173	0.0197	0.0178	0.0018
174	0.0200	0.0181	0.0019
175	0.0207	0.0188	0.0019
176	0.0211	0.0191	0.0020
177	0.0219	0.0199	0.0020
178	0.0223	0.0203	0.0021
179	0.0234	0.0212	0.0022
180	0.0239	0.0217	0.0022
181	0.0252	0.0228	0.0023
182	0.0259	0.0235	0.0024
183	0.0275	0.0250	0.0026
184	0.0284	0.0258	0.0026
185	0.0234	0.0212	0.0022
186	0.0247	0.0224	0.0023
187	0.0280	0.0254	0.0026
188	0.0302	0.0274	0.0028
189	0.0364	0.0331	0.0034
190	0.0411	0.0373	0.0038
191	0.0588	0.0533	0.0055
192	0.0809	0.0733	0.0075
193	0.2531	0.0733	0.1797
194	0.0479	0.0434	0.0044
195	0.0330	0.0299	0.0031
196	0.0262	0.0238	0.0024
197	0.0295	0.0268	0.0027
198	0.0267	0.0242	0.0025

199	0.0245	0.0222	0.0023
200	0.0228	0.0207	0.0021
201	0.0215	0.0195	0.0020
202	0.0203	0.0184	0.0019
203	0.0194	0.0176	0.0018
204	0.0185	0.0168	0.0017
205	0.0178	0.0161	0.0016
206	0.0171	0.0155	0.0016
207	0.0165	0.0150	0.0015
208	0.0160	0.0145	0.0015
209	0.0155	0.0141	0.0014
210	0.0151	0.0137	0.0014
211	0.0147	0.0133	0.0014
212	0.0143	0.0130	0.0013
213	0.0140	0.0127	0.0013
214	0.0137	0.0124	0.0013
215	0.0134	0.0121	0.0012
216	0.0131	0.0119	0.0012
217	0.0106	0.0096	0.0010
218	0.0104	0.0094	0.0010
219	0.0101	0.0092	0.0009
220	0.0099	0.0090	0.0009
221	0.0097	0.0088	0.0009
222	0.0095	0.0087	0.0009
223	0.0094	0.0085	0.0009
224	0.0092	0.0083	0.0009
225	0.0090	0.0082	0.0008
226	0.0089	0.0081	0.0008
227	0.0087	0.0079	0.0008
228	0.0086	0.0078	0.0008
229	0.0085	0.0077	0.0008
230	0.0083	0.0076	0.0008
231	0.0082	0.0074	0.0008
232	0.0081	0.0073	0.0007
233	0.0080	0.0072	0.0007
234	0.0079	0.0071	0.0007
235	0.0078	0.0070	0.0007
236	0.0076	0.0069	0.0007
237	0.0076	0.0068	0.0007
238	0.0075	0.0068	0.0007
239	0.0074	0.0067	0.0007
240	0.0073	0.0066	0.0007
241	0.0072	0.0065	0.0007
242	0.0071	0.0064	0.0007
243	0.0070	0.0064	0.0007
244	0.0069	0.0063	0.0006
245	0.0069	0.0062	0.0006
246	0.0068	0.0062	0.0006
247	0.0067	0.0061	0.0006
248	0.0067	0.0060	0.0006
249	0.0066	0.0060	0.0006
250	0.0065	0.0059	0.0006
251	0.0065	0.0059	0.0006
252	0.0064	0.0058	0.0006
253	0.0063	0.0058	0.0006
254	0.0063	0.0057	0.0006
255	0.0062	0.0056	0.0006
256	0.0062	0.0056	0.0006
257	0.0061	0.0055	0.0006
258	0.0061	0.0055	0.0006
259	0.0060	0.0055	0.0006

260	0.0060	0.0054	0.0006
261	0.0059	0.0054	0.0005
262	0.0059	0.0053	0.0005
263	0.0058	0.0053	0.0005
264	0.0058	0.0052	0.0005
265	0.0057	0.0052	0.0005
266	0.0057	0.0052	0.0005
267	0.0056	0.0051	0.0005
268	0.0056	0.0051	0.0005
269	0.0056	0.0050	0.0005
270	0.0055	0.0050	0.0005
271	0.0055	0.0050	0.0005
272	0.0054	0.0049	0.0005
273	0.0054	0.0049	0.0005
274	0.0054	0.0049	0.0005
275	0.0053	0.0048	0.0005
276	0.0053	0.0048	0.0005
277	0.0052	0.0048	0.0005
278	0.0052	0.0047	0.0005
279	0.0052	0.0047	0.0005
280	0.0051	0.0047	0.0005
281	0.0051	0.0046	0.0005
282	0.0051	0.0046	0.0005
283	0.0050	0.0046	0.0005
284	0.0050	0.0046	0.0005
285	0.0050	0.0045	0.0005
286	0.0050	0.0045	0.0005
287	0.0049	0.0045	0.0005
288	0.0049	0.0044	0.0005

Total soil rain loss = 2.76(In)
Total effective rainfall = 0.45(In)
Peak flow rate in flood hydrograph = 5.49(CFS)

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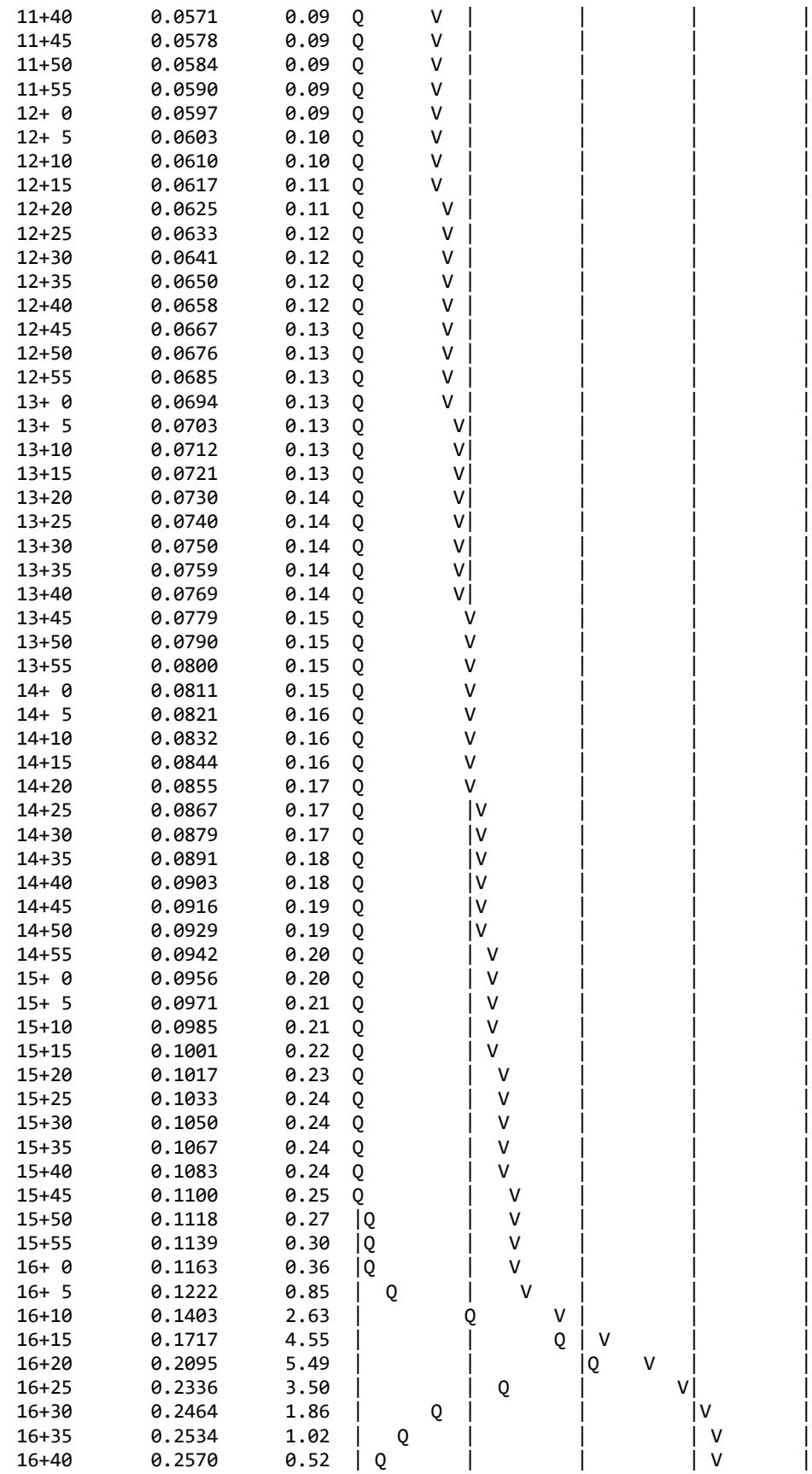
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.00	Q	|	|	|	|
0+10	0.0001	0.01	Q	|	|	|	|
0+15	0.0002	0.02	Q	|	|	|	|
0+20	0.0004	0.03	Q	|	|	|	|
0+25	0.0006	0.04	Q	|	|	|	|
0+30	0.0009	0.04	Q	|	|	|	|
0+35	0.0012	0.04	Q	|	|	|	|
0+40	0.0015	0.04	Q	|	|	|	|
0+45	0.0018	0.05	Q	|	|	|	|
0+50	0.0022	0.05	Q	|	|	|	|
0+55	0.0025	0.05	Q	|	|	|	|
1+ 0	0.0028	0.05	Q	|	|	|	|
1+ 5	0.0031	0.05	Q	|	|	|	|
1+10	0.0034	0.05	Q	|	|	|	|
1+15	0.0038	0.05	Q	|	|	|	|
1+20	0.0041	0.05	Q	|	|	|	|
1+25	0.0044	0.05	Q	|	|	|	|

1+30	0.0047	0.05	Q	|	|	|	|
1+35	0.0050	0.05	Q	|	|	|	|
1+40	0.0054	0.05	Q	|	|	|	|
1+45	0.0057	0.05	Q	|	|	|	|
1+50	0.0060	0.05	Q	|	|	|	|
1+55	0.0064	0.05	Q	|	|	|	|
2+ 0	0.0067	0.05	Q	|	|	|	|
2+ 5	0.0070	0.05	Q	|	|	|	|
2+10	0.0073	0.05	Q	|	|	|	|
2+15	0.0077	0.05	Q	|	|	|	|
2+20	0.0080	0.05	QV	|	|	|	|
2+25	0.0083	0.05	QV	|	|	|	|
2+30	0.0087	0.05	QV	|	|	|	|
2+35	0.0090	0.05	QV	|	|	|	|
2+40	0.0094	0.05	QV	|	|	|	|
2+45	0.0097	0.05	QV	|	|	|	|
2+50	0.0100	0.05	QV	|	|	|	|
2+55	0.0104	0.05	QV	|	|	|	|
3+ 0	0.0107	0.05	QV	|	|	|	|
3+ 5	0.0111	0.05	QV	|	|	|	|
3+10	0.0114	0.05	QV	|	|	|	|
3+15	0.0118	0.05	QV	|	|	|	|
3+20	0.0121	0.05	QV	|	|	|	|
3+25	0.0125	0.05	QV	|	|	|	|
3+30	0.0128	0.05	QV	|	|	|	|
3+35	0.0132	0.05	QV	|	|	|	|
3+40	0.0135	0.05	QV	|	|	|	|
3+45	0.0139	0.05	QV	|	|	|	|
3+50	0.0142	0.05	QV	|	|	|	|
3+55	0.0146	0.05	QV	|	|	|	|
4+ 0	0.0149	0.05	QV	|	|	|	|
4+ 5	0.0153	0.05	QV	|	|	|	|
4+10	0.0157	0.05	Q V	|	|	|	|
4+15	0.0160	0.05	Q V	|	|	|	|
4+20	0.0164	0.05	Q V	|	|	|	|
4+25	0.0168	0.05	Q V	|	|	|	|
4+30	0.0171	0.05	Q V	|	|	|	|
4+35	0.0175	0.05	Q V	|	|	|	|
4+40	0.0179	0.05	Q V	|	|	|	|
4+45	0.0182	0.05	Q V	|	|	|	|
4+50	0.0186	0.05	Q V	|	|	|	|
4+55	0.0190	0.05	Q V	|	|	|	|
5+ 0	0.0194	0.05	Q V	|	|	|	|
5+ 5	0.0197	0.05	Q V	|	|	|	|
5+10	0.0201	0.06	Q V	|	|	|	|
5+15	0.0205	0.06	Q V	|	|	|	|
5+20	0.0209	0.06	Q V	|	|	|	|
5+25	0.0213	0.06	Q V	|	|	|	|
5+30	0.0216	0.06	Q V	|	|	|	|
5+35	0.0220	0.06	Q V	|	|	|	|
5+40	0.0224	0.06	Q V	|	|	|	|
5+45	0.0228	0.06	Q V	|	|	|	|
5+50	0.0232	0.06	Q V	|	|	|	|
5+55	0.0236	0.06	Q V	|	|	|	|
6+ 0	0.0240	0.06	Q V	|	|	|	|
6+ 5	0.0244	0.06	Q V	|	|	|	|
6+10	0.0248	0.06	Q V	|	|	|	|
6+15	0.0252	0.06	Q V	|	|	|	|
6+20	0.0256	0.06	Q V	|	|	|	|
6+25	0.0260	0.06	Q V	|	|	|	|
6+30	0.0264	0.06	Q V	|	|	|	|

6+35	0.0268	0.06	Q	V				
6+40	0.0272	0.06	Q	V				
6+45	0.0276	0.06	Q	V				
6+50	0.0281	0.06	Q	V				
6+55	0.0285	0.06	Q	V				
7+ 0	0.0289	0.06	Q	V				
7+ 5	0.0293	0.06	Q	V				
7+10	0.0297	0.06	Q	V				
7+15	0.0302	0.06	Q	V				
7+20	0.0306	0.06	Q	V				
7+25	0.0310	0.06	Q	V				
7+30	0.0315	0.06	Q	V				
7+35	0.0319	0.06	Q	V				
7+40	0.0323	0.06	Q	V				
7+45	0.0328	0.06	Q	V				
7+50	0.0332	0.06	Q	V				
7+55	0.0337	0.06	Q	V				
8+ 0	0.0341	0.06	Q	V				
8+ 5	0.0346	0.07	Q	V				
8+10	0.0350	0.07	Q	V				
8+15	0.0355	0.07	Q	V				
8+20	0.0359	0.07	Q	V				
8+25	0.0364	0.07	Q	V				
8+30	0.0368	0.07	Q	V				
8+35	0.0373	0.07	Q	V				
8+40	0.0378	0.07	Q	V				
8+45	0.0383	0.07	Q	V				
8+50	0.0387	0.07	Q	V				
8+55	0.0392	0.07	Q	V				
9+ 0	0.0397	0.07	Q	V				
9+ 5	0.0402	0.07	Q	V				
9+10	0.0407	0.07	Q	V				
9+15	0.0411	0.07	Q	V				
9+20	0.0416	0.07	Q	V				
9+25	0.0421	0.07	Q	V				
9+30	0.0426	0.07	Q	V				
9+35	0.0431	0.07	Q	V				
9+40	0.0437	0.07	Q	V				
9+45	0.0442	0.07	Q	V				
9+50	0.0447	0.07	Q	V				
9+55	0.0452	0.08	Q	V				
10+ 0	0.0457	0.08	Q	V				
10+ 5	0.0462	0.08	Q	V				
10+10	0.0468	0.08	Q	V				
10+15	0.0473	0.08	Q	V				
10+20	0.0478	0.08	Q	V				
10+25	0.0484	0.08	Q	V				
10+30	0.0489	0.08	Q	V				
10+35	0.0495	0.08	Q	V				
10+40	0.0500	0.08	Q	V				
10+45	0.0506	0.08	Q	V				
10+50	0.0512	0.08	Q	V				
10+55	0.0517	0.08	Q	V				
11+ 0	0.0523	0.08	Q	V				
11+ 5	0.0529	0.08	Q	V				
11+10	0.0535	0.09	Q	V				
11+15	0.0541	0.09	Q	V				
11+20	0.0547	0.09	Q	V				
11+25	0.0553	0.09	Q	V				
11+30	0.0559	0.09	Q	V				
11+35	0.0565	0.09	Q	V				


11+40 0.0571 0.09
11+45 0.0578 0.09
11+50 0.0584 0.09
11+55 0.0590 0.09
12+ 0 0.0597 0.09
12+ 5 0.0603 0.10
12+10 0.0610 0.10
12+15 0.0617 0.11
12+20 0.0625 0.11
12+25 0.0633 0.12
12+30 0.0641 0.12
12+35 0.0650 0.12
12+40 0.0658 0.12
12+45 0.0667 0.13
12+50 0.0676 0.13
12+55 0.0685 0.13
13+ 0 0.0694 0.13
13+ 5 0.0703 0.13
13+10 0.0712 0.13
13+15 0.0721 0.13
13+20 0.0730 0.14
13+25 0.0740 0.14
13+30 0.0750 0.14
13+35 0.0759 0.14
13+40 0.0769 0.14
13+45 0.0779 0.15
13+50 0.0790 0.15
13+55 0.0800 0.15
14+ 0 0.0811 0.15
14+ 5 0.0821 0.16
14+10 0.0832 0.16
14+15 0.0844 0.16
14+20 0.0855 0.17
14+25 0.0867 0.17
14+30 0.0879 0.17
14+35 0.0891 0.18
14+40 0.0903 0.18
14+45 0.0916 0.19
14+50 0.0929 0.19
14+55 0.0942 0.20
15+ 0 0.0956 0.20
15+ 5 0.0971 0.21
15+10 0.0985 0.21
15+15 0.1001 0.22
15+20 0.1017 0.23
15+25 0.1033 0.24
15+30 0.1050 0.24
15+35 0.1067 0.24
15+40 0.1083 0.24
15+45 0.1100 0.25
15+50 0.1118 0.27
15+55 0.1139 0.30
16+ 0 0.1163 0.36
16+ 5 0.1222 0.85
16+10 0.1403 2.63
16+15 0.1717 4.55
16+20 0.2095 5.49
16+25 0.2336 3.50
16+30 0.2464 1.86
16+35 0.2534 1.02
16+40 0.2570 0.52

```
16+45       0.2594      0.36  |Q        |         |         |  V      |
16+50       0.2618      0.34  |Q        |         |         |  V      |
16+55       0.2637      0.27  |Q        |         |         |  V      |
17+ 0       0.2651      0.20  Q         |         |         |   V     |
17+ 5       0.2664      0.19  Q         |         |         |   V     |
17+10       0.2676      0.18  Q         |         |         |   V     |
17+15       0.2688      0.17  Q         |         |         |   V     |
17+20       0.2699      0.17  Q         |         |         |   V     |
17+25       0.2710      0.16  Q         |         |         |   V     |
17+30       0.2721      0.15  Q         |         |         |   V     |
17+35       0.2731      0.15  Q         |         |         |    V    |
17+40       0.2741      0.14  Q         |         |         |    V    |
17+45       0.2751      0.14  Q         |         |         |    V    |
17+50       0.2760      0.14  Q         |         |         |    V    |
17+55       0.2769      0.13  Q         |         |         |    V    |
18+ 0       0.2778      0.13  Q         |         |         |    V    |
18+ 5       0.2787      0.13  Q         |         |         |    V    |
18+10       0.2795      0.12  Q         |         |         |    V    |
18+15       0.2803      0.11  Q         |         |         |    V    |
18+20       0.2810      0.11  Q         |         |         |     V   |
18+25       0.2817      0.10  Q         |         |         |     V   |
18+30       0.2824      0.10  Q         |         |         |     V   |
18+35       0.2830      0.09  Q         |         |         |     V   |
18+40       0.2836      0.09  Q         |         |         |     V   |
18+45       0.2842      0.09  Q         |         |         |     V   |
18+50       0.2848      0.09  Q         |         |         |     V   |
18+55       0.2854      0.08  Q         |         |         |     V   |
19+ 0       0.2860      0.08  Q         |         |         |     V   |
19+ 5       0.2866      0.08  Q         |         |         |     V   |
19+10       0.2871      0.08  Q         |         |         |     V   |
19+15       0.2877      0.08  Q         |         |         |     V   |
19+20       0.2882      0.08  Q         |         |         |      V  |
19+25       0.2887      0.08  Q         |         |         |      V  |
19+30       0.2893      0.08  Q         |         |         |      V  |
19+35       0.2898      0.07  Q         |         |         |      V  |
19+40       0.2903      0.07  Q         |         |         |      V  |
19+45       0.2908      0.07  Q         |         |         |      V  |
19+50       0.2913      0.07  Q         |         |         |      V  |
19+55       0.2918      0.07  Q         |         |         |      V  |
20+ 0       0.2922      0.07  Q         |         |         |      V  |
20+ 5       0.2927      0.07  Q         |         |         |      V  |
20+10       0.2932      0.07  Q         |         |         |      V  |
20+15       0.2936      0.07  Q         |         |         |      V  |
20+20       0.2941      0.07  Q         |         |         |      V  |
20+25       0.2946      0.07  Q         |         |         |      V  |
20+30       0.2950      0.06  Q         |         |         |      V  |
20+35       0.2954      0.06  Q         |         |         |      V  |
20+40       0.2959      0.06  Q         |         |         |      V  |
20+45       0.2963      0.06  Q         |         |         |       V |
20+50       0.2967      0.06  Q         |         |         |       V |
20+55       0.2972      0.06  Q         |         |         |       V |
21+ 0       0.2976      0.06  Q         |         |         |       V |
21+ 5       0.2980      0.06  Q         |         |         |       V |
21+10       0.2984      0.06  Q         |         |         |       V |
21+15       0.2988      0.06  Q         |         |         |       V |
21+20       0.2992      0.06  Q         |         |         |       V |
21+25       0.2996      0.06  Q         |         |         |       V |
21+30       0.3000      0.06  Q         |         |         |       V |
21+35       0.3004      0.06  Q         |         |         |       V |
21+40       0.3008      0.06  Q         |         |         |       V |
21+45       0.3012      0.06  Q         |         |         |       V |
```

21+50	0.3016	0.06	Q	|	|	|	V |
21+55	0.3019	0.06	Q	|	|	|	V |
22+ 0	0.3023	0.05	Q	|	|	|	V |
22+ 5	0.3027	0.05	Q	|	|	|	V |
22+10	0.3031	0.05	Q	|	|	|	V |
22+15	0.3034	0.05	Q	|	|	|	V |
22+20	0.3038	0.05	Q	|	|	|	V|
22+25	0.3042	0.05	Q	|	|	|	V|
22+30	0.3045	0.05	Q	|	|	|	V|
22+35	0.3049	0.05	Q	|	|	|	V|
22+40	0.3052	0.05	Q	|	|	|	V|
22+45	0.3056	0.05	Q	|	|	|	V|
22+50	0.3059	0.05	Q	|	|	|	V|
22+55	0.3063	0.05	Q	|	|	|	V|
23+ 0	0.3066	0.05	Q	|	|	|	V|
23+ 5	0.3069	0.05	Q	|	|	|	V|
23+10	0.3073	0.05	Q	|	|	|	V|
23+15	0.3076	0.05	Q	|	|	|	V|
23+20	0.3080	0.05	Q	|	|	|	V|
23+25	0.3083	0.05	Q	|	|	|	V|
23+30	0.3086	0.05	Q	|	|	|	V|
23+35	0.3089	0.05	Q	|	|	|	V|
23+40	0.3093	0.05	Q	|	|	|	V|
23+45	0.3096	0.05	Q	|	|	|	V|
23+50	0.3099	0.05	Q	|	|	|	V|
23+55	0.3102	0.05	Q	|	|	|	V|
24+ 0	0.3105	0.05	Q	|	|	|	V|

APPENDIX C.3

UNIT HYDROGRAPH ANALYSIS

PRE-DEVELOPMENT CONDITIONS – 25 YEAR

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2004, Version 7.0

Study date 01/23/23

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San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6277

JOB NO 2022-318
11115 HEMLOCK AVENUE
25 YEAR, UNIT HYDROGRAPH
PRE-CONDITION, AREA A

Storm Event Year = 25

Antecedent Moisture Condition = 2

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 10		
29.19	1	0.82
Rainfall data for year 10		
29.19	6	2.07
Rainfall data for year 10		
29.19	24	3.81

Note: Per City of Fontana Master Storm Drain Plan, the 25-year pre-condition flow rates shall be calculated using 10-year rainfall

++

******** Area-averaged max loss rate, Fm ********

SCS curve No.(AMCII)	SCS curve NO.(AMC 2)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
32.0	32.0	29.19	1.000	0.978	0.600	0.587

Area-averaged adjusted loss rate Fm (In/Hr) = 0.587

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
17.51	0.600	32.0	32.0	19.05	0.000
11.68	0.400	98.0	98.0	0.20	0.938

Area-averaged catchment yield fraction, Y = 0.375
Area-averaged low loss fraction, Yb = 0.625
User entry of time of concentration = 0.234 (hours)
++
Watershed area = 29.19(Ac.)
Catchment Lag time = 0.187 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 44.5728
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.587(In/Hr)
Average low loss rate fraction (Yb) = 0.625 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.305(In)
Computed peak 30-minute rainfall = 0.624(In)
Specified peak 1-hour rainfall = 0.823(In)
Computed peak 3-hour rainfall = 1.449(In)
Specified peak 6-hour rainfall = 2.070(In)
Specified peak 24-hour rainfall = 3.810(In)

Rainfall depth area reduction factors:
Using a total area of 29.19(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.304(In)
30-minute factor = 0.999 Adjusted rainfall = 0.623(In)
1-hour factor = 0.999 Adjusted rainfall = 0.822(In)
3-hour factor = 1.000 Adjusted rainfall = 1.449(In)
6-hour factor = 1.000 Adjusted rainfall = 2.070(In)
24-hour factor = 1.000 Adjusted rainfall = 3.810(In)

U n i t H y d r o g r a p h
++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
	(K = 353.02 (CFS))	
1	3.685	13.008
2	24.015	71.770
3	59.263	124.431
4	84.366	88.618
5	94.554	35.962
6	98.081	12.451
7	99.015	3.299
8	100.000	1.649

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3042	0.3042
2	0.4014	0.0972
3	0.4720	0.0707
4	0.5296	0.0576
5	0.5791	0.0494
6	0.6229	0.0438

7	0.6625	0.0396
8	0.6988	0.0363
9	0.7325	0.0337
10	0.7641	0.0315
11	0.7938	0.0297
12	0.8219	0.0281
13	0.8565	0.0346
14	0.8899	0.0334
15	0.9221	0.0322
16	0.9534	0.0312
17	0.9836	0.0303
18	1.0131	0.0294
19	1.0417	0.0287
20	1.0697	0.0279
21	1.0969	0.0273
22	1.1236	0.0266
23	1.1496	0.0261
24	1.1752	0.0255
25	1.2002	0.0250
26	1.2247	0.0245
27	1.2488	0.0241
28	1.2724	0.0236
29	1.2957	0.0232
30	1.3185	0.0229
31	1.3410	0.0225
32	1.3632	0.0221
33	1.3850	0.0218
34	1.4065	0.0215
35	1.4277	0.0212
36	1.4485	0.0209
37	1.4691	0.0206
38	1.4894	0.0203
39	1.5095	0.0201
40	1.5293	0.0198
41	1.5489	0.0196
42	1.5682	0.0193
43	1.5873	0.0191
44	1.6062	0.0189
45	1.6249	0.0187
46	1.6434	0.0185
47	1.6617	0.0183
48	1.6798	0.0181
49	1.6978	0.0179
50	1.7155	0.0178
51	1.7331	0.0176
52	1.7505	0.0174
53	1.7678	0.0173
54	1.7848	0.0171
55	1.8018	0.0169
56	1.8186	0.0168
57	1.8352	0.0166
58	1.8517	0.0165
59	1.8681	0.0164
60	1.8843	0.0162
61	1.9005	0.0161
62	1.9164	0.0160
63	1.9323	0.0159
64	1.9480	0.0157
65	1.9636	0.0156
66	1.9791	0.0155
67	1.9945	0.0154

68	2.0098	0.0153
69	2.0249	0.0152
70	2.0400	0.0151
71	2.0550	0.0150
72	2.0698	0.0149
73	2.0824	0.0126
74	2.0949	0.0125
75	2.1073	0.0124
76	2.1197	0.0123
77	2.1319	0.0122
78	2.1440	0.0121
79	2.1561	0.0121
80	2.1681	0.0120
81	2.1799	0.0119
82	2.1917	0.0118
83	2.2035	0.0117
84	2.2151	0.0116
85	2.2267	0.0116
86	2.2382	0.0115
87	2.2496	0.0114
88	2.2609	0.0113
89	2.2722	0.0113
90	2.2834	0.0112
91	2.2945	0.0111
92	2.3056	0.0111
93	2.3166	0.0110
94	2.3275	0.0109
95	2.3384	0.0109
96	2.3492	0.0108
97	2.3599	0.0107
98	2.3706	0.0107
99	2.3812	0.0106
100	2.3918	0.0106
101	2.4023	0.0105
102	2.4127	0.0104
103	2.4231	0.0104
104	2.4334	0.0103
105	2.4437	0.0103
106	2.4539	0.0102
107	2.4641	0.0102
108	2.4742	0.0101
109	2.4842	0.0101
110	2.4942	0.0100
111	2.5042	0.0100
112	2.5141	0.0099
113	2.5240	0.0099
114	2.5338	0.0098
115	2.5435	0.0098
116	2.5532	0.0097
117	2.5629	0.0097
118	2.5725	0.0096
119	2.5821	0.0096
120	2.5916	0.0095
121	2.6011	0.0095
122	2.6105	0.0094
123	2.6199	0.0094
124	2.6293	0.0094
125	2.6386	0.0093
126	2.6479	0.0093
127	2.6571	0.0092
128	2.6663	0.0092

129	2.6754	0.0091
130	2.6845	0.0091
131	2.6936	0.0091
132	2.7026	0.0090
133	2.7116	0.0090
134	2.7206	0.0090
135	2.7295	0.0089
136	2.7384	0.0089
137	2.7472	0.0088
138	2.7560	0.0088
139	2.7648	0.0088
140	2.7735	0.0087
141	2.7822	0.0087
142	2.7909	0.0087
143	2.7995	0.0086
144	2.8081	0.0086
145	2.8167	0.0086
146	2.8252	0.0085
147	2.8337	0.0085
148	2.8422	0.0085
149	2.8507	0.0084
150	2.8591	0.0084
151	2.8674	0.0084
152	2.8758	0.0083
153	2.8841	0.0083
154	2.8924	0.0083
155	2.9006	0.0083
156	2.9088	0.0082
157	2.9170	0.0082
158	2.9252	0.0082
159	2.9333	0.0081
160	2.9414	0.0081
161	2.9495	0.0081
162	2.9576	0.0080
163	2.9656	0.0080
164	2.9736	0.0080
165	2.9815	0.0080
166	2.9895	0.0079
167	2.9974	0.0079
168	3.0053	0.0079
169	3.0131	0.0079
170	3.0210	0.0078
171	3.0288	0.0078
172	3.0366	0.0078
173	3.0443	0.0078
174	3.0521	0.0077
175	3.0598	0.0077
176	3.0674	0.0077
177	3.0751	0.0077
178	3.0827	0.0076
179	3.0903	0.0076
180	3.0979	0.0076
181	3.1055	0.0076
182	3.1130	0.0075
183	3.1206	0.0075
184	3.1280	0.0075
185	3.1355	0.0075
186	3.1430	0.0074
187	3.1504	0.0074
188	3.1578	0.0074
189	3.1652	0.0074

190	3.1725	0.0074
191	3.1799	0.0073
192	3.1872	0.0073
193	3.1945	0.0073
194	3.2018	0.0073
195	3.2090	0.0073
196	3.2162	0.0072
197	3.2235	0.0072
198	3.2306	0.0072
199	3.2378	0.0072
200	3.2450	0.0072
201	3.2521	0.0071
202	3.2592	0.0071
203	3.2663	0.0071
204	3.2734	0.0071
205	3.2804	0.0071
206	3.2875	0.0070
207	3.2945	0.0070
208	3.3015	0.0070
209	3.3084	0.0070
210	3.3154	0.0070
211	3.3223	0.0069
212	3.3293	0.0069
213	3.3362	0.0069
214	3.3431	0.0069
215	3.3499	0.0069
216	3.3568	0.0068
217	3.3636	0.0068
218	3.3704	0.0068
219	3.3772	0.0068
220	3.3840	0.0068
221	3.3907	0.0068
222	3.3975	0.0067
223	3.4042	0.0067
224	3.4109	0.0067
225	3.4176	0.0067
226	3.4243	0.0067
227	3.4310	0.0067
228	3.4376	0.0066
229	3.4442	0.0066
230	3.4508	0.0066
231	3.4574	0.0066
232	3.4640	0.0066
233	3.4706	0.0066
234	3.4771	0.0065
235	3.4837	0.0065
236	3.4902	0.0065
237	3.4967	0.0065
238	3.5032	0.0065
239	3.5096	0.0065
240	3.5161	0.0065
241	3.5225	0.0064
242	3.5290	0.0064
243	3.5354	0.0064
244	3.5418	0.0064
245	3.5481	0.0064
246	3.5545	0.0064
247	3.5609	0.0064
248	3.5672	0.0063
249	3.5735	0.0063
250	3.5798	0.0063

251	3.5861	0.0063
252	3.5924	0.0063
253	3.5987	0.0063
254	3.6049	0.0063
255	3.6112	0.0062
256	3.6174	0.0062
257	3.6236	0.0062
258	3.6298	0.0062
259	3.6360	0.0062
260	3.6422	0.0062
261	3.6483	0.0062
262	3.6545	0.0061
263	3.6606	0.0061
264	3.6667	0.0061
265	3.6728	0.0061
266	3.6789	0.0061
267	3.6850	0.0061
268	3.6911	0.0061
269	3.6971	0.0061
270	3.7032	0.0060
271	3.7092	0.0060
272	3.7152	0.0060
273	3.7212	0.0060
274	3.7272	0.0060
275	3.7332	0.0060
276	3.7392	0.0060
277	3.7451	0.0060
278	3.7511	0.0059
279	3.7570	0.0059
280	3.7629	0.0059
281	3.7688	0.0059
282	3.7747	0.0059
283	3.7806	0.0059
284	3.7865	0.0059
285	3.7923	0.0059
286	3.7982	0.0059
287	3.8040	0.0058
288	3.8099	0.0058

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0058	0.0036	0.0022
2	0.0058	0.0036	0.0022
3	0.0059	0.0037	0.0022
4	0.0059	0.0037	0.0022
5	0.0059	0.0037	0.0022
6	0.0059	0.0037	0.0022
7	0.0059	0.0037	0.0022
8	0.0059	0.0037	0.0022
9	0.0060	0.0037	0.0022
10	0.0060	0.0037	0.0022
11	0.0060	0.0038	0.0023
12	0.0060	0.0038	0.0023
13	0.0060	0.0038	0.0023
14	0.0061	0.0038	0.0023
15	0.0061	0.0038	0.0023
16	0.0061	0.0038	0.0023
17	0.0061	0.0038	0.0023
18	0.0061	0.0038	0.0023

19	0.0062	0.0038	0.0023
20	0.0062	0.0039	0.0023
21	0.0062	0.0039	0.0023
22	0.0062	0.0039	0.0023
23	0.0062	0.0039	0.0023
24	0.0063	0.0039	0.0023
25	0.0063	0.0039	0.0024
26	0.0063	0.0039	0.0024
27	0.0063	0.0039	0.0024
28	0.0063	0.0040	0.0024
29	0.0064	0.0040	0.0024
30	0.0064	0.0040	0.0024
31	0.0064	0.0040	0.0024
32	0.0064	0.0040	0.0024
33	0.0065	0.0040	0.0024
34	0.0065	0.0040	0.0024
35	0.0065	0.0041	0.0024
36	0.0065	0.0041	0.0024
37	0.0065	0.0041	0.0025
38	0.0066	0.0041	0.0025
39	0.0066	0.0041	0.0025
40	0.0066	0.0041	0.0025
41	0.0066	0.0041	0.0025
42	0.0067	0.0042	0.0025
43	0.0067	0.0042	0.0025
44	0.0067	0.0042	0.0025
45	0.0067	0.0042	0.0025
46	0.0068	0.0042	0.0025
47	0.0068	0.0042	0.0026
48	0.0068	0.0043	0.0026
49	0.0068	0.0043	0.0026
50	0.0069	0.0043	0.0026
51	0.0069	0.0043	0.0026
52	0.0069	0.0043	0.0026
53	0.0070	0.0043	0.0026
54	0.0070	0.0044	0.0026
55	0.0070	0.0044	0.0026
56	0.0070	0.0044	0.0026
57	0.0071	0.0044	0.0027
58	0.0071	0.0044	0.0027
59	0.0071	0.0045	0.0027
60	0.0072	0.0045	0.0027
61	0.0072	0.0045	0.0027
62	0.0072	0.0045	0.0027
63	0.0073	0.0045	0.0027
64	0.0073	0.0045	0.0027
65	0.0073	0.0046	0.0027
66	0.0073	0.0046	0.0028
67	0.0074	0.0046	0.0028
68	0.0074	0.0046	0.0028
69	0.0074	0.0047	0.0028
70	0.0075	0.0047	0.0028
71	0.0075	0.0047	0.0028
72	0.0075	0.0047	0.0028
73	0.0076	0.0047	0.0028
74	0.0076	0.0048	0.0029
75	0.0077	0.0048	0.0029
76	0.0077	0.0048	0.0029
77	0.0077	0.0048	0.0029
78	0.0078	0.0048	0.0029
79	0.0078	0.0049	0.0029

80	0.0078	0.0049	0.0029
81	0.0079	0.0049	0.0030
82	0.0079	0.0049	0.0030
83	0.0080	0.0050	0.0030
84	0.0080	0.0050	0.0030
85	0.0080	0.0050	0.0030
86	0.0081	0.0050	0.0030
87	0.0081	0.0051	0.0031
88	0.0082	0.0051	0.0031
89	0.0082	0.0051	0.0031
90	0.0083	0.0052	0.0031
91	0.0083	0.0052	0.0031
92	0.0083	0.0052	0.0031
93	0.0084	0.0052	0.0032
94	0.0084	0.0053	0.0032
95	0.0085	0.0053	0.0032
96	0.0085	0.0053	0.0032
97	0.0086	0.0054	0.0032
98	0.0086	0.0054	0.0032
99	0.0087	0.0054	0.0033
100	0.0087	0.0055	0.0033
101	0.0088	0.0055	0.0033
102	0.0088	0.0055	0.0033
103	0.0089	0.0056	0.0033
104	0.0090	0.0056	0.0034
105	0.0090	0.0056	0.0034
106	0.0091	0.0057	0.0034
107	0.0091	0.0057	0.0034
108	0.0092	0.0057	0.0034
109	0.0093	0.0058	0.0035
110	0.0093	0.0058	0.0035
111	0.0094	0.0059	0.0035
112	0.0094	0.0059	0.0035
113	0.0095	0.0060	0.0036
114	0.0096	0.0060	0.0036
115	0.0097	0.0060	0.0036
116	0.0097	0.0061	0.0036
117	0.0098	0.0061	0.0037
118	0.0099	0.0062	0.0037
119	0.0100	0.0062	0.0037
120	0.0100	0.0062	0.0038
121	0.0101	0.0063	0.0038
122	0.0102	0.0063	0.0038
123	0.0103	0.0064	0.0039
124	0.0103	0.0064	0.0039
125	0.0104	0.0065	0.0039
126	0.0105	0.0066	0.0039
127	0.0106	0.0066	0.0040
128	0.0107	0.0067	0.0040
129	0.0108	0.0067	0.0041
130	0.0109	0.0068	0.0041
131	0.0110	0.0069	0.0041
132	0.0111	0.0069	0.0042
133	0.0112	0.0070	0.0042
134	0.0113	0.0070	0.0042
135	0.0114	0.0071	0.0043
136	0.0115	0.0072	0.0043
137	0.0116	0.0073	0.0044
138	0.0117	0.0073	0.0044
139	0.0119	0.0074	0.0045
140	0.0120	0.0075	0.0045

141	0.0121	0.0076	0.0046
142	0.0122	0.0076	0.0046
143	0.0124	0.0078	0.0047
144	0.0125	0.0078	0.0047
145	0.0149	0.0093	0.0056
146	0.0150	0.0093	0.0056
147	0.0152	0.0095	0.0057
148	0.0153	0.0095	0.0057
149	0.0155	0.0097	0.0058
150	0.0156	0.0098	0.0059
151	0.0159	0.0099	0.0060
152	0.0160	0.0100	0.0060
153	0.0162	0.0101	0.0061
154	0.0164	0.0102	0.0061
155	0.0166	0.0104	0.0062
156	0.0168	0.0105	0.0063
157	0.0171	0.0107	0.0064
158	0.0173	0.0108	0.0065
159	0.0176	0.0110	0.0066
160	0.0178	0.0111	0.0067
161	0.0181	0.0113	0.0068
162	0.0183	0.0114	0.0069
163	0.0187	0.0117	0.0070
164	0.0189	0.0118	0.0071
165	0.0193	0.0121	0.0073
166	0.0196	0.0122	0.0073
167	0.0201	0.0125	0.0075
168	0.0203	0.0127	0.0076
169	0.0209	0.0131	0.0078
170	0.0212	0.0132	0.0080
171	0.0218	0.0136	0.0082
172	0.0221	0.0138	0.0083
173	0.0229	0.0143	0.0086
174	0.0232	0.0145	0.0087
175	0.0241	0.0150	0.0090
176	0.0245	0.0153	0.0092
177	0.0255	0.0159	0.0096
178	0.0261	0.0163	0.0098
179	0.0273	0.0170	0.0102
180	0.0279	0.0174	0.0105
181	0.0294	0.0184	0.0110
182	0.0303	0.0189	0.0114
183	0.0322	0.0201	0.0121
184	0.0334	0.0208	0.0125
185	0.0281	0.0176	0.0106
186	0.0297	0.0185	0.0111
187	0.0337	0.0211	0.0127
188	0.0363	0.0227	0.0136
189	0.0438	0.0274	0.0164
190	0.0494	0.0309	0.0186
191	0.0707	0.0441	0.0265
192	0.0972	0.0489	0.0483
193	0.3042	0.0489	0.2553
194	0.0576	0.0360	0.0216
195	0.0396	0.0247	0.0149
196	0.0315	0.0197	0.0118
197	0.0346	0.0216	0.0130
198	0.0312	0.0195	0.0117
199	0.0287	0.0179	0.0108
200	0.0266	0.0166	0.0100
201	0.0250	0.0156	0.0094

202	0.0236	0.0148	0.0089
203	0.0225	0.0140	0.0084
204	0.0215	0.0134	0.0081
205	0.0206	0.0129	0.0077
206	0.0198	0.0124	0.0074
207	0.0191	0.0119	0.0072
208	0.0185	0.0116	0.0069
209	0.0179	0.0112	0.0067
210	0.0174	0.0109	0.0065
211	0.0169	0.0106	0.0064
212	0.0165	0.0103	0.0062
213	0.0161	0.0101	0.0060
214	0.0157	0.0098	0.0059
215	0.0154	0.0096	0.0058
216	0.0151	0.0094	0.0057
217	0.0126	0.0079	0.0047
218	0.0123	0.0077	0.0046
219	0.0121	0.0075	0.0045
220	0.0118	0.0074	0.0044
221	0.0116	0.0072	0.0043
222	0.0113	0.0071	0.0043
223	0.0111	0.0070	0.0042
224	0.0109	0.0068	0.0041
225	0.0107	0.0067	0.0040
226	0.0106	0.0066	0.0040
227	0.0104	0.0065	0.0039
228	0.0102	0.0064	0.0038
229	0.0101	0.0063	0.0038
230	0.0099	0.0062	0.0037
231	0.0098	0.0061	0.0037
232	0.0096	0.0060	0.0036
233	0.0095	0.0059	0.0036
234	0.0094	0.0058	0.0035
235	0.0092	0.0058	0.0035
236	0.0091	0.0057	0.0034
237	0.0090	0.0056	0.0034
238	0.0089	0.0055	0.0033
239	0.0088	0.0055	0.0033
240	0.0087	0.0054	0.0033
241	0.0086	0.0054	0.0032
242	0.0085	0.0053	0.0032
243	0.0084	0.0052	0.0031
244	0.0083	0.0052	0.0031
245	0.0082	0.0051	0.0031
246	0.0081	0.0051	0.0030
247	0.0080	0.0050	0.0030
248	0.0079	0.0050	0.0030
249	0.0079	0.0049	0.0030
250	0.0078	0.0049	0.0029
251	0.0077	0.0048	0.0029
252	0.0076	0.0048	0.0029
253	0.0076	0.0047	0.0028
254	0.0075	0.0047	0.0028
255	0.0074	0.0046	0.0028
256	0.0074	0.0046	0.0028
257	0.0073	0.0046	0.0027
258	0.0072	0.0045	0.0027
259	0.0072	0.0045	0.0027
260	0.0071	0.0044	0.0027
261	0.0071	0.0044	0.0026
262	0.0070	0.0044	0.0026

263	0.0069	0.0043	0.0026
264	0.0069	0.0043	0.0026
265	0.0068	0.0043	0.0026
266	0.0068	0.0042	0.0025
267	0.0067	0.0042	0.0025
268	0.0067	0.0042	0.0025
269	0.0066	0.0041	0.0025
270	0.0066	0.0041	0.0025
271	0.0065	0.0041	0.0025
272	0.0065	0.0041	0.0024
273	0.0064	0.0040	0.0024
274	0.0064	0.0040	0.0024
275	0.0064	0.0040	0.0024
276	0.0063	0.0039	0.0024
277	0.0063	0.0039	0.0024
278	0.0062	0.0039	0.0023
279	0.0062	0.0039	0.0023
280	0.0061	0.0038	0.0023
281	0.0061	0.0038	0.0023
282	0.0061	0.0038	0.0023
283	0.0060	0.0038	0.0023
284	0.0060	0.0037	0.0022
285	0.0060	0.0037	0.0022
286	0.0059	0.0037	0.0022
287	0.0059	0.0037	0.0022
288	0.0059	0.0037	0.0022

Total soil rain loss = 2.23(In)
Total effective rainfall = 1.58(In)
Peak flow rate in flood hydrograph = 39.05(CFS)

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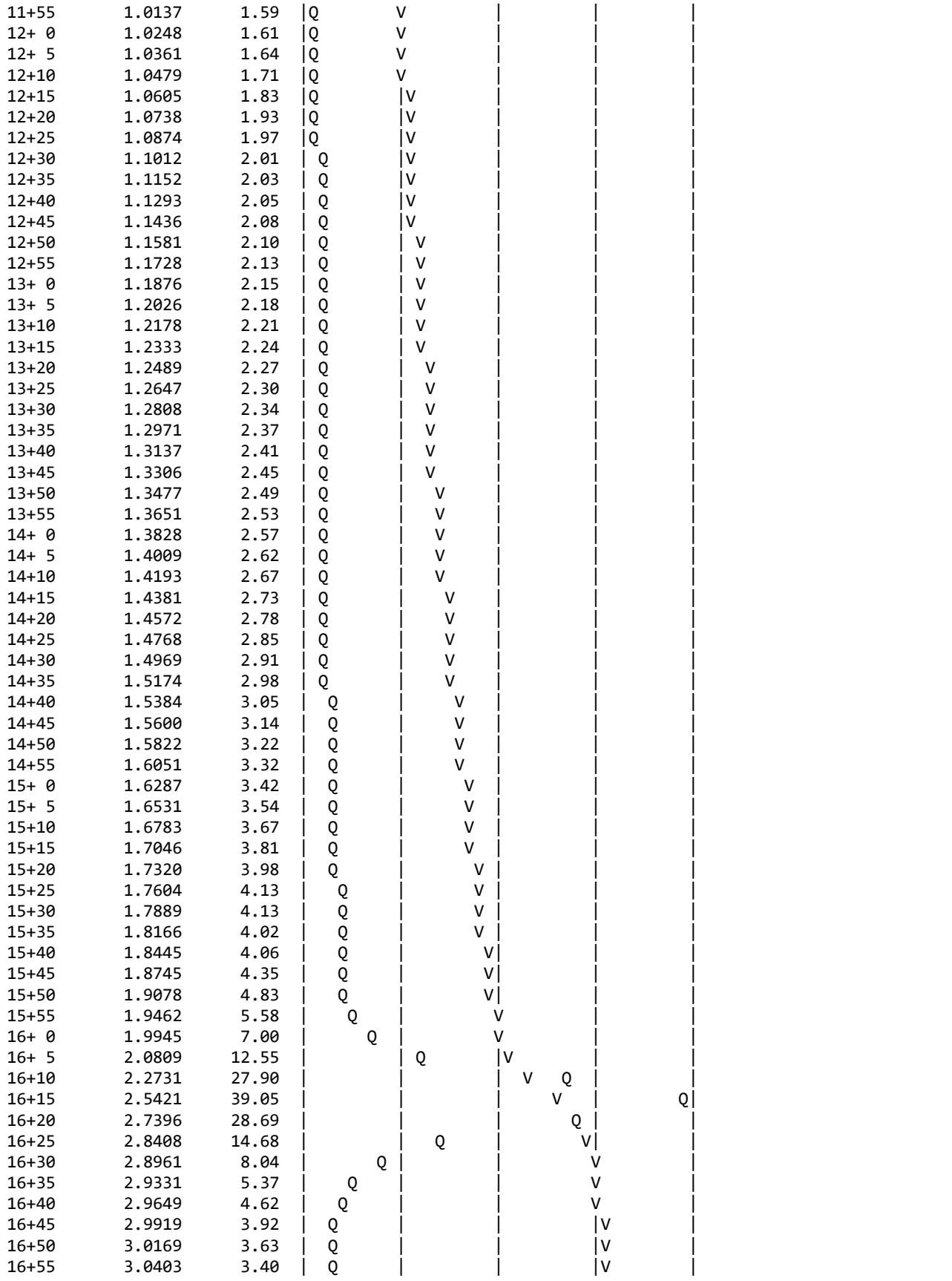
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0002	0.03	Q	|	|	|	|
0+10	0.0015	0.19	Q	|	|	|	|
0+15	0.0046	0.46	Q	|	|	|	|
0+20	0.0091	0.65	Q	|	|	|	|
0+25	0.0142	0.73	Q	|	|	|	|
0+30	0.0194	0.76	Q	|	|	|	|
0+35	0.0248	0.77	Q	|	|	|	|
0+40	0.0301	0.78	Q	|	|	|	|
0+45	0.0355	0.78	Q	|	|	|	|
0+50	0.0409	0.78	Q	|	|	|	|
0+55	0.0463	0.79	Q	|	|	|	|
1+ 0	0.0517	0.79	Q	|	|	|	|
1+ 5	0.0572	0.79	Q	|	|	|	|
1+10	0.0626	0.79	Q	|	|	|	|
1+15	0.0681	0.80	Q	|	|	|	|
1+20	0.0736	0.80	Q	|	|	|	|
1+25	0.0791	0.80	Q	|	|	|	|
1+30	0.0847	0.80	Q	|	|	|	|
1+35	0.0902	0.81	Q	|	|	|	|
1+40	0.0958	0.81	QV	|	|	|	|

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1+45       0.1013      0.81  QV        |         |         |         |
1+50       0.1069      0.81  QV        |         |         |         |
1+55       0.1126      0.82  QV        |         |         |         |
2+ 0       0.1182      0.82  QV        |         |         |         |
2+ 5       0.1239      0.82  QV        |         |         |         |
2+10       0.1295      0.82  QV        |         |         |         |
2+15       0.1352      0.83  QV        |         |         |         |
2+20       0.1409      0.83  QV        |         |         |         |
2+25       0.1467      0.83  QV        |         |         |         |
2+30       0.1524      0.84  QV        |         |         |         |
2+35       0.1582      0.84  QV        |         |         |         |
2+40       0.1640      0.84  QV        |         |         |         |
2+45       0.1698      0.84  QV        |         |         |         |
2+50       0.1756      0.85  QV        |         |         |         |
2+55       0.1815      0.85  QV        |         |         |         |
3+ 0       0.1873      0.85  QV        |         |         |         |
3+ 5       0.1932      0.86  Q V       |         |         |         |
3+10       0.1991      0.86  Q V       |         |         |         |
3+15       0.2051      0.86  Q V       |         |         |         |
3+20       0.2110      0.86  Q V       |         |         |         |
3+25       0.2170      0.87  Q V       |         |         |         |
3+30       0.2230      0.87  Q V       |         |         |         |
3+35       0.2290      0.87  Q V       |         |         |         |
3+40       0.2351      0.88  Q V       |         |         |         |
3+45       0.2411      0.88  Q V       |         |         |         |
3+50       0.2472      0.88  Q V       |         |         |         |
3+55       0.2533      0.89  Q V       |         |         |         |
4+ 0       0.2595      0.89  Q V       |         |         |         |
4+ 5       0.2656      0.89  Q V       |         |         |         |
4+10       0.2718      0.90  Q V       |         |         |         |
4+15       0.2780      0.90  Q V       |         |         |         |
4+20       0.2843      0.90  Q V       |         |         |         |
4+25       0.2905      0.91  Q  V      |         |         |         |
4+30       0.2968      0.91  Q  V      |         |         |         |
4+35       0.3031      0.92  Q  V      |         |         |         |
4+40       0.3094      0.92  Q  V      |         |         |         |
4+45       0.3158      0.92  Q  V      |         |         |         |
4+50       0.3222      0.93  Q  V      |         |         |         |
4+55       0.3286      0.93  Q  V      |         |         |         |
5+ 0       0.3350      0.93  Q  V      |         |         |         |
5+ 5       0.3415      0.94  Q  V      |         |         |         |
5+10       0.3480      0.94  Q  V      |         |         |         |
5+15       0.3545      0.95  Q  V      |         |         |         |
5+20       0.3610      0.95  Q  V      |         |         |         |
5+25       0.3676      0.95  Q  V      |         |         |         |
5+30       0.3742      0.96  Q  V      |         |         |         |
5+35       0.3808      0.96  Q  V      |         |         |         |
5+40       0.3875      0.97  Q   V     |         |         |         |
5+45       0.3942      0.97  Q   V     |         |         |         |
5+50       0.4009      0.98  Q   V     |         |         |         |
5+55       0.4076      0.98  Q   V     |         |         |         |
6+ 0       0.4144      0.98  Q   V     |         |         |         |
6+ 5       0.4212      0.99  Q   V     |         |         |         |
6+10       0.4280      0.99  Q   V     |         |         |         |
6+15       0.4349      1.00  Q   V     |         |         |         |
6+20       0.4418      1.00  |Q  V     |         |         |         |
6+25       0.4488      1.01  |Q  V     |         |         |         |
6+30       0.4557      1.01  |Q  V     |         |         |         |
6+35       0.4627      1.02  |Q  V     |         |         |         |
6+40       0.4698      1.02  |Q  V     |         |         |         |
6+45       0.4768      1.03  |Q  V     |         |         |         |
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 6+50       0.4839      1.03  |Q   V    |         |         |         |
 6+55       0.4911      1.04  |Q   V    |         |         |         |
 7+ 0       0.4983      1.04  |Q   V    |         |         |         |
 7+ 5       0.5055      1.05  |Q   V    |         |         |         |
 7+10       0.5127      1.05  |Q   V    |         |         |         |
 7+15       0.5200      1.06  |Q   V    |         |         |         |
 7+20       0.5274      1.06  |Q   V    |         |         |         |
 7+25       0.5347      1.07  |Q   V    |         |         |         |
 7+30       0.5421      1.08  |Q   V    |         |         |         |
 7+35       0.5496      1.08  |Q   V    |         |         |         |
 7+40       0.5570      1.09  |Q   V    |         |         |         |
 7+45       0.5646      1.09  |Q   V    |         |         |         |
 7+50       0.5721      1.10  |Q   V    |         |         |         |
 7+55       0.5798      1.10  |Q    V   |         |         |         |
 8+ 0       0.5874      1.11  |Q    V   |         |         |         |
 8+ 5       0.5951      1.12  |Q    V   |         |         |         |
 8+10       0.6028      1.12  |Q    V   |         |         |         |
 8+15       0.6106      1.13  |Q    V   |         |         |         |
 8+20       0.6185      1.14  |Q    V   |         |         |         |
 8+25       0.6263      1.14  |Q    V   |         |         |         |
 8+30       0.6343      1.15  |Q    V   |         |         |         |
 8+35       0.6422      1.16  |Q    V   |         |         |         |
 8+40       0.6503      1.16  |Q    V   |         |         |         |
 8+45       0.6583      1.17  |Q    V   |         |         |         |
 8+50       0.6664      1.18  |Q    V   |         |         |         |
 8+55       0.6746      1.19  |Q     V  |         |         |         |
 9+ 0       0.6828      1.19  |Q     V  |         |         |         |
 9+ 5       0.6911      1.20  |Q     V  |         |         |         |
 9+10       0.6995      1.21  |Q     V  |         |         |         |
 9+15       0.7078      1.22  |Q     V  |         |         |         |
 9+20       0.7163      1.23  |Q     V  |         |         |         |
 9+25       0.7248      1.23  |Q     V  |         |         |         |
 9+30       0.7333      1.24  |Q     V  |         |         |         |
 9+35       0.7420      1.25  |Q     V  |         |         |         |
 9+40       0.7507      1.26  |Q     V  |         |         |         |
 9+45       0.7594      1.27  |Q     V  |         |         |         |
 9+50       0.7682      1.28  |Q      V |         |         |         |
 9+55       0.7771      1.29  |Q      V |         |         |         |
10+ 0       0.7860      1.30  |Q      V |         |         |         |
10+ 5       0.7950      1.31  |Q      V |         |         |         |
10+10       0.8041      1.32  |Q      V |         |         |         |
10+15       0.8132      1.33  |Q      V |         |         |         |
10+20       0.8224      1.34  |Q      V |         |         |         |
10+25       0.8317      1.35  |Q      V |         |         |         |
10+30       0.8411      1.36  |Q      V |         |         |         |
10+35       0.8505      1.37  |Q      V |         |         |         |
10+40       0.8601      1.38  |Q      V |         |         |         |
10+45       0.8696      1.39  |Q       V|         |         |         |
10+50       0.8793      1.41  |Q       V|         |         |         |
10+55       0.8891      1.42  |Q       V|         |         |         |
11+ 0       0.8989      1.43  |Q       V|         |         |         |
11+ 5       0.9089      1.44  |Q       V|         |         |         |
11+10       0.9189      1.46  |Q       V|         |         |         |
11+15       0.9290      1.47  |Q       V|         |         |         |
11+20       0.9393      1.48  |Q       V|         |         |         |
11+25       0.9496      1.50  |Q       V|         |         |         |
11+30       0.9600      1.51  |Q        V         |         |         |
11+35       0.9705      1.53  |Q        V         |         |         |
11+40       0.9811      1.54  |Q        V         |         |         |
11+45       0.9919      1.56  |Q        V         |         |         |
11+50       1.0027      1.58  |Q        V         |         |         |
```


11+55 1.0137 1.59
12+ 0 1.0248 1.61
12+ 5 1.0361 1.64
12+10 1.0479 1.71
12+15 1.0605 1.83
12+20 1.0738 1.93
12+25 1.0874 1.97
12+30 1.1012 2.01
12+35 1.1152 2.03
12+40 1.1293 2.05
12+45 1.1436 2.08
12+50 1.1581 2.10
12+55 1.1728 2.13
13+ 0 1.1876 2.15
13+ 5 1.2026 2.18
13+10 1.2178 2.21
13+15 1.2333 2.24
13+20 1.2489 2.27
13+25 1.2647 2.30
13+30 1.2808 2.34
13+35 1.2971 2.37
13+40 1.3137 2.41
13+45 1.3306 2.45
13+50 1.3477 2.49
13+55 1.3651 2.53
14+ 0 1.3828 2.57
14+ 5 1.4009 2.62
14+10 1.4193 2.67
14+15 1.4381 2.73
14+20 1.4572 2.78
14+25 1.4768 2.85
14+30 1.4969 2.91
14+35 1.5174 2.98
14+40 1.5384 3.05
14+45 1.5600 3.14
14+50 1.5822 3.22
14+55 1.6051 3.32
15+ 0 1.6287 3.42
15+ 5 1.6531 3.54
15+10 1.6783 3.67
15+15 1.7046 3.81
15+20 1.7320 3.98
15+25 1.7604 4.13
15+30 1.7889 4.13
15+35 1.8166 4.02
15+40 1.8445 4.06
15+45 1.8745 4.35
15+50 1.9078 4.83
15+55 1.9462 5.58
16+ 0 1.9945 7.00
16+ 5 2.0809 12.55
16+10 2.2731 27.90
16+15 2.5421 39.05
16+20 2.7396 28.69
16+25 2.8408 14.68
16+30 2.8961 8.04
16+35 2.9331 5.37
16+40 2.9649 4.62
16+45 2.9919 3.92
16+50 3.0169 3.63
16+55 3.0403 3.40

17+ 0	3.0624	3.20	Q			V
17+ 5	3.0832	3.03	Q			V
17+10	3.1032	2.89	Q			V
17+15	3.1222	2.76	Q			V
17+20	3.1405	2.66	Q			V
17+25	3.1581	2.56	Q			V
17+30	3.1751	2.47	Q			V
17+35	3.1916	2.39	Q			V
17+40	3.2076	2.32	Q			V
17+45	3.2232	2.26	Q			V
17+50	3.2383	2.20	Q			V
17+55	3.2531	2.14	Q			V
18+ 0	3.2675	2.09	Q			V
18+ 5	3.2815	2.04	Q			V
18+10	3.2948	1.93	Q			V
18+15	3.3072	1.79	Q			V
18+20	3.3188	1.68	Q			V
18+25	3.3299	1.62	Q			V
18+30	3.3407	1.57	Q			V
18+35	3.3513	1.54	Q			V
18+40	3.3617	1.51	Q			V
18+45	3.3719	1.48	Q			V
18+50	3.3819	1.45	Q			V
18+55	3.3917	1.43	Q			V
19+ 0	3.4013	1.40	Q			V
19+ 5	3.4108	1.38	Q			V
19+10	3.4201	1.36	Q			V
19+15	3.4293	1.33	Q			V
19+20	3.4384	1.31	Q			V
19+25	3.4473	1.29	Q			V
19+30	3.4561	1.27	Q			V
19+35	3.4647	1.26	Q			V
19+40	3.4733	1.24	Q			V
19+45	3.4817	1.22	Q			V
19+50	3.4900	1.21	Q			V
19+55	3.4982	1.19	Q			V
20+ 0	3.5063	1.18	Q			V
20+ 5	3.5143	1.16	Q			V
20+10	3.5222	1.15	Q			V
20+15	3.5300	1.13	Q			V
20+20	3.5377	1.12	Q			V
20+25	3.5454	1.11	Q			V
20+30	3.5529	1.10	Q			V
20+35	3.5604	1.08	Q			V
20+40	3.5678	1.07	Q			V
20+45	3.5751	1.06	Q			V
20+50	3.5823	1.05	Q			V
20+55	3.5895	1.04	Q			V
21+ 0	3.5966	1.03	Q			V
21+ 5	3.6036	1.02	Q			V
21+10	3.6105	1.01	Q			V
21+15	3.6174	1.00	Q			V
21+20	3.6243	0.99	Q			V
21+25	3.6310	0.98	Q			V
21+30	3.6377	0.97	Q			V
21+35	3.6444	0.96	Q			V
21+40	3.6510	0.96	Q			V
21+45	3.6575	0.95	Q			V
21+50	3.6640	0.94	Q			V
21+55	3.6704	0.93	Q			V
22+ 0	3.6768	0.92	Q			V

22+ 5	3.6831	0.92	Q	|	|	|	V |
22+10	3.6893	0.91	Q	|	|	|	V |
22+15	3.6956	0.90	Q	|	|	|	V |
22+20	3.7017	0.90	Q	|	|	|	V |
22+25	3.7079	0.89	Q	|	|	|	V |
22+30	3.7139	0.88	Q	|	|	|	V |
22+35	3.7200	0.88	Q	|	|	|	V |
22+40	3.7260	0.87	Q	|	|	|	V |
22+45	3.7319	0.86	Q	|	|	|	V |
22+50	3.7378	0.86	Q	|	|	|	V|
22+55	3.7437	0.85	Q	|	|	|	V|
23+ 0	3.7495	0.85	Q	|	|	|	V|
23+ 5	3.7553	0.84	Q	|	|	|	V|
23+10	3.7610	0.83	Q	|	|	|	V|
23+15	3.7667	0.83	Q	|	|	|	V|
23+20	3.7724	0.82	Q	|	|	|	V|
23+25	3.7780	0.82	Q	|	|	|	V|
23+30	3.7836	0.81	Q	|	|	|	V|
23+35	3.7892	0.81	Q	|	|	|	V|
23+40	3.7947	0.80	Q	|	|	|	V|
23+45	3.8002	0.80	Q	|	|	|	V|
23+50	3.8056	0.79	Q	|	|	|	V|
23+55	3.8111	0.79	Q	|	|	|	V|
24+ 0	3.8164	0.78	Q	|	|	|	V|

U n i t H y d r o g r a p h A n a l y s i s

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Study date 01/23/23

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San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6277

JOB NO 2022-318
11115 HEMLOCK AVENUE
25 YEAR, UNIT HYDROGRAPH
PRE-CONDITION, AREA B

Storm Event Year = 25

Antecedent Moisture Condition = 2

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)	
Rainfall data for year 10			
8.22	1	0.82	
Rainfall data for year 10			
8.22	6	2.07	
Rainfall data for year 10			
8.22	24	3.81	

Note: Per City of Fontana Master Storm Drain Plan, the 25-year pre-condition flow rates shall be calculated using 10-year rainfall

++

******** Area-averaged max loss rate, Fm ********

SCS curve No.(AMCII)	SCS curve NO.(AMC 2)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
32.0	32.0	8.22	1.000	0.978	0.900	0.880

Area-averaged adjusted loss rate Fm (In/Hr) = 0.880

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
7.40	0.900	32.0	32.0	19.05	0.000
0.82	0.100	98.0	98.0	0.20	0.938

Area-averaged catchment yield fraction, Y = 0.094
Area-averaged low loss fraction, Yb = 0.906
User entry of time of concentration = 0.303 (hours)
++
Watershed area = 8.22(Ac.)
Catchment Lag time = 0.243 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 34.3614
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.880(In/Hr)
Average low loss rate fraction (Yb) = 0.906 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.305(In)
Computed peak 30-minute rainfall = 0.624(In)
Specified peak 1-hour rainfall = 0.823(In)
Computed peak 3-hour rainfall = 1.449(In)
Specified peak 6-hour rainfall = 2.070(In)
Specified peak 24-hour rainfall = 3.810(In)

Rainfall depth area reduction factors:
Using a total area of 8.22(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.304(In)
30-minute factor = 1.000 Adjusted rainfall = 0.623(In)
1-hour factor = 1.000 Adjusted rainfall = 0.823(In)
3-hour factor = 1.000 Adjusted rainfall = 1.449(In)
6-hour factor = 1.000 Adjusted rainfall = 2.070(In)
24-hour factor = 1.000 Adjusted rainfall = 3.810(In)

U n i t H y d r o g r a p h
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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
	(K = 99.41 (CFS))	
1	2.380	2.366
2	14.565	12.114
3	37.668	22.967
4	66.447	28.609
5	84.161	17.610
6	92.859	8.646
7	97.015	4.132
8	98.439	1.416
9	99.057	0.615
10	99.673	0.612
11	100.000	0.325

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3045	0.3045
2	0.4018	0.0973
3	0.4725	0.0707

4	0.5301	0.0576
5	0.5796	0.0495
6	0.6235	0.0439
7	0.6631	0.0397
8	0.6995	0.0364
9	0.7333	0.0337
10	0.7648	0.0316
11	0.7945	0.0297
12	0.8227	0.0281
13	0.8573	0.0346
14	0.8907	0.0334
15	0.9229	0.0322
16	0.9541	0.0312
17	0.9843	0.0303
18	1.0138	0.0294
19	1.0424	0.0286
20	1.0703	0.0279
21	1.0975	0.0272
22	1.1241	0.0266
23	1.1502	0.0260
24	1.1757	0.0255
25	1.2007	0.0250
26	1.2252	0.0245
27	1.2492	0.0240
28	1.2728	0.0236
29	1.2960	0.0232
30	1.3189	0.0228
31	1.3413	0.0225
32	1.3635	0.0221
33	1.3852	0.0218
34	1.4067	0.0215
35	1.4279	0.0212
36	1.4487	0.0209
37	1.4693	0.0206
38	1.4896	0.0203
39	1.5097	0.0201
40	1.5295	0.0198
41	1.5490	0.0196
42	1.5684	0.0193
43	1.5875	0.0191
44	1.6064	0.0189
45	1.6251	0.0187
46	1.6436	0.0185
47	1.6619	0.0183
48	1.6800	0.0181
49	1.6979	0.0179
50	1.7157	0.0178
51	1.7332	0.0176
52	1.7507	0.0174
53	1.7679	0.0173
54	1.7850	0.0171
55	1.8019	0.0169
56	1.8187	0.0168
57	1.8354	0.0166
58	1.8519	0.0165
59	1.8683	0.0164
60	1.8845	0.0162
61	1.9006	0.0161
62	1.9166	0.0160
63	1.9324	0.0159
64	1.9482	0.0157

65	1.9638	0.0156
66	1.9793	0.0155
67	1.9947	0.0154
68	2.0099	0.0153
69	2.0251	0.0152
70	2.0401	0.0151
71	2.0551	0.0150
72	2.0699	0.0149
73	2.0826	0.0126
74	2.0951	0.0125
75	2.1075	0.0124
76	2.1198	0.0123
77	2.1320	0.0122
78	2.1442	0.0121
79	2.1562	0.0121
80	2.1682	0.0120
81	2.1801	0.0119
82	2.1919	0.0118
83	2.2036	0.0117
84	2.2152	0.0116
85	2.2268	0.0116
86	2.2383	0.0115
87	2.2497	0.0114
88	2.2611	0.0113
89	2.2723	0.0113
90	2.2835	0.0112
91	2.2947	0.0111
92	2.3057	0.0111
93	2.3167	0.0110
94	2.3277	0.0109
95	2.3385	0.0109
96	2.3493	0.0108
97	2.3601	0.0107
98	2.3707	0.0107
99	2.3814	0.0106
100	2.3919	0.0106
101	2.4024	0.0105
102	2.4129	0.0104
103	2.4232	0.0104
104	2.4336	0.0103
105	2.4438	0.0103
106	2.4540	0.0102
107	2.4642	0.0102
108	2.4743	0.0101
109	2.4844	0.0101
110	2.4944	0.0100
111	2.5043	0.0100
112	2.5142	0.0099
113	2.5241	0.0099
114	2.5339	0.0098
115	2.5437	0.0098
116	2.5534	0.0097
117	2.5630	0.0097
118	2.5726	0.0096
119	2.5822	0.0096
120	2.5917	0.0095
121	2.6012	0.0095
122	2.6107	0.0094
123	2.6201	0.0094
124	2.6294	0.0094
125	2.6387	0.0093

126	2.6480	0.0093
127	2.6572	0.0092
128	2.6664	0.0092
129	2.6756	0.0091
130	2.6847	0.0091
131	2.6937	0.0091
132	2.7028	0.0090
133	2.7118	0.0090
134	2.7207	0.0090
135	2.7296	0.0089
136	2.7385	0.0089
137	2.7474	0.0088
138	2.7562	0.0088
139	2.7649	0.0088
140	2.7737	0.0087
141	2.7824	0.0087
142	2.7910	0.0087
143	2.7997	0.0086
144	2.8083	0.0086
145	2.8168	0.0086
146	2.8254	0.0085
147	2.8339	0.0085
148	2.8423	0.0085
149	2.8508	0.0084
150	2.8592	0.0084
151	2.8676	0.0084
152	2.8759	0.0083
153	2.8842	0.0083
154	2.8925	0.0083
155	2.9007	0.0083
156	2.9090	0.0082
157	2.9172	0.0082
158	2.9253	0.0082
159	2.9335	0.0081
160	2.9416	0.0081
161	2.9496	0.0081
162	2.9577	0.0080
163	2.9657	0.0080
164	2.9737	0.0080
165	2.9817	0.0080
166	2.9896	0.0079
167	2.9975	0.0079
168	3.0054	0.0079
169	3.0133	0.0079
170	3.0211	0.0078
171	3.0289	0.0078
172	3.0367	0.0078
173	3.0444	0.0078
174	3.0522	0.0077
175	3.0599	0.0077
176	3.0676	0.0077
177	3.0752	0.0077
178	3.0829	0.0076
179	3.0905	0.0076
180	3.0981	0.0076
181	3.1056	0.0076
182	3.1132	0.0075
183	3.1207	0.0075
184	3.1282	0.0075
185	3.1356	0.0075
186	3.1431	0.0074

187	3.1505	0.0074
188	3.1579	0.0074
189	3.1653	0.0074
190	3.1727	0.0074
191	3.1800	0.0073
192	3.1873	0.0073
193	3.1946	0.0073
194	3.2019	0.0073
195	3.2091	0.0073
196	3.2164	0.0072
197	3.2236	0.0072
198	3.2308	0.0072
199	3.2379	0.0072
200	3.2451	0.0072
201	3.2522	0.0071
202	3.2593	0.0071
203	3.2664	0.0071
204	3.2735	0.0071
205	3.2805	0.0071
206	3.2876	0.0070
207	3.2946	0.0070
208	3.3016	0.0070
209	3.3086	0.0070
210	3.3155	0.0070
211	3.3225	0.0069
212	3.3294	0.0069
213	3.3363	0.0069
214	3.3432	0.0069
215	3.3500	0.0069
216	3.3569	0.0068
217	3.3637	0.0068
218	3.3705	0.0068
219	3.3773	0.0068
220	3.3841	0.0068
221	3.3909	0.0068
222	3.3976	0.0067
223	3.4043	0.0067
224	3.4110	0.0067
225	3.4177	0.0067
226	3.4244	0.0067
227	3.4311	0.0067
228	3.4377	0.0066
229	3.4443	0.0066
230	3.4510	0.0066
231	3.4575	0.0066
232	3.4641	0.0066
233	3.4707	0.0066
234	3.4772	0.0065
235	3.4838	0.0065
236	3.4903	0.0065
237	3.4968	0.0065
238	3.5033	0.0065
239	3.5097	0.0065
240	3.5162	0.0065
241	3.5226	0.0064
242	3.5291	0.0064
243	3.5355	0.0064
244	3.5419	0.0064
245	3.5483	0.0064
246	3.5546	0.0064
247	3.5610	0.0064

248	3.5673	0.0063
249	3.5736	0.0063
250	3.5799	0.0063
251	3.5862	0.0063
252	3.5925	0.0063
253	3.5988	0.0063
254	3.6050	0.0063
255	3.6113	0.0062
256	3.6175	0.0062
257	3.6237	0.0062
258	3.6299	0.0062
259	3.6361	0.0062
260	3.6423	0.0062
261	3.6484	0.0062
262	3.6546	0.0061
263	3.6607	0.0061
264	3.6668	0.0061
265	3.6729	0.0061
266	3.6790	0.0061
267	3.6851	0.0061
268	3.6912	0.0061
269	3.6972	0.0061
270	3.7033	0.0060
271	3.7093	0.0060
272	3.7153	0.0060
273	3.7213	0.0060
274	3.7273	0.0060
275	3.7333	0.0060
276	3.7393	0.0060
277	3.7452	0.0060
278	3.7512	0.0059
279	3.7571	0.0059
280	3.7630	0.0059
281	3.7689	0.0059
282	3.7748	0.0059
283	3.7807	0.0059
284	3.7866	0.0059
285	3.7924	0.0059
286	3.7983	0.0059
287	3.8041	0.0058
288	3.8100	0.0058

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0058	0.0053	0.0005
2	0.0058	0.0053	0.0005
3	0.0059	0.0053	0.0006
4	0.0059	0.0053	0.0006
5	0.0059	0.0053	0.0006
6	0.0059	0.0054	0.0006
7	0.0059	0.0054	0.0006
8	0.0059	0.0054	0.0006
9	0.0060	0.0054	0.0006
10	0.0060	0.0054	0.0006
11	0.0060	0.0054	0.0006
12	0.0060	0.0055	0.0006
13	0.0060	0.0055	0.0006
14	0.0061	0.0055	0.0006
15	0.0061	0.0055	0.0006

16	0.0061	0.0055	0.0006
17	0.0061	0.0055	0.0006
18	0.0061	0.0056	0.0006
19	0.0062	0.0056	0.0006
20	0.0062	0.0056	0.0006
21	0.0062	0.0056	0.0006
22	0.0062	0.0056	0.0006
23	0.0062	0.0057	0.0006
24	0.0063	0.0057	0.0006
25	0.0063	0.0057	0.0006
26	0.0063	0.0057	0.0006
27	0.0063	0.0057	0.0006
28	0.0063	0.0057	0.0006
29	0.0064	0.0058	0.0006
30	0.0064	0.0058	0.0006
31	0.0064	0.0058	0.0006
32	0.0064	0.0058	0.0006
33	0.0065	0.0058	0.0006
34	0.0065	0.0059	0.0006
35	0.0065	0.0059	0.0006
36	0.0065	0.0059	0.0006
37	0.0065	0.0059	0.0006
38	0.0066	0.0059	0.0006
39	0.0066	0.0060	0.0006
40	0.0066	0.0060	0.0006
41	0.0066	0.0060	0.0006
42	0.0067	0.0060	0.0006
43	0.0067	0.0061	0.0006
44	0.0067	0.0061	0.0006
45	0.0067	0.0061	0.0006
46	0.0068	0.0061	0.0006
47	0.0068	0.0062	0.0006
48	0.0068	0.0062	0.0006
49	0.0068	0.0062	0.0006
50	0.0069	0.0062	0.0006
51	0.0069	0.0063	0.0006
52	0.0069	0.0063	0.0006
53	0.0070	0.0063	0.0007
54	0.0070	0.0063	0.0007
55	0.0070	0.0064	0.0007
56	0.0070	0.0064	0.0007
57	0.0071	0.0064	0.0007
58	0.0071	0.0064	0.0007
59	0.0071	0.0065	0.0007
60	0.0072	0.0065	0.0007
61	0.0072	0.0065	0.0007
62	0.0072	0.0065	0.0007
63	0.0073	0.0066	0.0007
64	0.0073	0.0066	0.0007
65	0.0073	0.0066	0.0007
66	0.0073	0.0066	0.0007
67	0.0074	0.0067	0.0007
68	0.0074	0.0067	0.0007
69	0.0074	0.0067	0.0007
70	0.0075	0.0068	0.0007
71	0.0075	0.0068	0.0007
72	0.0075	0.0068	0.0007
73	0.0076	0.0069	0.0007
74	0.0076	0.0069	0.0007
75	0.0077	0.0069	0.0007
76	0.0077	0.0070	0.0007

77	0.0077	0.0070	0.0007
78	0.0078	0.0070	0.0007
79	0.0078	0.0071	0.0007
80	0.0078	0.0071	0.0007
81	0.0079	0.0071	0.0007
82	0.0079	0.0072	0.0007
83	0.0080	0.0072	0.0007
84	0.0080	0.0072	0.0008
85	0.0080	0.0073	0.0008
86	0.0081	0.0073	0.0008
87	0.0081	0.0074	0.0008
88	0.0082	0.0074	0.0008
89	0.0082	0.0074	0.0008
90	0.0083	0.0075	0.0008
91	0.0083	0.0075	0.0008
92	0.0083	0.0076	0.0008
93	0.0084	0.0076	0.0008
94	0.0084	0.0076	0.0008
95	0.0085	0.0077	0.0008
96	0.0085	0.0077	0.0008
97	0.0086	0.0078	0.0008
98	0.0086	0.0078	0.0008
99	0.0087	0.0079	0.0008
100	0.0087	0.0079	0.0008
101	0.0088	0.0080	0.0008
102	0.0088	0.0080	0.0008
103	0.0089	0.0081	0.0008
104	0.0090	0.0081	0.0008
105	0.0090	0.0082	0.0008
106	0.0091	0.0082	0.0009
107	0.0091	0.0083	0.0009
108	0.0092	0.0083	0.0009
109	0.0093	0.0084	0.0009
110	0.0093	0.0084	0.0009
111	0.0094	0.0085	0.0009
112	0.0094	0.0086	0.0009
113	0.0095	0.0086	0.0009
114	0.0096	0.0087	0.0009
115	0.0097	0.0088	0.0009
116	0.0097	0.0088	0.0009
117	0.0098	0.0089	0.0009
118	0.0099	0.0089	0.0009
119	0.0100	0.0090	0.0009
120	0.0100	0.0091	0.0009
121	0.0101	0.0092	0.0009
122	0.0102	0.0092	0.0010
123	0.0103	0.0093	0.0010
124	0.0103	0.0094	0.0010
125	0.0104	0.0095	0.0010
126	0.0105	0.0095	0.0010
127	0.0106	0.0096	0.0010
128	0.0107	0.0097	0.0010
129	0.0108	0.0098	0.0010
130	0.0109	0.0098	0.0010
131	0.0110	0.0100	0.0010
132	0.0111	0.0100	0.0010
133	0.0112	0.0102	0.0011
134	0.0113	0.0102	0.0011
135	0.0114	0.0103	0.0011
136	0.0115	0.0104	0.0011
137	0.0116	0.0106	0.0011

138	0.0117	0.0106	0.0011
139	0.0119	0.0108	0.0011
140	0.0120	0.0108	0.0011
141	0.0121	0.0110	0.0011
142	0.0122	0.0111	0.0011
143	0.0124	0.0112	0.0012
144	0.0125	0.0113	0.0012
145	0.0149	0.0135	0.0014
146	0.0150	0.0135	0.0014
147	0.0152	0.0137	0.0014
148	0.0153	0.0138	0.0014
149	0.0155	0.0140	0.0015
150	0.0156	0.0141	0.0015
151	0.0159	0.0144	0.0015
152	0.0160	0.0145	0.0015
153	0.0162	0.0147	0.0015
154	0.0164	0.0148	0.0015
155	0.0166	0.0151	0.0016
156	0.0168	0.0152	0.0016
157	0.0171	0.0155	0.0016
158	0.0173	0.0156	0.0016
159	0.0176	0.0159	0.0016
160	0.0178	0.0161	0.0017
161	0.0181	0.0164	0.0017
162	0.0183	0.0166	0.0017
163	0.0187	0.0169	0.0018
164	0.0189	0.0171	0.0018
165	0.0193	0.0175	0.0018
166	0.0196	0.0177	0.0018
167	0.0201	0.0182	0.0019
168	0.0203	0.0184	0.0019
169	0.0209	0.0189	0.0020
170	0.0212	0.0192	0.0020
171	0.0218	0.0197	0.0020
172	0.0221	0.0200	0.0021
173	0.0228	0.0207	0.0021
174	0.0232	0.0210	0.0022
175	0.0240	0.0218	0.0023
176	0.0245	0.0222	0.0023
177	0.0255	0.0231	0.0024
178	0.0260	0.0236	0.0024
179	0.0272	0.0247	0.0026
180	0.0279	0.0253	0.0026
181	0.0294	0.0267	0.0028
182	0.0303	0.0274	0.0028
183	0.0322	0.0292	0.0030
184	0.0334	0.0302	0.0031
185	0.0281	0.0255	0.0026
186	0.0297	0.0269	0.0028
187	0.0337	0.0306	0.0032
188	0.0364	0.0330	0.0034
189	0.0439	0.0397	0.0041
190	0.0495	0.0448	0.0046
191	0.0707	0.0641	0.0066
192	0.0973	0.0733	0.0239
193	0.3045	0.0733	0.2311
194	0.0576	0.0522	0.0054
195	0.0397	0.0359	0.0037
196	0.0316	0.0286	0.0030
197	0.0346	0.0314	0.0032
198	0.0312	0.0283	0.0029

199	0.0286	0.0259	0.0027
200	0.0266	0.0241	0.0025
201	0.0250	0.0226	0.0023
202	0.0236	0.0214	0.0022
203	0.0225	0.0204	0.0021
204	0.0215	0.0195	0.0020
205	0.0206	0.0186	0.0019
206	0.0198	0.0179	0.0019
207	0.0191	0.0173	0.0018
208	0.0185	0.0168	0.0017
209	0.0179	0.0162	0.0017
210	0.0174	0.0158	0.0016
211	0.0169	0.0154	0.0016
212	0.0165	0.0150	0.0015
213	0.0161	0.0146	0.0015
214	0.0157	0.0143	0.0015
215	0.0154	0.0139	0.0014
216	0.0151	0.0136	0.0014
217	0.0126	0.0114	0.0012
218	0.0123	0.0112	0.0012
219	0.0121	0.0109	0.0011
220	0.0118	0.0107	0.0011
221	0.0116	0.0105	0.0011
222	0.0113	0.0103	0.0011
223	0.0111	0.0101	0.0010
224	0.0109	0.0099	0.0010
225	0.0107	0.0097	0.0010
226	0.0106	0.0096	0.0010
227	0.0104	0.0094	0.0010
228	0.0102	0.0093	0.0010
229	0.0101	0.0091	0.0009
230	0.0099	0.0090	0.0009
231	0.0098	0.0088	0.0009
232	0.0096	0.0087	0.0009
233	0.0095	0.0086	0.0009
234	0.0094	0.0085	0.0009
235	0.0092	0.0084	0.0009
236	0.0091	0.0083	0.0009
237	0.0090	0.0081	0.0008
238	0.0089	0.0080	0.0008
239	0.0088	0.0079	0.0008
240	0.0087	0.0079	0.0008
241	0.0086	0.0078	0.0008
242	0.0085	0.0077	0.0008
243	0.0084	0.0076	0.0008
244	0.0083	0.0075	0.0008
245	0.0082	0.0074	0.0008
246	0.0081	0.0073	0.0008
247	0.0080	0.0073	0.0008
248	0.0079	0.0072	0.0007
249	0.0079	0.0071	0.0007
250	0.0078	0.0071	0.0007
251	0.0077	0.0070	0.0007
252	0.0076	0.0069	0.0007
253	0.0076	0.0069	0.0007
254	0.0075	0.0068	0.0007
255	0.0074	0.0067	0.0007
256	0.0074	0.0067	0.0007
257	0.0073	0.0066	0.0007
258	0.0072	0.0066	0.0007
259	0.0072	0.0065	0.0007

260	0.0071	0.0064	0.0007
261	0.0071	0.0064	0.0007
262	0.0070	0.0063	0.0007
263	0.0069	0.0063	0.0007
264	0.0069	0.0062	0.0006
265	0.0068	0.0062	0.0006
266	0.0068	0.0061	0.0006
267	0.0067	0.0061	0.0006
268	0.0067	0.0061	0.0006
269	0.0066	0.0060	0.0006
270	0.0066	0.0060	0.0006
271	0.0065	0.0059	0.0006
272	0.0065	0.0059	0.0006
273	0.0064	0.0058	0.0006
274	0.0064	0.0058	0.0006
275	0.0064	0.0058	0.0006
276	0.0063	0.0057	0.0006
277	0.0063	0.0057	0.0006
278	0.0062	0.0056	0.0006
279	0.0062	0.0056	0.0006
280	0.0061	0.0056	0.0006
281	0.0061	0.0055	0.0006
282	0.0061	0.0055	0.0006
283	0.0060	0.0055	0.0006
284	0.0060	0.0054	0.0006
285	0.0060	0.0054	0.0006
286	0.0059	0.0054	0.0006
287	0.0059	0.0053	0.0006
288	0.0059	0.0053	0.0005

Total soil rain loss = 3.24(In)
Total effective rainfall = 0.57(In)
Peak flow rate in flood hydrograph = 7.30(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.00	Q	|	|	|	|
0+10	0.0001	0.01	Q	|	|	|	|
0+15	0.0002	0.02	Q	|	|	|	|
0+20	0.0005	0.04	Q	|	|	|	|
0+25	0.0008	0.05	Q	|	|	|	|
0+30	0.0011	0.05	Q	|	|	|	|
0+35	0.0015	0.05	Q	|	|	|	|
0+40	0.0019	0.05	Q	|	|	|	|
0+45	0.0022	0.05	Q	|	|	|	|
0+50	0.0026	0.06	Q	|	|	|	|
0+55	0.0030	0.06	Q	|	|	|	|
1+ 0	0.0034	0.06	Q	|	|	|	|
1+ 5	0.0038	0.06	Q	|	|	|	|
1+10	0.0042	0.06	Q	|	|	|	|
1+15	0.0045	0.06	Q	|	|	|	|
1+20	0.0049	0.06	Q	|	|	|	|
1+25	0.0053	0.06	Q	|	|	|	|

1+30	0.0057	0.06	Q	|	|	|	|
1+35	0.0061	0.06	Q	|	|	|	|
1+40	0.0065	0.06	Q	|	|	|	|
1+45	0.0069	0.06	Q	|	|	|	|
1+50	0.0073	0.06	Q	|	|	|	|
1+55	0.0077	0.06	Q	|	|	|	|
2+ 0	0.0081	0.06	Q	|	|	|	|
2+ 5	0.0085	0.06	Q	|	|	|	|
2+10	0.0089	0.06	Q	|	|	|	|
2+15	0.0093	0.06	Q	|	|	|	|
2+20	0.0097	0.06	Q	|	|	|	|
2+25	0.0101	0.06	QV	|	|	|	|
2+30	0.0105	0.06	QV	|	|	|	|
2+35	0.0109	0.06	QV	|	|	|	|
2+40	0.0113	0.06	QV	|	|	|	|
2+45	0.0117	0.06	QV	|	|	|	|
2+50	0.0121	0.06	QV	|	|	|	|
2+55	0.0125	0.06	QV	|	|	|	|
3+ 0	0.0130	0.06	QV	|	|	|	|
3+ 5	0.0134	0.06	QV	|	|	|	|
3+10	0.0138	0.06	QV	|	|	|	|
3+15	0.0142	0.06	QV	|	|	|	|
3+20	0.0146	0.06	QV	|	|	|	|
3+25	0.0150	0.06	QV	|	|	|	|
3+30	0.0155	0.06	QV	|	|	|	|
3+35	0.0159	0.06	QV	|	|	|	|
3+40	0.0163	0.06	QV	|	|	|	|
3+45	0.0168	0.06	QV	|	|	|	|
3+50	0.0172	0.06	QV	|	|	|	|
3+55	0.0176	0.06	QV	|	|	|	|
4+ 0	0.0180	0.06	QV	|	|	|	|
4+ 5	0.0185	0.06	QV	|	|	|	|
4+10	0.0189	0.06	QV	|	|	|	|
4+15	0.0194	0.06	QV	|	|	|	|
4+20	0.0198	0.06	Q V	|	|	|	|
4+25	0.0202	0.06	Q V	|	|	|	|
4+30	0.0207	0.06	Q V	|	|	|	|
4+35	0.0211	0.06	Q V	|	|	|	|
4+40	0.0216	0.06	Q V	|	|	|	|
4+45	0.0220	0.07	Q V	|	|	|	|
4+50	0.0225	0.07	Q V	|	|	|	|
4+55	0.0229	0.07	Q V	|	|	|	|
5+ 0	0.0234	0.07	Q V	|	|	|	|
5+ 5	0.0238	0.07	Q V	|	|	|	|
5+10	0.0243	0.07	Q V	|	|	|	|
5+15	0.0247	0.07	Q V	|	|	|	|
5+20	0.0252	0.07	Q V	|	|	|	|
5+25	0.0257	0.07	Q V	|	|	|	|
5+30	0.0261	0.07	Q V	|	|	|	|
5+35	0.0266	0.07	Q V	|	|	|	|
5+40	0.0271	0.07	Q V	|	|	|	|
5+45	0.0275	0.07	Q V	|	|	|	|
5+50	0.0280	0.07	Q V	|	|	|	|
5+55	0.0285	0.07	Q V	|	|	|	|
6+ 0	0.0290	0.07	Q V	|	|	|	|
6+ 5	0.0295	0.07	Q V	|	|	|	|
6+10	0.0299	0.07	Q V	|	|	|	|
6+15	0.0304	0.07	Q V	|	|	|	|
6+20	0.0309	0.07	Q V	|	|	|	|
6+25	0.0314	0.07	Q V	|	|	|	|
6+30	0.0319	0.07	Q V	|	|	|	|

6+35	0.0324	0.07	Q	V				
6+40	0.0329	0.07	Q	V				
6+45	0.0334	0.07	Q	V				
6+50	0.0339	0.07	Q	V				
6+55	0.0344	0.07	Q	V				
7+ 0	0.0349	0.07	Q	V				
7+ 5	0.0354	0.07	Q	V				
7+10	0.0359	0.07	Q	V				
7+15	0.0364	0.07	Q	V				
7+20	0.0369	0.08	Q	V				
7+25	0.0375	0.08	Q	V				
7+30	0.0380	0.08	Q	V				
7+35	0.0385	0.08	Q	V				
7+40	0.0390	0.08	Q	V				
7+45	0.0396	0.08	Q	V				
7+50	0.0401	0.08	Q	V				
7+55	0.0406	0.08	Q	V				
8+ 0	0.0412	0.08	Q	V				
8+ 5	0.0417	0.08	Q	V				
8+10	0.0423	0.08	Q	V				
8+15	0.0428	0.08	Q	V				
8+20	0.0434	0.08	Q	V				
8+25	0.0439	0.08	Q	V				
8+30	0.0445	0.08	Q	V				
8+35	0.0450	0.08	Q	V				
8+40	0.0456	0.08	Q	V				
8+45	0.0462	0.08	Q	V				
8+50	0.0467	0.08	Q	V				
8+55	0.0473	0.08	Q	V				
9+ 0	0.0479	0.08	Q	V				
9+ 5	0.0485	0.08	Q	V				
9+10	0.0491	0.09	Q	V				
9+15	0.0497	0.09	Q	V				
9+20	0.0503	0.09	Q	V				
9+25	0.0509	0.09	Q	V				
9+30	0.0515	0.09	Q	V				
9+35	0.0521	0.09	Q	V				
9+40	0.0527	0.09	Q	V				
9+45	0.0533	0.09	Q	V				
9+50	0.0539	0.09	Q	V				
9+55	0.0545	0.09	Q	V				
10+ 0	0.0552	0.09	Q	V				
10+ 5	0.0558	0.09	Q	V				
10+10	0.0564	0.09	Q	V				
10+15	0.0571	0.09	Q	V				
10+20	0.0577	0.09	Q	V				
10+25	0.0584	0.09	Q	V				
10+30	0.0590	0.10	Q	V				
10+35	0.0597	0.10	Q	V				
10+40	0.0604	0.10	Q	V				
10+45	0.0610	0.10	Q	V				
10+50	0.0617	0.10	Q	V				
10+55	0.0624	0.10	Q	V				
11+ 0	0.0631	0.10	Q	V				
11+ 5	0.0638	0.10	Q	V				
11+10	0.0645	0.10	Q	V				
11+15	0.0652	0.10	Q	V				
11+20	0.0659	0.10	Q	V				
11+25	0.0667	0.11	Q	V				
11+30	0.0674	0.11	Q	V				
11+35	0.0681	0.11	Q	V				

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11+40       0.0689      0.11  Q     V   |          |          |          |
11+45       0.0696      0.11  Q      V  |          |          |          |
11+50       0.0704      0.11  Q      V  |          |          |          |
11+55       0.0712      0.11  Q      V  |          |          |          |
12+ 0       0.0719      0.11  Q      V  |          |          |          |
12+ 5       0.0727      0.11  Q      V  |          |          |          |
12+10       0.0736      0.12  Q      V  |          |          |          |
12+15       0.0744      0.12  Q      V  |          |          |          |
12+20       0.0753      0.13  Q      V  |          |          |          |
12+25       0.0763      0.14  Q      V  |          |          |          |
12+30       0.0772      0.14  Q      V  |          |          |          |
12+35       0.0782      0.14  Q      V  |          |          |          |
12+40       0.0792      0.14  Q       V |          |          |          |
12+45       0.0802      0.15  Q       V |          |          |          |
12+50       0.0812      0.15  Q       V |          |          |          |
12+55       0.0822      0.15  Q       V |          |          |          |
13+ 0       0.0833      0.15  Q       V |          |          |          |
13+ 5       0.0843      0.15  Q       V |          |          |          |
13+10       0.0854      0.15  Q       V |          |          |          |
13+15       0.0865      0.16  Q       V |          |          |          |
13+20       0.0876      0.16  Q       V |          |          |          |
13+25       0.0887      0.16  Q        V|          |          |          |
13+30       0.0898      0.16  Q        V|          |          |          |
13+35       0.0910      0.17  Q        V|          |          |          |
13+40       0.0921      0.17  Q        V|          |          |          |
13+45       0.0933      0.17  Q        V|          |          |          |
13+50       0.0945      0.17  Q        V|          |          |          |
13+55       0.0957      0.18  Q        V|          |          |          |
14+ 0       0.0969      0.18  Q        V|          |          |          |
14+ 5       0.0982      0.18  Q        V|          |          |          |
14+10       0.0995      0.19  Q         V          |          |          |
14+15       0.1008      0.19  Q         V          |          |          |
14+20       0.1021      0.19  Q         V          |          |          |
14+25       0.1035      0.20  Q         V          |          |          |
14+30       0.1049      0.20  Q         V          |          |          |
14+35       0.1063      0.21  Q         V          |          |          |
14+40       0.1078      0.21  Q         V          |          |          |
14+45       0.1093      0.22  Q         |V         |          |          |
14+50       0.1108      0.22  Q         |V         |          |          |
14+55       0.1124      0.23  Q         |V         |          |          |
15+ 0       0.1140      0.24  Q         |V         |          |          |
15+ 5       0.1157      0.24  Q         |V         |          |          |
15+10       0.1175      0.25  |Q        |V         |          |          |
15+15       0.1193      0.26  |Q        | V        |          |          |
15+20       0.1212      0.27  |Q        | V        |          |          |
15+25       0.1231      0.28  |Q        | V        |          |          |
15+30       0.1251      0.29  |Q        | V        |          |          |
15+35       0.1271      0.29  |Q        | V        |          |          |
15+40       0.1291      0.29  |Q        |  V       |          |          |
15+45       0.1311      0.30  |Q        |  V       |          |          |
15+50       0.1333      0.32  |Q        |  V       |          |          |
15+55       0.1358      0.36  |Q        |  V       |          |          |
16+ 0       0.1391      0.47  |Q        |   V      |          |          |
16+ 5       0.1477      1.25  |   Q     |    V     |          |          |
16+10       0.1731      3.69  |         |   Q  V   |          |          |
16+15       0.2161      6.25  |         |          |V   Q     |          |
16+20       0.2664      7.30  |         |          |      V Q |          |
16+25       0.2981      4.60  |         |       Q  |         V          |
16+30       0.3148      2.43  |        Q|          |         |V         |
16+35       0.3239      1.31  |    Q    |          |         | V        |
16+40       0.3284      0.65  | Q       |          |         |  V       |
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16+45       0.3314      0.45  |Q        |         |         |  V      |
16+50       0.3343      0.42  |Q        |         |         |  V      |
16+55       0.3366      0.33  |Q        |         |         |   V     |
17+ 0       0.3382      0.24  Q         |         |         |   V     |
17+ 5       0.3397      0.22  Q         |         |         |   V     |
17+10       0.3412      0.21  Q         |         |         |   V     |
17+15       0.3426      0.20  Q         |         |         |   V     |
17+20       0.3439      0.19  Q         |         |         |   V     |
17+25       0.3452      0.19  Q         |         |         |    V    |
17+30       0.3465      0.18  Q         |         |         |    V    |
17+35       0.3477      0.17  Q         |         |         |    V    |
17+40       0.3488      0.17  Q         |         |         |    V    |
17+45       0.3499      0.16  Q         |         |         |    V    |
17+50       0.3510      0.16  Q         |         |         |    V    |
17+55       0.3521      0.15  Q         |         |         |    V    |
18+ 0       0.3531      0.15  Q         |         |         |    V    |
18+ 5       0.3542      0.15  Q         |         |         |    V    |
18+10       0.3551      0.14  Q         |         |         |     V   |
18+15       0.3560      0.13  Q         |         |         |     V   |
18+20       0.3569      0.12  Q         |         |         |     V   |
18+25       0.3577      0.12  Q         |         |         |     V   |
18+30       0.3585      0.11  Q         |         |         |     V   |
18+35       0.3593      0.11  Q         |         |         |     V   |
18+40       0.3600      0.11  Q         |         |         |     V   |
18+45       0.3608      0.11  Q         |         |         |     V   |
18+50       0.3615      0.10  Q         |         |         |     V   |
18+55       0.3622      0.10  Q         |         |         |     V   |
19+ 0       0.3629      0.10  Q         |         |         |     V   |
19+ 5       0.3635      0.10  Q         |         |         |     V   |
19+10       0.3642      0.10  Q         |         |         |      V  |
19+15       0.3649      0.10  Q         |         |         |      V  |
19+20       0.3655      0.09  Q         |         |         |      V  |
19+25       0.3662      0.09  Q         |         |         |      V  |
19+30       0.3668      0.09  Q         |         |         |      V  |
19+35       0.3674      0.09  Q         |         |         |      V  |
19+40       0.3680      0.09  Q         |         |         |      V  |
19+45       0.3686      0.09  Q         |         |         |      V  |
19+50       0.3692      0.09  Q         |         |         |      V  |
19+55       0.3698      0.09  Q         |         |         |      V  |
20+ 0       0.3704      0.08  Q         |         |         |      V  |
20+ 5       0.3709      0.08  Q         |         |         |      V  |
20+10       0.3715      0.08  Q         |         |         |      V  |
20+15       0.3721      0.08  Q         |         |         |      V  |
20+20       0.3726      0.08  Q         |         |         |      V  |
20+25       0.3732      0.08  Q         |         |         |      V  |
20+30       0.3737      0.08  Q         |         |         |      V  |
20+35       0.3742      0.08  Q         |         |         |       V |
20+40       0.3748      0.08  Q         |         |         |       V |
20+45       0.3753      0.08  Q         |         |         |       V |
20+50       0.3758      0.07  Q         |         |         |       V |
20+55       0.3763      0.07  Q         |         |         |       V |
21+ 0       0.3768      0.07  Q         |         |         |       V |
21+ 5       0.3773      0.07  Q         |         |         |       V |
21+10       0.3778      0.07  Q         |         |         |       V |
21+15       0.3783      0.07  Q         |         |         |       V |
21+20       0.3788      0.07  Q         |         |         |       V |
21+25       0.3793      0.07  Q         |         |         |       V |
21+30       0.3798      0.07  Q         |         |         |       V |
21+35       0.3802      0.07  Q         |         |         |       V |
21+40       0.3807      0.07  Q         |         |         |       V |
21+45       0.3812      0.07  Q         |         |         |       V |
```

21+50	0.3816	0.07	Q	|	|	|	V |
21+55	0.3821	0.07	Q	|	|	|	V |
22+ 0	0.3825	0.07	Q	|	|	|	V |
22+ 5	0.3830	0.07	Q	|	|	|	V |
22+10	0.3834	0.06	Q	|	|	|	V |
22+15	0.3839	0.06	Q	|	|	|	V|
22+20	0.3843	0.06	Q	|	|	|	V|
22+25	0.3847	0.06	Q	|	|	|	V|
22+30	0.3852	0.06	Q	|	|	|	V|
22+35	0.3856	0.06	Q	|	|	|	V|
22+40	0.3860	0.06	Q	|	|	|	V|
22+45	0.3865	0.06	Q	|	|	|	V|
22+50	0.3869	0.06	Q	|	|	|	V|
22+55	0.3873	0.06	Q	|	|	|	V|
23+ 0	0.3877	0.06	Q	|	|	|	V|
23+ 5	0.3881	0.06	Q	|	|	|	V|
23+10	0.3885	0.06	Q	|	|	|	V|
23+15	0.3889	0.06	Q	|	|	|	V|
23+20	0.3893	0.06	Q	|	|	|	V|
23+25	0.3897	0.06	Q	|	|	|	V|
23+30	0.3901	0.06	Q	|	|	|	V|
23+35	0.3905	0.06	Q	|	|	|	V|
23+40	0.3909	0.06	Q	|	|	|	V|
23+45	0.3913	0.06	Q	|	|	|	V|
23+50	0.3917	0.06	Q	|	|	|	V|
23+55	0.3921	0.06	Q	|	|	|	V|
24+ 0	0.3925	0.06	Q	|	|	|	V|

APPENDIX C.4

UNIT HYDROGRAPH ANALYSIS

PRE-DEVELOPMENT CONDITIONS – 100 YEAR

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2004, Version 7.0

Study date 01/23/23

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San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6277

JOB NO 2022-318
11115 HEMLOCK AVENUE
100-YEAR, UNIT HYDROGRAPH
PRE-CONDITION, AREA A

Storm Event Year = 100

Antecedent Moisture Condition = 2

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 25		
29.19	1	1.02
Rainfall data for year 25		
29.19	6	2.49
Rainfall data for year 25		
29.19	24	4.57

Note: Per City of Fontana Master Storm Drain Plan, the 100-year pre-condition flow rates shall be calculated using 25-year rainfall

++

******** Area-averaged max loss rate, Fm ********

SCS curve No.(AMCII)	SCS curve NO.(AMC 2)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
32.0	32.0	29.19	1.000	0.978	0.600	0.587

Area-averaged adjusted loss rate Fm (In/Hr) = 0.587

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
17.51	0.600	32.0	32.0	21.25	0.001
11.68	0.400	98.0	98.0	0.20	0.948

Area-averaged catchment yield fraction, Y = 0.380
Area-averaged low loss fraction, Yb = 0.620
User entry of time of concentration = 0.231 (hours)

++

Watershed area = 29.19(Ac.)
Catchment Lag time = 0.185 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 45.1172
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.587(In/Hr)
Average low loss rate fraction (Yb) = 0.620 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.378(In)
Computed peak 30-minute rainfall = 0.773(In)
Specified peak 1-hour rainfall = 1.020(In)
Computed peak 3-hour rainfall = 1.763(In)
Specified peak 6-hour rainfall = 2.490(In)
Specified peak 24-hour rainfall = 4.570(In)

Rainfall depth area reduction factors:
Using a total area of 29.19(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.377(In)
30-minute factor = 0.999 Adjusted rainfall = 0.772(In)
1-hour factor = 0.999 Adjusted rainfall = 1.019(In)
3-hour factor = 1.000 Adjusted rainfall = 1.763(In)
6-hour factor = 1.000 Adjusted rainfall = 2.490(In)
24-hour factor = 1.000 Adjusted rainfall = 4.570(In)

U n i t H y d r o g r a p h

++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
	(K = 353.02 (CFS))	
1	3.769	13.305
2	24.569	73.427
3	60.316	126.193
4	85.008	87.169
5	94.874	34.829
6	98.178	11.662
7	99.079	3.180
8	100.000	1.590

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3770	0.3770
2	0.4974	0.1205
3	0.5850	0.0876
4	0.6564	0.0713
5	0.7177	0.0613
6	0.7720	0.0543

7	0.8211	0.0491
8	0.8661	0.0450
9	0.9079	0.0418
10	0.9470	0.0391
11	0.9838	0.0368
12	1.0186	0.0348
13	1.0601	0.0415
14	1.1001	0.0400
15	1.1386	0.0385
16	1.1759	0.0373
17	1.2120	0.0361
18	1.2471	0.0351
19	1.2812	0.0341
20	1.3145	0.0332
21	1.3469	0.0324
22	1.3785	0.0316
23	1.4095	0.0309
24	1.4397	0.0303
25	1.4694	0.0296
26	1.4984	0.0291
27	1.5269	0.0285
28	1.5549	0.0280
29	1.5824	0.0275
30	1.6094	0.0270
31	1.6359	0.0266
32	1.6621	0.0261
33	1.6878	0.0257
34	1.7131	0.0253
35	1.7381	0.0250
36	1.7627	0.0246
37	1.7869	0.0242
38	1.8108	0.0239
39	1.8344	0.0236
40	1.8577	0.0233
41	1.8807	0.0230
42	1.9034	0.0227
43	1.9259	0.0224
44	1.9481	0.0222
45	1.9700	0.0219
46	1.9917	0.0217
47	2.0131	0.0215
48	2.0344	0.0212
49	2.0554	0.0210
50	2.0762	0.0208
51	2.0967	0.0206
52	2.1171	0.0204
53	2.1373	0.0202
54	2.1573	0.0200
55	2.1771	0.0198
56	2.1968	0.0196
57	2.2162	0.0195
58	2.2355	0.0193
59	2.2546	0.0191
60	2.2736	0.0190
61	2.2924	0.0188
62	2.3110	0.0186
63	2.3295	0.0185
64	2.3479	0.0183
65	2.3661	0.0182
66	2.3841	0.0181
67	2.4021	0.0179

68	2.4199	0.0178
69	2.4375	0.0177
70	2.4551	0.0175
71	2.4725	0.0174
72	2.4898	0.0173
73	2.5049	0.0151
74	2.5198	0.0150
75	2.5347	0.0149
76	2.5494	0.0147
77	2.5641	0.0146
78	2.5786	0.0145
79	2.5931	0.0144
80	2.6074	0.0143
81	2.6216	0.0142
82	2.6357	0.0141
83	2.6498	0.0140
84	2.6637	0.0139
85	2.6776	0.0138
86	2.6913	0.0138
87	2.7050	0.0137
88	2.7185	0.0136
89	2.7320	0.0135
90	2.7454	0.0134
91	2.7588	0.0133
92	2.7720	0.0132
93	2.7852	0.0132
94	2.7982	0.0131
95	2.8112	0.0130
96	2.8242	0.0129
97	2.8370	0.0128
98	2.8498	0.0128
99	2.8625	0.0127
100	2.8751	0.0126
101	2.8877	0.0126
102	2.9002	0.0125
103	2.9126	0.0124
104	2.9250	0.0124
105	2.9372	0.0123
106	2.9495	0.0122
107	2.9616	0.0122
108	2.9737	0.0121
109	2.9857	0.0120
110	2.9977	0.0120
111	3.0096	0.0119
112	3.0215	0.0118
113	3.0333	0.0118
114	3.0450	0.0117
115	3.0567	0.0117
116	3.0683	0.0116
117	3.0798	0.0116
118	3.0913	0.0115
119	3.1028	0.0114
120	3.1142	0.0114
121	3.1255	0.0113
122	3.1368	0.0113
123	3.1480	0.0112
124	3.1592	0.0112
125	3.1704	0.0111
126	3.1815	0.0111
127	3.1925	0.0110
128	3.2035	0.0110

129	3.2144	0.0109
130	3.2253	0.0109
131	3.2362	0.0108
132	3.2470	0.0108
133	3.2577	0.0108
134	3.2684	0.0107
135	3.2791	0.0107
136	3.2897	0.0106
137	3.3003	0.0106
138	3.3108	0.0105
139	3.3213	0.0105
140	3.3317	0.0104
141	3.3421	0.0104
142	3.3525	0.0104
143	3.3628	0.0103
144	3.3731	0.0103
145	3.3833	0.0102
146	3.3935	0.0102
147	3.4037	0.0102
148	3.4138	0.0101
149	3.4239	0.0101
150	3.4340	0.0100
151	3.4440	0.0100
152	3.4540	0.0100
153	3.4639	0.0099
154	3.4738	0.0099
155	3.4837	0.0099
156	3.4935	0.0098
157	3.5033	0.0098
158	3.5130	0.0098
159	3.5228	0.0097
160	3.5324	0.0097
161	3.5421	0.0097
162	3.5517	0.0096
163	3.5613	0.0096
164	3.5709	0.0096
165	3.5804	0.0095
166	3.5899	0.0095
167	3.5993	0.0095
168	3.6088	0.0094
169	3.6181	0.0094
170	3.6275	0.0094
171	3.6368	0.0093
172	3.6461	0.0093
173	3.6554	0.0093
174	3.6647	0.0092
175	3.6739	0.0092
176	3.6830	0.0092
177	3.6922	0.0092
178	3.7013	0.0091
179	3.7104	0.0091
180	3.7195	0.0091
181	3.7285	0.0090
182	3.7375	0.0090
183	3.7465	0.0090
184	3.7555	0.0090
185	3.7644	0.0089
186	3.7733	0.0089
187	3.7822	0.0089
188	3.7910	0.0088
189	3.7998	0.0088

190	3.8086	0.0088
191	3.8174	0.0088
192	3.8261	0.0087
193	3.8349	0.0087
194	3.8436	0.0087
195	3.8522	0.0087
196	3.8609	0.0086
197	3.8695	0.0086
198	3.8781	0.0086
199	3.8866	0.0086
200	3.8952	0.0085
201	3.9037	0.0085
202	3.9122	0.0085
203	3.9207	0.0085
204	3.9291	0.0084
205	3.9375	0.0084
206	3.9459	0.0084
207	3.9543	0.0084
208	3.9627	0.0084
209	3.9710	0.0083
210	3.9793	0.0083
211	3.9876	0.0083
212	3.9959	0.0083
213	4.0041	0.0082
214	4.0124	0.0082
215	4.0206	0.0082
216	4.0287	0.0082
217	4.0369	0.0082
218	4.0450	0.0081
219	4.0532	0.0081
220	4.0613	0.0081
221	4.0693	0.0081
222	4.0774	0.0081
223	4.0854	0.0080
224	4.0934	0.0080
225	4.1014	0.0080
226	4.1094	0.0080
227	4.1174	0.0080
228	4.1253	0.0079
229	4.1332	0.0079
230	4.1411	0.0079
231	4.1490	0.0079
232	4.1568	0.0079
233	4.1647	0.0078
234	4.1725	0.0078
235	4.1803	0.0078
236	4.1881	0.0078
237	4.1959	0.0078
238	4.2036	0.0077
239	4.2113	0.0077
240	4.2190	0.0077
241	4.2267	0.0077
242	4.2344	0.0077
243	4.2421	0.0077
244	4.2497	0.0076
245	4.2573	0.0076
246	4.2649	0.0076
247	4.2725	0.0076
248	4.2801	0.0076
249	4.2876	0.0076
250	4.2952	0.0075

251	4.3027	0.0075
252	4.3102	0.0075
253	4.3177	0.0075
254	4.3251	0.0075
255	4.3326	0.0075
256	4.3400	0.0074
257	4.3474	0.0074
258	4.3548	0.0074
259	4.3622	0.0074
260	4.3696	0.0074
261	4.3770	0.0074
262	4.3843	0.0073
263	4.3916	0.0073
264	4.3989	0.0073
265	4.4062	0.0073
266	4.4135	0.0073
267	4.4208	0.0073
268	4.4280	0.0072
269	4.4352	0.0072
270	4.4424	0.0072
271	4.4496	0.0072
272	4.4568	0.0072
273	4.4640	0.0072
274	4.4712	0.0072
275	4.4783	0.0071
276	4.4854	0.0071
277	4.4925	0.0071
278	4.4996	0.0071
279	4.5067	0.0071
280	4.5138	0.0071
281	4.5208	0.0071
282	4.5279	0.0070
283	4.5349	0.0070
284	4.5419	0.0070
285	4.5489	0.0070
286	4.5559	0.0070
287	4.5629	0.0070
288	4.5698	0.0070

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0070	0.0043	0.0026
2	0.0070	0.0043	0.0026
3	0.0070	0.0043	0.0027
4	0.0070	0.0043	0.0027
5	0.0070	0.0044	0.0027
6	0.0071	0.0044	0.0027
7	0.0071	0.0044	0.0027
8	0.0071	0.0044	0.0027
9	0.0071	0.0044	0.0027
10	0.0071	0.0044	0.0027
11	0.0072	0.0044	0.0027
12	0.0072	0.0045	0.0027
13	0.0072	0.0045	0.0027
14	0.0072	0.0045	0.0027
15	0.0073	0.0045	0.0028
16	0.0073	0.0045	0.0028
17	0.0073	0.0045	0.0028
18	0.0073	0.0045	0.0028

19	0.0074	0.0046	0.0028
20	0.0074	0.0046	0.0028
21	0.0074	0.0046	0.0028
22	0.0074	0.0046	0.0028
23	0.0075	0.0046	0.0028
24	0.0075	0.0046	0.0028
25	0.0075	0.0047	0.0029
26	0.0075	0.0047	0.0029
27	0.0076	0.0047	0.0029
28	0.0076	0.0047	0.0029
29	0.0076	0.0047	0.0029
30	0.0076	0.0047	0.0029
31	0.0077	0.0047	0.0029
32	0.0077	0.0048	0.0029
33	0.0077	0.0048	0.0029
34	0.0077	0.0048	0.0029
35	0.0078	0.0048	0.0030
36	0.0078	0.0048	0.0030
37	0.0078	0.0048	0.0030
38	0.0078	0.0049	0.0030
39	0.0079	0.0049	0.0030
40	0.0079	0.0049	0.0030
41	0.0079	0.0049	0.0030
42	0.0080	0.0049	0.0030
43	0.0080	0.0050	0.0030
44	0.0080	0.0050	0.0030
45	0.0081	0.0050	0.0031
46	0.0081	0.0050	0.0031
47	0.0081	0.0050	0.0031
48	0.0081	0.0050	0.0031
49	0.0082	0.0051	0.0031
50	0.0082	0.0051	0.0031
51	0.0082	0.0051	0.0031
52	0.0083	0.0051	0.0031
53	0.0083	0.0052	0.0032
54	0.0083	0.0052	0.0032
55	0.0084	0.0052	0.0032
56	0.0084	0.0052	0.0032
57	0.0084	0.0052	0.0032
58	0.0085	0.0053	0.0032
59	0.0085	0.0053	0.0032
60	0.0085	0.0053	0.0032
61	0.0086	0.0053	0.0033
62	0.0086	0.0053	0.0033
63	0.0087	0.0054	0.0033
64	0.0087	0.0054	0.0033
65	0.0087	0.0054	0.0033
66	0.0088	0.0054	0.0033
67	0.0088	0.0055	0.0034
68	0.0088	0.0055	0.0034
69	0.0089	0.0055	0.0034
70	0.0089	0.0055	0.0034
71	0.0090	0.0056	0.0034
72	0.0090	0.0056	0.0034
73	0.0091	0.0056	0.0034
74	0.0091	0.0056	0.0035
75	0.0092	0.0057	0.0035
76	0.0092	0.0057	0.0035
77	0.0092	0.0057	0.0035
78	0.0093	0.0057	0.0035
79	0.0093	0.0058	0.0035

80	0.0094	0.0058	0.0036
81	0.0094	0.0058	0.0036
82	0.0095	0.0059	0.0036
83	0.0095	0.0059	0.0036
84	0.0096	0.0059	0.0036
85	0.0096	0.0060	0.0037
86	0.0097	0.0060	0.0037
87	0.0097	0.0060	0.0037
88	0.0098	0.0061	0.0037
89	0.0098	0.0061	0.0037
90	0.0099	0.0061	0.0037
91	0.0099	0.0062	0.0038
92	0.0100	0.0062	0.0038
93	0.0100	0.0062	0.0038
94	0.0101	0.0063	0.0038
95	0.0102	0.0063	0.0039
96	0.0102	0.0063	0.0039
97	0.0103	0.0064	0.0039
98	0.0103	0.0064	0.0039
99	0.0104	0.0065	0.0040
100	0.0104	0.0065	0.0040
101	0.0105	0.0065	0.0040
102	0.0106	0.0066	0.0040
103	0.0107	0.0066	0.0041
104	0.0107	0.0066	0.0041
105	0.0108	0.0067	0.0041
106	0.0108	0.0067	0.0041
107	0.0109	0.0068	0.0042
108	0.0110	0.0068	0.0042
109	0.0111	0.0069	0.0042
110	0.0111	0.0069	0.0042
111	0.0112	0.0070	0.0043
112	0.0113	0.0070	0.0043
113	0.0114	0.0071	0.0043
114	0.0114	0.0071	0.0044
115	0.0116	0.0072	0.0044
116	0.0116	0.0072	0.0044
117	0.0117	0.0073	0.0045
118	0.0118	0.0073	0.0045
119	0.0119	0.0074	0.0045
120	0.0120	0.0074	0.0045
121	0.0121	0.0075	0.0046
122	0.0122	0.0075	0.0046
123	0.0123	0.0076	0.0047
124	0.0124	0.0077	0.0047
125	0.0125	0.0077	0.0047
126	0.0126	0.0078	0.0048
127	0.0127	0.0079	0.0048
128	0.0128	0.0079	0.0049
129	0.0129	0.0080	0.0049
130	0.0130	0.0081	0.0049
131	0.0132	0.0082	0.0050
132	0.0132	0.0082	0.0050
133	0.0134	0.0083	0.0051
134	0.0135	0.0084	0.0051
135	0.0137	0.0085	0.0052
136	0.0138	0.0085	0.0052
137	0.0139	0.0086	0.0053
138	0.0140	0.0087	0.0053
139	0.0142	0.0088	0.0054
140	0.0143	0.0089	0.0054

141	0.0145	0.0090	0.0055
142	0.0146	0.0091	0.0056
143	0.0149	0.0092	0.0056
144	0.0150	0.0093	0.0057
145	0.0173	0.0107	0.0066
146	0.0174	0.0108	0.0066
147	0.0177	0.0110	0.0067
148	0.0178	0.0110	0.0068
149	0.0181	0.0112	0.0069
150	0.0182	0.0113	0.0069
151	0.0185	0.0115	0.0070
152	0.0186	0.0116	0.0071
153	0.0190	0.0118	0.0072
154	0.0191	0.0119	0.0073
155	0.0195	0.0121	0.0074
156	0.0196	0.0122	0.0075
157	0.0200	0.0124	0.0076
158	0.0202	0.0125	0.0077
159	0.0206	0.0128	0.0078
160	0.0208	0.0129	0.0079
161	0.0212	0.0132	0.0081
162	0.0215	0.0133	0.0082
163	0.0219	0.0136	0.0083
164	0.0222	0.0138	0.0084
165	0.0227	0.0141	0.0086
166	0.0230	0.0143	0.0087
167	0.0236	0.0146	0.0090
168	0.0239	0.0148	0.0091
169	0.0246	0.0153	0.0094
170	0.0250	0.0155	0.0095
171	0.0257	0.0160	0.0098
172	0.0261	0.0162	0.0099
173	0.0270	0.0167	0.0103
174	0.0275	0.0170	0.0104
175	0.0285	0.0177	0.0108
176	0.0291	0.0180	0.0110
177	0.0303	0.0188	0.0115
178	0.0309	0.0192	0.0118
179	0.0324	0.0201	0.0123
180	0.0332	0.0206	0.0126
181	0.0351	0.0218	0.0133
182	0.0361	0.0224	0.0137
183	0.0385	0.0239	0.0146
184	0.0400	0.0248	0.0152
185	0.0348	0.0216	0.0132
186	0.0368	0.0228	0.0140
187	0.0418	0.0259	0.0159
188	0.0450	0.0279	0.0171
189	0.0543	0.0337	0.0206
190	0.0613	0.0380	0.0233
191	0.0876	0.0489	0.0387
192	0.1205	0.0489	0.0716
193	0.3770	0.0489	0.3281
194	0.0713	0.0442	0.0271
195	0.0491	0.0304	0.0187
196	0.0391	0.0242	0.0148
197	0.0415	0.0257	0.0158
198	0.0373	0.0231	0.0142
199	0.0341	0.0212	0.0130
200	0.0316	0.0196	0.0120
201	0.0296	0.0184	0.0113

202	0.0280	0.0173	0.0106
203	0.0266	0.0165	0.0101
204	0.0253	0.0157	0.0096
205	0.0242	0.0150	0.0092
206	0.0233	0.0144	0.0088
207	0.0224	0.0139	0.0085
208	0.0217	0.0134	0.0082
209	0.0210	0.0130	0.0080
210	0.0204	0.0126	0.0077
211	0.0198	0.0123	0.0075
212	0.0193	0.0120	0.0073
213	0.0188	0.0117	0.0071
214	0.0183	0.0114	0.0070
215	0.0179	0.0111	0.0068
216	0.0175	0.0109	0.0067
217	0.0151	0.0094	0.0057
218	0.0147	0.0091	0.0056
219	0.0144	0.0089	0.0055
220	0.0141	0.0088	0.0054
221	0.0138	0.0086	0.0053
222	0.0136	0.0084	0.0052
223	0.0133	0.0083	0.0051
224	0.0131	0.0081	0.0050
225	0.0128	0.0080	0.0049
226	0.0126	0.0078	0.0048
227	0.0124	0.0077	0.0047
228	0.0122	0.0076	0.0046
229	0.0120	0.0075	0.0046
230	0.0118	0.0073	0.0045
231	0.0117	0.0072	0.0044
232	0.0115	0.0071	0.0044
233	0.0113	0.0070	0.0043
234	0.0112	0.0069	0.0043
235	0.0110	0.0068	0.0042
236	0.0109	0.0068	0.0041
237	0.0108	0.0067	0.0041
238	0.0106	0.0066	0.0040
239	0.0105	0.0065	0.0040
240	0.0104	0.0064	0.0039
241	0.0102	0.0064	0.0039
242	0.0101	0.0063	0.0038
243	0.0100	0.0062	0.0038
244	0.0099	0.0061	0.0038
245	0.0098	0.0061	0.0037
246	0.0097	0.0060	0.0037
247	0.0096	0.0059	0.0036
248	0.0095	0.0059	0.0036
249	0.0094	0.0058	0.0036
250	0.0093	0.0058	0.0035
251	0.0092	0.0057	0.0035
252	0.0091	0.0057	0.0035
253	0.0090	0.0056	0.0034
254	0.0090	0.0056	0.0034
255	0.0089	0.0055	0.0034
256	0.0088	0.0055	0.0033
257	0.0087	0.0054	0.0033
258	0.0086	0.0054	0.0033
259	0.0086	0.0053	0.0033
260	0.0085	0.0053	0.0032
261	0.0084	0.0052	0.0032
262	0.0084	0.0052	0.0032

263	0.0083	0.0051	0.0031
264	0.0082	0.0051	0.0031
265	0.0082	0.0051	0.0031
266	0.0081	0.0050	0.0031
267	0.0080	0.0050	0.0031
268	0.0080	0.0049	0.0030
269	0.0079	0.0049	0.0030
270	0.0079	0.0049	0.0030
271	0.0078	0.0048	0.0030
272	0.0077	0.0048	0.0029
273	0.0077	0.0048	0.0029
274	0.0076	0.0047	0.0029
275	0.0076	0.0047	0.0029
276	0.0075	0.0047	0.0029
277	0.0075	0.0046	0.0028
278	0.0074	0.0046	0.0028
279	0.0074	0.0046	0.0028
280	0.0073	0.0046	0.0028
281	0.0073	0.0045	0.0028
282	0.0072	0.0045	0.0028
283	0.0072	0.0045	0.0027
284	0.0072	0.0044	0.0027
285	0.0071	0.0044	0.0027
286	0.0071	0.0044	0.0027
287	0.0070	0.0044	0.0027
288	0.0070	0.0043	0.0027

Total soil rain loss = 2.62(In)
Total effective rainfall = 1.95(In)
Peak flow rate in flood hydrograph = 51.59(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	15.0	30.0	45.0	60.0
0+ 5	0.0002	0.04	Q	|	|	|	|
0+10	0.0018	0.23	Q	|	|	|	|
0+15	0.0057	0.56	Q	|	|	|	|
0+20	0.0112	0.80	Q	|	|	|	|
0+25	0.0173	0.89	Q	|	|	|	|
0+30	0.0237	0.92	Q	|	|	|	|
0+35	0.0301	0.93	Q	|	|	|	|
0+40	0.0366	0.94	Q	|	|	|	|
0+45	0.0431	0.94	Q	|	|	|	|
0+50	0.0496	0.95	Q	|	|	|	|
0+55	0.0562	0.95	Q	|	|	|	|
1+ 0	0.0627	0.95	Q	|	|	|	|
1+ 5	0.0693	0.96	Q	|	|	|	|
1+10	0.0759	0.96	Q	|	|	|	|
1+15	0.0825	0.96	Q	|	|	|	|
1+20	0.0892	0.96	Q	|	|	|	|
1+25	0.0958	0.97	Q	|	|	|	|
1+30	0.1025	0.97	Q	|	|	|	|
1+35	0.1092	0.97	Q	|	|	|	|
1+40	0.1160	0.98	Q	|	|	|	|

1+45	0.1227	0.98	QV	|	|	|	|
1+50	0.1295	0.98	QV	|	|	|	|
1+55	0.1363	0.99	QV	|	|	|	|
2+ 0	0.1431	0.99	QV	|	|	|	|
2+ 5	0.1499	0.99	QV	|	|	|	|
2+10	0.1568	1.00	QV	|	|	|	|
2+15	0.1637	1.00	QV	|	|	|	|
2+20	0.1706	1.00	QV	|	|	|	|
2+25	0.1775	1.01	QV	|	|	|	|
2+30	0.1845	1.01	QV	|	|	|	|
2+35	0.1915	1.01	QV	|	|	|	|
2+40	0.1985	1.02	QV	|	|	|	|
2+45	0.2055	1.02	QV	|	|	|	|
2+50	0.2125	1.02	QV	|	|	|	|
2+55	0.2196	1.03	QV	|	|	|	|
3+ 0	0.2267	1.03	QV	|	|	|	|
3+ 5	0.2338	1.03	QV	|	|	|	|
3+10	0.2410	1.04	Q V	|	|	|	|
3+15	0.2482	1.04	Q V	|	|	|	|
3+20	0.2554	1.05	Q V	|	|	|	|
3+25	0.2626	1.05	Q V	|	|	|	|
3+30	0.2699	1.05	Q V	|	|	|	|
3+35	0.2772	1.06	Q V	|	|	|	|
3+40	0.2845	1.06	Q V	|	|	|	|
3+45	0.2918	1.07	Q V	|	|	|	|
3+50	0.2992	1.07	Q V	|	|	|	|
3+55	0.3066	1.07	Q V	|	|	|	|
4+ 0	0.3140	1.08	Q V	|	|	|	|
4+ 5	0.3214	1.08	Q V	|	|	|	|
4+10	0.3289	1.09	Q V	|	|	|	|
4+15	0.3364	1.09	Q V	|	|	|	|
4+20	0.3440	1.09	Q V	|	|	|	|
4+25	0.3515	1.10	Q V	|	|	|	|
4+30	0.3591	1.10	Q V	|	|	|	|
4+35	0.3667	1.11	Q V	|	|	|	|
4+40	0.3744	1.11	Q V	|	|	|	|
4+45	0.3821	1.12	Q V	|	|	|	|
4+50	0.3898	1.12	Q V	|	|	|	|
4+55	0.3976	1.13	Q V	|	|	|	|
5+ 0	0.4054	1.13	Q V	|	|	|	|
5+ 5	0.4132	1.14	Q V	|	|	|	|
5+10	0.4210	1.14	Q V	|	|	|	|
5+15	0.4289	1.14	Q V	|	|	|	|
5+20	0.4368	1.15	Q V	|	|	|	|
5+25	0.4448	1.15	Q V	|	|	|	|
5+30	0.4528	1.16	Q V	|	|	|	|
5+35	0.4608	1.16	Q V	|	|	|	|
5+40	0.4688	1.17	Q V	|	|	|	|
5+45	0.4769	1.18	Q V	|	|	|	|
5+50	0.4851	1.18	Q V	|	|	|	|
5+55	0.4932	1.19	Q V	|	|	|	|
6+ 0	0.5014	1.19	Q V	|	|	|	|
6+ 5	0.5097	1.20	Q V	|	|	|	|
6+10	0.5179	1.20	Q V	|	|	|	|
6+15	0.5263	1.21	Q V	|	|	|	|
6+20	0.5346	1.21	Q V	|	|	|	|
6+25	0.5430	1.22	Q V	|	|	|	|
6+30	0.5515	1.22	Q V	|	|	|	|
6+35	0.5599	1.23	Q V	|	|	|	|
6+40	0.5684	1.24	Q V	|	|	|	|
6+45	0.5770	1.24	Q V	|	|	|	|

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 6+50       0.5856      1.25  Q   V     |         |         |         |
 6+55       0.5943      1.26  Q    V    |         |         |         |
 7+ 0       0.6029      1.26  Q    V    |         |         |         |
 7+ 5       0.6117      1.27  Q    V    |         |         |         |
 7+10       0.6205      1.27  Q    V    |         |         |         |
 7+15       0.6293      1.28  Q    V    |         |         |         |
 7+20       0.6382      1.29  Q    V    |         |         |         |
 7+25       0.6471      1.29  Q    V    |         |         |         |
 7+30       0.6560      1.30  Q    V    |         |         |         |
 7+35       0.6650      1.31  Q    V    |         |         |         |
 7+40       0.6741      1.32  Q    V    |         |         |         |
 7+45       0.6832      1.32  Q    V    |         |         |         |
 7+50       0.6924      1.33  Q    V    |         |         |         |
 7+55       0.7016      1.34  Q    V    |         |         |         |
 8+ 0       0.7109      1.35  Q     V   |         |         |         |
 8+ 5       0.7202      1.35  Q     V   |         |         |         |
 8+10       0.7295      1.36  Q     V   |         |         |         |
 8+15       0.7390      1.37  Q     V   |         |         |         |
 8+20       0.7485      1.38  Q     V   |         |         |         |
 8+25       0.7580      1.39  Q     V   |         |         |         |
 8+30       0.7676      1.39  Q     V   |         |         |         |
 8+35       0.7772      1.40  Q     V   |         |         |         |
 8+40       0.7870      1.41  Q     V   |         |         |         |
 8+45       0.7967      1.42  Q     V   |         |         |         |
 8+50       0.8066      1.43  Q     V   |         |         |         |
 8+55       0.8165      1.44  Q     V   |         |         |         |
 9+ 0       0.8264      1.45  Q     V   |         |         |         |
 9+ 5       0.8365      1.46  Q      V  |         |         |         |
 9+10       0.8466      1.47  Q      V  |         |         |         |
 9+15       0.8567      1.48  Q      V  |         |         |         |
 9+20       0.8669      1.49  Q      V  |         |         |         |
 9+25       0.8772      1.50  Q      V  |         |         |         |
 9+30       0.8876      1.51  |Q     V  |         |         |         |
 9+35       0.8981      1.52  |Q     V  |         |         |         |
 9+40       0.9086      1.53  |Q     V  |         |         |         |
 9+45       0.9192      1.54  |Q     V  |         |         |         |
 9+50       0.9298      1.55  |Q     V  |         |         |         |
 9+55       0.9406      1.56  |Q     V  |         |         |         |
10+ 0       0.9514      1.57  |Q      V |         |         |         |
10+ 5       0.9623      1.58  |Q      V |         |         |         |
10+10       0.9733      1.60  |Q      V |         |         |         |
10+15       0.9844      1.61  |Q      V |         |         |         |
10+20       0.9955      1.62  |Q      V |         |         |         |
10+25       1.0068      1.63  |Q      V |         |         |         |
10+30       1.0181      1.65  |Q      V |         |         |         |
10+35       1.0296      1.66  |Q      V |         |         |         |
10+40       1.0411      1.67  |Q      V |         |         |         |
10+45       1.0528      1.69  |Q      V |         |         |         |
10+50       1.0645      1.70  |Q       V|         |         |         |
10+55       1.0763      1.72  |Q       V|         |         |         |
11+ 0       1.0883      1.73  |Q       V|         |         |         |
11+ 5       1.1003      1.75  |Q       V|         |         |         |
11+10       1.1125      1.77  |Q       V|         |         |         |
11+15       1.1247      1.78  |Q       V|         |         |         |
11+20       1.1371      1.80  |Q       V|         |         |         |
11+25       1.1496      1.82  |Q       V|         |         |         |
11+30       1.1623      1.83  |Q       V|         |         |         |
11+35       1.1750      1.85  |Q       V|         |         |         |
11+40       1.1879      1.87  |Q        V         |         |         |
11+45       1.2009      1.89  |Q        V         |         |         |
11+50       1.2141      1.91  |Q        V         |         |         |
```

```
11+55       1.2274      1.93  |Q        V         |         |         |
12+ 0       1.2408      1.95  |Q        V         |         |         |
12+ 5       1.2545      1.98  |Q        V         |         |         |
12+10       1.2687      2.06  |Q        V         |         |         |
12+15       1.2838      2.19  |Q        V         |         |         |
12+20       1.2995      2.28  |Q        |V        |         |         |
12+25       1.3155      2.33  |Q        |V        |         |         |
12+30       1.3318      2.37  |Q        |V        |         |         |
12+35       1.3484      2.40  |Q        |V        |         |         |
12+40       1.3651      2.43  |Q        |V        |         |         |
12+45       1.3820      2.46  |Q        |V        |         |         |
12+50       1.3991      2.49  |Q        |V        |         |         |
12+55       1.4164      2.52  |Q        |V        |         |         |
13+ 0       1.4340      2.55  |Q        | V       |         |         |
13+ 5       1.4518      2.58  |Q        | V       |         |         |
13+10       1.4698      2.62  |Q        | V       |         |         |
13+15       1.4881      2.65  |Q        | V       |         |         |
13+20       1.5066      2.69  |Q        | V       |         |         |
13+25       1.5254      2.73  |Q        | V       |         |         |
13+30       1.5445      2.77  |Q        |  V      |         |         |
13+35       1.5639      2.81  |Q        |  V      |         |         |
13+40       1.5835      2.86  |Q        |  V      |         |         |
13+45       1.6036      2.91  |Q        |  V      |         |         |
13+50       1.6239      2.96  |Q        |  V      |         |         |
13+55       1.6446      3.01  | Q       |  V      |         |         |
14+ 0       1.6657      3.06  | Q       |   V     |         |         |
14+ 5       1.6872      3.12  | Q       |   V     |         |         |
14+10       1.7092      3.19  | Q       |   V     |         |         |
14+15       1.7316      3.25  | Q       |   V     |         |         |
14+20       1.7545      3.32  | Q       |   V     |         |         |
14+25       1.7779      3.40  | Q       |    V    |         |         |
14+30       1.8019      3.48  | Q       |    V    |         |         |
14+35       1.8264      3.57  | Q       |    V    |         |         |
14+40       1.8516      3.66  | Q       |    V    |         |         |
14+45       1.8775      3.76  | Q       |    V    |         |         |
14+50       1.9041      3.87  | Q       |     V   |         |         |
14+55       1.9316      3.99  | Q       |     V   |         |         |
15+ 0       1.9600      4.12  | Q       |     V   |         |         |
15+ 5       1.9893      4.26  | Q       |     V   |         |         |
15+10       2.0198      4.42  | Q       |      V  |         |         |
15+15       2.0515      4.61  |  Q      |      V  |         |         |
15+20       2.0846      4.81  |  Q      |      V  |         |         |
15+25       2.1191      5.01  |  Q      |      V  |         |         |
15+30       2.1539      5.04  |  Q      |       V |         |         |
15+35       2.1880      4.96  |  Q      |       V |         |         |
15+40       2.2230      5.08  |  Q      |       V |         |         |
15+45       2.2606      5.46  |  Q      |        V|         |         |
15+50       2.3025      6.08  |   Q     |        V|         |         |
15+55       2.3514      7.10  |   Q     |        V|         |         |
16+ 0       2.4160      9.38  |     Q   |         V         |         |
16+ 5       2.5367     17.52  |         |Q        |V        |         |
16+10       2.7983     37.99  |         |         |  V Q    |         |
16+15       3.1536     51.59  |         |         |     V   |   Q     |
16+20       3.4059     36.64  |         |         |   Q   V |         |
16+25       3.5329     18.44  |         | Q       |        V|         |
16+30       3.6012      9.91  |     Q   |         |         V         |
16+35       3.6468      6.62  |   Q     |         |         V         |
16+40       3.6855      5.62  |  Q      |         |         |V        |
16+45       3.7180      4.73  |  Q      |         |         |V        |
16+50       3.7481      4.37  | Q       |         |         |V        |
16+55       3.7762      4.07  | Q       |         |         |V        |
```

17+ 0	3.8026	3.83	Q			V
17+ 5	3.8275	3.63	Q			V
17+10	3.8513	3.45	Q			V
17+15	3.8740	3.29	Q			V
17+20	3.8957	3.16	Q			V
17+25	3.9167	3.04	Q			V
17+30	3.9369	2.93	Q			V
17+35	3.9564	2.84	Q			V
17+40	3.9754	2.75	Q			V
17+45	3.9938	2.67	Q			V
17+50	4.0117	2.60	Q			V
17+55	4.0292	2.53	Q			V
18+ 0	4.0462	2.47	Q			V
18+ 5	4.0628	2.40	Q			V
18+10	4.0785	2.29	Q			V
18+15	4.0933	2.14	Q			V
18+20	4.1072	2.03	Q			V
18+25	4.1207	1.95	Q			V
18+30	4.1338	1.90	Q			V
18+35	4.1466	1.86	Q			V
18+40	4.1592	1.83	Q			V
18+45	4.1715	1.79	Q			V
18+50	4.1837	1.76	Q			V
18+55	4.1955	1.73	Q			V
19+ 0	4.2072	1.70	Q			V
19+ 5	4.2187	1.67	Q			V
19+10	4.2300	1.64	Q			V
19+15	4.2411	1.61	Q			V
19+20	4.2521	1.59	Q			V
19+25	4.2629	1.57	Q			V
19+30	4.2735	1.54	Q			V
19+35	4.2840	1.52	Q			V
19+40	4.2943	1.50	Q			V
19+45	4.3045	1.48	Q			V
19+50	4.3146	1.46	Q			V
19+55	4.3245	1.44	Q			V
20+ 0	4.3343	1.42	Q			V
20+ 5	4.3440	1.41	Q			V
20+10	4.3536	1.39	Q			V
20+15	4.3630	1.37	Q			V
20+20	4.3724	1.36	Q			V
20+25	4.3816	1.34	Q			V
20+30	4.3907	1.33	Q			V
20+35	4.3998	1.31	Q			V
20+40	4.4087	1.30	Q			V
20+45	4.4176	1.28	Q			V
20+50	4.4263	1.27	Q			V
20+55	4.4350	1.26	Q			V
21+ 0	4.4436	1.25	Q			V
21+ 5	4.4521	1.23	Q			V
21+10	4.4605	1.22	Q			V
21+15	4.4688	1.21	Q			V
21+20	4.4771	1.20	Q			V
21+25	4.4852	1.19	Q			V
21+30	4.4934	1.18	Q			V
21+35	4.5014	1.17	Q			V
21+40	4.5094	1.16	Q			V
21+45	4.5173	1.15	Q			V
21+50	4.5251	1.14	Q			V
21+55	4.5329	1.13	Q			V
22+ 0	4.5406	1.12	Q			V

22+ 5	4.5482	1.11	Q	|	|	|	V |
22+10	4.5558	1.10	Q	|	|	|	V |
22+15	4.5633	1.09	Q	|	|	|	V |
22+20	4.5708	1.08	Q	|	|	|	V |
22+25	4.5782	1.08	Q	|	|	|	V |
22+30	4.5855	1.07	Q	|	|	|	V |
22+35	4.5928	1.06	Q	|	|	|	V |
22+40	4.6001	1.05	Q	|	|	|	V |
22+45	4.6073	1.04	Q	|	|	|	V|
22+50	4.6144	1.04	Q	|	|	|	V|
22+55	4.6215	1.03	Q	|	|	|	V|
23+ 0	4.6285	1.02	Q	|	|	|	V|
23+ 5	4.6355	1.02	Q	|	|	|	V|
23+10	4.6425	1.01	Q	|	|	|	V|
23+15	4.6494	1.00	Q	|	|	|	V|
23+20	4.6562	0.99	Q	|	|	|	V|
23+25	4.6630	0.99	Q	|	|	|	V|
23+30	4.6698	0.98	Q	|	|	|	V|
23+35	4.6765	0.98	Q	|	|	|	V|
23+40	4.6832	0.97	Q	|	|	|	V|
23+45	4.6898	0.96	Q	|	|	|	V|
23+50	4.6964	0.96	Q	|	|	|	V|
23+55	4.7030	0.95	Q	|	|	|	V|
24+ 0	4.7095	0.95	Q	|	|	|	V|

U n i t H y d r o g r a p h A n a l y s i s

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Study date 01/23/23

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San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6277

JOB NO 2022-318
11115 HEMLOCK AVENUE
100-YEAR, UNIT HYDROGRAPH
PRE-CONDITION, AREA B

Storm Event Year = 100

Antecedent Moisture Condition = 2

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)	
Rainfall data for year 25			
8.22	1	1.02	
Rainfall data for year 25			
8.22	6	2.49	
Rainfall data for year 25			
8.22	24	4.57	

Note: Per City of Fontana Master Storm Drain Plan, the 100-year pre-condition flow rates shall be calculated using 25-year rainfall

++

******** Area-averaged max loss rate, Fm ********

SCS curve No.(AMCII)	SCS curve NO.(AMC 2)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
32.0	32.0	8.22	1.000	0.978	0.900	0.880

Area-averaged adjusted loss rate Fm (In/Hr) = 0.880

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
7.40	0.900	32.0	32.0	21.25	0.001
0.82	0.100	98.0	98.0	0.20	0.948

Area-averaged catchment yield fraction, Y = 0.096
Area-averaged low loss fraction, Yb = 0.904
User entry of time of concentration = 0.303 (hours)
++
Watershed area = 8.22(Ac.)
Catchment Lag time = 0.243 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 34.3614
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.880(In/Hr)
Average low loss rate fraction (Yb) = 0.904 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.378(In)
Computed peak 30-minute rainfall = 0.773(In)
Specified peak 1-hour rainfall = 1.020(In)
Computed peak 3-hour rainfall = 1.763(In)
Specified peak 6-hour rainfall = 2.490(In)
Specified peak 24-hour rainfall = 4.570(In)

Rainfall depth area reduction factors:
Using a total area of 8.22(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.377(In)
30-minute factor = 1.000 Adjusted rainfall = 0.773(In)
1-hour factor = 1.000 Adjusted rainfall = 1.020(In)
3-hour factor = 1.000 Adjusted rainfall = 1.763(In)
6-hour factor = 1.000 Adjusted rainfall = 2.490(In)
24-hour factor = 1.000 Adjusted rainfall = 4.570(In)

U n i t H y d r o g r a p h
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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
	(K = 99.41 (CFS))	
1	2.380	2.366
2	14.565	12.114
3	37.668	22.967
4	66.447	28.609
5	84.161	17.610
6	92.859	8.646
7	97.015	4.132
8	98.439	1.416
9	99.057	0.615
10	99.673	0.612
11	100.000	0.325

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3774	0.3774
2	0.4979	0.1206
3	0.5856	0.0877

4	0.6570	0.0714
5	0.7184	0.0613
6	0.7727	0.0543
7	0.8219	0.0491
8	0.8670	0.0451
9	0.9088	0.0418
10	0.9479	0.0391
11	0.9847	0.0368
12	1.0196	0.0349
13	1.0611	0.0415
14	1.1010	0.0399
15	1.1396	0.0385
16	1.1768	0.0373
17	1.2129	0.0361
18	1.2480	0.0351
19	1.2820	0.0341
20	1.3152	0.0332
21	1.3476	0.0324
22	1.3792	0.0316
23	1.4101	0.0309
24	1.4404	0.0302
25	1.4700	0.0296
26	1.4990	0.0290
27	1.5274	0.0285
28	1.5554	0.0279
29	1.5828	0.0274
30	1.6098	0.0270
31	1.6363	0.0265
32	1.6624	0.0261
33	1.6881	0.0257
34	1.7134	0.0253
35	1.7383	0.0249
36	1.7629	0.0246
37	1.7872	0.0242
38	1.8111	0.0239
39	1.8346	0.0236
40	1.8579	0.0233
41	1.8809	0.0230
42	1.9036	0.0227
43	1.9261	0.0224
44	1.9483	0.0222
45	1.9702	0.0219
46	1.9919	0.0217
47	2.0133	0.0215
48	2.0346	0.0212
49	2.0556	0.0210
50	2.0764	0.0208
51	2.0969	0.0206
52	2.1173	0.0204
53	2.1375	0.0202
54	2.1575	0.0200
55	2.1773	0.0198
56	2.1969	0.0196
57	2.2164	0.0195
58	2.2357	0.0193
59	2.2548	0.0191
60	2.2738	0.0190
61	2.2926	0.0188
62	2.3112	0.0186
63	2.3297	0.0185
64	2.3480	0.0183

65	2.3663	0.0182
66	2.3843	0.0181
67	2.4022	0.0179
68	2.4200	0.0178
69	2.4377	0.0177
70	2.4552	0.0175
71	2.4726	0.0174
72	2.4899	0.0173
73	2.5050	0.0151
74	2.5200	0.0150
75	2.5349	0.0149
76	2.5496	0.0147
77	2.5643	0.0146
78	2.5788	0.0145
79	2.5932	0.0144
80	2.6075	0.0143
81	2.6218	0.0142
82	2.6359	0.0141
83	2.6499	0.0140
84	2.6639	0.0139
85	2.6777	0.0138
86	2.6915	0.0138
87	2.7051	0.0137
88	2.7187	0.0136
89	2.7322	0.0135
90	2.7456	0.0134
91	2.7589	0.0133
92	2.7722	0.0132
93	2.7853	0.0132
94	2.7984	0.0131
95	2.8114	0.0130
96	2.8243	0.0129
97	2.8372	0.0128
98	2.8500	0.0128
99	2.8627	0.0127
100	2.8753	0.0126
101	2.8878	0.0126
102	2.9003	0.0125
103	2.9128	0.0124
104	2.9251	0.0124
105	2.9374	0.0123
106	2.9496	0.0122
107	2.9618	0.0122
108	2.9739	0.0121
109	2.9859	0.0120
110	2.9979	0.0120
111	3.0098	0.0119
112	3.0216	0.0118
113	3.0334	0.0118
114	3.0451	0.0117
115	3.0568	0.0117
116	3.0684	0.0116
117	3.0800	0.0116
118	3.0915	0.0115
119	3.1029	0.0114
120	3.1143	0.0114
121	3.1257	0.0113
122	3.1370	0.0113
123	3.1482	0.0112
124	3.1594	0.0112
125	3.1705	0.0111

126	3.1816	0.0111
127	3.1926	0.0110
128	3.2036	0.0110
129	3.2146	0.0109
130	3.2255	0.0109
131	3.2363	0.0108
132	3.2471	0.0108
133	3.2579	0.0108
134	3.2686	0.0107
135	3.2792	0.0107
136	3.2899	0.0106
137	3.3004	0.0106
138	3.3110	0.0105
139	3.3214	0.0105
140	3.3319	0.0104
141	3.3423	0.0104
142	3.3527	0.0104
143	3.3630	0.0103
144	3.3733	0.0103
145	3.3835	0.0102
146	3.3937	0.0102
147	3.4039	0.0102
148	3.4140	0.0101
149	3.4241	0.0101
150	3.4341	0.0100
151	3.4441	0.0100
152	3.4541	0.0100
153	3.4640	0.0099
154	3.4739	0.0099
155	3.4838	0.0099
156	3.4936	0.0098
157	3.5034	0.0098
158	3.5132	0.0098
159	3.5229	0.0097
160	3.5326	0.0097
161	3.5422	0.0097
162	3.5519	0.0096
163	3.5615	0.0096
164	3.5710	0.0096
165	3.5805	0.0095
166	3.5900	0.0095
167	3.5995	0.0095
168	3.6089	0.0094
169	3.6183	0.0094
170	3.6277	0.0094
171	3.6370	0.0093
172	3.6463	0.0093
173	3.6556	0.0093
174	3.6648	0.0092
175	3.6740	0.0092
176	3.6832	0.0092
177	3.6923	0.0092
178	3.7015	0.0091
179	3.7106	0.0091
180	3.7196	0.0091
181	3.7287	0.0090
182	3.7377	0.0090
183	3.7467	0.0090
184	3.7556	0.0090
185	3.7645	0.0089
186	3.7734	0.0089

187	3.7823	0.0089
188	3.7912	0.0088
189	3.8000	0.0088
190	3.8088	0.0088
191	3.8175	0.0088
192	3.8263	0.0087
193	3.8350	0.0087
194	3.8437	0.0087
195	3.8524	0.0087
196	3.8610	0.0086
197	3.8696	0.0086
198	3.8782	0.0086
199	3.8868	0.0086
200	3.8953	0.0085
201	3.9038	0.0085
202	3.9123	0.0085
203	3.9208	0.0085
204	3.9293	0.0084
205	3.9377	0.0084
206	3.9461	0.0084
207	3.9545	0.0084
208	3.9628	0.0084
209	3.9712	0.0083
210	3.9795	0.0083
211	3.9878	0.0083
212	3.9960	0.0083
213	4.0043	0.0082
214	4.0125	0.0082
215	4.0207	0.0082
216	4.0289	0.0082
217	4.0370	0.0082
218	4.0452	0.0081
219	4.0533	0.0081
220	4.0614	0.0081
221	4.0695	0.0081
222	4.0775	0.0081
223	4.0856	0.0080
224	4.0936	0.0080
225	4.1016	0.0080
226	4.1095	0.0080
227	4.1175	0.0080
228	4.1254	0.0079
229	4.1334	0.0079
230	4.1412	0.0079
231	4.1491	0.0079
232	4.1570	0.0079
233	4.1648	0.0078
234	4.1726	0.0078
235	4.1804	0.0078
236	4.1882	0.0078
237	4.1960	0.0078
238	4.2037	0.0077
239	4.2115	0.0077
240	4.2192	0.0077
241	4.2269	0.0077
242	4.2345	0.0077
243	4.2422	0.0077
244	4.2498	0.0076
245	4.2575	0.0076
246	4.2651	0.0076
247	4.2726	0.0076

248	4.2802	0.0076
249	4.2878	0.0076
250	4.2953	0.0075
251	4.3028	0.0075
252	4.3103	0.0075
253	4.3178	0.0075
254	4.3253	0.0075
255	4.3327	0.0075
256	4.3402	0.0074
257	4.3476	0.0074
258	4.3550	0.0074
259	4.3624	0.0074
260	4.3697	0.0074
261	4.3771	0.0074
262	4.3844	0.0073
263	4.3917	0.0073
264	4.3991	0.0073
265	4.4063	0.0073
266	4.4136	0.0073
267	4.4209	0.0073
268	4.4281	0.0072
269	4.4354	0.0072
270	4.4426	0.0072
271	4.4498	0.0072
272	4.4570	0.0072
273	4.4641	0.0072
274	4.4713	0.0072
275	4.4784	0.0071
276	4.4855	0.0071
277	4.4927	0.0071
278	4.4998	0.0071
279	4.5068	0.0071
280	4.5139	0.0071
281	4.5210	0.0071
282	4.5280	0.0070
283	4.5350	0.0070
284	4.5420	0.0070
285	4.5490	0.0070
286	4.5560	0.0070
287	4.5630	0.0070
288	4.5700	0.0070

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0070	0.0063	0.0007
2	0.0070	0.0063	0.0007
3	0.0070	0.0063	0.0007
4	0.0070	0.0063	0.0007
5	0.0070	0.0064	0.0007
6	0.0071	0.0064	0.0007
7	0.0071	0.0064	0.0007
8	0.0071	0.0064	0.0007
9	0.0071	0.0064	0.0007
10	0.0071	0.0065	0.0007
11	0.0072	0.0065	0.0007
12	0.0072	0.0065	0.0007
13	0.0072	0.0065	0.0007
14	0.0072	0.0065	0.0007
15	0.0073	0.0066	0.0007

16	0.0073	0.0066	0.0007
17	0.0073	0.0066	0.0007
18	0.0073	0.0066	0.0007
19	0.0074	0.0066	0.0007
20	0.0074	0.0067	0.0007
21	0.0074	0.0067	0.0007
22	0.0074	0.0067	0.0007
23	0.0075	0.0067	0.0007
24	0.0075	0.0068	0.0007
25	0.0075	0.0068	0.0007
26	0.0075	0.0068	0.0007
27	0.0076	0.0068	0.0007
28	0.0076	0.0068	0.0007
29	0.0076	0.0069	0.0007
30	0.0076	0.0069	0.0007
31	0.0077	0.0069	0.0007
32	0.0077	0.0069	0.0007
33	0.0077	0.0070	0.0007
34	0.0077	0.0070	0.0007
35	0.0078	0.0070	0.0007
36	0.0078	0.0070	0.0007
37	0.0078	0.0071	0.0007
38	0.0078	0.0071	0.0008
39	0.0079	0.0071	0.0008
40	0.0079	0.0071	0.0008
41	0.0079	0.0072	0.0008
42	0.0080	0.0072	0.0008
43	0.0080	0.0072	0.0008
44	0.0080	0.0072	0.0008
45	0.0081	0.0073	0.0008
46	0.0081	0.0073	0.0008
47	0.0081	0.0073	0.0008
48	0.0081	0.0074	0.0008
49	0.0082	0.0074	0.0008
50	0.0082	0.0074	0.0008
51	0.0082	0.0075	0.0008
52	0.0083	0.0075	0.0008
53	0.0083	0.0075	0.0008
54	0.0083	0.0075	0.0008
55	0.0084	0.0076	0.0008
56	0.0084	0.0076	0.0008
57	0.0084	0.0076	0.0008
58	0.0085	0.0077	0.0008
59	0.0085	0.0077	0.0008
60	0.0085	0.0077	0.0008
61	0.0086	0.0078	0.0008
62	0.0086	0.0078	0.0008
63	0.0087	0.0078	0.0008
64	0.0087	0.0079	0.0008
65	0.0087	0.0079	0.0008
66	0.0088	0.0079	0.0008
67	0.0088	0.0080	0.0008
68	0.0088	0.0080	0.0008
69	0.0089	0.0080	0.0009
70	0.0089	0.0081	0.0009
71	0.0090	0.0081	0.0009
72	0.0090	0.0081	0.0009
73	0.0091	0.0082	0.0009
74	0.0091	0.0082	0.0009
75	0.0092	0.0083	0.0009
76	0.0092	0.0083	0.0009

77	0.0092	0.0084	0.0009
78	0.0093	0.0084	0.0009
79	0.0093	0.0084	0.0009
80	0.0094	0.0085	0.0009
81	0.0094	0.0085	0.0009
82	0.0095	0.0086	0.0009
83	0.0095	0.0086	0.0009
84	0.0096	0.0086	0.0009
85	0.0096	0.0087	0.0009
86	0.0097	0.0087	0.0009
87	0.0097	0.0088	0.0009
88	0.0098	0.0088	0.0009
89	0.0098	0.0089	0.0009
90	0.0099	0.0089	0.0009
91	0.0099	0.0090	0.0010
92	0.0100	0.0090	0.0010
93	0.0100	0.0091	0.0010
94	0.0101	0.0091	0.0010
95	0.0102	0.0092	0.0010
96	0.0102	0.0092	0.0010
97	0.0103	0.0093	0.0010
98	0.0103	0.0093	0.0010
99	0.0104	0.0094	0.0010
100	0.0104	0.0094	0.0010
101	0.0105	0.0095	0.0010
102	0.0106	0.0096	0.0010
103	0.0107	0.0096	0.0010
104	0.0107	0.0097	0.0010
105	0.0108	0.0098	0.0010
106	0.0108	0.0098	0.0010
107	0.0109	0.0099	0.0010
108	0.0110	0.0099	0.0011
109	0.0111	0.0100	0.0011
110	0.0111	0.0101	0.0011
111	0.0112	0.0102	0.0011
112	0.0113	0.0102	0.0011
113	0.0114	0.0103	0.0011
114	0.0114	0.0104	0.0011
115	0.0116	0.0105	0.0011
116	0.0116	0.0105	0.0011
117	0.0117	0.0106	0.0011
118	0.0118	0.0107	0.0011
119	0.0119	0.0108	0.0011
120	0.0120	0.0108	0.0011
121	0.0121	0.0109	0.0012
122	0.0122	0.0110	0.0012
123	0.0123	0.0111	0.0012
124	0.0124	0.0112	0.0012
125	0.0125	0.0113	0.0012
126	0.0126	0.0114	0.0012
127	0.0127	0.0115	0.0012
128	0.0128	0.0116	0.0012
129	0.0129	0.0117	0.0012
130	0.0130	0.0118	0.0012
131	0.0132	0.0119	0.0013
132	0.0132	0.0120	0.0013
133	0.0134	0.0121	0.0013
134	0.0135	0.0122	0.0013
135	0.0137	0.0124	0.0013
136	0.0138	0.0124	0.0013
137	0.0139	0.0126	0.0013

138	0.0140	0.0127	0.0013
139	0.0142	0.0129	0.0014
140	0.0143	0.0130	0.0014
141	0.0145	0.0131	0.0014
142	0.0146	0.0132	0.0014
143	0.0149	0.0134	0.0014
144	0.0150	0.0135	0.0014
145	0.0173	0.0156	0.0017
146	0.0174	0.0157	0.0017
147	0.0177	0.0160	0.0017
148	0.0178	0.0161	0.0017
149	0.0181	0.0163	0.0017
150	0.0182	0.0165	0.0017
151	0.0185	0.0167	0.0018
152	0.0186	0.0169	0.0018
153	0.0190	0.0171	0.0018
154	0.0191	0.0173	0.0018
155	0.0195	0.0176	0.0019
156	0.0196	0.0178	0.0019
157	0.0200	0.0181	0.0019
158	0.0202	0.0183	0.0019
159	0.0206	0.0186	0.0020
160	0.0208	0.0188	0.0020
161	0.0212	0.0192	0.0020
162	0.0215	0.0194	0.0021
163	0.0219	0.0198	0.0021
164	0.0222	0.0201	0.0021
165	0.0227	0.0205	0.0022
166	0.0230	0.0208	0.0022
167	0.0236	0.0213	0.0023
168	0.0239	0.0216	0.0023
169	0.0246	0.0222	0.0024
170	0.0249	0.0225	0.0024
171	0.0257	0.0232	0.0025
172	0.0261	0.0236	0.0025
173	0.0270	0.0244	0.0026
174	0.0274	0.0248	0.0026
175	0.0285	0.0257	0.0027
176	0.0290	0.0262	0.0028
177	0.0302	0.0273	0.0029
178	0.0309	0.0279	0.0030
179	0.0324	0.0293	0.0031
180	0.0332	0.0300	0.0032
181	0.0351	0.0317	0.0034
182	0.0361	0.0326	0.0035
183	0.0385	0.0348	0.0037
184	0.0399	0.0361	0.0038
185	0.0349	0.0315	0.0033
186	0.0368	0.0333	0.0035
187	0.0418	0.0378	0.0040
188	0.0451	0.0408	0.0043
189	0.0543	0.0491	0.0052
190	0.0613	0.0555	0.0059
191	0.0877	0.0733	0.0143
192	0.1206	0.0733	0.0472
193	0.3774	0.0733	0.3040
194	0.0714	0.0646	0.0068
195	0.0491	0.0444	0.0047
196	0.0391	0.0354	0.0037
197	0.0415	0.0375	0.0040
198	0.0373	0.0337	0.0036

199	0.0341	0.0308	0.0033
200	0.0316	0.0286	0.0030
201	0.0296	0.0268	0.0028
202	0.0279	0.0253	0.0027
203	0.0265	0.0240	0.0025
204	0.0253	0.0229	0.0024
205	0.0242	0.0219	0.0023
206	0.0233	0.0211	0.0022
207	0.0224	0.0203	0.0021
208	0.0217	0.0196	0.0021
209	0.0210	0.0190	0.0020
210	0.0204	0.0184	0.0020
211	0.0198	0.0179	0.0019
212	0.0193	0.0174	0.0018
213	0.0188	0.0170	0.0018
214	0.0183	0.0166	0.0018
215	0.0179	0.0162	0.0017
216	0.0175	0.0159	0.0017
217	0.0151	0.0136	0.0014
218	0.0147	0.0133	0.0014
219	0.0144	0.0130	0.0014
220	0.0141	0.0128	0.0014
221	0.0138	0.0125	0.0013
222	0.0136	0.0123	0.0013
223	0.0133	0.0120	0.0013
224	0.0131	0.0118	0.0013
225	0.0128	0.0116	0.0012
226	0.0126	0.0114	0.0012
227	0.0124	0.0112	0.0012
228	0.0122	0.0111	0.0012
229	0.0120	0.0109	0.0012
230	0.0118	0.0107	0.0011
231	0.0117	0.0106	0.0011
232	0.0115	0.0104	0.0011
233	0.0113	0.0103	0.0011
234	0.0112	0.0101	0.0011
235	0.0110	0.0100	0.0011
236	0.0109	0.0098	0.0010
237	0.0108	0.0097	0.0010
238	0.0106	0.0096	0.0010
239	0.0105	0.0095	0.0010
240	0.0104	0.0094	0.0010
241	0.0102	0.0093	0.0010
242	0.0101	0.0092	0.0010
243	0.0100	0.0091	0.0010
244	0.0099	0.0090	0.0009
245	0.0098	0.0089	0.0009
246	0.0097	0.0088	0.0009
247	0.0096	0.0087	0.0009
248	0.0095	0.0086	0.0009
249	0.0094	0.0085	0.0009
250	0.0093	0.0084	0.0009
251	0.0092	0.0083	0.0009
252	0.0091	0.0082	0.0009
253	0.0090	0.0082	0.0009
254	0.0090	0.0081	0.0009
255	0.0089	0.0080	0.0008
256	0.0088	0.0080	0.0008
257	0.0087	0.0079	0.0008
258	0.0086	0.0078	0.0008
259	0.0086	0.0077	0.0008

260	0.0085	0.0077	0.0008
261	0.0084	0.0076	0.0008
262	0.0084	0.0076	0.0008
263	0.0083	0.0075	0.0008
264	0.0082	0.0074	0.0008
265	0.0082	0.0074	0.0008
266	0.0081	0.0073	0.0008
267	0.0080	0.0073	0.0008
268	0.0080	0.0072	0.0008
269	0.0079	0.0072	0.0008
270	0.0079	0.0071	0.0008
271	0.0078	0.0071	0.0007
272	0.0077	0.0070	0.0007
273	0.0077	0.0070	0.0007
274	0.0076	0.0069	0.0007
275	0.0076	0.0069	0.0007
276	0.0075	0.0068	0.0007
277	0.0075	0.0068	0.0007
278	0.0074	0.0067	0.0007
279	0.0074	0.0067	0.0007
280	0.0073	0.0066	0.0007
281	0.0073	0.0066	0.0007
282	0.0072	0.0066	0.0007
283	0.0072	0.0065	0.0007
284	0.0072	0.0065	0.0007
285	0.0071	0.0064	0.0007
286	0.0071	0.0064	0.0007
287	0.0070	0.0064	0.0007
288	0.0070	0.0063	0.0007

Total soil rain loss = 3.82(In)
Total effective rainfall = 0.75(In)
Peak flow rate in flood hydrograph = 9.91(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.00	Q	|	|	|	|
0+10	0.0001	0.01	Q	|	|	|	|
0+15	0.0002	0.02	Q	|	|	|	|
0+20	0.0006	0.04	Q	|	|	|	|
0+25	0.0009	0.06	Q	|	|	|	|
0+30	0.0014	0.06	Q	|	|	|	|
0+35	0.0018	0.06	Q	|	|	|	|
0+40	0.0023	0.07	Q	|	|	|	|
0+45	0.0027	0.07	Q	|	|	|	|
0+50	0.0032	0.07	Q	|	|	|	|
0+55	0.0037	0.07	Q	|	|	|	|
1+ 0	0.0041	0.07	Q	|	|	|	|
1+ 5	0.0046	0.07	Q	|	|	|	|
1+10	0.0051	0.07	Q	|	|	|	|
1+15	0.0055	0.07	Q	|	|	|	|
1+20	0.0060	0.07	Q	|	|	|	|
1+25	0.0065	0.07	Q	|	|	|	|

1+30	0.0070	0.07	Q				
1+35	0.0074	0.07	Q				
1+40	0.0079	0.07	Q				
1+45	0.0084	0.07	Q				
1+50	0.0089	0.07	Q				
1+55	0.0094	0.07	Q				
2+ 0	0.0098	0.07	Q				
2+ 5	0.0103	0.07	Q				
2+10	0.0108	0.07	Q				
2+15	0.0113	0.07	Q				
2+20	0.0118	0.07	Q				
2+25	0.0123	0.07	Q				
2+30	0.0128	0.07	Q				
2+35	0.0133	0.07	QV				
2+40	0.0138	0.07	QV				
2+45	0.0143	0.07	QV				
2+50	0.0148	0.07	QV				
2+55	0.0153	0.07	QV				
3+ 0	0.0158	0.07	QV				
3+ 5	0.0163	0.07	QV				
3+10	0.0168	0.07	QV				
3+15	0.0173	0.07	QV				
3+20	0.0178	0.07	QV				
3+25	0.0183	0.07	QV				
3+30	0.0189	0.07	QV				
3+35	0.0194	0.08	QV				
3+40	0.0199	0.08	QV				
3+45	0.0204	0.08	QV				
3+50	0.0209	0.08	QV				
3+55	0.0215	0.08	QV				
4+ 0	0.0220	0.08	QV				
4+ 5	0.0225	0.08	QV				
4+10	0.0231	0.08	QV				
4+15	0.0236	0.08	QV				
4+20	0.0241	0.08	QV				
4+25	0.0247	0.08	QV				
4+30	0.0252	0.08	QV				
4+35	0.0257	0.08	Q V				
4+40	0.0263	0.08	Q V				
4+45	0.0268	0.08	Q V				
4+50	0.0274	0.08	Q V				
4+55	0.0279	0.08	Q V				
5+ 0	0.0285	0.08	Q V				
5+ 5	0.0290	0.08	Q V				
5+10	0.0296	0.08	Q V				
5+15	0.0302	0.08	Q V				
5+20	0.0307	0.08	Q V				
5+25	0.0313	0.08	Q V				
5+30	0.0319	0.08	Q V				
5+35	0.0324	0.08	Q V				
5+40	0.0330	0.08	Q V				
5+45	0.0336	0.08	Q V				
5+50	0.0342	0.08	Q V				
5+55	0.0347	0.08	Q V				
6+ 0	0.0353	0.08	Q V				
6+ 5	0.0359	0.09	Q V				
6+10	0.0365	0.09	Q V				
6+15	0.0371	0.09	Q V				
6+20	0.0377	0.09	Q V				
6+25	0.0383	0.09	Q V				
6+30	0.0389	0.09	Q V				

6+35	0.0395	0.09	Q	V				
6+40	0.0401	0.09	Q	V				
6+45	0.0407	0.09	Q	V				
6+50	0.0413	0.09	Q	V				
6+55	0.0419	0.09	Q	V				
7+ 0	0.0425	0.09	Q	V				
7+ 5	0.0431	0.09	Q	V				
7+10	0.0438	0.09	Q	V				
7+15	0.0444	0.09	Q	V				
7+20	0.0450	0.09	Q	V				
7+25	0.0457	0.09	Q	V				
7+30	0.0463	0.09	Q	V				
7+35	0.0469	0.09	Q	V				
7+40	0.0476	0.09	Q	V				
7+45	0.0482	0.09	Q	V				
7+50	0.0489	0.09	Q	V				
7+55	0.0495	0.09	Q	V				
8+ 0	0.0502	0.10	Q	V				
8+ 5	0.0509	0.10	Q	V				
8+10	0.0515	0.10	Q	V				
8+15	0.0522	0.10	Q	V				
8+20	0.0529	0.10	Q	V				
8+25	0.0535	0.10	Q	V				
8+30	0.0542	0.10	Q	V				
8+35	0.0549	0.10	Q	V				
8+40	0.0556	0.10	Q	V				
8+45	0.0563	0.10	Q	V				
8+50	0.0570	0.10	Q	V				
8+55	0.0577	0.10	Q	V				
9+ 0	0.0584	0.10	Q	V				
9+ 5	0.0591	0.10	Q	V				
9+10	0.0598	0.10	Q	V				
9+15	0.0605	0.10	Q	V				
9+20	0.0613	0.11	Q	V				
9+25	0.0620	0.11	Q	V				
9+30	0.0627	0.11	Q	V				
9+35	0.0635	0.11	Q	V				
9+40	0.0642	0.11	Q	V				
9+45	0.0650	0.11	Q	V				
9+50	0.0657	0.11	Q	V				
9+55	0.0665	0.11	Q	V				
10+ 0	0.0673	0.11	Q	V				
10+ 5	0.0680	0.11	Q	V				
10+10	0.0688	0.11	Q	V				
10+15	0.0696	0.11	Q	V				
10+20	0.0704	0.11	Q	V				
10+25	0.0712	0.12	Q	V				
10+30	0.0720	0.12	Q	V				
10+35	0.0728	0.12	Q	V				
10+40	0.0736	0.12	Q	V				
10+45	0.0744	0.12	Q	V				
10+50	0.0753	0.12	Q	V				
10+55	0.0761	0.12	Q	V				
11+ 0	0.0770	0.12	Q	V				
11+ 5	0.0778	0.12	Q	V				
11+10	0.0787	0.13	Q	V				
11+15	0.0795	0.13	Q	V				
11+20	0.0804	0.13	Q	V				
11+25	0.0813	0.13	Q	V				
11+30	0.0822	0.13	Q	V				
11+35	0.0831	0.13	Q	V				

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11+40       0.0840      0.13  Q     V   |          |          |          |
11+45       0.0849      0.13  Q     V   |          |          |          |
11+50       0.0859      0.14  Q     V   |          |          |          |
11+55       0.0868      0.14  Q     V   |          |          |          |
12+ 0       0.0878      0.14  Q     V   |          |          |          |
12+ 5       0.0887      0.14  Q     V   |          |          |          |
12+10       0.0897      0.14  Q      V  |          |          |          |
12+15       0.0908      0.15  Q      V  |          |          |          |
12+20       0.0918      0.16  Q      V  |          |          |          |
12+25       0.0930      0.16  Q      V  |          |          |          |
12+30       0.0941      0.17  Q      V  |          |          |          |
12+35       0.0953      0.17  Q      V  |          |          |          |
12+40       0.0965      0.17  Q      V  |          |          |          |
12+45       0.0976      0.17  Q      V  |          |          |          |
12+50       0.0989      0.18  Q      V  |          |          |          |
12+55       0.1001      0.18  Q      V  |          |          |          |
13+ 0       0.1013      0.18  Q      V  |          |          |          |
13+ 5       0.1026      0.18  Q       V |          |          |          |
13+10       0.1038      0.18  Q       V |          |          |          |
13+15       0.1051      0.19  Q       V |          |          |          |
13+20       0.1064      0.19  Q       V |          |          |          |
13+25       0.1078      0.19  Q       V |          |          |          |
13+30       0.1091      0.20  Q       V |          |          |          |
13+35       0.1105      0.20  Q       V |          |          |          |
13+40       0.1119      0.20  Q       V |          |          |          |
13+45       0.1133      0.20  Q       V |          |          |          |
13+50       0.1147      0.21  Q       V |          |          |          |
13+55       0.1162      0.21  Q        V|          |          |          |
14+ 0       0.1177      0.22  Q        V|          |          |          |
14+ 5       0.1192      0.22  Q        V|          |          |          |
14+10       0.1207      0.22  Q        V|          |          |          |
14+15       0.1223      0.23  Q        V|          |          |          |
14+20       0.1239      0.23  Q        V|          |          |          |
14+25       0.1255      0.24  Q        V|          |          |          |
14+30       0.1272      0.24  Q        V|          |          |          |
14+35       0.1289      0.25  Q         V          |          |          |
14+40       0.1307      0.26  |Q        V          |          |          |
14+45       0.1325      0.26  |Q        V          |          |          |
14+50       0.1344      0.27  |Q        V          |          |          |
14+55       0.1363      0.28  |Q        V          |          |          |
15+ 0       0.1382      0.29  |Q        V          |          |          |
15+ 5       0.1403      0.30  |Q        V          |          |          |
15+10       0.1424      0.31  |Q        |V         |          |          |
15+15       0.1446      0.32  |Q        |V         |          |          |
15+20       0.1469      0.33  |Q        |V         |          |          |
15+25       0.1493      0.35  |Q        |V         |          |          |
15+30       0.1517      0.35  |Q        |V         |          |          |
15+35       0.1542      0.36  |Q        | V        |          |          |
15+40       0.1566      0.36  |Q        | V        |          |          |
15+45       0.1592      0.37  |Q        | V        |          |          |
15+50       0.1620      0.41  |Q        | V        |          |          |
15+55       0.1653      0.47  |Q        | V        |          |          |
16+ 0       0.1701      0.70  | Q       |  V       |          |          |
16+ 5       0.1835      1.94  |      Q  |   V      |          |          |
16+10       0.2205      5.37  |         |      V   |Q         |          |
16+15       0.2809      8.76  |         |          |V         |    Q     |
16+20       0.3492      9.91  |         |          |      V   |         Q|
16+25       0.3918      6.20  |         |          |   Q      V          |
16+30       0.4142      3.25  |         |  Q       |          | V        |
16+35       0.4261      1.73  |     Q   |          |          |  V       |
16+40       0.4320      0.85  |  Q      |          |          |  V       |
```

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16+45       0.4359      0.57  | Q       |         |         |   V     |
16+50       0.4395      0.53  | Q       |         |         |   V     |
16+55       0.4423      0.41  |Q        |         |         |   V     |
17+ 0       0.4443      0.29  |Q        |         |         |   V     |
17+ 5       0.4462      0.27  |Q        |         |         |   V     |
17+10       0.4480      0.26  |Q        |         |         |    V    |
17+15       0.4496      0.24  Q         |         |         |    V    |
17+20       0.4512      0.23  Q         |         |         |    V    |
17+25       0.4528      0.22  Q         |         |         |    V    |
17+30       0.4543      0.22  Q         |         |         |    V    |
17+35       0.4557      0.21  Q         |         |         |    V    |
17+40       0.4571      0.20  Q         |         |         |    V    |
17+45       0.4584      0.20  Q         |         |         |    V    |
17+50       0.4597      0.19  Q         |         |         |    V    |
17+55       0.4610      0.18  Q         |         |         |     V   |
18+ 0       0.4623      0.18  Q         |         |         |     V   |
18+ 5       0.4635      0.17  Q         |         |         |     V   |
18+10       0.4646      0.17  Q         |         |         |     V   |
18+15       0.4657      0.16  Q         |         |         |     V   |
18+20       0.4668      0.15  Q         |         |         |     V   |
18+25       0.4677      0.14  Q         |         |         |     V   |
18+30       0.4687      0.14  Q         |         |         |     V   |
18+35       0.4696      0.14  Q         |         |         |     V   |
18+40       0.4706      0.13  Q         |         |         |     V   |
18+45       0.4714      0.13  Q         |         |         |     V   |
18+50       0.4723      0.13  Q         |         |         |     V   |
18+55       0.4732      0.12  Q         |         |         |     V   |
19+ 0       0.4740      0.12  Q         |         |         |      V  |
19+ 5       0.4749      0.12  Q         |         |         |      V  |
19+10       0.4757      0.12  Q         |         |         |      V  |
19+15       0.4765      0.12  Q         |         |         |      V  |
19+20       0.4773      0.11  Q         |         |         |      V  |
19+25       0.4780      0.11  Q         |         |         |      V  |
19+30       0.4788      0.11  Q         |         |         |      V  |
19+35       0.4796      0.11  Q         |         |         |      V  |
19+40       0.4803      0.11  Q         |         |         |      V  |
19+45       0.4811      0.11  Q         |         |         |      V  |
19+50       0.4818      0.11  Q         |         |         |      V  |
19+55       0.4825      0.10  Q         |         |         |      V  |
20+ 0       0.4832      0.10  Q         |         |         |      V  |
20+ 5       0.4839      0.10  Q         |         |         |      V  |
20+10       0.4846      0.10  Q         |         |         |      V  |
20+15       0.4853      0.10  Q         |         |         |      V  |
20+20       0.4859      0.10  Q         |         |         |      V  |
20+25       0.4866      0.10  Q         |         |         |       V |
20+30       0.4873      0.10  Q         |         |         |       V |
20+35       0.4879      0.09  Q         |         |         |       V |
20+40       0.4886      0.09  Q         |         |         |       V |
20+45       0.4892      0.09  Q         |         |         |       V |
20+50       0.4898      0.09  Q         |         |         |       V |
20+55       0.4904      0.09  Q         |         |         |       V |
21+ 0       0.4911      0.09  Q         |         |         |       V |
21+ 5       0.4917      0.09  Q         |         |         |       V |
21+10       0.4923      0.09  Q         |         |         |       V |
21+15       0.4929      0.09  Q         |         |         |       V |
21+20       0.4935      0.09  Q         |         |         |       V |
21+25       0.4941      0.09  Q         |         |         |       V |
21+30       0.4946      0.08  Q         |         |         |       V |
21+35       0.4952      0.08  Q         |         |         |       V |
21+40       0.4958      0.08  Q         |         |         |       V |
21+45       0.4963      0.08  Q         |         |         |       V |
```

21+50	0.4969	0.08	Q	|	|	|	V |
21+55	0.4975	0.08	Q	|	|	|	V |
22+ 0	0.4980	0.08	Q	|	|	|	V |
22+ 5	0.4986	0.08	Q	|	|	|	V |
22+10	0.4991	0.08	Q	|	|	|	V|
22+15	0.4997	0.08	Q	|	|	|	V|
22+20	0.5002	0.08	Q	|	|	|	V|
22+25	0.5007	0.08	Q	|	|	|	V|
22+30	0.5012	0.08	Q	|	|	|	V|
22+35	0.5018	0.08	Q	|	|	|	V|
22+40	0.5023	0.08	Q	|	|	|	V|
22+45	0.5028	0.07	Q	|	|	|	V|
22+50	0.5033	0.07	Q	|	|	|	V|
22+55	0.5038	0.07	Q	|	|	|	V|
23+ 0	0.5043	0.07	Q	|	|	|	V|
23+ 5	0.5048	0.07	Q	|	|	|	V|
23+10	0.5053	0.07	Q	|	|	|	V|
23+15	0.5058	0.07	Q	|	|	|	V|
23+20	0.5063	0.07	Q	|	|	|	V|
23+25	0.5068	0.07	Q	|	|	|	V|
23+30	0.5073	0.07	Q	|	|	|	V|
23+35	0.5078	0.07	Q	|	|	|	V|
23+40	0.5082	0.07	Q	|	|	|	V|
23+45	0.5087	0.07	Q	|	|	|	V|
23+50	0.5092	0.07	Q	|	|	|	V|
23+55	0.5097	0.07	Q	|	|	|	V|
24+ 0	0.5101	0.07	Q	|	|	|	V|

APPENDIX C.5

UNIT HYDROGRAPH ANALYSIS

POST-DEVELOPMENT CONDITIONS – 2 YEAR

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2004, Version 7.0

Study date 01/22/23

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San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6277

JOB NO 2022-318
11115 HEMLOCK AVENUE
2 YEAR, UNIT HYDROGRAPH
POST-CONDITION, AREA A

Storm Event Year = 2

Antecedent Moisture Condition = 1

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2		
24.47	1	0.52
Rainfall data for year 2		
24.47	6	1.36
Rainfall data for year 2		
24.47	24	2.46

++

******** Area-averaged max loss rate, Fm ********

SCS curve No.(AMCII)	SCS curve NO.(AMC 1)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
32.0	16.6	24.47	1.000	1.000	0.120	0.120

Area-averaged adjusted loss rate Fm (In/Hr) = 0.120

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC1)	S	Pervious Yield Fr
2.94	0.120	32.0	16.6	12.30	0.000
21.53	0.880	98.0	98.0	0.20	0.907

Area-averaged catchment yield fraction, Y = 0.798
Area-averaged low loss fraction, Yb = 0.202
User entry of time of concentration = 0.145 (hours)

++

Watershed area = 24.47(Ac.)
Catchment Lag time = 0.116 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 72.0212
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.120(In/Hr)
Average low loss rate fraction (Yb) = 0.202 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.192(In)
Computed peak 30-minute rainfall = 0.393(In)
Specified peak 1-hour rainfall = 0.518(In)
Computed peak 3-hour rainfall = 0.936(In)
Specified peak 6-hour rainfall = 1.360(In)
Specified peak 24-hour rainfall = 2.460(In)

Rainfall depth area reduction factors:
Using a total area of 24.47(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.191(In)
30-minute factor = 0.999 Adjusted rainfall = 0.392(In)
1-hour factor = 0.999 Adjusted rainfall = 0.517(In)
3-hour factor = 1.000 Adjusted rainfall = 0.936(In)
6-hour factor = 1.000 Adjusted rainfall = 1.360(In)
24-hour factor = 1.000 Adjusted rainfall = 2.460(In)

U n i t H y d r o g r a p h

++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
	(K = 295.93 (CFS))	
1	9.266	27.422
2	55.659	137.291
3	90.486	103.067
4	98.166	22.727
5	100.000	5.428

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.1915	0.1915
2	0.2527	0.0612
3	0.2972	0.0445
4	0.3334	0.0362
5	0.3645	0.0311
6	0.3921	0.0276
7	0.4171	0.0249
8	0.4399	0.0229
9	0.4612	0.0212

10	0.4810	0.0199
11	0.4997	0.0187
12	0.5174	0.0177
13	0.5402	0.0228
14	0.5623	0.0220
15	0.5836	0.0213
16	0.6043	0.0207
17	0.6244	0.0201
18	0.6440	0.0196
19	0.6630	0.0191
20	0.6816	0.0186
21	0.6998	0.0182
22	0.7176	0.0178
23	0.7350	0.0174
24	0.7521	0.0171
25	0.7689	0.0168
26	0.7853	0.0164
27	0.8015	0.0162
28	0.8173	0.0159
29	0.8330	0.0156
30	0.8483	0.0154
31	0.8635	0.0151
32	0.8784	0.0149
33	0.8931	0.0147
34	0.9076	0.0145
35	0.9219	0.0143
36	0.9361	0.0141
37	0.9500	0.0139
38	0.9637	0.0137
39	0.9773	0.0136
40	0.9907	0.0134
41	1.0040	0.0133
42	1.0171	0.0131
43	1.0301	0.0130
44	1.0429	0.0128
45	1.0557	0.0127
46	1.0682	0.0126
47	1.0807	0.0125
48	1.0930	0.0123
49	1.1052	0.0122
50	1.1173	0.0121
51	1.1293	0.0120
52	1.1412	0.0119
53	1.1530	0.0118
54	1.1646	0.0117
55	1.1762	0.0116
56	1.1877	0.0115
57	1.1991	0.0114
58	1.2103	0.0113
59	1.2215	0.0112
60	1.2327	0.0111
61	1.2437	0.0110
62	1.2546	0.0109
63	1.2655	0.0109
64	1.2763	0.0108
65	1.2870	0.0107
66	1.2976	0.0106
67	1.3082	0.0106
68	1.3187	0.0105
69	1.3291	0.0104
70	1.3394	0.0103

71	1.3497	0.0103
72	1.3599	0.0102
73	1.3679	0.0080
74	1.3759	0.0080
75	1.3838	0.0079
76	1.3917	0.0079
77	1.3995	0.0078
78	1.4072	0.0077
79	1.4149	0.0077
80	1.4226	0.0076
81	1.4301	0.0076
82	1.4377	0.0075
83	1.4451	0.0075
84	1.4525	0.0074
85	1.4599	0.0074
86	1.4672	0.0073
87	1.4745	0.0073
88	1.4817	0.0072
89	1.4889	0.0072
90	1.4960	0.0071
91	1.5031	0.0071
92	1.5102	0.0070
93	1.5172	0.0070
94	1.5241	0.0070
95	1.5310	0.0069
96	1.5379	0.0069
97	1.5447	0.0068
98	1.5515	0.0068
99	1.5583	0.0067
100	1.5650	0.0067
101	1.5716	0.0067
102	1.5783	0.0066
103	1.5849	0.0066
104	1.5914	0.0066
105	1.5980	0.0065
106	1.6044	0.0065
107	1.6109	0.0065
108	1.6173	0.0064
109	1.6237	0.0064
110	1.6301	0.0064
111	1.6364	0.0063
112	1.6427	0.0063
113	1.6489	0.0063
114	1.6551	0.0062
115	1.6613	0.0062
116	1.6675	0.0062
117	1.6736	0.0061
118	1.6797	0.0061
119	1.6858	0.0061
120	1.6918	0.0060
121	1.6979	0.0060
122	1.7038	0.0060
123	1.7098	0.0060
124	1.7157	0.0059
125	1.7216	0.0059
126	1.7275	0.0059
127	1.7334	0.0058
128	1.7392	0.0058
129	1.7450	0.0058
130	1.7507	0.0058
131	1.7565	0.0057

132	1.7622	0.0057
133	1.7679	0.0057
134	1.7736	0.0057
135	1.7792	0.0056
136	1.7848	0.0056
137	1.7904	0.0056
138	1.7960	0.0056
139	1.8016	0.0056
140	1.8071	0.0055
141	1.8126	0.0055
142	1.8181	0.0055
143	1.8236	0.0055
144	1.8290	0.0054
145	1.8344	0.0054
146	1.8398	0.0054
147	1.8452	0.0054
148	1.8506	0.0054
149	1.8559	0.0053
150	1.8612	0.0053
151	1.8665	0.0053
152	1.8718	0.0053
153	1.8770	0.0053
154	1.8823	0.0052
155	1.8875	0.0052
156	1.8927	0.0052
157	1.8979	0.0052
158	1.9030	0.0052
159	1.9082	0.0051
160	1.9133	0.0051
161	1.9184	0.0051
162	1.9235	0.0051
163	1.9285	0.0051
164	1.9336	0.0050
165	1.9386	0.0050
166	1.9436	0.0050
167	1.9486	0.0050
168	1.9536	0.0050
169	1.9586	0.0050
170	1.9635	0.0049
171	1.9684	0.0049
172	1.9734	0.0049
173	1.9783	0.0049
174	1.9831	0.0049
175	1.9880	0.0049
176	1.9929	0.0048
177	1.9977	0.0048
178	2.0025	0.0048
179	2.0073	0.0048
180	2.0121	0.0048
181	2.0169	0.0048
182	2.0216	0.0048
183	2.0264	0.0047
184	2.0311	0.0047
185	2.0358	0.0047
186	2.0405	0.0047
187	2.0452	0.0047
188	2.0499	0.0047
189	2.0545	0.0047
190	2.0592	0.0046
191	2.0638	0.0046
192	2.0684	0.0046

193	2.0730	0.0046
194	2.0776	0.0046
195	2.0821	0.0046
196	2.0867	0.0046
197	2.0913	0.0045
198	2.0958	0.0045
199	2.1003	0.0045
200	2.1048	0.0045
201	2.1093	0.0045
202	2.1138	0.0045
203	2.1182	0.0045
204	2.1227	0.0045
205	2.1271	0.0044
206	2.1316	0.0044
207	2.1360	0.0044
208	2.1404	0.0044
209	2.1448	0.0044
210	2.1492	0.0044
211	2.1535	0.0044
212	2.1579	0.0044
213	2.1623	0.0043
214	2.1666	0.0043
215	2.1709	0.0043
216	2.1752	0.0043
217	2.1795	0.0043
218	2.1838	0.0043
219	2.1881	0.0043
220	2.1924	0.0043
221	2.1966	0.0043
222	2.2009	0.0042
223	2.2051	0.0042
224	2.2093	0.0042
225	2.2135	0.0042
226	2.2177	0.0042
227	2.2219	0.0042
228	2.2261	0.0042
229	2.2303	0.0042
230	2.2344	0.0042
231	2.2386	0.0041
232	2.2427	0.0041
233	2.2468	0.0041
234	2.2510	0.0041
235	2.2551	0.0041
236	2.2592	0.0041
237	2.2632	0.0041
238	2.2673	0.0041
239	2.2714	0.0041
240	2.2754	0.0041
241	2.2795	0.0040
242	2.2835	0.0040
243	2.2876	0.0040
244	2.2916	0.0040
245	2.2956	0.0040
246	2.2996	0.0040
247	2.3036	0.0040
248	2.3076	0.0040
249	2.3115	0.0040
250	2.3155	0.0040
251	2.3195	0.0040
252	2.3234	0.0039
253	2.3274	0.0039

254	2.3313	0.0039
255	2.3352	0.0039
256	2.3391	0.0039
257	2.3430	0.0039
258	2.3469	0.0039
259	2.3508	0.0039
260	2.3547	0.0039
261	2.3585	0.0039
262	2.3624	0.0039
263	2.3662	0.0039
264	2.3701	0.0038
265	2.3739	0.0038
266	2.3778	0.0038
267	2.3816	0.0038
268	2.3854	0.0038
269	2.3892	0.0038
270	2.3930	0.0038
271	2.3968	0.0038
272	2.4005	0.0038
273	2.4043	0.0038
274	2.4081	0.0038
275	2.4118	0.0038
276	2.4156	0.0037
277	2.4193	0.0037
278	2.4230	0.0037
279	2.4268	0.0037
280	2.4305	0.0037
281	2.4342	0.0037
282	2.4379	0.0037
283	2.4416	0.0037
284	2.4453	0.0037
285	2.4489	0.0037
286	2.4526	0.0037
287	2.4563	0.0037
288	2.4599	0.0037

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0037	0.0007	0.0029
2	0.0037	0.0007	0.0029
3	0.0037	0.0007	0.0029
4	0.0037	0.0007	0.0029
5	0.0037	0.0007	0.0030
6	0.0037	0.0007	0.0030
7	0.0037	0.0008	0.0030
8	0.0037	0.0008	0.0030
9	0.0037	0.0008	0.0030
10	0.0038	0.0008	0.0030
11	0.0038	0.0008	0.0030
12	0.0038	0.0008	0.0030
13	0.0038	0.0008	0.0030
14	0.0038	0.0008	0.0030
15	0.0038	0.0008	0.0030
16	0.0038	0.0008	0.0031
17	0.0038	0.0008	0.0031
18	0.0039	0.0008	0.0031
19	0.0039	0.0008	0.0031
20	0.0039	0.0008	0.0031
21	0.0039	0.0008	0.0031

22	0.0039	0.0008	0.0031
23	0.0039	0.0008	0.0031
24	0.0039	0.0008	0.0031
25	0.0039	0.0008	0.0031
26	0.0040	0.0008	0.0032
27	0.0040	0.0008	0.0032
28	0.0040	0.0008	0.0032
29	0.0040	0.0008	0.0032
30	0.0040	0.0008	0.0032
31	0.0040	0.0008	0.0032
32	0.0040	0.0008	0.0032
33	0.0041	0.0008	0.0032
34	0.0041	0.0008	0.0032
35	0.0041	0.0008	0.0033
36	0.0041	0.0008	0.0033
37	0.0041	0.0008	0.0033
38	0.0041	0.0008	0.0033
39	0.0041	0.0008	0.0033
40	0.0042	0.0008	0.0033
41	0.0042	0.0008	0.0033
42	0.0042	0.0008	0.0033
43	0.0042	0.0009	0.0034
44	0.0042	0.0009	0.0034
45	0.0042	0.0009	0.0034
46	0.0043	0.0009	0.0034
47	0.0043	0.0009	0.0034
48	0.0043	0.0009	0.0034
49	0.0043	0.0009	0.0034
50	0.0043	0.0009	0.0035
51	0.0043	0.0009	0.0035
52	0.0044	0.0009	0.0035
53	0.0044	0.0009	0.0035
54	0.0044	0.0009	0.0035
55	0.0044	0.0009	0.0035
56	0.0044	0.0009	0.0035
57	0.0045	0.0009	0.0036
58	0.0045	0.0009	0.0036
59	0.0045	0.0009	0.0036
60	0.0045	0.0009	0.0036
61	0.0045	0.0009	0.0036
62	0.0045	0.0009	0.0036
63	0.0046	0.0009	0.0036
64	0.0046	0.0009	0.0037
65	0.0046	0.0009	0.0037
66	0.0046	0.0009	0.0037
67	0.0047	0.0009	0.0037
68	0.0047	0.0009	0.0037
69	0.0047	0.0009	0.0037
70	0.0047	0.0010	0.0038
71	0.0047	0.0010	0.0038
72	0.0048	0.0010	0.0038
73	0.0048	0.0010	0.0038
74	0.0048	0.0010	0.0038
75	0.0048	0.0010	0.0039
76	0.0048	0.0010	0.0039
77	0.0049	0.0010	0.0039
78	0.0049	0.0010	0.0039
79	0.0049	0.0010	0.0039
80	0.0049	0.0010	0.0039
81	0.0050	0.0010	0.0040
82	0.0050	0.0010	0.0040

83	0.0050	0.0010	0.0040
84	0.0050	0.0010	0.0040
85	0.0051	0.0010	0.0041
86	0.0051	0.0010	0.0041
87	0.0051	0.0010	0.0041
88	0.0052	0.0010	0.0041
89	0.0052	0.0010	0.0041
90	0.0052	0.0011	0.0042
91	0.0053	0.0011	0.0042
92	0.0053	0.0011	0.0042
93	0.0053	0.0011	0.0042
94	0.0053	0.0011	0.0043
95	0.0054	0.0011	0.0043
96	0.0054	0.0011	0.0043
97	0.0054	0.0011	0.0043
98	0.0055	0.0011	0.0044
99	0.0055	0.0011	0.0044
100	0.0055	0.0011	0.0044
101	0.0056	0.0011	0.0045
102	0.0056	0.0011	0.0045
103	0.0056	0.0011	0.0045
104	0.0057	0.0011	0.0045
105	0.0057	0.0012	0.0046
106	0.0057	0.0012	0.0046
107	0.0058	0.0012	0.0046
108	0.0058	0.0012	0.0046
109	0.0059	0.0012	0.0047
110	0.0059	0.0012	0.0047
111	0.0060	0.0012	0.0048
112	0.0060	0.0012	0.0048
113	0.0060	0.0012	0.0048
114	0.0061	0.0012	0.0048
115	0.0061	0.0012	0.0049
116	0.0062	0.0012	0.0049
117	0.0062	0.0013	0.0050
118	0.0063	0.0013	0.0050
119	0.0063	0.0013	0.0050
120	0.0064	0.0013	0.0051
121	0.0064	0.0013	0.0051
122	0.0065	0.0013	0.0052
123	0.0065	0.0013	0.0052
124	0.0066	0.0013	0.0052
125	0.0066	0.0013	0.0053
126	0.0067	0.0013	0.0053
127	0.0067	0.0014	0.0054
128	0.0068	0.0014	0.0054
129	0.0069	0.0014	0.0055
130	0.0069	0.0014	0.0055
131	0.0070	0.0014	0.0056
132	0.0070	0.0014	0.0056
133	0.0071	0.0014	0.0057
134	0.0072	0.0014	0.0057
135	0.0073	0.0015	0.0058
136	0.0073	0.0015	0.0058
137	0.0074	0.0015	0.0059
138	0.0075	0.0015	0.0060
139	0.0076	0.0015	0.0060
140	0.0076	0.0015	0.0061
141	0.0077	0.0016	0.0062
142	0.0078	0.0016	0.0062
143	0.0079	0.0016	0.0063

144	0.0080	0.0016	0.0064
145	0.0102	0.0021	0.0081
146	0.0103	0.0021	0.0082
147	0.0104	0.0021	0.0083
148	0.0105	0.0021	0.0084
149	0.0106	0.0021	0.0085
150	0.0107	0.0022	0.0085
151	0.0109	0.0022	0.0087
152	0.0109	0.0022	0.0087
153	0.0111	0.0022	0.0089
154	0.0112	0.0023	0.0089
155	0.0114	0.0023	0.0091
156	0.0115	0.0023	0.0092
157	0.0117	0.0024	0.0093
158	0.0118	0.0024	0.0094
159	0.0120	0.0024	0.0096
160	0.0121	0.0024	0.0097
161	0.0123	0.0025	0.0098
162	0.0125	0.0025	0.0099
163	0.0127	0.0026	0.0101
164	0.0128	0.0026	0.0102
165	0.0131	0.0026	0.0105
166	0.0133	0.0027	0.0106
167	0.0136	0.0027	0.0108
168	0.0137	0.0028	0.0110
169	0.0141	0.0029	0.0113
170	0.0143	0.0029	0.0114
171	0.0147	0.0030	0.0117
172	0.0149	0.0030	0.0119
173	0.0154	0.0031	0.0123
174	0.0156	0.0032	0.0125
175	0.0162	0.0033	0.0129
176	0.0164	0.0033	0.0131
177	0.0171	0.0034	0.0136
178	0.0174	0.0035	0.0139
179	0.0182	0.0037	0.0145
180	0.0186	0.0038	0.0149
181	0.0196	0.0039	0.0156
182	0.0201	0.0041	0.0160
183	0.0213	0.0043	0.0170
184	0.0220	0.0045	0.0176
185	0.0177	0.0036	0.0141
186	0.0187	0.0038	0.0149
187	0.0212	0.0043	0.0169
188	0.0229	0.0046	0.0183
189	0.0276	0.0056	0.0220
190	0.0311	0.0063	0.0248
191	0.0445	0.0090	0.0355
192	0.0612	0.0100	0.0512
193	0.1915	0.0100	0.1815
194	0.0362	0.0073	0.0289
195	0.0249	0.0050	0.0199
196	0.0199	0.0040	0.0158
197	0.0228	0.0046	0.0182
198	0.0207	0.0042	0.0165
199	0.0191	0.0038	0.0152
200	0.0178	0.0036	0.0142
201	0.0168	0.0034	0.0134
202	0.0159	0.0032	0.0127
203	0.0151	0.0031	0.0121
204	0.0145	0.0029	0.0116

205	0.0139	0.0028	0.0111
206	0.0134	0.0027	0.0107
207	0.0130	0.0026	0.0104
208	0.0126	0.0025	0.0100
209	0.0122	0.0025	0.0097
210	0.0119	0.0024	0.0095
211	0.0116	0.0023	0.0092
212	0.0113	0.0023	0.0090
213	0.0110	0.0022	0.0088
214	0.0108	0.0022	0.0086
215	0.0106	0.0021	0.0084
216	0.0103	0.0021	0.0083
217	0.0080	0.0016	0.0064
218	0.0079	0.0016	0.0063
219	0.0077	0.0016	0.0061
220	0.0075	0.0015	0.0060
221	0.0074	0.0015	0.0059
222	0.0072	0.0015	0.0058
223	0.0071	0.0014	0.0057
224	0.0070	0.0014	0.0055
225	0.0068	0.0014	0.0055
226	0.0067	0.0014	0.0054
227	0.0066	0.0013	0.0053
228	0.0065	0.0013	0.0052
229	0.0064	0.0013	0.0051
230	0.0063	0.0013	0.0050
231	0.0062	0.0013	0.0049
232	0.0061	0.0012	0.0049
233	0.0060	0.0012	0.0048
234	0.0059	0.0012	0.0047
235	0.0058	0.0012	0.0047
236	0.0058	0.0012	0.0046
237	0.0057	0.0012	0.0045
238	0.0056	0.0011	0.0045
239	0.0056	0.0011	0.0044
240	0.0055	0.0011	0.0044
241	0.0054	0.0011	0.0043
242	0.0054	0.0011	0.0043
243	0.0053	0.0011	0.0042
244	0.0052	0.0011	0.0042
245	0.0052	0.0010	0.0041
246	0.0051	0.0010	0.0041
247	0.0051	0.0010	0.0040
248	0.0050	0.0010	0.0040
249	0.0050	0.0010	0.0040
250	0.0049	0.0010	0.0039
251	0.0049	0.0010	0.0039
252	0.0048	0.0010	0.0038
253	0.0048	0.0010	0.0038
254	0.0047	0.0010	0.0038
255	0.0047	0.0009	0.0037
256	0.0046	0.0009	0.0037
257	0.0046	0.0009	0.0037
258	0.0046	0.0009	0.0036
259	0.0045	0.0009	0.0036
260	0.0045	0.0009	0.0036
261	0.0044	0.0009	0.0035
262	0.0044	0.0009	0.0035
263	0.0044	0.0009	0.0035
264	0.0043	0.0009	0.0035
265	0.0043	0.0009	0.0034

266	0.0043	0.0009	0.0034
267	0.0042	0.0009	0.0034
268	0.0042	0.0008	0.0034
269	0.0042	0.0008	0.0033
270	0.0041	0.0008	0.0033
271	0.0041	0.0008	0.0033
272	0.0041	0.0008	0.0033
273	0.0040	0.0008	0.0032
274	0.0040	0.0008	0.0032
275	0.0040	0.0008	0.0032
276	0.0040	0.0008	0.0032
277	0.0039	0.0008	0.0031
278	0.0039	0.0008	0.0031
279	0.0039	0.0008	0.0031
280	0.0039	0.0008	0.0031
281	0.0038	0.0008	0.0031
282	0.0038	0.0008	0.0030
283	0.0038	0.0008	0.0030
284	0.0038	0.0008	0.0030
285	0.0037	0.0008	0.0030
286	0.0037	0.0008	0.0030
287	0.0037	0.0007	0.0029
288	0.0037	0.0007	0.0029

Total soil rain loss = 0.47(In)
Total effective rainfall = 1.99(In)
Peak flow rate in flood hydrograph = 31.93(CFS)

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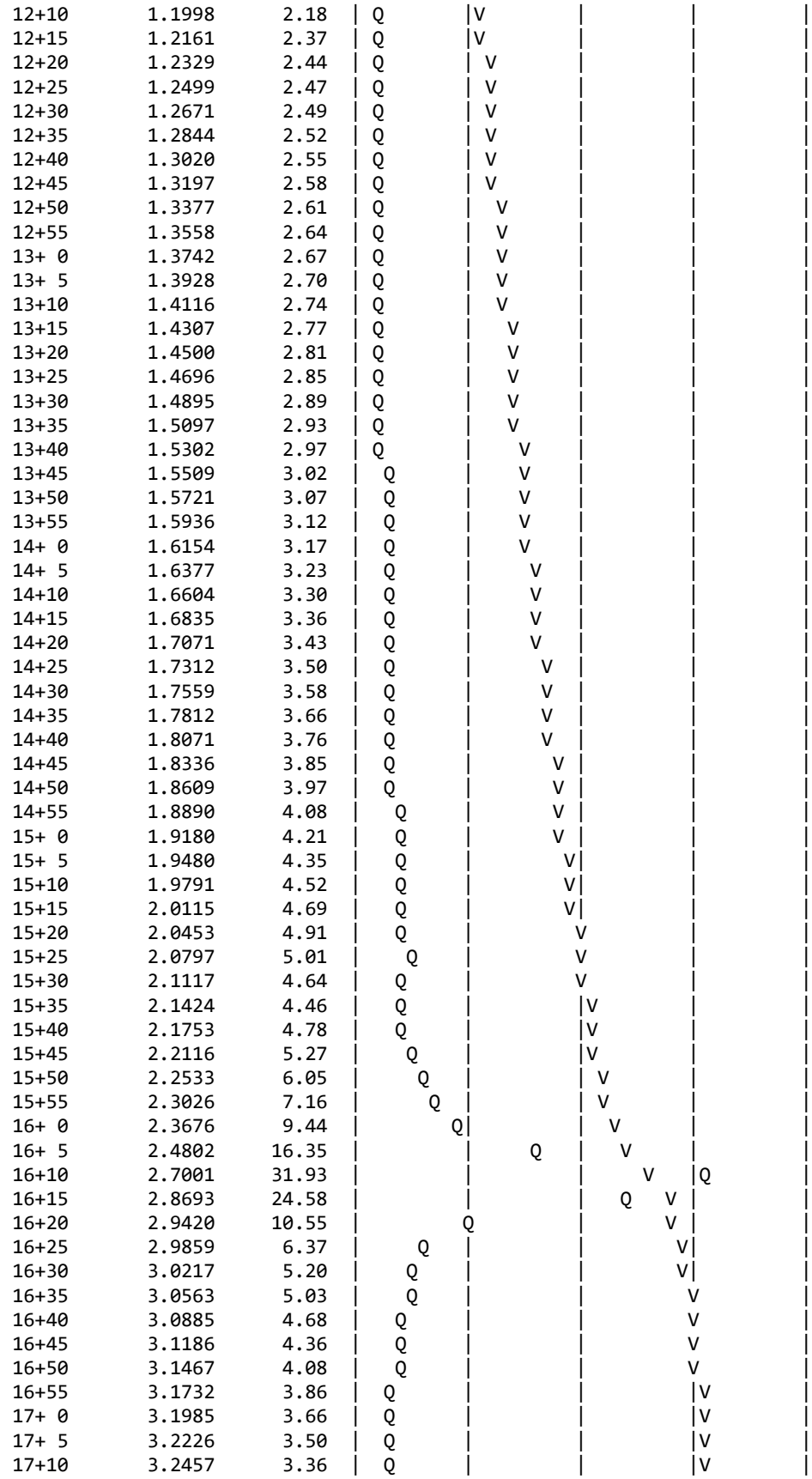
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0006	0.08	Q	|	|	|	|
0+10	0.0039	0.48	Q	|	|	|	|
0+15	0.0093	0.78	Q	|	|	|	|
0+20	0.0151	0.85	Q	|	|	|	|
0+25	0.0211	0.87	Q	|	|	|	|
0+30	0.0271	0.87	Q	|	|	|	|
0+35	0.0331	0.87	Q	|	|	|	|
0+40	0.0392	0.88	Q	|	|	|	|
0+45	0.0452	0.88	Q	|	|	|	|
0+50	0.0513	0.88	Q	|	|	|	|
0+55	0.0574	0.89	Q	|	|	|	|
1+ 0	0.0635	0.89	Q	|	|	|	|
1+ 5	0.0697	0.89	Q	|	|	|	|
1+10	0.0758	0.89	Q	|	|	|	|
1+15	0.0820	0.90	Q	|	|	|	|
1+20	0.0882	0.90	Q	|	|	|	|
1+25	0.0944	0.90	Q	|	|	|	|
1+30	0.1007	0.91	Q	|	|	|	|
1+35	0.1069	0.91	QV	|	|	|	|
1+40	0.1132	0.91	QV	|	|	|	|
1+45	0.1195	0.91	QV	|	|	|	|
1+50	0.1258	0.92	QV	|	|	|	|
1+55	0.1322	0.92	QV	|	|	|	|

2+ 0	0.1385	0.92	QV	|	|	|	|
2+ 5	0.1449	0.93	QV	|	|	|	|
2+10	0.1513	0.93	QV	|	|	|	|
2+15	0.1577	0.93	QV	|	|	|	|
2+20	0.1642	0.94	QV	|	|	|	|
2+25	0.1707	0.94	QV	|	|	|	|
2+30	0.1772	0.94	QV	|	|	|	|
2+35	0.1837	0.95	QV	|	|	|	|
2+40	0.1902	0.95	QV	|	|	|	|
2+45	0.1968	0.95	QV	|	|	|	|
2+50	0.2034	0.96	Q V	|	|	|	|
2+55	0.2100	0.96	Q V	|	|	|	|
3+ 0	0.2166	0.96	Q V	|	|	|	|
3+ 5	0.2233	0.97	Q V	|	|	|	|
3+10	0.2300	0.97	Q V	|	|	|	|
3+15	0.2367	0.97	Q V	|	|	|	|
3+20	0.2434	0.98	Q V	|	|	|	|
3+25	0.2501	0.98	Q V	|	|	|	|
3+30	0.2569	0.98	Q V	|	|	|	|
3+35	0.2637	0.99	Q V	|	|	|	|
3+40	0.2706	0.99	Q V	|	|	|	|
3+45	0.2774	1.00	Q V	|	|	|	|
3+50	0.2843	1.00	|QV	|	|	|	|
3+55	0.2912	1.00	|QV	|	|	|	|
4+ 0	0.2982	1.01	|QV	|	|	|	|
4+ 5	0.3051	1.01	|Q V	|	|	|	|
4+10	0.3121	1.02	|Q V	|	|	|	|
4+15	0.3192	1.02	|Q V	|	|	|	|
4+20	0.3262	1.02	|Q V	|	|	|	|
4+25	0.3333	1.03	|Q V	|	|	|	|
4+30	0.3404	1.03	|Q V	|	|	|	|
4+35	0.3475	1.04	|Q V	|	|	|	|
4+40	0.3547	1.04	|Q V	|	|	|	|
4+45	0.3619	1.04	|Q V	|	|	|	|
4+50	0.3691	1.05	|Q V	|	|	|	|
4+55	0.3764	1.05	|Q V	|	|	|	|
5+ 0	0.3837	1.06	|Q V	|	|	|	|
5+ 5	0.3910	1.06	|Q V	|	|	|	|
5+10	0.3983	1.07	|Q V	|	|	|	|
5+15	0.4057	1.07	|Q V	|	|	|	|
5+20	0.4131	1.08	|Q V	|	|	|	|
5+25	0.4206	1.08	|Q V	|	|	|	|
5+30	0.4281	1.09	|Q V	|	|	|	|
5+35	0.4356	1.09	|Q V	|	|	|	|
5+40	0.4431	1.10	|Q V	|	|	|	|
5+45	0.4507	1.10	|Q V	|	|	|	|
5+50	0.4583	1.11	|Q V	|	|	|	|
5+55	0.4660	1.11	|Q V	|	|	|	|
6+ 0	0.4737	1.12	|Q V	|	|	|	|
6+ 5	0.4814	1.12	|Q V	|	|	|	|
6+10	0.4892	1.13	|Q V	|	|	|	|
6+15	0.4970	1.13	|Q V	|	|	|	|
6+20	0.5048	1.14	|Q V	|	|	|	|
6+25	0.5127	1.14	|Q V	|	|	|	|
6+30	0.5206	1.15	|Q V	|	|	|	|
6+35	0.5286	1.15	|Q V	|	|	|	|
6+40	0.5366	1.16	|Q V	|	|	|	|
6+45	0.5446	1.17	|Q V	|	|	|	|
6+50	0.5527	1.17	|Q V	|	|	|	|
6+55	0.5608	1.18	|Q V	|	|	|	|
7+ 0	0.5689	1.18	|Q V	|	|	|	|

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 7+ 5       0.5771      1.19  |Q   V    |         |         |         |
 7+10       0.5854      1.20  |Q   V    |         |         |         |
 7+15       0.5937      1.20  |Q   V    |         |         |         |
 7+20       0.6020      1.21  |Q   V    |         |         |         |
 7+25       0.6104      1.22  |Q    V   |         |         |         |
 7+30       0.6188      1.22  |Q    V   |         |         |         |
 7+35       0.6273      1.23  |Q    V   |         |         |         |
 7+40       0.6358      1.24  |Q    V   |         |         |         |
 7+45       0.6444      1.24  |Q    V   |         |         |         |
 7+50       0.6530      1.25  |Q    V   |         |         |         |
 7+55       0.6616      1.26  |Q    V   |         |         |         |
 8+ 0       0.6704      1.27  |Q    V   |         |         |         |
 8+ 5       0.6791      1.27  |Q    V   |         |         |         |
 8+10       0.6879      1.28  |Q    V   |         |         |         |
 8+15       0.6968      1.29  |Q    V   |         |         |         |
 8+20       0.7057      1.30  |Q    V   |         |         |         |
 8+25       0.7147      1.30  |Q     V  |         |         |         |
 8+30       0.7238      1.31  |Q     V  |         |         |         |
 8+35       0.7328      1.32  |Q     V  |         |         |         |
 8+40       0.7420      1.33  |Q     V  |         |         |         |
 8+45       0.7512      1.34  |Q     V  |         |         |         |
 8+50       0.7605      1.35  |Q     V  |         |         |         |
 8+55       0.7698      1.35  |Q     V  |         |         |         |
 9+ 0       0.7792      1.36  |Q     V  |         |         |         |
 9+ 5       0.7886      1.37  |Q     V  |         |         |         |
 9+10       0.7982      1.38  |Q     V  |         |         |         |
 9+15       0.8077      1.39  |Q     V  |         |         |         |
 9+20       0.8174      1.40  |Q      V |         |         |         |
 9+25       0.8271      1.41  |Q      V |         |         |         |
 9+30       0.8369      1.42  |Q      V |         |         |         |
 9+35       0.8467      1.43  |Q      V |         |         |         |
 9+40       0.8567      1.44  |Q      V |         |         |         |
 9+45       0.8667      1.45  |Q      V |         |         |         |
 9+50       0.8767      1.46  |Q      V |         |         |         |
 9+55       0.8869      1.47  |Q      V |         |         |         |
10+ 0       0.8971      1.49  |Q      V |         |         |         |
10+ 5       0.9074      1.50  |Q      V |         |         |         |
10+10       0.9178      1.51  |Q       V|         |         |         |
10+15       0.9283      1.52  |Q       V|         |         |         |
10+20       0.9389      1.53  |Q       V|         |         |         |
10+25       0.9495      1.55  |Q       V|         |         |         |
10+30       0.9602      1.56  |Q       V|         |         |         |
10+35       0.9711      1.57  |Q       V|         |         |         |
10+40       0.9820      1.59  |Q       V|         |         |         |
10+45       0.9930      1.60  |Q       V|         |         |         |
10+50       1.0041      1.61  |Q       V|         |         |         |
10+55       1.0153      1.63  |Q       V|         |         |         |
11+ 0       1.0266      1.64  |Q        V         |         |         |
11+ 5       1.0381      1.66  |Q        V         |         |         |
11+10       1.0496      1.67  |Q        V         |         |         |
11+15       1.0612      1.69  |Q        V         |         |         |
11+20       1.0730      1.71  |Q        V         |         |         |
11+25       1.0848      1.72  |Q        V         |         |         |
11+30       1.0968      1.74  |Q        V         |         |         |
11+35       1.1090      1.76  |Q        V         |         |         |
11+40       1.1212      1.78  |Q        |V        |         |         |
11+45       1.1336      1.80  |Q        |V        |         |         |
11+50       1.1461      1.82  |Q        |V        |         |         |
11+55       1.1587      1.84  |Q        |V        |         |         |
12+ 0       1.1715      1.86  |Q        |V        |         |         |
12+ 5       1.1848      1.92  |Q        |V        |         |         |
```



17+15	3.2679	3.23	| Q	|	|	| V |
17+20	3.2894	3.12	| Q	|	|	| V |
17+25	3.3101	3.02	| Q	|	|	| V |
17+30	3.3303	2.93	| Q	|	|	| V |
17+35	3.3499	2.84	| Q	|	|	| V |
17+40	3.3689	2.77	| Q	|	|	| V |
17+45	3.3875	2.70	| Q	|	|	| V |
17+50	3.4057	2.63	| Q	|	|	| V |
17+55	3.4234	2.57	| Q	|	|	| V |
18+ 0	3.4408	2.52	| Q	|	|	| V |
18+ 5	3.4574	2.42	| Q	|	|	| V |
18+10	3.4722	2.14	| Q	|	|	| V |
18+15	3.4854	1.92	|Q	|	|	| V |
18+20	3.4981	1.84	|Q	|	|	| V |
18+25	3.5105	1.80	|Q	|	|	| V |
18+30	3.5226	1.76	|Q	|	|	| V |
18+35	3.5345	1.72	|Q	|	|	| V |
18+40	3.5461	1.69	|Q	|	|	| V |
18+45	3.5575	1.66	|Q	|	|	| V |
18+50	3.5687	1.63	|Q	|	|	| V |
18+55	3.5797	1.60	|Q	|	|	| V |
19+ 0	3.5905	1.57	|Q	|	|	| V |
19+ 5	3.6012	1.54	|Q	|	|	| V |
19+10	3.6116	1.52	|Q	|	|	| V |
19+15	3.6219	1.50	|Q	|	|	| V |
19+20	3.6321	1.47	|Q	|	|	| V |
19+25	3.6421	1.45	|Q	|	|	| V |
19+30	3.6519	1.43	|Q	|	|	| V |
19+35	3.6616	1.41	|Q	|	|	| V |
19+40	3.6712	1.39	|Q	|	|	| V |
19+45	3.6807	1.37	|Q	|	|	| V |
19+50	3.6900	1.35	|Q	|	|	| V |
19+55	3.6992	1.34	|Q	|	|	| V |
20+ 0	3.7083	1.32	|Q	|	|	| V |
20+ 5	3.7172	1.30	|Q	|	|	| V |
20+10	3.7261	1.29	|Q	|	|	| V |
20+15	3.7349	1.27	|Q	|	|	| V |
20+20	3.7435	1.26	|Q	|	|	| V |
20+25	3.7521	1.24	|Q	|	|	| V |
20+30	3.7606	1.23	|Q	|	|	| V |
20+35	3.7689	1.22	|Q	|	|	| V |
20+40	3.7772	1.20	|Q	|	|	| V |
20+45	3.7854	1.19	|Q	|	|	| V |
20+50	3.7935	1.18	|Q	|	|	| V |
20+55	3.8016	1.17	|Q	|	|	| V |
21+ 0	3.8095	1.15	|Q	|	|	| V |
21+ 5	3.8174	1.14	|Q	|	|	| V |
21+10	3.8252	1.13	|Q	|	|	| V |
21+15	3.8329	1.12	|Q	|	|	| V |
21+20	3.8406	1.11	|Q	|	|	| V |
21+25	3.8481	1.10	|Q	|	|	| V |
21+30	3.8556	1.09	|Q	|	|	| V |
21+35	3.8631	1.08	|Q	|	|	| V |
21+40	3.8705	1.07	|Q	|	|	| V |
21+45	3.8778	1.06	|Q	|	|	| V |
21+50	3.8850	1.05	|Q	|	|	| V |
21+55	3.8922	1.04	|Q	|	|	| V |
22+ 0	3.8994	1.04	|Q	|	|	| V |
22+ 5	3.9065	1.03	|Q	|	|	| V |
22+10	3.9135	1.02	|Q	|	|	| V |
22+15	3.9204	1.01	|Q	|	|	| V |

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22+20       3.9273      1.00  |Q       |         |         |       V |
22+25       3.9342      1.00  Q        |         |         |       V |
22+30       3.9410      0.99  Q        |         |         |       V |
22+35       3.9478      0.98  Q        |         |         |       V |
22+40       3.9545      0.97  Q        |         |         |       V |
22+45       3.9611      0.97  Q        |         |         |       V |
22+50       3.9677      0.96  Q        |         |         |        V|
22+55       3.9743      0.95  Q        |         |         |        V|
23+ 0       3.9808      0.95  Q        |         |         |        V|
23+ 5       3.9873      0.94  Q        |         |         |        V|
23+10       3.9937      0.93  Q        |         |         |        V|
23+15       4.0001      0.93  Q        |         |         |        V|
23+20       4.0064      0.92  Q        |         |         |        V|
23+25       4.0127      0.91  Q        |         |         |        V|
23+30       4.0190      0.91  Q        |         |         |        V|
23+35       4.0252      0.90  Q        |         |         |        V|
23+40       4.0314      0.90  Q        |         |         |        V|
23+45       4.0375      0.89  Q        |         |         |        V|
23+50       4.0436      0.89  Q        |         |         |        V|
23+55       4.0497      0.88  Q        |         |         |        V|
24+ 0       4.0557      0.87  Q        |         |         |        V|
```

U n i t H y d r o g r a p h A n a l y s i s

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Study date 01/22/23

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San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6277

JOB NO 2022-318
11115 HEMLOCK AVENUE
2 YEAR, UNIT HYDROGRAPH
POST-CONDITION, AREA B

Storm Event Year = 2

Antecedent Moisture Condition = 1

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2		
12.94	1	0.52
Rainfall data for year 2		
12.94	6	1.36
Rainfall data for year 2		
12.94	24	2.46

++

******** Area-averaged max loss rate, Fm ********

SCS curve No.(AMCII)	SCS curve NO.(AMC 1)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
32.0	16.6	12.94	1.000	1.000	0.090	0.090

Area-averaged adjusted loss rate Fm (In/Hr) = 0.090

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC1)	S	Pervious Yield Fr
1.16	0.090	32.0	16.6	12.30	0.000
11.78	0.910	98.0	98.0	0.20	0.907

Area-averaged catchment yield fraction, Y = 0.825
Area-averaged low loss fraction, Yb = 0.175
User entry of time of concentration = 0.138 (hours)
++
Watershed area = 12.94(Ac.)
Catchment Lag time = 0.111 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 75.3830
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.090(In/Hr)
Average low loss rate fraction (Yb) = 0.175 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.192(In)
Computed peak 30-minute rainfall = 0.393(In)
Specified peak 1-hour rainfall = 0.518(In)
Computed peak 3-hour rainfall = 0.936(In)
Specified peak 6-hour rainfall = 1.360(In)
Specified peak 24-hour rainfall = 2.460(In)

Rainfall depth area reduction factors:
Using a total area of 12.94(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.192(In)
30-minute factor = 0.999 Adjusted rainfall = 0.392(In)
1-hour factor = 0.999 Adjusted rainfall = 0.518(In)
3-hour factor = 1.000 Adjusted rainfall = 0.936(In)
6-hour factor = 1.000 Adjusted rainfall = 1.360(In)
24-hour factor = 1.000 Adjusted rainfall = 2.460(In)

U n i t H y d r o g r a p h
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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
	(K = 156.49 (CFS))	
1	10.105	15.813
2	59.170	76.784
3	92.172	51.646
4	98.501	9.904
5	100.000	2.347

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.1916	0.1916
2	0.2528	0.0612
3	0.2973	0.0445
4	0.3336	0.0363
5	0.3647	0.0311
6	0.3923	0.0276
7	0.4173	0.0250
8	0.4402	0.0229
9	0.4614	0.0212

10	0.4813	0.0199
11	0.5000	0.0187
12	0.5177	0.0177
13	0.5405	0.0228
14	0.5626	0.0220
15	0.5839	0.0213
16	0.6046	0.0207
17	0.6246	0.0201
18	0.6442	0.0196
19	0.6632	0.0191
20	0.6818	0.0186
21	0.7000	0.0182
22	0.7178	0.0178
23	0.7352	0.0174
24	0.7523	0.0171
25	0.7690	0.0167
26	0.7855	0.0164
27	0.8016	0.0161
28	0.8175	0.0159
29	0.8331	0.0156
30	0.8485	0.0154
31	0.8636	0.0151
32	0.8785	0.0149
33	0.8932	0.0147
34	0.9077	0.0145
35	0.9220	0.0143
36	0.9361	0.0141
37	0.9500	0.0139
38	0.9638	0.0137
39	0.9774	0.0136
40	0.9908	0.0134
41	1.0041	0.0133
42	1.0172	0.0131
43	1.0302	0.0130
44	1.0430	0.0128
45	1.0557	0.0127
46	1.0683	0.0126
47	1.0807	0.0125
48	1.0931	0.0123
49	1.1053	0.0122
50	1.1174	0.0121
51	1.1294	0.0120
52	1.1412	0.0119
53	1.1530	0.0118
54	1.1647	0.0117
55	1.1763	0.0116
56	1.1877	0.0115
57	1.1991	0.0114
58	1.2104	0.0113
59	1.2216	0.0112
60	1.2327	0.0111
61	1.2437	0.0110
62	1.2547	0.0109
63	1.2655	0.0109
64	1.2763	0.0108
65	1.2870	0.0107
66	1.2977	0.0106
67	1.3082	0.0106
68	1.3187	0.0105
69	1.3291	0.0104
70	1.3395	0.0103

71	1.3497	0.0103
72	1.3599	0.0102
73	1.3680	0.0080
74	1.3760	0.0080
75	1.3839	0.0079
76	1.3917	0.0079
77	1.3995	0.0078
78	1.4073	0.0077
79	1.4150	0.0077
80	1.4226	0.0076
81	1.4302	0.0076
82	1.4377	0.0075
83	1.4452	0.0075
84	1.4526	0.0074
85	1.4600	0.0074
86	1.4673	0.0073
87	1.4746	0.0073
88	1.4818	0.0072
89	1.4889	0.0072
90	1.4961	0.0071
91	1.5032	0.0071
92	1.5102	0.0070
93	1.5172	0.0070
94	1.5242	0.0070
95	1.5311	0.0069
96	1.5379	0.0069
97	1.5448	0.0068
98	1.5516	0.0068
99	1.5583	0.0067
100	1.5650	0.0067
101	1.5717	0.0067
102	1.5783	0.0066
103	1.5849	0.0066
104	1.5915	0.0066
105	1.5980	0.0065
106	1.6045	0.0065
107	1.6109	0.0065
108	1.6174	0.0064
109	1.6238	0.0064
110	1.6301	0.0064
111	1.6364	0.0063
112	1.6427	0.0063
113	1.6490	0.0063
114	1.6552	0.0062
115	1.6614	0.0062
116	1.6675	0.0062
117	1.6737	0.0061
118	1.6798	0.0061
119	1.6858	0.0061
120	1.6919	0.0060
121	1.6979	0.0060
122	1.7039	0.0060
123	1.7098	0.0060
124	1.7158	0.0059
125	1.7217	0.0059
126	1.7276	0.0059
127	1.7334	0.0058
128	1.7392	0.0058
129	1.7450	0.0058
130	1.7508	0.0058
131	1.7565	0.0057

132	1.7623	0.0057
133	1.7679	0.0057
134	1.7736	0.0057
135	1.7793	0.0056
136	1.7849	0.0056
137	1.7905	0.0056
138	1.7961	0.0056
139	1.8016	0.0056
140	1.8071	0.0055
141	1.8127	0.0055
142	1.8181	0.0055
143	1.8236	0.0055
144	1.8290	0.0054
145	1.8345	0.0054
146	1.8399	0.0054
147	1.8452	0.0054
148	1.8506	0.0054
149	1.8559	0.0053
150	1.8612	0.0053
151	1.8665	0.0053
152	1.8718	0.0053
153	1.8771	0.0053
154	1.8823	0.0052
155	1.8875	0.0052
156	1.8927	0.0052
157	1.8979	0.0052
158	1.9031	0.0052
159	1.9082	0.0051
160	1.9133	0.0051
161	1.9184	0.0051
162	1.9235	0.0051
163	1.9286	0.0051
164	1.9336	0.0050
165	1.9387	0.0050
166	1.9437	0.0050
167	1.9487	0.0050
168	1.9537	0.0050
169	1.9586	0.0050
170	1.9636	0.0049
171	1.9685	0.0049
172	1.9734	0.0049
173	1.9783	0.0049
174	1.9832	0.0049
175	1.9880	0.0049
176	1.9929	0.0048
177	1.9977	0.0048
178	2.0025	0.0048
179	2.0074	0.0048
180	2.0121	0.0048
181	2.0169	0.0048
182	2.0217	0.0048
183	2.0264	0.0047
184	2.0311	0.0047
185	2.0358	0.0047
186	2.0405	0.0047
187	2.0452	0.0047
188	2.0499	0.0047
189	2.0546	0.0047
190	2.0592	0.0046
191	2.0638	0.0046
192	2.0684	0.0046

193	2.0730	0.0046
194	2.0776	0.0046
195	2.0822	0.0046
196	2.0867	0.0046
197	2.0913	0.0045
198	2.0958	0.0045
199	2.1003	0.0045
200	2.1049	0.0045
201	2.1093	0.0045
202	2.1138	0.0045
203	2.1183	0.0045
204	2.1227	0.0045
205	2.1272	0.0044
206	2.1316	0.0044
207	2.1360	0.0044
208	2.1404	0.0044
209	2.1448	0.0044
210	2.1492	0.0044
211	2.1536	0.0044
212	2.1579	0.0044
213	2.1623	0.0043
214	2.1666	0.0043
215	2.1709	0.0043
216	2.1753	0.0043
217	2.1796	0.0043
218	2.1838	0.0043
219	2.1881	0.0043
220	2.1924	0.0043
221	2.1966	0.0043
222	2.2009	0.0042
223	2.2051	0.0042
224	2.2093	0.0042
225	2.2136	0.0042
226	2.2178	0.0042
227	2.2220	0.0042
228	2.2261	0.0042
229	2.2303	0.0042
230	2.2345	0.0042
231	2.2386	0.0041
232	2.2427	0.0041
233	2.2469	0.0041
234	2.2510	0.0041
235	2.2551	0.0041
236	2.2592	0.0041
237	2.2633	0.0041
238	2.2674	0.0041
239	2.2714	0.0041
240	2.2755	0.0041
241	2.2795	0.0040
242	2.2836	0.0040
243	2.2876	0.0040
244	2.2916	0.0040
245	2.2956	0.0040
246	2.2996	0.0040
247	2.3036	0.0040
248	2.3076	0.0040
249	2.3116	0.0040
250	2.3156	0.0040
251	2.3195	0.0040
252	2.3235	0.0039
253	2.3274	0.0039

254	2.3313	0.0039
255	2.3352	0.0039
256	2.3392	0.0039
257	2.3431	0.0039
258	2.3469	0.0039
259	2.3508	0.0039
260	2.3547	0.0039
261	2.3586	0.0039
262	2.3624	0.0039
263	2.3663	0.0039
264	2.3701	0.0038
265	2.3740	0.0038
266	2.3778	0.0038
267	2.3816	0.0038
268	2.3854	0.0038
269	2.3892	0.0038
270	2.3930	0.0038
271	2.3968	0.0038
272	2.4006	0.0038
273	2.4043	0.0038
274	2.4081	0.0038
275	2.4119	0.0038
276	2.4156	0.0037
277	2.4193	0.0037
278	2.4231	0.0037
279	2.4268	0.0037
280	2.4305	0.0037
281	2.4342	0.0037
282	2.4379	0.0037
283	2.4416	0.0037
284	2.4453	0.0037
285	2.4490	0.0037
286	2.4526	0.0037
287	2.4563	0.0037
288	2.4600	0.0037

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0037	0.0006	0.0030
2	0.0037	0.0006	0.0030
3	0.0037	0.0006	0.0030
4	0.0037	0.0006	0.0030
5	0.0037	0.0006	0.0031
6	0.0037	0.0006	0.0031
7	0.0037	0.0007	0.0031
8	0.0037	0.0007	0.0031
9	0.0037	0.0007	0.0031
10	0.0038	0.0007	0.0031
11	0.0038	0.0007	0.0031
12	0.0038	0.0007	0.0031
13	0.0038	0.0007	0.0031
14	0.0038	0.0007	0.0031
15	0.0038	0.0007	0.0032
16	0.0038	0.0007	0.0032
17	0.0038	0.0007	0.0032
18	0.0039	0.0007	0.0032
19	0.0039	0.0007	0.0032
20	0.0039	0.0007	0.0032
21	0.0039	0.0007	0.0032

22	0.0039	0.0007	0.0032
23	0.0039	0.0007	0.0032
24	0.0039	0.0007	0.0032
25	0.0039	0.0007	0.0033
26	0.0040	0.0007	0.0033
27	0.0040	0.0007	0.0033
28	0.0040	0.0007	0.0033
29	0.0040	0.0007	0.0033
30	0.0040	0.0007	0.0033
31	0.0040	0.0007	0.0033
32	0.0040	0.0007	0.0033
33	0.0041	0.0007	0.0033
34	0.0041	0.0007	0.0034
35	0.0041	0.0007	0.0034
36	0.0041	0.0007	0.0034
37	0.0041	0.0007	0.0034
38	0.0041	0.0007	0.0034
39	0.0041	0.0007	0.0034
40	0.0042	0.0007	0.0034
41	0.0042	0.0007	0.0034
42	0.0042	0.0007	0.0035
43	0.0042	0.0007	0.0035
44	0.0042	0.0007	0.0035
45	0.0042	0.0007	0.0035
46	0.0043	0.0007	0.0035
47	0.0043	0.0007	0.0035
48	0.0043	0.0007	0.0035
49	0.0043	0.0008	0.0036
50	0.0043	0.0008	0.0036
51	0.0043	0.0008	0.0036
52	0.0044	0.0008	0.0036
53	0.0044	0.0008	0.0036
54	0.0044	0.0008	0.0036
55	0.0044	0.0008	0.0036
56	0.0044	0.0008	0.0037
57	0.0045	0.0008	0.0037
58	0.0045	0.0008	0.0037
59	0.0045	0.0008	0.0037
60	0.0045	0.0008	0.0037
61	0.0045	0.0008	0.0037
62	0.0045	0.0008	0.0038
63	0.0046	0.0008	0.0038
64	0.0046	0.0008	0.0038
65	0.0046	0.0008	0.0038
66	0.0046	0.0008	0.0038
67	0.0047	0.0008	0.0038
68	0.0047	0.0008	0.0039
69	0.0047	0.0008	0.0039
70	0.0047	0.0008	0.0039
71	0.0047	0.0008	0.0039
72	0.0048	0.0008	0.0039
73	0.0048	0.0008	0.0040
74	0.0048	0.0008	0.0040
75	0.0048	0.0008	0.0040
76	0.0048	0.0008	0.0040
77	0.0049	0.0009	0.0040
78	0.0049	0.0009	0.0040
79	0.0049	0.0009	0.0041
80	0.0049	0.0009	0.0041
81	0.0050	0.0009	0.0041
82	0.0050	0.0009	0.0041

83	0.0050	0.0009	0.0042
84	0.0050	0.0009	0.0042
85	0.0051	0.0009	0.0042
86	0.0051	0.0009	0.0042
87	0.0051	0.0009	0.0042
88	0.0052	0.0009	0.0043
89	0.0052	0.0009	0.0043
90	0.0052	0.0009	0.0043
91	0.0053	0.0009	0.0043
92	0.0053	0.0009	0.0044
93	0.0053	0.0009	0.0044
94	0.0053	0.0009	0.0044
95	0.0054	0.0009	0.0044
96	0.0054	0.0009	0.0045
97	0.0054	0.0010	0.0045
98	0.0055	0.0010	0.0045
99	0.0055	0.0010	0.0045
100	0.0055	0.0010	0.0046
101	0.0056	0.0010	0.0046
102	0.0056	0.0010	0.0046
103	0.0056	0.0010	0.0047
104	0.0057	0.0010	0.0047
105	0.0057	0.0010	0.0047
106	0.0057	0.0010	0.0047
107	0.0058	0.0010	0.0048
108	0.0058	0.0010	0.0048
109	0.0059	0.0010	0.0048
110	0.0059	0.0010	0.0049
111	0.0060	0.0010	0.0049
112	0.0060	0.0010	0.0049
113	0.0060	0.0011	0.0050
114	0.0061	0.0011	0.0050
115	0.0061	0.0011	0.0051
116	0.0062	0.0011	0.0051
117	0.0062	0.0011	0.0051
118	0.0063	0.0011	0.0052
119	0.0063	0.0011	0.0052
120	0.0064	0.0011	0.0052
121	0.0064	0.0011	0.0053
122	0.0065	0.0011	0.0053
123	0.0065	0.0011	0.0054
124	0.0066	0.0011	0.0054
125	0.0066	0.0012	0.0055
126	0.0067	0.0012	0.0055
127	0.0067	0.0012	0.0056
128	0.0068	0.0012	0.0056
129	0.0069	0.0012	0.0057
130	0.0069	0.0012	0.0057
131	0.0070	0.0012	0.0058
132	0.0070	0.0012	0.0058
133	0.0071	0.0012	0.0059
134	0.0072	0.0013	0.0059
135	0.0073	0.0013	0.0060
136	0.0073	0.0013	0.0060
137	0.0074	0.0013	0.0061
138	0.0075	0.0013	0.0062
139	0.0076	0.0013	0.0063
140	0.0076	0.0013	0.0063
141	0.0077	0.0014	0.0064
142	0.0078	0.0014	0.0064
143	0.0079	0.0014	0.0065

144	0.0080	0.0014	0.0066
145	0.0102	0.0018	0.0084
146	0.0103	0.0018	0.0085
147	0.0104	0.0018	0.0086
148	0.0105	0.0018	0.0087
149	0.0106	0.0019	0.0088
150	0.0107	0.0019	0.0088
151	0.0109	0.0019	0.0090
152	0.0109	0.0019	0.0090
153	0.0111	0.0019	0.0092
154	0.0112	0.0020	0.0092
155	0.0114	0.0020	0.0094
156	0.0115	0.0020	0.0095
157	0.0117	0.0020	0.0096
158	0.0118	0.0021	0.0097
159	0.0120	0.0021	0.0099
160	0.0121	0.0021	0.0100
161	0.0123	0.0022	0.0102
162	0.0125	0.0022	0.0103
163	0.0127	0.0022	0.0105
164	0.0128	0.0022	0.0106
165	0.0131	0.0023	0.0108
166	0.0133	0.0023	0.0110
167	0.0136	0.0024	0.0112
168	0.0137	0.0024	0.0113
169	0.0141	0.0025	0.0116
170	0.0143	0.0025	0.0118
171	0.0147	0.0026	0.0121
172	0.0149	0.0026	0.0123
173	0.0154	0.0027	0.0127
174	0.0156	0.0027	0.0129
175	0.0161	0.0028	0.0133
176	0.0164	0.0029	0.0136
177	0.0171	0.0030	0.0141
178	0.0174	0.0030	0.0144
179	0.0182	0.0032	0.0150
180	0.0186	0.0032	0.0154
181	0.0196	0.0034	0.0161
182	0.0201	0.0035	0.0166
183	0.0213	0.0037	0.0176
184	0.0220	0.0039	0.0182
185	0.0177	0.0031	0.0146
186	0.0187	0.0033	0.0154
187	0.0212	0.0037	0.0175
188	0.0229	0.0040	0.0189
189	0.0276	0.0048	0.0228
190	0.0311	0.0054	0.0257
191	0.0445	0.0075	0.0370
192	0.0612	0.0075	0.0537
193	0.1916	0.0075	0.1841
194	0.0363	0.0063	0.0299
195	0.0250	0.0044	0.0206
196	0.0199	0.0035	0.0164
197	0.0228	0.0040	0.0188
198	0.0207	0.0036	0.0171
199	0.0191	0.0033	0.0157
200	0.0178	0.0031	0.0147
201	0.0167	0.0029	0.0138
202	0.0159	0.0028	0.0131
203	0.0151	0.0026	0.0125
204	0.0145	0.0025	0.0120

205	0.0139	0.0024	0.0115
206	0.0134	0.0023	0.0111
207	0.0130	0.0023	0.0107
208	0.0126	0.0022	0.0104
209	0.0122	0.0021	0.0101
210	0.0119	0.0021	0.0098
211	0.0116	0.0020	0.0095
212	0.0113	0.0020	0.0093
213	0.0110	0.0019	0.0091
214	0.0108	0.0019	0.0089
215	0.0106	0.0018	0.0087
216	0.0103	0.0018	0.0085
217	0.0080	0.0014	0.0066
218	0.0079	0.0014	0.0065
219	0.0077	0.0013	0.0063
220	0.0075	0.0013	0.0062
221	0.0074	0.0013	0.0061
222	0.0072	0.0013	0.0060
223	0.0071	0.0012	0.0058
224	0.0070	0.0012	0.0057
225	0.0068	0.0012	0.0056
226	0.0067	0.0012	0.0055
227	0.0066	0.0012	0.0054
228	0.0065	0.0011	0.0054
229	0.0064	0.0011	0.0053
230	0.0063	0.0011	0.0052
231	0.0062	0.0011	0.0051
232	0.0061	0.0011	0.0050
233	0.0060	0.0011	0.0050
234	0.0059	0.0010	0.0049
235	0.0058	0.0010	0.0048
236	0.0058	0.0010	0.0048
237	0.0057	0.0010	0.0047
238	0.0056	0.0010	0.0046
239	0.0056	0.0010	0.0046
240	0.0055	0.0010	0.0045
241	0.0054	0.0009	0.0045
242	0.0054	0.0009	0.0044
243	0.0053	0.0009	0.0044
244	0.0052	0.0009	0.0043
245	0.0052	0.0009	0.0043
246	0.0051	0.0009	0.0042
247	0.0051	0.0009	0.0042
248	0.0050	0.0009	0.0041
249	0.0050	0.0009	0.0041
250	0.0049	0.0009	0.0041
251	0.0049	0.0009	0.0040
252	0.0048	0.0008	0.0040
253	0.0048	0.0008	0.0039
254	0.0047	0.0008	0.0039
255	0.0047	0.0008	0.0039
256	0.0046	0.0008	0.0038
257	0.0046	0.0008	0.0038
258	0.0046	0.0008	0.0038
259	0.0045	0.0008	0.0037
260	0.0045	0.0008	0.0037
261	0.0044	0.0008	0.0037
262	0.0044	0.0008	0.0036
263	0.0044	0.0008	0.0036
264	0.0043	0.0008	0.0036
265	0.0043	0.0008	0.0035

266	0.0043	0.0007	0.0035
267	0.0042	0.0007	0.0035
268	0.0042	0.0007	0.0035
269	0.0042	0.0007	0.0034
270	0.0041	0.0007	0.0034
271	0.0041	0.0007	0.0034
272	0.0041	0.0007	0.0034
273	0.0040	0.0007	0.0033
274	0.0040	0.0007	0.0033
275	0.0040	0.0007	0.0033
276	0.0040	0.0007	0.0033
277	0.0039	0.0007	0.0032
278	0.0039	0.0007	0.0032
279	0.0039	0.0007	0.0032
280	0.0039	0.0007	0.0032
281	0.0038	0.0007	0.0032
282	0.0038	0.0007	0.0031
283	0.0038	0.0007	0.0031
284	0.0038	0.0007	0.0031
285	0.0037	0.0007	0.0031
286	0.0037	0.0006	0.0031
287	0.0037	0.0006	0.0030
288	0.0037	0.0006	0.0030

Total soil rain loss = 0.40(In)
Total effective rainfall = 2.06(In)
Peak flow rate in flood hydrograph = 17.81(CFS)

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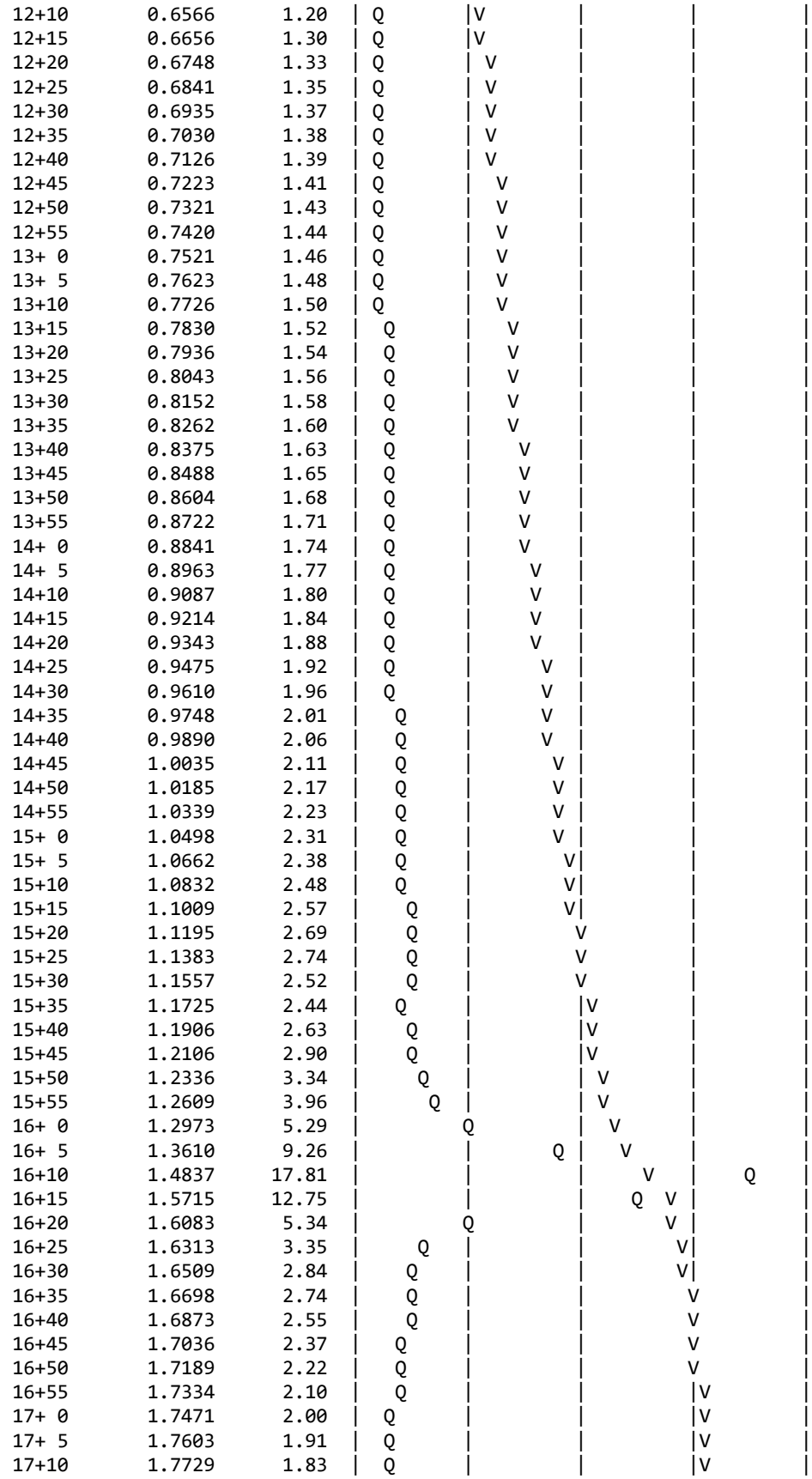
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0003	0.05	Q	|	|	|	|
0+10	0.0023	0.28	Q	|	|	|	|
0+15	0.0053	0.44	Q	|	|	|	|
0+20	0.0085	0.47	Q	|	|	|	|
0+25	0.0117	0.48	Q	|	|	|	|
0+30	0.0150	0.48	Q	|	|	|	|
0+35	0.0183	0.48	Q	|	|	|	|
0+40	0.0216	0.48	Q	|	|	|	|
0+45	0.0249	0.48	Q	|	|	|	|
0+50	0.0283	0.48	Q	|	|	|	|
0+55	0.0316	0.48	Q	|	|	|	|
1+ 0	0.0350	0.49	Q	|	|	|	|
1+ 5	0.0383	0.49	Q	|	|	|	|
1+10	0.0417	0.49	Q	|	|	|	|
1+15	0.0451	0.49	Q	|	|	|	|
1+20	0.0485	0.49	Q	|	|	|	|
1+25	0.0519	0.49	Q	|	|	|	|
1+30	0.0553	0.50	Q	|	|	|	|
1+35	0.0587	0.50	QV	|	|	|	|
1+40	0.0621	0.50	QV	|	|	|	|
1+45	0.0656	0.50	|Q	|	|	|	|
1+50	0.0690	0.50	|Q	|	|	|	|
1+55	0.0725	0.50	|Q	|	|	|	|

2+ 0	0.0760	0.51	Q				
2+ 5	0.0795	0.51	Q				
2+10	0.0830	0.51	Q				
2+15	0.0865	0.51	Q				
2+20	0.0900	0.51	Q				
2+25	0.0935	0.51	Q				
2+30	0.0971	0.52	Q				
2+35	0.1007	0.52	Q				
2+40	0.1042	0.52	Q				
2+45	0.1078	0.52	Q				
2+50	0.1114	0.52	QV				
2+55	0.1151	0.52	QV				
3+ 0	0.1187	0.53	QV				
3+ 5	0.1223	0.53	QV				
3+10	0.1260	0.53	QV				
3+15	0.1296	0.53	QV				
3+20	0.1333	0.53	QV				
3+25	0.1370	0.54	QV				
3+30	0.1407	0.54	QV				
3+35	0.1445	0.54	QV				
3+40	0.1482	0.54	QV				
3+45	0.1519	0.54	QV				
3+50	0.1557	0.55	QV				
3+55	0.1595	0.55	QV				
4+ 0	0.1633	0.55	QV				
4+ 5	0.1671	0.55	Q V				
4+10	0.1709	0.56	Q V				
4+15	0.1748	0.56	Q V				
4+20	0.1786	0.56	Q V				
4+25	0.1825	0.56	Q V				
4+30	0.1864	0.56	Q V				
4+35	0.1903	0.57	Q V				
4+40	0.1942	0.57	Q V				
4+45	0.1981	0.57	Q V				
4+50	0.2021	0.57	Q V				
4+55	0.2061	0.58	Q V				
5+ 0	0.2101	0.58	Q V				
5+ 5	0.2141	0.58	Q V				
5+10	0.2181	0.58	Q V				
5+15	0.2221	0.59	Q V				
5+20	0.2262	0.59	Q V				
5+25	0.2303	0.59	Q V				
5+30	0.2343	0.59	Q V				
5+35	0.2385	0.60	Q V				
5+40	0.2426	0.60	Q V				
5+45	0.2467	0.60	Q V				
5+50	0.2509	0.61	Q V				
5+55	0.2551	0.61	Q V				
6+ 0	0.2593	0.61	Q V				
6+ 5	0.2635	0.61	Q V				
6+10	0.2678	0.62	Q V				
6+15	0.2720	0.62	Q V				
6+20	0.2763	0.62	Q V				
6+25	0.2806	0.63	Q V				
6+30	0.2850	0.63	Q V				
6+35	0.2893	0.63	Q V				
6+40	0.2937	0.63	Q V				
6+45	0.2981	0.64	Q V				
6+50	0.3025	0.64	Q V				
6+55	0.3069	0.64	Q V				
7+ 0	0.3114	0.65	Q V				

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 7+ 5       0.3159      0.65  |Q   V    |         |         |         |
 7+10       0.3204      0.65  |Q   V    |         |         |         |
 7+15       0.3249      0.66  |Q   V    |         |         |         |
 7+20       0.3295      0.66  |Q   V    |         |         |         |
 7+25       0.3341      0.67  |Q    V   |         |         |         |
 7+30       0.3387      0.67  |Q    V   |         |         |         |
 7+35       0.3433      0.67  |Q    V   |         |         |         |
 7+40       0.3480      0.68  |Q    V   |         |         |         |
 7+45       0.3527      0.68  |Q    V   |         |         |         |
 7+50       0.3574      0.68  |Q    V   |         |         |         |
 7+55       0.3621      0.69  |Q    V   |         |         |         |
 8+ 0       0.3669      0.69  |Q    V   |         |         |         |
 8+ 5       0.3717      0.70  |Q    V   |         |         |         |
 8+10       0.3765      0.70  |Q    V   |         |         |         |
 8+15       0.3813      0.70  |Q    V   |         |         |         |
 8+20       0.3862      0.71  |Q    V   |         |         |         |
 8+25       0.3911      0.71  |Q     V  |         |         |         |
 8+30       0.3961      0.72  |Q     V  |         |         |         |
 8+35       0.4011      0.72  |Q     V  |         |         |         |
 8+40       0.4061      0.73  |Q     V  |         |         |         |
 8+45       0.4111      0.73  |Q     V  |         |         |         |
 8+50       0.4162      0.74  |Q     V  |         |         |         |
 8+55       0.4213      0.74  |Q     V  |         |         |         |
 9+ 0       0.4264      0.75  |Q     V  |         |         |         |
 9+ 5       0.4316      0.75  |Q     V  |         |         |         |
 9+10       0.4368      0.76  |Q     V  |         |         |         |
 9+15       0.4420      0.76  |Q     V  |         |         |         |
 9+20       0.4473      0.77  |Q      V |         |         |         |
 9+25       0.4526      0.77  |Q      V |         |         |         |
 9+30       0.4580      0.78  |Q      V |         |         |         |
 9+35       0.4634      0.78  |Q      V |         |         |         |
 9+40       0.4688      0.79  |Q      V |         |         |         |
 9+45       0.4743      0.79  |Q      V |         |         |         |
 9+50       0.4798      0.80  |Q      V |         |         |         |
 9+55       0.4853      0.81  |Q      V |         |         |         |
10+ 0       0.4909      0.81  |Q      V |         |         |         |
10+ 5       0.4966      0.82  |Q      V |         |         |         |
10+10       0.5023      0.83  |Q       V|         |         |         |
10+15       0.5080      0.83  |Q       V|         |         |         |
10+20       0.5138      0.84  |Q       V|         |         |         |
10+25       0.5196      0.85  |Q       V|         |         |         |
10+30       0.5255      0.85  |Q       V|         |         |         |
10+35       0.5314      0.86  |Q       V|         |         |         |
10+40       0.5374      0.87  |Q       V|         |         |         |
10+45       0.5434      0.87  |Q       V|         |         |         |
10+50       0.5495      0.88  |Q       V|         |         |         |
10+55       0.5556      0.89  |Q        V         |         |         |
11+ 0       0.5618      0.90  |Q        V         |         |         |
11+ 5       0.5680      0.91  |Q        V         |         |         |
11+10       0.5743      0.92  |Q        V         |         |         |
11+15       0.5807      0.92  |Q        V         |         |         |
11+20       0.5871      0.93  |Q        V         |         |         |
11+25       0.5936      0.94  |Q        V         |         |         |
11+30       0.6002      0.95  |Q        V         |         |         |
11+35       0.6068      0.96  |Q        V         |         |         |
11+40       0.6135      0.97  |Q        |V        |         |         |
11+45       0.6203      0.98  |Q        |V        |         |         |
11+50       0.6271      0.99  |Q        |V        |         |         |
11+55       0.6341      1.00  | Q       |V        |         |         |
12+ 0       0.6411      1.02  | Q       |V        |         |         |
12+ 5       0.6483      1.06  | Q       |V        |         |         |
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17+15	1.7850	1.76	Q			V
17+20	1.7967	1.70	Q			V
17+25	1.8080	1.65	Q			V
17+30	1.8190	1.60	Q			V
17+35	1.8297	1.55	Q			V
17+40	1.8401	1.51	Q			V
17+45	1.8503	1.47	Q			V
17+50	1.8602	1.44	Q			V
17+55	1.8699	1.41	Q			V
18+ 0	1.8793	1.38	Q			V
18+ 5	1.8884	1.32	Q			V
18+10	1.8964	1.16	Q			V
18+15	1.9036	1.05	Q			V
18+20	1.9106	1.01	Q			V
18+25	1.9173	0.98	Q			V
18+30	1.9239	0.96	Q			V
18+35	1.9304	0.94	Q			V
18+40	1.9367	0.92	Q			V
18+45	1.9430	0.91	Q			V
18+50	1.9491	0.89	Q			V
18+55	1.9551	0.87	Q			V
19+ 0	1.9610	0.86	Q			V
19+ 5	1.9668	0.84	Q			V
19+10	1.9725	0.83	Q			V
19+15	1.9782	0.82	Q			V
19+20	1.9837	0.80	Q			V
19+25	1.9892	0.79	Q			V
19+30	1.9946	0.78	Q			V
19+35	1.9999	0.77	Q			V
19+40	2.0051	0.76	Q			V
19+45	2.0103	0.75	Q			V
19+50	2.0153	0.74	Q			V
19+55	2.0204	0.73	Q			V
20+ 0	2.0253	0.72	Q			V
20+ 5	2.0302	0.71	Q			V
20+10	2.0351	0.70	Q			V
20+15	2.0399	0.70	Q			V
20+20	2.0446	0.69	Q			V
20+25	2.0493	0.68	Q			V
20+30	2.0539	0.67	Q			V
20+35	2.0585	0.66	Q			V
20+40	2.0630	0.66	Q			V
20+45	2.0675	0.65	Q			V
20+50	2.0719	0.64	Q			V
20+55	2.0763	0.64	Q			V
21+ 0	2.0807	0.63	Q			V
21+ 5	2.0850	0.62	Q			V
21+10	2.0892	0.62	Q			V
21+15	2.0934	0.61	Q			V
21+20	2.0976	0.61	Q			V
21+25	2.1018	0.60	Q			V
21+30	2.1059	0.60	Q			V
21+35	2.1099	0.59	Q			V
21+40	2.1140	0.59	Q			V
21+45	2.1180	0.58	Q			V
21+50	2.1219	0.58	Q			V
21+55	2.1259	0.57	Q			V
22+ 0	2.1298	0.57	Q			V
22+ 5	2.1336	0.56	Q			V
22+10	2.1375	0.56	Q			V
22+15	2.1413	0.55	Q			V

```
22+20       2.1451      0.55  |Q        |         |         |       V |
22+25       2.1488      0.54  |Q        |         |         |       V |
22+30       2.1525      0.54  |Q        |         |         |       V |
22+35       2.1562      0.54  |Q        |         |         |       V |
22+40       2.1599      0.53  |Q        |         |         |       V |
22+45       2.1635      0.53  |Q        |         |         |       V |
22+50       2.1671      0.52  |Q        |         |         |        V|
22+55       2.1707      0.52  |Q        |         |         |        V|
23+ 0       2.1743      0.52  |Q        |         |         |        V|
23+ 5       2.1778      0.51  |Q        |         |         |        V|
23+10       2.1813      0.51  |Q        |         |         |        V|
23+15       2.1848      0.51  |Q        |         |         |        V|
23+20       2.1883      0.50  |Q        |         |         |        V|
23+25       2.1917      0.50  Q         |         |         |        V|
23+30       2.1951      0.50  Q         |         |         |        V|
23+35       2.1985      0.49  Q         |         |         |        V|
23+40       2.2019      0.49  Q         |         |         |        V|
23+45       2.2053      0.49  Q         |         |         |        V|
23+50       2.2086      0.48  Q         |         |         |        V|
23+55       2.2119      0.48  Q         |         |         |        V|
24+ 0       2.2152      0.48  Q         |         |         |        V|
```

APPENDIX C.6

UNIT HYDROGRAPH ANALYSIS

POST-DEVELOPMENT CONDITIONS – 10 YEAR

U n i t H y d r o g r a p h A n a l y s i s

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Study date 01/22/23

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San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6277

JOB NO 2022-318
11115 HEMLOCK AVENUE
10-YEAR, UNIT HYDROGRAPH
POST-CONDITION, AREA A

Storm Event Year = 10

Antecedent Moisture Condition = 2

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 10		
24.47	1	0.82
Rainfall data for year 10		
24.47	6	2.07
Rainfall data for year 10		
24.47	24	3.81

++

******** Area-averaged max loss rate, Fm ********

SCS curve No.(AMCII)	SCS curve NO.(AMC 2)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
32.0	32.0	24.47	1.000	0.978	0.120	0.117

Area-averaged adjusted loss rate Fm (In/Hr) = 0.117

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
2.94	0.120	32.0	32.0	19.05	0.000
21.53	0.880	98.0	98.0	0.20	0.938

Area-averaged catchment yield fraction, Y = 0.826
Area-averaged low loss fraction, Yb = 0.174
User entry of time of concentration = 0.142 (hours)
++
Watershed area = 24.47(Ac.)
Catchment Lag time = 0.114 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 73.1080
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.117(In/Hr)
Average low loss rate fraction (Yb) = 0.174 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.305(In)
Computed peak 30-minute rainfall = 0.624(In)
Specified peak 1-hour rainfall = 0.823(In)
Computed peak 3-hour rainfall = 1.449(In)
Specified peak 6-hour rainfall = 2.070(In)
Specified peak 24-hour rainfall = 3.810(In)

Rainfall depth area reduction factors:
Using a total area of 24.47(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.304(In)
30-minute factor = 0.999 Adjusted rainfall = 0.623(In)
1-hour factor = 0.999 Adjusted rainfall = 0.822(In)
3-hour factor = 1.000 Adjusted rainfall = 1.449(In)
6-hour factor = 1.000 Adjusted rainfall = 2.070(In)
24-hour factor = 1.000 Adjusted rainfall = 3.810(In)

U n i t H y d r o g r a p h
++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
	(K = 295.93 (CFS))	
1	9.533	28.213
2	56.811	139.910
3	91.068	101.378
4	98.284	21.355
5	100.000	5.079

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3042	0.3042
2	0.4015	0.0972
3	0.4721	0.0707
4	0.5297	0.0576
5	0.5792	0.0495
6	0.6230	0.0438
7	0.6626	0.0396
8	0.6990	0.0364
9	0.7327	0.0337

10	0.7642	0.0315
11	0.7939	0.0297
12	0.8221	0.0281
13	0.8567	0.0346
14	0.8901	0.0334
15	0.9223	0.0322
16	0.9535	0.0312
17	0.9838	0.0303
18	1.0132	0.0294
19	1.0419	0.0286
20	1.0698	0.0279
21	1.0971	0.0273
22	1.1237	0.0266
23	1.1498	0.0261
24	1.1753	0.0255
25	1.2003	0.0250
26	1.2248	0.0245
27	1.2489	0.0241
28	1.2725	0.0236
29	1.2957	0.0232
30	1.3186	0.0229
31	1.3411	0.0225
32	1.3632	0.0221
33	1.3850	0.0218
34	1.4065	0.0215
35	1.4277	0.0212
36	1.4486	0.0209
37	1.4692	0.0206
38	1.4895	0.0203
39	1.5095	0.0201
40	1.5293	0.0198
41	1.5489	0.0196
42	1.5682	0.0193
43	1.5874	0.0191
44	1.6063	0.0189
45	1.6250	0.0187
46	1.6434	0.0185
47	1.6617	0.0183
48	1.6799	0.0181
49	1.6978	0.0179
50	1.7155	0.0178
51	1.7331	0.0176
52	1.7505	0.0174
53	1.7678	0.0173
54	1.7849	0.0171
55	1.8018	0.0169
56	1.8186	0.0168
57	1.8353	0.0166
58	1.8518	0.0165
59	1.8681	0.0164
60	1.8844	0.0162
61	1.9005	0.0161
62	1.9165	0.0160
63	1.9323	0.0159
64	1.9481	0.0157
65	1.9637	0.0156
66	1.9792	0.0155
67	1.9945	0.0154
68	2.0098	0.0153
69	2.0250	0.0152
70	2.0400	0.0151

71	2.0550	0.0150
72	2.0698	0.0149
73	2.0824	0.0126
74	2.0950	0.0125
75	2.1074	0.0124
76	2.1197	0.0123
77	2.1319	0.0122
78	2.1441	0.0121
79	2.1561	0.0121
80	2.1681	0.0120
81	2.1800	0.0119
82	2.1918	0.0118
83	2.2035	0.0117
84	2.2151	0.0116
85	2.2267	0.0116
86	2.2382	0.0115
87	2.2496	0.0114
88	2.2610	0.0113
89	2.2722	0.0113
90	2.2834	0.0112
91	2.2946	0.0111
92	2.3056	0.0111
93	2.3166	0.0110
94	2.3276	0.0109
95	2.3384	0.0109
96	2.3492	0.0108
97	2.3600	0.0107
98	2.3706	0.0107
99	2.3813	0.0106
100	2.3918	0.0106
101	2.4023	0.0105
102	2.4127	0.0104
103	2.4231	0.0104
104	2.4335	0.0103
105	2.4437	0.0103
106	2.4539	0.0102
107	2.4641	0.0102
108	2.4742	0.0101
109	2.4843	0.0101
110	2.4943	0.0100
111	2.5042	0.0100
112	2.5141	0.0099
113	2.5240	0.0099
114	2.5338	0.0098
115	2.5436	0.0098
116	2.5533	0.0097
117	2.5629	0.0097
118	2.5725	0.0096
119	2.5821	0.0096
120	2.5916	0.0095
121	2.6011	0.0095
122	2.6106	0.0094
123	2.6200	0.0094
124	2.6293	0.0094
125	2.6386	0.0093
126	2.6479	0.0093
127	2.6571	0.0092
128	2.6663	0.0092
129	2.6755	0.0091
130	2.6846	0.0091
131	2.6936	0.0091

132	2.7027	0.0090
133	2.7117	0.0090
134	2.7206	0.0090
135	2.7295	0.0089
136	2.7384	0.0089
137	2.7473	0.0088
138	2.7561	0.0088
139	2.7648	0.0088
140	2.7736	0.0087
141	2.7823	0.0087
142	2.7909	0.0087
143	2.7996	0.0086
144	2.8082	0.0086
145	2.8167	0.0086
146	2.8253	0.0085
147	2.8338	0.0085
148	2.8422	0.0085
149	2.8507	0.0084
150	2.8591	0.0084
151	2.8675	0.0084
152	2.8758	0.0083
153	2.8841	0.0083
154	2.8924	0.0083
155	2.9006	0.0083
156	2.9089	0.0082
157	2.9171	0.0082
158	2.9252	0.0082
159	2.9334	0.0081
160	2.9415	0.0081
161	2.9495	0.0081
162	2.9576	0.0080
163	2.9656	0.0080
164	2.9736	0.0080
165	2.9816	0.0080
166	2.9895	0.0079
167	2.9974	0.0079
168	3.0053	0.0079
169	3.0132	0.0079
170	3.0210	0.0078
171	3.0288	0.0078
172	3.0366	0.0078
173	3.0443	0.0078
174	3.0521	0.0077
175	3.0598	0.0077
176	3.0675	0.0077
177	3.0751	0.0077
178	3.0828	0.0076
179	3.0904	0.0076
180	3.0980	0.0076
181	3.1055	0.0076
182	3.1131	0.0075
183	3.1206	0.0075
184	3.1281	0.0075
185	3.1355	0.0075
186	3.1430	0.0074
187	3.1504	0.0074
188	3.1578	0.0074
189	3.1652	0.0074
190	3.1726	0.0074
191	3.1799	0.0073
192	3.1872	0.0073

193	3.1945	0.0073
194	3.2018	0.0073
195	3.2090	0.0073
196	3.2163	0.0072
197	3.2235	0.0072
198	3.2307	0.0072
199	3.2378	0.0072
200	3.2450	0.0072
201	3.2521	0.0071
202	3.2592	0.0071
203	3.2663	0.0071
204	3.2734	0.0071
205	3.2805	0.0071
206	3.2875	0.0070
207	3.2945	0.0070
208	3.3015	0.0070
209	3.3085	0.0070
210	3.3154	0.0070
211	3.3224	0.0069
212	3.3293	0.0069
213	3.3362	0.0069
214	3.3431	0.0069
215	3.3499	0.0069
216	3.3568	0.0068
217	3.3636	0.0068
218	3.3704	0.0068
219	3.3772	0.0068
220	3.3840	0.0068
221	3.3908	0.0068
222	3.3975	0.0067
223	3.4042	0.0067
224	3.4110	0.0067
225	3.4176	0.0067
226	3.4243	0.0067
227	3.4310	0.0067
228	3.4376	0.0066
229	3.4443	0.0066
230	3.4509	0.0066
231	3.4575	0.0066
232	3.4640	0.0066
233	3.4706	0.0066
234	3.4772	0.0065
235	3.4837	0.0065
236	3.4902	0.0065
237	3.4967	0.0065
238	3.5032	0.0065
239	3.5097	0.0065
240	3.5161	0.0065
241	3.5226	0.0064
242	3.5290	0.0064
243	3.5354	0.0064
244	3.5418	0.0064
245	3.5482	0.0064
246	3.5545	0.0064
247	3.5609	0.0064
248	3.5672	0.0063
249	3.5735	0.0063
250	3.5799	0.0063
251	3.5862	0.0063
252	3.5924	0.0063
253	3.5987	0.0063

254	3.6050	0.0063
255	3.6112	0.0062
256	3.6174	0.0062
257	3.6236	0.0062
258	3.6298	0.0062
259	3.6360	0.0062
260	3.6422	0.0062
261	3.6483	0.0062
262	3.6545	0.0061
263	3.6606	0.0061
264	3.6667	0.0061
265	3.6728	0.0061
266	3.6789	0.0061
267	3.6850	0.0061
268	3.6911	0.0061
269	3.6971	0.0061
270	3.7032	0.0060
271	3.7092	0.0060
272	3.7152	0.0060
273	3.7212	0.0060
274	3.7272	0.0060
275	3.7332	0.0060
276	3.7392	0.0060
277	3.7451	0.0060
278	3.7511	0.0059
279	3.7570	0.0059
280	3.7629	0.0059
281	3.7688	0.0059
282	3.7747	0.0059
283	3.7806	0.0059
284	3.7865	0.0059
285	3.7924	0.0059
286	3.7982	0.0059
287	3.8041	0.0058
288	3.8099	0.0058

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0058	0.0010	0.0048
2	0.0058	0.0010	0.0048
3	0.0059	0.0010	0.0048
4	0.0059	0.0010	0.0049
5	0.0059	0.0010	0.0049
6	0.0059	0.0010	0.0049
7	0.0059	0.0010	0.0049
8	0.0059	0.0010	0.0049
9	0.0060	0.0010	0.0049
10	0.0060	0.0010	0.0049
11	0.0060	0.0010	0.0050
12	0.0060	0.0010	0.0050
13	0.0060	0.0011	0.0050
14	0.0061	0.0011	0.0050
15	0.0061	0.0011	0.0050
16	0.0061	0.0011	0.0050
17	0.0061	0.0011	0.0051
18	0.0061	0.0011	0.0051
19	0.0062	0.0011	0.0051
20	0.0062	0.0011	0.0051
21	0.0062	0.0011	0.0051

22	0.0062	0.0011	0.0051
23	0.0062	0.0011	0.0052
24	0.0063	0.0011	0.0052
25	0.0063	0.0011	0.0052
26	0.0063	0.0011	0.0052
27	0.0063	0.0011	0.0052
28	0.0063	0.0011	0.0052
29	0.0064	0.0011	0.0053
30	0.0064	0.0011	0.0053
31	0.0064	0.0011	0.0053
32	0.0064	0.0011	0.0053
33	0.0065	0.0011	0.0053
34	0.0065	0.0011	0.0053
35	0.0065	0.0011	0.0054
36	0.0065	0.0011	0.0054
37	0.0065	0.0011	0.0054
38	0.0066	0.0011	0.0054
39	0.0066	0.0011	0.0054
40	0.0066	0.0012	0.0055
41	0.0066	0.0012	0.0055
42	0.0067	0.0012	0.0055
43	0.0067	0.0012	0.0055
44	0.0067	0.0012	0.0055
45	0.0067	0.0012	0.0056
46	0.0068	0.0012	0.0056
47	0.0068	0.0012	0.0056
48	0.0068	0.0012	0.0056
49	0.0068	0.0012	0.0057
50	0.0069	0.0012	0.0057
51	0.0069	0.0012	0.0057
52	0.0069	0.0012	0.0057
53	0.0070	0.0012	0.0057
54	0.0070	0.0012	0.0058
55	0.0070	0.0012	0.0058
56	0.0070	0.0012	0.0058
57	0.0071	0.0012	0.0058
58	0.0071	0.0012	0.0059
59	0.0071	0.0012	0.0059
60	0.0072	0.0012	0.0059
61	0.0072	0.0013	0.0059
62	0.0072	0.0013	0.0060
63	0.0073	0.0013	0.0060
64	0.0073	0.0013	0.0060
65	0.0073	0.0013	0.0060
66	0.0073	0.0013	0.0061
67	0.0074	0.0013	0.0061
68	0.0074	0.0013	0.0061
69	0.0074	0.0013	0.0062
70	0.0075	0.0013	0.0062
71	0.0075	0.0013	0.0062
72	0.0075	0.0013	0.0062
73	0.0076	0.0013	0.0063
74	0.0076	0.0013	0.0063
75	0.0077	0.0013	0.0063
76	0.0077	0.0013	0.0063
77	0.0077	0.0013	0.0064
78	0.0078	0.0014	0.0064
79	0.0078	0.0014	0.0064
80	0.0078	0.0014	0.0065
81	0.0079	0.0014	0.0065
82	0.0079	0.0014	0.0065

83	0.0080	0.0014	0.0066
84	0.0080	0.0014	0.0066
85	0.0080	0.0014	0.0066
86	0.0081	0.0014	0.0067
87	0.0081	0.0014	0.0067
88	0.0082	0.0014	0.0067
89	0.0082	0.0014	0.0068
90	0.0083	0.0014	0.0068
91	0.0083	0.0014	0.0069
92	0.0083	0.0015	0.0069
93	0.0084	0.0015	0.0069
94	0.0084	0.0015	0.0070
95	0.0085	0.0015	0.0070
96	0.0085	0.0015	0.0070
97	0.0086	0.0015	0.0071
98	0.0086	0.0015	0.0071
99	0.0087	0.0015	0.0072
100	0.0087	0.0015	0.0072
101	0.0088	0.0015	0.0073
102	0.0088	0.0015	0.0073
103	0.0089	0.0016	0.0074
104	0.0090	0.0016	0.0074
105	0.0090	0.0016	0.0075
106	0.0091	0.0016	0.0075
107	0.0091	0.0016	0.0076
108	0.0092	0.0016	0.0076
109	0.0093	0.0016	0.0077
110	0.0093	0.0016	0.0077
111	0.0094	0.0016	0.0078
112	0.0094	0.0016	0.0078
113	0.0095	0.0017	0.0079
114	0.0096	0.0017	0.0079
115	0.0097	0.0017	0.0080
116	0.0097	0.0017	0.0080
117	0.0098	0.0017	0.0081
118	0.0099	0.0017	0.0081
119	0.0100	0.0017	0.0082
120	0.0100	0.0017	0.0083
121	0.0101	0.0018	0.0083
122	0.0102	0.0018	0.0084
123	0.0103	0.0018	0.0085
124	0.0103	0.0018	0.0085
125	0.0104	0.0018	0.0086
126	0.0105	0.0018	0.0087
127	0.0106	0.0018	0.0088
128	0.0107	0.0019	0.0088
129	0.0108	0.0019	0.0089
130	0.0109	0.0019	0.0090
131	0.0110	0.0019	0.0091
132	0.0111	0.0019	0.0091
133	0.0112	0.0020	0.0093
134	0.0113	0.0020	0.0093
135	0.0114	0.0020	0.0094
136	0.0115	0.0020	0.0095
137	0.0116	0.0020	0.0096
138	0.0117	0.0020	0.0097
139	0.0119	0.0021	0.0098
140	0.0120	0.0021	0.0099
141	0.0121	0.0021	0.0100
142	0.0122	0.0021	0.0101
143	0.0124	0.0022	0.0103

144	0.0125	0.0022	0.0103
145	0.0149	0.0026	0.0123
146	0.0150	0.0026	0.0123
147	0.0152	0.0026	0.0125
148	0.0153	0.0027	0.0126
149	0.0155	0.0027	0.0128
150	0.0156	0.0027	0.0129
151	0.0159	0.0028	0.0131
152	0.0160	0.0028	0.0132
153	0.0162	0.0028	0.0134
154	0.0164	0.0029	0.0135
155	0.0166	0.0029	0.0137
156	0.0168	0.0029	0.0139
157	0.0171	0.0030	0.0141
158	0.0173	0.0030	0.0142
159	0.0176	0.0031	0.0145
160	0.0178	0.0031	0.0147
161	0.0181	0.0032	0.0150
162	0.0183	0.0032	0.0151
163	0.0187	0.0033	0.0154
164	0.0189	0.0033	0.0156
165	0.0193	0.0034	0.0160
166	0.0196	0.0034	0.0162
167	0.0201	0.0035	0.0166
168	0.0203	0.0035	0.0168
169	0.0209	0.0036	0.0173
170	0.0212	0.0037	0.0175
171	0.0218	0.0038	0.0180
172	0.0221	0.0039	0.0183
173	0.0229	0.0040	0.0189
174	0.0232	0.0040	0.0192
175	0.0241	0.0042	0.0199
176	0.0245	0.0043	0.0203
177	0.0255	0.0044	0.0211
178	0.0261	0.0045	0.0215
179	0.0273	0.0047	0.0225
180	0.0279	0.0049	0.0231
181	0.0294	0.0051	0.0243
182	0.0303	0.0053	0.0250
183	0.0322	0.0056	0.0266
184	0.0334	0.0058	0.0276
185	0.0281	0.0049	0.0232
186	0.0297	0.0052	0.0245
187	0.0337	0.0059	0.0278
188	0.0364	0.0063	0.0300
189	0.0438	0.0076	0.0362
190	0.0495	0.0086	0.0408
191	0.0707	0.0098	0.0609
192	0.0972	0.0098	0.0874
193	0.3042	0.0098	0.2945
194	0.0576	0.0098	0.0478
195	0.0396	0.0069	0.0327
196	0.0315	0.0055	0.0260
197	0.0346	0.0060	0.0286
198	0.0312	0.0054	0.0258
199	0.0286	0.0050	0.0237
200	0.0266	0.0046	0.0220
201	0.0250	0.0044	0.0206
202	0.0236	0.0041	0.0195
203	0.0225	0.0039	0.0186
204	0.0215	0.0037	0.0177

205	0.0206	0.0036	0.0170
206	0.0198	0.0034	0.0164
207	0.0191	0.0033	0.0158
208	0.0185	0.0032	0.0153
209	0.0179	0.0031	0.0148
210	0.0174	0.0030	0.0144
211	0.0169	0.0030	0.0140
212	0.0165	0.0029	0.0136
213	0.0161	0.0028	0.0133
214	0.0157	0.0027	0.0130
215	0.0154	0.0027	0.0127
216	0.0151	0.0026	0.0124
217	0.0126	0.0022	0.0104
218	0.0123	0.0021	0.0102
219	0.0121	0.0021	0.0100
220	0.0118	0.0021	0.0097
221	0.0116	0.0020	0.0096
222	0.0113	0.0020	0.0094
223	0.0111	0.0019	0.0092
224	0.0109	0.0019	0.0090
225	0.0107	0.0019	0.0089
226	0.0106	0.0018	0.0087
227	0.0104	0.0018	0.0086
228	0.0102	0.0018	0.0084
229	0.0101	0.0018	0.0083
230	0.0099	0.0017	0.0082
231	0.0098	0.0017	0.0081
232	0.0096	0.0017	0.0079
233	0.0095	0.0017	0.0078
234	0.0094	0.0016	0.0077
235	0.0092	0.0016	0.0076
236	0.0091	0.0016	0.0075
237	0.0090	0.0016	0.0074
238	0.0089	0.0015	0.0073
239	0.0088	0.0015	0.0072
240	0.0087	0.0015	0.0072
241	0.0086	0.0015	0.0071
242	0.0085	0.0015	0.0070
243	0.0084	0.0015	0.0069
244	0.0083	0.0014	0.0068
245	0.0082	0.0014	0.0068
246	0.0081	0.0014	0.0067
247	0.0080	0.0014	0.0066
248	0.0079	0.0014	0.0066
249	0.0079	0.0014	0.0065
250	0.0078	0.0014	0.0064
251	0.0077	0.0013	0.0064
252	0.0076	0.0013	0.0063
253	0.0076	0.0013	0.0062
254	0.0075	0.0013	0.0062
255	0.0074	0.0013	0.0061
256	0.0074	0.0013	0.0061
257	0.0073	0.0013	0.0060
258	0.0072	0.0013	0.0060
259	0.0072	0.0012	0.0059
260	0.0071	0.0012	0.0059
261	0.0071	0.0012	0.0058
262	0.0070	0.0012	0.0058
263	0.0069	0.0012	0.0057
264	0.0069	0.0012	0.0057
265	0.0068	0.0012	0.0056

266	0.0068	0.0012	0.0056
267	0.0067	0.0012	0.0056
268	0.0067	0.0012	0.0055
269	0.0066	0.0012	0.0055
270	0.0066	0.0011	0.0054
271	0.0065	0.0011	0.0054
272	0.0065	0.0011	0.0054
273	0.0064	0.0011	0.0053
274	0.0064	0.0011	0.0053
275	0.0064	0.0011	0.0052
276	0.0063	0.0011	0.0052
277	0.0063	0.0011	0.0052
278	0.0062	0.0011	0.0051
279	0.0062	0.0011	0.0051
280	0.0061	0.0011	0.0051
281	0.0061	0.0011	0.0050
282	0.0061	0.0011	0.0050
283	0.0060	0.0011	0.0050
284	0.0060	0.0010	0.0049
285	0.0060	0.0010	0.0049
286	0.0059	0.0010	0.0049
287	0.0059	0.0010	0.0049
288	0.0059	0.0010	0.0048

Total soil rain loss = 0.61(In)
Total effective rainfall = 3.20(In)
Peak flow rate in flood hydrograph = 52.92(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	15.0	30.0	45.0	60.0
0+ 5	0.0009	0.14	Q	|	|	|	|
0+10	0.0065	0.81	Q	|	|	|	|
0+15	0.0155	1.30	Q	|	|	|	|
0+20	0.0251	1.41	Q	|	|	|	|
0+25	0.0350	1.43	Q	|	|	|	|
0+30	0.0449	1.44	Q	|	|	|	|
0+35	0.0549	1.44	Q	|	|	|	|
0+40	0.0648	1.45	Q	|	|	|	|
0+45	0.0748	1.45	Q	|	|	|	|
0+50	0.0849	1.46	Q	|	|	|	|
0+55	0.0949	1.46	Q	|	|	|	|
1+ 0	0.1050	1.47	Q	|	|	|	|
1+ 5	0.1151	1.47	Q	|	|	|	|
1+10	0.1253	1.47	Q	|	|	|	|
1+15	0.1355	1.48	Q	|	|	|	|
1+20	0.1457	1.48	Q	|	|	|	|
1+25	0.1559	1.49	Q	|	|	|	|
1+30	0.1662	1.49	QV	|	|	|	|
1+35	0.1765	1.50	QV	|	|	|	|
1+40	0.1869	1.50	|Q	|	|	|	|
1+45	0.1972	1.51	|Q	|	|	|	|
1+50	0.2077	1.51	|Q	|	|	|	|
1+55	0.2181	1.52	|Q	|	|	|	|

2+ 0	0.2286	1.52	Q				
2+ 5	0.2391	1.53	Q				
2+10	0.2496	1.53	Q				
2+15	0.2602	1.54	Q				
2+20	0.2709	1.54	Q				
2+25	0.2815	1.55	Q				
2+30	0.2922	1.55	Q				
2+35	0.3029	1.56	Q				
2+40	0.3137	1.56	Q				
2+45	0.3245	1.57	Q				
2+50	0.3354	1.57	QV				
2+55	0.3462	1.58	QV				
3+ 0	0.3572	1.59	QV				
3+ 5	0.3681	1.59	QV				
3+10	0.3791	1.60	QV				
3+15	0.3901	1.60	QV				
3+20	0.4012	1.61	QV				
3+25	0.4123	1.61	QV				
3+30	0.4235	1.62	QV				
3+35	0.4347	1.63	QV				
3+40	0.4459	1.63	QV				
3+45	0.4572	1.64	QV				
3+50	0.4685	1.64	QV				
3+55	0.4799	1.65	QV				
4+ 0	0.4913	1.66	Q V				
4+ 5	0.5028	1.66	Q V				
4+10	0.5143	1.67	Q V				
4+15	0.5258	1.68	Q V				
4+20	0.5374	1.68	Q V				
4+25	0.5491	1.69	Q V				
4+30	0.5607	1.70	Q V				
4+35	0.5725	1.70	Q V				
4+40	0.5842	1.71	Q V				
4+45	0.5961	1.72	Q V				
4+50	0.6079	1.72	Q V				
4+55	0.6199	1.73	Q V				
5+ 0	0.6318	1.74	Q V				
5+ 5	0.6439	1.75	Q V				
5+10	0.6559	1.75	Q V				
5+15	0.6681	1.76	Q V				
5+20	0.6802	1.77	Q V				
5+25	0.6925	1.78	Q V				
5+30	0.7047	1.78	Q V				
5+35	0.7171	1.79	Q V				
5+40	0.7295	1.80	Q V				
5+45	0.7419	1.81	Q V				
5+50	0.7544	1.82	Q V				
5+55	0.7670	1.82	Q V				
6+ 0	0.7796	1.83	Q V				
6+ 5	0.7923	1.84	Q V				
6+10	0.8050	1.85	Q V				
6+15	0.8178	1.86	Q V				
6+20	0.8307	1.87	Q V				
6+25	0.8436	1.88	Q V				
6+30	0.8565	1.88	Q V				
6+35	0.8696	1.89	Q V				
6+40	0.8827	1.90	Q V				
6+45	0.8959	1.91	Q V				
6+50	0.9091	1.92	Q V				
6+55	0.9224	1.93	Q V				
7+ 0	0.9358	1.94	Q V				

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 7+ 5       0.9492      1.95  |Q   V    |         |         |         |
 7+10       0.9627      1.96  |Q   V    |         |         |         |
 7+15       0.9763      1.97  |Q   V    |         |         |         |
 7+20       0.9899      1.98  |Q    V   |         |         |         |
 7+25       1.0036      1.99  |Q    V   |         |         |         |
 7+30       1.0174      2.00  |Q    V   |         |         |         |
 7+35       1.0313      2.01  |Q    V   |         |         |         |
 7+40       1.0453      2.02  |Q    V   |         |         |         |
 7+45       1.0593      2.04  |Q    V   |         |         |         |
 7+50       1.0734      2.05  |Q    V   |         |         |         |
 7+55       1.0875      2.06  |Q    V   |         |         |         |
 8+ 0       1.1018      2.07  |Q    V   |         |         |         |
 8+ 5       1.1161      2.08  |Q    V   |         |         |         |
 8+10       1.1306      2.09  |Q    V   |         |         |         |
 8+15       1.1451      2.11  |Q     V  |         |         |         |
 8+20       1.1597      2.12  |Q     V  |         |         |         |
 8+25       1.1744      2.13  |Q     V  |         |         |         |
 8+30       1.1891      2.14  |Q     V  |         |         |         |
 8+35       1.2040      2.16  |Q     V  |         |         |         |
 8+40       1.2189      2.17  |Q     V  |         |         |         |
 8+45       1.2340      2.18  |Q     V  |         |         |         |
 8+50       1.2491      2.20  |Q     V  |         |         |         |
 8+55       1.2644      2.21  |Q     V  |         |         |         |
 9+ 0       1.2797      2.23  |Q     V  |         |         |         |
 9+ 5       1.2951      2.24  |Q     V  |         |         |         |
 9+10       1.3107      2.26  |Q      V |         |         |         |
 9+15       1.3263      2.27  |Q      V |         |         |         |
 9+20       1.3421      2.29  |Q      V |         |         |         |
 9+25       1.3579      2.30  |Q      V |         |         |         |
 9+30       1.3739      2.32  |Q      V |         |         |         |
 9+35       1.3900      2.33  |Q      V |         |         |         |
 9+40       1.4062      2.35  |Q      V |         |         |         |
 9+45       1.4225      2.37  |Q      V |         |         |         |
 9+50       1.4389      2.39  |Q      V |         |         |         |
 9+55       1.4555      2.40  |Q      V |         |         |         |
10+ 0       1.4722      2.42  |Q       V|         |         |         |
10+ 5       1.4890      2.44  |Q       V|         |         |         |
10+10       1.5059      2.46  |Q       V|         |         |         |
10+15       1.5230      2.48  |Q       V|         |         |         |
10+20       1.5402      2.50  |Q       V|         |         |         |
10+25       1.5575      2.52  |Q       V|         |         |         |
10+30       1.5750      2.54  |Q       V|         |         |         |
10+35       1.5926      2.56  |Q       V|         |         |         |
10+40       1.6104      2.58  |Q       V|         |         |         |
10+45       1.6283      2.60  |Q       V|         |         |         |
10+50       1.6464      2.63  |Q        V         |         |         |
10+55       1.6647      2.65  |Q        V         |         |         |
11+ 0       1.6831      2.67  |Q        V         |         |         |
11+ 5       1.7017      2.70  |Q        V         |         |         |
11+10       1.7204      2.72  |Q        V         |         |         |
11+15       1.7393      2.75  |Q        V         |         |         |
11+20       1.7584      2.77  |Q        V         |         |         |
11+25       1.7777      2.80  |Q        V         |         |         |
11+30       1.7972      2.83  |Q        |V        |         |         |
11+35       1.8169      2.86  |Q        |V        |         |         |
11+40       1.8368      2.89  |Q        |V        |         |         |
11+45       1.8569      2.92  |Q        |V        |         |         |
11+50       1.8772      2.95  |Q        |V        |         |         |
11+55       1.8977      2.98  |Q        |V        |         |         |
12+ 0       1.9184      3.01  | Q       |V        |         |         |
12+ 5       1.9398      3.10  | Q       |V        |         |         |
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12+10	1.9631	3.38	Q	V			
12+15	1.9878	3.60	Q	V			
12+20	2.0131	3.67	Q	V			
12+25	2.0388	3.72	Q	V			
12+30	2.0647	3.76	Q	V			
12+35	2.0909	3.80	Q	V			
12+40	2.1174	3.85	Q	V			
12+45	2.1442	3.89	Q	V			
12+50	2.1713	3.94	Q	V			
12+55	2.1988	3.99	Q	V			
13+ 0	2.2266	4.04	Q	V			
13+ 5	2.2548	4.09	Q	V			
13+10	2.2833	4.15	Q	V			
13+15	2.3123	4.20	Q	V			
13+20	2.3416	4.26	Q	V			
13+25	2.3714	4.32	Q	V			
13+30	2.4016	4.39	Q	V			
13+35	2.4323	4.45	Q	V			
13+40	2.4634	4.53	Q	V			
13+45	2.4951	4.60	Q	V			
13+50	2.5273	4.68	Q	V			
13+55	2.5601	4.76	Q	V			
14+ 0	2.5935	4.85	Q	V			
14+ 5	2.6275	4.94	Q	V			
14+10	2.6622	5.04	Q	V			
14+15	2.6977	5.15	Q	V			
14+20	2.7339	5.26	Q	V			
14+25	2.7710	5.38	Q	V			
14+30	2.8089	5.51	Q	V			
14+35	2.8477	5.64	Q	V			
14+40	2.8877	5.79	Q	V			
14+45	2.9286	5.95	Q	V			
14+50	2.9708	6.13	Q	V			
14+55	3.0143	6.32	Q	V			
15+ 0	3.0593	6.53	Q	V			
15+ 5	3.1059	6.76	Q	V			
15+10	3.1543	7.03	Q	V			
15+15	3.2048	7.32	Q	V			
15+20	3.2576	7.67	Q	V			
15+25	3.3118	7.87	Q	V			
15+30	3.3630	7.43	Q	V			
15+35	3.4132	7.30	Q	V			
15+40	3.4674	7.87	Q	V			
15+45	3.5272	8.69	Q	V			
15+50	3.5959	9.98	Q	V			
15+55	3.6778	11.88	Q	V			
16+ 0	3.7884	16.05	Q	V			
16+ 5	3.9796	27.77	Q	V			
16+10	4.3441	52.92	Q	V		Q	
16+15	4.6171	39.64	Q	V			
16+20	4.7334	16.89	Q	V			
16+25	4.8043	10.29	Q	V			
16+30	4.8615	8.31	Q	V			
16+35	4.9159	7.90	Q	V			
16+40	4.9661	7.29	Q	V			
16+45	5.0126	6.75	Q	V			
16+50	5.0560	6.31	Q	V			
16+55	5.0969	5.94	Q	V			
17+ 0	5.1357	5.63	Q	V			
17+ 5	5.1727	5.37	Q	V			
17+10	5.2080	5.13	Q	V			

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17+15       5.2420      4.93  |  Q      |         |         | V       |
17+20       5.2747      4.75  |  Q      |         |         | V       |
17+25       5.3063      4.59  |  Q      |         |         | V       |
17+30       5.3369      4.45  | Q       |         |         | V       |
17+35       5.3666      4.31  | Q       |         |         | V       |
17+40       5.3955      4.19  | Q       |         |         |  V      |
17+45       5.4236      4.08  | Q       |         |         |  V      |
17+50       5.4511      3.98  | Q       |         |         |  V      |
17+55       5.4778      3.89  | Q       |         |         |  V      |
18+ 0       5.5040      3.80  | Q       |         |         |  V      |
18+ 5       5.5292      3.67  | Q       |         |         |  V      |
18+10       5.5523      3.34  | Q       |         |         |   V     |
18+15       5.5735      3.09  | Q       |         |         |   V     |
18+20       5.5941      2.98  |Q        |         |         |   V     |
18+25       5.6142      2.91  |Q        |         |         |   V     |
18+30       5.6338      2.85  |Q        |         |         |   V     |
18+35       5.6531      2.80  |Q        |         |         |   V     |
18+40       5.6720      2.74  |Q        |         |         |   V     |
18+45       5.6905      2.69  |Q        |         |         |   V     |
18+50       5.7087      2.65  |Q        |         |         |    V    |
18+55       5.7267      2.60  |Q        |         |         |    V    |
19+ 0       5.7443      2.56  |Q        |         |         |    V    |
19+ 5       5.7616      2.52  |Q        |         |         |    V    |
19+10       5.7786      2.48  |Q        |         |         |    V    |
19+15       5.7954      2.44  |Q        |         |         |    V    |
19+20       5.8120      2.40  |Q        |         |         |    V    |
19+25       5.8283      2.37  |Q        |         |         |    V    |
19+30       5.8443      2.33  |Q        |         |         |    V    |
19+35       5.8602      2.30  |Q        |         |         |    V    |
19+40       5.8758      2.27  |Q        |         |         |     V   |
19+45       5.8912      2.24  |Q        |         |         |     V   |
19+50       5.9064      2.21  |Q        |         |         |     V   |
19+55       5.9215      2.18  |Q        |         |         |     V   |
20+ 0       5.9363      2.16  |Q        |         |         |     V   |
20+ 5       5.9510      2.13  |Q        |         |         |     V   |
20+10       5.9655      2.10  |Q        |         |         |     V   |
20+15       5.9798      2.08  |Q        |         |         |     V   |
20+20       5.9940      2.06  |Q        |         |         |     V   |
20+25       6.0080      2.03  |Q        |         |         |     V   |
20+30       6.0218      2.01  |Q        |         |         |     V   |
20+35       6.0355      1.99  |Q        |         |         |      V  |
20+40       6.0491      1.97  |Q        |         |         |      V  |
20+45       6.0625      1.95  |Q        |         |         |      V  |
20+50       6.0758      1.93  |Q        |         |         |      V  |
20+55       6.0890      1.91  |Q        |         |         |      V  |
21+ 0       6.1020      1.89  |Q        |         |         |      V  |
21+ 5       6.1149      1.87  |Q        |         |         |      V  |
21+10       6.1277      1.86  |Q        |         |         |      V  |
21+15       6.1404      1.84  |Q        |         |         |      V  |
21+20       6.1529      1.82  |Q        |         |         |      V  |
21+25       6.1654      1.81  |Q        |         |         |      V  |
21+30       6.1777      1.79  |Q        |         |         |      V  |
21+35       6.1899      1.77  |Q        |         |         |      V  |
21+40       6.2020      1.76  |Q        |         |         |       V |
21+45       6.2140      1.74  |Q        |         |         |       V |
21+50       6.2259      1.73  |Q        |         |         |       V |
21+55       6.2378      1.72  |Q        |         |         |       V |
22+ 0       6.2495      1.70  |Q        |         |         |       V |
22+ 5       6.2611      1.69  |Q        |         |         |       V |
22+10       6.2727      1.68  |Q        |         |         |       V |
22+15       6.2841      1.66  |Q        |         |         |       V |
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22+20       6.2955      1.65  |Q        |         |         |       V |
22+25       6.3067      1.64  |Q        |         |         |       V |
22+30       6.3179      1.63  |Q        |         |         |       V |
22+35       6.3290      1.61  |Q        |         |         |       V |
22+40       6.3401      1.60  |Q        |         |         |       V |
22+45       6.3510      1.59  |Q        |         |         |       V |
22+50       6.3619      1.58  |Q        |         |         |        V|
22+55       6.3727      1.57  |Q        |         |         |        V|
23+ 0       6.3834      1.56  |Q        |         |         |        V|
23+ 5       6.3941      1.55  |Q        |         |         |        V|
23+10       6.4047      1.54  |Q        |         |         |        V|
23+15       6.4152      1.53  |Q        |         |         |        V|
23+20       6.4256      1.52  |Q        |         |         |        V|
23+25       6.4360      1.51  |Q        |         |         |        V|
23+30       6.4463      1.50  Q         |         |         |        V|
23+35       6.4565      1.49  Q         |         |         |        V|
23+40       6.4667      1.48  Q         |         |         |        V|
23+45       6.4768      1.47  Q         |         |         |        V|
23+50       6.4869      1.46  Q         |         |         |        V|
23+55       6.4969      1.45  Q         |         |         |        V|
24+ 0       6.5068      1.44  Q         |         |         |        V|
```

U n i t H y d r o g r a p h A n a l y s i s

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Study date 01/22/23

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San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6277

JOB NO 2022-318
11115 HEMLOCK AVENUE
10-YEAR, UNIT HYDROGRAPH
POST-CONDITION, AREA B

Storm Event Year = 10

Antecedent Moisture Condition = 2

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 10		
12.94	1	0.82
Rainfall data for year 10		
12.94	6	2.07
Rainfall data for year 10		
12.94	24	3.81

++

******** Area-averaged max loss rate, Fm ********

SCS curve No.(AMCII)	SCS curve NO.(AMC 2)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
32.0	32.0	12.94	1.000	0.978	0.090	0.088

Area-averaged adjusted loss rate Fm (In/Hr) = 0.088

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
1.16	0.090	32.0	32.0	19.05	0.000
11.78	0.910	98.0	98.0	0.20	0.938

Area-averaged catchment yield fraction, Y = 0.854
Area-averaged low loss fraction, Yb = 0.146
User entry of time of concentration = 0.136 (hours)
++
Watershed area = 12.94(Ac.)
Catchment Lag time = 0.109 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 76.4246
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.088(In/Hr)
Average low loss rate fraction (Yb) = 0.146 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.305(In)
Computed peak 30-minute rainfall = 0.624(In)
Specified peak 1-hour rainfall = 0.823(In)
Computed peak 3-hour rainfall = 1.449(In)
Specified peak 6-hour rainfall = 2.070(In)
Specified peak 24-hour rainfall = 3.810(In)

Rainfall depth area reduction factors:
Using a total area of 12.94(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.304(In)
30-minute factor = 0.999 Adjusted rainfall = 0.623(In)
1-hour factor = 0.999 Adjusted rainfall = 0.823(In)
3-hour factor = 1.000 Adjusted rainfall = 1.449(In)
6-hour factor = 1.000 Adjusted rainfall = 2.070(In)
24-hour factor = 1.000 Adjusted rainfall = 3.810(In)

U n i t H y d r o g r a p h
++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
	(K = 156.49 (CFS))	
1	10.371	16.230
2	60.229	78.024
3	92.628	50.703
4	98.588	9.326
5	100.000	2.210

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3044	0.3044
2	0.4017	0.0973
3	0.4724	0.0707
4	0.5300	0.0576
5	0.5795	0.0495
6	0.6233	0.0438
7	0.6630	0.0396
8	0.6994	0.0364
9	0.7331	0.0337

10	0.7647	0.0316
11	0.7944	0.0297
12	0.8225	0.0281
13	0.8571	0.0346
14	0.8905	0.0334
15	0.9227	0.0322
16	0.9539	0.0312
17	0.9842	0.0303
18	1.0136	0.0294
19	1.0422	0.0286
20	1.0702	0.0279
21	1.0974	0.0272
22	1.1240	0.0266
23	1.1501	0.0260
24	1.1756	0.0255
25	1.2005	0.0250
26	1.2251	0.0245
27	1.2491	0.0241
28	1.2727	0.0236
29	1.2960	0.0232
30	1.3188	0.0228
31	1.3413	0.0225
32	1.3634	0.0221
33	1.3852	0.0218
34	1.4066	0.0215
35	1.4278	0.0212
36	1.4487	0.0209
37	1.4693	0.0206
38	1.4896	0.0203
39	1.5096	0.0201
40	1.5294	0.0198
41	1.5490	0.0196
42	1.5683	0.0193
43	1.5875	0.0191
44	1.6064	0.0189
45	1.6251	0.0187
46	1.6435	0.0185
47	1.6618	0.0183
48	1.6800	0.0181
49	1.6979	0.0179
50	1.7156	0.0178
51	1.7332	0.0176
52	1.7506	0.0174
53	1.7679	0.0173
54	1.7850	0.0171
55	1.8019	0.0169
56	1.8187	0.0168
57	1.8354	0.0166
58	1.8519	0.0165
59	1.8682	0.0164
60	1.8845	0.0162
61	1.9006	0.0161
62	1.9165	0.0160
63	1.9324	0.0159
64	1.9481	0.0157
65	1.9637	0.0156
66	1.9792	0.0155
67	1.9946	0.0154
68	2.0099	0.0153
69	2.0251	0.0152
70	2.0401	0.0151

71	2.0551	0.0150
72	2.0699	0.0149
73	2.0825	0.0126
74	2.0950	0.0125
75	2.1074	0.0124
76	2.1198	0.0123
77	2.1320	0.0122
78	2.1441	0.0121
79	2.1562	0.0121
80	2.1682	0.0120
81	2.1800	0.0119
82	2.1918	0.0118
83	2.2036	0.0117
84	2.2152	0.0116
85	2.2268	0.0116
86	2.2383	0.0115
87	2.2497	0.0114
88	2.2610	0.0113
89	2.2723	0.0113
90	2.2835	0.0112
91	2.2946	0.0111
92	2.3057	0.0111
93	2.3167	0.0110
94	2.3276	0.0109
95	2.3385	0.0109
96	2.3493	0.0108
97	2.3600	0.0107
98	2.3707	0.0107
99	2.3813	0.0106
100	2.3919	0.0106
101	2.4024	0.0105
102	2.4128	0.0104
103	2.4232	0.0104
104	2.4335	0.0103
105	2.4438	0.0103
106	2.4540	0.0102
107	2.4642	0.0102
108	2.4743	0.0101
109	2.4843	0.0101
110	2.4943	0.0100
111	2.5043	0.0100
112	2.5142	0.0099
113	2.5241	0.0099
114	2.5339	0.0098
115	2.5436	0.0098
116	2.5533	0.0097
117	2.5630	0.0097
118	2.5726	0.0096
119	2.5822	0.0096
120	2.5917	0.0095
121	2.6012	0.0095
122	2.6106	0.0094
123	2.6200	0.0094
124	2.6294	0.0094
125	2.6387	0.0093
126	2.6480	0.0093
127	2.6572	0.0092
128	2.6664	0.0092
129	2.6755	0.0091
130	2.6846	0.0091
131	2.6937	0.0091

132	2.7027	0.0090
133	2.7117	0.0090
134	2.7207	0.0090
135	2.7296	0.0089
136	2.7385	0.0089
137	2.7473	0.0088
138	2.7561	0.0088
139	2.7649	0.0088
140	2.7736	0.0087
141	2.7823	0.0087
142	2.7910	0.0087
143	2.7996	0.0086
144	2.8082	0.0086
145	2.8168	0.0086
146	2.8253	0.0085
147	2.8338	0.0085
148	2.8423	0.0085
149	2.8508	0.0084
150	2.8592	0.0084
151	2.8675	0.0084
152	2.8759	0.0083
153	2.8842	0.0083
154	2.8925	0.0083
155	2.9007	0.0083
156	2.9089	0.0082
157	2.9171	0.0082
158	2.9253	0.0082
159	2.9334	0.0081
160	2.9415	0.0081
161	2.9496	0.0081
162	2.9577	0.0080
163	2.9657	0.0080
164	2.9737	0.0080
165	2.9816	0.0080
166	2.9896	0.0079
167	2.9975	0.0079
168	3.0054	0.0079
169	3.0132	0.0079
170	3.0211	0.0078
171	3.0289	0.0078
172	3.0367	0.0078
173	3.0444	0.0078
174	3.0521	0.0077
175	3.0599	0.0077
176	3.0675	0.0077
177	3.0752	0.0077
178	3.0828	0.0076
179	3.0904	0.0076
180	3.0980	0.0076
181	3.1056	0.0076
182	3.1131	0.0075
183	3.1206	0.0075
184	3.1281	0.0075
185	3.1356	0.0075
186	3.1431	0.0074
187	3.1505	0.0074
188	3.1579	0.0074
189	3.1653	0.0074
190	3.1726	0.0074
191	3.1800	0.0073
192	3.1873	0.0073

193	3.1946	0.0073
194	3.2019	0.0073
195	3.2091	0.0073
196	3.2163	0.0072
197	3.2235	0.0072
198	3.2307	0.0072
199	3.2379	0.0072
200	3.2451	0.0072
201	3.2522	0.0071
202	3.2593	0.0071
203	3.2664	0.0071
204	3.2735	0.0071
205	3.2805	0.0071
206	3.2876	0.0070
207	3.2946	0.0070
208	3.3016	0.0070
209	3.3085	0.0070
210	3.3155	0.0070
211	3.3224	0.0069
212	3.3294	0.0069
213	3.3363	0.0069
214	3.3431	0.0069
215	3.3500	0.0069
216	3.3569	0.0068
217	3.3637	0.0068
218	3.3705	0.0068
219	3.3773	0.0068
220	3.3841	0.0068
221	3.3908	0.0068
222	3.3976	0.0067
223	3.4043	0.0067
224	3.4110	0.0067
225	3.4177	0.0067
226	3.4244	0.0067
227	3.4310	0.0067
228	3.4377	0.0066
229	3.4443	0.0066
230	3.4509	0.0066
231	3.4575	0.0066
232	3.4641	0.0066
233	3.4707	0.0066
234	3.4772	0.0065
235	3.4837	0.0065
236	3.4903	0.0065
237	3.4968	0.0065
238	3.5032	0.0065
239	3.5097	0.0065
240	3.5162	0.0065
241	3.5226	0.0064
242	3.5290	0.0064
243	3.5355	0.0064
244	3.5418	0.0064
245	3.5482	0.0064
246	3.5546	0.0064
247	3.5609	0.0064
248	3.5673	0.0063
249	3.5736	0.0063
250	3.5799	0.0063
251	3.5862	0.0063
252	3.5925	0.0063
253	3.5988	0.0063

254	3.6050	0.0063
255	3.6113	0.0062
256	3.6175	0.0062
257	3.6237	0.0062
258	3.6299	0.0062
259	3.6361	0.0062
260	3.6422	0.0062
261	3.6484	0.0062
262	3.6545	0.0061
263	3.6607	0.0061
264	3.6668	0.0061
265	3.6729	0.0061
266	3.6790	0.0061
267	3.6851	0.0061
268	3.6911	0.0061
269	3.6972	0.0061
270	3.7032	0.0060
271	3.7093	0.0060
272	3.7153	0.0060
273	3.7213	0.0060
274	3.7273	0.0060
275	3.7333	0.0060
276	3.7392	0.0060
277	3.7452	0.0060
278	3.7511	0.0059
279	3.7571	0.0059
280	3.7630	0.0059
281	3.7689	0.0059
282	3.7748	0.0059
283	3.7807	0.0059
284	3.7866	0.0059
285	3.7924	0.0059
286	3.7983	0.0059
287	3.8041	0.0058
288	3.8099	0.0058

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0058	0.0009	0.0050
2	0.0058	0.0009	0.0050
3	0.0059	0.0009	0.0050
4	0.0059	0.0009	0.0050
5	0.0059	0.0009	0.0050
6	0.0059	0.0009	0.0050
7	0.0059	0.0009	0.0051
8	0.0059	0.0009	0.0051
9	0.0060	0.0009	0.0051
10	0.0060	0.0009	0.0051
11	0.0060	0.0009	0.0051
12	0.0060	0.0009	0.0051
13	0.0060	0.0009	0.0052
14	0.0061	0.0009	0.0052
15	0.0061	0.0009	0.0052
16	0.0061	0.0009	0.0052
17	0.0061	0.0009	0.0052
18	0.0061	0.0009	0.0052
19	0.0062	0.0009	0.0053
20	0.0062	0.0009	0.0053
21	0.0062	0.0009	0.0053

22	0.0062	0.0009	0.0053
23	0.0062	0.0009	0.0053
24	0.0063	0.0009	0.0053
25	0.0063	0.0009	0.0054
26	0.0063	0.0009	0.0054
27	0.0063	0.0009	0.0054
28	0.0063	0.0009	0.0054
29	0.0064	0.0009	0.0054
30	0.0064	0.0009	0.0054
31	0.0064	0.0009	0.0055
32	0.0064	0.0009	0.0055
33	0.0065	0.0009	0.0055
34	0.0065	0.0009	0.0055
35	0.0065	0.0009	0.0056
36	0.0065	0.0010	0.0056
37	0.0065	0.0010	0.0056
38	0.0066	0.0010	0.0056
39	0.0066	0.0010	0.0056
40	0.0066	0.0010	0.0056
41	0.0066	0.0010	0.0057
42	0.0067	0.0010	0.0057
43	0.0067	0.0010	0.0057
44	0.0067	0.0010	0.0057
45	0.0067	0.0010	0.0058
46	0.0068	0.0010	0.0058
47	0.0068	0.0010	0.0058
48	0.0068	0.0010	0.0058
49	0.0068	0.0010	0.0058
50	0.0069	0.0010	0.0059
51	0.0069	0.0010	0.0059
52	0.0069	0.0010	0.0059
53	0.0070	0.0010	0.0059
54	0.0070	0.0010	0.0060
55	0.0070	0.0010	0.0060
56	0.0070	0.0010	0.0060
57	0.0071	0.0010	0.0060
58	0.0071	0.0010	0.0061
59	0.0071	0.0010	0.0061
60	0.0072	0.0010	0.0061
61	0.0072	0.0010	0.0061
62	0.0072	0.0011	0.0062
63	0.0073	0.0011	0.0062
64	0.0073	0.0011	0.0062
65	0.0073	0.0011	0.0062
66	0.0073	0.0011	0.0063
67	0.0074	0.0011	0.0063
68	0.0074	0.0011	0.0063
69	0.0074	0.0011	0.0064
70	0.0075	0.0011	0.0064
71	0.0075	0.0011	0.0064
72	0.0075	0.0011	0.0064
73	0.0076	0.0011	0.0065
74	0.0076	0.0011	0.0065
75	0.0077	0.0011	0.0065
76	0.0077	0.0011	0.0066
77	0.0077	0.0011	0.0066
78	0.0078	0.0011	0.0066
79	0.0078	0.0011	0.0067
80	0.0078	0.0011	0.0067
81	0.0079	0.0012	0.0067
82	0.0079	0.0012	0.0068

83	0.0080	0.0012	0.0068
84	0.0080	0.0012	0.0068
85	0.0080	0.0012	0.0069
86	0.0081	0.0012	0.0069
87	0.0081	0.0012	0.0069
88	0.0082	0.0012	0.0070
89	0.0082	0.0012	0.0070
90	0.0083	0.0012	0.0070
91	0.0083	0.0012	0.0071
92	0.0083	0.0012	0.0071
93	0.0084	0.0012	0.0072
94	0.0084	0.0012	0.0072
95	0.0085	0.0012	0.0073
96	0.0085	0.0012	0.0073
97	0.0086	0.0013	0.0073
98	0.0086	0.0013	0.0074
99	0.0087	0.0013	0.0074
100	0.0087	0.0013	0.0075
101	0.0088	0.0013	0.0075
102	0.0088	0.0013	0.0076
103	0.0089	0.0013	0.0076
104	0.0090	0.0013	0.0076
105	0.0090	0.0013	0.0077
106	0.0091	0.0013	0.0077
107	0.0091	0.0013	0.0078
108	0.0092	0.0013	0.0078
109	0.0093	0.0014	0.0079
110	0.0093	0.0014	0.0080
111	0.0094	0.0014	0.0080
112	0.0094	0.0014	0.0081
113	0.0095	0.0014	0.0081
114	0.0096	0.0014	0.0082
115	0.0097	0.0014	0.0083
116	0.0097	0.0014	0.0083
117	0.0098	0.0014	0.0084
118	0.0099	0.0014	0.0084
119	0.0100	0.0015	0.0085
120	0.0100	0.0015	0.0085
121	0.0101	0.0015	0.0086
122	0.0102	0.0015	0.0087
123	0.0103	0.0015	0.0088
124	0.0103	0.0015	0.0088
125	0.0104	0.0015	0.0089
126	0.0105	0.0015	0.0090
127	0.0106	0.0015	0.0091
128	0.0107	0.0016	0.0091
129	0.0108	0.0016	0.0092
130	0.0109	0.0016	0.0093
131	0.0110	0.0016	0.0094
132	0.0111	0.0016	0.0094
133	0.0112	0.0016	0.0096
134	0.0113	0.0016	0.0096
135	0.0114	0.0017	0.0098
136	0.0115	0.0017	0.0098
137	0.0116	0.0017	0.0099
138	0.0117	0.0017	0.0100
139	0.0119	0.0017	0.0102
140	0.0120	0.0017	0.0102
141	0.0121	0.0018	0.0104
142	0.0122	0.0018	0.0104
143	0.0124	0.0018	0.0106

144	0.0125	0.0018	0.0107
145	0.0149	0.0022	0.0127
146	0.0150	0.0022	0.0128
147	0.0152	0.0022	0.0129
148	0.0153	0.0022	0.0130
149	0.0155	0.0023	0.0132
150	0.0156	0.0023	0.0133
151	0.0159	0.0023	0.0135
152	0.0160	0.0023	0.0136
153	0.0162	0.0024	0.0139
154	0.0164	0.0024	0.0140
155	0.0166	0.0024	0.0142
156	0.0168	0.0025	0.0143
157	0.0171	0.0025	0.0146
158	0.0173	0.0025	0.0147
159	0.0176	0.0026	0.0150
160	0.0178	0.0026	0.0152
161	0.0181	0.0026	0.0155
162	0.0183	0.0027	0.0156
163	0.0187	0.0027	0.0160
164	0.0189	0.0028	0.0161
165	0.0193	0.0028	0.0165
166	0.0196	0.0029	0.0167
167	0.0201	0.0029	0.0171
168	0.0203	0.0030	0.0173
169	0.0209	0.0030	0.0178
170	0.0212	0.0031	0.0181
171	0.0218	0.0032	0.0186
172	0.0221	0.0032	0.0189
173	0.0228	0.0033	0.0195
174	0.0232	0.0034	0.0198
175	0.0241	0.0035	0.0205
176	0.0245	0.0036	0.0209
177	0.0255	0.0037	0.0218
178	0.0260	0.0038	0.0222
179	0.0272	0.0040	0.0233
180	0.0279	0.0041	0.0238
181	0.0294	0.0043	0.0251
182	0.0303	0.0044	0.0258
183	0.0322	0.0047	0.0275
184	0.0334	0.0049	0.0285
185	0.0281	0.0041	0.0240
186	0.0297	0.0043	0.0254
187	0.0337	0.0049	0.0288
188	0.0364	0.0053	0.0311
189	0.0438	0.0064	0.0374
190	0.0495	0.0072	0.0423
191	0.0707	0.0073	0.0634
192	0.0973	0.0073	0.0899
193	0.3044	0.0073	0.2971
194	0.0576	0.0073	0.0503
195	0.0396	0.0058	0.0339
196	0.0316	0.0046	0.0269
197	0.0346	0.0051	0.0296
198	0.0312	0.0046	0.0266
199	0.0286	0.0042	0.0245
200	0.0266	0.0039	0.0227
201	0.0250	0.0036	0.0213
202	0.0236	0.0034	0.0202
203	0.0225	0.0033	0.0192
204	0.0215	0.0031	0.0183

205	0.0206	0.0030	0.0176
206	0.0198	0.0029	0.0169
207	0.0191	0.0028	0.0163
208	0.0185	0.0027	0.0158
209	0.0179	0.0026	0.0153
210	0.0174	0.0025	0.0149
211	0.0169	0.0025	0.0145
212	0.0165	0.0024	0.0141
213	0.0161	0.0024	0.0138
214	0.0157	0.0023	0.0134
215	0.0154	0.0022	0.0131
216	0.0151	0.0022	0.0129
217	0.0126	0.0018	0.0108
218	0.0123	0.0018	0.0105
219	0.0121	0.0018	0.0103
220	0.0118	0.0017	0.0101
221	0.0116	0.0017	0.0099
222	0.0113	0.0017	0.0097
223	0.0111	0.0016	0.0095
224	0.0109	0.0016	0.0093
225	0.0107	0.0016	0.0092
226	0.0106	0.0015	0.0090
227	0.0104	0.0015	0.0089
228	0.0102	0.0015	0.0087
229	0.0101	0.0015	0.0086
230	0.0099	0.0014	0.0085
231	0.0098	0.0014	0.0083
232	0.0096	0.0014	0.0082
233	0.0095	0.0014	0.0081
234	0.0094	0.0014	0.0080
235	0.0092	0.0013	0.0079
236	0.0091	0.0013	0.0078
237	0.0090	0.0013	0.0077
238	0.0089	0.0013	0.0076
239	0.0088	0.0013	0.0075
240	0.0087	0.0013	0.0074
241	0.0086	0.0013	0.0073
242	0.0085	0.0012	0.0072
243	0.0084	0.0012	0.0072
244	0.0083	0.0012	0.0071
245	0.0082	0.0012	0.0070
246	0.0081	0.0012	0.0069
247	0.0080	0.0012	0.0069
248	0.0079	0.0012	0.0068
249	0.0079	0.0011	0.0067
250	0.0078	0.0011	0.0066
251	0.0077	0.0011	0.0066
252	0.0076	0.0011	0.0065
253	0.0076	0.0011	0.0065
254	0.0075	0.0011	0.0064
255	0.0074	0.0011	0.0063
256	0.0074	0.0011	0.0063
257	0.0073	0.0011	0.0062
258	0.0072	0.0011	0.0062
259	0.0072	0.0010	0.0061
260	0.0071	0.0010	0.0061
261	0.0071	0.0010	0.0060
262	0.0070	0.0010	0.0060
263	0.0069	0.0010	0.0059
264	0.0069	0.0010	0.0059
265	0.0068	0.0010	0.0058

266	0.0068	0.0010	0.0058
267	0.0067	0.0010	0.0057
268	0.0067	0.0010	0.0057
269	0.0066	0.0010	0.0057
270	0.0066	0.0010	0.0056
271	0.0065	0.0010	0.0056
272	0.0065	0.0009	0.0055
273	0.0064	0.0009	0.0055
274	0.0064	0.0009	0.0055
275	0.0064	0.0009	0.0054
276	0.0063	0.0009	0.0054
277	0.0063	0.0009	0.0054
278	0.0062	0.0009	0.0053
279	0.0062	0.0009	0.0053
280	0.0061	0.0009	0.0052
281	0.0061	0.0009	0.0052
282	0.0061	0.0009	0.0052
283	0.0060	0.0009	0.0051
284	0.0060	0.0009	0.0051
285	0.0060	0.0009	0.0051
286	0.0059	0.0009	0.0051
287	0.0059	0.0009	0.0050
288	0.0059	0.0009	0.0050

Total soil rain loss = 0.51(In)
Total effective rainfall = 3.30(In)
Peak flow rate in flood hydrograph = 29.24(CFS)

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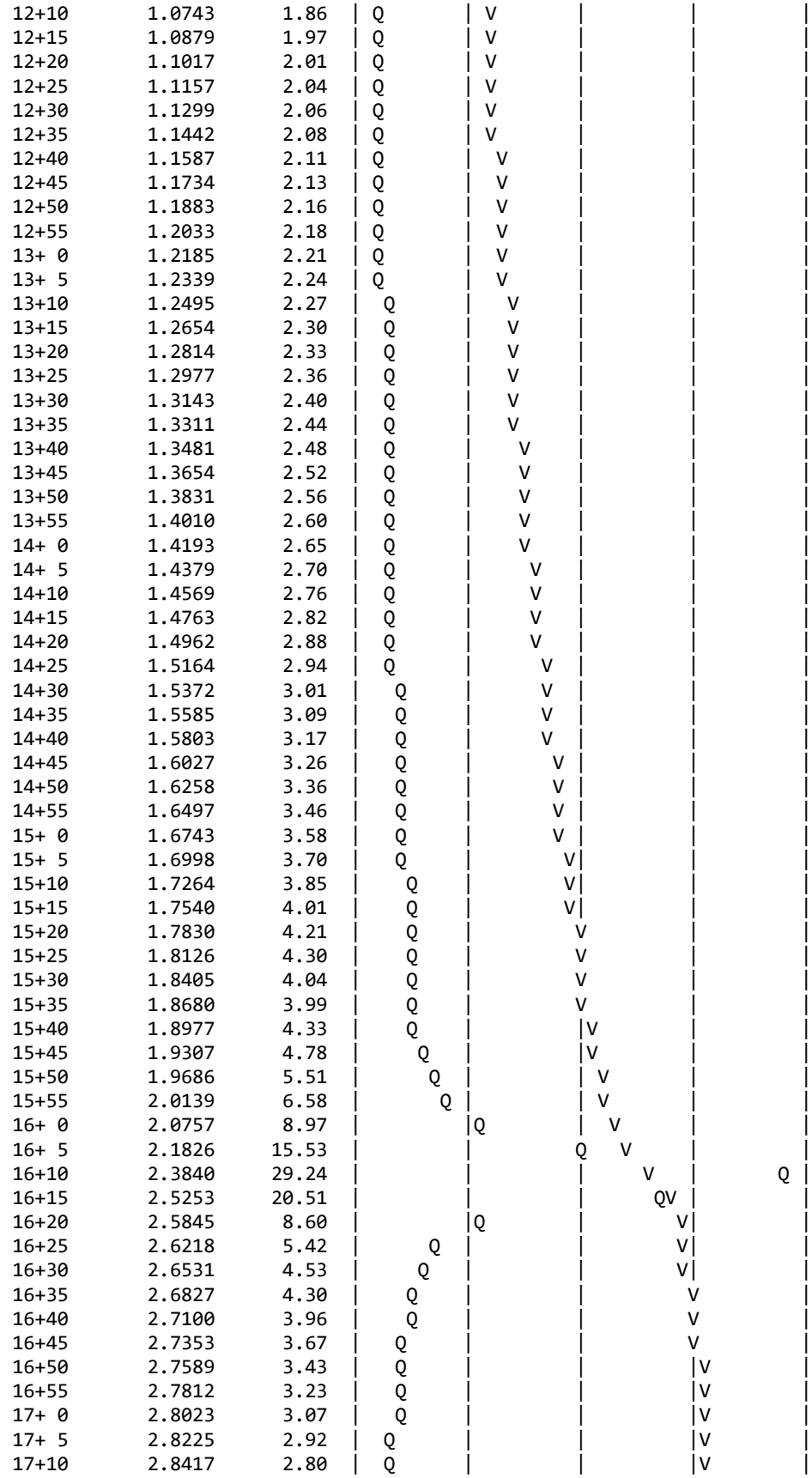
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0006	0.08	Q				
0+10	0.0038	0.47	Q				
0+15	0.0088	0.72	Q				
0+20	0.0141	0.77	VQ				
0+25	0.0195	0.78	VQ				
0+30	0.0249	0.79	VQ				
0+35	0.0303	0.79	VQ				
0+40	0.0358	0.79	VQ				
0+45	0.0413	0.79	VQ				
0+50	0.0467	0.80	VQ				
0+55	0.0522	0.80	VQ				
1+ 0	0.0578	0.80	VQ				
1+ 5	0.0633	0.80	VQ				
1+10	0.0688	0.81	VQ				
1+15	0.0744	0.81	VQ				
1+20	0.0800	0.81	VQ				
1+25	0.0856	0.81	VQ				
1+30	0.0912	0.82	|Q				
1+35	0.0969	0.82	|Q				
1+40	0.1025	0.82	|Q				
1+45	0.1082	0.82	|Q				
1+50	0.1139	0.83	|Q				
1+55	0.1196	0.83	|Q				

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2+ 0       0.1253      0.83  |Q        |         |         |         |
2+ 5       0.1311      0.84  |Q        |         |         |         |
2+10       0.1369      0.84  |Q        |         |         |         |
2+15       0.1427      0.84  |Q        |         |         |         |
2+20       0.1485      0.84  |Q        |         |         |         |
2+25       0.1543      0.85  |Q        |         |         |         |
2+30       0.1601      0.85  |Q        |         |         |         |
2+35       0.1660      0.85  |Q        |         |         |         |
2+40       0.1719      0.86  |Q        |         |         |         |
2+45       0.1778      0.86  |Q        |         |         |         |
2+50       0.1837      0.86  |QV       |         |         |         |
2+55       0.1897      0.86  |QV       |         |         |         |
3+ 0       0.1957      0.87  |QV       |         |         |         |
3+ 5       0.2017      0.87  |QV       |         |         |         |
3+10       0.2077      0.87  |QV       |         |         |         |
3+15       0.2137      0.88  |QV       |         |         |         |
3+20       0.2198      0.88  |QV       |         |         |         |
3+25       0.2259      0.88  |QV       |         |         |         |
3+30       0.2320      0.89  |QV       |         |         |         |
3+35       0.2381      0.89  |QV       |         |         |         |
3+40       0.2442      0.89  |QV       |         |         |         |
3+45       0.2504      0.90  |QV       |         |         |         |
3+50       0.2566      0.90  |QV       |         |         |         |
3+55       0.2628      0.90  |QV       |         |         |         |
4+ 0       0.2691      0.91  |Q V      |         |         |         |
4+ 5       0.2753      0.91  |Q V      |         |         |         |
4+10       0.2816      0.91  |Q V      |         |         |         |
4+15       0.2879      0.92  |Q V      |         |         |         |
4+20       0.2943      0.92  |Q V      |         |         |         |
4+25       0.3006      0.92  |Q V      |         |         |         |
4+30       0.3070      0.93  |Q V      |         |         |         |
4+35       0.3134      0.93  |Q V      |         |         |         |
4+40       0.3199      0.94  |Q V      |         |         |         |
4+45       0.3263      0.94  |Q V      |         |         |         |
4+50       0.3328      0.94  |Q V      |         |         |         |
4+55       0.3394      0.95  |Q V      |         |         |         |
5+ 0       0.3459      0.95  |Q V      |         |         |         |
5+ 5       0.3525      0.95  |Q V      |         |         |         |
5+10       0.3591      0.96  |Q  V     |         |         |         |
5+15       0.3657      0.96  |Q  V     |         |         |         |
5+20       0.3724      0.97  |Q  V     |         |         |         |
5+25       0.3791      0.97  |Q  V     |         |         |         |
5+30       0.3858      0.98  |Q  V     |         |         |         |
5+35       0.3925      0.98  |Q  V     |         |         |         |
5+40       0.3993      0.98  |Q  V     |         |         |         |
5+45       0.4061      0.99  |Q  V     |         |         |         |
5+50       0.4130      0.99  |Q  V     |         |         |         |
5+55       0.4198      1.00  |Q  V     |         |         |         |
6+ 0       0.4267      1.00  |Q  V     |         |         |         |
6+ 5       0.4337      1.01  |Q  V     |         |         |         |
6+10       0.4406      1.01  |Q  V     |         |         |         |
6+15       0.4476      1.02  |Q   V    |         |         |         |
6+20       0.4547      1.02  |Q   V    |         |         |         |
6+25       0.4617      1.03  |Q   V    |         |         |         |
6+30       0.4688      1.03  |Q   V    |         |         |         |
6+35       0.4760      1.04  |Q   V    |         |         |         |
6+40       0.4831      1.04  |Q   V    |         |         |         |
6+45       0.4903      1.05  |Q   V    |         |         |         |
6+50       0.4976      1.05  |Q   V    |         |         |         |
6+55       0.5048      1.06  |Q   V    |         |         |         |
7+ 0       0.5122      1.06  |Q   V    |         |         |         |
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 7+ 5       0.5195      1.07  |Q   V    |         |         |         |
 7+10       0.5269      1.07  |Q   V    |         |         |         |
 7+15       0.5343      1.08  |Q    V   |         |         |         |
 7+20       0.5418      1.08  |Q    V   |         |         |         |
 7+25       0.5493      1.09  |Q    V   |         |         |         |
 7+30       0.5568      1.10  |Q    V   |         |         |         |
 7+35       0.5644      1.10  |Q    V   |         |         |         |
 7+40       0.5720      1.11  |Q    V   |         |         |         |
 7+45       0.5797      1.11  |Q    V   |         |         |         |
 7+50       0.5874      1.12  |Q    V   |         |         |         |
 7+55       0.5952      1.13  |Q    V   |         |         |         |
 8+ 0       0.6030      1.13  |Q    V   |         |         |         |
 8+ 5       0.6108      1.14  |Q    V   |         |         |         |
 8+10       0.6187      1.15  |Q    V   |         |         |         |
 8+15       0.6266      1.15  |Q     V  |         |         |         |
 8+20       0.6346      1.16  |Q     V  |         |         |         |
 8+25       0.6427      1.17  |Q     V  |         |         |         |
 8+30       0.6507      1.17  |Q     V  |         |         |         |
 8+35       0.6589      1.18  |Q     V  |         |         |         |
 8+40       0.6671      1.19  |Q     V  |         |         |         |
 8+45       0.6753      1.19  |Q     V  |         |         |         |
 8+50       0.6836      1.20  |Q     V  |         |         |         |
 8+55       0.6919      1.21  |Q     V  |         |         |         |
 9+ 0       0.7003      1.22  |Q     V  |         |         |         |
 9+ 5       0.7087      1.23  |Q     V  |         |         |         |
 9+10       0.7172      1.23  |Q      V |         |         |         |
 9+15       0.7258      1.24  |Q      V |         |         |         |
 9+20       0.7344      1.25  |Q      V |         |         |         |
 9+25       0.7431      1.26  |Q      V |         |         |         |
 9+30       0.7518      1.27  |Q      V |         |         |         |
 9+35       0.7606      1.28  |Q      V |         |         |         |
 9+40       0.7695      1.29  |Q      V |         |         |         |
 9+45       0.7784      1.30  |Q      V |         |         |         |
 9+50       0.7874      1.31  |Q      V |         |         |         |
 9+55       0.7965      1.31  |Q      V |         |         |         |
10+ 0       0.8056      1.33  |Q       V|         |         |         |
10+ 5       0.8148      1.33  |Q       V|         |         |         |
10+10       0.8240      1.35  |Q       V|         |         |         |
10+15       0.8334      1.36  |Q       V|         |         |         |
10+20       0.8428      1.37  |Q       V|         |         |         |
10+25       0.8523      1.38  |Q       V|         |         |         |
10+30       0.8618      1.39  |Q       V|         |         |         |
10+35       0.8715      1.40  |Q       V|         |         |         |
10+40       0.8812      1.41  |Q       V|         |         |         |
10+45       0.8910      1.42  |Q        V         |         |         |
10+50       0.9009      1.44  |Q        V         |         |         |
10+55       0.9109      1.45  |Q        V         |         |         |
11+ 0       0.9210      1.46  |Q        V         |         |         |
11+ 5       0.9311      1.48  |Q        V         |         |         |
11+10       0.9414      1.49  |Q        V         |         |         |
11+15       0.9518      1.50  | Q       V         |         |         |
11+20       0.9622      1.52  | Q       V         |         |         |
11+25       0.9728      1.53  | Q       V         |         |         |
11+30       0.9834      1.55  | Q       |V        |         |         |
11+35       0.9942      1.56  | Q       |V        |         |         |
11+40       1.0051      1.58  | Q       |V        |         |         |
11+45       1.0161      1.60  | Q       |V        |         |         |
11+50       1.0272      1.61  | Q       |V        |         |         |
11+55       1.0384      1.63  | Q       |V        |         |         |
12+ 0       1.0498      1.65  | Q       |V        |         |         |
12+ 5       1.0615      1.70  | Q       |V        |         |         |
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17+15	2.8603	2.69	Q			V
17+20	2.8781	2.59	Q			V
17+25	2.8954	2.50	Q			V
17+30	2.9121	2.43	Q			V
17+35	2.9283	2.35	Q			V
17+40	2.9441	2.29	Q			V
17+45	2.9594	2.23	Q			V
17+50	2.9744	2.17	Q			V
17+55	2.9890	2.12	Q			V
18+ 0	3.0033	2.07	Q			V
18+ 5	3.0171	2.00	Q			V
18+10	3.0296	1.81	Q			V
18+15	3.0411	1.68	Q			V
18+20	3.0524	1.63	Q			V
18+25	3.0633	1.59	Q			V
18+30	3.0741	1.56	Q			V
18+35	3.0846	1.53	Q			V
18+40	3.0949	1.50	Q			V
18+45	3.1050	1.47	Q			V
18+50	3.1150	1.45	Q			V
18+55	3.1248	1.42	Q			V
19+ 0	3.1344	1.40	Q			V
19+ 5	3.1438	1.37	Q			V
19+10	3.1532	1.35	Q			V
19+15	3.1623	1.33	Q			V
19+20	3.1714	1.31	Q			V
19+25	3.1803	1.29	Q			V
19+30	3.1890	1.27	Q			V
19+35	3.1977	1.26	Q			V
19+40	3.2062	1.24	Q			V
19+45	3.2147	1.22	Q			V
19+50	3.2230	1.21	Q			V
19+55	3.2312	1.19	Q			V
20+ 0	3.2393	1.18	Q			V
20+ 5	3.2473	1.16	Q			V
20+10	3.2552	1.15	Q			V
20+15	3.2631	1.14	Q			V
20+20	3.2708	1.12	Q			V
20+25	3.2785	1.11	Q			V
20+30	3.2860	1.10	Q			V
20+35	3.2935	1.09	Q			V
20+40	3.3009	1.08	Q			V
20+45	3.3083	1.07	Q			V
20+50	3.3155	1.05	Q			V
20+55	3.3227	1.04	Q			V
21+ 0	3.3299	1.03	Q			V
21+ 5	3.3369	1.02	Q			V
21+10	3.3439	1.01	Q			V
21+15	3.3508	1.01	Q			V
21+20	3.3577	1.00	Q			V
21+25	3.3645	0.99	Q			V
21+30	3.3712	0.98	Q			V
21+35	3.3779	0.97	Q			V
21+40	3.3845	0.96	Q			V
21+45	3.3911	0.95	Q			V
21+50	3.3976	0.95	Q			V
21+55	3.4041	0.94	Q			V
22+ 0	3.4105	0.93	Q			V
22+ 5	3.4168	0.92	Q			V
22+10	3.4231	0.92	Q			V
22+15	3.4294	0.91	Q			V

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22+20       3.4356      0.90  |Q        |         |         |       V |
22+25       3.4418      0.89  |Q        |         |         |       V |
22+30       3.4479      0.89  |Q        |         |         |       V |
22+35       3.4539      0.88  |Q        |         |         |       V |
22+40       3.4600      0.88  |Q        |         |         |       V |
22+45       3.4660      0.87  |Q        |         |         |       V |
22+50       3.4719      0.86  |Q        |         |         |        V|
22+55       3.4778      0.86  |Q        |         |         |        V|
23+ 0       3.4837      0.85  |Q        |         |         |        V|
23+ 5       3.4895      0.85  |Q        |         |         |        V|
23+10       3.4953      0.84  |Q        |         |         |        V|
23+15       3.5010      0.83  |Q        |         |         |        V|
23+20       3.5067      0.83  |Q        |         |         |        V|
23+25       3.5124      0.82  |Q        |         |         |        V|
23+30       3.5180      0.82  |Q        |         |         |        V|
23+35       3.5236      0.81  |Q        |         |         |        V|
23+40       3.5292      0.81  |Q        |         |         |        V|
23+45       3.5347      0.80  |Q        |         |         |        V|
23+50       3.5402      0.80  |Q        |         |         |        V|
23+55       3.5457      0.79  |Q        |         |         |        V|
24+ 0       3.5511      0.79  |Q        |         |         |        V|
```

APPENDIX C.7

UNIT HYDROGRAPH ANALYSIS

POST-DEVELOPMENT CONDITIONS – 25 YEAR

U n i t H y d r o g r a p h A n a l y s i s

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Study date 01/22/23

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San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6277

JOB NO 2022-318
11115 HEMLOCK AVENUE
25 YEAR, UNIT HYDROGRAPH
POST-CONDITION, AREA A

Storm Event Year = 25

Antecedent Moisture Condition = 2

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 25		
24.47	1	1.02
Rainfall data for year 25		
24.47	6	2.49
Rainfall data for year 25		
24.47	24	4.57

++

******** Area-averaged max loss rate, Fm ********

SCS curve No.(AMCII)	SCS curve NO.(AMC 2)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
32.0	32.0	24.47	1.000	0.978	0.120	0.117

Area-averaged adjusted loss rate Fm (In/Hr) = 0.117

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
2.94	0.120	32.0	32.0	21.25	0.001
21.53	0.880	98.0	98.0	0.20	0.948

Area-averaged catchment yield fraction, Y = 0.835
Area-averaged low loss fraction, Yb = 0.165
User entry of time of concentration = 0.142 (hours)
++
Watershed area = 24.47(Ac.)
Catchment Lag time = 0.114 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 73.3482
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.117(In/Hr)
Average low loss rate fraction (Yb) = 0.165 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.378(In)
Computed peak 30-minute rainfall = 0.773(In)
Specified peak 1-hour rainfall = 1.020(In)
Computed peak 3-hour rainfall = 1.763(In)
Specified peak 6-hour rainfall = 2.490(In)
Specified peak 24-hour rainfall = 4.570(In)

Rainfall depth area reduction factors:
Using a total area of 24.47(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.377(In)
30-minute factor = 0.999 Adjusted rainfall = 0.772(In)
1-hour factor = 0.999 Adjusted rainfall = 1.019(In)
3-hour factor = 1.000 Adjusted rainfall = 1.763(In)
6-hour factor = 1.000 Adjusted rainfall = 2.490(In)
24-hour factor = 1.000 Adjusted rainfall = 4.570(In)

U n i t H y d r o g r a p h

++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
	(K = 295.93 (CFS))	
1	9.593	28.389
2	57.063	140.480
3	91.191	100.997
4	98.308	21.062
5	100.000	5.006

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3771	0.3771
2	0.4976	0.1205
3	0.5852	0.0876
4	0.6565	0.0714
5	0.7178	0.0613
6	0.7721	0.0543
7	0.8212	0.0491
8	0.8663	0.0451
9	0.9081	0.0418

10	0.9472	0.0391
11	0.9840	0.0368
12	1.0188	0.0348
13	1.0603	0.0415
14	1.1003	0.0399
15	1.1388	0.0385
16	1.1761	0.0373
17	1.2122	0.0361
18	1.2473	0.0351
19	1.2814	0.0341
20	1.3146	0.0332
21	1.3470	0.0324
22	1.3787	0.0316
23	1.4096	0.0309
24	1.4399	0.0303
25	1.4695	0.0296
26	1.4985	0.0290
27	1.5270	0.0285
28	1.5550	0.0280
29	1.5825	0.0275
30	1.6095	0.0270
31	1.6360	0.0266
32	1.6621	0.0261
33	1.6879	0.0257
34	1.7132	0.0253
35	1.7381	0.0250
36	1.7628	0.0246
37	1.7870	0.0242
38	1.8109	0.0239
39	1.8345	0.0236
40	1.8578	0.0233
41	1.8808	0.0230
42	1.9035	0.0227
43	1.9259	0.0224
44	1.9481	0.0222
45	1.9700	0.0219
46	1.9917	0.0217
47	2.0132	0.0215
48	2.0344	0.0212
49	2.0554	0.0210
50	2.0762	0.0208
51	2.0968	0.0206
52	2.1172	0.0204
53	2.1374	0.0202
54	2.1574	0.0200
55	2.1772	0.0198
56	2.1968	0.0196
57	2.2163	0.0195
58	2.2355	0.0193
59	2.2547	0.0191
60	2.2736	0.0190
61	2.2924	0.0188
62	2.3111	0.0186
63	2.3296	0.0185
64	2.3479	0.0183
65	2.3661	0.0182
66	2.3842	0.0181
67	2.4021	0.0179
68	2.4199	0.0178
69	2.4376	0.0177
70	2.4551	0.0175

71	2.4725	0.0174
72	2.4898	0.0173
73	2.5049	0.0151
74	2.5199	0.0150
75	2.5347	0.0149
76	2.5495	0.0147
77	2.5641	0.0146
78	2.5787	0.0145
79	2.5931	0.0144
80	2.6074	0.0143
81	2.6216	0.0142
82	2.6358	0.0141
83	2.6498	0.0140
84	2.6637	0.0139
85	2.6776	0.0138
86	2.6913	0.0138
87	2.7050	0.0137
88	2.7186	0.0136
89	2.7321	0.0135
90	2.7455	0.0134
91	2.7588	0.0133
92	2.7720	0.0132
93	2.7852	0.0132
94	2.7983	0.0131
95	2.8113	0.0130
96	2.8242	0.0129
97	2.8371	0.0128
98	2.8498	0.0128
99	2.8625	0.0127
100	2.8752	0.0126
101	2.8877	0.0126
102	2.9002	0.0125
103	2.9126	0.0124
104	2.9250	0.0124
105	2.9373	0.0123
106	2.9495	0.0122
107	2.9617	0.0122
108	2.9737	0.0121
109	2.9858	0.0120
110	2.9977	0.0120
111	3.0097	0.0119
112	3.0215	0.0118
113	3.0333	0.0118
114	3.0450	0.0117
115	3.0567	0.0117
116	3.0683	0.0116
117	3.0799	0.0116
118	3.0914	0.0115
119	3.1028	0.0114
120	3.1142	0.0114
121	3.1256	0.0113
122	3.1368	0.0113
123	3.1481	0.0112
124	3.1593	0.0112
125	3.1704	0.0111
126	3.1815	0.0111
127	3.1925	0.0110
128	3.2035	0.0110
129	3.2145	0.0109
130	3.2253	0.0109
131	3.2362	0.0108

132	3.2470	0.0108
133	3.2577	0.0108
134	3.2685	0.0107
135	3.2791	0.0107
136	3.2897	0.0106
137	3.3003	0.0106
138	3.3108	0.0105
139	3.3213	0.0105
140	3.3318	0.0104
141	3.3422	0.0104
142	3.3525	0.0104
143	3.3629	0.0103
144	3.3731	0.0103
145	3.3834	0.0102
146	3.3936	0.0102
147	3.4037	0.0102
148	3.4139	0.0101
149	3.4240	0.0101
150	3.4340	0.0100
151	3.4440	0.0100
152	3.4540	0.0100
153	3.4639	0.0099
154	3.4738	0.0099
155	3.4837	0.0099
156	3.4935	0.0098
157	3.5033	0.0098
158	3.5131	0.0098
159	3.5228	0.0097
160	3.5325	0.0097
161	3.5421	0.0097
162	3.5517	0.0096
163	3.5613	0.0096
164	3.5709	0.0096
165	3.5804	0.0095
166	3.5899	0.0095
167	3.5994	0.0095
168	3.6088	0.0094
169	3.6182	0.0094
170	3.6275	0.0094
171	3.6369	0.0093
172	3.6462	0.0093
173	3.6554	0.0093
174	3.6647	0.0092
175	3.6739	0.0092
176	3.6831	0.0092
177	3.6922	0.0092
178	3.7014	0.0091
179	3.7105	0.0091
180	3.7195	0.0091
181	3.7286	0.0090
182	3.7376	0.0090
183	3.7465	0.0090
184	3.7555	0.0090
185	3.7644	0.0089
186	3.7733	0.0089
187	3.7822	0.0089
188	3.7911	0.0088
189	3.7999	0.0088
190	3.8087	0.0088
191	3.8174	0.0088
192	3.8262	0.0087

193	3.8349	0.0087
194	3.8436	0.0087
195	3.8522	0.0087
196	3.8609	0.0086
197	3.8695	0.0086
198	3.8781	0.0086
199	3.8867	0.0086
200	3.8952	0.0085
201	3.9037	0.0085
202	3.9122	0.0085
203	3.9207	0.0085
204	3.9291	0.0084
205	3.9376	0.0084
206	3.9460	0.0084
207	3.9544	0.0084
208	3.9627	0.0084
209	3.9710	0.0083
210	3.9794	0.0083
211	3.9876	0.0083
212	3.9959	0.0083
213	4.0042	0.0082
214	4.0124	0.0082
215	4.0206	0.0082
216	4.0288	0.0082
217	4.0369	0.0082
218	4.0451	0.0081
219	4.0532	0.0081
220	4.0613	0.0081
221	4.0694	0.0081
222	4.0774	0.0081
223	4.0855	0.0080
224	4.0935	0.0080
225	4.1015	0.0080
226	4.1094	0.0080
227	4.1174	0.0080
228	4.1253	0.0079
229	4.1332	0.0079
230	4.1411	0.0079
231	4.1490	0.0079
232	4.1569	0.0079
233	4.1647	0.0078
234	4.1725	0.0078
235	4.1803	0.0078
236	4.1881	0.0078
237	4.1959	0.0078
238	4.2036	0.0077
239	4.2114	0.0077
240	4.2191	0.0077
241	4.2268	0.0077
242	4.2344	0.0077
243	4.2421	0.0077
244	4.2497	0.0076
245	4.2574	0.0076
246	4.2650	0.0076
247	4.2725	0.0076
248	4.2801	0.0076
249	4.2877	0.0076
250	4.2952	0.0075
251	4.3027	0.0075
252	4.3102	0.0075
253	4.3177	0.0075

254	4.3252	0.0075
255	4.3326	0.0075
256	4.3401	0.0074
257	4.3475	0.0074
258	4.3549	0.0074
259	4.3623	0.0074
260	4.3696	0.0074
261	4.3770	0.0074
262	4.3843	0.0073
263	4.3916	0.0073
264	4.3990	0.0073
265	4.4062	0.0073
266	4.4135	0.0073
267	4.4208	0.0073
268	4.4280	0.0072
269	4.4353	0.0072
270	4.4425	0.0072
271	4.4497	0.0072
272	4.4569	0.0072
273	4.4640	0.0072
274	4.4712	0.0072
275	4.4783	0.0071
276	4.4855	0.0071
277	4.4926	0.0071
278	4.4997	0.0071
279	4.5067	0.0071
280	4.5138	0.0071
281	4.5209	0.0071
282	4.5279	0.0070
283	4.5349	0.0070
284	4.5419	0.0070
285	4.5489	0.0070
286	4.5559	0.0070
287	4.5629	0.0070
288	4.5699	0.0070

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0070	0.0012	0.0058
2	0.0070	0.0012	0.0058
3	0.0070	0.0012	0.0058
4	0.0070	0.0012	0.0059
5	0.0070	0.0012	0.0059
6	0.0071	0.0012	0.0059
7	0.0071	0.0012	0.0059
8	0.0071	0.0012	0.0059
9	0.0071	0.0012	0.0059
10	0.0071	0.0012	0.0060
11	0.0072	0.0012	0.0060
12	0.0072	0.0012	0.0060
13	0.0072	0.0012	0.0060
14	0.0072	0.0012	0.0060
15	0.0073	0.0012	0.0061
16	0.0073	0.0012	0.0061
17	0.0073	0.0012	0.0061
18	0.0073	0.0012	0.0061
19	0.0074	0.0012	0.0061
20	0.0074	0.0012	0.0062
21	0.0074	0.0012	0.0062

22	0.0074	0.0012	0.0062
23	0.0075	0.0012	0.0062
24	0.0075	0.0012	0.0062
25	0.0075	0.0012	0.0063
26	0.0075	0.0012	0.0063
27	0.0076	0.0012	0.0063
28	0.0076	0.0013	0.0063
29	0.0076	0.0013	0.0063
30	0.0076	0.0013	0.0064
31	0.0077	0.0013	0.0064
32	0.0077	0.0013	0.0064
33	0.0077	0.0013	0.0064
34	0.0077	0.0013	0.0065
35	0.0078	0.0013	0.0065
36	0.0078	0.0013	0.0065
37	0.0078	0.0013	0.0065
38	0.0078	0.0013	0.0065
39	0.0079	0.0013	0.0066
40	0.0079	0.0013	0.0066
41	0.0079	0.0013	0.0066
42	0.0080	0.0013	0.0066
43	0.0080	0.0013	0.0067
44	0.0080	0.0013	0.0067
45	0.0081	0.0013	0.0067
46	0.0081	0.0013	0.0067
47	0.0081	0.0013	0.0068
48	0.0081	0.0013	0.0068
49	0.0082	0.0014	0.0068
50	0.0082	0.0014	0.0068
51	0.0082	0.0014	0.0069
52	0.0083	0.0014	0.0069
53	0.0083	0.0014	0.0069
54	0.0083	0.0014	0.0070
55	0.0084	0.0014	0.0070
56	0.0084	0.0014	0.0070
57	0.0084	0.0014	0.0071
58	0.0085	0.0014	0.0071
59	0.0085	0.0014	0.0071
60	0.0085	0.0014	0.0071
61	0.0086	0.0014	0.0072
62	0.0086	0.0014	0.0072
63	0.0087	0.0014	0.0072
64	0.0087	0.0014	0.0073
65	0.0087	0.0014	0.0073
66	0.0088	0.0014	0.0073
67	0.0088	0.0015	0.0074
68	0.0088	0.0015	0.0074
69	0.0089	0.0015	0.0074
70	0.0089	0.0015	0.0075
71	0.0090	0.0015	0.0075
72	0.0090	0.0015	0.0075
73	0.0091	0.0015	0.0076
74	0.0091	0.0015	0.0076
75	0.0092	0.0015	0.0076
76	0.0092	0.0015	0.0077
77	0.0092	0.0015	0.0077
78	0.0093	0.0015	0.0077
79	0.0093	0.0015	0.0078
80	0.0094	0.0015	0.0078
81	0.0094	0.0016	0.0079
82	0.0095	0.0016	0.0079

83	0.0095	0.0016	0.0079
84	0.0096	0.0016	0.0080
85	0.0096	0.0016	0.0080
86	0.0097	0.0016	0.0081
87	0.0097	0.0016	0.0081
88	0.0098	0.0016	0.0081
89	0.0098	0.0016	0.0082
90	0.0099	0.0016	0.0082
91	0.0099	0.0016	0.0083
92	0.0100	0.0016	0.0083
93	0.0100	0.0017	0.0084
94	0.0101	0.0017	0.0084
95	0.0102	0.0017	0.0085
96	0.0102	0.0017	0.0085
97	0.0103	0.0017	0.0086
98	0.0103	0.0017	0.0086
99	0.0104	0.0017	0.0087
100	0.0104	0.0017	0.0087
101	0.0105	0.0017	0.0088
102	0.0106	0.0017	0.0088
103	0.0107	0.0018	0.0089
104	0.0107	0.0018	0.0089
105	0.0108	0.0018	0.0090
106	0.0108	0.0018	0.0091
107	0.0109	0.0018	0.0091
108	0.0110	0.0018	0.0092
109	0.0111	0.0018	0.0093
110	0.0111	0.0018	0.0093
111	0.0112	0.0019	0.0094
112	0.0113	0.0019	0.0094
113	0.0114	0.0019	0.0095
114	0.0114	0.0019	0.0096
115	0.0116	0.0019	0.0096
116	0.0116	0.0019	0.0097
117	0.0117	0.0019	0.0098
118	0.0118	0.0019	0.0098
119	0.0119	0.0020	0.0099
120	0.0120	0.0020	0.0100
121	0.0121	0.0020	0.0101
122	0.0122	0.0020	0.0101
123	0.0123	0.0020	0.0103
124	0.0124	0.0020	0.0103
125	0.0125	0.0021	0.0104
126	0.0126	0.0021	0.0105
127	0.0127	0.0021	0.0106
128	0.0128	0.0021	0.0107
129	0.0129	0.0021	0.0108
130	0.0130	0.0021	0.0109
131	0.0132	0.0022	0.0110
132	0.0132	0.0022	0.0111
133	0.0134	0.0022	0.0112
134	0.0135	0.0022	0.0113
135	0.0137	0.0023	0.0114
136	0.0138	0.0023	0.0115
137	0.0139	0.0023	0.0116
138	0.0140	0.0023	0.0117
139	0.0142	0.0024	0.0119
140	0.0143	0.0024	0.0120
141	0.0145	0.0024	0.0121
142	0.0146	0.0024	0.0122
143	0.0149	0.0025	0.0124

144	0.0150	0.0025	0.0125
145	0.0173	0.0029	0.0144
146	0.0174	0.0029	0.0145
147	0.0177	0.0029	0.0147
148	0.0178	0.0029	0.0149
149	0.0181	0.0030	0.0151
150	0.0182	0.0030	0.0152
151	0.0185	0.0031	0.0154
152	0.0186	0.0031	0.0156
153	0.0190	0.0031	0.0158
154	0.0191	0.0032	0.0160
155	0.0195	0.0032	0.0162
156	0.0196	0.0032	0.0164
157	0.0200	0.0033	0.0167
158	0.0202	0.0033	0.0168
159	0.0206	0.0034	0.0172
160	0.0208	0.0034	0.0174
161	0.0212	0.0035	0.0177
162	0.0215	0.0035	0.0179
163	0.0219	0.0036	0.0183
164	0.0222	0.0037	0.0185
165	0.0227	0.0038	0.0190
166	0.0230	0.0038	0.0192
167	0.0236	0.0039	0.0197
168	0.0239	0.0040	0.0199
169	0.0246	0.0041	0.0205
170	0.0250	0.0041	0.0208
171	0.0257	0.0043	0.0215
172	0.0261	0.0043	0.0218
173	0.0270	0.0045	0.0225
174	0.0275	0.0045	0.0229
175	0.0285	0.0047	0.0238
176	0.0290	0.0048	0.0242
177	0.0303	0.0050	0.0253
178	0.0309	0.0051	0.0258
179	0.0324	0.0054	0.0270
180	0.0332	0.0055	0.0277
181	0.0351	0.0058	0.0293
182	0.0361	0.0060	0.0302
183	0.0385	0.0064	0.0322
184	0.0399	0.0066	0.0333
185	0.0348	0.0058	0.0291
186	0.0368	0.0061	0.0307
187	0.0418	0.0069	0.0349
188	0.0451	0.0074	0.0376
189	0.0543	0.0090	0.0453
190	0.0613	0.0098	0.0515
191	0.0876	0.0098	0.0778
192	0.1205	0.0098	0.1107
193	0.3771	0.0098	0.3673
194	0.0714	0.0098	0.0616
195	0.0491	0.0081	0.0410
196	0.0391	0.0065	0.0326
197	0.0415	0.0069	0.0347
198	0.0373	0.0062	0.0311
199	0.0341	0.0056	0.0285
200	0.0316	0.0052	0.0264
201	0.0296	0.0049	0.0247
202	0.0280	0.0046	0.0233
203	0.0266	0.0044	0.0222
204	0.0253	0.0042	0.0211

205	0.0242	0.0040	0.0202
206	0.0233	0.0038	0.0194
207	0.0224	0.0037	0.0187
208	0.0217	0.0036	0.0181
209	0.0210	0.0035	0.0175
210	0.0204	0.0034	0.0170
211	0.0198	0.0033	0.0165
212	0.0193	0.0032	0.0161
213	0.0188	0.0031	0.0157
214	0.0183	0.0030	0.0153
215	0.0179	0.0030	0.0150
216	0.0175	0.0029	0.0146
217	0.0151	0.0025	0.0126
218	0.0147	0.0024	0.0123
219	0.0144	0.0024	0.0120
220	0.0141	0.0023	0.0118
221	0.0138	0.0023	0.0116
222	0.0136	0.0022	0.0113
223	0.0133	0.0022	0.0111
224	0.0131	0.0022	0.0109
225	0.0128	0.0021	0.0107
226	0.0126	0.0021	0.0105
227	0.0124	0.0021	0.0104
228	0.0122	0.0020	0.0102
229	0.0120	0.0020	0.0100
230	0.0118	0.0020	0.0099
231	0.0117	0.0019	0.0097
232	0.0115	0.0019	0.0096
233	0.0113	0.0019	0.0095
234	0.0112	0.0018	0.0093
235	0.0110	0.0018	0.0092
236	0.0109	0.0018	0.0091
237	0.0108	0.0018	0.0090
238	0.0106	0.0018	0.0089
239	0.0105	0.0017	0.0088
240	0.0104	0.0017	0.0086
241	0.0102	0.0017	0.0085
242	0.0101	0.0017	0.0084
243	0.0100	0.0017	0.0084
244	0.0099	0.0016	0.0083
245	0.0098	0.0016	0.0082
246	0.0097	0.0016	0.0081
247	0.0096	0.0016	0.0080
248	0.0095	0.0016	0.0079
249	0.0094	0.0016	0.0078
250	0.0093	0.0015	0.0078
251	0.0092	0.0015	0.0077
252	0.0091	0.0015	0.0076
253	0.0090	0.0015	0.0075
254	0.0090	0.0015	0.0075
255	0.0089	0.0015	0.0074
256	0.0088	0.0015	0.0073
257	0.0087	0.0014	0.0073
258	0.0086	0.0014	0.0072
259	0.0086	0.0014	0.0072
260	0.0085	0.0014	0.0071
261	0.0084	0.0014	0.0070
262	0.0084	0.0014	0.0070
263	0.0083	0.0014	0.0069
264	0.0082	0.0014	0.0069
265	0.0082	0.0013	0.0068

266	0.0081	0.0013	0.0068
267	0.0080	0.0013	0.0067
268	0.0080	0.0013	0.0067
269	0.0079	0.0013	0.0066
270	0.0079	0.0013	0.0066
271	0.0078	0.0013	0.0065
272	0.0077	0.0013	0.0065
273	0.0077	0.0013	0.0064
274	0.0076	0.0013	0.0064
275	0.0076	0.0013	0.0063
276	0.0075	0.0012	0.0063
277	0.0075	0.0012	0.0062
278	0.0074	0.0012	0.0062
279	0.0074	0.0012	0.0062
280	0.0073	0.0012	0.0061
281	0.0073	0.0012	0.0061
282	0.0072	0.0012	0.0060
283	0.0072	0.0012	0.0060
284	0.0072	0.0012	0.0060
285	0.0071	0.0012	0.0059
286	0.0071	0.0012	0.0059
287	0.0070	0.0012	0.0059
288	0.0070	0.0012	0.0058

Total soil rain loss = 0.69(In)
Total effective rainfall = 3.88(In)
Peak flow rate in flood hydrograph = 66.42(CFS)

++

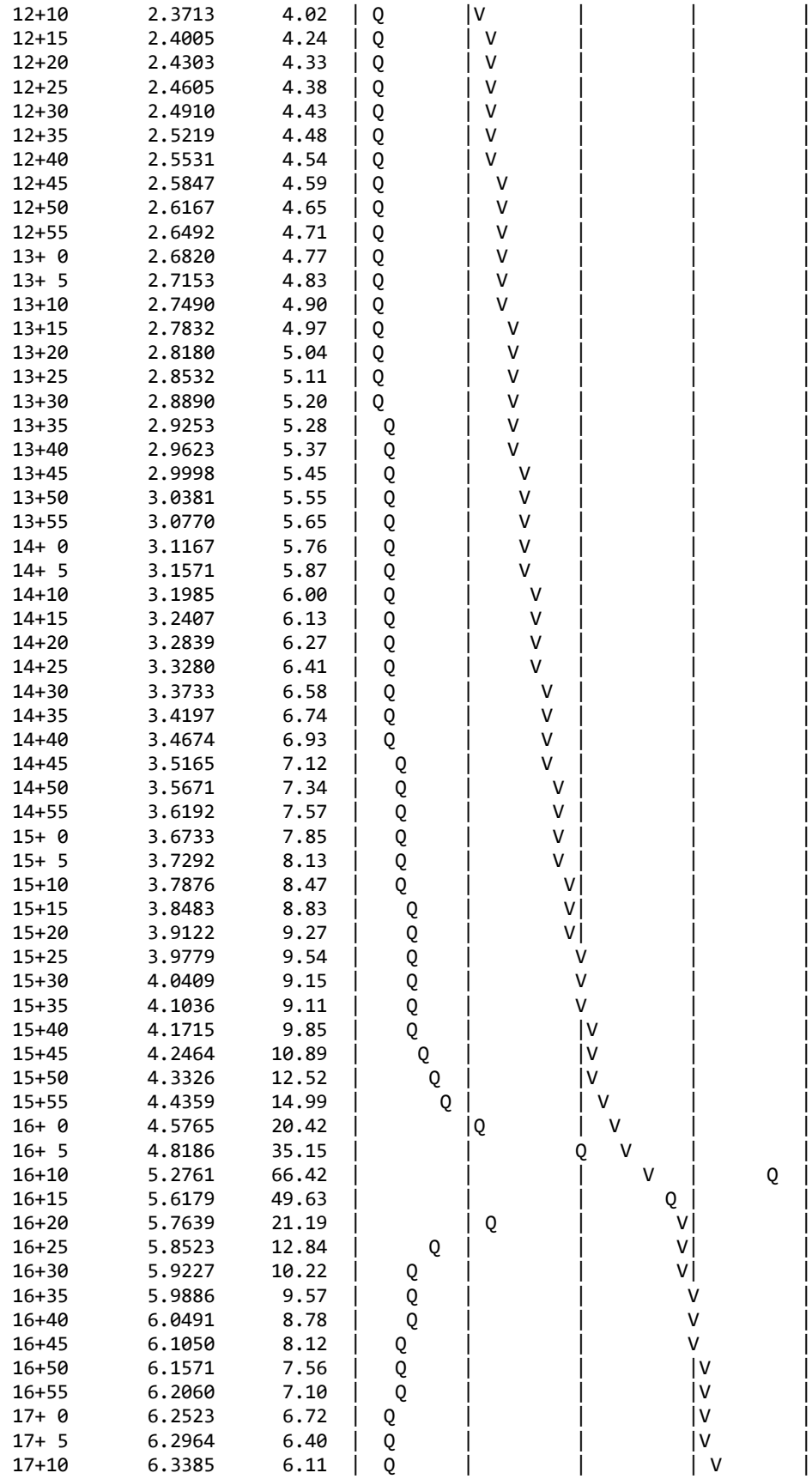
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	17.5	35.0	52.5	70.0
0+ 5	0.0011	0.16	Q	|	|	|	|
0+10	0.0079	0.98	Q	|	|	|	|
0+15	0.0187	1.57	Q	|	|	|	|
0+20	0.0304	1.70	Q	|	|	|	|
0+25	0.0423	1.73	Q	|	|	|	|
0+30	0.0543	1.74	Q	|	|	|	|
0+35	0.0663	1.74	Q	|	|	|	|
0+40	0.0783	1.75	Q	|	|	|	|
0+45	0.0903	1.75	VQ	|	|	|	|
0+50	0.1024	1.76	VQ	|	|	|	|
0+55	0.1146	1.76	VQ	|	|	|	|
1+ 0	0.1268	1.77	VQ	|	|	|	|
1+ 5	0.1390	1.77	VQ	|	|	|	|
1+10	0.1512	1.78	VQ	|	|	|	|
1+15	0.1635	1.78	VQ	|	|	|	|
1+20	0.1758	1.79	VQ	|	|	|	|
1+25	0.1882	1.80	VQ	|	|	|	|
1+30	0.2006	1.80	|Q	|	|	|	|
1+35	0.2131	1.81	|Q	|	|	|	|
1+40	0.2255	1.81	|Q	|	|	|	|
1+45	0.2381	1.82	|Q	|	|	|	|
1+50	0.2506	1.82	|Q	|	|	|	|
1+55	0.2632	1.83	|Q	|	|	|	|

2+ 0	0.2759	1.84	Q				
2+ 5	0.2886	1.84	Q				
2+10	0.3013	1.85	Q				
2+15	0.3141	1.86	Q				
2+20	0.3269	1.86	Q				
2+25	0.3398	1.87	Q				
2+30	0.3527	1.87	Q				
2+35	0.3656	1.88	Q				
2+40	0.3786	1.89	Q				
2+45	0.3917	1.89	Q				
2+50	0.4048	1.90	QV				
2+55	0.4179	1.91	QV				
3+ 0	0.4311	1.91	QV				
3+ 5	0.4443	1.92	QV				
3+10	0.4576	1.93	QV				
3+15	0.4709	1.93	QV				
3+20	0.4843	1.94	QV				
3+25	0.4977	1.95	QV				
3+30	0.5112	1.96	QV				
3+35	0.5247	1.96	QV				
3+40	0.5383	1.97	QV				
3+45	0.5519	1.98	QV				
3+50	0.5656	1.99	QV				
3+55	0.5793	1.99	QV				
4+ 0	0.5931	2.00	QV				
4+ 5	0.6069	2.01	Q V				
4+10	0.6208	2.02	Q V				
4+15	0.6347	2.02	Q V				
4+20	0.6487	2.03	Q V				
4+25	0.6628	2.04	Q V				
4+30	0.6769	2.05	Q V				
4+35	0.6910	2.06	Q V				
4+40	0.7052	2.06	Q V				
4+45	0.7195	2.07	Q V				
4+50	0.7339	2.08	Q V				
4+55	0.7483	2.09	Q V				
5+ 0	0.7627	2.10	Q V				
5+ 5	0.7772	2.11	Q V				
5+10	0.7918	2.12	Q V				
5+15	0.8065	2.13	Q V				
5+20	0.8212	2.14	Q V				
5+25	0.8359	2.14	Q V				
5+30	0.8508	2.15	Q V				
5+35	0.8657	2.16	Q V				
5+40	0.8806	2.17	Q V				
5+45	0.8957	2.18	Q V				
5+50	0.9108	2.19	Q V				
5+55	0.9259	2.20	Q V				
6+ 0	0.9412	2.21	Q V				
6+ 5	0.9565	2.22	Q V				
6+10	0.9718	2.23	Q V				
6+15	0.9873	2.24	Q V				
6+20	1.0028	2.25	Q V				
6+25	1.0184	2.26	Q V				
6+30	1.0341	2.28	Q V				
6+35	1.0498	2.29	Q V				
6+40	1.0657	2.30	Q V				
6+45	1.0816	2.31	Q V				
6+50	1.0976	2.32	Q V				
6+55	1.1136	2.33	Q V				
7+ 0	1.1298	2.34	Q V				

7+ 5	1.1460	2.36	|Q V |	|	|	|
7+10	1.1623	2.37	|Q V |	|	|	|
7+15	1.1787	2.38	|Q V |	|	|	|
7+20	1.1952	2.39	|Q V |	|	|	|
7+25	1.2118	2.41	|Q V |	|	|	|
7+30	1.2285	2.42	|Q V |	|	|	|
7+35	1.2452	2.43	|Q V |	|	|	|
7+40	1.2621	2.45	|Q V |	|	|	|
7+45	1.2790	2.46	|Q V |	|	|	|
7+50	1.2960	2.47	|Q V |	|	|	|
7+55	1.3132	2.49	|Q V |	|	|	|
8+ 0	1.3304	2.50	|Q V |	|	|	|
8+ 5	1.3477	2.52	|Q V |	|	|	|
8+10	1.3652	2.53	|Q V |	|	|	|
8+15	1.3827	2.55	|Q V |	|	|	|
8+20	1.4003	2.56	|Q V |	|	|	|
8+25	1.4181	2.58	|Q V |	|	|	|
8+30	1.4359	2.59	|Q V |	|	|	|
8+35	1.4539	2.61	|Q V |	|	|	|
8+40	1.4719	2.62	|Q V |	|	|	|
8+45	1.4901	2.64	|Q V |	|	|	|
8+50	1.5084	2.66	|Q V |	|	|	|
8+55	1.5268	2.67	|Q V |	|	|	|
9+ 0	1.5454	2.69	|Q V |	|	|	|
9+ 5	1.5640	2.71	|Q V |	|	|	|
9+10	1.5828	2.73	|Q V |	|	|	|
9+15	1.6017	2.75	|Q V |	|	|	|
9+20	1.6208	2.76	|Q V |	|	|	|
9+25	1.6399	2.78	|Q V |	|	|	|
9+30	1.6592	2.80	|Q V |	|	|	|
9+35	1.6787	2.82	|Q V |	|	|	|
9+40	1.6983	2.84	|Q V |	|	|	|
9+45	1.7180	2.86	|Q V |	|	|	|
9+50	1.7378	2.88	|Q V |	|	|	|
9+55	1.7579	2.91	|Q V |	|	|	|
10+ 0	1.7780	2.93	|Q V |	|	|	|
10+ 5	1.7983	2.95	|Q V|	|	|	|
10+10	1.8188	2.97	|Q V|	|	|	|
10+15	1.8395	3.00	|Q V|	|	|	|
10+20	1.8603	3.02	|Q V|	|	|	|
10+25	1.8812	3.04	|Q V|	|	|	|
10+30	1.9024	3.07	|Q V|	|	|	|
10+35	1.9237	3.10	|Q V|	|	|	|
10+40	1.9452	3.12	|Q V|	|	|	|
10+45	1.9669	3.15	|Q V|	|	|	|
10+50	1.9887	3.18	|Q V |	|	|	|
10+55	2.0108	3.20	|Q V |	|	|	|
11+ 0	2.0331	3.23	|Q V |	|	|	|
11+ 5	2.0555	3.26	|Q V |	|	|	|
11+10	2.0782	3.29	|Q V |	|	|	|
11+15	2.1011	3.32	|Q V |	|	|	|
11+20	2.1242	3.36	|Q V |	|	|	|
11+25	2.1476	3.39	|Q V |	|	|	|
11+30	2.1711	3.42	|Q V |	|	|	|
11+35	2.1949	3.46	|Q |V |	|	|	|
11+40	2.2190	3.49	|Q |V |	|	|	|
11+45	2.2433	3.53	| Q |V |	|	|	|
11+50	2.2679	3.57	| Q |V |	|	|	|
11+55	2.2927	3.61	| Q |V |	|	|	|
12+ 0	2.3178	3.65	| Q |V |	|	|	|
12+ 5	2.3435	3.74	| Q |V |	|	|	|



17+15	6.3788	5.86	Q			V
17+20	6.4177	5.64	Q			V
17+25	6.4552	5.44	Q			V
17+30	6.4914	5.27	Q			V
17+35	6.5266	5.11	Q			V
17+40	6.5607	4.96	Q			V
17+45	6.5940	4.82	Q			V
17+50	6.6263	4.70	Q			V
17+55	6.6579	4.58	Q			V
18+ 0	6.6887	4.48	Q			V
18+ 5	6.7185	4.33	Q			V
18+10	6.7460	3.99	Q			V
18+15	6.7716	3.73	Q			V
18+20	6.7965	3.61	Q			V
18+25	6.8208	3.52	Q			V
18+30	6.8445	3.45	Q			V
18+35	6.8678	3.38	Q			V
18+40	6.8907	3.32	Q			V
18+45	6.9131	3.26	Q			V
18+50	6.9351	3.20	Q			V
18+55	6.9568	3.14	Q			V
19+ 0	6.9781	3.09	Q			V
19+ 5	6.9990	3.04	Q			V
19+10	7.0196	2.99	Q			V
19+15	7.0399	2.95	Q			V
19+20	7.0599	2.90	Q			V
19+25	7.0796	2.86	Q			V
19+30	7.0990	2.82	Q			V
19+35	7.1182	2.78	Q			V
19+40	7.1371	2.74	Q			V
19+45	7.1557	2.71	Q			V
19+50	7.1741	2.67	Q			V
19+55	7.1923	2.64	Q			V
20+ 0	7.2102	2.60	Q			V
20+ 5	7.2279	2.57	Q			V
20+10	7.2455	2.54	Q			V
20+15	7.2628	2.51	Q			V
20+20	7.2799	2.49	Q			V
20+25	7.2968	2.46	Q			V
20+30	7.3135	2.43	Q			V
20+35	7.3301	2.40	Q			V
20+40	7.3465	2.38	Q			V
20+45	7.3627	2.35	Q			V
20+50	7.3788	2.33	Q			V
20+55	7.3947	2.31	Q			V
21+ 0	7.4104	2.29	Q			V
21+ 5	7.4260	2.26	Q			V
21+10	7.4414	2.24	Q			V
21+15	7.4567	2.22	Q			V
21+20	7.4719	2.20	Q			V
21+25	7.4869	2.18	Q			V
21+30	7.5018	2.16	Q			V
21+35	7.5165	2.14	Q			V
21+40	7.5312	2.12	Q			V
21+45	7.5457	2.11	Q			V
21+50	7.5601	2.09	Q			V
21+55	7.5743	2.07	Q			V
22+ 0	7.5885	2.05	Q			V
22+ 5	7.6025	2.04	Q			V
22+10	7.6165	2.02	Q			V
22+15	7.6303	2.01	Q			V

22+20	7.6440	1.99	|Q	|	|	|	V |
22+25	7.6576	1.98	|Q	|	|	|	V |
22+30	7.6711	1.96	|Q	|	|	|	V |
22+35	7.6845	1.95	|Q	|	|	|	V |
22+40	7.6978	1.93	|Q	|	|	|	V |
22+45	7.7111	1.92	|Q	|	|	|	V |
22+50	7.7242	1.91	|Q	|	|	|	V|
22+55	7.7372	1.89	|Q	|	|	|	V|
23+ 0	7.7502	1.88	|Q	|	|	|	V|
23+ 5	7.7630	1.87	|Q	|	|	|	V|
23+10	7.7758	1.85	|Q	|	|	|	V|
23+15	7.7885	1.84	|Q	|	|	|	V|
23+20	7.8011	1.83	|Q	|	|	|	V|
23+25	7.8136	1.82	|Q	|	|	|	V|
23+30	7.8260	1.81	|Q	|	|	|	V|
23+35	7.8384	1.79	|Q	|	|	|	V|
23+40	7.8507	1.78	|Q	|	|	|	V|
23+45	7.8629	1.77	|Q	|	|	|	V|
23+50	7.8750	1.76	|Q	|	|	|	V|
23+55	7.8871	1.75	|Q	|	|	|	V|
24+ 0	7.8991	1.74	Q	|	|	|	V|

U n i t H y d r o g r a p h A n a l y s i s

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Study date 01/22/23

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San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6277

JOB NO 2022-318
11115 HEMLOCK AVENUE
25 YEAR, UNIT HYDROGRAPH
POST-CONDITION, AREA B

Storm Event Year = 25

Antecedent Moisture Condition = 2

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 25		
12.94	1	1.02
Rainfall data for year 25		
12.94	6	2.49
Rainfall data for year 25		
12.94	24	4.57

++

******** Area-averaged max loss rate, Fm ********

SCS curve No.(AMCII)	SCS curve NO.(AMC 2)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
32.0	32.0	12.94	1.000	0.978	0.090	0.088

Area-averaged adjusted loss rate Fm (In/Hr) = 0.088

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
1.16	0.090	32.0	32.0	21.25	0.001
11.78	0.910	98.0	98.0	0.20	0.948

Area-averaged catchment yield fraction, Y = 0.863
Area-averaged low loss fraction, Yb = 0.137
User entry of time of concentration = 0.135 (hours)
++
Watershed area = 12.94(Ac.)
Catchment Lag time = 0.108 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 77.0084
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.088(In/Hr)
Average low loss rate fraction (Yb) = 0.137 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.378(In)
Computed peak 30-minute rainfall = 0.773(In)
Specified peak 1-hour rainfall = 1.020(In)
Computed peak 3-hour rainfall = 1.763(In)
Specified peak 6-hour rainfall = 2.490(In)
Specified peak 24-hour rainfall = 4.570(In)

Rainfall depth area reduction factors:
Using a total area of 12.94(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.377(In)
30-minute factor = 0.999 Adjusted rainfall = 0.773(In)
1-hour factor = 0.999 Adjusted rainfall = 1.019(In)
3-hour factor = 1.000 Adjusted rainfall = 1.763(In)
6-hour factor = 1.000 Adjusted rainfall = 2.490(In)
24-hour factor = 1.000 Adjusted rainfall = 4.570(In)

U n i t H y d r o g r a p h
++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
	(K = 156.49 (CFS))	
1	10.522	16.466
2	60.817	78.709
3	92.871	50.161
4	98.633	9.019
5	100.000	2.139

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3773	0.3773
2	0.4978	0.1205
3	0.5855	0.0877
4	0.6569	0.0714
5	0.7182	0.0613
6	0.7725	0.0543
7	0.8217	0.0491
8	0.8668	0.0451
9	0.9086	0.0418

10	0.9477	0.0391
11	0.9845	0.0368
12	1.0194	0.0349
13	1.0609	0.0415
14	1.1008	0.0399
15	1.1393	0.0385
16	1.1766	0.0373
17	1.2127	0.0361
18	1.2478	0.0351
19	1.2819	0.0341
20	1.3151	0.0332
21	1.3474	0.0324
22	1.3791	0.0316
23	1.4100	0.0309
24	1.4402	0.0302
25	1.4698	0.0296
26	1.4988	0.0290
27	1.5273	0.0285
28	1.5553	0.0279
29	1.5827	0.0275
30	1.6097	0.0270
31	1.6362	0.0265
32	1.6623	0.0261
33	1.6880	0.0257
34	1.7133	0.0253
35	1.7383	0.0249
36	1.7629	0.0246
37	1.7871	0.0242
38	1.8110	0.0239
39	1.8346	0.0236
40	1.8579	0.0233
41	1.8809	0.0230
42	1.9036	0.0227
43	1.9260	0.0224
44	1.9482	0.0222
45	1.9701	0.0219
46	1.9918	0.0217
47	2.0133	0.0215
48	2.0345	0.0212
49	2.0555	0.0210
50	2.0763	0.0208
51	2.0969	0.0206
52	2.1173	0.0204
53	2.1375	0.0202
54	2.1575	0.0200
55	2.1773	0.0198
56	2.1969	0.0196
57	2.2164	0.0195
58	2.2356	0.0193
59	2.2548	0.0191
60	2.2737	0.0190
61	2.2925	0.0188
62	2.3112	0.0186
63	2.3297	0.0185
64	2.3480	0.0183
65	2.3662	0.0182
66	2.3843	0.0181
67	2.4022	0.0179
68	2.4200	0.0178
69	2.4377	0.0177
70	2.4552	0.0175

71	2.4726	0.0174
72	2.4899	0.0173
73	2.5050	0.0151
74	2.5200	0.0150
75	2.5348	0.0149
76	2.5496	0.0147
77	2.5642	0.0146
78	2.5787	0.0145
79	2.5932	0.0144
80	2.6075	0.0143
81	2.6217	0.0142
82	2.6359	0.0141
83	2.6499	0.0140
84	2.6638	0.0139
85	2.6777	0.0138
86	2.6914	0.0138
87	2.7051	0.0137
88	2.7187	0.0136
89	2.7322	0.0135
90	2.7456	0.0134
91	2.7589	0.0133
92	2.7721	0.0132
93	2.7853	0.0132
94	2.7984	0.0131
95	2.8114	0.0130
96	2.8243	0.0129
97	2.8371	0.0128
98	2.8499	0.0128
99	2.8626	0.0127
100	2.8753	0.0126
101	2.8878	0.0126
102	2.9003	0.0125
103	2.9127	0.0124
104	2.9251	0.0124
105	2.9374	0.0123
106	2.9496	0.0122
107	2.9617	0.0122
108	2.9738	0.0121
109	2.9859	0.0120
110	2.9978	0.0120
111	3.0097	0.0119
112	3.0216	0.0118
113	3.0334	0.0118
114	3.0451	0.0117
115	3.0568	0.0117
116	3.0684	0.0116
117	3.0800	0.0116
118	3.0915	0.0115
119	3.1029	0.0114
120	3.1143	0.0114
121	3.1256	0.0113
122	3.1369	0.0113
123	3.1482	0.0112
124	3.1594	0.0112
125	3.1705	0.0111
126	3.1816	0.0111
127	3.1926	0.0110
128	3.2036	0.0110
129	3.2145	0.0109
130	3.2254	0.0109
131	3.2363	0.0108

132	3.2471	0.0108
133	3.2578	0.0108
134	3.2685	0.0107
135	3.2792	0.0107
136	3.2898	0.0106
137	3.3004	0.0106
138	3.3109	0.0105
139	3.3214	0.0105
140	3.3319	0.0104
141	3.3423	0.0104
142	3.3526	0.0104
143	3.3629	0.0103
144	3.3732	0.0103
145	3.3835	0.0102
146	3.3937	0.0102
147	3.4038	0.0102
148	3.4140	0.0101
149	3.4240	0.0101
150	3.4341	0.0100
151	3.4441	0.0100
152	3.4541	0.0100
153	3.4640	0.0099
154	3.4739	0.0099
155	3.4838	0.0099
156	3.4936	0.0098
157	3.5034	0.0098
158	3.5131	0.0098
159	3.5229	0.0097
160	3.5326	0.0097
161	3.5422	0.0097
162	3.5518	0.0096
163	3.5614	0.0096
164	3.5710	0.0096
165	3.5805	0.0095
166	3.5900	0.0095
167	3.5994	0.0095
168	3.6089	0.0094
169	3.6183	0.0094
170	3.6276	0.0094
171	3.6370	0.0093
172	3.6463	0.0093
173	3.6555	0.0093
174	3.6648	0.0092
175	3.6740	0.0092
176	3.6832	0.0092
177	3.6923	0.0092
178	3.7014	0.0091
179	3.7105	0.0091
180	3.7196	0.0091
181	3.7286	0.0090
182	3.7376	0.0090
183	3.7466	0.0090
184	3.7556	0.0090
185	3.7645	0.0089
186	3.7734	0.0089
187	3.7823	0.0089
188	3.7911	0.0088
189	3.8000	0.0088
190	3.8087	0.0088
191	3.8175	0.0088
192	3.8263	0.0087

193	3.8350	0.0087
194	3.8437	0.0087
195	3.8523	0.0087
196	3.8610	0.0086
197	3.8696	0.0086
198	3.8782	0.0086
199	3.8867	0.0086
200	3.8953	0.0085
201	3.9038	0.0085
202	3.9123	0.0085
203	3.9208	0.0085
204	3.9292	0.0084
205	3.9377	0.0084
206	3.9461	0.0084
207	3.9544	0.0084
208	3.9628	0.0084
209	3.9711	0.0083
210	3.9794	0.0083
211	3.9877	0.0083
212	3.9960	0.0083
213	4.0042	0.0082
214	4.0125	0.0082
215	4.0207	0.0082
216	4.0288	0.0082
217	4.0370	0.0082
218	4.0451	0.0081
219	4.0533	0.0081
220	4.0614	0.0081
221	4.0694	0.0081
222	4.0775	0.0081
223	4.0855	0.0080
224	4.0935	0.0080
225	4.1015	0.0080
226	4.1095	0.0080
227	4.1175	0.0080
228	4.1254	0.0079
229	4.1333	0.0079
230	4.1412	0.0079
231	4.1491	0.0079
232	4.1570	0.0079
233	4.1648	0.0078
234	4.1726	0.0078
235	4.1804	0.0078
236	4.1882	0.0078
237	4.1960	0.0078
238	4.2037	0.0077
239	4.2114	0.0077
240	4.2191	0.0077
241	4.2268	0.0077
242	4.2345	0.0077
243	4.2422	0.0077
244	4.2498	0.0076
245	4.2574	0.0076
246	4.2650	0.0076
247	4.2726	0.0076
248	4.2802	0.0076
249	4.2877	0.0076
250	4.2953	0.0075
251	4.3028	0.0075
252	4.3103	0.0075
253	4.3178	0.0075

254	4.3252	0.0075
255	4.3327	0.0075
256	4.3401	0.0074
257	4.3475	0.0074
258	4.3549	0.0074
259	4.3623	0.0074
260	4.3697	0.0074
261	4.3771	0.0074
262	4.3844	0.0073
263	4.3917	0.0073
264	4.3990	0.0073
265	4.4063	0.0073
266	4.4136	0.0073
267	4.4209	0.0073
268	4.4281	0.0072
269	4.4353	0.0072
270	4.4425	0.0072
271	4.4497	0.0072
272	4.4569	0.0072
273	4.4641	0.0072
274	4.4713	0.0072
275	4.4784	0.0071
276	4.4855	0.0071
277	4.4926	0.0071
278	4.4997	0.0071
279	4.5068	0.0071
280	4.5139	0.0071
281	4.5209	0.0071
282	4.5280	0.0070
283	4.5350	0.0070
284	4.5420	0.0070
285	4.5490	0.0070
286	4.5560	0.0070
287	4.5630	0.0070
288	4.5699	0.0070

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0070	0.0010	0.0060
2	0.0070	0.0010	0.0060
3	0.0070	0.0010	0.0060
4	0.0070	0.0010	0.0061
5	0.0070	0.0010	0.0061
6	0.0071	0.0010	0.0061
7	0.0071	0.0010	0.0061
8	0.0071	0.0010	0.0061
9	0.0071	0.0010	0.0062
10	0.0071	0.0010	0.0062
11	0.0072	0.0010	0.0062
12	0.0072	0.0010	0.0062
13	0.0072	0.0010	0.0062
14	0.0072	0.0010	0.0062
15	0.0073	0.0010	0.0063
16	0.0073	0.0010	0.0063
17	0.0073	0.0010	0.0063
18	0.0073	0.0010	0.0063
19	0.0074	0.0010	0.0063
20	0.0074	0.0010	0.0064
21	0.0074	0.0010	0.0064

22	0.0074	0.0010	0.0064
23	0.0075	0.0010	0.0064
24	0.0075	0.0010	0.0064
25	0.0075	0.0010	0.0065
26	0.0075	0.0010	0.0065
27	0.0076	0.0010	0.0065
28	0.0076	0.0010	0.0065
29	0.0076	0.0010	0.0066
30	0.0076	0.0010	0.0066
31	0.0077	0.0010	0.0066
32	0.0077	0.0011	0.0066
33	0.0077	0.0011	0.0067
34	0.0077	0.0011	0.0067
35	0.0078	0.0011	0.0067
36	0.0078	0.0011	0.0067
37	0.0078	0.0011	0.0067
38	0.0078	0.0011	0.0068
39	0.0079	0.0011	0.0068
40	0.0079	0.0011	0.0068
41	0.0079	0.0011	0.0068
42	0.0080	0.0011	0.0069
43	0.0080	0.0011	0.0069
44	0.0080	0.0011	0.0069
45	0.0081	0.0011	0.0070
46	0.0081	0.0011	0.0070
47	0.0081	0.0011	0.0070
48	0.0081	0.0011	0.0070
49	0.0082	0.0011	0.0071
50	0.0082	0.0011	0.0071
51	0.0082	0.0011	0.0071
52	0.0083	0.0011	0.0071
53	0.0083	0.0011	0.0072
54	0.0083	0.0011	0.0072
55	0.0084	0.0011	0.0072
56	0.0084	0.0012	0.0073
57	0.0084	0.0012	0.0073
58	0.0085	0.0012	0.0073
59	0.0085	0.0012	0.0074
60	0.0085	0.0012	0.0074
61	0.0086	0.0012	0.0074
62	0.0086	0.0012	0.0074
63	0.0087	0.0012	0.0075
64	0.0087	0.0012	0.0075
65	0.0087	0.0012	0.0075
66	0.0088	0.0012	0.0076
67	0.0088	0.0012	0.0076
68	0.0088	0.0012	0.0076
69	0.0089	0.0012	0.0077
70	0.0089	0.0012	0.0077
71	0.0090	0.0012	0.0078
72	0.0090	0.0012	0.0078
73	0.0091	0.0012	0.0078
74	0.0091	0.0012	0.0078
75	0.0092	0.0013	0.0079
76	0.0092	0.0013	0.0079
77	0.0092	0.0013	0.0080
78	0.0093	0.0013	0.0080
79	0.0093	0.0013	0.0081
80	0.0094	0.0013	0.0081
81	0.0094	0.0013	0.0081
82	0.0095	0.0013	0.0082

83	0.0095	0.0013	0.0082
84	0.0096	0.0013	0.0082
85	0.0096	0.0013	0.0083
86	0.0097	0.0013	0.0083
87	0.0097	0.0013	0.0084
88	0.0098	0.0013	0.0084
89	0.0098	0.0013	0.0085
90	0.0099	0.0014	0.0085
91	0.0099	0.0014	0.0086
92	0.0100	0.0014	0.0086
93	0.0100	0.0014	0.0087
94	0.0101	0.0014	0.0087
95	0.0102	0.0014	0.0088
96	0.0102	0.0014	0.0088
97	0.0103	0.0014	0.0089
98	0.0103	0.0014	0.0089
99	0.0104	0.0014	0.0090
100	0.0104	0.0014	0.0090
101	0.0105	0.0014	0.0091
102	0.0106	0.0014	0.0091
103	0.0107	0.0015	0.0092
104	0.0107	0.0015	0.0092
105	0.0108	0.0015	0.0093
106	0.0108	0.0015	0.0094
107	0.0109	0.0015	0.0094
108	0.0110	0.0015	0.0095
109	0.0111	0.0015	0.0096
110	0.0111	0.0015	0.0096
111	0.0112	0.0015	0.0097
112	0.0113	0.0015	0.0097
113	0.0114	0.0016	0.0098
114	0.0114	0.0016	0.0099
115	0.0116	0.0016	0.0100
116	0.0116	0.0016	0.0100
117	0.0117	0.0016	0.0101
118	0.0118	0.0016	0.0102
119	0.0119	0.0016	0.0103
120	0.0120	0.0016	0.0103
121	0.0121	0.0017	0.0104
122	0.0122	0.0017	0.0105
123	0.0123	0.0017	0.0106
124	0.0124	0.0017	0.0107
125	0.0125	0.0017	0.0108
126	0.0126	0.0017	0.0108
127	0.0127	0.0017	0.0110
128	0.0128	0.0017	0.0110
129	0.0129	0.0018	0.0112
130	0.0130	0.0018	0.0112
131	0.0132	0.0018	0.0114
132	0.0132	0.0018	0.0114
133	0.0134	0.0018	0.0116
134	0.0135	0.0018	0.0116
135	0.0137	0.0019	0.0118
136	0.0138	0.0019	0.0119
137	0.0139	0.0019	0.0120
138	0.0140	0.0019	0.0121
139	0.0142	0.0019	0.0123
140	0.0143	0.0020	0.0124
141	0.0145	0.0020	0.0125
142	0.0146	0.0020	0.0126
143	0.0149	0.0020	0.0128

144	0.0150	0.0021	0.0129
145	0.0173	0.0024	0.0149
146	0.0174	0.0024	0.0150
147	0.0177	0.0024	0.0152
148	0.0178	0.0024	0.0154
149	0.0181	0.0025	0.0156
150	0.0182	0.0025	0.0157
151	0.0185	0.0025	0.0160
152	0.0186	0.0026	0.0161
153	0.0190	0.0026	0.0164
154	0.0191	0.0026	0.0165
155	0.0195	0.0027	0.0168
156	0.0196	0.0027	0.0169
157	0.0200	0.0027	0.0173
158	0.0202	0.0028	0.0174
159	0.0206	0.0028	0.0178
160	0.0208	0.0028	0.0179
161	0.0212	0.0029	0.0183
162	0.0215	0.0029	0.0185
163	0.0219	0.0030	0.0189
164	0.0222	0.0030	0.0191
165	0.0227	0.0031	0.0196
166	0.0230	0.0031	0.0198
167	0.0236	0.0032	0.0204
168	0.0239	0.0033	0.0206
169	0.0246	0.0034	0.0212
170	0.0249	0.0034	0.0215
171	0.0257	0.0035	0.0222
172	0.0261	0.0036	0.0225
173	0.0270	0.0037	0.0233
174	0.0275	0.0038	0.0237
175	0.0285	0.0039	0.0246
176	0.0290	0.0040	0.0251
177	0.0302	0.0041	0.0261
178	0.0309	0.0042	0.0267
179	0.0324	0.0044	0.0279
180	0.0332	0.0045	0.0287
181	0.0351	0.0048	0.0303
182	0.0361	0.0049	0.0312
183	0.0385	0.0053	0.0333
184	0.0399	0.0055	0.0345
185	0.0349	0.0048	0.0301
186	0.0368	0.0050	0.0318
187	0.0418	0.0057	0.0361
188	0.0451	0.0062	0.0389
189	0.0543	0.0073	0.0470
190	0.0613	0.0073	0.0540
191	0.0877	0.0073	0.0803
192	0.1205	0.0073	0.1132
193	0.3773	0.0073	0.3699
194	0.0714	0.0073	0.0641
195	0.0491	0.0067	0.0424
196	0.0391	0.0054	0.0338
197	0.0415	0.0057	0.0358
198	0.0373	0.0051	0.0322
199	0.0341	0.0047	0.0294
200	0.0316	0.0043	0.0273
201	0.0296	0.0041	0.0256
202	0.0279	0.0038	0.0241
203	0.0265	0.0036	0.0229
204	0.0253	0.0035	0.0218

205	0.0242	0.0033	0.0209
206	0.0233	0.0032	0.0201
207	0.0224	0.0031	0.0194
208	0.0217	0.0030	0.0187
209	0.0210	0.0029	0.0181
210	0.0204	0.0028	0.0176
211	0.0198	0.0027	0.0171
212	0.0193	0.0026	0.0166
213	0.0188	0.0026	0.0162
214	0.0183	0.0025	0.0158
215	0.0179	0.0025	0.0155
216	0.0175	0.0024	0.0151
217	0.0151	0.0021	0.0130
218	0.0147	0.0020	0.0127
219	0.0144	0.0020	0.0125
220	0.0141	0.0019	0.0122
221	0.0138	0.0019	0.0119
222	0.0136	0.0019	0.0117
223	0.0133	0.0018	0.0115
224	0.0131	0.0018	0.0113
225	0.0128	0.0018	0.0111
226	0.0126	0.0017	0.0109
227	0.0124	0.0017	0.0107
228	0.0122	0.0017	0.0105
229	0.0120	0.0016	0.0104
230	0.0118	0.0016	0.0102
231	0.0117	0.0016	0.0101
232	0.0115	0.0016	0.0099
233	0.0113	0.0016	0.0098
234	0.0112	0.0015	0.0097
235	0.0110	0.0015	0.0095
236	0.0109	0.0015	0.0094
237	0.0108	0.0015	0.0093
238	0.0106	0.0015	0.0092
239	0.0105	0.0014	0.0091
240	0.0104	0.0014	0.0089
241	0.0102	0.0014	0.0088
242	0.0101	0.0014	0.0087
243	0.0100	0.0014	0.0086
244	0.0099	0.0014	0.0085
245	0.0098	0.0013	0.0085
246	0.0097	0.0013	0.0084
247	0.0096	0.0013	0.0083
248	0.0095	0.0013	0.0082
249	0.0094	0.0013	0.0081
250	0.0093	0.0013	0.0080
251	0.0092	0.0013	0.0079
252	0.0091	0.0012	0.0079
253	0.0090	0.0012	0.0078
254	0.0090	0.0012	0.0077
255	0.0089	0.0012	0.0077
256	0.0088	0.0012	0.0076
257	0.0087	0.0012	0.0075
258	0.0086	0.0012	0.0075
259	0.0086	0.0012	0.0074
260	0.0085	0.0012	0.0073
261	0.0084	0.0012	0.0073
262	0.0084	0.0011	0.0072
263	0.0083	0.0011	0.0072
264	0.0082	0.0011	0.0071
265	0.0082	0.0011	0.0070

266	0.0081	0.0011	0.0070
267	0.0080	0.0011	0.0069
268	0.0080	0.0011	0.0069
269	0.0079	0.0011	0.0068
270	0.0079	0.0011	0.0068
271	0.0078	0.0011	0.0067
272	0.0077	0.0011	0.0067
273	0.0077	0.0011	0.0066
274	0.0076	0.0010	0.0066
275	0.0076	0.0010	0.0065
276	0.0075	0.0010	0.0065
277	0.0075	0.0010	0.0065
278	0.0074	0.0010	0.0064
279	0.0074	0.0010	0.0064
280	0.0073	0.0010	0.0063
281	0.0073	0.0010	0.0063
282	0.0072	0.0010	0.0063
283	0.0072	0.0010	0.0062
284	0.0072	0.0010	0.0062
285	0.0071	0.0010	0.0061
286	0.0071	0.0010	0.0061
287	0.0070	0.0010	0.0061
288	0.0070	0.0010	0.0060

Total soil rain loss = 0.56(In)
Total effective rainfall = 4.01(In)
Peak flow rate in flood hydrograph = 36.69(CFS)

++

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0007	0.10	Q				
0+10	0.0046	0.57	Q				
0+15	0.0106	0.87	Q				
0+20	0.0171	0.93	Q				
0+25	0.0236	0.95	Q				
0+30	0.0301	0.95	Q				
0+35	0.0367	0.95	Q				
0+40	0.0432	0.96	Q				
0+45	0.0498	0.96	Q				
0+50	0.0565	0.96	Q				
0+55	0.0631	0.96	Q				
1+ 0	0.0698	0.97	Q				
1+ 5	0.0764	0.97	Q				
1+10	0.0831	0.97	Q				
1+15	0.0899	0.98	Q				
1+20	0.0966	0.98	Q				
1+25	0.1034	0.98	Q				
1+30	0.1102	0.99	QV				
1+35	0.1170	0.99	QV				
1+40	0.1238	0.99	QV				
1+45	0.1306	0.99	QV				
1+50	0.1375	1.00	QV				
1+55	0.1444	1.00	|Q				

2+ 0	0.1513	1.00	Q				
2+ 5	0.1583	1.01	Q				
2+10	0.1652	1.01	Q				
2+15	0.1722	1.01	Q				
2+20	0.1792	1.02	Q				
2+25	0.1863	1.02	Q				
2+30	0.1933	1.03	Q				
2+35	0.2004	1.03	Q				
2+40	0.2075	1.03	Q				
2+45	0.2147	1.04	Q				
2+50	0.2218	1.04	QV				
2+55	0.2290	1.04	QV				
3+ 0	0.2362	1.05	QV				
3+ 5	0.2434	1.05	QV				
3+10	0.2507	1.05	QV				
3+15	0.2580	1.06	QV				
3+20	0.2653	1.06	QV				
3+25	0.2726	1.07	QV				
3+30	0.2800	1.07	QV				
3+35	0.2874	1.07	QV				
3+40	0.2948	1.08	QV				
3+45	0.3023	1.08	QV				
3+50	0.3098	1.09	QV				
3+55	0.3173	1.09	QV				
4+ 0	0.3248	1.09	Q V				
4+ 5	0.3324	1.10	Q V				
4+10	0.3400	1.10	Q V				
4+15	0.3476	1.11	Q V				
4+20	0.3552	1.11	Q V				
4+25	0.3629	1.12	Q V				
4+30	0.3706	1.12	Q V				
4+35	0.3784	1.12	Q V				
4+40	0.3862	1.13	Q V				
4+45	0.3940	1.13	Q V				
4+50	0.4018	1.14	Q V				
4+55	0.4097	1.14	Q V				
5+ 0	0.4176	1.15	Q V				
5+ 5	0.4255	1.15	Q V				
5+10	0.4335	1.16	Q V				
5+15	0.4415	1.16	Q V				
5+20	0.4496	1.17	Q V				
5+25	0.4576	1.17	Q V				
5+30	0.4657	1.18	Q V				
5+35	0.4739	1.18	Q V				
5+40	0.4821	1.19	Q V				
5+45	0.4903	1.19	Q V				
5+50	0.4986	1.20	Q V				
5+55	0.5069	1.20	Q V				
6+ 0	0.5152	1.21	Q V				
6+ 5	0.5236	1.22	Q V				
6+10	0.5320	1.22	Q V				
6+15	0.5404	1.23	Q V				
6+20	0.5489	1.23	Q V				
6+25	0.5575	1.24	Q V				
6+30	0.5660	1.25	Q V				
6+35	0.5746	1.25	Q V				
6+40	0.5833	1.26	Q V				
6+45	0.5920	1.26	Q V				
6+50	0.6007	1.27	Q V				
6+55	0.6095	1.28	Q V				
7+ 0	0.6184	1.28	Q V				

```
 7+ 5       0.6272      1.29  |Q   V    |         |         |         |
 7+10       0.6362      1.30  |Q   V    |         |         |         |
 7+15       0.6451      1.30  |Q   V    |         |         |         |
 7+20       0.6542      1.31  |Q    V   |         |         |         |
 7+25       0.6632      1.32  |Q    V   |         |         |         |
 7+30       0.6723      1.32  |Q    V   |         |         |         |
 7+35       0.6815      1.33  |Q    V   |         |         |         |
 7+40       0.6907      1.34  |Q    V   |         |         |         |
 7+45       0.7000      1.35  |Q    V   |         |         |         |
 7+50       0.7093      1.35  |Q    V   |         |         |         |
 7+55       0.7187      1.36  |Q    V   |         |         |         |
 8+ 0       0.7281      1.37  |Q    V   |         |         |         |
 8+ 5       0.7376      1.38  |Q    V   |         |         |         |
 8+10       0.7471      1.38  |Q    V   |         |         |         |
 8+15       0.7567      1.39  |Q     V  |         |         |         |
 8+20       0.7663      1.40  |Q     V  |         |         |         |
 8+25       0.7761      1.41  |Q     V  |         |         |         |
 8+30       0.7858      1.42  |Q     V  |         |         |         |
 8+35       0.7956      1.43  |Q     V  |         |         |         |
 8+40       0.8055      1.44  |Q     V  |         |         |         |
 8+45       0.8155      1.44  |Q     V  |         |         |         |
 8+50       0.8255      1.45  |Q     V  |         |         |         |
 8+55       0.8356      1.46  |Q     V  |         |         |         |
 9+ 0       0.8457      1.47  |Q     V  |         |         |         |
 9+ 5       0.8559      1.48  |Q     V  |         |         |         |
 9+10       0.8662      1.49  |Q      V |         |         |         |
 9+15       0.8765      1.50  |Q      V |         |         |         |
 9+20       0.8869      1.51  |Q      V |         |         |         |
 9+25       0.8974      1.52  |Q      V |         |         |         |
 9+30       0.9080      1.53  |Q      V |         |         |         |
 9+35       0.9186      1.54  |Q      V |         |         |         |
 9+40       0.9293      1.56  |Q      V |         |         |         |
 9+45       0.9401      1.57  |Q      V |         |         |         |
 9+50       0.9510      1.58  |Q      V |         |         |         |
 9+55       0.9619      1.59  |Q      V |         |         |         |
10+ 0       0.9730      1.60  |Q       V|         |         |         |
10+ 5       0.9841      1.61  |Q       V|         |         |         |
10+10       0.9953      1.63  |Q       V|         |         |         |
10+15       1.0066      1.64  |Q       V|         |         |         |
10+20       1.0180      1.65  |Q       V|         |         |         |
10+25       1.0294      1.67  |Q       V|         |         |         |
10+30       1.0410      1.68  |Q       V|         |         |         |
10+35       1.0527      1.69  |Q       V|         |         |         |
10+40       1.0644      1.71  |Q       V|         |         |         |
10+45       1.0763      1.72  |Q       V|         |         |         |
10+50       1.0883      1.74  |Q        V         |         |         |
10+55       1.1003      1.75  |Q        V         |         |         |
11+ 0       1.1125      1.77  |Q        V         |         |         |
11+ 5       1.1248      1.78  |Q        V         |         |         |
11+10       1.1372      1.80  |Q        V         |         |         |
11+15       1.1497      1.82  |Q        V         |         |         |
11+20       1.1624      1.84  |Q        V         |         |         |
11+25       1.1752      1.85  |Q        V         |         |         |
11+30       1.1881      1.87  |Q        |V        |         |         |
11+35       1.2011      1.89  |Q        |V        |         |         |
11+40       1.2142      1.91  |Q        |V        |         |         |
11+45       1.2275      1.93  |Q        |V        |         |         |
11+50       1.2410      1.95  |Q        |V        |         |         |
11+55       1.2546      1.97  |Q        |V        |         |         |
12+ 0       1.2683      2.00  |Q        |V        |         |         |
12+ 5       1.2824      2.05  | Q       |V        |         |         |
```

12+10	1.2977	2.21	Q	V			
12+15	1.3137	2.33	Q	V			
12+20	1.3300	2.37	Q	V			
12+25	1.3465	2.40	Q	V			
12+30	1.3632	2.43	Q	V			
12+35	1.3801	2.45	Q	V			
12+40	1.3972	2.48	Q	V			
12+45	1.4145	2.51	Q	V			
12+50	1.4320	2.54	Q	V			
12+55	1.4498	2.58	Q	V			
13+ 0	1.4677	2.61	Q	V			
13+ 5	1.4860	2.64	Q	V			
13+10	1.5044	2.68	Q	V			
13+15	1.5231	2.72	Q	V			
13+20	1.5421	2.76	Q	V			
13+25	1.5614	2.80	Q	V			
13+30	1.5810	2.84	Q	V			
13+35	1.6009	2.89	Q	V			
13+40	1.6211	2.94	Q	V			
13+45	1.6417	2.99	Q	V			
13+50	1.6626	3.04	Q	V			
13+55	1.6839	3.09	Q	V			
14+ 0	1.7057	3.16	Q	V			
14+ 5	1.7278	3.22	Q	V			
14+10	1.7504	3.29	Q	V			
14+15	1.7735	3.35	Q	V			
14+20	1.7972	3.43	Q	V			
14+25	1.8213	3.51	Q	V			
14+30	1.8461	3.60	Q	V			
14+35	1.8715	3.69	Q	V			
14+40	1.8977	3.79	Q	V			
14+45	1.9245	3.90	Q	V			
14+50	1.9522	4.02	Q	V			
14+55	1.9808	4.15	Q	V			
15+ 0	2.0104	4.30	Q	V			
15+ 5	2.0410	4.45	Q	V			
15+10	2.0730	4.64	Q	V			
15+15	2.1063	4.84	Q	V			
15+20	2.1413	5.08	Q	V			
15+25	2.1773	5.22	Q	V			
15+30	2.2116	4.99	Q	V			
15+35	2.2460	4.99	Q	V			
15+40	2.2833	5.42	Q	V			
15+45	2.3246	6.00	Q	V			
15+50	2.3724	6.93	Q	V			
15+55	2.4299	8.36	Q	V			
16+ 0	2.5084	11.40	Q	V			
16+ 5	2.6436	19.62	Q	V			
16+10	2.8963	36.69	Q	V		Q	
16+15	3.0718	25.49	Q	V			
16+20	3.1454	10.69	Q	V			
16+25	3.1918	6.74	Q	V			
16+30	3.2301	5.56	Q	V			
16+35	3.2660	5.21	Q	V			
16+40	3.2989	4.77	Q	V			
16+45	3.3293	4.41	Q	V			
16+50	3.3576	4.11	Q	V			
16+55	3.3842	3.87	Q	V			
17+ 0	3.4094	3.66	Q	V			
17+ 5	3.4334	3.48	Q	V			
17+10	3.4564	3.33	Q	V			

17+15	3.4784	3.20	Q			V
17+20	3.4996	3.08	Q			V
17+25	3.5200	2.97	Q			V
17+30	3.5398	2.87	Q			V
17+35	3.5590	2.79	Q			V
17+40	3.5776	2.71	Q			V
17+45	3.5958	2.63	Q			V
17+50	3.6134	2.56	Q			V
17+55	3.6306	2.50	Q			V
18+ 0	3.6475	2.44	Q			V
18+ 5	3.6637	2.36	Q			V
18+10	3.6787	2.17	Q			V
18+15	3.6926	2.03	Q			V
18+20	3.7062	1.97	Q			V
18+25	3.7194	1.92	Q			V
18+30	3.7324	1.88	Q			V
18+35	3.7451	1.85	Q			V
18+40	3.7576	1.81	Q			V
18+45	3.7699	1.78	Q			V
18+50	3.7819	1.75	Q			V
18+55	3.7937	1.72	Q			V
19+ 0	3.8054	1.69	Q			V
19+ 5	3.8168	1.66	Q			V
19+10	3.8281	1.63	Q			V
19+15	3.8392	1.61	Q			V
19+20	3.8501	1.59	Q			V
19+25	3.8608	1.56	Q			V
19+30	3.8714	1.54	Q			V
19+35	3.8819	1.52	Q			V
19+40	3.8922	1.50	Q			V
19+45	3.9024	1.48	Q			V
19+50	3.9125	1.46	Q			V
19+55	3.9224	1.44	Q			V
20+ 0	3.9322	1.42	Q			V
20+ 5	3.9419	1.41	Q			V
20+10	3.9514	1.39	Q			V
20+15	3.9609	1.37	Q			V
20+20	3.9702	1.36	Q			V
20+25	3.9795	1.34	Q			V
20+30	3.9886	1.33	Q			V
20+35	3.9977	1.31	Q			V
20+40	4.0066	1.30	Q			V
20+45	4.0155	1.29	Q			V
20+50	4.0243	1.27	Q			V
20+55	4.0330	1.26	Q			V
21+ 0	4.0416	1.25	Q			V
21+ 5	4.0501	1.24	Q			V
21+10	4.0585	1.23	Q			V
21+15	4.0669	1.21	Q			V
21+20	4.0752	1.20	Q			V
21+25	4.0834	1.19	Q			V
21+30	4.0915	1.18	Q			V
21+35	4.0996	1.17	Q			V
21+40	4.1076	1.16	Q			V
21+45	4.1155	1.15	Q			V
21+50	4.1233	1.14	Q			V
21+55	4.1311	1.13	Q			V
22+ 0	4.1389	1.12	Q			V
22+ 5	4.1466	1.11	Q			V
22+10	4.1542	1.11	Q			V
22+15	4.1617	1.10	Q			V

```
22+20       4.1692      1.09  |Q        |         |         |       V |
22+25       4.1767      1.08  |Q        |         |         |       V |
22+30       4.1840      1.07  |Q        |         |         |       V |
22+35       4.1914      1.06  |Q        |         |         |       V |
22+40       4.1986      1.06  |Q        |         |         |       V |
22+45       4.2059      1.05  |Q        |         |         |       V |
22+50       4.2130      1.04  |Q        |         |         |        V|
22+55       4.2202      1.03  |Q        |         |         |        V|
23+ 0       4.2272      1.03  |Q        |         |         |        V|
23+ 5       4.2343      1.02  |Q        |         |         |        V|
23+10       4.2413      1.01  |Q        |         |         |        V|
23+15       4.2482      1.01  |Q        |         |         |        V|
23+20       4.2551      1.00  |Q        |         |         |        V|
23+25       4.2619      0.99  Q        |         |         |        V|
23+30       4.2687      0.99  Q        |         |         |        V|
23+35       4.2755      0.98  Q        |         |         |        V|
23+40       4.2822      0.97  Q        |         |         |        V|
23+45       4.2889      0.97  Q        |         |         |        V|
23+50       4.2955      0.96  Q        |         |         |        V|
23+55       4.3021      0.96  Q        |         |         |        V|
24+ 0       4.3086      0.95  Q        |         |         |        V|
```

APPENDIX C.8

UNIT HYDROGRAPH ANALYSIS

POST-DEVELOPMENT CONDITIONS – 100 YEAR

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2004, Version 7.0

Study date 01/22/23

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San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6277

JOB NO 2022-318
11115 HEMLOCK AVENUE
100-YEAR, UNIT HYDROGRAPH
POST-CONDITION, AREA A

Storm Event Year = 100

Antecedent Moisture Condition = 3

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 100		
24.47	1	1.33
Rainfall data for year 100		
24.47	6	3.11
Rainfall data for year 100		
24.47	24	5.69

++

******** Area-averaged max loss rate, Fm ********

SCS curve No.(AMCII)	SCS curve NO.(AMC 3)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
32.0	52.0	24.47	1.000	0.785	0.120	0.094

Area-averaged adjusted loss rate Fm (In/Hr) = 0.094

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
2.94	0.120	32.0	52.0	9.23	0.199
21.53	0.880	98.0	98.0	0.20	0.958

Area-averaged catchment yield fraction, Y = 0.867
Area-averaged low loss fraction, Yb = 0.133
User entry of time of concentration = 0.141 (hours)
++
Watershed area = 24.47(Ac.)
Catchment Lag time = 0.113 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 73.8247
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.094(In/Hr)
Average low loss rate fraction (Yb) = 0.133 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.492(In)
Computed peak 30-minute rainfall = 1.008(In)
Specified peak 1-hour rainfall = 1.330(In)
Computed peak 3-hour rainfall = 2.239(In)
Specified peak 6-hour rainfall = 3.110(In)
Specified peak 24-hour rainfall = 5.690(In)

Rainfall depth area reduction factors:
Using a total area of 24.47(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.492(In)
30-minute factor = 0.999 Adjusted rainfall = 1.007(In)
1-hour factor = 0.999 Adjusted rainfall = 1.328(In)
3-hour factor = 1.000 Adjusted rainfall = 2.239(In)
6-hour factor = 1.000 Adjusted rainfall = 3.110(In)
24-hour factor = 1.000 Adjusted rainfall = 5.690(In)

U n i t H y d r o g r a p h
++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
	(K = 295.93 (CFS))	
1	9.712	28.740
2	57.561	141.604
3	91.432	100.233
4	98.356	20.492
5	100.000	4.865

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.4917	0.4917
2	0.6488	0.1571
3	0.7630	0.1142
4	0.8561	0.0931
5	0.9360	0.0799
6	1.0068	0.0708
7	1.0708	0.0640
8	1.1296	0.0588
9	1.1841	0.0545

10	1.2350	0.0510
11	1.2830	0.0480
12	1.3285	0.0454
13	1.3800	0.0515
14	1.4294	0.0494
15	1.4770	0.0476
16	1.5230	0.0460
17	1.5675	0.0445
18	1.6106	0.0431
19	1.6525	0.0419
20	1.6933	0.0408
21	1.7330	0.0397
22	1.7717	0.0387
23	1.8095	0.0378
24	1.8465	0.0370
25	1.8826	0.0362
26	1.9180	0.0354
27	1.9527	0.0347
28	1.9867	0.0340
29	2.0201	0.0334
30	2.0529	0.0328
31	2.0851	0.0322
32	2.1168	0.0317
33	2.1480	0.0312
34	2.1787	0.0307
35	2.2089	0.0302
36	2.2386	0.0298
37	2.2679	0.0293
38	2.2968	0.0289
39	2.3252	0.0285
40	2.3533	0.0281
41	2.3810	0.0277
42	2.4084	0.0274
43	2.4354	0.0270
44	2.4621	0.0267
45	2.4885	0.0264
46	2.5146	0.0261
47	2.5403	0.0258
48	2.5658	0.0255
49	2.5910	0.0252
50	2.6160	0.0249
51	2.6407	0.0247
52	2.6651	0.0244
53	2.6893	0.0242
54	2.7132	0.0239
55	2.7369	0.0237
56	2.7604	0.0235
57	2.7837	0.0233
58	2.8067	0.0231
59	2.8296	0.0228
60	2.8522	0.0226
61	2.8746	0.0224
62	2.8969	0.0223
63	2.9190	0.0221
64	2.9408	0.0219
65	2.9625	0.0217
66	2.9841	0.0215
67	3.0054	0.0214
68	3.0266	0.0212
69	3.0476	0.0210
70	3.0685	0.0209

71	3.0892	0.0207
72	3.1098	0.0206
73	3.1285	0.0187
74	3.1471	0.0186
75	3.1656	0.0185
76	3.1839	0.0183
77	3.2021	0.0182
78	3.2202	0.0181
79	3.2381	0.0179
80	3.2559	0.0178
81	3.2735	0.0177
82	3.2911	0.0176
83	3.3085	0.0174
84	3.3258	0.0173
85	3.3430	0.0172
86	3.3601	0.0171
87	3.3771	0.0170
88	3.3940	0.0169
89	3.4107	0.0168
90	3.4274	0.0166
91	3.4439	0.0165
92	3.4603	0.0164
93	3.4767	0.0163
94	3.4929	0.0162
95	3.5091	0.0161
96	3.5251	0.0160
97	3.5411	0.0160
98	3.5569	0.0159
99	3.5727	0.0158
100	3.5884	0.0157
101	3.6040	0.0156
102	3.6195	0.0155
103	3.6349	0.0154
104	3.6503	0.0153
105	3.6655	0.0153
106	3.6807	0.0152
107	3.6958	0.0151
108	3.7108	0.0150
109	3.7257	0.0149
110	3.7406	0.0149
111	3.7554	0.0148
112	3.7701	0.0147
113	3.7847	0.0146
114	3.7993	0.0146
115	3.8137	0.0145
116	3.8282	0.0144
117	3.8425	0.0143
118	3.8568	0.0143
119	3.8710	0.0142
120	3.8851	0.0141
121	3.8992	0.0141
122	3.9132	0.0140
123	3.9272	0.0139
124	3.9411	0.0139
125	3.9549	0.0138
126	3.9686	0.0138
127	3.9823	0.0137
128	3.9960	0.0136
129	4.0095	0.0136
130	4.0231	0.0135
131	4.0365	0.0135

132	4.0499	0.0134
133	4.0633	0.0133
134	4.0765	0.0133
135	4.0898	0.0132
136	4.1029	0.0132
137	4.1161	0.0131
138	4.1291	0.0131
139	4.1421	0.0130
140	4.1551	0.0130
141	4.1680	0.0129
142	4.1809	0.0129
143	4.1937	0.0128
144	4.2064	0.0128
145	4.2191	0.0127
146	4.2318	0.0127
147	4.2444	0.0126
148	4.2570	0.0126
149	4.2695	0.0125
150	4.2819	0.0125
151	4.2943	0.0124
152	4.3067	0.0124
153	4.3190	0.0123
154	4.3313	0.0123
155	4.3436	0.0122
156	4.3557	0.0122
157	4.3679	0.0121
158	4.3800	0.0121
159	4.3920	0.0121
160	4.4041	0.0120
161	4.4160	0.0120
162	4.4280	0.0119
163	4.4399	0.0119
164	4.4517	0.0118
165	4.4635	0.0118
166	4.4753	0.0118
167	4.4870	0.0117
168	4.4987	0.0117
169	4.5104	0.0117
170	4.5220	0.0116
171	4.5335	0.0116
172	4.5451	0.0115
173	4.5566	0.0115
174	4.5680	0.0115
175	4.5795	0.0114
176	4.5908	0.0114
177	4.6022	0.0113
178	4.6135	0.0113
179	4.6248	0.0113
180	4.6360	0.0112
181	4.6472	0.0112
182	4.6584	0.0112
183	4.6695	0.0111
184	4.6806	0.0111
185	4.6917	0.0111
186	4.7027	0.0110
187	4.7137	0.0110
188	4.7247	0.0110
189	4.7356	0.0109
190	4.7466	0.0109
191	4.7574	0.0109
192	4.7683	0.0108

193	4.7791	0.0108
194	4.7898	0.0108
195	4.8006	0.0107
196	4.8113	0.0107
197	4.8220	0.0107
198	4.8326	0.0107
199	4.8433	0.0106
200	4.8538	0.0106
201	4.8644	0.0106
202	4.8749	0.0105
203	4.8854	0.0105
204	4.8959	0.0105
205	4.9064	0.0104
206	4.9168	0.0104
207	4.9272	0.0104
208	4.9375	0.0104
209	4.9479	0.0103
210	4.9582	0.0103
211	4.9684	0.0103
212	4.9787	0.0102
213	4.9889	0.0102
214	4.9991	0.0102
215	5.0093	0.0102
216	5.0194	0.0101
217	5.0295	0.0101
218	5.0396	0.0101
219	5.0497	0.0101
220	5.0597	0.0100
221	5.0697	0.0100
222	5.0797	0.0100
223	5.0897	0.0100
224	5.0996	0.0099
225	5.1095	0.0099
226	5.1194	0.0099
227	5.1292	0.0099
228	5.1391	0.0098
229	5.1489	0.0098
230	5.1587	0.0098
231	5.1684	0.0098
232	5.1782	0.0097
233	5.1879	0.0097
234	5.1976	0.0097
235	5.2072	0.0097
236	5.2169	0.0096
237	5.2265	0.0096
238	5.2361	0.0096
239	5.2457	0.0096
240	5.2552	0.0096
241	5.2648	0.0095
242	5.2743	0.0095
243	5.2838	0.0095
244	5.2932	0.0095
245	5.3027	0.0094
246	5.3121	0.0094
247	5.3215	0.0094
248	5.3309	0.0094
249	5.3402	0.0094
250	5.3496	0.0093
251	5.3589	0.0093
252	5.3682	0.0093
253	5.3774	0.0093

254	5.3867	0.0093
255	5.3959	0.0092
256	5.4051	0.0092
257	5.4143	0.0092
258	5.4235	0.0092
259	5.4327	0.0092
260	5.4418	0.0091
261	5.4509	0.0091
262	5.4600	0.0091
263	5.4691	0.0091
264	5.4781	0.0091
265	5.4871	0.0090
266	5.4962	0.0090
267	5.5052	0.0090
268	5.5141	0.0090
269	5.5231	0.0090
270	5.5320	0.0089
271	5.5409	0.0089
272	5.5498	0.0089
273	5.5587	0.0089
274	5.5676	0.0089
275	5.5764	0.0088
276	5.5853	0.0088
277	5.5941	0.0088
278	5.6029	0.0088
279	5.6116	0.0088
280	5.6204	0.0088
281	5.6291	0.0087
282	5.6379	0.0087
283	5.6466	0.0087
284	5.6553	0.0087
285	5.6639	0.0087
286	5.6726	0.0087
287	5.6812	0.0086
288	5.6898	0.0086

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0086	0.0011	0.0075
2	0.0086	0.0011	0.0075
3	0.0087	0.0012	0.0075
4	0.0087	0.0012	0.0075
5	0.0087	0.0012	0.0076
6	0.0087	0.0012	0.0076
7	0.0088	0.0012	0.0076
8	0.0088	0.0012	0.0076
9	0.0088	0.0012	0.0077
10	0.0088	0.0012	0.0077
11	0.0089	0.0012	0.0077
12	0.0089	0.0012	0.0077
13	0.0089	0.0012	0.0077
14	0.0090	0.0012	0.0078
15	0.0090	0.0012	0.0078
16	0.0090	0.0012	0.0078
17	0.0091	0.0012	0.0078
18	0.0091	0.0012	0.0079
19	0.0091	0.0012	0.0079
20	0.0091	0.0012	0.0079
21	0.0092	0.0012	0.0080

22	0.0092	0.0012	0.0080
23	0.0092	0.0012	0.0080
24	0.0093	0.0012	0.0080
25	0.0093	0.0012	0.0081
26	0.0093	0.0012	0.0081
27	0.0094	0.0012	0.0081
28	0.0094	0.0012	0.0081
29	0.0094	0.0013	0.0082
30	0.0094	0.0013	0.0082
31	0.0095	0.0013	0.0082
32	0.0095	0.0013	0.0082
33	0.0096	0.0013	0.0083
34	0.0096	0.0013	0.0083
35	0.0096	0.0013	0.0083
36	0.0096	0.0013	0.0084
37	0.0097	0.0013	0.0084
38	0.0097	0.0013	0.0084
39	0.0098	0.0013	0.0085
40	0.0098	0.0013	0.0085
41	0.0098	0.0013	0.0085
42	0.0099	0.0013	0.0085
43	0.0099	0.0013	0.0086
44	0.0099	0.0013	0.0086
45	0.0100	0.0013	0.0087
46	0.0100	0.0013	0.0087
47	0.0101	0.0013	0.0087
48	0.0101	0.0013	0.0087
49	0.0101	0.0013	0.0088
50	0.0102	0.0014	0.0088
51	0.0102	0.0014	0.0089
52	0.0102	0.0014	0.0089
53	0.0103	0.0014	0.0089
54	0.0103	0.0014	0.0090
55	0.0104	0.0014	0.0090
56	0.0104	0.0014	0.0090
57	0.0105	0.0014	0.0091
58	0.0105	0.0014	0.0091
59	0.0106	0.0014	0.0092
60	0.0106	0.0014	0.0092
61	0.0107	0.0014	0.0092
62	0.0107	0.0014	0.0093
63	0.0107	0.0014	0.0093
64	0.0108	0.0014	0.0093
65	0.0108	0.0014	0.0094
66	0.0109	0.0014	0.0094
67	0.0109	0.0015	0.0095
68	0.0110	0.0015	0.0095
69	0.0110	0.0015	0.0096
70	0.0111	0.0015	0.0096
71	0.0111	0.0015	0.0097
72	0.0112	0.0015	0.0097
73	0.0112	0.0015	0.0097
74	0.0113	0.0015	0.0098
75	0.0113	0.0015	0.0098
76	0.0114	0.0015	0.0099
77	0.0115	0.0015	0.0099
78	0.0115	0.0015	0.0100
79	0.0116	0.0015	0.0100
80	0.0116	0.0015	0.0101
81	0.0117	0.0016	0.0101
82	0.0117	0.0016	0.0102

83	0.0118	0.0016	0.0102
84	0.0118	0.0016	0.0103
85	0.0119	0.0016	0.0103
86	0.0120	0.0016	0.0104
87	0.0121	0.0016	0.0105
88	0.0121	0.0016	0.0105
89	0.0122	0.0016	0.0106
90	0.0122	0.0016	0.0106
91	0.0123	0.0016	0.0107
92	0.0124	0.0016	0.0107
93	0.0125	0.0017	0.0108
94	0.0125	0.0017	0.0108
95	0.0126	0.0017	0.0109
96	0.0127	0.0017	0.0110
97	0.0128	0.0017	0.0111
98	0.0128	0.0017	0.0111
99	0.0129	0.0017	0.0112
100	0.0130	0.0017	0.0112
101	0.0131	0.0017	0.0113
102	0.0131	0.0017	0.0114
103	0.0132	0.0018	0.0115
104	0.0133	0.0018	0.0115
105	0.0134	0.0018	0.0116
106	0.0135	0.0018	0.0117
107	0.0136	0.0018	0.0118
108	0.0136	0.0018	0.0118
109	0.0138	0.0018	0.0119
110	0.0138	0.0018	0.0120
111	0.0139	0.0019	0.0121
112	0.0140	0.0019	0.0121
113	0.0141	0.0019	0.0123
114	0.0142	0.0019	0.0123
115	0.0143	0.0019	0.0124
116	0.0144	0.0019	0.0125
117	0.0146	0.0019	0.0126
118	0.0146	0.0019	0.0127
119	0.0148	0.0020	0.0128
120	0.0149	0.0020	0.0129
121	0.0150	0.0020	0.0130
122	0.0151	0.0020	0.0131
123	0.0153	0.0020	0.0132
124	0.0153	0.0020	0.0133
125	0.0155	0.0021	0.0134
126	0.0156	0.0021	0.0135
127	0.0158	0.0021	0.0137
128	0.0159	0.0021	0.0138
129	0.0160	0.0021	0.0139
130	0.0161	0.0021	0.0140
131	0.0163	0.0022	0.0142
132	0.0164	0.0022	0.0143
133	0.0166	0.0022	0.0144
134	0.0168	0.0022	0.0145
135	0.0170	0.0023	0.0147
136	0.0171	0.0023	0.0148
137	0.0173	0.0023	0.0150
138	0.0174	0.0023	0.0151
139	0.0177	0.0023	0.0153
140	0.0178	0.0024	0.0154
141	0.0181	0.0024	0.0157
142	0.0182	0.0024	0.0158
143	0.0185	0.0025	0.0160

144	0.0186	0.0025	0.0161
145	0.0206	0.0027	0.0178
146	0.0207	0.0028	0.0180
147	0.0210	0.0028	0.0182
148	0.0212	0.0028	0.0184
149	0.0215	0.0029	0.0187
150	0.0217	0.0029	0.0188
151	0.0221	0.0029	0.0191
152	0.0223	0.0030	0.0193
153	0.0226	0.0030	0.0196
154	0.0228	0.0030	0.0198
155	0.0233	0.0031	0.0202
156	0.0235	0.0031	0.0204
157	0.0239	0.0032	0.0208
158	0.0242	0.0032	0.0210
159	0.0247	0.0033	0.0214
160	0.0249	0.0033	0.0216
161	0.0255	0.0034	0.0221
162	0.0258	0.0034	0.0223
163	0.0264	0.0035	0.0229
164	0.0267	0.0035	0.0231
165	0.0274	0.0036	0.0237
166	0.0277	0.0037	0.0240
167	0.0285	0.0038	0.0247
168	0.0289	0.0038	0.0250
169	0.0298	0.0040	0.0258
170	0.0302	0.0040	0.0262
171	0.0312	0.0041	0.0270
172	0.0317	0.0042	0.0275
173	0.0328	0.0044	0.0284
174	0.0334	0.0044	0.0290
175	0.0347	0.0046	0.0301
176	0.0354	0.0047	0.0307
177	0.0370	0.0049	0.0320
178	0.0378	0.0050	0.0328
179	0.0397	0.0053	0.0344
180	0.0408	0.0054	0.0353
181	0.0431	0.0057	0.0374
182	0.0445	0.0059	0.0386
183	0.0476	0.0063	0.0413
184	0.0494	0.0066	0.0429
185	0.0454	0.0060	0.0394
186	0.0480	0.0064	0.0416
187	0.0545	0.0072	0.0472
188	0.0588	0.0078	0.0509
189	0.0708	0.0079	0.0630
190	0.0799	0.0079	0.0721
191	0.1142	0.0079	0.1064
192	0.1571	0.0079	0.1492
193	0.4917	0.0079	0.4838
194	0.0931	0.0079	0.0852
195	0.0640	0.0079	0.0562
196	0.0510	0.0068	0.0442
197	0.0515	0.0068	0.0446
198	0.0460	0.0061	0.0399
199	0.0419	0.0056	0.0363
200	0.0387	0.0051	0.0336
201	0.0362	0.0048	0.0313
202	0.0340	0.0045	0.0295
203	0.0322	0.0043	0.0279
204	0.0307	0.0041	0.0266

205	0.0293	0.0039	0.0254
206	0.0281	0.0037	0.0243
207	0.0270	0.0036	0.0234
208	0.0261	0.0035	0.0226
209	0.0252	0.0034	0.0219
210	0.0244	0.0032	0.0212
211	0.0237	0.0032	0.0206
212	0.0231	0.0031	0.0200
213	0.0224	0.0030	0.0195
214	0.0219	0.0029	0.0190
215	0.0214	0.0028	0.0185
216	0.0209	0.0028	0.0181
217	0.0187	0.0025	0.0163
218	0.0183	0.0024	0.0159
219	0.0179	0.0024	0.0155
220	0.0176	0.0023	0.0152
221	0.0172	0.0023	0.0149
222	0.0169	0.0022	0.0146
223	0.0165	0.0022	0.0143
224	0.0162	0.0022	0.0141
225	0.0160	0.0021	0.0138
226	0.0157	0.0021	0.0136
227	0.0154	0.0021	0.0134
228	0.0152	0.0020	0.0132
229	0.0149	0.0020	0.0129
230	0.0147	0.0020	0.0128
231	0.0145	0.0019	0.0126
232	0.0143	0.0019	0.0124
233	0.0141	0.0019	0.0122
234	0.0139	0.0018	0.0120
235	0.0137	0.0018	0.0119
236	0.0135	0.0018	0.0117
237	0.0133	0.0018	0.0116
238	0.0132	0.0018	0.0114
239	0.0130	0.0017	0.0113
240	0.0129	0.0017	0.0111
241	0.0127	0.0017	0.0110
242	0.0126	0.0017	0.0109
243	0.0124	0.0017	0.0108
244	0.0123	0.0016	0.0106
245	0.0121	0.0016	0.0105
246	0.0120	0.0016	0.0104
247	0.0119	0.0016	0.0103
248	0.0118	0.0016	0.0102
249	0.0117	0.0015	0.0101
250	0.0115	0.0015	0.0100
251	0.0114	0.0015	0.0099
252	0.0113	0.0015	0.0098
253	0.0112	0.0015	0.0097
254	0.0111	0.0015	0.0096
255	0.0110	0.0015	0.0095
256	0.0109	0.0014	0.0095
257	0.0108	0.0014	0.0094
258	0.0107	0.0014	0.0093
259	0.0106	0.0014	0.0092
260	0.0105	0.0014	0.0091
261	0.0104	0.0014	0.0091
262	0.0104	0.0014	0.0090
263	0.0103	0.0014	0.0089
264	0.0102	0.0014	0.0088
265	0.0101	0.0013	0.0088

266	0.0100	0.0013	0.0087
267	0.0100	0.0013	0.0086
268	0.0099	0.0013	0.0086
269	0.0098	0.0013	0.0085
270	0.0097	0.0013	0.0084
271	0.0097	0.0013	0.0084
272	0.0096	0.0013	0.0083
273	0.0095	0.0013	0.0083
274	0.0095	0.0013	0.0082
275	0.0094	0.0012	0.0082
276	0.0093	0.0012	0.0081
277	0.0093	0.0012	0.0080
278	0.0092	0.0012	0.0080
279	0.0092	0.0012	0.0079
280	0.0091	0.0012	0.0079
281	0.0090	0.0012	0.0078
282	0.0090	0.0012	0.0078
283	0.0089	0.0012	0.0077
284	0.0089	0.0012	0.0077
285	0.0088	0.0012	0.0076
286	0.0088	0.0012	0.0076
287	0.0087	0.0012	0.0075
288	0.0087	0.0012	0.0075

Total soil rain loss = 0.67(In)
Total effective rainfall = 5.02(In)
Peak flow rate in flood hydrograph = 88.45(CFS)

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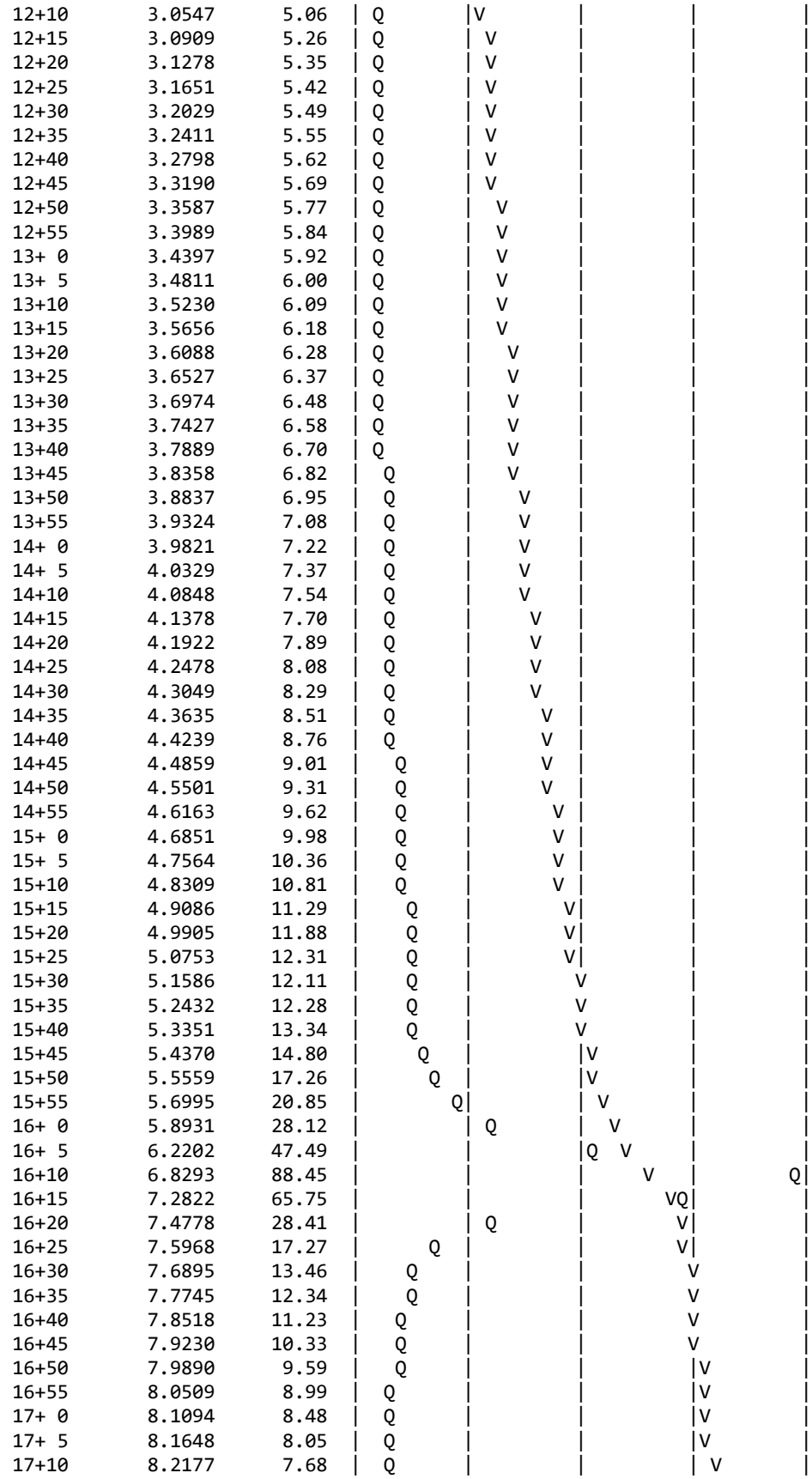
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	22.5	45.0	67.5	90.0
0+ 5	0.0015	0.21	Q	|	|	|	|
0+10	0.0102	1.27	Q	|	|	|	|
0+15	0.0242	2.03	Q	|	|	|	|
0+20	0.0392	2.18	Q	|	|	|	|
0+25	0.0546	2.23	Q	|	|	|	|
0+30	0.0700	2.23	Q	|	|	|	|
0+35	0.0854	2.24	Q	|	|	|	|
0+40	0.1009	2.25	Q	|	|	|	|
0+45	0.1164	2.25	VQ	|	|	|	|
0+50	0.1320	2.26	VQ	|	|	|	|
0+55	0.1476	2.27	VQ	|	|	|	|
1+ 0	0.1633	2.28	VQ	|	|	|	|
1+ 5	0.1790	2.28	VQ	|	|	|	|
1+10	0.1947	2.29	VQ	|	|	|	|
1+15	0.2106	2.30	VQ	|	|	|	|
1+20	0.2264	2.30	VQ	|	|	|	|
1+25	0.2423	2.31	VQ	|	|	|	|
1+30	0.2583	2.32	|Q	|	|	|	|
1+35	0.2743	2.33	|Q	|	|	|	|
1+40	0.2904	2.33	|Q	|	|	|	|
1+45	0.3065	2.34	|Q	|	|	|	|
1+50	0.3227	2.35	|Q	|	|	|	|
1+55	0.3389	2.36	|Q	|	|	|	|

2+ 0	0.3552	2.36	Q				
2+ 5	0.3715	2.37	Q				
2+10	0.3879	2.38	Q				
2+15	0.4044	2.39	Q				
2+20	0.4209	2.40	Q				
2+25	0.4374	2.40	Q				
2+30	0.4540	2.41	Q				
2+35	0.4707	2.42	Q				
2+40	0.4874	2.43	Q				
2+45	0.5042	2.44	Q				
2+50	0.5211	2.45	QV				
2+55	0.5380	2.45	QV				
3+ 0	0.5550	2.46	QV				
3+ 5	0.5720	2.47	QV				
3+10	0.5891	2.48	QV				
3+15	0.6062	2.49	QV				
3+20	0.6234	2.50	QV				
3+25	0.6407	2.51	QV				
3+30	0.6581	2.52	QV				
3+35	0.6755	2.53	QV				
3+40	0.6929	2.54	QV				
3+45	0.7105	2.55	QV				
3+50	0.7281	2.56	QV				
3+55	0.7458	2.57	QV				
4+ 0	0.7635	2.58	QV				
4+ 5	0.7813	2.59	Q V				
4+10	0.7992	2.60	Q V				
4+15	0.8171	2.61	Q V				
4+20	0.8351	2.62	Q V				
4+25	0.8532	2.63	Q V				
4+30	0.8714	2.64	Q V				
4+35	0.8896	2.65	Q V				
4+40	0.9079	2.66	Q V				
4+45	0.9263	2.67	Q V				
4+50	0.9448	2.68	Q V				
4+55	0.9633	2.69	Q V				
5+ 0	0.9820	2.70	Q V				
5+ 5	1.0006	2.71	Q V				
5+10	1.0194	2.73	Q V				
5+15	1.0383	2.74	Q V				
5+20	1.0572	2.75	Q V				
5+25	1.0762	2.76	Q V				
5+30	1.0953	2.77	Q V				
5+35	1.1145	2.79	Q V				
5+40	1.1338	2.80	Q V				
5+45	1.1532	2.81	Q V				
5+50	1.1726	2.82	Q V				
5+55	1.1922	2.84	Q V				
6+ 0	1.2118	2.85	Q V				
6+ 5	1.2315	2.86	Q V				
6+10	1.2513	2.88	Q V				
6+15	1.2712	2.89	Q V				
6+20	1.2912	2.90	Q V				
6+25	1.3113	2.92	Q V				
6+30	1.3315	2.93	Q V				
6+35	1.3518	2.95	Q V				
6+40	1.3722	2.96	Q V				
6+45	1.3927	2.98	Q V				
6+50	1.4133	2.99	Q V				
6+55	1.4340	3.01	Q V				
7+ 0	1.4548	3.02	Q V				

```
 7+ 5       1.4757      3.04  |Q   V    |         |         |         |
 7+10       1.4967      3.05  |Q   V    |         |         |         |
 7+15       1.5178      3.07  |Q   V    |         |         |         |
 7+20       1.5391      3.08  |Q    V   |         |         |         |
 7+25       1.5604      3.10  |Q    V   |         |         |         |
 7+30       1.5819      3.12  |Q    V   |         |         |         |
 7+35       1.6035      3.13  |Q    V   |         |         |         |
 7+40       1.6252      3.15  |Q    V   |         |         |         |
 7+45       1.6470      3.17  |Q    V   |         |         |         |
 7+50       1.6690      3.19  |Q    V   |         |         |         |
 7+55       1.6911      3.21  |Q    V   |         |         |         |
 8+ 0       1.7133      3.22  |Q    V   |         |         |         |
 8+ 5       1.7356      3.24  |Q    V   |         |         |         |
 8+10       1.7581      3.26  |Q    V   |         |         |         |
 8+15       1.7807      3.28  |Q    V   |         |         |         |
 8+20       1.8034      3.30  |Q     V  |         |         |         |
 8+25       1.8263      3.32  |Q     V  |         |         |         |
 8+30       1.8493      3.34  |Q     V  |         |         |         |
 8+35       1.8724      3.36  |Q     V  |         |         |         |
 8+40       1.8957      3.38  |Q     V  |         |         |         |
 8+45       1.9191      3.40  |Q     V  |         |         |         |
 8+50       1.9427      3.43  |Q     V  |         |         |         |
 8+55       1.9665      3.45  |Q     V  |         |         |         |
 9+ 0       1.9904      3.47  |Q     V  |         |         |         |
 9+ 5       2.0144      3.49  |Q     V  |         |         |         |
 9+10       2.0386      3.52  |Q     V  |         |         |         |
 9+15       2.0630      3.54  |Q      V |         |         |         |
 9+20       2.0876      3.56  |Q      V |         |         |         |
 9+25       2.1123      3.59  |Q      V |         |         |         |
 9+30       2.1372      3.61  |Q      V |         |         |         |
 9+35       2.1622      3.64  |Q      V |         |         |         |
 9+40       2.1875      3.67  |Q      V |         |         |         |
 9+45       2.2129      3.69  |Q      V |         |         |         |
 9+50       2.2385      3.72  |Q      V |         |         |         |
 9+55       2.2643      3.75  |Q      V |         |         |         |
10+ 0       2.2903      3.78  |Q      V |         |         |         |
10+ 5       2.3165      3.80  |Q       V|         |         |         |
10+10       2.3429      3.83  |Q       V|         |         |         |
10+15       2.3696      3.86  |Q       V|         |         |         |
10+20       2.3964      3.90  |Q       V|         |         |         |
10+25       2.4234      3.93  |Q       V|         |         |         |
10+30       2.4507      3.96  |Q       V|         |         |         |
10+35       2.4782      3.99  |Q       V|         |         |         |
10+40       2.5059      4.03  |Q       V|         |         |         |
10+45       2.5339      4.06  |Q       V|         |         |         |
10+50       2.5621      4.10  |Q        V         |         |         |
10+55       2.5906      4.13  |Q        V         |         |         |
11+ 0       2.6193      4.17  |Q        V         |         |         |
11+ 5       2.6483      4.21  |Q        V         |         |         |
11+10       2.6776      4.25  |Q        V         |         |         |
11+15       2.7071      4.29  |Q        V         |         |         |
11+20       2.7369      4.33  |Q        V         |         |         |
11+25       2.7670      4.37  |Q        V         |         |         |
11+30       2.7974      4.42  |Q        V         |         |         |
11+35       2.8282      4.46  |Q        |V        |         |         |
11+40       2.8592      4.51  | Q       |V        |         |         |
11+45       2.8906      4.55  | Q       |V        |         |         |
11+50       2.9223      4.60  | Q       |V        |         |         |
11+55       2.9543      4.65  | Q       |V        |         |         |
12+ 0       2.9868      4.71  | Q       |V        |         |         |
12+ 5       3.0198      4.80  | Q       |V        |         |         |
```



17+15	8.2683	7.35	Q			V
17+20	8.3169	7.06	Q			V
17+25	8.3637	6.80	Q			V
17+30	8.4090	6.57	Q			V
17+35	8.4528	6.36	Q			V
17+40	8.4952	6.17	Q			V
17+45	8.5365	5.99	Q			V
17+50	8.5766	5.83	Q			V
17+55	8.6157	5.68	Q			V
18+ 0	8.6539	5.54	Q			V
18+ 5	8.6908	5.37	Q			V
18+10	8.7256	5.04	Q			V
18+15	8.7586	4.79	Q			V
18+20	8.7906	4.65	Q			V
18+25	8.8219	4.55	Q			V
18+30	8.8526	4.45	Q			V
18+35	8.8826	4.36	Q			V
18+40	8.9121	4.28	Q			V
18+45	8.9410	4.20	Q			V
18+50	8.9695	4.13	Q			V
18+55	8.9974	4.05	Q			V
19+ 0	9.0248	3.99	Q			V
19+ 5	9.0519	3.92	Q			V
19+10	9.0784	3.86	Q			V
19+15	9.1046	3.80	Q			V
19+20	9.1304	3.74	Q			V
19+25	9.1558	3.69	Q			V
19+30	9.1808	3.63	Q			V
19+35	9.2055	3.58	Q			V
19+40	9.2298	3.54	Q			V
19+45	9.2538	3.49	Q			V
19+50	9.2776	3.44	Q			V
19+55	9.3010	3.40	Q			V
20+ 0	9.3241	3.36	Q			V
20+ 5	9.3469	3.32	Q			V
20+10	9.3695	3.28	Q			V
20+15	9.3918	3.24	Q			V
20+20	9.4139	3.20	Q			V
20+25	9.4357	3.17	Q			V
20+30	9.4572	3.13	Q			V
20+35	9.4786	3.10	Q			V
20+40	9.4997	3.07	Q			V
20+45	9.5206	3.03	Q			V
20+50	9.5412	3.00	Q			V
20+55	9.5617	2.97	Q			V
21+ 0	9.5820	2.94	Q			V
21+ 5	9.6021	2.92	Q			V
21+10	9.6219	2.89	Q			V
21+15	9.6416	2.86	Q			V
21+20	9.6612	2.83	Q			V
21+25	9.6805	2.81	Q			V
21+30	9.6997	2.78	Q			V
21+35	9.7187	2.76	Q			V
21+40	9.7375	2.74	Q			V
21+45	9.7562	2.71	Q			V
21+50	9.7747	2.69	Q			V
21+55	9.7931	2.67	Q			V
22+ 0	9.8113	2.65	Q			V
22+ 5	9.8294	2.62	Q			V
22+10	9.8473	2.60	Q			V
22+15	9.8651	2.58	Q			V

```
22+20       9.8828      2.56  |Q        |         |         |       V |
22+25       9.9003      2.54  |Q        |         |         |       V |
22+30       9.9177      2.53  |Q        |         |         |       V |
22+35       9.9350      2.51  |Q        |         |         |       V |
22+40       9.9521      2.49  |Q        |         |         |       V |
22+45       9.9691      2.47  |Q        |         |         |       V |
22+50       9.9860      2.45  |Q        |         |         |        V|
22+55      10.0028      2.44  |Q        |         |         |        V|
23+ 0      10.0195      2.42  |Q        |         |         |        V|
23+ 5      10.0360      2.40  |Q        |         |         |        V|
23+10      10.0524      2.39  |Q        |         |         |        V|
23+15      10.0688      2.37  |Q        |         |         |        V|
23+20      10.0850      2.35  |Q        |         |         |        V|
23+25      10.1011      2.34  |Q        |         |         |        V|
23+30      10.1171      2.32  |Q        |         |         |        V|
23+35      10.1330      2.31  |Q        |         |         |        V|
23+40      10.1488      2.29  |Q        |         |         |        V|
23+45      10.1645      2.28  |Q        |         |         |        V|
23+50      10.1801      2.27  |Q        |         |         |        V|
23+55      10.1956      2.25  |Q        |         |         |        V|
24+ 0      10.2111      2.24  Q        |         |         |        V|
```

U n i t H y d r o g r a p h A n a l y s i s

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Study date 01/22/23

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San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6277

JOB NO 2022-318
11115 HEMLOCK AVENUE
100-YEAR, UNIT HYDROGRAPH
POST-CONDITION, AREA B

Storm Event Year = 100

Antecedent Moisture Condition = 3

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 100		
12.94	1	1.33
Rainfall data for year 100		
12.94	6	3.11
Rainfall data for year 100		
12.94	24	5.69

++

******** Area-averaged max loss rate, Fm ********

SCS curve No.(AMCII)	SCS curve NO.(AMC 3)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
32.0	52.0	12.94	1.000	0.785	0.090	0.071

Area-averaged adjusted loss rate Fm (In/Hr) = 0.071

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
1.16	0.090	32.0	52.0	9.23	0.199
11.78	0.910	98.0	98.0	0.20	0.958

Area-averaged catchment yield fraction, Y = 0.890
Area-averaged low loss fraction, Yb = 0.110
User entry of time of concentration = 0.134 (hours)
++
Watershed area = 12.94(Ac.)
Catchment Lag time = 0.107 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 77.5819
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.071(In/Hr)
Average low loss rate fraction (Yb) = 0.110 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.492(In)
Computed peak 30-minute rainfall = 1.008(In)
Specified peak 1-hour rainfall = 1.330(In)
Computed peak 3-hour rainfall = 2.239(In)
Specified peak 6-hour rainfall = 3.110(In)
Specified peak 24-hour rainfall = 5.690(In)

Rainfall depth area reduction factors:
Using a total area of 12.94(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.492(In)
30-minute factor = 0.999 Adjusted rainfall = 1.007(In)
1-hour factor = 0.999 Adjusted rainfall = 1.329(In)
3-hour factor = 1.000 Adjusted rainfall = 2.239(In)
6-hour factor = 1.000 Adjusted rainfall = 3.110(In)
24-hour factor = 1.000 Adjusted rainfall = 5.690(In)

U n i t H y d r o g r a p h
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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
	(K = 156.49 (CFS))	
1	10.670	16.699
2	61.392	79.375
3	93.099	49.620
4	98.677	8.729
5	100.000	2.071

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.4919	0.4919
2	0.6491	0.1572
3	0.7634	0.1143
4	0.8565	0.0931
5	0.9365	0.0800
6	1.0073	0.0708
7	1.0714	0.0641
8	1.1302	0.0588
9	1.1847	0.0545

10	1.2357	0.0510
11	1.2837	0.0480
12	1.3292	0.0455
13	1.3807	0.0515
14	1.4301	0.0494
15	1.4777	0.0476
16	1.5236	0.0460
17	1.5681	0.0445
18	1.6112	0.0431
19	1.6531	0.0419
20	1.6938	0.0407
21	1.7335	0.0397
22	1.7722	0.0387
23	1.8100	0.0378
24	1.8469	0.0369
25	1.8830	0.0361
26	1.9184	0.0354
27	1.9531	0.0347
28	1.9871	0.0340
29	2.0205	0.0334
30	2.0532	0.0328
31	2.0854	0.0322
32	2.1171	0.0317
33	2.1482	0.0311
34	2.1789	0.0307
35	2.2091	0.0302
36	2.2388	0.0297
37	2.2681	0.0293
38	2.2969	0.0289
39	2.3254	0.0285
40	2.3535	0.0281
41	2.3812	0.0277
42	2.4085	0.0274
43	2.4356	0.0270
44	2.4623	0.0267
45	2.4886	0.0264
46	2.5147	0.0261
47	2.5405	0.0258
48	2.5660	0.0255
49	2.5912	0.0252
50	2.6161	0.0249
51	2.6408	0.0247
52	2.6652	0.0244
53	2.6894	0.0242
54	2.7133	0.0239
55	2.7371	0.0237
56	2.7605	0.0235
57	2.7838	0.0233
58	2.8069	0.0231
59	2.8297	0.0228
60	2.8523	0.0226
61	2.8748	0.0224
62	2.8970	0.0222
63	2.9191	0.0221
64	2.9410	0.0219
65	2.9627	0.0217
66	2.9842	0.0215
67	3.0055	0.0214
68	3.0267	0.0212
69	3.0477	0.0210
70	3.0686	0.0209

71	3.0893	0.0207
72	3.1099	0.0206
73	3.1286	0.0187
74	3.1472	0.0186
75	3.1657	0.0185
76	3.1840	0.0183
77	3.2022	0.0182
78	3.2203	0.0181
79	3.2382	0.0179
80	3.2560	0.0178
81	3.2737	0.0177
82	3.2912	0.0176
83	3.3086	0.0174
84	3.3260	0.0173
85	3.3432	0.0172
86	3.3602	0.0171
87	3.3772	0.0170
88	3.3941	0.0169
89	3.4108	0.0168
90	3.4275	0.0166
91	3.4440	0.0165
92	3.4605	0.0164
93	3.4768	0.0163
94	3.4930	0.0162
95	3.5092	0.0161
96	3.5252	0.0160
97	3.5412	0.0160
98	3.5571	0.0159
99	3.5728	0.0158
100	3.5885	0.0157
101	3.6041	0.0156
102	3.6196	0.0155
103	3.6350	0.0154
104	3.6504	0.0153
105	3.6656	0.0153
106	3.6808	0.0152
107	3.6959	0.0151
108	3.7109	0.0150
109	3.7258	0.0149
110	3.7407	0.0149
111	3.7555	0.0148
112	3.7702	0.0147
113	3.7848	0.0146
114	3.7994	0.0146
115	3.8139	0.0145
116	3.8283	0.0144
117	3.8426	0.0143
118	3.8569	0.0143
119	3.8711	0.0142
120	3.8852	0.0141
121	3.8993	0.0141
122	3.9133	0.0140
123	3.9273	0.0139
124	3.9412	0.0139
125	3.9550	0.0138
126	3.9687	0.0138
127	3.9824	0.0137
128	3.9961	0.0136
129	4.0096	0.0136
130	4.0232	0.0135
131	4.0366	0.0135

132	4.0500	0.0134
133	4.0634	0.0133
134	4.0766	0.0133
135	4.0899	0.0132
136	4.1030	0.0132
137	4.1162	0.0131
138	4.1292	0.0131
139	4.1422	0.0130
140	4.1552	0.0130
141	4.1681	0.0129
142	4.1810	0.0129
143	4.1938	0.0128
144	4.2065	0.0128
145	4.2192	0.0127
146	4.2319	0.0127
147	4.2445	0.0126
148	4.2571	0.0126
149	4.2696	0.0125
150	4.2820	0.0125
151	4.2944	0.0124
152	4.3068	0.0124
153	4.3191	0.0123
154	4.3314	0.0123
155	4.3437	0.0122
156	4.3558	0.0122
157	4.3680	0.0121
158	4.3801	0.0121
159	4.3922	0.0121
160	4.4042	0.0120
161	4.4161	0.0120
162	4.4281	0.0119
163	4.4400	0.0119
164	4.4518	0.0118
165	4.4636	0.0118
166	4.4754	0.0118
167	4.4871	0.0117
168	4.4988	0.0117
169	4.5105	0.0116
170	4.5221	0.0116
171	4.5336	0.0116
172	4.5452	0.0115
173	4.5567	0.0115
174	4.5681	0.0115
175	4.5796	0.0114
176	4.5909	0.0114
177	4.6023	0.0113
178	4.6136	0.0113
179	4.6249	0.0113
180	4.6361	0.0112
181	4.6473	0.0112
182	4.6585	0.0112
183	4.6696	0.0111
184	4.6807	0.0111
185	4.6918	0.0111
186	4.7028	0.0110
187	4.7138	0.0110
188	4.7248	0.0110
189	4.7357	0.0109
190	4.7467	0.0109
191	4.7575	0.0109
192	4.7684	0.0108

193	4.7792	0.0108
194	4.7899	0.0108
195	4.8007	0.0107
196	4.8114	0.0107
197	4.8221	0.0107
198	4.8327	0.0107
199	4.8434	0.0106
200	4.8539	0.0106
201	4.8645	0.0106
202	4.8750	0.0105
203	4.8855	0.0105
204	4.8960	0.0105
205	4.9065	0.0104
206	4.9169	0.0104
207	4.9273	0.0104
208	4.9376	0.0104
209	4.9479	0.0103
210	4.9583	0.0103
211	4.9685	0.0103
212	4.9788	0.0102
213	4.9890	0.0102
214	4.9992	0.0102
215	5.0094	0.0102
216	5.0195	0.0101
217	5.0296	0.0101
218	5.0397	0.0101
219	5.0498	0.0101
220	5.0598	0.0100
221	5.0698	0.0100
222	5.0798	0.0100
223	5.0897	0.0100
224	5.0997	0.0099
225	5.1096	0.0099
226	5.1195	0.0099
227	5.1293	0.0099
228	5.1392	0.0098
229	5.1490	0.0098
230	5.1588	0.0098
231	5.1685	0.0098
232	5.1783	0.0097
233	5.1880	0.0097
234	5.1977	0.0097
235	5.2073	0.0097
236	5.2170	0.0096
237	5.2266	0.0096
238	5.2362	0.0096
239	5.2458	0.0096
240	5.2553	0.0096
241	5.2649	0.0095
242	5.2744	0.0095
243	5.2839	0.0095
244	5.2933	0.0095
245	5.3028	0.0094
246	5.3122	0.0094
247	5.3216	0.0094
248	5.3310	0.0094
249	5.3403	0.0094
250	5.3497	0.0093
251	5.3590	0.0093
252	5.3683	0.0093
253	5.3775	0.0093

254	5.3868	0.0093
255	5.3960	0.0092
256	5.4052	0.0092
257	5.4144	0.0092
258	5.4236	0.0092
259	5.4327	0.0092
260	5.4419	0.0091
261	5.4510	0.0091
262	5.4601	0.0091
263	5.4691	0.0091
264	5.4782	0.0091
265	5.4872	0.0090
266	5.4962	0.0090
267	5.5052	0.0090
268	5.5142	0.0090
269	5.5232	0.0090
270	5.5321	0.0089
271	5.5410	0.0089
272	5.5499	0.0089
273	5.5588	0.0089
274	5.5677	0.0089
275	5.5765	0.0088
276	5.5854	0.0088
277	5.5942	0.0088
278	5.6030	0.0088
279	5.6117	0.0088
280	5.6205	0.0088
281	5.6292	0.0087
282	5.6379	0.0087
283	5.6466	0.0087
284	5.6553	0.0087
285	5.6640	0.0087
286	5.6727	0.0087
287	5.6813	0.0086
288	5.6899	0.0086

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0086	0.0009	0.0077
2	0.0086	0.0010	0.0077
3	0.0087	0.0010	0.0077
4	0.0087	0.0010	0.0077
5	0.0087	0.0010	0.0078
6	0.0087	0.0010	0.0078
7	0.0088	0.0010	0.0078
8	0.0088	0.0010	0.0078
9	0.0088	0.0010	0.0079
10	0.0088	0.0010	0.0079
11	0.0089	0.0010	0.0079
12	0.0089	0.0010	0.0079
13	0.0089	0.0010	0.0080
14	0.0090	0.0010	0.0080
15	0.0090	0.0010	0.0080
16	0.0090	0.0010	0.0080
17	0.0091	0.0010	0.0081
18	0.0091	0.0010	0.0081
19	0.0091	0.0010	0.0081
20	0.0091	0.0010	0.0081
21	0.0092	0.0010	0.0082

22	0.0092	0.0010	0.0082
23	0.0092	0.0010	0.0082
24	0.0093	0.0010	0.0082
25	0.0093	0.0010	0.0083
26	0.0093	0.0010	0.0083
27	0.0094	0.0010	0.0083
28	0.0094	0.0010	0.0083
29	0.0094	0.0010	0.0084
30	0.0094	0.0010	0.0084
31	0.0095	0.0010	0.0084
32	0.0095	0.0010	0.0085
33	0.0096	0.0011	0.0085
34	0.0096	0.0011	0.0085
35	0.0096	0.0011	0.0086
36	0.0096	0.0011	0.0086
37	0.0097	0.0011	0.0086
38	0.0097	0.0011	0.0086
39	0.0098	0.0011	0.0087
40	0.0098	0.0011	0.0087
41	0.0098	0.0011	0.0088
42	0.0099	0.0011	0.0088
43	0.0099	0.0011	0.0088
44	0.0099	0.0011	0.0088
45	0.0100	0.0011	0.0089
46	0.0100	0.0011	0.0089
47	0.0101	0.0011	0.0090
48	0.0101	0.0011	0.0090
49	0.0101	0.0011	0.0090
50	0.0102	0.0011	0.0090
51	0.0102	0.0011	0.0091
52	0.0102	0.0011	0.0091
53	0.0103	0.0011	0.0092
54	0.0103	0.0011	0.0092
55	0.0104	0.0011	0.0092
56	0.0104	0.0011	0.0093
57	0.0105	0.0012	0.0093
58	0.0105	0.0012	0.0093
59	0.0106	0.0012	0.0094
60	0.0106	0.0012	0.0094
61	0.0107	0.0012	0.0095
62	0.0107	0.0012	0.0095
63	0.0107	0.0012	0.0096
64	0.0108	0.0012	0.0096
65	0.0108	0.0012	0.0096
66	0.0109	0.0012	0.0097
67	0.0109	0.0012	0.0097
68	0.0110	0.0012	0.0098
69	0.0110	0.0012	0.0098
70	0.0111	0.0012	0.0098
71	0.0111	0.0012	0.0099
72	0.0112	0.0012	0.0099
73	0.0112	0.0012	0.0100
74	0.0113	0.0012	0.0100
75	0.0113	0.0013	0.0101
76	0.0114	0.0013	0.0101
77	0.0115	0.0013	0.0102
78	0.0115	0.0013	0.0102
79	0.0116	0.0013	0.0103
80	0.0116	0.0013	0.0103
81	0.0117	0.0013	0.0104
82	0.0117	0.0013	0.0104

83	0.0118	0.0013	0.0105
84	0.0118	0.0013	0.0105
85	0.0119	0.0013	0.0106
86	0.0120	0.0013	0.0107
87	0.0121	0.0013	0.0107
88	0.0121	0.0013	0.0108
89	0.0122	0.0013	0.0108
90	0.0122	0.0013	0.0109
91	0.0123	0.0014	0.0110
92	0.0124	0.0014	0.0110
93	0.0125	0.0014	0.0111
94	0.0125	0.0014	0.0111
95	0.0126	0.0014	0.0112
96	0.0127	0.0014	0.0113
97	0.0128	0.0014	0.0113
98	0.0128	0.0014	0.0114
99	0.0129	0.0014	0.0115
100	0.0130	0.0014	0.0115
101	0.0131	0.0014	0.0116
102	0.0131	0.0014	0.0117
103	0.0132	0.0015	0.0118
104	0.0133	0.0015	0.0118
105	0.0134	0.0015	0.0119
106	0.0135	0.0015	0.0120
107	0.0136	0.0015	0.0121
108	0.0136	0.0015	0.0121
109	0.0138	0.0015	0.0122
110	0.0138	0.0015	0.0123
111	0.0139	0.0015	0.0124
112	0.0140	0.0015	0.0125
113	0.0141	0.0016	0.0126
114	0.0142	0.0016	0.0126
115	0.0143	0.0016	0.0128
116	0.0144	0.0016	0.0128
117	0.0146	0.0016	0.0130
118	0.0146	0.0016	0.0130
119	0.0148	0.0016	0.0132
120	0.0149	0.0016	0.0132
121	0.0150	0.0017	0.0134
122	0.0151	0.0017	0.0134
123	0.0153	0.0017	0.0136
124	0.0153	0.0017	0.0136
125	0.0155	0.0017	0.0138
126	0.0156	0.0017	0.0139
127	0.0158	0.0017	0.0140
128	0.0159	0.0017	0.0141
129	0.0160	0.0018	0.0143
130	0.0161	0.0018	0.0144
131	0.0163	0.0018	0.0145
132	0.0164	0.0018	0.0146
133	0.0166	0.0018	0.0148
134	0.0168	0.0018	0.0149
135	0.0170	0.0019	0.0151
136	0.0171	0.0019	0.0152
137	0.0173	0.0019	0.0154
138	0.0174	0.0019	0.0155
139	0.0177	0.0019	0.0157
140	0.0178	0.0020	0.0158
141	0.0181	0.0020	0.0161
142	0.0182	0.0020	0.0162
143	0.0185	0.0020	0.0164

144	0.0186	0.0020	0.0166
145	0.0206	0.0023	0.0183
146	0.0207	0.0023	0.0184
147	0.0210	0.0023	0.0187
148	0.0212	0.0023	0.0189
149	0.0215	0.0024	0.0192
150	0.0217	0.0024	0.0193
151	0.0221	0.0024	0.0196
152	0.0222	0.0025	0.0198
153	0.0226	0.0025	0.0201
154	0.0228	0.0025	0.0203
155	0.0233	0.0026	0.0207
156	0.0235	0.0026	0.0209
157	0.0239	0.0026	0.0213
158	0.0242	0.0027	0.0215
159	0.0247	0.0027	0.0220
160	0.0249	0.0027	0.0222
161	0.0255	0.0028	0.0227
162	0.0258	0.0028	0.0229
163	0.0264	0.0029	0.0235
164	0.0267	0.0029	0.0238
165	0.0274	0.0030	0.0243
166	0.0277	0.0031	0.0247
167	0.0285	0.0031	0.0253
168	0.0289	0.0032	0.0257
169	0.0297	0.0033	0.0265
170	0.0302	0.0033	0.0269
171	0.0311	0.0034	0.0277
172	0.0317	0.0035	0.0282
173	0.0328	0.0036	0.0292
174	0.0334	0.0037	0.0297
175	0.0347	0.0038	0.0309
176	0.0354	0.0039	0.0315
177	0.0369	0.0041	0.0329
178	0.0378	0.0042	0.0336
179	0.0397	0.0044	0.0353
180	0.0407	0.0045	0.0362
181	0.0431	0.0047	0.0384
182	0.0445	0.0049	0.0396
183	0.0476	0.0052	0.0424
184	0.0494	0.0054	0.0440
185	0.0455	0.0050	0.0405
186	0.0480	0.0053	0.0427
187	0.0545	0.0059	0.0486
188	0.0588	0.0059	0.0529
189	0.0708	0.0059	0.0650
190	0.0800	0.0059	0.0741
191	0.1143	0.0059	0.1084
192	0.1572	0.0059	0.1513
193	0.4919	0.0059	0.4861
194	0.0931	0.0059	0.0872
195	0.0641	0.0059	0.0582
196	0.0510	0.0056	0.0454
197	0.0515	0.0057	0.0458
198	0.0460	0.0051	0.0409
199	0.0419	0.0046	0.0373
200	0.0387	0.0043	0.0344
201	0.0361	0.0040	0.0321
202	0.0340	0.0037	0.0303
203	0.0322	0.0035	0.0287
204	0.0307	0.0034	0.0273

205	0.0293	0.0032	0.0260
206	0.0281	0.0031	0.0250
207	0.0270	0.0030	0.0240
208	0.0261	0.0029	0.0232
209	0.0252	0.0028	0.0224
210	0.0244	0.0027	0.0217
211	0.0237	0.0026	0.0211
212	0.0231	0.0025	0.0205
213	0.0224	0.0025	0.0200
214	0.0219	0.0024	0.0195
215	0.0214	0.0024	0.0190
216	0.0209	0.0023	0.0186
217	0.0187	0.0021	0.0167
218	0.0183	0.0020	0.0163
219	0.0179	0.0020	0.0160
220	0.0176	0.0019	0.0156
221	0.0172	0.0019	0.0153
222	0.0169	0.0019	0.0150
223	0.0165	0.0018	0.0147
224	0.0162	0.0018	0.0145
225	0.0160	0.0018	0.0142
226	0.0157	0.0017	0.0140
227	0.0154	0.0017	0.0137
228	0.0152	0.0017	0.0135
229	0.0149	0.0016	0.0133
230	0.0147	0.0016	0.0131
231	0.0145	0.0016	0.0129
232	0.0143	0.0016	0.0127
233	0.0141	0.0016	0.0125
234	0.0139	0.0015	0.0124
235	0.0137	0.0015	0.0122
236	0.0135	0.0015	0.0120
237	0.0133	0.0015	0.0119
238	0.0132	0.0015	0.0117
239	0.0130	0.0014	0.0116
240	0.0129	0.0014	0.0114
241	0.0127	0.0014	0.0113
242	0.0126	0.0014	0.0112
243	0.0124	0.0014	0.0110
244	0.0123	0.0014	0.0109
245	0.0121	0.0013	0.0108
246	0.0120	0.0013	0.0107
247	0.0119	0.0013	0.0106
248	0.0118	0.0013	0.0105
249	0.0116	0.0013	0.0104
250	0.0115	0.0013	0.0103
251	0.0114	0.0013	0.0102
252	0.0113	0.0012	0.0101
253	0.0112	0.0012	0.0100
254	0.0111	0.0012	0.0099
255	0.0110	0.0012	0.0098
256	0.0109	0.0012	0.0097
257	0.0108	0.0012	0.0096
258	0.0107	0.0012	0.0095
259	0.0106	0.0012	0.0095
260	0.0105	0.0012	0.0094
261	0.0104	0.0012	0.0093
262	0.0104	0.0011	0.0092
263	0.0103	0.0011	0.0091
264	0.0102	0.0011	0.0091
265	0.0101	0.0011	0.0090

266	0.0100	0.0011	0.0089
267	0.0100	0.0011	0.0089
268	0.0099	0.0011	0.0088
269	0.0098	0.0011	0.0087
270	0.0097	0.0011	0.0087
271	0.0097	0.0011	0.0086
272	0.0096	0.0011	0.0085
273	0.0095	0.0010	0.0085
274	0.0095	0.0010	0.0084
275	0.0094	0.0010	0.0084
276	0.0093	0.0010	0.0083
277	0.0093	0.0010	0.0083
278	0.0092	0.0010	0.0082
279	0.0092	0.0010	0.0081
280	0.0091	0.0010	0.0081
281	0.0090	0.0010	0.0080
282	0.0090	0.0010	0.0080
283	0.0089	0.0010	0.0079
284	0.0089	0.0010	0.0079
285	0.0088	0.0010	0.0078
286	0.0088	0.0010	0.0078
287	0.0087	0.0010	0.0077
288	0.0087	0.0010	0.0077

Total soil rain loss = 0.55(In)
Total effective rainfall = 5.14(In)
Peak flow rate in flood hydrograph = 48.64(CFS)

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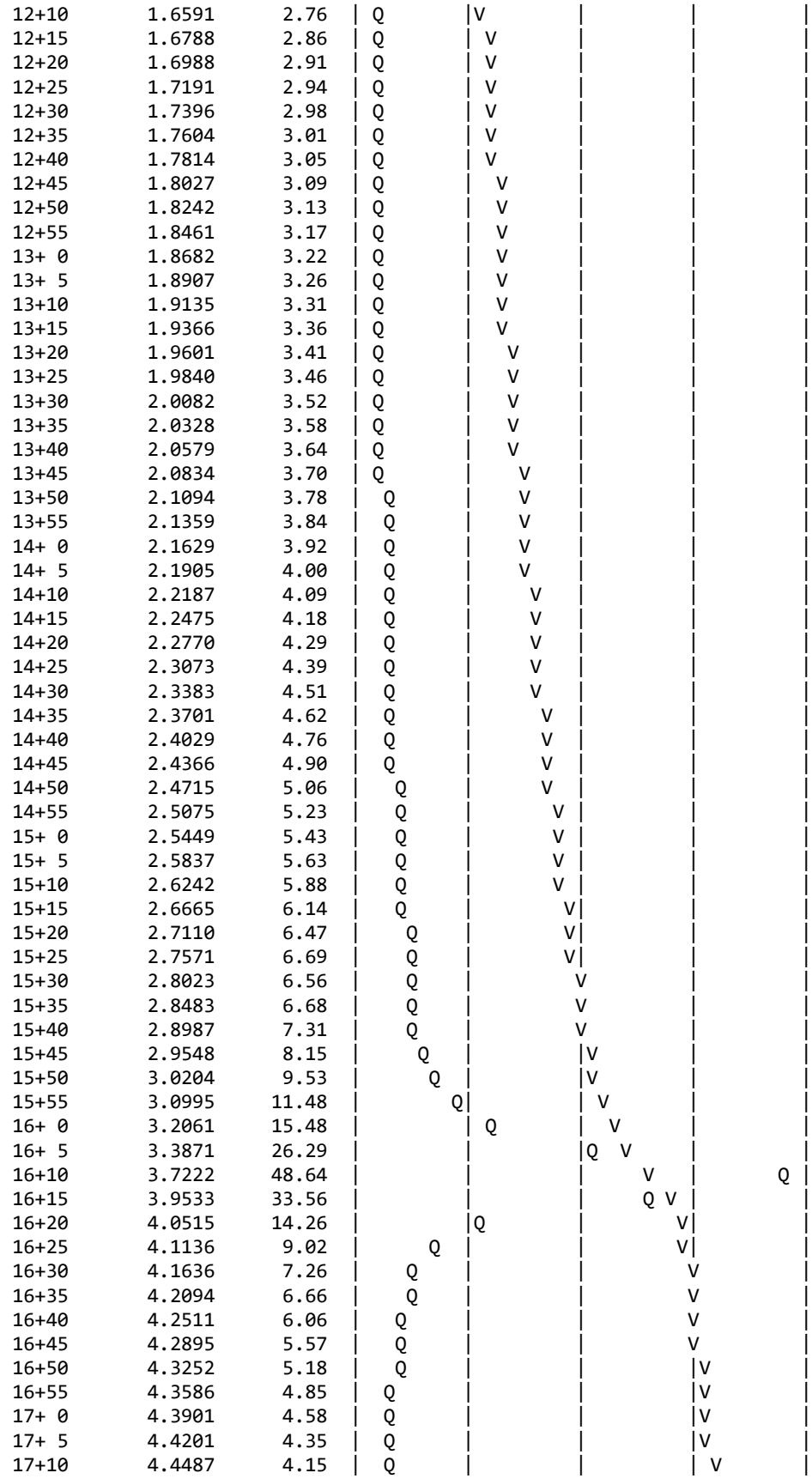
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	12.5	25.0	37.5	50.0
0+ 5	0.0009	0.13	Q	|	|	|	|
0+10	0.0060	0.74	Q	|	|	|	|
0+15	0.0137	1.12	Q	|	|	|	|
0+20	0.0219	1.19	Q	|	|	|	|
0+25	0.0302	1.21	Q	|	|	|	|
0+30	0.0385	1.21	Q	|	|	|	|
0+35	0.0469	1.22	Q	|	|	|	|
0+40	0.0553	1.22	Q	|	|	|	|
0+45	0.0637	1.22	Q	|	|	|	|
0+50	0.0722	1.23	Q	|	|	|	|
0+55	0.0807	1.23	Q	|	|	|	|
1+ 0	0.0892	1.23	Q	|	|	|	|
1+ 5	0.0977	1.24	Q	|	|	|	|
1+10	0.1063	1.24	Q	|	|	|	|
1+15	0.1148	1.25	Q	|	|	|	|
1+20	0.1235	1.25	VQ	|	|	|	|
1+25	0.1321	1.25	VQ	|	|	|	|
1+30	0.1408	1.26	|Q	|	|	|	|
1+35	0.1495	1.26	|Q	|	|	|	|
1+40	0.1582	1.27	|Q	|	|	|	|
1+45	0.1669	1.27	|Q	|	|	|	|
1+50	0.1757	1.27	|Q	|	|	|	|
1+55	0.1845	1.28	|Q	|	|	|	|

2+ 0	0.1934	1.28	Q				
2+ 5	0.2022	1.29	Q				
2+10	0.2111	1.29	Q				
2+15	0.2201	1.30	Q				
2+20	0.2290	1.30	Q				
2+25	0.2380	1.30	Q				
2+30	0.2470	1.31	Q				
2+35	0.2561	1.31	Q				
2+40	0.2652	1.32	Q				
2+45	0.2743	1.32	Q				
2+50	0.2834	1.33	QV				
2+55	0.2926	1.33	QV				
3+ 0	0.3018	1.34	QV				
3+ 5	0.3110	1.34	QV				
3+10	0.3203	1.35	QV				
3+15	0.3296	1.35	QV				
3+20	0.3390	1.36	QV				
3+25	0.3484	1.36	QV				
3+30	0.3578	1.37	QV				
3+35	0.3672	1.37	QV				
3+40	0.3767	1.38	QV				
3+45	0.3862	1.38	QV				
3+50	0.3958	1.39	QV				
3+55	0.4054	1.39	QV				
4+ 0	0.4150	1.40	QV				
4+ 5	0.4247	1.40	Q V				
4+10	0.4344	1.41	Q V				
4+15	0.4441	1.41	Q V				
4+20	0.4539	1.42	Q V				
4+25	0.4637	1.43	Q V				
4+30	0.4736	1.43	Q V				
4+35	0.4835	1.44	Q V				
4+40	0.4934	1.44	Q V				
4+45	0.5034	1.45	Q V				
4+50	0.5134	1.46	Q V				
4+55	0.5235	1.46	Q V				
5+ 0	0.5336	1.47	Q V				
5+ 5	0.5437	1.47	Q V				
5+10	0.5539	1.48	Q V				
5+15	0.5642	1.49	Q V				
5+20	0.5744	1.49	Q V				
5+25	0.5848	1.50	Q V				
5+30	0.5951	1.51	Q V				
5+35	0.6056	1.51	Q V				
5+40	0.6160	1.52	Q V				
5+45	0.6265	1.53	Q V				
5+50	0.6371	1.53	Q V				
5+55	0.6477	1.54	Q V				
6+ 0	0.6584	1.55	Q V				
6+ 5	0.6691	1.55	Q V				
6+10	0.6798	1.56	Q V				
6+15	0.6906	1.57	Q V				
6+20	0.7015	1.58	Q V				
6+25	0.7124	1.58	Q V				
6+30	0.7233	1.59	Q V				
6+35	0.7344	1.60	Q V				
6+40	0.7454	1.61	Q V				
6+45	0.7566	1.62	Q V				
6+50	0.7677	1.62	Q V				
6+55	0.7790	1.63	Q V				
7+ 0	0.7903	1.64	Q V				

```
 7+ 5       0.8016      1.65  |Q   V    |         |         |         |
 7+10       0.8130      1.66  |Q   V    |         |         |         |
 7+15       0.8245      1.67  |Q   V    |         |         |         |
 7+20       0.8360      1.67  |Q    V   |         |         |         |
 7+25       0.8476      1.68  |Q    V   |         |         |         |
 7+30       0.8593      1.69  |Q    V   |         |         |         |
 7+35       0.8710      1.70  |Q    V   |         |         |         |
 7+40       0.8828      1.71  |Q    V   |         |         |         |
 7+45       0.8947      1.72  |Q    V   |         |         |         |
 7+50       0.9066      1.73  |Q    V   |         |         |         |
 7+55       0.9186      1.74  |Q    V   |         |         |         |
 8+ 0       0.9306      1.75  |Q    V   |         |         |         |
 8+ 5       0.9427      1.76  |Q    V   |         |         |         |
 8+10       0.9549      1.77  |Q    V   |         |         |         |
 8+15       0.9672      1.78  |Q    V   |         |         |         |
 8+20       0.9795      1.79  |Q     V  |         |         |         |
 8+25       0.9920      1.80  |Q     V  |         |         |         |
 8+30       1.0044      1.81  |Q     V  |         |         |         |
 8+35       1.0170      1.82  |Q     V  |         |         |         |
 8+40       1.0297      1.84  |Q     V  |         |         |         |
 8+45       1.0424      1.85  |Q     V  |         |         |         |
 8+50       1.0552      1.86  |Q     V  |         |         |         |
 8+55       1.0681      1.87  |Q     V  |         |         |         |
 9+ 0       1.0811      1.88  |Q     V  |         |         |         |
 9+ 5       1.0941      1.90  |Q     V  |         |         |         |
 9+10       1.1073      1.91  |Q     V  |         |         |         |
 9+15       1.1205      1.92  |Q      V |         |         |         |
 9+20       1.1338      1.94  |Q      V |         |         |         |
 9+25       1.1472      1.95  |Q      V |         |         |         |
 9+30       1.1608      1.96  |Q      V |         |         |         |
 9+35       1.1744      1.98  |Q      V |         |         |         |
 9+40       1.1881      1.99  |Q      V |         |         |         |
 9+45       1.2019      2.00  |Q      V |         |         |         |
 9+50       1.2158      2.02  |Q      V |         |         |         |
 9+55       1.2298      2.03  |Q      V |         |         |         |
10+ 0       1.2439      2.05  |Q      V |         |         |         |
10+ 5       1.2582      2.07  |Q       V|         |         |         |
10+10       1.2725      2.08  |Q       V|         |         |         |
10+15       1.2869      2.10  |Q       V|         |         |         |
10+20       1.3015      2.12  |Q       V|         |         |         |
10+25       1.3162      2.13  |Q       V|         |         |         |
10+30       1.3310      2.15  |Q       V|         |         |         |
10+35       1.3459      2.17  |Q       V|         |         |         |
10+40       1.3610      2.19  |Q       V|         |         |         |
10+45       1.3762      2.20  |Q       V|         |         |         |
10+50       1.3915      2.23  |Q        V         |         |         |
10+55       1.4070      2.24  |Q        V         |         |         |
11+ 0       1.4226      2.27  |Q        V         |         |         |
11+ 5       1.4383      2.29  |Q        V         |         |         |
11+10       1.4542      2.31  |Q        V         |         |         |
11+15       1.4702      2.33  |Q        V         |         |         |
11+20       1.4864      2.35  |Q        V         |         |         |
11+25       1.5028      2.37  |Q        V         |         |         |
11+30       1.5193      2.40  |Q        V         |         |         |
11+35       1.5360      2.42  |Q        |V        |         |         |
11+40       1.5528      2.45  |Q        |V        |         |         |
11+45       1.5699      2.47  |Q        |V        |         |         |
11+50       1.5871      2.50  | Q       |V        |         |         |
11+55       1.6045      2.53  | Q       |V        |         |         |
12+ 0       1.6221      2.56  | Q       |V        |         |         |
12+ 5       1.6401      2.61  | Q       |V        |         |         |
```



17+15	4.4761	3.97	Q			V
17+20	4.5024	3.82	Q			V
17+25	4.5277	3.68	Q			V
17+30	4.5522	3.56	Q			V
17+35	4.5759	3.44	Q			V
17+40	4.5989	3.34	Q			V
17+45	4.6213	3.24	Q			V
17+50	4.6430	3.16	Q			V
17+55	4.6642	3.08	Q			V
18+ 0	4.6849	3.00	Q			V
18+ 5	4.7049	2.91	Q			V
18+10	4.7237	2.72	Q			V
18+15	4.7415	2.59	Q			V
18+20	4.7589	2.52	Q			V
18+25	4.7758	2.46	Q			V
18+30	4.7924	2.41	Q			V
18+35	4.8087	2.37	Q			V
18+40	4.8247	2.32	Q			V
18+45	4.8404	2.28	Q			V
18+50	4.8558	2.24	Q			V
18+55	4.8709	2.20	Q			V
19+ 0	4.8858	2.16	Q			V
19+ 5	4.9005	2.13	Q			V
19+10	4.9149	2.09	Q			V
19+15	4.9291	2.06	Q			V
19+20	4.9430	2.03	Q			V
19+25	4.9568	2.00	Q			V
19+30	4.9704	1.97	Q			V
19+35	4.9837	1.94	Q			V
19+40	4.9969	1.92	Q			V
19+45	5.0100	1.89	Q			V
19+50	5.0228	1.87	Q			V
19+55	5.0355	1.84	Q			V
20+ 0	5.0481	1.82	Q			V
20+ 5	5.0604	1.80	Q			V
20+10	5.0727	1.78	Q			V
20+15	5.0848	1.76	Q			V
20+20	5.0967	1.74	Q			V
20+25	5.1086	1.72	Q			V
20+30	5.1203	1.70	Q			V
20+35	5.1318	1.68	Q			V
20+40	5.1433	1.66	Q			V
20+45	5.1546	1.65	Q			V
20+50	5.1658	1.63	Q			V
20+55	5.1769	1.61	Q			V
21+ 0	5.1879	1.60	Q			V
21+ 5	5.1988	1.58	Q			V
21+10	5.2096	1.57	Q			V
21+15	5.2203	1.55	Q			V
21+20	5.2309	1.54	Q			V
21+25	5.2414	1.52	Q			V
21+30	5.2518	1.51	Q			V
21+35	5.2621	1.50	Q			V
21+40	5.2723	1.48	Q			V
21+45	5.2824	1.47	Q			V
21+50	5.2925	1.46	Q			V
21+55	5.3024	1.45	Q			V
22+ 0	5.3123	1.44	Q			V
22+ 5	5.3221	1.42	Q			V
22+10	5.3318	1.41	Q			V
22+15	5.3415	1.40	Q			V

```
22+20       5.3511      1.39  |Q        |         |         |       V |
22+25       5.3606      1.38  |Q        |         |         |       V |
22+30       5.3700      1.37  |Q        |         |         |       V |
22+35       5.3794      1.36  |Q        |         |         |       V |
22+40       5.3887      1.35  |Q        |         |         |       V |
22+45       5.3979      1.34  |Q        |         |         |       V |
22+50       5.4071      1.33  |Q        |         |         |        V|
22+55       5.4162      1.32  |Q        |         |         |        V|
23+ 0       5.4252      1.31  |Q        |         |         |        V|
23+ 5       5.4342      1.30  |Q        |         |         |        V|
23+10       5.4431      1.29  |Q        |         |         |        V|
23+15       5.4519      1.29  |Q        |         |         |        V|
23+20       5.4607      1.28  |Q        |         |         |        V|
23+25       5.4695      1.27  |Q        |         |         |        V|
23+30       5.4782      1.26  |Q        |         |         |        V|
23+35       5.4868      1.25  |Q        |         |         |        V|
23+40       5.4954      1.24  Q         |         |         |        V|
23+45       5.5039      1.24  Q         |         |         |        V|
23+50       5.5124      1.23  Q         |         |         |        V|
23+55       5.5208      1.22  Q         |         |         |        V|
24+ 0       5.5291      1.21  Q         |         |         |        V|
```

APPENDIX D

BASIN ROUTING ANALYSIS

POST-DEVELOPMENT BASIN SUMMARY TABLE - 100 YEAR							
Subarea ID	Drainage Area (Ac)	24-Hr Runoff Volume "V" (cu-ft)	Provided Basin Volume (cu-ft)	Bottom Basin Surface Area (sf)	Percolation Rate (in/hr)	Total Drawdown Time (hours)	Basin Designation
A	24.47	444,796	255,288	38,619	1.43	48	Chamber A
B	12.94	240,848	144,007	21,580	1.90	48	Chamber B
TOTAL	37.40	685,643	399,295	60,199	--	--	--

POST-DEVELOPMENT BASIN DEPTH SUMMARY TABLE - 100 YEAR							
Subarea ID	Bottom Basin Elevation (ft)	Top Basin Elevation (ft)	Total Depth of Basin (ft)	100-Year Storm WSE (ft)	DCV WSE (ft)	Freeboard (ft)	Basin Designation
A	964.00	973.00	9	970.50	967.50	2.50	Chamber A
B	970.00	979.00	9	976.73	973.50	2.27	Chamber B

POST-DEVELOPMENT BASIN ROUTING ANALYSIS SUMMARY TABLE						
Storm Event	Pre-Development Peak Flow (cfs)	90% of Pre-Development Peak Flow (cfs)	Unattenuated Post-Development Peak Flow (cfs)	Attenuated Post-Development Peak Flow (cfs)	Storm Water Peak Depth (ft)	Freeboard (ft)
Drainage Area A						
2-year	11.44	10.30	33.24	1.49	3.61	5.39
10-Year	22.55	20.29	54.11	11.20	4.96	4.04
25-Year	30.10	27.09	67.58	17.49	5.67	3.33
100-year	40.48	36.43	89.14	23.30	6.50	2.50
Drainage Area B						
2-year	1.18	1.07	19.44	1.00	3.06	5.94
10-Year	3.70	3.33	31.34	2.90	4.52	4.48
25-Year	5.95	5.35	38.99	5.29	5.37	3.63
100-year	8.93	8.04	51.18	7.59	6.73	2.27

BASIN ROUTING STAGING - CHAMBER A						
Stage (ft)	Elevation (ft)	Total Storage (cu-ft)	Total Storage (ac-ft)	Orifice Discharge (cfs)	Infiltration Dischrage (cfs)	Total Discharge (cfs)
0	964.00	0	0.00	0.00	1.27	1.27
1	965.00	15,990	0.37	0.00	1.27	1.27
2	966.00	40,016	0.92	0.00	1.27	1.27
3	967.00	69,745	1.60	0.00	1.27	1.27
4	968.00	102,109	2.34	1.63	0.00	1.63
5	969.00	135,639	3.11	11.60	0.00	11.60
6	970.00	169,169	3.88	20.38	0.00	20.38
7	971.00	201,534	4.63	26.31	0.00	26.31
8	972.00	231,263	5.31	31.13	0.00	31.13
9	973.00	255,288	5.86	35.29	0.00	35.29

BASIN ROUTING STAGING - CHAMBER B						
Stage (ft)	Elevation (ft)	Total Storage (cu-ft)	Total Storage (ac-ft)	Orifice Discharge (cfs)	Infiltration Dischrage (cfs)	Total Discharge (cfs)
0	970.00	0	0.00	0.00	0.95	0.95
1	971.00	9,007	0.21	0.00	0.95	0.95
2	972.00	22,555	0.52	0.00	0.95	0.95
3	973.00	39,327	0.90	0.00	0.95	0.95
4	974.00	57,588	1.32	1.04	0.00	1.04
5	975.00	76,507	1.76	4.58	0.00	4.58
6	976.00	95,427	2.19	6.51	0.00	6.51
7	977.00	113,688	2.61	7.98	0.00	7.98
8	978.00	130,459	2.99	9.22	0.00	9.22
9	979.00	144,007	3.31	10.32	0.00	10.32

Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 — Wednesday, 01 / 25 / 2023

Pond No. 1 - Chamber A

Provide details of outlet facilities, chambers, as-built storm drain plans, etc. in this report to verify hydraulic calcs summarized in the basin routing. These will be checked later.

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	964.00	n/a	0	0
1.00	965.00	n/a	15,990	15,990
2.00	966.00	n/a	24,026	40,016
3.00	967.00	n/a	29,729	69,745
4.00	968.00	n/a	32,364	102,109
5.00	969.00	n/a	33,530	135,639
6.00	970.00	n/a	33,530	169,169
7.00	971.00	n/a	32,365	201,534
8.00	972.00	n/a	29,729	231,263
9.00	973.00	n/a	24,025	255,288

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	Inactive	0.00	0.00
Span (in)	= 24.00	8.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 967.50	970.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.66	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

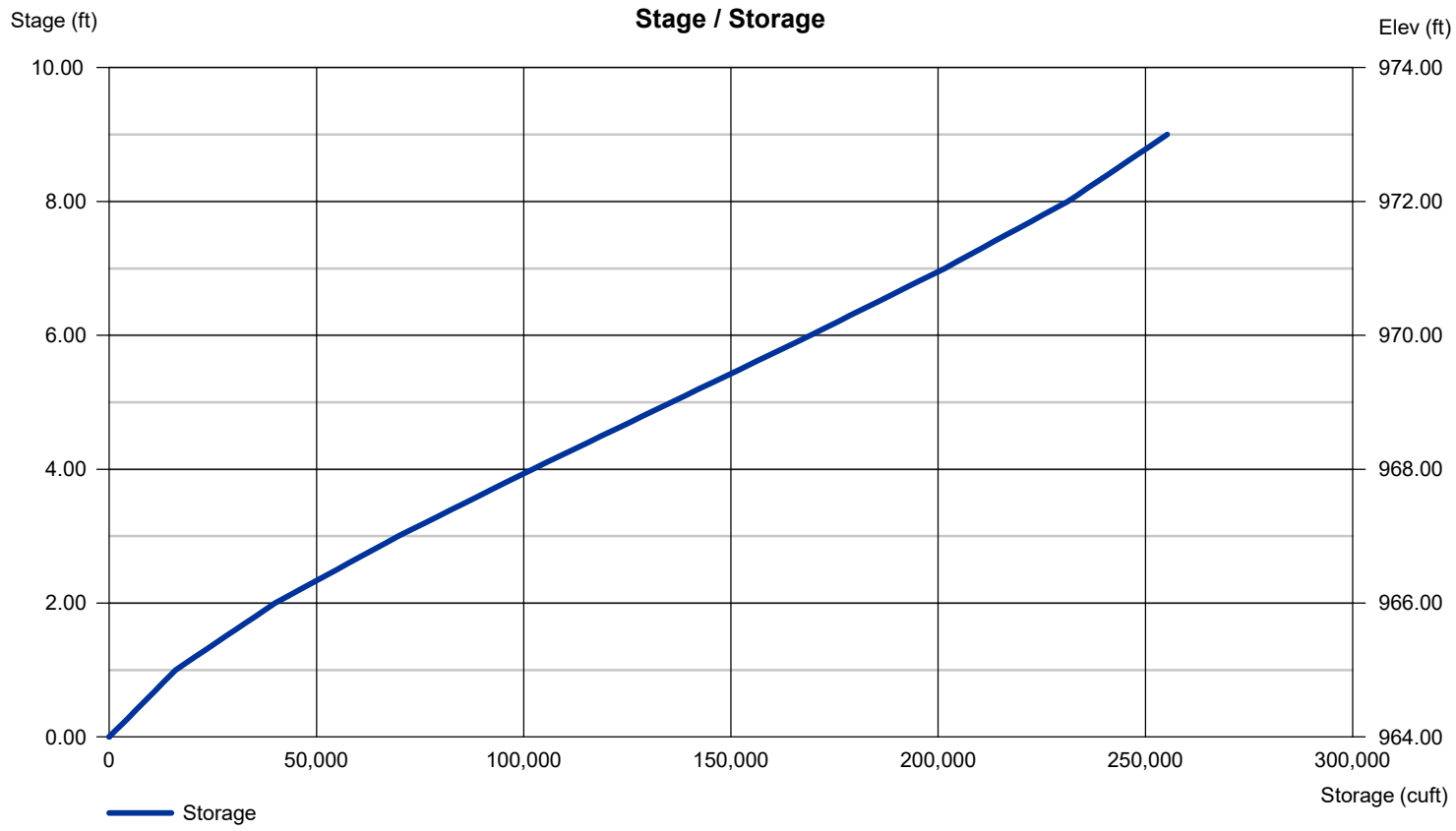
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	Inactive	0.00	0.00	0.00
Crest El. (ft)	= 971.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Wednesday, 01 / 25 / 2023

Pond No. 2 - Chamber B

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	970.00	n/a	0	0
1.00	971.00	n/a	9,007	9,007
2.00	972.00	n/a	13,548	22,555
3.00	973.00	n/a	16,772	39,327
4.00	974.00	n/a	18,261	57,588
5.00	975.00	n/a	18,919	76,507
6.00	976.00	n/a	18,920	95,427
7.00	977.00	n/a	18,261	113,688
8.00	978.00	n/a	16,771	130,459
9.00	979.00	n/a	13,548	144,007

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	4.00	Inactive	0.00
Span (in)	= 12.00	4.00	6.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 973.50	974.00	976.50	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.66	0.66	0.66	0.60
Multi-Stage	= n/a	No	No	No

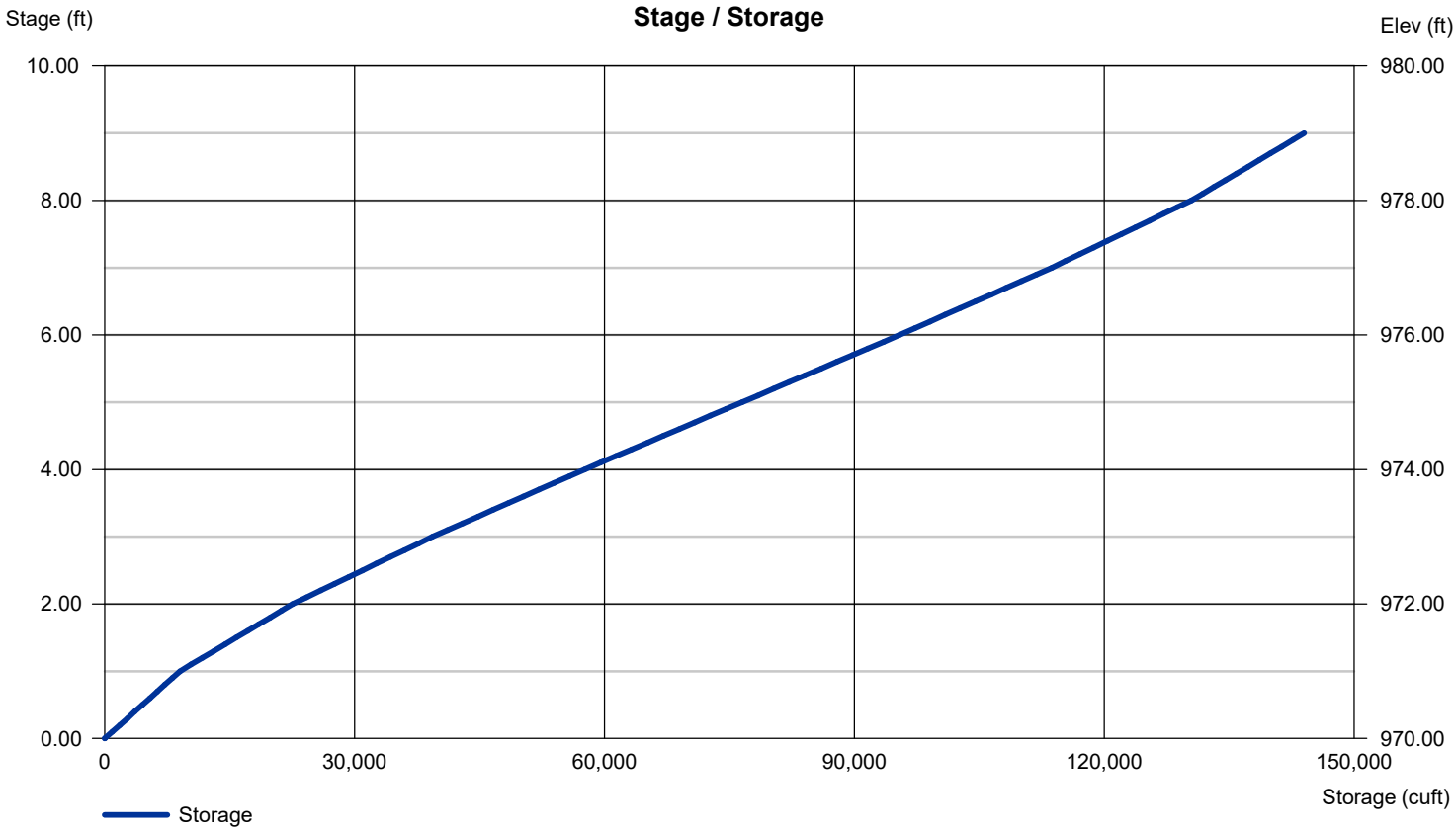
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



CONTECH ENGINEERED SOLUTIONS

CMP: Underground Detention System
Storage Volume Estimation

Date: 01/24/23
Project Name: Chamber A

City / County: Fontana
State: California

Designed By: JL
Company: Westland Group
Telephone:

=Adjustable Input Cells

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

Summary of Inputs

System Information		Backfill Information		Pipe & Analysis Information	
Out-to-out length (ft):	613.0	Backfill Porosity (%):	40%	System Diameter (in):	96
Out-to-out width (ft):	63.0	Depth Above Pipe (in):	6.0	Pipe Spacing (in):	36
Number of Manifolds (ea):	1.0	Depth Below Pipe (in):	6.0	Incremental Analysis (in):	2
Number of Barrels (ea):	6.0	Width At Ends (ft):	1.0	System Invert (Elevation):	964
		Width At Sides (ft):	1.0		

Storage Volume Estimation

System		Pipe		Stone		Total System		Miscellaneous	
Depth (ft)	Elevation (ft)	Incremental Storage (cf)	Cumulative Storage (cf)	Incremental Storage (cf)	Cumulative Storage (cf)	Incremental Storage (cf)	Cumulative Storage (cf)	Percent Open Storage (%)	Ave. Surface Area (sf)
0.00	964.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	15,990.0
0.17	964.16	0.0	0.0	2,665.0	2,665.0	2,665.0	2,665.0	0.0%	15,990.0
0.33	964.33	0.0	0.0	2,665.0	5,330.0	2,665.0	5,330.0	0.0%	15,990.0
0.50	964.50	0.0	0.0	2,665.0	7,995.0	2,665.0	7,995.0	0.0%	15,990.0
0.67	964.66	941.7	941.7	2,288.3	10,283.3	3,230.0	11,225.0	8.4%	21,053.6
0.83	964.83	1,704.8	2,646.5	1,983.1	12,266.4	3,687.9	14,912.9	17.7%	23,074.4
1.00	965.00	2,184.1	4,830.6	1,791.4	14,057.8	3,975.5	18,888.4	25.6%	24,571.8
1.17	965.16	2,557.9	7,388.6	1,641.8	15,699.6	4,199.8	23,088.1	32.0%	25,788.6
1.33	965.33	2,868.7	10,257.3	1,517.5	17,217.1	4,386.2	27,474.4	37.3%	26,820.0
1.50	965.50	3,135.4	13,392.6	1,410.8	18,627.9	4,546.2	32,020.6	41.8%	27,714.9
1.67	965.66	3,368.6	16,761.2	1,317.6	19,945.5	4,686.1	36,706.7	45.7%	28,502.7
1.83	965.83	3,574.8	20,336.0	1,235.1	21,180.6	4,809.9	41,516.6	49.0%	29,202.5
2.00	966.00	3,758.6	24,094.6	1,161.6	22,342.2	4,920.1	46,436.7	51.9%	29,827.7
2.17	966.16	3,923.0	28,017.6	1,095.8	23,438.0	5,018.8	51,455.6	54.5%	30,388.0
2.33	966.33	4,070.5	32,088.1	1,036.8	24,474.8	5,107.3	56,562.9	56.7%	30,890.7
2.50	966.50	4,202.8	36,291.0	983.9	25,458.6	5,186.7	61,749.6	58.8%	31,341.5
2.67	966.66	4,321.4	40,612.3	936.4	26,395.1	5,257.8	67,007.4	60.6%	31,744.9
2.83	966.83	4,427.3	45,039.6	894.1	27,289.2	5,321.4	72,328.8	62.3%	32,104.3
3.00	967.00	4,521.4	49,561.0	856.5	28,145.6	5,377.8	77,706.6	63.8%	32,422.8
3.17	967.16	4,604.4	54,165.4	823.2	28,968.9	5,427.6	83,134.2	65.2%	32,702.6
3.33	967.33	4,677.0	58,842.3	794.2	29,763.1	5,471.2	88,605.4	66.4%	32,945.7
3.50	967.50	4,739.6	63,581.9	769.2	30,532.2	5,508.7	94,114.1	67.6%	33,153.5
3.67	967.66	4,792.6	68,374.5	748.0	31,280.2	5,540.5	99,654.7	68.6%	33,327.4
3.83	967.83	4,836.3	73,210.8	730.5	32,010.7	5,566.8	105,221.5	69.6%	33,468.5
4.00	968.00	4,871.0	78,081.8	716.6	32,727.3	5,587.6	110,809.1	70.5%	33,577.4
4.17	968.16	4,896.9	82,978.6	706.3	33,433.6	5,603.1	116,412.2	71.3%	33,654.7
4.33	968.33	4,914.0	87,892.6	699.4	34,132.9	5,613.4	122,025.6	72.0%	33,701.0
4.50	968.50	4,922.6	92,815.2	696.0	34,828.9	5,618.5	127,644.1	72.7%	33,716.4
4.67	968.66	4,922.6	97,737.8	696.0	35,524.9	5,618.5	133,262.7	73.3%	33,701.0
4.83	968.83	4,914.0	102,651.8	699.4	36,224.3	5,613.4	138,876.1	73.9%	33,654.7
5.00	969.00	4,896.9	107,548.7	706.3	36,930.5	5,603.1	144,479.2	74.4%	33,577.4
5.17	969.16	4,871.0	112,419.6	716.6	37,647.1	5,587.6	150,066.8	74.9%	33,468.5
5.33	969.33	4,836.3	117,255.9	730.5	38,377.6	5,566.8	155,633.6	75.3%	33,327.4
5.50	969.50	4,792.6	122,048.5	748.0	39,125.6	5,540.5	161,174.1	75.7%	33,153.5
5.67	969.66	4,739.6	126,788.1	769.2	39,894.8	5,508.7	166,682.9	76.1%	32,945.7
5.83	969.83	4,677.0	131,465.1	794.2	40,689.0	5,471.2	172,154.0	76.4%	32,702.6
6.00	970.00	4,604.4	136,069.5	823.2	41,512.2	5,427.6	177,581.7	76.6%	32,422.8
6.17	970.16	4,521.4	140,590.8	856.5	42,368.7	5,377.8	182,959.5	76.8%	32,104.3
6.33	970.33	4,427.3	145,018.1	894.1	43,262.8	5,321.4	188,280.9	77.0%	31,744.9
6.50	970.50	4,321.4	149,339.5	936.4	44,199.2	5,257.8	193,538.7	77.2%	31,341.5
6.67	970.66	4,202.8	153,542.3	983.9	45,183.1	5,186.7	198,725.4	77.3%	30,890.7
6.83	970.83	4,070.5	157,612.8	1,036.8	46,219.9	5,107.3	203,832.7	77.3%	30,388.0
7.00	971.00	3,923.0	161,535.9	1,095.8	47,315.7	5,018.8	208,851.5	77.3%	29,827.7
7.17	971.16	3,758.6	165,294.4	1,161.6	48,477.2	4,920.1	213,771.7	77.3%	29,202.5
7.33	971.33	3,574.8	168,869.2	1,235.1	49,712.3	4,809.9	218,581.5	77.3%	28,502.7
7.50	971.50	3,368.6	172,237.8	1,317.6	51,029.9	4,686.1	223,267.7	77.1%	27,714.9
7.67	971.66	3,135.4	175,373.2	1,410.8	52,440.7	4,546.2	227,813.9	77.0%	26,820.0
7.83	971.83	2,868.7	178,241.9	1,517.5	53,958.3	4,386.2	232,200.1	76.8%	25,788.6
8.00	972.00	2,557.9	180,799.8	1,641.8	55,600.1	4,199.8	236,399.9	76.5%	24,571.8
8.17	972.16	2,184.1	182,983.9	1,791.4	57,391.4	3,975.5	240,375.3	76.1%	23,074.4
8.33	972.33	1,704.8	184,688.7	1,983.1	59,374.5	3,687.9	244,063.2	75.7%	21,053.6
8.50	972.50	941.7	185,630.4	2,288.3	61,662.8	3,230.0	247,293.3	75.1%	15,990.0
8.67	972.66	0.0	185,630.4	2,665.0	64,327.8	2,665.0	249,958.3	74.3%	15,990.0
8.83	972.83	0.0	185,630.4	2,665.0	66,992.8	2,665.0	252,623.3	73.5%	15,990.0
9.00	973.00	0.0	185,630.4	2,665.0	69,657.8	2,665.0	255,288.3	72.7%	15,990.0

These results are submitted to you as a guideline only, without liability on the part of CONTECH Engineered Solutions, LLC for accuracy or suitability to any particular application, and are subject to your verification.

CONTECH ENGINEERED SOLUTIONS

CMP: Underground Detention System
Storage Volume Estimation

Date: 01/24/23
Project Name: Chamber B

City / County: Fontana
State: California

Designed By: JL
Company: Westland Group
Telephone:

=Adjustable Input Cells

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

Summary of Inputs

System Information		Backfill Information		Pipe & Analysis Information	
Out-to-out length (ft):	415.0	Backfill Porosity (%):	40%	System Diameter (in):	96
Out-to-out width (ft):	52.0	Depth Above Pipe (in):	6.0	Pipe Spacing (in):	36
Number of Manifolds (ea):	1.0	Depth Below Pipe (in):	6.0	Incremental Analysis (in):	2
Number of Barrels (ea):	5.0	Width At Ends (ft):	1.0	System Invert (Elevation):	970
		Width At Sides (ft):	1.0		

Storage Volume Estimation

System		Pipe		Stone		Total System		Miscellaneous	
Depth (ft)	Elevation (ft)	Incremental Storage (cf)	Cumulative Storage (cf)	Incremental Storage (cf)	Cumulative Storage (cf)	Incremental Storage (cf)	Cumulative Storage (cf)	Percent Open Storage (%)	Ave. Surface Area (sf)
0.00	970.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	9,007.2
0.17	970.16	0.0	0.0	1,501.2	1,501.2	1,501.2	1,501.2	0.0%	9,007.2
0.33	970.33	0.0	0.0	1,501.2	3,002.4	1,501.2	3,002.4	0.0%	9,007.2
0.50	970.50	0.0	0.0	1,501.2	4,503.6	1,501.2	4,503.6	0.0%	9,007.2
0.67	970.66	532.2	532.2	1,288.3	5,791.9	1,820.5	6,324.1	8.4%	11,868.8
0.83	970.83	963.5	1,495.6	1,115.8	6,907.8	2,079.3	8,403.4	17.8%	13,010.8
1.00	971.00	1,234.3	2,729.9	1,007.5	7,915.2	2,241.8	10,645.1	25.6%	13,856.9
1.17	971.16	1,445.5	4,175.4	923.0	8,838.2	2,368.5	13,013.7	32.1%	14,544.6
1.33	971.33	1,621.2	5,796.6	852.7	9,691.0	2,473.9	15,487.6	37.4%	15,127.5
1.50	971.50	1,771.9	7,568.5	792.4	10,483.4	2,564.3	18,051.9	41.9%	15,633.2
1.67	971.66	1,903.7	9,472.1	739.7	11,223.1	2,643.4	20,695.3	45.8%	16,078.4
1.83	971.83	2,020.2	11,492.3	693.1	11,916.3	2,713.3	23,408.6	49.1%	16,473.9
2.00	972.00	2,124.1	13,616.4	651.6	12,567.8	2,775.6	26,184.2	52.0%	16,827.2
2.17	972.16	2,217.0	15,833.4	614.4	13,182.2	2,831.4	29,015.6	54.6%	17,143.8
2.33	972.33	2,300.3	18,133.7	581.1	13,763.3	2,881.4	31,897.0	56.9%	17,427.9
2.50	972.50	2,375.1	20,508.9	551.2	14,314.5	2,926.3	34,823.3	58.9%	17,682.7
2.67	972.66	2,442.1	22,951.0	524.4	14,838.8	2,966.5	37,789.8	60.7%	17,910.6
2.83	972.83	2,501.9	25,452.9	500.4	15,339.2	3,002.4	40,792.2	62.4%	18,113.8
3.00	973.00	2,555.1	28,008.0	479.1	15,818.4	3,034.3	43,826.4	63.9%	18,293.8
3.17	973.16	2,602.1	30,610.1	460.4	16,278.8	3,062.4	46,888.9	65.3%	18,451.9
3.33	973.33	2,643.1	33,253.2	444.0	16,722.7	3,087.0	49,975.9	66.5%	18,589.2
3.50	973.50	2,678.4	35,931.6	429.8	17,152.6	3,108.3	53,084.2	67.7%	18,706.7
3.67	973.66	2,708.4	38,640.0	417.8	17,570.4	3,126.2	56,210.4	68.7%	18,805.0
3.83	973.83	2,733.1	41,373.1	408.0	17,978.4	3,141.1	59,351.5	69.7%	18,884.7
4.00	974.00	2,752.7	44,125.8	400.1	18,378.5	3,152.8	62,504.3	70.6%	18,946.2
4.17	974.16	2,767.3	46,893.1	394.3	18,772.7	3,161.6	65,665.9	71.4%	18,990.0
4.33	974.33	2,777.0	49,670.2	390.4	19,163.1	3,167.4	68,833.3	72.2%	19,016.1
4.50	974.50	2,781.9	52,452.0	388.5	19,551.6	3,170.3	72,003.6	72.8%	19,024.8
4.67	974.66	2,781.9	55,233.9	388.5	19,940.0	3,170.3	75,173.9	73.5%	19,016.1
4.83	974.83	2,777.0	58,010.9	390.4	20,330.4	3,167.4	78,341.3	74.0%	18,990.0
5.00	975.00	2,767.3	60,778.2	394.3	20,724.7	3,161.6	81,502.9	74.6%	18,946.2
5.17	975.16	2,752.7	63,530.9	400.1	21,124.8	3,152.8	84,655.8	75.0%	18,884.7
5.33	975.33	2,733.1	66,264.1	408.0	21,532.8	3,141.1	87,796.8	75.5%	18,805.0
5.50	975.50	2,708.4	68,972.4	417.8	21,950.6	3,126.2	90,923.1	75.9%	18,706.7
5.67	975.66	2,678.4	71,650.9	429.8	22,380.4	3,108.3	94,031.3	76.2%	18,589.2
5.83	975.83	2,643.1	74,294.0	444.0	22,824.4	3,087.0	97,118.4	76.5%	18,451.9
6.00	976.00	2,602.1	76,896.0	460.4	23,284.8	3,062.4	100,180.8	76.8%	18,293.8
6.17	976.16	2,555.1	79,451.1	479.1	23,763.9	3,034.3	103,215.1	77.0%	18,113.8
6.33	976.33	2,501.9	81,953.1	500.4	24,264.4	3,002.4	106,217.5	77.2%	17,910.6
6.50	976.50	2,442.1	84,395.2	524.4	24,788.7	2,966.5	109,183.9	77.3%	17,682.7
6.67	976.66	2,375.1	86,770.3	551.2	25,339.9	2,926.3	112,110.2	77.4%	17,427.9
6.83	976.83	2,300.3	89,070.7	581.1	25,920.9	2,881.4	114,991.6	77.5%	17,143.8
7.00	977.00	2,217.0	91,287.7	614.4	26,535.3	2,831.4	117,823.0	77.5%	16,827.2
7.17	977.16	2,124.1	93,411.7	651.6	27,186.9	2,775.6	120,598.6	77.5%	16,473.9
7.33	977.33	2,020.2	95,431.9	693.1	27,880.0	2,713.3	123,312.0	77.4%	16,078.4
7.50	977.50	1,903.7	97,335.6	739.7	28,619.8	2,643.4	125,955.3	77.3%	15,633.2
7.67	977.66	1,771.9	99,107.5	792.4	29,412.2	2,564.3	128,519.7	77.1%	15,127.5
7.83	977.83	1,621.2	100,728.6	852.7	30,265.0	2,473.9	130,993.6	76.9%	14,544.6
8.00	978.00	1,445.5	102,174.2	923.0	31,187.9	2,368.5	133,362.1	76.6%	13,856.9
8.17	978.16	1,234.3	103,408.4	1,007.5	32,195.4	2,241.8	135,603.9	76.3%	13,010.8
8.33	978.33	963.5	104,371.9	1,115.8	33,311.2	2,079.3	137,683.1	75.8%	11,868.8
8.50	978.50	532.2	104,904.1	1,288.3	34,599.6	1,820.5	139,503.6	75.2%	9,007.2
8.67	978.66	0.0	104,904.1	1,501.2	36,100.8	1,501.2	141,004.8	74.4%	9,007.2
8.83	978.83	0.0	104,904.1	1,501.2	37,602.0	1,501.2	142,506.0	73.6%	9,007.2
9.00	979.00	0.0	104,904.1	1,501.2	39,103.2	1,501.2	144,007.2	72.8%	9,007.2

These results are submitted to you as a guideline only, without liability on the part of CONTECH Engineered Solutions, LLC for accuracy or suitability to any particular application, and are subject to your verification.

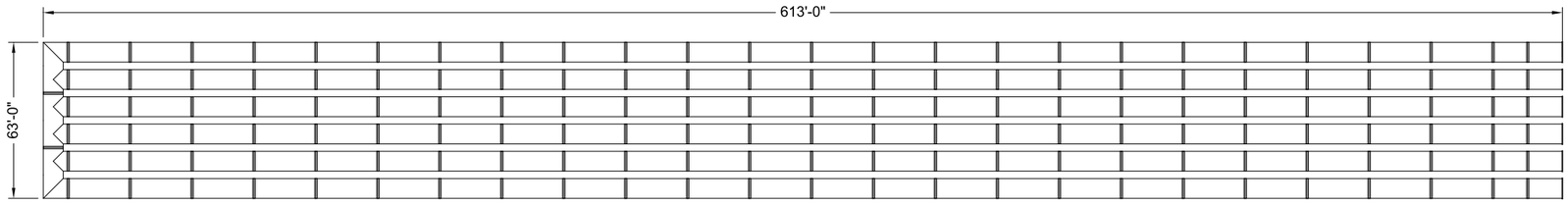
PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 3,693 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = 255,200 CF
- PIPE STORAGE VOLUME = 185,630 CF
- BACKFILL STORAGE VOLUME = 69,658 CF
- TOTAL STORAGE PROVIDED = 255,288 CF

PIPE DETAILS
- DIAMETER = 96"
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = PERFORATED
- BARREL SPACING = 36"

BACKFILL DETAILS
- WIDTH AT ENDS = 12"
- ABOVE PIPE = 6"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 6"



NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

ASSEMBLY
SCALE: 1" = 60'

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DATE	REVISION DESCRIPTION	BY

CONTECH® ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH® CMP DETENTION SYSTEMS
CONTECH **DYODS** DRAWING

DYO22645 11115 Hemlock Avenue
Underground Infiltration Chamber System A
Fontana, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
14898	22645	1/26/2023
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

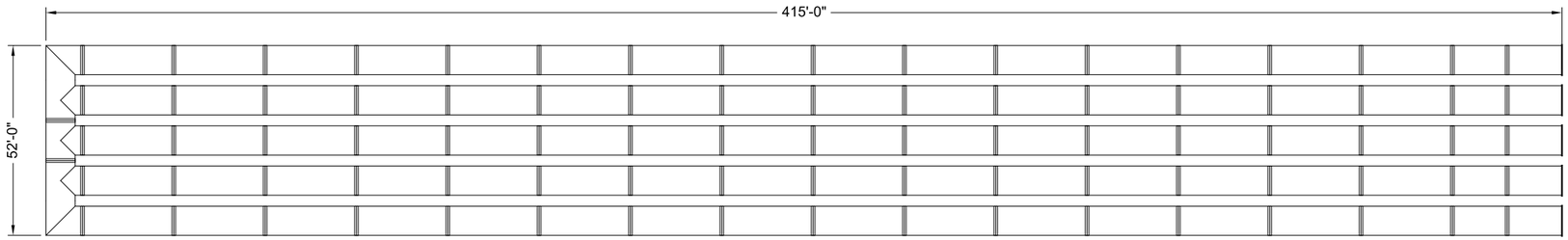
PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 2,087 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = 144,000 CF
- PIPE STORAGE VOLUME = 104,904 CF
- BACKFILL STORAGE VOLUME = 39,103 CF
- TOTAL STORAGE PROVIDED = 144,007 CF

PIPE DETAILS
- DIAMETER = 96"
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = PERFORATED
- BARREL SPACING = 36"

BACKFILL DETAILS
- WIDTH AT ENDS = 12"
- ABOVE PIPE = 6"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 6"



NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
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ASSEMBLY
SCALE: 1" = 40'

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DATE	REVISION DESCRIPTION	BY

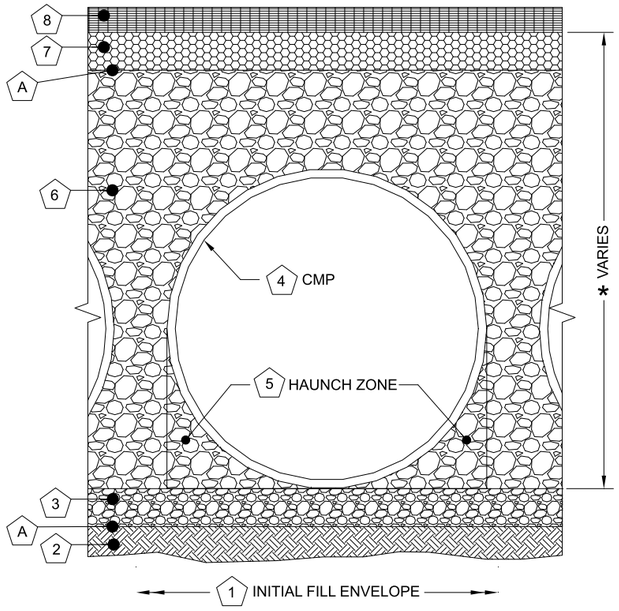
CONTECH® ENGINEERED SOLUTIONS LLC
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CONTECH® CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO22646 11115 Hemlock Avenue
Underground Infiltration Chamber System B
Fontana, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
14898	22646	1/26/2023
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

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Infiltration Systems - CMP Infiltration & CMP Perforated Drainage Pipe			
Material Location	Description	Material Designation	Designation
8 Rigid or Flexible Pavement (if applicable)			
7 Road Base (if applicable			
A Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types. Wrap the trench only.
6 Backfill	Infiltration pipe systems have a pipe perforation sized of 3/8" diameter. An open graded, free draining stone, with a particle size of ½" – 2 ½" diameter is recommended.	AASHTO M 145-A-1 or AASHTO M 43 - 3, 4	Material shall be worked into the pipe haunches by means of shovel-slicing, rodding, air-tamper, vibratory rod, or other effective methods. Compaction of all placed fill material is necessary and shall be considered adequate when no further yielding of the material is observed under the compactor, or under foot, and the Project Engineer or his representative is satisfied with the level of compaction"
3 Bedding Stone	Well graded granular bedding material w/maximum particle size of 3"	AASHTO M43 - 3,357,4,467, 5, 56, 57	For soil aggregates larger than 3/8" a dedicated bedding layer is not required for CMP. Pipe may be placed on the trench bottom comprised of native suitable well graded & granular material. For Arch pipes it is recommended to be shaped to a relatively flat bottom or fine-grade the foundation to a slight v-shape. Soil aggregates less than 3/8" and unsuitable material should be over-excavated and re-placed with a 4"-6" layer of well graded & granular stone per the material designation.
A Geotextile Layer	None	None	Contech does not recommend geotextiles be placed under the invert of Infiltration systems due to the propensity for geotextiles to clog over time.
* Note: The listed AASHTO designations are for gradation only. The stone must also be angular and clean.			

1 MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT.

FOUNDATION/BEDDING PREPARATION

2 PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND BROUGHT BACK TO THE GRADE WITH A FILL MATERIAL AS APPROVED BY THE ENGINEER.

5 HAUNCH ZONE MATERIAL SHALL BE PLACED AND UNIFORMLY COMPACTED WITHOUT SOFT SPOTS.

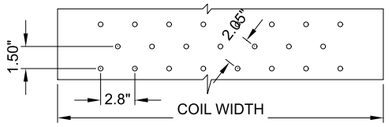
BACKFILL

MATERIAL SHALL BE PLACED IN 8"-10" MAXIMUM LIFTS. INADEQUATE COMPACTION CAN LEAD TO EXCESSIVE DEFLECTIONS WITHIN THE SYSTEM AND SETTLEMENT OF THE SOILS OVER THE SYSTEM. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO-LIFT DIFFERENTIAL BETWEEN THE SIDES OF ANY PIPE IN THE SYSTEM AT ALL TIMES DURING THE BACKFILL PROCESS. BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON ANY PIPES IN THE SYSTEM.

EQUIPMENT USED TO PLACE AND COMPACT THE BACKFILL SHALL BE OF A SIZE AND TYPE SO AS NOT TO DISTORT, DAMAGE, OR DISPLACE THE PIPE. ATTENTION MUST BE GIVEN TO PROVIDING ADEQUATE MINIMUM COVER FOR SUCH EQUIPMENT. MAINTAIN BALANCED LOADING ON ALL PIPES IN THE SYSTEM DURING ALL SUCH OPERATIONS.

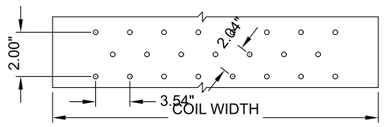
OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS. REFER TO TYPICAL BACKFILL DETAIL FOR MATERIAL REQUIRED.

2 2/3" x 1/2" CORRUGATION - STEEL AND ALUMINUM CMP EDGE SPACING EQUAL ON BOTH SIDES



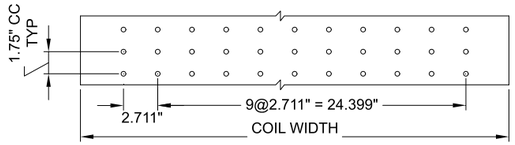
OPEN AREA = 3.76 SQ IN/SQ FT

3" x 1" CORRUGATION - STEEL AND ALUMINUM CMP (COIL PROVIDED FROM CONTECH LANTANA, FL PLANT)



OPEN AREA = 4.16 SQ IN/SQ FT

5" x 1" CORRUGATION - STEEL ONLY
EDGE SPACING EQUAL ON BOTH SIDES



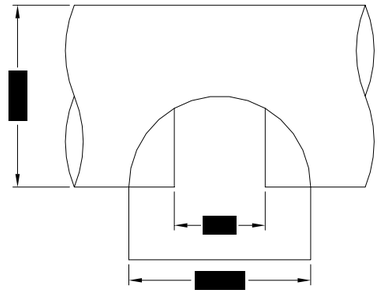
OPEN AREA = 3.33 SQ IN/SQ FT

NOTES:

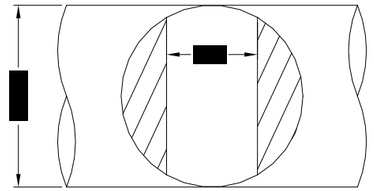
1. PERFORATIONS MEET AASHTO AND ASTM SPECIFICATIONS.
2. PERFORATION OPEN AREA PER SQUARE FOOT OF PIPE IS BASED ON THE NOMINAL DIAMETER AND LENGTH OF PIPE.
3. ALL DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES.
4. ALL HOLES ⌀3/8".

TYPICAL PERFORATION DETAIL

SCALE: N.T.S.



PLAN

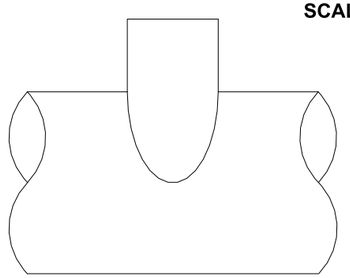


FRONT

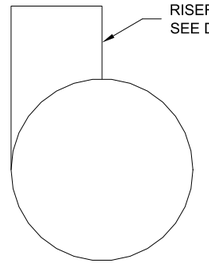
TYPICAL MANWAY DETAIL

SCALE: N.T.S.

NOTE:
MANWAY DETAIL APPLICABLE FOR CMP SYSTEMS WITH DIAMETERS 48" AND LARGER. MANWAYS MAY BE REQUIRED ON SMALLER SYSTEMS DEPENDING ON ACTUAL SITE SPECIFIC CONDITIONS.



ELEVATION

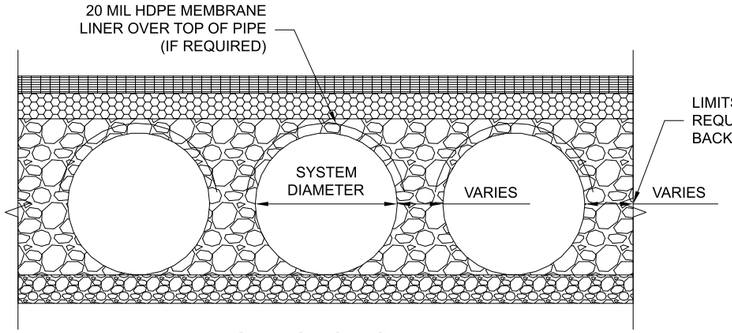


END

TYPICAL RISER DETAIL

SCALE: N.T.S.

NOTE:
LADDERS ARE OPTIONAL AND ARE NOT REQUIRED FOR ALL SYSTEMS.



TYPICAL SECTION VIEW

LINER OVER ROWS
SCALE: N.T.S.

NOTE: IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, AN HDPE MEMBRANE LINER IS RECOMMENDED WITH THE SYSTEM. THE IMPERMEABLE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

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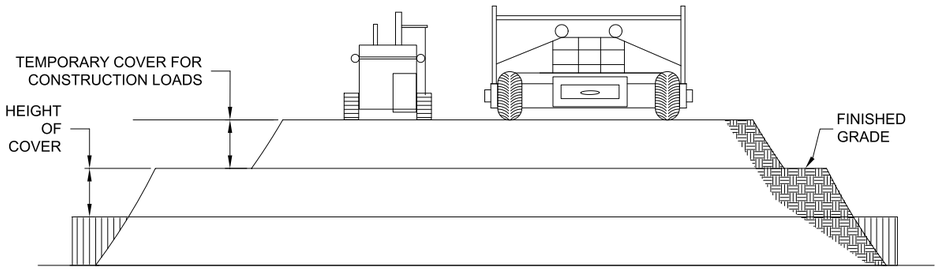
CONTECH ENGINEERED SOLUTIONS LLC
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CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO22645 11115 Hemlock Avenue
Underground Infiltration Chamber System A
Fontana, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
14898	22645	1/26/2023
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

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CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

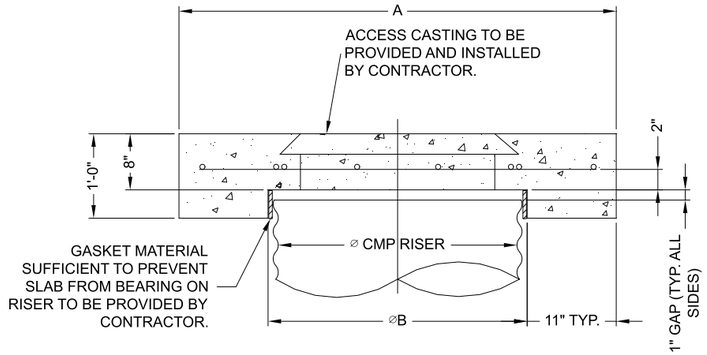
APPLICABLE POLYMER COATED: AASHTO M-245 OR ASTM A-762

ALUMINUM: AASHTO M-196 OR ASTM B-745

APPLICABLE
HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.
REQUIREMENTS
INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

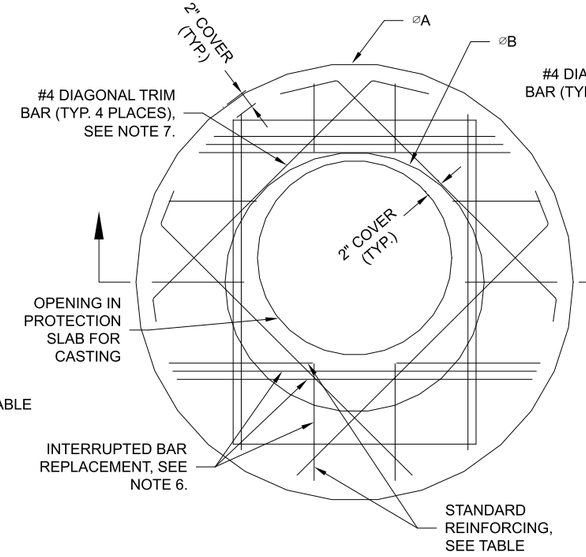
NOTE:
THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.



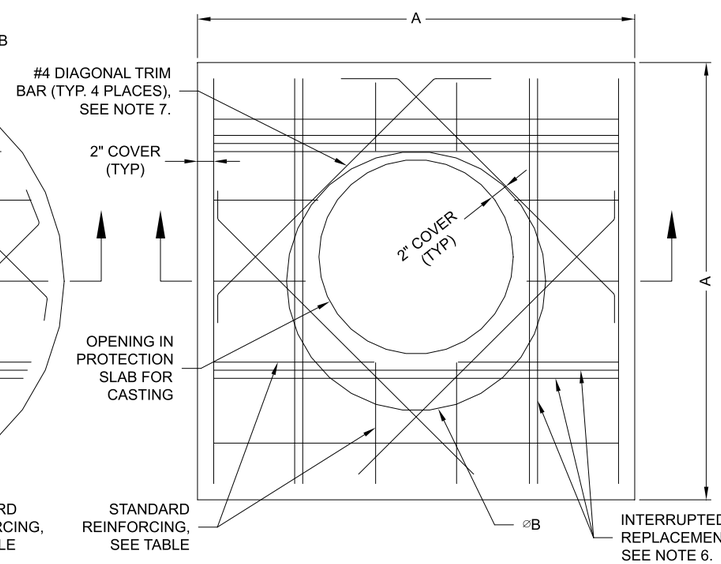
SECTION VIEW

REINFORCING TABLE				
⌀ CMP RISER	A	⌀ B	REINFORCING	**BEARING PRESSURE (PSF)
24"	⌀ 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	⌀ 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	⌀ 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	⌀ 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	⌀ 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

SCALE: N.T.S.

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CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO22645 11115 Hemlock Avenue
Underground Infiltration Chamber System A
Fontana, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
14898	22645	1/26/2023
DESIGNED: DYO	DRAWN: DYO	
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SHEET NO.: 1		

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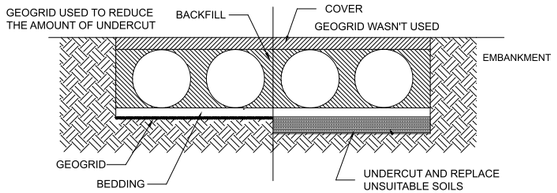
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.

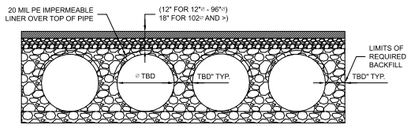


GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

A SITE'S RESISTIVITY MAY CHANGE OVER TIME WHEN VARIOUS TYPES OF SALTING AGENTS ARE USED, SUCH AS ROAD SALTS FOR DEICING AGENTS. IF SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE, A GEOMEMBRANE BARRIER IS RECOMMENDED WITH THE SYSTEM. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM THE USE OF SUCH AGENTS INCLUDING PREMATURE CORROSION AND REDUCED ACTUAL SERVICE LIFE.

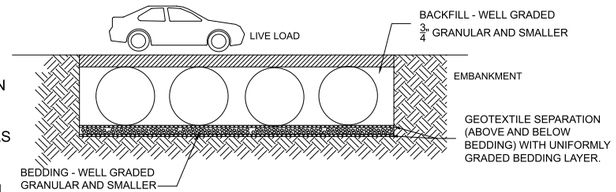
THE PROJECT'S ENGINEER OF RECORD IS TO EVALUATE WHETHER SALTING AGENTS WILL BE USED ON OR NEAR THE PROJECT SITE, AND USE HIS/HER BEST JUDGEMENT TO DETERMINE IF ANY ADDITIONAL PROTECTIVE MEASURES ARE REQUIRED. BELOW IS A TYPICAL DETAIL SHOWING THE PLACEMENT OF A GEOMEMBRANE BARRIER FOR PROJECTS WHERE SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE.



IN-SITU TRENCH WALL

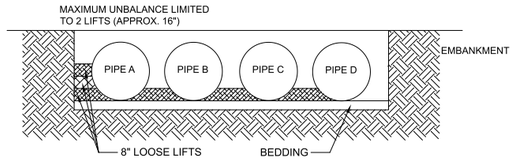
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



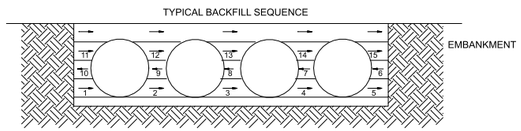
BACKFILL PLACEMENT

MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.

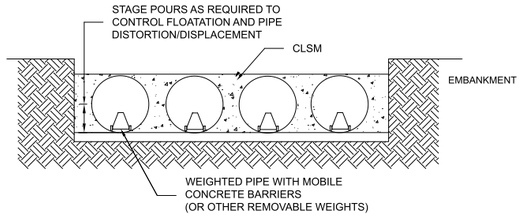


IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

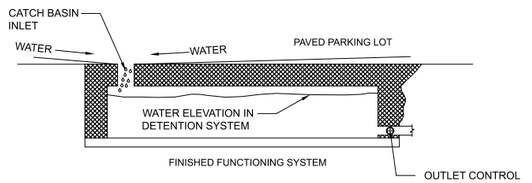


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

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CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO22645 11115 Hemlock Avenue
Underground Infiltration Chamber System A
Fontana, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
14898	22645	1/26/2023
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

APPENDIX D.1

BASIN ROUTING ANALYSIS

DRAINAGE AREA A – 2 YEAR

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
Study date: 01/25/23

JOB NO. 2022-318
11115 HEMLOCK AVE
2 YEAR, BASIN ROUTING
POST-CONDITION, CHAMBER A

Program License Serial Number 6277

********** HYDROGRAPH INFORMATION **********

From study/file name: 2022318UH2POSTA.rte
**********HYDROGRAPH DATA**********
Number of intervals = 292
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 31.928 (CFS)
Total volume = 4.064 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

++
Process from Point/Station 3.700 to Point/Station 3.700
**** RETARDING BASIN ROUTING ****
_____

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 292
Hydrograph time unit = 5.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)
Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
1.000	0.370	1.270	0.366	0.374
2.000	0.920	1.270	0.916	0.924
3.000	1.600	1.270	1.596	1.604
4.000	2.340	1.629	2.334	2.346

5.000	3.110	11.600	3.070	3.150
6.000	3.880	20.380	3.810	3.950
7.000	4.630	26.310	4.539	4.721
8.000	5.310	31.130	5.203	5.417
9.000	5.860	35.290	5.738	5.982

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	8.0	15.96	23.95	31.93	Depth (Ft.)
0.083	0.08	0.00	0.000	O	|	|	|	|	0.00
0.167	0.48	0.01	0.002	O	|	|	|	|	0.01
0.250	0.78	0.02	0.006	O	|	|	|	|	0.02
0.333	0.85	0.04	0.012	O	|	|	|	|	0.03
0.417	0.87	0.06	0.017	O	|	|	|	|	0.05
0.500	0.87	0.08	0.023	O	|	|	|	|	0.06
0.583	0.87	0.10	0.028	O	|	|	|	|	0.08
0.667	0.88	0.12	0.034	O	|	|	|	|	0.09
0.750	0.88	0.13	0.039	O	|	|	|	|	0.10
0.833	0.88	0.15	0.044	O	|	|	|	|	0.12
0.917	0.89	0.17	0.049	O	|	|	|	|	0.13
1.000	0.89	0.18	0.054	O	|	|	|	|	0.15
1.083	0.89	0.20	0.059	O	|	|	|	|	0.16
1.167	0.89	0.22	0.063	O	|	|	|	|	0.17
1.250	0.90	0.23	0.068	O	|	|	|	|	0.18
1.333	0.90	0.25	0.072	O	|	|	|	|	0.20
1.417	0.90	0.26	0.077	O	|	|	|	|	0.21
1.500	0.91	0.28	0.081	O	|	|	|	|	0.22
1.583	0.91	0.29	0.086	O	|	|	|	|	0.23
1.667	0.91	0.31	0.090	O	|	|	|	|	0.24
1.750	0.91	0.32	0.094	O	|	|	|	|	0.25
1.833	0.92	0.34	0.098	O	|	|	|	|	0.26
1.917	0.92	0.35	0.102	O	|	|	|	|	0.28
2.000	0.92	0.36	0.106	O	|	|	|	|	0.29
2.083	0.93	0.38	0.110	O	|	|	|	|	0.30
2.167	0.93	0.39	0.113	O	|	|	|	|	0.31
2.250	0.93	0.40	0.117	O	|	|	|	|	0.32
2.333	0.94	0.41	0.121	O	|	|	|	|	0.33
2.417	0.94	0.43	0.124	O	|	|	|	|	0.34
2.500	0.94	0.44	0.128	O	|	|	|	|	0.35
2.583	0.95	0.45	0.131	O	|	|	|	|	0.35
2.667	0.95	0.46	0.135	O	|	|	|	|	0.36
2.750	0.95	0.47	0.138	O	|	|	|	|	0.37
2.833	0.96	0.48	0.141	O	|	|	|	|	0.38
2.917	0.96	0.50	0.144	O	|	|	|	|	0.39
3.000	0.96	0.51	0.148	O	|	|	|	|	0.40
3.083	0.97	0.52	0.151	O	|	|	|	|	0.41
3.167	0.97	0.53	0.154	O	|	|	|	|	0.42
3.250	0.97	0.54	0.157	O	|	|	|	|	0.42
3.333	0.98	0.55	0.160	O	|	|	|	|	0.43
3.417	0.98	0.56	0.163	O	|	|	|	|	0.44
3.500	0.98	0.57	0.166	O	|	|	|	|	0.45
3.583	0.99	0.58	0.168	O	|	|	|	|	0.46
3.667	0.99	0.59	0.171	O	|	|	|	|	0.46
3.750	1.00	0.60	0.174	O	|	|	|	|	0.47
3.833	1.00	0.61	0.177	OI	|	|	|	|	0.48
3.917	1.00	0.62	0.179	OI	|	|	|	|	0.48
4.000	1.01	0.63	0.182	OI	|	|	|	|	0.49

4.083	1.01	0.63	0.185	OI	|	|	|	0.50
4.167	1.02	0.64	0.187	OI	|	|	|	0.51
4.250	1.02	0.65	0.190	OI	|	|	|	0.51
4.333	1.02	0.66	0.192	OI	|	|	|	0.52
4.417	1.03	0.67	0.195	OI	|	|	|	0.53
4.500	1.03	0.68	0.197	OI	|	|	|	0.53
4.583	1.04	0.69	0.200	OI	|	|	|	0.54
4.667	1.04	0.69	0.202	OI	|	|	|	0.55
4.750	1.04	0.70	0.205	OI	|	|	|	0.55
4.833	1.05	0.71	0.207	OI	|	|	|	0.56
4.917	1.05	0.72	0.209	OI	|	|	|	0.57
5.000	1.06	0.73	0.211	OI	|	|	|	0.57
5.083	1.06	0.73	0.214	OI	|	|	|	0.58
5.167	1.07	0.74	0.216	OI	|	|	|	0.58
5.250	1.07	0.75	0.218	OI	|	|	|	0.59
5.333	1.08	0.76	0.220	OI	|	|	|	0.60
5.417	1.08	0.76	0.223	OI	|	|	|	0.60
5.500	1.09	0.77	0.225	OI	|	|	|	0.61
5.583	1.09	0.78	0.227	OI	|	|	|	0.61
5.667	1.10	0.79	0.229	OI	|	|	|	0.62
5.750	1.10	0.79	0.231	OI	|	|	|	0.63
5.833	1.11	0.80	0.233	OI	|	|	|	0.63
5.917	1.11	0.81	0.235	OI	|	|	|	0.64
6.000	1.12	0.82	0.238	OI	|	|	|	0.64
6.083	1.12	0.82	0.240	OI	|	|	|	0.65
6.167	1.13	0.83	0.242	OI	|	|	|	0.65
6.250	1.13	0.84	0.244	OI	|	|	|	0.66
6.333	1.14	0.84	0.246	OI	|	|	|	0.66
6.417	1.14	0.85	0.248	OI	|	|	|	0.67
6.500	1.15	0.86	0.250	OI	|	|	|	0.68
6.583	1.15	0.86	0.252	OI	|	|	|	0.68
6.667	1.16	0.87	0.254	OI	|	|	|	0.69
6.750	1.17	0.88	0.256	OI	|	|	|	0.69
6.833	1.17	0.88	0.258	OI	|	|	|	0.70
6.917	1.18	0.89	0.260	OI	|	|	|	0.70
7.000	1.18	0.90	0.262	OI	|	|	|	0.71
7.083	1.19	0.91	0.264	OI	|	|	|	0.71
7.167	1.20	0.91	0.266	OI	|	|	|	0.72
7.250	1.20	0.92	0.268	OI	|	|	|	0.72
7.333	1.21	0.93	0.270	OI	|	|	|	0.73
7.417	1.22	0.93	0.272	OI	|	|	|	0.73
7.500	1.22	0.94	0.274	OI	|	|	|	0.74
7.583	1.23	0.95	0.275	OI	|	|	|	0.74
7.667	1.24	0.95	0.277	OI	|	|	|	0.75
7.750	1.24	0.96	0.279	OI	|	|	|	0.76
7.833	1.25	0.97	0.281	OI	|	|	|	0.76
7.917	1.26	0.97	0.283	OI	|	|	|	0.77
8.000	1.27	0.98	0.285	OI	|	|	|	0.77
8.083	1.27	0.99	0.287	OI	|	|	|	0.78
8.167	1.28	0.99	0.289	OI	|	|	|	0.78
8.250	1.29	1.00	0.291	|O	|	|	|	0.79
8.333	1.30	1.01	0.293	|O	|	|	|	0.79
8.417	1.30	1.01	0.295	|O	|	|	|	0.80
8.500	1.31	1.02	0.297	|O	|	|	|	0.80
8.583	1.32	1.03	0.299	|O	|	|	|	0.81
8.667	1.33	1.03	0.301	|O	|	|	|	0.81
8.750	1.34	1.04	0.303	|O	|	|	|	0.82
8.833	1.35	1.05	0.305	|O	|	|	|	0.83
8.917	1.35	1.06	0.307	|O	|	|	|	0.83
9.000	1.36	1.06	0.309	|O	|	|	|	0.84
9.083	1.37	1.07	0.312	|O	|	|	|	0.84

9.167	1.38	1.08	0.314	O				0.85
9.250	1.39	1.08	0.316	O				0.85
9.333	1.40	1.09	0.318	O				0.86
9.417	1.41	1.10	0.320	O				0.86
9.500	1.42	1.11	0.322	O				0.87
9.583	1.43	1.11	0.324	O				0.88
9.667	1.44	1.12	0.327	O				0.88
9.750	1.45	1.13	0.329	O				0.89
9.833	1.46	1.14	0.331	O				0.89
9.917	1.47	1.14	0.333	O				0.90
10.000	1.49	1.15	0.336	O				0.91
10.083	1.50	1.16	0.338	O				0.91
10.167	1.51	1.17	0.340	O				0.92
10.250	1.52	1.18	0.343	O				0.93
10.333	1.53	1.18	0.345	O				0.93
10.417	1.55	1.19	0.347	O				0.94
10.500	1.56	1.20	0.350	O				0.95
10.583	1.57	1.21	0.352	O				0.95
10.667	1.59	1.22	0.355	O				0.96
10.750	1.60	1.23	0.357	O				0.97
10.833	1.61	1.24	0.360	O				0.97
10.917	1.63	1.24	0.363	O				0.98
11.000	1.64	1.25	0.365	O				0.99
11.083	1.66	1.26	0.368	O				0.99
11.167	1.67	1.27	0.371	O				1.00
11.250	1.69	1.27	0.374	O				1.01
11.333	1.71	1.27	0.376	O				1.01
11.417	1.72	1.27	0.380	O				1.02
11.500	1.74	1.27	0.383	O				1.02
11.583	1.76	1.27	0.386	O				1.03
11.667	1.78	1.27	0.389	O				1.04
11.750	1.80	1.27	0.393	O				1.04
11.833	1.82	1.27	0.397	O				1.05
11.917	1.84	1.27	0.401	O				1.06
12.000	1.86	1.27	0.405	O				1.06
12.083	1.92	1.27	0.409	O				1.07
12.167	2.18	1.27	0.414	OI				1.08
12.250	2.37	1.27	0.421	OI				1.09
12.333	2.44	1.27	0.429	OI				1.11
12.417	2.47	1.27	0.437	OI				1.12
12.500	2.49	1.27	0.445	OI				1.14
12.583	2.52	1.27	0.454	OI				1.15
12.667	2.55	1.27	0.463	OI				1.17
12.750	2.58	1.27	0.472	OI				1.18
12.833	2.61	1.27	0.481	OI				1.20
12.917	2.64	1.27	0.490	OI				1.22
13.000	2.67	1.27	0.499	OI				1.24
13.083	2.70	1.27	0.509	OI				1.25
13.167	2.74	1.27	0.519	OI				1.27
13.250	2.77	1.27	0.529	OI				1.29
13.333	2.81	1.27	0.540	OI				1.31
13.417	2.85	1.27	0.551	OI				1.33
13.500	2.89	1.27	0.562	OI				1.35
13.583	2.93	1.27	0.573	OI				1.37
13.667	2.97	1.27	0.584	OI				1.39
13.750	3.02	1.27	0.596	O I				1.41
13.833	3.07	1.27	0.608	O I				1.43
13.917	3.12	1.27	0.621	O I				1.46
14.000	3.17	1.27	0.634	O I				1.48
14.083	3.23	1.27	0.647	O I				1.50
14.167	3.30	1.27	0.661	O I				1.53

```
14.250    3.36    1.27      0.675  |O I    |       |       |       |     1.55
14.333    3.43    1.27      0.690  |O I    |       |       |       |     1.58
14.417    3.50    1.27      0.705  |O I    |       |       |       |     1.61
14.500    3.58    1.27      0.721  |O I    |       |       |       |     1.64
14.583    3.66    1.27      0.737  |O I    |       |       |       |     1.67
14.667    3.76    1.27      0.754  |O I    |       |       |       |     1.70
14.750    3.85    1.27      0.771  |O I    |       |       |       |     1.73
14.833    3.97    1.27      0.789  |O I    |       |       |       |     1.76
14.917    4.08    1.27      0.808  |O  I   |       |       |       |     1.80
15.000    4.21    1.27      0.828  |O  I   |       |       |       |     1.83
15.083    4.35    1.27      0.849  |O  I   |       |       |       |     1.87
15.167    4.52    1.27      0.871  |O  I   |       |       |       |     1.91
15.250    4.69    1.27      0.894  |O  I   |       |       |       |     1.95
15.333    4.91    1.27      0.918  |O  I   |       |       |       |     2.00
15.417    5.01    1.27      0.943  |O   I  |       |       |       |     2.03
15.500    4.64    1.27      0.968  |O  I   |       |       |       |     2.07
15.583    4.46    1.27      0.990  |O  I   |       |       |       |     2.10
15.667    4.78    1.27      1.013  |O  I   |       |       |       |     2.14
15.750    5.27    1.27      1.039  |O   I  |       |       |       |     2.18
15.833    6.05    1.27      1.069  |O    I |       |       |       |     2.22
15.917    7.16    1.27      1.106  |O     I|       |       |       |     2.27
16.000    9.44    1.27      1.155  |O      I       |       |       |     2.35
16.083   16.35    1.27      1.235  |O      |       I       |       |     2.46
16.167   31.93    1.27      1.392  |O      |       |       |      I|     2.69
16.250   24.58    1.27      1.578  |O      |       |       I       |     2.97
16.333   10.55    1.31      1.690  |O      | I     |       |       |     3.12
16.417    6.37    1.34      1.739  |O    I |       |       |       |     3.19
16.500    5.20    1.35      1.770  |O   I  |       |       |       |     3.23
16.583    5.03    1.36      1.796  |O   I  |       |       |       |     3.26
16.667    4.68    1.38      1.820  |O  I   |       |       |       |     3.30
16.750    4.36    1.39      1.841  |O  I   |       |       |       |     3.33
16.833    4.08    1.40      1.861  |O  I   |       |       |       |     3.35
16.917    3.86    1.41      1.878  |O I    |       |       |       |     3.38
17.000    3.66    1.41      1.895  |O I    |       |       |       |     3.40
17.083    3.50    1.42      1.910  |O I    |       |       |       |     3.42
17.167    3.36    1.43      1.923  |O I    |       |       |       |     3.44
17.250    3.23    1.43      1.936  |O I    |       |       |       |     3.45
17.333    3.12    1.44      1.948  |O I    |       |       |       |     3.47
17.417    3.02    1.44      1.959  |O I    |       |       |       |     3.49
17.500    2.93    1.45      1.970  |OI     |       |       |       |     3.50
17.583    2.84    1.45      1.980  |OI     |       |       |       |     3.51
17.667    2.77    1.46      1.989  |OI     |       |       |       |     3.53
17.750    2.70    1.46      1.998  |OI     |       |       |       |     3.54
17.833    2.63    1.47      2.006  |OI     |       |       |       |     3.55
17.917    2.57    1.47      2.014  |OI     |       |       |       |     3.56
18.000    2.52    1.47      2.021  |OI     |       |       |       |     3.57
18.083    2.42    1.48      2.028  |OI     |       |       |       |     3.58
18.167    2.14    1.48      2.034  |OI     |       |       |       |     3.59
18.250    1.92    1.48      2.037  |O      |       |       |       |     3.59
18.333    1.84    1.48      2.040  |O      |       |       |       |     3.59
18.417    1.80    1.48      2.042  |O      |       |       |       |     3.60
18.500    1.76    1.49      2.044  |O      |       |       |       |     3.60
18.583    1.72    1.49      2.046  |O      |       |       |       |     3.60
18.667    1.69    1.49      2.048  |O      |       |       |       |     3.61
18.750    1.66    1.49      2.049  |O      |       |       |       |     3.61
18.833    1.63    1.49      2.050  |O      |       |       |       |     3.61
18.917    1.60    1.49      2.051  |O      |       |       |       |     3.61
19.000    1.57    1.49      2.052  |O      |       |       |       |     3.61
19.083    1.54    1.49      2.052  |O      |       |       |       |     3.61
19.167    1.52    1.49      2.052  |O      |       |       |       |     3.61
19.250    1.50    1.49      2.052  |O      |       |       |       |     3.61
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19.333	1.47	1.49	2.052	O				3.61
19.417	1.45	1.49	2.052	O				3.61
19.500	1.43	1.49	2.052	O				3.61
19.583	1.41	1.49	2.051	O				3.61
19.667	1.39	1.49	2.051	O				3.61
19.750	1.37	1.49	2.050	O				3.61
19.833	1.35	1.49	2.049	O				3.61
19.917	1.34	1.49	2.048	O				3.61
20.000	1.32	1.49	2.047	O				3.60
20.083	1.30	1.49	2.046	O				3.60
20.167	1.29	1.49	2.045	O				3.60
20.250	1.27	1.49	2.043	O				3.60
20.333	1.26	1.48	2.042	O				3.60
20.417	1.24	1.48	2.040	O				3.59
20.500	1.23	1.48	2.038	O				3.59
20.583	1.22	1.48	2.037	O				3.59
20.667	1.20	1.48	2.035	O				3.59
20.750	1.19	1.48	2.033	O				3.58
20.833	1.18	1.48	2.031	O				3.58
20.917	1.17	1.48	2.029	O				3.58
21.000	1.15	1.48	2.026	O				3.58
21.083	1.14	1.48	2.024	O				3.57
21.167	1.13	1.47	2.022	O				3.57
21.250	1.12	1.47	2.019	O				3.57
21.333	1.11	1.47	2.017	O				3.56
21.417	1.10	1.47	2.014	O				3.56
21.500	1.09	1.47	2.012	O				3.56
21.583	1.08	1.47	2.009	O				3.55
21.667	1.07	1.47	2.007	O				3.55
21.750	1.06	1.47	2.004	O				3.55
21.833	1.05	1.46	2.001	O				3.54
21.917	1.04	1.46	1.998	O				3.54
22.000	1.04	1.46	1.995	O				3.53
22.083	1.03	1.46	1.992	O				3.53
22.167	1.02	1.46	1.989	O				3.53
22.250	1.01	1.46	1.986	O				3.52
22.333	1.00	1.46	1.983	O				3.52
22.417	1.00	1.45	1.980	IO				3.51
22.500	0.99	1.45	1.977	IO				3.51
22.583	0.98	1.45	1.974	IO				3.50
22.667	0.97	1.45	1.970	IO				3.50
22.750	0.97	1.45	1.967	IO				3.50
22.833	0.96	1.45	1.964	IO				3.49
22.917	0.95	1.44	1.960	IO				3.49
23.000	0.95	1.44	1.957	IO				3.48
23.083	0.94	1.44	1.954	IO				3.48
23.167	0.93	1.44	1.950	IO				3.47
23.250	0.93	1.44	1.947	IO				3.47
23.333	0.92	1.44	1.943	IO				3.46
23.417	0.91	1.43	1.939	IO				3.46
23.500	0.91	1.43	1.936	IO				3.45
23.583	0.90	1.43	1.932	IO				3.45
23.667	0.90	1.43	1.929	IO				3.44
23.750	0.89	1.43	1.925	IO				3.44
23.833	0.89	1.43	1.921	IO				3.43
23.917	0.88	1.42	1.917	IO				3.43
24.000	0.87	1.42	1.914	IO				3.42
24.083	0.79	1.42	1.910	IO				3.42
24.167	0.38	1.42	1.904	IO				3.41
24.250	0.08	1.41	1.896	IO				3.40
24.333	0.02	1.41	1.886	IO				3.39

24.417	0.00	1.40	1.877	IO				3.37
24.500	0.00	1.40	1.867	IO				3.36
24.583	0.00	1.39	1.857	IO				3.35
24.667	0.00	1.39	1.848	IO				3.33
24.750	0.00	1.39	1.838	IO				3.32
24.833	0.00	1.38	1.829	IO				3.31
24.917	0.00	1.38	1.819	IO				3.30
25.000	0.00	1.37	1.810	IO				3.28
25.083	0.00	1.37	1.800	IO				3.27
25.167	0.00	1.36	1.791	IO				3.26
25.250	0.00	1.36	1.782	IO				3.25
25.333	0.00	1.35	1.772	IO				3.23
25.417	0.00	1.35	1.763	IO				3.22
25.500	0.00	1.34	1.754	IO				3.21
25.583	0.00	1.34	1.744	IO				3.20
25.667	0.00	1.34	1.735	IO				3.18
25.750	0.00	1.33	1.726	IO				3.17
25.833	0.00	1.33	1.717	IO				3.16
25.917	0.00	1.32	1.708	IO				3.15
26.000	0.00	1.32	1.699	IO				3.13
26.083	0.00	1.31	1.690	IO				3.12
26.167	0.00	1.31	1.681	IO				3.11
26.250	0.00	1.30	1.672	IO				3.10
26.333	0.00	1.30	1.663	IO				3.08
26.417	0.00	1.30	1.654	IO				3.07
26.500	0.00	1.29	1.645	IO				3.06
26.583	0.00	1.29	1.636	IO				3.05
26.667	0.00	1.28	1.627	IO				3.04
26.750	0.00	1.28	1.618	IO				3.02
26.833	0.00	1.27	1.609	IO				3.01
26.917	0.00	1.27	1.601	IO				3.00
27.000	0.00	1.27	1.592	IO				2.99
27.083	0.00	1.27	1.583	IO				2.98
27.167	0.00	1.27	1.574	IO				2.96
27.250	0.00	1.27	1.566	IO				2.95
27.333	0.00	1.27	1.557	IO				2.94
27.417	0.00	1.27	1.548	IO				2.92
27.500	0.00	1.27	1.539	IO				2.91
27.583	0.00	1.27	1.531	IO				2.90
27.667	0.00	1.27	1.522	IO				2.89
27.750	0.00	1.27	1.513	IO				2.87
27.833	0.00	1.27	1.504	IO				2.86
27.917	0.00	1.27	1.496	IO				2.85
28.000	0.00	1.27	1.487	IO				2.83
28.083	0.00	1.27	1.478	IO				2.82
28.167	0.00	1.27	1.469	IO				2.81
28.250	0.00	1.27	1.461	IO				2.80
28.333	0.00	1.27	1.452	IO				2.78
28.417	0.00	1.27	1.443	IO				2.77
28.500	0.00	1.27	1.434	IO				2.76
28.583	0.00	1.27	1.426	IO				2.74
28.667	0.00	1.27	1.417	IO				2.73
28.750	0.00	1.27	1.408	IO				2.72
28.833	0.00	1.27	1.399	IO				2.71
28.917	0.00	1.27	1.391	IO				2.69
29.000	0.00	1.27	1.382	IO				2.68
29.083	0.00	1.27	1.373	IO				2.67
29.167	0.00	1.27	1.364	IO				2.65
29.250	0.00	1.27	1.356	IO				2.64
29.333	0.00	1.27	1.347	IO				2.63
29.417	0.00	1.27	1.338	IO				2.62

29.500	0.00	1.27	1.330	IO				2.60
29.583	0.00	1.27	1.321	IO				2.59
29.667	0.00	1.27	1.312	IO				2.58
29.750	0.00	1.27	1.303	IO				2.56
29.833	0.00	1.27	1.295	IO				2.55
29.917	0.00	1.27	1.286	IO				2.54
30.000	0.00	1.27	1.277	IO				2.53
30.083	0.00	1.27	1.268	IO				2.51
30.167	0.00	1.27	1.260	IO				2.50
30.250	0.00	1.27	1.251	IO				2.49
30.333	0.00	1.27	1.242	IO				2.47
30.417	0.00	1.27	1.233	IO				2.46
30.500	0.00	1.27	1.225	IO				2.45
30.583	0.00	1.27	1.216	IO				2.43
30.667	0.00	1.27	1.207	IO				2.42
30.750	0.00	1.27	1.198	IO				2.41
30.833	0.00	1.27	1.190	IO				2.40
30.917	0.00	1.27	1.181	IO				2.38
31.000	0.00	1.27	1.172	IO				2.37
31.083	0.00	1.27	1.163	IO				2.36
31.167	0.00	1.27	1.155	IO				2.34
31.250	0.00	1.27	1.146	IO				2.33
31.333	0.00	1.27	1.137	IO				2.32
31.417	0.00	1.27	1.128	IO				2.31
31.500	0.00	1.27	1.120	IO				2.29
31.583	0.00	1.27	1.111	IO				2.28
31.667	0.00	1.27	1.102	IO				2.27
31.750	0.00	1.27	1.093	IO				2.25
31.833	0.00	1.27	1.085	IO				2.24
31.917	0.00	1.27	1.076	IO				2.23
32.000	0.00	1.27	1.067	IO				2.22
32.083	0.00	1.27	1.058	IO				2.20
32.167	0.00	1.27	1.050	IO				2.19
32.250	0.00	1.27	1.041	IO				2.18
32.333	0.00	1.27	1.032	IO				2.16
32.417	0.00	1.27	1.023	IO				2.15
32.500	0.00	1.27	1.015	IO				2.14
32.583	0.00	1.27	1.006	IO				2.13
32.667	0.00	1.27	0.997	IO				2.11
32.750	0.00	1.27	0.988	IO				2.10
32.833	0.00	1.27	0.980	IO				2.09
32.917	0.00	1.27	0.971	IO				2.07
33.000	0.00	1.27	0.962	IO				2.06
33.083	0.00	1.27	0.953	IO				2.05
33.167	0.00	1.27	0.945	IO				2.04
33.250	0.00	1.27	0.936	IO				2.02
33.333	0.00	1.27	0.927	IO				2.01
33.417	0.00	1.27	0.918	IO				2.00
33.500	0.00	1.27	0.910	IO				1.98
33.583	0.00	1.27	0.901	IO				1.97
33.667	0.00	1.27	0.892	IO				1.95
33.750	0.00	1.27	0.883	IO				1.93
33.833	0.00	1.27	0.875	IO				1.92
33.917	0.00	1.27	0.866	IO				1.90
34.000	0.00	1.27	0.857	IO				1.89
34.083	0.00	1.27	0.848	IO				1.87
34.167	0.00	1.27	0.840	IO				1.85
34.250	0.00	1.27	0.831	IO				1.84
34.333	0.00	1.27	0.822	IO				1.82
34.417	0.00	1.27	0.813	IO				1.81
34.500	0.00	1.27	0.805	IO				1.79

34.583	0.00	1.27	0.796	IO				1.77
34.667	0.00	1.27	0.787	IO				1.76
34.750	0.00	1.27	0.778	IO				1.74
34.833	0.00	1.27	0.770	IO				1.73
34.917	0.00	1.27	0.761	IO				1.71
35.000	0.00	1.27	0.752	IO				1.69
35.083	0.00	1.27	0.743	IO				1.68
35.167	0.00	1.27	0.735	IO				1.66
35.250	0.00	1.27	0.726	IO				1.65
35.333	0.00	1.27	0.717	IO				1.63
35.417	0.00	1.27	0.708	IO				1.62
35.500	0.00	1.27	0.700	IO				1.60
35.583	0.00	1.27	0.691	IO				1.58
35.667	0.00	1.27	0.682	IO				1.57
35.750	0.00	1.27	0.674	IO				1.55
35.833	0.00	1.27	0.665	IO				1.54
35.917	0.00	1.27	0.656	IO				1.52
36.000	0.00	1.27	0.647	IO				1.50
36.083	0.00	1.27	0.639	IO				1.49
36.167	0.00	1.27	0.630	IO				1.47
36.250	0.00	1.27	0.621	IO				1.46
36.333	0.00	1.27	0.612	IO				1.44
36.417	0.00	1.27	0.604	IO				1.42
36.500	0.00	1.27	0.595	IO				1.41
36.583	0.00	1.27	0.586	IO				1.39
36.667	0.00	1.27	0.577	IO				1.38
36.750	0.00	1.27	0.569	IO				1.36
36.833	0.00	1.27	0.560	IO				1.35
36.917	0.00	1.27	0.551	IO				1.33
37.000	0.00	1.27	0.542	IO				1.31
37.083	0.00	1.27	0.534	IO				1.30
37.167	0.00	1.27	0.525	IO				1.28
37.250	0.00	1.27	0.516	IO				1.27
37.333	0.00	1.27	0.507	IO				1.25
37.417	0.00	1.27	0.499	IO				1.23
37.500	0.00	1.27	0.490	IO				1.22
37.583	0.00	1.27	0.481	IO				1.20
37.667	0.00	1.27	0.472	IO				1.19
37.750	0.00	1.27	0.464	IO				1.17
37.833	0.00	1.27	0.455	IO				1.15
37.917	0.00	1.27	0.446	IO				1.14
38.000	0.00	1.27	0.437	IO				1.12
38.083	0.00	1.27	0.429	IO				1.11
38.167	0.00	1.27	0.420	IO				1.09
38.250	0.00	1.27	0.411	IO				1.07
38.333	0.00	1.27	0.402	IO				1.06
38.417	0.00	1.27	0.394	IO				1.04
38.500	0.00	1.27	0.385	IO				1.03
38.583	0.00	1.27	0.376	IO				1.01
38.667	0.00	1.26	0.367	IO				0.99
38.750	0.00	1.23	0.359	IO				0.97
38.833	0.00	1.20	0.350	IO				0.95
38.917	0.00	1.17	0.342	IO				0.93
39.000	0.00	1.15	0.334	IO				0.90
39.083	0.00	1.12	0.326	IO				0.88
39.167	0.00	1.09	0.319	IO				0.86
39.250	0.00	1.07	0.311	IO				0.84
39.333	0.00	1.04	0.304	IO				0.82
39.417	0.00	1.02	0.297	IO				0.80
39.500	0.00	1.00	0.290	O				0.78
39.583	0.00	0.97	0.283	O				0.77

39.667	0.00	0.95	0.277	O	|	|	|	|	0.75
39.750	0.00	0.93	0.270	O	|	|	|	|	0.73
39.833	0.00	0.91	0.264	O	|	|	|	|	0.71
39.917	0.00	0.88	0.258	O	|	|	|	|	0.70
40.000	0.00	0.86	0.252	O	|	|	|	|	0.68
40.083	0.00	0.84	0.246	O	|	|	|	|	0.66
40.167	0.00	0.82	0.240	O	|	|	|	|	0.65
40.250	0.00	0.80	0.234	O	|	|	|	|	0.63
40.333	0.00	0.79	0.229	O	|	|	|	|	0.62
40.417	0.00	0.77	0.224	O	|	|	|	|	0.60
40.500	0.00	0.75	0.218	O	|	|	|	|	0.59
40.583	0.00	0.73	0.213	O	|	|	|	|	0.58
40.667	0.00	0.72	0.208	O	|	|	|	|	0.56
40.750	0.00	0.70	0.203	O	|	|	|	|	0.55
40.833	0.00	0.68	0.199	O	|	|	|	|	0.54
40.917	0.00	0.67	0.194	O	|	|	|	|	0.52
41.000	0.00	0.65	0.190	O	|	|	|	|	0.51
41.083	0.00	0.64	0.185	O	|	|	|	|	0.50
41.167	0.00	0.62	0.181	O	|	|	|	|	0.49
41.250	0.00	0.61	0.177	O	|	|	|	|	0.48
41.333	0.00	0.59	0.172	O	|	|	|	|	0.47
41.417	0.00	0.58	0.168	O	|	|	|	|	0.46
41.500	0.00	0.56	0.164	O	|	|	|	|	0.44
41.583	0.00	0.55	0.161	O	|	|	|	|	0.43
41.667	0.00	0.54	0.157	O	|	|	|	|	0.42
41.750	0.00	0.53	0.153	O	|	|	|	|	0.41
41.833	0.00	0.51	0.150	O	|	|	|	|	0.40
41.917	0.00	0.50	0.146	O	|	|	|	|	0.39
42.000	0.00	0.49	0.143	O	|	|	|	|	0.39
42.083	0.00	0.48	0.139	O	|	|	|	|	0.38
42.167	0.00	0.47	0.136	O	|	|	|	|	0.37
42.250	0.00	0.46	0.133	O	|	|	|	|	0.36
42.333	0.00	0.45	0.130	O	|	|	|	|	0.35
42.417	0.00	0.44	0.127	O	|	|	|	|	0.34
42.500	0.00	0.43	0.124	O	|	|	|	|	0.33
42.583	0.00	0.42	0.121	O	|	|	|	|	0.33
42.667	0.00	0.41	0.118	O	|	|	|	|	0.32
42.750	0.00	0.40	0.115	O	|	|	|	|	0.31
42.833	0.00	0.39	0.113	O	|	|	|	|	0.30
42.917	0.00	0.38	0.110	O	|	|	|	|	0.30
43.000	0.00	0.37	0.107	O	|	|	|	|	0.29
43.083	0.00	0.36	0.105	O	|	|	|	|	0.28
43.167	0.00	0.35	0.103	O	|	|	|	|	0.28
43.250	0.00	0.34	0.100	O	|	|	|	|	0.27
43.333	0.00	0.34	0.098	O	|	|	|	|	0.26
43.417	0.00	0.33	0.095	O	|	|	|	|	0.26
43.500	0.00	0.32	0.093	O	|	|	|	|	0.25
43.583	0.00	0.31	0.091	O	|	|	|	|	0.25
43.667	0.00	0.31	0.089	O	|	|	|	|	0.24
43.750	0.00	0.30	0.087	O	|	|	|	|	0.23
43.833	0.00	0.29	0.085	O	|	|	|	|	0.23
43.917	0.00	0.28	0.083	O	|	|	|	|	0.22
44.000	0.00	0.28	0.081	O	|	|	|	|	0.22
44.083	0.00	0.27	0.079	O	|	|	|	|	0.21
44.167	0.00	0.26	0.077	O	|	|	|	|	0.21
44.250	0.00	0.26	0.075	O	|	|	|	|	0.20
44.333	0.00	0.25	0.074	O	|	|	|	|	0.20
44.417	0.00	0.25	0.072	O	|	|	|	|	0.19
44.500	0.00	0.24	0.070	O	|	|	|	|	0.19
44.583	0.00	0.24	0.069	O	|	|	|	|	0.19
44.667	0.00	0.23	0.067	O	|	|	|	|	0.18

Storm drainage remaining in the basin is the part of the DCV Volume (Water Quality) which allows a 48-hour drawdown time.

44.750	0.00	0.22	0.065	O	|	|	|	|	0.18
44.833	0.00	0.22	0.064	O	|	|	|	|	0.17
44.917	0.00	0.21	0.062	O	|	|	|	|	0.17
45.000	0.00	0.21	0.061	O	|	|	|	|	0.16
45.083	0.00	0.20	0.060	O	|	|	|	|	0.16
45.167	0.00	0.20	0.058	O	|	|	|	|	0.16
45.250	0.00	0.19	0.057	O	|	|	|	|	0.15
45.333	0.00	0.19	0.055	O	|	|	|	|	0.15
45.417	0.00	0.19	0.054	O	|	|	|	|	0.15
45.500	0.00	0.18	0.053	O	|	|	|	|	0.14
45.583	0.00	0.18	0.052	O	|	|	|	|	0.14
45.667	0.00	0.17	0.050	O	|	|	|	|	0.14
45.750	0.00	0.17	0.049	O	|	|	|	|	0.13
45.833	0.00	0.17	0.048	O	|	|	|	|	0.13
45.917	0.00	0.16	0.047	O	|	|	|	|	0.13
46.000	0.00	0.16	0.046	O	|	|	|	|	0.12
46.083	0.00	0.15	0.045	O	|	|	|	|	0.12
46.167	0.00	0.15	0.044	O	|	|	|	|	0.12
46.250	0.00	0.15	0.043	O	|	|	|	|	0.12
46.333	0.00	0.14	0.042	O	|	|	|	|	0.11
46.417	0.00	0.14	0.041	O	|	|	|	|	0.11
46.500	0.00	0.14	0.040	O	|	|	|	|	0.11
46.583	0.00	0.13	0.036	O	|	|	|	|	0.11
46.667	0.00	0.13	0.032	O	|	|	|	|	0.10
46.750	0.00	0.13	0.030	O	|	|	|	|	0.10
46.833	0.00	0.12	0.028	O	|	|	|	|	0.10
46.917	0.00	0.12	0.026	O	|	|	|	|	0.10
47.000	0.00	0.12	0.024	O	|	|	|	|	0.09
47.083	0.00	0.11	0.022	O	|	|	|	|	0.09
47.167	0.00	0.10	0.020	O	|	|	|	|	0.09
47.250	0.00	0.09	0.018	O	|	|	|	|	0.09
47.333	0.00	0.08	0.016	O	|	|	|	|	0.08
47.417	0.00	0.07	0.014	O	|	|	|	|	0.07
47.500	0.00	0.06	0.012	O	|	|	|	|	0.06
47.583	0.00	0.05	0.010	O	|	|	|	|	0.05
47.667	0.00	0.04	0.008	O	|	|	|	|	0.04
47.750	0.00	0.03	0.006	O	|	|	|	|	0.03
47.833	0.00	0.02	0.004	O	|	|	|	|	0.02
47.917	0.00	0.01	0.002	O	|	|	|	|	0.01
48.000	0.00	0.00	0.000	O	|	|	|	|	0.00
48.083	0.00	0.00	0.000	O	|	|	|	|	0.00
48.167	0.00	0.00	0.000	O	|	|	|	|	0.00
48.250	0.00	0.00	0.000	O	|	|	|	|	0.00
48.333	0.00	0.00	0.000	O	|	|	|	|	0.00
48.417	0.00	0.00	0.000	O	|	|	|	|	0.00
48.500	0.00	0.00	0.000	O	|	|	|	|	0.00

**********HYDROGRAPH DATA**********

Number of intervals = 582
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 1.490 (CFS)
Total volume = 4.064 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

APPENDIX D.2

BASIN ROUTING ANALYSIS

DRAINAGE AREA A – 10 YEAR

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
Study date: 01/25/23

JOB NO. 2022-318
11115 HEMLOCK AVE
10 YEAR, BASIN ROUTING
POST-CONDITION, CHAMBER A

Program License Serial Number 6277

********** HYDROGRAPH INFORMATION **********

From study/file name: 2022318UH10POSTA.rte
**********HYDROGRAPH DATA**********
Number of intervals = 292
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 52.920 (CFS)
Total volume = 6.521 (Ac.Ft)
Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

++
Process from Point/Station 3.700 to Point/Station 3.700
**** RETARDING BASIN ROUTING ****
_____

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 292
Hydrograph time unit = 5.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)
Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
1.000	0.370	1.270	0.366	0.374
2.000	0.920	1.270	0.916	0.924
3.000	1.600	1.270	1.596	1.604
4.000	2.340	1.629	2.334	2.346

5.000	3.110	11.600	3.070	3.150
6.000	3.880	20.380	3.810	3.950
7.000	4.630	26.310	4.539	4.721
8.000	5.310	31.130	5.203	5.417
9.000	5.860	35.290	5.738	5.982

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	13.2	26.46	39.69	52.92	Depth (Ft.)
0.083	0.14	0.00	0.000	O	|	|	|	|	0.00
0.167	0.81	0.01	0.004	O	|	|	|	|	0.01
0.250	1.30	0.04	0.011	O	|	|	|	|	0.03
0.333	1.41	0.07	0.020	O	|	|	|	|	0.05
0.417	1.43	0.10	0.029	O	|	|	|	|	0.08
0.500	1.44	0.13	0.038	O	|	|	|	|	0.10
0.583	1.44	0.16	0.047	O	|	|	|	|	0.13
0.667	1.45	0.19	0.056	O	|	|	|	|	0.15
0.750	1.45	0.22	0.064	O	|	|	|	|	0.17
0.833	1.46	0.25	0.073	O	|	|	|	|	0.20
0.917	1.46	0.28	0.081	O	|	|	|	|	0.22
1.000	1.47	0.31	0.089	O	|	|	|	|	0.24
1.083	1.47	0.33	0.097	O	|	|	|	|	0.26
1.167	1.47	0.36	0.105	O	|	|	|	|	0.28
1.250	1.48	0.39	0.112	O	|	|	|	|	0.30
1.333	1.48	0.41	0.120	O	|	|	|	|	0.32
1.417	1.49	0.44	0.127	O	|	|	|	|	0.34
1.500	1.49	0.46	0.134	O	|	|	|	|	0.36
1.583	1.50	0.48	0.141	O	|	|	|	|	0.38
1.667	1.50	0.51	0.148	O	|	|	|	|	0.40
1.750	1.51	0.53	0.155	O	|	|	|	|	0.42
1.833	1.51	0.55	0.162	O	|	|	|	|	0.44
1.917	1.52	0.58	0.168	O	|	|	|	|	0.45
2.000	1.52	0.60	0.174	O	|	|	|	|	0.47
2.083	1.53	0.62	0.181	O	|	|	|	|	0.49
2.167	1.53	0.64	0.187	O	|	|	|	|	0.51
2.250	1.54	0.66	0.193	O	|	|	|	|	0.52
2.333	1.54	0.68	0.199	O	|	|	|	|	0.54
2.417	1.55	0.70	0.205	O	|	|	|	|	0.55
2.500	1.55	0.72	0.211	O	|	|	|	|	0.57
2.583	1.56	0.74	0.216	O	|	|	|	|	0.58
2.667	1.56	0.76	0.222	O	|	|	|	|	0.60
2.750	1.57	0.78	0.227	O	|	|	|	|	0.61
2.833	1.57	0.80	0.233	O	|	|	|	|	0.63
2.917	1.58	0.82	0.238	O	|	|	|	|	0.64
3.000	1.59	0.83	0.243	O	|	|	|	|	0.66
3.083	1.59	0.85	0.248	O	|	|	|	|	0.67
3.167	1.60	0.87	0.253	O	|	|	|	|	0.68
3.250	1.60	0.89	0.258	O	|	|	|	|	0.70
3.333	1.61	0.90	0.263	O	|	|	|	|	0.71
3.417	1.61	0.92	0.268	O	|	|	|	|	0.72
3.500	1.62	0.94	0.273	O	|	|	|	|	0.74
3.583	1.63	0.95	0.278	O	|	|	|	|	0.75
3.667	1.63	0.97	0.282	O	|	|	|	|	0.76
3.750	1.64	0.98	0.287	O	|	|	|	|	0.77
3.833	1.64	1.00	0.291	O	|	|	|	|	0.79
3.917	1.65	1.01	0.296	O	|	|	|	|	0.80
4.000	1.66	1.03	0.300	OI	|	|	|	|	0.81

4.083	1.66	1.04	0.304	OI				0.82
4.167	1.67	1.06	0.308	OI				0.83
4.250	1.68	1.07	0.313	OI				0.84
4.333	1.68	1.09	0.317	OI				0.86
4.417	1.69	1.10	0.321	OI				0.87
4.500	1.70	1.12	0.325	OI				0.88
4.583	1.70	1.13	0.329	OI				0.89
4.667	1.71	1.14	0.333	OI				0.90
4.750	1.72	1.16	0.337	OI				0.91
4.833	1.72	1.17	0.341	OI				0.92
4.917	1.73	1.18	0.344	OI				0.93
5.000	1.74	1.19	0.348	OI				0.94
5.083	1.75	1.21	0.352	OI				0.95
5.167	1.75	1.22	0.355	OI				0.96
5.250	1.76	1.23	0.359	OI				0.97
5.333	1.77	1.25	0.363	OI				0.98
5.417	1.78	1.26	0.366	OI				0.99
5.500	1.78	1.27	0.370	OI				1.00
5.583	1.79	1.27	0.373	OI				1.01
5.667	1.80	1.27	0.377	OI				1.01
5.750	1.81	1.27	0.381	OI				1.02
5.833	1.82	1.27	0.384	OI				1.03
5.917	1.82	1.27	0.388	OI				1.03
6.000	1.83	1.27	0.392	OI				1.04
6.083	1.84	1.27	0.396	OI				1.05
6.167	1.85	1.27	0.400	OI				1.05
6.250	1.86	1.27	0.404	OI				1.06
6.333	1.87	1.27	0.408	OI				1.07
6.417	1.88	1.27	0.412	OI				1.08
6.500	1.88	1.27	0.416	OI				1.08
6.583	1.89	1.27	0.421	OI				1.09
6.667	1.90	1.27	0.425	OI				1.10
6.750	1.91	1.27	0.429	OI				1.11
6.833	1.92	1.27	0.434	OI				1.12
6.917	1.93	1.27	0.438	OI				1.12
7.000	1.94	1.27	0.443	OI				1.13
7.083	1.95	1.27	0.448	OI				1.14
7.167	1.96	1.27	0.452	OI				1.15
7.250	1.97	1.27	0.457	OI				1.16
7.333	1.98	1.27	0.462	OI				1.17
7.417	1.99	1.27	0.467	OI				1.18
7.500	2.00	1.27	0.472	OI				1.19
7.583	2.01	1.27	0.477	OI				1.19
7.667	2.02	1.27	0.482	OI				1.20
7.750	2.04	1.27	0.487	OI				1.21
7.833	2.05	1.27	0.493	OI				1.22
7.917	2.06	1.27	0.498	OI				1.23
8.000	2.07	1.27	0.504	OI				1.24
8.083	2.08	1.27	0.509	OI				1.25
8.167	2.09	1.27	0.515	OI				1.26
8.250	2.11	1.27	0.520	OI				1.27
8.333	2.12	1.27	0.526	OI				1.28
8.417	2.13	1.27	0.532	OI				1.29
8.500	2.14	1.27	0.538	OI				1.31
8.583	2.16	1.27	0.544	OI				1.32
8.667	2.17	1.27	0.550	OI				1.33
8.750	2.18	1.27	0.557	OI				1.34
8.833	2.20	1.27	0.563	OI				1.35
8.917	2.21	1.27	0.569	OI				1.36
9.000	2.23	1.27	0.576	OI				1.37
9.083	2.24	1.27	0.583	OI				1.39

9.167	2.26	1.27	0.589	OI	|	|	|	1.40
9.250	2.27	1.27	0.596	OI	|	|	|	1.41
9.333	2.29	1.27	0.603	OI	|	|	|	1.42
9.417	2.30	1.27	0.610	OI	|	|	|	1.44
9.500	2.32	1.27	0.617	OI	|	|	|	1.45
9.583	2.33	1.27	0.625	OI	|	|	|	1.46
9.667	2.35	1.27	0.632	OI	|	|	|	1.48
9.750	2.37	1.27	0.640	OI	|	|	|	1.49
9.833	2.39	1.27	0.647	OI	|	|	|	1.50
9.917	2.40	1.27	0.655	OI	|	|	|	1.52
10.000	2.42	1.27	0.663	OI	|	|	|	1.53
10.083	2.44	1.27	0.671	OI	|	|	|	1.55
10.167	2.46	1.27	0.679	OI	|	|	|	1.56
10.250	2.48	1.27	0.687	OI	|	|	|	1.58
10.333	2.50	1.27	0.696	OI	|	|	|	1.59
10.417	2.52	1.27	0.704	OI	|	|	|	1.61
10.500	2.54	1.27	0.713	OI	|	|	|	1.62
10.583	2.56	1.27	0.722	OI	|	|	|	1.64
10.667	2.58	1.27	0.731	OI	|	|	|	1.66
10.750	2.60	1.27	0.740	OI	|	|	|	1.67
10.833	2.63	1.27	0.749	OI	|	|	|	1.69
10.917	2.65	1.27	0.758	OI	|	|	|	1.71
11.000	2.67	1.27	0.768	OI	|	|	|	1.72
11.083	2.70	1.27	0.778	OI	|	|	|	1.74
11.167	2.72	1.27	0.788	OI	|	|	|	1.76
11.250	2.75	1.27	0.798	OI	|	|	|	1.78
11.333	2.77	1.27	0.808	OI	|	|	|	1.80
11.417	2.80	1.27	0.818	OI	|	|	|	1.82
11.500	2.83	1.27	0.829	OI	|	|	|	1.83
11.583	2.86	1.27	0.840	OI	|	|	|	1.85
11.667	2.89	1.27	0.851	OI	|	|	|	1.87
11.750	2.92	1.27	0.862	OI	|	|	|	1.89
11.833	2.95	1.27	0.874	OI	|	|	|	1.92
11.917	2.98	1.27	0.885	OI	|	|	|	1.94
12.000	3.01	1.27	0.897	OI	|	|	|	1.96
12.083	3.10	1.27	0.909	OI	|	|	|	1.98
12.167	3.38	1.27	0.923	O I	|	|	|	2.00
12.250	3.60	1.27	0.938	O I	|	|	|	2.03
12.333	3.67	1.27	0.955	O I	|	|	|	2.05
12.417	3.72	1.27	0.971	O I	|	|	|	2.08
12.500	3.76	1.27	0.988	O I	|	|	|	2.10
12.583	3.80	1.27	1.006	O I	|	|	|	2.13
12.667	3.85	1.27	1.023	O I	|	|	|	2.15
12.750	3.89	1.27	1.041	O I	|	|	|	2.18
12.833	3.94	1.27	1.059	O I	|	|	|	2.20
12.917	3.99	1.27	1.078	O I	|	|	|	2.23
13.000	4.04	1.27	1.097	O I	|	|	|	2.26
13.083	4.09	1.27	1.116	O I	|	|	|	2.29
13.167	4.15	1.27	1.136	O I	|	|	|	2.32
13.250	4.20	1.27	1.156	O I	|	|	|	2.35
13.333	4.26	1.27	1.176	O I	|	|	|	2.38
13.417	4.32	1.27	1.197	O I	|	|	|	2.41
13.500	4.39	1.27	1.218	O I	|	|	|	2.44
13.583	4.45	1.27	1.240	O I	|	|	|	2.47
13.667	4.53	1.27	1.262	O I	|	|	|	2.50
13.750	4.60	1.27	1.285	O I	|	|	|	2.54
13.833	4.68	1.27	1.308	O I	|	|	|	2.57
13.917	4.76	1.27	1.332	O I	|	|	|	2.61
14.000	4.85	1.27	1.356	O I	|	|	|	2.64
14.083	4.94	1.27	1.381	O I	|	|	|	2.68
14.167	5.04	1.27	1.407	O I	|	|	|	2.72

14.250	5.15	1.27	1.433	O	I	|	|	|	2.75
14.333	5.26	1.27	1.460	O	I	|	|	|	2.79
14.417	5.38	1.27	1.488	O	I	|	|	|	2.84
14.500	5.51	1.27	1.517	O	I	|	|	|	2.88
14.583	5.64	1.27	1.546	O	I	|	|	|	2.92
14.667	5.79	1.27	1.577	O	I	|	|	|	2.97
14.750	5.95	1.27	1.609	O	I	|	|	|	3.01
14.833	6.13	1.29	1.641	O	I	|	|	|	3.06
14.917	6.32	1.31	1.675	O	I	|	|	|	3.10
15.000	6.53	1.32	1.710	O	I	|	|	|	3.15
15.083	6.76	1.34	1.747	O	I	|	|	|	3.20
15.167	7.03	1.36	1.785	O	I	|	|	|	3.25
15.250	7.32	1.38	1.825	O	I	|	|	|	3.30
15.333	7.67	1.40	1.867	O	I	|	|	|	3.36
15.417	7.87	1.42	1.911	O	I	|	|	|	3.42
15.500	7.43	1.44	1.954	O	I	|	|	|	3.48
15.583	7.30	1.46	1.995	O	I	|	|	|	3.53
15.667	7.87	1.48	2.037	O	I	|	|	|	3.59
15.750	8.69	1.50	2.083	O	I	|	|	|	3.65
15.833	9.98	1.53	2.137	O	I	|	|	|	3.73
15.917	11.88	1.56	2.202	O	I	|	|	|	3.81
16.000	16.05	1.60	2.287	O	I	|	|	|	3.93
16.083	27.77	2.71	2.423	O	|	I	|	|	4.11
16.167	52.92	5.92	2.671	O	|	|	|	I	4.43
16.250	39.64	9.37	2.937	O	|	|	I	|	4.78
16.333	16.89	10.98	3.062	O	I	|	|	|	4.94
16.417	10.29	11.20	3.079	O	|	|	|	|	4.96
16.500	8.31	11.04	3.067	IO	|	|	|	|	4.94
16.583	7.90	10.79	3.047	I	O	|	|	|	4.92
16.667	7.29	10.52	3.026	I	O	|	|	|	4.89
16.750	6.75	10.22	3.003	I	O	|	|	|	4.86
16.833	6.31	9.90	2.979	I	O	|	|	|	4.83
16.917	5.94	9.58	2.954	I	O	|	|	|	4.80
17.000	5.63	9.26	2.929	I	O	|	|	|	4.76
17.083	5.37	8.94	2.904	I	O	|	|	|	4.73
17.167	5.13	8.62	2.880	I	O	|	|	|	4.70
17.250	4.93	8.31	2.856	I	O	|	|	|	4.67
17.333	4.75	8.02	2.833	I	O	|	|	|	4.64
17.417	4.59	7.73	2.811	I	O	|	|	|	4.61
17.500	4.45	7.46	2.790	I	O	|	|	|	4.58
17.583	4.31	7.19	2.770	I	O	|	|	|	4.56
17.667	4.19	6.94	2.750	I	O	|	|	|	4.53
17.750	4.08	6.70	2.732	I	O	|	|	|	4.51
17.833	3.98	6.48	2.714	IO	|	|	|	|	4.49
17.917	3.89	6.26	2.698	IO	|	|	|	|	4.46
18.000	3.80	6.05	2.682	IO	|	|	|	|	4.44
18.083	3.67	5.85	2.666	IO	|	|	|	|	4.42
18.167	3.34	5.65	2.651	IO	|	|	|	|	4.40
18.250	3.09	5.45	2.635	I	O	|	|	|	4.38
18.333	2.98	5.24	2.619	I	O	|	|	|	4.36
18.417	2.91	5.04	2.604	I	O	|	|	|	4.34
18.500	2.85	4.86	2.590	IO	|	|	|	|	4.32
18.583	2.80	4.69	2.576	IO	|	|	|	|	4.31
18.667	2.74	4.52	2.563	IO	|	|	|	|	4.29
18.750	2.69	4.37	2.552	IO	|	|	|	|	4.27
18.833	2.65	4.22	2.540	IO	|	|	|	|	4.26
18.917	2.60	4.09	2.530	IO	|	|	|	|	4.25
19.000	2.56	3.96	2.520	IO	|	|	|	|	4.23
19.083	2.52	3.84	2.511	IO	|	|	|	|	4.22
19.167	2.48	3.72	2.502	IO	|	|	|	|	4.21
19.250	2.44	3.61	2.493	IO	|	|	|	|	4.20

19.333	2.40	3.51	2.485	IO				4.19
19.417	2.37	3.42	2.478	IO				4.18
19.500	2.33	3.32	2.471	IO				4.17
19.583	2.30	3.24	2.464	O				4.16
19.667	2.27	3.16	2.458	O				4.15
19.750	2.24	3.08	2.452	O				4.15
19.833	2.21	3.01	2.446	O				4.14
19.917	2.18	2.94	2.441	O				4.13
20.000	2.16	2.87	2.436	O				4.12
20.083	2.13	2.81	2.431	O				4.12
20.167	2.10	2.75	2.427	O				4.11
20.250	2.08	2.69	2.422	O				4.11
20.333	2.06	2.64	2.418	O				4.10
20.417	2.03	2.59	2.414	O				4.10
20.500	2.01	2.54	2.410	O				4.09
20.583	1.99	2.50	2.407	O				4.09
20.667	1.97	2.45	2.404	O				4.08
20.750	1.95	2.41	2.400	O				4.08
20.833	1.93	2.37	2.397	O				4.07
20.917	1.91	2.33	2.394	O				4.07
21.000	1.89	2.29	2.391	O				4.07
21.083	1.87	2.26	2.389	O				4.06
21.167	1.86	2.23	2.386	O				4.06
21.250	1.84	2.19	2.384	O				4.06
21.333	1.82	2.16	2.381	O				4.05
21.417	1.81	2.13	2.379	O				4.05
21.500	1.79	2.10	2.377	O				4.05
21.583	1.77	2.08	2.375	O				4.04
21.667	1.76	2.05	2.373	O				4.04
21.750	1.74	2.02	2.371	O				4.04
21.833	1.73	2.00	2.369	O				4.04
21.917	1.72	1.98	2.367	O				4.03
22.000	1.70	1.95	2.365	O				4.03
22.083	1.69	1.93	2.363	O				4.03
22.167	1.68	1.91	2.362	O				4.03
22.250	1.66	1.89	2.360	O				4.03
22.333	1.65	1.87	2.359	IO				4.02
22.417	1.64	1.85	2.357	IO				4.02
22.500	1.63	1.83	2.356	IO				4.02
22.583	1.61	1.81	2.354	IO				4.02
22.667	1.60	1.80	2.353	IO				4.02
22.750	1.59	1.78	2.352	IO				4.02
22.833	1.58	1.76	2.350	IO				4.01
22.917	1.57	1.75	2.349	IO				4.01
23.000	1.56	1.73	2.348	IO				4.01
23.083	1.55	1.72	2.347	IO				4.01
23.167	1.54	1.70	2.346	IO				4.01
23.250	1.53	1.69	2.344	IO				4.01
23.333	1.52	1.67	2.343	IO				4.00
23.417	1.51	1.66	2.342	IO				4.00
23.500	1.50	1.64	2.341	O				4.00
23.583	1.49	1.63	2.340	O				4.00
23.667	1.48	1.63	2.339	O				4.00
23.750	1.47	1.63	2.338	O				4.00
23.833	1.46	1.63	2.337	O				4.00
23.917	1.45	1.63	2.336	O				3.99
24.000	1.44	1.63	2.335	O				3.99
24.083	1.30	1.63	2.333	O				3.99
24.167	0.62	1.62	2.328	O				3.98
24.250	0.13	1.62	2.320	O				3.97
24.333	0.02	1.61	2.309	O				3.96

24.417	0.00	1.61	2.298	O	|	|	|	|	3.94
24.500	0.00	1.60	2.287	O	|	|	|	|	3.93
24.583	0.00	1.60	2.276	O	|	|	|	|	3.91
24.667	0.00	1.59	2.265	O	|	|	|	|	3.90
24.750	0.00	1.59	2.254	O	|	|	|	|	3.88
24.833	0.00	1.58	2.243	O	|	|	|	|	3.87
24.917	0.00	1.58	2.232	O	|	|	|	|	3.85
25.000	0.00	1.57	2.221	O	|	|	|	|	3.84
25.083	0.00	1.57	2.211	O	|	|	|	|	3.83
25.167	0.00	1.56	2.200	O	|	|	|	|	3.81
25.250	0.00	1.56	2.189	O	|	|	|	|	3.80
25.333	0.00	1.55	2.178	O	|	|	|	|	3.78
25.417	0.00	1.55	2.168	O	|	|	|	|	3.77
25.500	0.00	1.54	2.157	O	|	|	|	|	3.75
25.583	0.00	1.54	2.146	O	|	|	|	|	3.74
25.667	0.00	1.53	2.136	O	|	|	|	|	3.72
25.750	0.00	1.52	2.125	O	|	|	|	|	3.71
25.833	0.00	1.52	2.115	O	|	|	|	|	3.70
25.917	0.00	1.51	2.104	O	|	|	|	|	3.68
26.000	0.00	1.51	2.094	O	|	|	|	|	3.67
26.083	0.00	1.50	2.084	O	|	|	|	|	3.65
26.167	0.00	1.50	2.073	O	|	|	|	|	3.64
26.250	0.00	1.49	2.063	O	|	|	|	|	3.63
26.333	0.00	1.49	2.053	O	|	|	|	|	3.61
26.417	0.00	1.48	2.043	O	|	|	|	|	3.60
26.500	0.00	1.48	2.032	O	|	|	|	|	3.58
26.583	0.00	1.47	2.022	O	|	|	|	|	3.57
26.667	0.00	1.47	2.012	O	|	|	|	|	3.56
26.750	0.00	1.46	2.002	O	|	|	|	|	3.54
26.833	0.00	1.46	1.992	O	|	|	|	|	3.53
26.917	0.00	1.46	1.982	O	|	|	|	|	3.52
27.000	0.00	1.45	1.972	O	|	|	|	|	3.50
27.083	0.00	1.45	1.962	O	|	|	|	|	3.49
27.167	0.00	1.44	1.952	O	|	|	|	|	3.48
27.250	0.00	1.44	1.942	O	|	|	|	|	3.46
27.333	0.00	1.43	1.932	O	|	|	|	|	3.45
27.417	0.00	1.43	1.922	O	|	|	|	|	3.44
27.500	0.00	1.42	1.912	O	|	|	|	|	3.42
27.583	0.00	1.42	1.903	O	|	|	|	|	3.41
27.667	0.00	1.41	1.893	O	|	|	|	|	3.40
27.750	0.00	1.41	1.883	O	|	|	|	|	3.38
27.833	0.00	1.40	1.874	O	|	|	|	|	3.37
27.917	0.00	1.40	1.864	O	|	|	|	|	3.36
28.000	0.00	1.39	1.854	O	|	|	|	|	3.34
28.083	0.00	1.39	1.845	O	|	|	|	|	3.33
28.167	0.00	1.38	1.835	O	|	|	|	|	3.32
28.250	0.00	1.38	1.826	O	|	|	|	|	3.30
28.333	0.00	1.37	1.816	O	|	|	|	|	3.29
28.417	0.00	1.37	1.807	O	|	|	|	|	3.28
28.500	0.00	1.37	1.797	O	|	|	|	|	3.27
28.583	0.00	1.36	1.788	O	|	|	|	|	3.25
28.667	0.00	1.36	1.779	O	|	|	|	|	3.24
28.750	0.00	1.35	1.769	O	|	|	|	|	3.23
28.833	0.00	1.35	1.760	O	|	|	|	|	3.22
28.917	0.00	1.34	1.751	O	|	|	|	|	3.20
29.000	0.00	1.34	1.741	O	|	|	|	|	3.19
29.083	0.00	1.33	1.732	O	|	|	|	|	3.18
29.167	0.00	1.33	1.723	O	|	|	|	|	3.17
29.250	0.00	1.33	1.714	O	|	|	|	|	3.15
29.333	0.00	1.32	1.705	O	|	|	|	|	3.14
29.417	0.00	1.32	1.696	O	|	|	|	|	3.13

29.500	0.00	1.31	1.687	O	|	|	|	3.12
29.583	0.00	1.31	1.678	O	|	|	|	3.10
29.667	0.00	1.30	1.669	O	|	|	|	3.09
29.750	0.00	1.30	1.660	O	|	|	|	3.08
29.833	0.00	1.29	1.651	O	|	|	|	3.07
29.917	0.00	1.29	1.642	O	|	|	|	3.06
30.000	0.00	1.29	1.633	O	|	|	|	3.04
30.083	0.00	1.28	1.624	O	|	|	|	3.03
30.167	0.00	1.28	1.615	O	|	|	|	3.02
30.250	0.00	1.27	1.607	O	|	|	|	3.01
30.333	0.00	1.27	1.598	O	|	|	|	3.00
30.417	0.00	1.27	1.589	O	|	|	|	2.98
30.500	0.00	1.27	1.580	O	|	|	|	2.97
30.583	0.00	1.27	1.572	O	|	|	|	2.96
30.667	0.00	1.27	1.563	O	|	|	|	2.95
30.750	0.00	1.27	1.554	O	|	|	|	2.93
30.833	0.00	1.27	1.545	O	|	|	|	2.92
30.917	0.00	1.27	1.537	O	|	|	|	2.91
31.000	0.00	1.27	1.528	O	|	|	|	2.89
31.083	0.00	1.27	1.519	O	|	|	|	2.88
31.167	0.00	1.27	1.510	O	|	|	|	2.87
31.250	0.00	1.27	1.502	O	|	|	|	2.86
31.333	0.00	1.27	1.493	O	|	|	|	2.84
31.417	0.00	1.27	1.484	O	|	|	|	2.83
31.500	0.00	1.27	1.475	O	|	|	|	2.82
31.583	0.00	1.27	1.467	O	|	|	|	2.80
31.667	0.00	1.27	1.458	O	|	|	|	2.79
31.750	0.00	1.27	1.449	O	|	|	|	2.78
31.833	0.00	1.27	1.440	O	|	|	|	2.77
31.917	0.00	1.27	1.432	O	|	|	|	2.75
32.000	0.00	1.27	1.423	O	|	|	|	2.74
32.083	0.00	1.27	1.414	O	|	|	|	2.73
32.167	0.00	1.27	1.405	O	|	|	|	2.71
32.250	0.00	1.27	1.397	O	|	|	|	2.70
32.333	0.00	1.27	1.388	O	|	|	|	2.69
32.417	0.00	1.27	1.379	O	|	|	|	2.68
32.500	0.00	1.27	1.370	O	|	|	|	2.66
32.583	0.00	1.27	1.362	O	|	|	|	2.65
32.667	0.00	1.27	1.353	O	|	|	|	2.64
32.750	0.00	1.27	1.344	O	|	|	|	2.62
32.833	0.00	1.27	1.335	O	|	|	|	2.61
32.917	0.00	1.27	1.327	O	|	|	|	2.60
33.000	0.00	1.27	1.318	O	|	|	|	2.59
33.083	0.00	1.27	1.309	O	|	|	|	2.57
33.167	0.00	1.27	1.300	O	|	|	|	2.56
33.250	0.00	1.27	1.292	O	|	|	|	2.55
33.333	0.00	1.27	1.283	O	|	|	|	2.53
33.417	0.00	1.27	1.274	O	|	|	|	2.52
33.500	0.00	1.27	1.265	O	|	|	|	2.51
33.583	0.00	1.27	1.257	O	|	|	|	2.50
33.667	0.00	1.27	1.248	O	|	|	|	2.48
33.750	0.00	1.27	1.239	O	|	|	|	2.47
33.833	0.00	1.27	1.230	O	|	|	|	2.46
33.917	0.00	1.27	1.222	O	|	|	|	2.44
34.000	0.00	1.27	1.213	O	|	|	|	2.43
34.083	0.00	1.27	1.204	O	|	|	|	2.42
34.167	0.00	1.27	1.195	O	|	|	|	2.41
34.250	0.00	1.27	1.187	O	|	|	|	2.39
34.333	0.00	1.27	1.178	O	|	|	|	2.38
34.417	0.00	1.27	1.169	O	|	|	|	2.37
34.500	0.00	1.27	1.160	O	|	|	|	2.35

34.583	0.00	1.27	1.152	O				2.34
34.667	0.00	1.27	1.143	O				2.33
34.750	0.00	1.27	1.134	O				2.31
34.833	0.00	1.27	1.125	O				2.30
34.917	0.00	1.27	1.117	O				2.29
35.000	0.00	1.27	1.108	O				2.28
35.083	0.00	1.27	1.099	O				2.26
35.167	0.00	1.27	1.090	O				2.25
35.250	0.00	1.27	1.082	O				2.24
35.333	0.00	1.27	1.073	O				2.22
35.417	0.00	1.27	1.064	O				2.21
35.500	0.00	1.27	1.055	O				2.20
35.583	0.00	1.27	1.047	O				2.19
35.667	0.00	1.27	1.038	O				2.17
35.750	0.00	1.27	1.029	O				2.16
35.833	0.00	1.27	1.020	O				2.15
35.917	0.00	1.27	1.012	O				2.13
36.000	0.00	1.27	1.003	O				2.12
36.083	0.00	1.27	0.994	O				2.11
36.167	0.00	1.27	0.985	O				2.10
36.250	0.00	1.27	0.977	O				2.08
36.333	0.00	1.27	0.968	O				2.07
36.417	0.00	1.27	0.959	O				2.06
36.500	0.00	1.27	0.951	O				2.04
36.583	0.00	1.27	0.942	O				2.03
36.667	0.00	1.27	0.933	O				2.02
36.750	0.00	1.27	0.924	O				2.01
36.833	0.00	1.27	0.916	O				1.99
36.917	0.00	1.27	0.907	O				1.98
37.000	0.00	1.27	0.898	O				1.96
37.083	0.00	1.27	0.889	O				1.94
37.167	0.00	1.27	0.881	O				1.93
37.250	0.00	1.27	0.872	O				1.91
37.333	0.00	1.27	0.863	O				1.90
37.417	0.00	1.27	0.854	O				1.88
37.500	0.00	1.27	0.846	O				1.86
37.583	0.00	1.27	0.837	O				1.85
37.667	0.00	1.27	0.828	O				1.83
37.750	0.00	1.27	0.819	O				1.82
37.833	0.00	1.27	0.811	O				1.80
37.917	0.00	1.27	0.802	O				1.79
38.000	0.00	1.27	0.793	O				1.77
38.083	0.00	1.27	0.784	O				1.75
38.167	0.00	1.27	0.776	O				1.74
38.250	0.00	1.27	0.767	O				1.72
38.333	0.00	1.27	0.758	O				1.71
38.417	0.00	1.27	0.749	O				1.69
38.500	0.00	1.27	0.741	O				1.67
38.583	0.00	1.27	0.732	O				1.66
38.667	0.00	1.27	0.723	O				1.64
38.750	0.00	1.27	0.714	O				1.63
38.833	0.00	1.27	0.706	O				1.61
38.917	0.00	1.27	0.697	O				1.59
39.000	0.00	1.27	0.688	O				1.58
39.083	0.00	1.27	0.679	O				1.56
39.167	0.00	1.27	0.671	O				1.55
39.250	0.00	1.27	0.662	O				1.53
39.333	0.00	1.27	0.653	O				1.51
39.417	0.00	1.27	0.644	O				1.50
39.500	0.00	1.27	0.636	O				1.48
39.583	0.00	1.27	0.627	O				1.47

39.667	0.00	1.27	0.618	0					1.45	
39.750	0.00	1.27	0.609	0					1.44	
39.833	0.00	1.27	0.601	0					1.42	
39.917	0.00	1.27	0.592	0					1.40	
40.000	0.00	1.27	0.583	0					1.39	Storm drainage remaining in the basin is the part of the DCV Volume (Water Quality) which allows a 48-hour drawdown time.
40.083	0.00	1.27	0.574	0					1.37	
40.167	0.00	1.27	0.566	0					1.36	
40.250	0.00	1.27	0.557	0					1.34	
40.333	0.00	1.27	0.548	0					1.32	
40.417	0.00	1.27	0.539	0					1.31	
40.500	0.00	1.27	0.531	0					1.29	
40.583	0.00	1.27	0.522	0					1.28	
40.667	0.00	1.27	0.513	0					1.26	
40.750	0.00	1.27	0.504	0					1.24	
40.833	0.00	1.27	0.496	0					1.23	
40.917	0.00	1.27	0.487	0					1.21	
41.000	0.00	1.27	0.478	0					1.20	
41.083	0.00	1.27	0.469	0					1.18	
41.167	0.00	1.27	0.461	0					1.16	
41.250	0.00	1.27	0.452	0					1.15	
41.333	0.00	1.27	0.443	0					1.13	
41.417	0.00	1.27	0.434	0					1.12	
41.500	0.00	1.27	0.426	0					1.10	
41.583	0.00	1.27	0.417	0					1.09	
41.667	0.00	1.27	0.408	0					1.07	
41.750	0.00	1.27	0.399	0					1.05	
41.833	0.00	1.27	0.391	0					1.04	
41.917	0.00	1.27	0.382	0					1.02	
42.000	0.00	1.27	0.373	0					1.01	
42.083	0.00	1.25	0.365	0					0.99	
42.167	0.00	1.22	0.356	0					0.96	
42.250	0.00	1.19	0.348	0					0.94	
42.333	0.00	1.17	0.340	0					0.92	
42.417	0.00	1.14	0.332	0					0.90	
42.500	0.00	1.11	0.324	0					0.88	
42.583	0.00	1.09	0.316	0					0.85	
42.667	0.00	1.06	0.309	0					0.84	
42.750	0.00	1.04	0.302	0					0.82	
42.833	0.00	1.01	0.295	0					0.80	
42.917	0.00	0.99	0.288	0					0.78	
43.000	0.00	0.96	0.281	0					0.76	
43.083	0.00	0.94	0.275	0					0.74	
43.167	0.00	0.92	0.268	0					0.72	
43.250	0.00	0.90	0.262	0					0.71	
43.333	0.00	0.88	0.256	0					0.69	
43.417	0.00	0.86	0.250	0					0.67	
43.500	0.00	0.84	0.244	0					0.66	
43.583	0.00	0.82	0.238	0					0.64	
43.667	0.00	0.80	0.233	0					0.63	
43.750	0.00	0.78	0.227	0					0.61	
43.833	0.00	0.76	0.222	0					0.60	
43.917	0.00	0.74	0.217	0					0.59	
44.000	0.00	0.73	0.212	0					0.57	
44.083	0.00	0.71	0.207	0					0.56	
44.167	0.00	0.69	0.202	0					0.55	
44.250	0.00	0.68	0.197	0					0.53	
44.333	0.00	0.66	0.193	0					0.52	
44.417	0.00	0.65	0.188	0					0.51	
44.500	0.00	0.63	0.184	0					0.50	
44.583	0.00	0.62	0.179	0					0.48	
44.667	0.00	0.60	0.175	0					0.47	

44.750	0.00	0.59	0.171	O	|	|	|	|	0.46
44.833	0.00	0.57	0.167	O	|	|	|	|	0.45
44.917	0.00	0.56	0.163	O	|	|	|	|	0.44
45.000	0.00	0.55	0.159	O	|	|	|	|	0.43
45.083	0.00	0.53	0.156	O	|	|	|	|	0.42
45.167	0.00	0.52	0.152	O	|	|	|	|	0.41
45.250	0.00	0.51	0.148	O	|	|	|	|	0.40
45.333	0.00	0.50	0.145	O	|	|	|	|	0.39
45.417	0.00	0.49	0.142	O	|	|	|	|	0.38
45.500	0.00	0.47	0.138	O	|	|	|	|	0.37
45.583	0.00	0.46	0.135	O	|	|	|	|	0.37
45.667	0.00	0.45	0.132	O	|	|	|	|	0.36
45.750	0.00	0.44	0.129	O	|	|	|	|	0.35
45.833	0.00	0.43	0.126	O	|	|	|	|	0.34
45.917	0.00	0.42	0.123	O	|	|	|	|	0.33
46.000	0.00	0.41	0.120	O	|	|	|	|	0.32
46.083	0.00	0.40	0.117	O	|	|	|	|	0.31
46.167	0.00	0.39	0.114	O	|	|	|	|	0.30
46.250	0.00	0.38	0.112	O	|	|	|	|	0.28
46.333	0.00	0.37	0.109	O	|	|	|	|	0.26
46.417	0.00	0.37	0.107	O	|	|	|	|	0.24
46.500	0.00	0.36	0.104	O	|	|	|	|	0.23
46.583	0.00	0.35	0.102	O	|	|	|	|	0.14
46.667	0.00	0.34	0.099	O	|	|	|	|	0.19
46.750	0.00	0.33	0.097	O	|	|	|	|	0.18
46.833	0.00	0.33	0.095	O	|	|	|	|	0.17
46.917	0.00	0.32	0.093	O	|	|	|	|	0.16
47.000	0.00	0.31	0.090	O	|	|	|	|	0.14
47.083	0.00	0.30	0.088	O	|	|	|	|	0.13
47.167	0.00	0.30	0.086	O	|	|	|	|	0.11
47.250	0.00	0.29	0.084	O	|	|	|	|	0.10
47.333	0.00	0.28	0.082	O	|	|	|	|	0.09
47.417	0.00	0.28	0.080	O	|	|	|	|	0.08
47.500	0.00	0.27	0.078	O	|	|	|	|	0.07
47.583	0.00	0.26	0.077	O	|	|	|	|	0.06
47.667	0.00	0.26	0.075	O	|	|	|	|	0.05
47.750	0.00	0.25	0.073	O	|	|	|	|	0.04
47.833	0.00	0.24	0.071	O	|	|	|	|	0.02
47.917	0.00	0.24	0.070	O	|	|	|	|	0.01
48.000	0.00	0.00	0.000	O	|	|	|	|	0.00
48.083	0.00	0.00	0.000	O	|	|	|	|	0.00
48.167	0.00	0.00	0.000	O	|	|	|	|	0.00
48.250	0.00	0.00	0.000	O	|	|	|	|	0.00
48.333	0.00	0.00	0.000	O	|	|	|	|	0.00
48.417	0.00	0.00	0.000	O	|	|	|	|	0.00
48.500	0.00	0.00	0.000	O	|	|	|	|	0.00

**********HYDROGRAPH DATA**********

Number of intervals = 582
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 11.203 (CFS)
Total volume = 6.521 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

APPENDIX D.3

BASIN ROUTING ANALYSIS

DRAINAGE AREA A – 25 YEAR

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
Study date: 01/25/23

JOB NO. 2022-318
11115 HEMLOCK AVE
25 YEAR, BASIN ROUTING
POST-CONDITION, CHAMBER A

Program License Serial Number 6277

********** HYDROGRAPH INFORMATION **********

From study/file name: 2022318UH25POSTA.rte
**********HYDROGRAPH DATA**********
Number of intervals = 292
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 66.424 (CFS)
Total volume = 7.916 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

++
Process from Point/Station 3.700 to Point/Station 3.700
**** RETARDING BASIN ROUTING ****
_____

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 292
Hydrograph time unit = 5.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)
Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
1.000	0.370	1.270	0.366	0.374
2.000	0.920	1.270	0.916	0.924
3.000	1.600	1.270	1.596	1.604
4.000	2.340	1.629	2.334	2.346

5.000	3.110	11.600	3.070	3.150
6.000	3.880	20.380	3.810	3.950
7.000	4.630	26.310	4.539	4.721
8.000	5.310	31.130	5.203	5.417
9.000	5.860	35.290	5.738	5.982

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 16.6 33.21 49.82 66.42	Depth (Ft.)
0.083	0.16	0.00	0.001	O | | | |	0.00
0.167	0.98	0.02	0.004	O | | | |	0.01
0.250	1.57	0.04	0.013	O | | | |	0.04
0.333	1.70	0.08	0.024	O | | | |	0.06
0.417	1.73	0.12	0.035	O | | | |	0.09
0.500	1.74	0.16	0.046	O | | | |	0.12
0.583	1.74	0.19	0.057	O | | | |	0.15
0.667	1.75	0.23	0.067	O | | | |	0.18
0.750	1.75	0.27	0.078	O | | | |	0.21
0.833	1.76	0.30	0.088	O | | | |	0.24
0.917	1.76	0.34	0.098	O | | | |	0.26
1.000	1.77	0.37	0.107	O | | | |	0.29
1.083	1.77	0.40	0.117	O | | | |	0.32
1.167	1.78	0.43	0.126	O | | | |	0.34
1.250	1.78	0.46	0.135	O | | | |	0.37
1.333	1.79	0.50	0.144	O | | | |	0.39
1.417	1.80	0.53	0.153	O | | | |	0.41
1.500	1.80	0.56	0.162	O | | | |	0.44
1.583	1.81	0.58	0.170	O | | | |	0.46
1.667	1.81	0.61	0.179	O | | | |	0.48
1.750	1.82	0.64	0.187	O | | | |	0.51
1.833	1.82	0.67	0.195	O | | | |	0.53
1.917	1.83	0.70	0.203	O | | | |	0.55
2.000	1.84	0.72	0.211	O | | | |	0.57
2.083	1.84	0.75	0.218	O | | | |	0.59
2.167	1.85	0.77	0.226	O | | | |	0.61
2.250	1.86	0.80	0.233	O | | | |	0.63
2.333	1.86	0.82	0.240	O | | | |	0.65
2.417	1.87	0.85	0.247	O | | | |	0.67
2.500	1.87	0.87	0.254	O | | | |	0.69
2.583	1.88	0.90	0.261	O | | | |	0.71
2.667	1.89	0.92	0.268	O | | | |	0.72
2.750	1.89	0.94	0.274	O | | | |	0.74
2.833	1.90	0.96	0.281	O | | | |	0.76
2.917	1.91	0.99	0.287	O | | | |	0.78
3.000	1.91	1.01	0.294	O | | | |	0.79
3.083	1.92	1.03	0.300	O | | | |	0.81
3.167	1.93	1.05	0.306	O | | | |	0.83
3.250	1.93	1.07	0.312	O | | | |	0.84
3.333	1.94	1.09	0.318	O | | | |	0.86
3.417	1.95	1.11	0.324	O | | | |	0.87
3.500	1.96	1.13	0.329	O | | | |	0.89
3.583	1.96	1.15	0.335	O | | | |	0.91
3.667	1.97	1.17	0.341	O | | | |	0.92
3.750	1.98	1.19	0.346	O | | | |	0.94
3.833	1.99	1.21	0.351	O | | | |	0.95
3.917	1.99	1.22	0.357	O | | | |	0.96
4.000	2.00	1.24	0.362	O | | | |	0.98

4.083	2.01	1.26	0.367	O				0.99
4.167	2.02	1.27	0.372	O				1.00
4.250	2.02	1.27	0.378	O				1.01
4.333	2.03	1.27	0.383	O				1.02
4.417	2.04	1.27	0.388	O				1.03
4.500	2.05	1.27	0.393	O				1.04
4.583	2.06	1.27	0.399	O				1.05
4.667	2.06	1.27	0.404	O				1.06
4.750	2.07	1.27	0.410	O				1.07
4.833	2.08	1.27	0.415	OI				1.08
4.917	2.09	1.27	0.421	OI				1.09
5.000	2.10	1.27	0.427	OI				1.10
5.083	2.11	1.27	0.432	OI				1.11
5.167	2.12	1.27	0.438	OI				1.12
5.250	2.13	1.27	0.444	OI				1.13
5.333	2.14	1.27	0.450	OI				1.15
5.417	2.14	1.27	0.456	OI				1.16
5.500	2.15	1.27	0.462	OI				1.17
5.583	2.16	1.27	0.468	OI				1.18
5.667	2.17	1.27	0.474	OI				1.19
5.750	2.18	1.27	0.480	OI				1.20
5.833	2.19	1.27	0.487	OI				1.21
5.917	2.20	1.27	0.493	OI				1.22
6.000	2.21	1.27	0.500	OI				1.24
6.083	2.22	1.27	0.506	OI				1.25
6.167	2.23	1.27	0.513	OI				1.26
6.250	2.24	1.27	0.519	OI				1.27
6.333	2.25	1.27	0.526	OI				1.28
6.417	2.26	1.27	0.533	OI				1.30
6.500	2.28	1.27	0.540	OI				1.31
6.583	2.29	1.27	0.547	OI				1.32
6.667	2.30	1.27	0.554	OI				1.33
6.750	2.31	1.27	0.561	OI				1.35
6.833	2.32	1.27	0.568	OI				1.36
6.917	2.33	1.27	0.575	OI				1.37
7.000	2.34	1.27	0.583	OI				1.39
7.083	2.36	1.27	0.590	OI				1.40
7.167	2.37	1.27	0.598	OI				1.41
7.250	2.38	1.27	0.605	OI				1.43
7.333	2.39	1.27	0.613	OI				1.44
7.417	2.41	1.27	0.621	OI				1.46
7.500	2.42	1.27	0.629	OI				1.47
7.583	2.43	1.27	0.637	OI				1.48
7.667	2.45	1.27	0.645	OI				1.50
7.750	2.46	1.27	0.653	OI				1.51
7.833	2.47	1.27	0.661	OI				1.53
7.917	2.49	1.27	0.670	OI				1.54
8.000	2.50	1.27	0.678	OI				1.56
8.083	2.52	1.27	0.686	OI				1.58
8.167	2.53	1.27	0.695	OI				1.59
8.250	2.55	1.27	0.704	OI				1.61
8.333	2.56	1.27	0.713	OI				1.62
8.417	2.58	1.27	0.722	OI				1.64
8.500	2.59	1.27	0.731	OI				1.66
8.583	2.61	1.27	0.740	OI				1.67
8.667	2.62	1.27	0.749	OI				1.69
8.750	2.64	1.27	0.758	OI				1.71
8.833	2.66	1.27	0.768	OI				1.72
8.917	2.67	1.27	0.778	OI				1.74
9.000	2.69	1.27	0.787	OI				1.76
9.083	2.71	1.27	0.797	OI				1.78

9.167	2.73	1.27	0.807	OI				1.79
9.250	2.75	1.27	0.817	OI				1.81
9.333	2.76	1.27	0.827	OI				1.83
9.417	2.78	1.27	0.838	OI				1.85
9.500	2.80	1.27	0.848	OI				1.87
9.583	2.82	1.27	0.859	OI				1.89
9.667	2.84	1.27	0.870	OI				1.91
9.750	2.86	1.27	0.881	OI				1.93
9.833	2.88	1.27	0.892	OI				1.95
9.917	2.91	1.27	0.903	OI				1.97
10.000	2.93	1.27	0.914	OI				1.99
10.083	2.95	1.27	0.926	OI				2.01
10.167	2.97	1.27	0.937	OI				2.03
10.250	3.00	1.27	0.949	OI				2.04
10.333	3.02	1.27	0.961	OI				2.06
10.417	3.04	1.27	0.973	OI				2.08
10.500	3.07	1.27	0.986	OI				2.10
10.583	3.10	1.27	0.998	OI				2.11
10.667	3.12	1.27	1.011	OI				2.13
10.750	3.15	1.27	1.024	OI				2.15
10.833	3.18	1.27	1.037	OI				2.17
10.917	3.20	1.27	1.050	OI				2.19
11.000	3.23	1.27	1.063	OI				2.21
11.083	3.26	1.27	1.077	OI				2.23
11.167	3.29	1.27	1.091	OI				2.25
11.250	3.32	1.27	1.105	OI				2.27
11.333	3.36	1.27	1.119	OI				2.29
11.417	3.39	1.27	1.133	OI				2.31
11.500	3.42	1.27	1.148	OI				2.34
11.583	3.46	1.27	1.163	OI				2.36
11.667	3.49	1.27	1.178	OI				2.38
11.750	3.53	1.27	1.194	OI				2.40
11.833	3.57	1.27	1.209	OI				2.43
11.917	3.61	1.27	1.225	OI				2.45
12.000	3.65	1.27	1.242	OI				2.47
12.083	3.74	1.27	1.258	OI				2.50
12.167	4.02	1.27	1.276	OI				2.52
12.250	4.24	1.27	1.296	O I				2.55
12.333	4.33	1.27	1.317	O I				2.58
12.417	4.38	1.27	1.338	O I				2.61
12.500	4.43	1.27	1.360	O I				2.65
12.583	4.48	1.27	1.382	O I				2.68
12.667	4.54	1.27	1.404	O I				2.71
12.750	4.59	1.27	1.427	O I				2.74
12.833	4.65	1.27	1.450	O I				2.78
12.917	4.71	1.27	1.473	O I				2.81
13.000	4.77	1.27	1.497	O I				2.85
13.083	4.83	1.27	1.521	O I				2.88
13.167	4.90	1.27	1.546	O I				2.92
13.250	4.97	1.27	1.571	O I				2.96
13.333	5.04	1.27	1.597	O I				3.00
13.417	5.11	1.28	1.623	O I				3.03
13.500	5.20	1.29	1.650	O I				3.07
13.583	5.28	1.31	1.677	O I				3.10
13.667	5.37	1.32	1.705	O I				3.14
13.750	5.45	1.33	1.733	O I				3.18
13.833	5.55	1.35	1.761	O I				3.22
13.917	5.65	1.36	1.791	O I				3.26
14.000	5.76	1.38	1.820	O I				3.30
14.083	5.87	1.39	1.851	O I				3.34
14.167	6.00	1.41	1.882	O I				3.38

14.250	6.13	1.42	1.914	O I	|	|	|	3.42
14.333	6.27	1.44	1.947	O I	|	|	|	3.47
14.417	6.41	1.45	1.981	O I	|	|	|	3.51
14.500	6.58	1.47	2.015	O I	|	|	|	3.56
14.583	6.74	1.49	2.051	O I	|	|	|	3.61
14.667	6.93	1.51	2.088	O I	|	|	|	3.66
14.750	7.12	1.53	2.126	O I	|	|	|	3.71
14.833	7.34	1.54	2.165	O I	|	|	|	3.76
14.917	7.57	1.56	2.206	O I	|	|	|	3.82
15.000	7.85	1.58	2.248	O I	|	|	|	3.88
15.083	8.13	1.61	2.292	O I	|	|	|	3.94
15.167	8.47	1.63	2.338	O I	|	|	|	4.00
15.250	8.83	2.20	2.384	O I	|	|	|	4.06
15.333	9.27	2.79	2.429	O I	|	|	|	4.12
15.417	9.54	3.35	2.473	O I	|	|	|	4.17
15.500	9.15	3.86	2.513	O I	|	|	|	4.22
15.583	9.11	4.31	2.547	O I	|	|	|	4.27
15.667	9.85	4.75	2.581	O I	|	|	|	4.31
15.750	10.89	5.23	2.618	O I	|	|	|	4.36
15.833	12.52	5.79	2.661	O I	|	|	|	4.42
15.917	14.99	6.47	2.714	O I	|	|	|	4.49
16.000	20.42	7.43	2.788	O I	|	|	|	4.58
16.083	35.15	9.16	2.922	O I	|	|	|	4.76
16.167	66.42	12.59	3.197	O I	|	|	|	5.11
16.250	49.63	16.02	3.498	O I	|	|	|	5.50
16.333	21.19	17.49	3.626	O I	|	|	|	5.67
16.417	12.84	17.45	3.623	O I	|	|	|	5.67
16.500	10.22	17.01	3.584	O I	|	|	|	5.62
16.583	9.57	16.47	3.537	O I	|	|	|	5.55
16.667	8.78	15.92	3.489	O I	|	|	|	5.49
16.750	8.12	15.35	3.439	O I	|	|	|	5.43
16.833	7.56	14.78	3.389	O I	|	|	|	5.36
16.917	7.10	14.22	3.340	O I	|	|	|	5.30
17.000	6.72	13.67	3.291	O I	|	|	|	5.24
17.083	6.40	13.13	3.244	O I	|	|	|	5.17
17.167	6.11	12.61	3.199	O I	|	|	|	5.12
17.250	5.86	12.11	3.155	O I	|	|	|	5.06
17.333	5.64	11.63	3.113	O I	|	|	|	5.00
17.417	5.44	11.12	3.073	O I	|	|	|	4.95
17.500	5.27	10.62	3.035	O I	|	|	|	4.90
17.583	5.11	10.16	2.999	O I	|	|	|	4.86
17.667	4.96	9.72	2.965	O I	|	|	|	4.81
17.750	4.82	9.31	2.933	O I	|	|	|	4.77
17.833	4.70	8.92	2.903	O I	|	|	|	4.73
17.917	4.58	8.56	2.875	O I	|	|	|	4.69
18.000	4.48	8.21	2.848	O I	|	|	|	4.66
18.083	4.33	7.89	2.823	O I	|	|	|	4.63
18.167	3.99	7.57	2.799	O I	|	|	|	4.60
18.250	3.73	7.25	2.774	O I	|	|	|	4.56
18.333	3.61	6.95	2.751	O I	|	|	|	4.53
18.417	3.52	6.66	2.728	O I	|	|	|	4.50
18.500	3.45	6.39	2.707	O I	|	|	|	4.48
18.583	3.38	6.13	2.688	O I	|	|	|	4.45
18.667	3.32	5.90	2.669	O I	|	|	|	4.43
18.750	3.26	5.67	2.652	O I	|	|	|	4.41
18.833	3.20	5.46	2.636	O I	|	|	|	4.38
18.917	3.14	5.27	2.621	O I	|	|	|	4.36
19.000	3.09	5.08	2.607	O I	|	|	|	4.35
19.083	3.04	4.91	2.594	O I	|	|	|	4.33
19.167	2.99	4.75	2.581	O I	|	|	|	4.31
19.250	2.95	4.60	2.569	O I	|	|	|	4.30

19.333	2.90	4.46	2.558	IO				4.28
19.417	2.86	4.32	2.548	IO				4.27
19.500	2.82	4.19	2.538	IO				4.26
19.583	2.78	4.08	2.529	O				4.25
19.667	2.74	3.96	2.520	O				4.23
19.750	2.71	3.86	2.512	O				4.22
19.833	2.67	3.76	2.504	O				4.21
19.917	2.64	3.66	2.497	O				4.20
20.000	2.60	3.57	2.490	O				4.20
20.083	2.57	3.49	2.484	O				4.19
20.167	2.54	3.41	2.478	O				4.18
20.250	2.51	3.34	2.472	O				4.17
20.333	2.49	3.26	2.466	O				4.16
20.417	2.46	3.20	2.461	O				4.16
20.500	2.43	3.13	2.456	O				4.15
20.583	2.40	3.07	2.451	O				4.14
20.667	2.38	3.01	2.447	O				4.14
20.750	2.35	2.96	2.443	O				4.13
20.833	2.33	2.91	2.439	O				4.13
20.917	2.31	2.86	2.435	O				4.12
21.000	2.29	2.81	2.431	O				4.12
21.083	2.26	2.76	2.428	O				4.11
21.167	2.24	2.72	2.424	O				4.11
21.250	2.22	2.68	2.421	O				4.11
21.333	2.20	2.64	2.418	O				4.10
21.417	2.18	2.60	2.415	O				4.10
21.500	2.16	2.56	2.412	O				4.09
21.583	2.14	2.53	2.409	O				4.09
21.667	2.12	2.49	2.407	O				4.09
21.750	2.11	2.46	2.404	O				4.08
21.833	2.09	2.43	2.402	O				4.08
21.917	2.07	2.40	2.400	IO				4.08
22.000	2.05	2.37	2.397	IO				4.07
22.083	2.04	2.34	2.395	IO				4.07
22.167	2.02	2.32	2.393	IO				4.07
22.250	2.01	2.29	2.391	IO				4.07
22.333	1.99	2.27	2.389	IO				4.06
22.417	1.98	2.24	2.387	IO				4.06
22.500	1.96	2.22	2.386	IO				4.06
22.583	1.95	2.20	2.384	IO				4.06
22.667	1.93	2.17	2.382	IO				4.05
22.750	1.92	2.15	2.380	IO				4.05
22.833	1.91	2.13	2.379	IO				4.05
22.917	1.89	2.11	2.377	IO				4.05
23.000	1.88	2.09	2.376	IO				4.05
23.083	1.87	2.07	2.374	O				4.04
23.167	1.85	2.06	2.373	O				4.04
23.250	1.84	2.04	2.372	O				4.04
23.333	1.83	2.02	2.370	O				4.04
23.417	1.82	2.00	2.369	O				4.04
23.500	1.81	1.99	2.368	O				4.04
23.583	1.79	1.97	2.366	O				4.03
23.667	1.78	1.96	2.365	O				4.03
23.750	1.77	1.94	2.364	O				4.03
23.833	1.76	1.93	2.363	O				4.03
23.917	1.75	1.91	2.362	O				4.03
24.000	1.74	1.90	2.361	O				4.03
24.083	1.57	1.88	2.359	O				4.02
24.167	0.74	1.81	2.354	O				4.02
24.250	0.15	1.70	2.345	O				4.01
24.333	0.03	1.63	2.335	O				3.99

24.417	0.00	1.62	2.323	O	|	|	|	|	3.98
24.500	0.00	1.62	2.312	O	|	|	|	|	3.96
24.583	0.00	1.61	2.301	O	|	|	|	|	3.95
24.667	0.00	1.60	2.290	O	|	|	|	|	3.93
24.750	0.00	1.60	2.279	O	|	|	|	|	3.92
24.833	0.00	1.59	2.268	O	|	|	|	|	3.90
24.917	0.00	1.59	2.257	O	|	|	|	|	3.89
25.000	0.00	1.58	2.246	O	|	|	|	|	3.87
25.083	0.00	1.58	2.235	O	|	|	|	|	3.86
25.167	0.00	1.57	2.224	O	|	|	|	|	3.84
25.250	0.00	1.57	2.214	O	|	|	|	|	3.83
25.333	0.00	1.56	2.203	O	|	|	|	|	3.81
25.417	0.00	1.56	2.192	O	|	|	|	|	3.80
25.500	0.00	1.55	2.181	O	|	|	|	|	3.79
25.583	0.00	1.55	2.171	O	|	|	|	|	3.77
25.667	0.00	1.54	2.160	O	|	|	|	|	3.76
25.750	0.00	1.54	2.150	O	|	|	|	|	3.74
25.833	0.00	1.53	2.139	O	|	|	|	|	3.73
25.917	0.00	1.53	2.128	O	|	|	|	|	3.71
26.000	0.00	1.52	2.118	O	|	|	|	|	3.70
26.083	0.00	1.52	2.107	O	|	|	|	|	3.69
26.167	0.00	1.51	2.097	O	|	|	|	|	3.67
26.250	0.00	1.51	2.087	O	|	|	|	|	3.66
26.333	0.00	1.50	2.076	O	|	|	|	|	3.64
26.417	0.00	1.50	2.066	O	|	|	|	|	3.63
26.500	0.00	1.49	2.056	O	|	|	|	|	3.62
26.583	0.00	1.49	2.045	O	|	|	|	|	3.60
26.667	0.00	1.48	2.035	O	|	|	|	|	3.59
26.750	0.00	1.48	2.025	O	|	|	|	|	3.57
26.833	0.00	1.47	2.015	O	|	|	|	|	3.56
26.917	0.00	1.47	2.005	O	|	|	|	|	3.55
27.000	0.00	1.46	1.995	O	|	|	|	|	3.53
27.083	0.00	1.46	1.985	O	|	|	|	|	3.52
27.167	0.00	1.45	1.975	O	|	|	|	|	3.51
27.250	0.00	1.45	1.965	O	|	|	|	|	3.49
27.333	0.00	1.44	1.955	O	|	|	|	|	3.48
27.417	0.00	1.44	1.945	O	|	|	|	|	3.47
27.500	0.00	1.43	1.935	O	|	|	|	|	3.45
27.583	0.00	1.43	1.925	O	|	|	|	|	3.44
27.667	0.00	1.42	1.915	O	|	|	|	|	3.43
27.750	0.00	1.42	1.905	O	|	|	|	|	3.41
27.833	0.00	1.41	1.896	O	|	|	|	|	3.40
27.917	0.00	1.41	1.886	O	|	|	|	|	3.39
28.000	0.00	1.40	1.876	O	|	|	|	|	3.37
28.083	0.00	1.40	1.867	O	|	|	|	|	3.36
28.167	0.00	1.39	1.857	O	|	|	|	|	3.35
28.250	0.00	1.39	1.847	O	|	|	|	|	3.33
28.333	0.00	1.39	1.838	O	|	|	|	|	3.32
28.417	0.00	1.38	1.828	O	|	|	|	|	3.31
28.500	0.00	1.38	1.819	O	|	|	|	|	3.30
28.583	0.00	1.37	1.809	O	|	|	|	|	3.28
28.667	0.00	1.37	1.800	O	|	|	|	|	3.27
28.750	0.00	1.36	1.791	O	|	|	|	|	3.26
28.833	0.00	1.36	1.781	O	|	|	|	|	3.24
28.917	0.00	1.35	1.772	O	|	|	|	|	3.23
29.000	0.00	1.35	1.763	O	|	|	|	|	3.22
29.083	0.00	1.34	1.753	O	|	|	|	|	3.21
29.167	0.00	1.34	1.744	O	|	|	|	|	3.19
29.250	0.00	1.34	1.735	O	|	|	|	|	3.18
29.333	0.00	1.33	1.726	O	|	|	|	|	3.17
29.417	0.00	1.33	1.716	O	|	|	|	|	3.16

29.500	0.00	1.32	1.707	O	|	|	|	3.15
29.583	0.00	1.32	1.698	O	|	|	|	3.13
29.667	0.00	1.31	1.689	O	|	|	|	3.12
29.750	0.00	1.31	1.680	O	|	|	|	3.11
29.833	0.00	1.30	1.671	O	|	|	|	3.10
29.917	0.00	1.30	1.662	O	|	|	|	3.08
30.000	0.00	1.30	1.653	O	|	|	|	3.07
30.083	0.00	1.29	1.644	O	|	|	|	3.06
30.167	0.00	1.29	1.635	O	|	|	|	3.05
30.250	0.00	1.28	1.627	O	|	|	|	3.04
30.333	0.00	1.28	1.618	O	|	|	|	3.02
30.417	0.00	1.27	1.609	O	|	|	|	3.01
30.500	0.00	1.27	1.600	O	|	|	|	3.00
30.583	0.00	1.27	1.592	O	|	|	|	2.99
30.667	0.00	1.27	1.583	O	|	|	|	2.97
30.750	0.00	1.27	1.574	O	|	|	|	2.96
30.833	0.00	1.27	1.565	O	|	|	|	2.95
30.917	0.00	1.27	1.557	O	|	|	|	2.94
31.000	0.00	1.27	1.548	O	|	|	|	2.92
31.083	0.00	1.27	1.539	O	|	|	|	2.91
31.167	0.00	1.27	1.530	O	|	|	|	2.90
31.250	0.00	1.27	1.522	O	|	|	|	2.88
31.333	0.00	1.27	1.513	O	|	|	|	2.87
31.417	0.00	1.27	1.504	O	|	|	|	2.86
31.500	0.00	1.27	1.495	O	|	|	|	2.85
31.583	0.00	1.27	1.487	O	|	|	|	2.83
31.667	0.00	1.27	1.478	O	|	|	|	2.82
31.750	0.00	1.27	1.469	O	|	|	|	2.81
31.833	0.00	1.27	1.460	O	|	|	|	2.79
31.917	0.00	1.27	1.452	O	|	|	|	2.78
32.000	0.00	1.27	1.443	O	|	|	|	2.77
32.083	0.00	1.27	1.434	O	|	|	|	2.76
32.167	0.00	1.27	1.425	O	|	|	|	2.74
32.250	0.00	1.27	1.417	O	|	|	|	2.73
32.333	0.00	1.27	1.408	O	|	|	|	2.72
32.417	0.00	1.27	1.399	O	|	|	|	2.70
32.500	0.00	1.27	1.390	O	|	|	|	2.69
32.583	0.00	1.27	1.382	O	|	|	|	2.68
32.667	0.00	1.27	1.373	O	|	|	|	2.67
32.750	0.00	1.27	1.364	O	|	|	|	2.65
32.833	0.00	1.27	1.355	O	|	|	|	2.64
32.917	0.00	1.27	1.347	O	|	|	|	2.63
33.000	0.00	1.27	1.338	O	|	|	|	2.61
33.083	0.00	1.27	1.329	O	|	|	|	2.60
33.167	0.00	1.27	1.320	O	|	|	|	2.59
33.250	0.00	1.27	1.312	O	|	|	|	2.58
33.333	0.00	1.27	1.303	O	|	|	|	2.56
33.417	0.00	1.27	1.294	O	|	|	|	2.55
33.500	0.00	1.27	1.285	O	|	|	|	2.54
33.583	0.00	1.27	1.277	O	|	|	|	2.52
33.667	0.00	1.27	1.268	O	|	|	|	2.51
33.750	0.00	1.27	1.259	O	|	|	|	2.50
33.833	0.00	1.27	1.250	O	|	|	|	2.49
33.917	0.00	1.27	1.242	O	|	|	|	2.47
34.000	0.00	1.27	1.233	O	|	|	|	2.46
34.083	0.00	1.27	1.224	O	|	|	|	2.45
34.167	0.00	1.27	1.215	O	|	|	|	2.43
34.250	0.00	1.27	1.207	O	|	|	|	2.42
34.333	0.00	1.27	1.198	O	|	|	|	2.41
34.417	0.00	1.27	1.189	O	|	|	|	2.40
34.500	0.00	1.27	1.180	O	|	|	|	2.38

34.583	0.00	1.27	1.172	O				2.37
34.667	0.00	1.27	1.163	O				2.36
34.750	0.00	1.27	1.154	O				2.34
34.833	0.00	1.27	1.145	O				2.33
34.917	0.00	1.27	1.137	O				2.32
35.000	0.00	1.27	1.128	O				2.31
35.083	0.00	1.27	1.119	O				2.29
35.167	0.00	1.27	1.110	O				2.28
35.250	0.00	1.27	1.102	O				2.27
35.333	0.00	1.27	1.093	O				2.25
35.417	0.00	1.27	1.084	O				2.24
35.500	0.00	1.27	1.075	O				2.23
35.583	0.00	1.27	1.067	O				2.22
35.667	0.00	1.27	1.058	O				2.20
35.750	0.00	1.27	1.049	O				2.19
35.833	0.00	1.27	1.040	O				2.18
35.917	0.00	1.27	1.032	O				2.16
36.000	0.00	1.27	1.023	O				2.15
36.083	0.00	1.27	1.014	O				2.14
36.167	0.00	1.27	1.005	O				2.13
36.250	0.00	1.27	0.997	O				2.11
36.333	0.00	1.27	0.988	O				2.10
36.417	0.00	1.27	0.979	O				2.09
36.500	0.00	1.27	0.971	O				2.07
36.583	0.00	1.27	0.962	O				2.06
36.667	0.00	1.27	0.953	O				2.05
36.750	0.00	1.27	0.944	O				2.04
36.833	0.00	1.27	0.936	O				2.02
36.917	0.00	1.27	0.927	O				2.01
37.000	0.00	1.27	0.918	O				2.00
37.083	0.00	1.27	0.909	O				1.98
37.167	0.00	1.27	0.901	O				1.96
37.250	0.00	1.27	0.892	O				1.95
37.333	0.00	1.27	0.883	O				1.93
37.417	0.00	1.27	0.874	O				1.92
37.500	0.00	1.27	0.866	O				1.90
37.583	0.00	1.27	0.857	O				1.89
37.667	0.00	1.27	0.848	O				1.87
37.750	0.00	1.27	0.839	O				1.85
37.833	0.00	1.27	0.831	O				1.84
37.917	0.00	1.27	0.822	O				1.82
38.000	0.00	1.27	0.813	O				1.81
38.083	0.00	1.27	0.804	O				1.79
38.167	0.00	1.27	0.796	O				1.77
38.250	0.00	1.27	0.787	O				1.76
38.333	0.00	1.27	0.778	O				1.74
38.417	0.00	1.27	0.769	O				1.73
38.500	0.00	1.27	0.761	O				1.71
38.583	0.00	1.27	0.752	O				1.69
38.667	0.00	1.27	0.743	O				1.68
38.750	0.00	1.27	0.734	O				1.66
38.833	0.00	1.27	0.726	O				1.65
38.917	0.00	1.27	0.717	O				1.63
39.000	0.00	1.27	0.708	O				1.61
39.083	0.00	1.27	0.699	O				1.60
39.167	0.00	1.27	0.691	O				1.58
39.250	0.00	1.27	0.682	O				1.57
39.333	0.00	1.27	0.673	O				1.55
39.417	0.00	1.27	0.664	O				1.54
39.500	0.00	1.27	0.656	O				1.52
39.583	0.00	1.27	0.647	O				1.50

39.667	0.00	1.27	0.638	0					1.49	
39.750	0.00	1.27	0.629	0					1.47	
39.833	0.00	1.27	0.621	0					1.46	
39.917	0.00	1.27	0.612	0					1.44	
40.000	0.00	1.27	0.603	0					1.42	Storm drainage remaining in the basin is the part of the DCV Volume (Water Quality) which allows a 48-hour drawdown time.
40.083	0.00	1.27	0.594	0					1.41	
40.167	0.00	1.27	0.586	0					1.39	
40.250	0.00	1.27	0.577	0					1.38	
40.333	0.00	1.27	0.568	0					1.36	
40.417	0.00	1.27	0.559	0					1.34	
40.500	0.00	1.27	0.551	0					1.33	
40.583	0.00	1.27	0.542	0					1.31	
40.667	0.00	1.27	0.533	0					1.30	
40.750	0.00	1.27	0.524	0					1.28	
40.833	0.00	1.27	0.516	0					1.26	
40.917	0.00	1.27	0.507	0					1.25	
41.000	0.00	1.27	0.498	0					1.23	
41.083	0.00	1.27	0.489	0					1.22	
41.167	0.00	1.27	0.481	0					1.20	
41.250	0.00	1.27	0.472	0					1.19	
41.333	0.00	1.27	0.463	0					1.17	
41.417	0.00	1.27	0.454	0					1.15	
41.500	0.00	1.27	0.446	0					1.14	
41.583	0.00	1.27	0.437	0					1.12	
41.667	0.00	1.27	0.428	0					1.11	
41.750	0.00	1.27	0.419	0					1.09	
41.833	0.00	1.27	0.411	0					1.07	
41.917	0.00	1.27	0.402	0					1.06	
42.000	0.00	1.27	0.393	0					1.04	
42.083	0.00	1.27	0.384	0					1.03	
42.167	0.00	1.27	0.376	0					1.01	
42.250	0.00	1.26	0.367	0					0.99	
42.333	0.00	1.23	0.358	0					0.97	
42.417	0.00	1.20	0.350	0					0.95	
42.500	0.00	1.17	0.342	0					0.92	
42.583	0.00	1.15	0.334	0					0.90	
42.667	0.00	1.12	0.326	0					0.88	
42.750	0.00	1.09	0.318	0					0.86	
42.833	0.00	1.07	0.311	0					0.84	
42.917	0.00	1.04	0.304	0					0.82	
43.000	0.00	1.02	0.297	0					0.80	
43.083	0.00	0.99	0.290	0					0.78	
43.167	0.00	0.97	0.283	0					0.76	
43.250	0.00	0.95	0.276	0					0.75	
43.333	0.00	0.93	0.270	0					0.73	
43.417	0.00	0.90	0.264	0					0.71	
43.500	0.00	0.88	0.257	0					0.70	
43.583	0.00	0.86	0.251	0					0.68	
43.667	0.00	0.84	0.246	0					0.66	
43.750	0.00	0.82	0.240	0					0.65	
43.833	0.00	0.80	0.234	0					0.63	
43.917	0.00	0.79	0.229	0					0.62	
44.000	0.00	0.77	0.223	0					0.60	
44.083	0.00	0.75	0.218	0					0.59	
44.167	0.00	0.73	0.213	0					0.58	
44.250	0.00	0.71	0.208	0					0.56	
44.333	0.00	0.70	0.203	0					0.55	
44.417	0.00	0.68	0.199	0					0.54	
44.500	0.00	0.67	0.194	0					0.52	
44.583	0.00	0.65	0.189	0					0.51	
44.667	0.00	0.63	0.185	0					0.50	

44.750	0.00	0.62	0.181	O	|	|	|	|	0.49
44.833	0.00	0.61	0.176	O	|	|	|	|	0.48
44.917	0.00	0.59	0.172	O	|	|	|	|	0.47
45.000	0.00	0.58	0.168	O	|	|	|	|	0.45
45.083	0.00	0.56	0.164	O	|	|	|	|	0.44
45.167	0.00	0.55	0.160	O	|	|	|	|	0.43
45.250	0.00	0.54	0.157	O	|	|	|	|	0.42
45.333	0.00	0.53	0.153	O	|	|	|	|	0.41
45.417	0.00	0.51	0.149	O	|	|	|	|	0.40
45.500	0.00	0.50	0.146	O	|	|	|	|	0.39
45.583	0.00	0.49	0.143	O	|	|	|	|	0.39
45.667	0.00	0.48	0.139	O	|	|	|	|	0.38
45.750	0.00	0.47	0.136	O	|	|	|	|	0.37
45.833	0.00	0.46	0.133	O	|	|	|	|	0.36
45.917	0.00	0.45	0.130	O	|	|	|	|	0.35
46.000	0.00	0.44	0.127	O	|	|	|	|	0.35
46.083	0.00	0.43	0.121	O	|	|	|	|	0.34
46.167	0.00	0.42	0.118	O	|	|	|	|	0.33
46.250	0.00	0.40	0.112	O	|	|	|	|	0.32
46.333	0.00	0.38	0.104	O	|	|	|	|	0.30
46.417	0.00	0.35	0.102	O	|	|	|	|	0.28
46.500	0.00	0.34	0.100	O	|	|	|	|	0.27
46.583	0.00	0.32	0.093	O	|	|	|	|	0.25
46.667	0.00	0.29	0.084	O	|	|	|	|	0.23
46.750	0.00	0.28	0.081	O	|	|	|	|	0.22
46.833	0.00	0.26	0.077	O	|	|	|	|	0.21
46.917	0.00	0.25	0.073	O	|	|	|	|	0.20
47.000	0.00	0.22	0.065	O	|	|	|	|	0.18
47.083	0.00	0.21	0.062	O	|	|	|	|	0.17
47.167	0.00	0.18	0.054	O	|	|	|	|	0.15
47.250	0.00	0.17	0.050	O	|	|	|	|	0.14
47.333	0.00	0.16	0.047	O	|	|	|	|	0.13
47.417	0.00	0.15	0.044	O	|	|	|	|	0.12
47.500	0.00	0.12	0.035	O	|	|	|	|	0.10
47.583	0.00	0.10	0.028	O	|	|	|	|	0.08
47.667	0.00	0.08	0.024	O	|	|	|	|	0.07
47.750	0.00	0.06	0.017	O	|	|	|	|	0.05
47.833	0.00	0.04	0.013	O	|	|	|	|	0.04
47.917	0.00	0.02	0.006	O	|	|	|	|	0.02
48.000	0.00	0.00	0.000	O	|	|	|	|	0.00
48.083	0.00	0.00	0.000	O	|	|	|	|	0.00
48.167	0.00	0.00	0.000	O	|	|	|	|	0.00
48.250	0.00	0.00	0.000	O	|	|	|	|	0.00
48.333	0.00	0.00	0.000	O	|	|	|	|	0.00
48.417	0.00	0.00	0.000	O	|	|	|	|	0.00
48.500	0.00	0.00	0.000	O	|	|	|	|	0.00

**********HYDROGRAPH DATA**********

Number of intervals = 582
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 17.488 (CFS)
Total volume = 7.916 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

APPENDIX D.4

BASIN ROUTING ANALYSIS

DRAINAGE AREA A – 100 YEAR

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
Study date: 01/24/23

JOB NO. 2022-318
11115 HEMLOCK AVE
100 YEAR, BASIN ROUTING
POST-CONDITION, CHAMBER A

Program License Serial Number 6277

********** HYDROGRAPH INFORMATION **********

From study/file name: 2022318UH100POSTA.rte
**********HYDROGRAPH DATA**********
Number of intervals = 292
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 88.450 (CFS)
Total volume = 10.233 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

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Process from Point/Station 3.700 to Point/Station 3.700
**** RETARDING BASIN ROUTING ****
_____

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 292
Hydrograph time unit = 5.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)
Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
1.000	0.370	1.270	0.366	0.374
2.000	0.920	1.270	0.916	0.924
3.000	1.600	1.270	1.596	1.604
4.000	2.340	1.629	2.334	2.346

5.000	3.110	11.600	3.070	3.150
6.000	3.880	20.380	3.810	3.950
7.000	4.630	26.310	4.539	4.721
8.000	5.310	31.130	5.203	5.417
9.000	5.860	35.290	5.738	5.982

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	22.1	44.23	66.34	88.45	Depth (Ft.)
0.083	0.21	0.00	0.001	O	|	|	|	|	0.00
0.167	1.27	0.02	0.006	O	|	|	|	|	0.02
0.250	2.03	0.06	0.017	O	|	|	|	|	0.05
0.333	2.18	0.11	0.031	O	|	|	|	|	0.08
0.417	2.23	0.15	0.045	O	|	|	|	|	0.12
0.500	2.23	0.20	0.059	O	|	|	|	|	0.16
0.583	2.24	0.25	0.073	O	|	|	|	|	0.20
0.667	2.25	0.30	0.087	O	|	|	|	|	0.23
0.750	2.25	0.34	0.100	O	|	|	|	|	0.27
0.833	2.26	0.39	0.113	O	|	|	|	|	0.31
0.917	2.27	0.43	0.126	O	|	|	|	|	0.34
1.000	2.28	0.47	0.138	O	|	|	|	|	0.37
1.083	2.28	0.52	0.151	O	|	|	|	|	0.41
1.167	2.29	0.56	0.163	O	|	|	|	|	0.44
1.250	2.30	0.60	0.174	O	|	|	|	|	0.47
1.333	2.30	0.64	0.186	O	|	|	|	|	0.50
1.417	2.31	0.68	0.197	O	|	|	|	|	0.53
1.500	2.32	0.72	0.208	O	|	|	|	|	0.56
1.583	2.33	0.75	0.219	O	|	|	|	|	0.59
1.667	2.33	0.79	0.230	O	|	|	|	|	0.62
1.750	2.34	0.83	0.241	O	|	|	|	|	0.65
1.833	2.35	0.86	0.251	O	|	|	|	|	0.68
1.917	2.36	0.90	0.261	O	|	|	|	|	0.71
2.000	2.36	0.93	0.271	O	|	|	|	|	0.73
2.083	2.37	0.96	0.281	O	|	|	|	|	0.76
2.167	2.38	1.00	0.291	O	|	|	|	|	0.79
2.250	2.39	1.03	0.300	O	|	|	|	|	0.81
2.333	2.40	1.06	0.309	O	|	|	|	|	0.84
2.417	2.40	1.09	0.318	O	|	|	|	|	0.86
2.500	2.41	1.12	0.327	O	|	|	|	|	0.88
2.583	2.42	1.15	0.336	O	|	|	|	|	0.91
2.667	2.43	1.18	0.345	O	|	|	|	|	0.93
2.750	2.44	1.21	0.353	O	|	|	|	|	0.95
2.833	2.45	1.24	0.362	O	|	|	|	|	0.98
2.917	2.45	1.27	0.370	O	|	|	|	|	1.00
3.000	2.46	1.27	0.378	O	|	|	|	|	1.01
3.083	2.47	1.27	0.386	O	|	|	|	|	1.03
3.167	2.48	1.27	0.395	O	|	|	|	|	1.04
3.250	2.49	1.27	0.403	O	|	|	|	|	1.06
3.333	2.50	1.27	0.411	O	|	|	|	|	1.08
3.417	2.51	1.27	0.420	O	|	|	|	|	1.09
3.500	2.52	1.27	0.428	O	|	|	|	|	1.11
3.583	2.53	1.27	0.437	O	|	|	|	|	1.12
3.667	2.54	1.27	0.446	O	|	|	|	|	1.14
3.750	2.55	1.27	0.455	O	|	|	|	|	1.15
3.833	2.56	1.27	0.463	O	|	|	|	|	1.17
3.917	2.57	1.27	0.472	O	|	|	|	|	1.19
4.000	2.58	1.27	0.481	O	|	|	|	|	1.20

4.083	2.59	1.27	0.490	O				1.22
4.167	2.60	1.27	0.499	O				1.24
4.250	2.61	1.27	0.509	O				1.25
4.333	2.62	1.27	0.518	O				1.27
4.417	2.63	1.27	0.527	O				1.29
4.500	2.64	1.27	0.536	O				1.30
4.583	2.65	1.27	0.546	O				1.32
4.667	2.66	1.27	0.555	O				1.34
4.750	2.67	1.27	0.565	O				1.35
4.833	2.68	1.27	0.575	O				1.37
4.917	2.69	1.27	0.584	O				1.39
5.000	2.70	1.27	0.594	O				1.41
5.083	2.71	1.27	0.604	O				1.43
5.167	2.73	1.27	0.614	O				1.44
5.250	2.74	1.27	0.624	O				1.46
5.333	2.75	1.27	0.634	O				1.48
5.417	2.76	1.27	0.645	O				1.50
5.500	2.77	1.27	0.655	OI				1.52
5.583	2.79	1.27	0.665	OI				1.54
5.667	2.80	1.27	0.676	OI				1.56
5.750	2.81	1.27	0.686	OI				1.58
5.833	2.82	1.27	0.697	OI				1.59
5.917	2.84	1.27	0.708	OI				1.61
6.000	2.85	1.27	0.719	OI				1.63
6.083	2.86	1.27	0.730	OI				1.65
6.167	2.88	1.27	0.741	OI				1.67
6.250	2.89	1.27	0.752	OI				1.69
6.333	2.90	1.27	0.763	OI				1.71
6.417	2.92	1.27	0.774	OI				1.73
6.500	2.93	1.27	0.786	OI				1.76
6.583	2.95	1.27	0.797	OI				1.78
6.667	2.96	1.27	0.809	OI				1.80
6.750	2.98	1.27	0.820	OI				1.82
6.833	2.99	1.27	0.832	OI				1.84
6.917	3.01	1.27	0.844	OI				1.86
7.000	3.02	1.27	0.856	OI				1.88
7.083	3.04	1.27	0.868	OI				1.91
7.167	3.05	1.27	0.880	OI				1.93
7.250	3.07	1.27	0.893	OI				1.95
7.333	3.08	1.27	0.905	OI				1.97
7.417	3.10	1.27	0.918	OI				2.00
7.500	3.12	1.27	0.930	OI				2.02
7.583	3.13	1.27	0.943	OI				2.03
7.667	3.15	1.27	0.956	OI				2.05
7.750	3.17	1.27	0.969	OI				2.07
7.833	3.19	1.27	0.982	OI				2.09
7.917	3.21	1.27	0.996	OI				2.11
8.000	3.22	1.27	1.009	OI				2.13
8.083	3.24	1.27	1.022	OI				2.15
8.167	3.26	1.27	1.036	OI				2.17
8.250	3.28	1.27	1.050	OI				2.19
8.333	3.30	1.27	1.064	OI				2.21
8.417	3.32	1.27	1.078	OI				2.23
8.500	3.34	1.27	1.092	OI				2.25
8.583	3.36	1.27	1.106	OI				2.27
8.667	3.38	1.27	1.121	OI				2.30
8.750	3.40	1.27	1.135	OI				2.32
8.833	3.43	1.27	1.150	OI				2.34
8.917	3.45	1.27	1.165	OI				2.36
9.000	3.47	1.27	1.180	OI				2.38
9.083	3.49	1.27	1.195	OI				2.41

9.167	3.52	1.27	1.211	OI	|	|	|	2.43
9.250	3.54	1.27	1.226	OI	|	|	|	2.45
9.333	3.56	1.27	1.242	OI	|	|	|	2.47
9.417	3.59	1.27	1.258	OI	|	|	|	2.50
9.500	3.61	1.27	1.274	OI	|	|	|	2.52
9.583	3.64	1.27	1.290	OI	|	|	|	2.54
9.667	3.67	1.27	1.307	OI	|	|	|	2.57
9.750	3.69	1.27	1.323	OI	|	|	|	2.59
9.833	3.72	1.27	1.340	OI	|	|	|	2.62
9.917	3.75	1.27	1.357	OI	|	|	|	2.64
10.000	3.78	1.27	1.374	OI	|	|	|	2.67
10.083	3.80	1.27	1.392	OI	|	|	|	2.69
10.167	3.83	1.27	1.409	OI	|	|	|	2.72
10.250	3.86	1.27	1.427	OI	|	|	|	2.75
10.333	3.90	1.27	1.445	OI	|	|	|	2.77
10.417	3.93	1.27	1.463	OI	|	|	|	2.80
10.500	3.96	1.27	1.481	OI	|	|	|	2.83
10.583	3.99	1.27	1.500	OI	|	|	|	2.85
10.667	4.03	1.27	1.519	OI	|	|	|	2.88
10.750	4.06	1.27	1.538	OI	|	|	|	2.91
10.833	4.10	1.27	1.557	OI	|	|	|	2.94
10.917	4.13	1.27	1.577	OI	|	|	|	2.97
11.000	4.17	1.27	1.597	OI	|	|	|	3.00
11.083	4.21	1.28	1.617	OI	|	|	|	3.02
11.167	4.25	1.29	1.637	OI	|	|	|	3.05
11.250	4.29	1.30	1.658	OI	|	|	|	3.08
11.333	4.33	1.31	1.678	OI	|	|	|	3.11
11.417	4.37	1.32	1.699	OI	|	|	|	3.13
11.500	4.42	1.33	1.720	OI	|	|	|	3.16
11.583	4.46	1.34	1.742	OI	|	|	|	3.19
11.667	4.51	1.35	1.764	OI	|	|	|	3.22
11.750	4.55	1.36	1.785	OI	|	|	|	3.25
11.833	4.60	1.37	1.808	OI	|	|	|	3.28
11.917	4.65	1.38	1.830	OI	|	|	|	3.31
12.000	4.71	1.39	1.853	OI	|	|	|	3.34
12.083	4.80	1.40	1.876	OI	|	|	|	3.37
12.167	5.06	1.42	1.900	OI	|	|	|	3.41
12.250	5.26	1.43	1.926	OI	|	|	|	3.44
12.333	5.35	1.44	1.952	OI	|	|	|	3.48
12.417	5.42	1.45	1.980	OI	|	|	|	3.51
12.500	5.49	1.47	2.007	OI	|	|	|	3.55
12.583	5.55	1.48	2.035	O I	|	|	|	3.59
12.667	5.62	1.49	2.063	O I	|	|	|	3.63
12.750	5.69	1.51	2.092	O I	|	|	|	3.66
12.833	5.77	1.52	2.121	O I	|	|	|	3.70
12.917	5.84	1.54	2.150	O I	|	|	|	3.74
13.000	5.92	1.55	2.180	O I	|	|	|	3.78
13.083	6.00	1.57	2.210	O I	|	|	|	3.82
13.167	6.09	1.58	2.241	O I	|	|	|	3.87
13.250	6.18	1.60	2.272	O I	|	|	|	3.91
13.333	6.28	1.61	2.304	O I	|	|	|	3.95
13.417	6.37	1.63	2.337	O I	|	|	|	4.00
13.500	6.48	2.00	2.369	O I	|	|	|	4.04
13.583	6.58	2.39	2.398	O I	|	|	|	4.08
13.667	6.70	2.75	2.426	O I	|	|	|	4.11
13.750	6.82	3.09	2.453	|OI	|	|	|	4.15
13.833	6.95	3.41	2.478	|OI	|	|	|	4.18
13.917	7.08	3.72	2.502	|OI	|	|	|	4.21
14.000	7.22	4.01	2.524	|OI	|	|	|	4.24
14.083	7.37	4.29	2.546	|OI	|	|	|	4.27
14.167	7.54	4.56	2.567	|OI	|	|	|	4.29

14.250	7.70	4.83	2.587	OI				4.32
14.333	7.89	5.08	2.606	OI				4.35
14.417	8.08	5.33	2.626	OI				4.37
14.500	8.29	5.57	2.644	OI				4.40
14.583	8.51	5.81	2.663	OI				4.42
14.667	8.76	6.05	2.682	OI				4.44
14.750	9.01	6.30	2.700	OI				4.47
14.833	9.31	6.54	2.719	OI				4.49
14.917	9.62	6.79	2.739	OI				4.52
15.000	9.98	7.05	2.758	OI				4.54
15.083	10.36	7.31	2.779	OI				4.57
15.167	10.81	7.59	2.801	OI				4.60
15.250	11.29	7.89	2.823	O I				4.63
15.333	11.88	8.20	2.848	O I				4.66
15.417	12.31	8.54	2.873	OI				4.69
15.500	12.11	8.85	2.898	OI				4.72
15.583	12.28	9.14	2.920	OI				4.75
15.667	13.34	9.45	2.944	OI				4.78
15.750	14.80	9.84	2.974	O I				4.82
15.833	17.26	10.37	3.015	O I				4.88
15.917	20.85	11.11	3.072	O I				4.95
16.000	28.12	12.18	3.161	O	I			5.07
16.083	47.49	14.12	3.331	O		I		5.29
16.167	88.45	18.18	3.687	O			I	5.75
16.250	65.75	21.96	4.080	O		I		6.27
16.333	28.41	23.29	4.249	O I				6.49
16.417	17.27	23.27	4.246	I O				6.49
16.500	13.46	22.85	4.193	I O				6.42
16.583	12.34	22.32	4.126	I O				6.33
16.667	11.23	21.77	4.055	I O				6.23
16.750	10.33	21.18	3.982	I O				6.14
16.833	9.59	20.59	3.906	I O				6.04
16.917	8.99	19.82	3.831	I O				5.94
17.000	8.48	18.99	3.758	I O				5.84
17.083	8.05	18.18	3.687	I O				5.75
17.167	7.68	17.40	3.618	I O				5.66
17.250	7.35	16.65	3.553	I O				5.58
17.333	7.06	15.94	3.490	I O				5.49
17.417	6.80	15.26	3.431	I O				5.42
17.500	6.57	14.61	3.374	I O				5.34
17.583	6.36	13.99	3.320	I O				5.27
17.667	6.17	13.41	3.269	I O				5.21
17.750	5.99	12.85	3.220	I O				5.14
17.833	5.83	12.33	3.174	I O				5.08
17.917	5.68	11.83	3.130	I O				5.03
18.000	5.54	11.33	3.089	I O				4.97
18.083	5.37	10.83	3.050	I O				4.92
18.167	5.04	10.35	3.013	I O				4.87
18.250	4.79	9.89	2.978	I O				4.83
18.333	4.65	9.44	2.944	I O				4.78
18.417	4.55	9.03	2.912	I O				4.74
18.500	4.45	8.64	2.882	I O				4.70
18.583	4.36	8.28	2.854	IO				4.67
18.667	4.28	7.94	2.828	IO				4.63
18.750	4.20	7.63	2.803	IO				4.60
18.833	4.13	7.33	2.780	IO				4.57
18.917	4.05	7.06	2.759	IO				4.54
19.000	3.99	6.80	2.739	IO				4.52
19.083	3.92	6.55	2.720	IO				4.49
19.167	3.86	6.33	2.703	IO				4.47
19.250	3.80	6.11	2.686	IO				4.45

19.333	3.74	5.91	2.671	|IO	|	|	|	4.43
19.417	3.69	5.73	2.656	|IO	|	|	|	4.41
19.500	3.63	5.55	2.643	|IO	|	|	|	4.39
19.583	3.58	5.38	2.630	|O	|	|	|	4.38
19.667	3.54	5.23	2.618	|O	|	|	|	4.36
19.750	3.49	5.08	2.607	|O	|	|	|	4.35
19.833	3.44	4.94	2.596	|O	|	|	|	4.33
19.917	3.40	4.81	2.586	|O	|	|	|	4.32
20.000	3.36	4.69	2.576	|O	|	|	|	4.31
20.083	3.32	4.58	2.568	|O	|	|	|	4.30
20.167	3.28	4.47	2.559	|O	|	|	|	4.28
20.250	3.24	4.36	2.551	|O	|	|	|	4.27
20.333	3.20	4.27	2.544	|O	|	|	|	4.26
20.417	3.17	4.17	2.536	|O	|	|	|	4.26
20.500	3.13	4.09	2.530	|O	|	|	|	4.25
20.583	3.10	4.00	2.523	|O	|	|	|	4.24
20.667	3.07	3.92	2.517	|O	|	|	|	4.23
20.750	3.03	3.85	2.511	|O	|	|	|	4.22
20.833	3.00	3.78	2.506	|O	|	|	|	4.22
20.917	2.97	3.71	2.501	|O	|	|	|	4.21
21.000	2.94	3.65	2.496	|O	|	|	|	4.20
21.083	2.92	3.59	2.491	|O	|	|	|	4.20
21.167	2.89	3.53	2.487	|O	|	|	|	4.19
21.250	2.86	3.47	2.482	|O	|	|	|	4.18
21.333	2.83	3.42	2.478	|O	|	|	|	4.18
21.417	2.81	3.37	2.474	|O	|	|	|	4.17
21.500	2.78	3.32	2.470	|O	|	|	|	4.17
21.583	2.76	3.27	2.467	IO	|	|	|	4.16
21.667	2.74	3.23	2.463	IO	|	|	|	4.16
21.750	2.71	3.18	2.460	IO	|	|	|	4.16
21.833	2.69	3.14	2.457	IO	|	|	|	4.15
21.917	2.67	3.10	2.454	IO	|	|	|	4.15
22.000	2.65	3.06	2.451	IO	|	|	|	4.14
22.083	2.62	3.03	2.448	IO	|	|	|	4.14
22.167	2.60	2.99	2.445	IO	|	|	|	4.14
22.250	2.58	2.96	2.443	IO	|	|	|	4.13
22.333	2.56	2.93	2.440	IO	|	|	|	4.13
22.417	2.54	2.89	2.438	IO	|	|	|	4.13
22.500	2.53	2.86	2.435	IO	|	|	|	4.12
22.583	2.51	2.83	2.433	IO	|	|	|	4.12
22.667	2.49	2.81	2.431	IO	|	|	|	4.12
22.750	2.47	2.78	2.429	IO	|	|	|	4.12
22.833	2.45	2.75	2.427	O	|	|	|	4.11
22.917	2.44	2.72	2.425	O	|	|	|	4.11
23.000	2.42	2.70	2.423	O	|	|	|	4.11
23.083	2.40	2.67	2.421	O	|	|	|	4.10
23.167	2.39	2.65	2.419	O	|	|	|	4.10
23.250	2.37	2.63	2.417	O	|	|	|	4.10
23.333	2.35	2.60	2.415	O	|	|	|	4.10
23.417	2.34	2.58	2.414	O	|	|	|	4.10
23.500	2.32	2.56	2.412	O	|	|	|	4.09
23.583	2.31	2.54	2.410	O	|	|	|	4.09
23.667	2.29	2.52	2.409	O	|	|	|	4.09
23.750	2.28	2.50	2.407	O	|	|	|	4.09
23.833	2.27	2.48	2.406	O	|	|	|	4.09
23.917	2.25	2.46	2.404	O	|	|	|	4.08
24.000	2.24	2.44	2.403	O	|	|	|	4.08
24.083	2.01	2.42	2.401	O	|	|	|	4.08
24.167	0.94	2.34	2.395	O	|	|	|	4.07
24.250	0.19	2.19	2.383	O	|	|	|	4.06
24.333	0.04	2.01	2.369	O	|	|	|	4.04

24.417	0.00	1.84	2.356	O	|	|	|	4.02
24.500	0.00	1.68	2.344	O	|	|	|	4.01
24.583	0.00	1.63	2.333	O	|	|	|	3.99
24.667	0.00	1.62	2.321	O	|	|	|	3.97
24.750	0.00	1.61	2.310	O	|	|	|	3.96
24.833	0.00	1.61	2.299	O	|	|	|	3.94
24.917	0.00	1.60	2.288	O	|	|	|	3.93
25.000	0.00	1.60	2.277	O	|	|	|	3.92
25.083	0.00	1.59	2.266	O	|	|	|	3.90
25.167	0.00	1.59	2.255	O	|	|	|	3.89
25.250	0.00	1.58	2.244	O	|	|	|	3.87
25.333	0.00	1.58	2.233	O	|	|	|	3.86
25.417	0.00	1.57	2.223	O	|	|	|	3.84
25.500	0.00	1.57	2.212	O	|	|	|	3.83
25.583	0.00	1.56	2.201	O	|	|	|	3.81
25.667	0.00	1.56	2.190	O	|	|	|	3.80
25.750	0.00	1.55	2.180	O	|	|	|	3.78
25.833	0.00	1.55	2.169	O	|	|	|	3.77
25.917	0.00	1.54	2.158	O	|	|	|	3.75
26.000	0.00	1.54	2.148	O	|	|	|	3.74
26.083	0.00	1.53	2.137	O	|	|	|	3.73
26.167	0.00	1.53	2.127	O	|	|	|	3.71
26.250	0.00	1.52	2.116	O	|	|	|	3.70
26.333	0.00	1.52	2.106	O	|	|	|	3.68
26.417	0.00	1.51	2.095	O	|	|	|	3.67
26.500	0.00	1.51	2.085	O	|	|	|	3.66
26.583	0.00	1.50	2.074	O	|	|	|	3.64
26.667	0.00	1.50	2.064	O	|	|	|	3.63
26.750	0.00	1.49	2.054	O	|	|	|	3.61
26.833	0.00	1.49	2.044	O	|	|	|	3.60
26.917	0.00	1.48	2.033	O	|	|	|	3.59
27.000	0.00	1.48	2.023	O	|	|	|	3.57
27.083	0.00	1.47	2.013	O	|	|	|	3.56
27.167	0.00	1.47	2.003	O	|	|	|	3.54
27.250	0.00	1.46	1.993	O	|	|	|	3.53
27.333	0.00	1.46	1.983	O	|	|	|	3.52
27.417	0.00	1.45	1.973	O	|	|	|	3.50
27.500	0.00	1.45	1.963	O	|	|	|	3.49
27.583	0.00	1.44	1.953	O	|	|	|	3.48
27.667	0.00	1.44	1.943	O	|	|	|	3.46
27.750	0.00	1.43	1.933	O	|	|	|	3.45
27.833	0.00	1.43	1.923	O	|	|	|	3.44
27.917	0.00	1.42	1.914	O	|	|	|	3.42
28.000	0.00	1.42	1.904	O	|	|	|	3.41
28.083	0.00	1.41	1.894	O	|	|	|	3.40
28.167	0.00	1.41	1.884	O	|	|	|	3.38
28.250	0.00	1.40	1.875	O	|	|	|	3.37
28.333	0.00	1.40	1.865	O	|	|	|	3.36
28.417	0.00	1.39	1.855	O	|	|	|	3.35
28.500	0.00	1.39	1.846	O	|	|	|	3.33
28.583	0.00	1.38	1.836	O	|	|	|	3.32
28.667	0.00	1.38	1.827	O	|	|	|	3.31
28.750	0.00	1.38	1.817	O	|	|	|	3.29
28.833	0.00	1.37	1.808	O	|	|	|	3.28
28.917	0.00	1.37	1.798	O	|	|	|	3.27
29.000	0.00	1.36	1.789	O	|	|	|	3.26
29.083	0.00	1.36	1.780	O	|	|	|	3.24
29.167	0.00	1.35	1.770	O	|	|	|	3.23
29.250	0.00	1.35	1.761	O	|	|	|	3.22
29.333	0.00	1.34	1.752	O	|	|	|	3.20
29.417	0.00	1.34	1.742	O	|	|	|	3.19

29.500	0.00	1.33	1.733	O	|	|	|	3.18
29.583	0.00	1.33	1.724	O	|	|	|	3.17
29.667	0.00	1.33	1.715	O	|	|	|	3.16
29.750	0.00	1.32	1.706	O	|	|	|	3.14
29.833	0.00	1.32	1.697	O	|	|	|	3.13
29.917	0.00	1.31	1.688	O	|	|	|	3.12
30.000	0.00	1.31	1.679	O	|	|	|	3.11
30.083	0.00	1.30	1.670	O	|	|	|	3.09
30.167	0.00	1.30	1.661	O	|	|	|	3.08
30.250	0.00	1.30	1.652	O	|	|	|	3.07
30.333	0.00	1.29	1.643	O	|	|	|	3.06
30.417	0.00	1.29	1.634	O	|	|	|	3.05
30.500	0.00	1.28	1.625	O	|	|	|	3.03
30.583	0.00	1.28	1.616	O	|	|	|	3.02
30.667	0.00	1.27	1.607	O	|	|	|	3.01
30.750	0.00	1.27	1.599	O	|	|	|	3.00
30.833	0.00	1.27	1.590	O	|	|	|	2.99
30.917	0.00	1.27	1.581	O	|	|	|	2.97
31.000	0.00	1.27	1.572	O	|	|	|	2.96
31.083	0.00	1.27	1.564	O	|	|	|	2.95
31.167	0.00	1.27	1.555	O	|	|	|	2.93
31.250	0.00	1.27	1.546	O	|	|	|	2.92
31.333	0.00	1.27	1.538	O	|	|	|	2.91
31.417	0.00	1.27	1.529	O	|	|	|	2.90
31.500	0.00	1.27	1.520	O	|	|	|	2.88
31.583	0.00	1.27	1.511	O	|	|	|	2.87
31.667	0.00	1.27	1.503	O	|	|	|	2.86
31.750	0.00	1.27	1.494	O	|	|	|	2.84
31.833	0.00	1.27	1.485	O	|	|	|	2.83
31.917	0.00	1.27	1.476	O	|	|	|	2.82
32.000	0.00	1.27	1.468	O	|	|	|	2.81
32.083	0.00	1.27	1.459	O	|	|	|	2.79
32.167	0.00	1.27	1.450	O	|	|	|	2.78
32.250	0.00	1.27	1.441	O	|	|	|	2.77
32.333	0.00	1.27	1.433	O	|	|	|	2.75
32.417	0.00	1.27	1.424	O	|	|	|	2.74
32.500	0.00	1.27	1.415	O	|	|	|	2.73
32.583	0.00	1.27	1.406	O	|	|	|	2.72
32.667	0.00	1.27	1.398	O	|	|	|	2.70
32.750	0.00	1.27	1.389	O	|	|	|	2.69
32.833	0.00	1.27	1.380	O	|	|	|	2.68
32.917	0.00	1.27	1.371	O	|	|	|	2.66
33.000	0.00	1.27	1.363	O	|	|	|	2.65
33.083	0.00	1.27	1.354	O	|	|	|	2.64
33.167	0.00	1.27	1.345	O	|	|	|	2.63
33.250	0.00	1.27	1.336	O	|	|	|	2.61
33.333	0.00	1.27	1.328	O	|	|	|	2.60
33.417	0.00	1.27	1.319	O	|	|	|	2.59
33.500	0.00	1.27	1.310	O	|	|	|	2.57
33.583	0.00	1.27	1.301	O	|	|	|	2.56
33.667	0.00	1.27	1.293	O	|	|	|	2.55
33.750	0.00	1.27	1.284	O	|	|	|	2.54
33.833	0.00	1.27	1.275	O	|	|	|	2.52
33.917	0.00	1.27	1.266	O	|	|	|	2.51
34.000	0.00	1.27	1.258	O	|	|	|	2.50
34.083	0.00	1.27	1.249	O	|	|	|	2.48
34.167	0.00	1.27	1.240	O	|	|	|	2.47
34.250	0.00	1.27	1.231	O	|	|	|	2.46
34.333	0.00	1.27	1.223	O	|	|	|	2.45
34.417	0.00	1.27	1.214	O	|	|	|	2.43
34.500	0.00	1.27	1.205	O	|	|	|	2.42

34.583	0.00	1.27	1.196	O	|	|	|	|	2.41
34.667	0.00	1.27	1.188	O	|	|	|	|	2.39
34.750	0.00	1.27	1.179	O	|	|	|	|	2.38
34.833	0.00	1.27	1.170	O	|	|	|	|	2.37
34.917	0.00	1.27	1.161	O	|	|	|	|	2.36
35.000	0.00	1.27	1.153	O	|	|	|	|	2.34
35.083	0.00	1.27	1.144	O	|	|	|	|	2.33
35.167	0.00	1.27	1.135	O	|	|	|	|	2.32
35.250	0.00	1.27	1.126	O	|	|	|	|	2.30
35.333	0.00	1.27	1.118	O	|	|	|	|	2.29
35.417	0.00	1.27	1.109	O	|	|	|	|	2.28
35.500	0.00	1.27	1.100	O	|	|	|	|	2.26
35.583	0.00	1.27	1.091	O	|	|	|	|	2.25
35.667	0.00	1.27	1.083	O	|	|	|	|	2.24
35.750	0.00	1.27	1.074	O	|	|	|	|	2.23
35.833	0.00	1.27	1.065	O	|	|	|	|	2.21
35.917	0.00	1.27	1.056	O	|	|	|	|	2.20
36.000	0.00	1.27	1.048	O	|	|	|	|	2.19
36.083	0.00	1.27	1.039	O	|	|	|	|	2.17
36.167	0.00	1.27	1.030	O	|	|	|	|	2.16
36.250	0.00	1.27	1.021	O	|	|	|	|	2.15
36.333	0.00	1.27	1.013	O	|	|	|	|	2.14
36.417	0.00	1.27	1.004	O	|	|	|	|	2.12
36.500	0.00	1.27	0.995	O	|	|	|	|	2.11
36.583	0.00	1.27	0.986	O	|	|	|	|	2.10
36.667	0.00	1.27	0.978	O	|	|	|	|	2.08
36.750	0.00	1.27	0.969	O	|	|	|	|	2.07
36.833	0.00	1.27	0.960	O	|	|	|	|	2.06
36.917	0.00	1.27	0.951	O	|	|	|	|	2.05
37.000	0.00	1.27	0.943	O	|	|	|	|	2.03
37.083	0.00	1.27	0.934	O	|	|	|	|	2.02
37.167	0.00	1.27	0.925	O	|	|	|	|	2.01
37.250	0.00	1.27	0.917	O	|	|	|	|	1.99
37.333	0.00	1.27	0.908	O	|	|	|	|	1.98
37.417	0.00	1.27	0.899	O	|	|	|	|	1.96
37.500	0.00	1.27	0.890	O	|	|	|	|	1.95
37.583	0.00	1.27	0.882	O	|	|	|	|	1.93
37.667	0.00	1.27	0.873	O	|	|	|	|	1.91
37.750	0.00	1.27	0.864	O	|	|	|	|	1.90
37.833	0.00	1.27	0.855	O	|	|	|	|	1.88
37.917	0.00	1.27	0.847	O	|	|	|	|	1.87
38.000	0.00	1.27	0.838	O	|	|	|	|	1.85
38.083	0.00	1.27	0.829	O	|	|	|	|	1.83
38.167	0.00	1.27	0.820	O	|	|	|	|	1.82
38.250	0.00	1.27	0.812	O	|	|	|	|	1.80
38.333	0.00	1.27	0.803	O	|	|	|	|	1.79
38.417	0.00	1.27	0.794	O	|	|	|	|	1.77
38.500	0.00	1.27	0.785	O	|	|	|	|	1.76
38.583	0.00	1.27	0.777	O	|	|	|	|	1.74
38.667	0.00	1.27	0.768	O	|	|	|	|	1.72
38.750	0.00	1.27	0.759	O	|	|	|	|	1.71
38.833	0.00	1.27	0.750	O	|	|	|	|	1.69
38.917	0.00	1.27	0.742	O	|	|	|	|	1.68
39.000	0.00	1.27	0.733	O	|	|	|	|	1.66
39.083	0.00	1.27	0.724	O	|	|	|	|	1.64
39.167	0.00	1.27	0.715	O	|	|	|	|	1.63
39.250	0.00	1.27	0.707	O	|	|	|	|	1.61
39.333	0.00	1.27	0.698	O	|	|	|	|	1.60
39.417	0.00	1.27	0.689	O	|	|	|	|	1.58
39.500	0.00	1.27	0.680	O	|	|	|	|	1.56
39.583	0.00	1.27	0.672	O	|	|	|	|	1.55

39.667	0.00	1.27	0.663	O	|	|	|	|	1.53
39.750	0.00	1.27	0.654	O	|	|	|	|	1.52
39.833	0.00	1.27	0.645	O	|	|	|	|	1.50
39.917	0.00	1.27	0.637	O	|	|	|	|	1.48
40.000	0.00	1.27	0.628	O	|	|	|	|	1.47
40.083	0.00	1.27	0.619	O	|	|	|	|	1.45
40.167	0.00	1.27	0.610	O	|	|	|	|	1.44
40.250	0.00	1.27	0.602	O	|	|	|	|	1.42
40.333	0.00	1.27	0.593	O	|	|	|	|	1.41
40.417	0.00	1.27	0.584	O	|	|	|	|	1.39
40.500	0.00	1.27	0.575	O	|	|	|	|	1.37
40.583	0.00	1.27	0.567	O	|	|	|	|	1.36
40.667	0.00	1.27	0.558	O	|	|	|	|	1.34
40.750	0.00	1.27	0.549	O	|	|	|	|	1.33
40.833	0.00	1.27	0.540	O	|	|	|	|	1.31
40.917	0.00	1.27	0.532	O	|	|	|	|	1.29
41.000	0.00	1.27	0.523	O	|	|	|	|	1.28
41.083	0.00	1.27	0.514	O	|	|	|	|	1.26
41.167	0.00	1.27	0.505	O	|	|	|	|	1.25
41.250	0.00	1.27	0.497	O	|	|	|	|	1.23
41.333	0.00	1.27	0.488	O	|	|	|	|	1.21
41.417	0.00	1.27	0.479	O	|	|	|	|	1.20
41.500	0.00	1.27	0.470	O	|	|	|	|	1.18
41.583	0.00	1.27	0.462	O	|	|	|	|	1.17
41.667	0.00	1.27	0.453	O	|	|	|	|	1.15
41.750	0.00	1.27	0.444	O	|	|	|	|	1.13
41.833	0.00	1.27	0.435	O	|	|	|	|	1.12
41.917	0.00	1.27	0.427	O	|	|	|	|	1.10
42.000	0.00	1.27	0.418	O	|	|	|	|	1.09
42.083	0.00	1.27	0.409	O	|	|	|	|	1.07
42.167	0.00	1.27	0.400	O	|	|	|	|	1.06
42.250	0.00	1.27	0.392	O	|	|	|	|	1.04
42.333	0.00	1.27	0.383	O	|	|	|	|	1.02
42.417	0.00	1.27	0.374	O	|	|	|	|	1.01
42.500	0.00	1.25	0.366	O	|	|	|	|	0.99
42.583	0.00	1.23	0.357	O	|	|	|	|	0.96
42.667	0.00	1.20	0.349	O	|	|	|	|	0.94
42.750	0.00	1.17	0.340	O	|	|	|	|	0.92
42.833	0.00	1.14	0.333	O	|	|	|	|	0.90
42.917	0.00	1.11	0.325	O	|	|	|	|	0.88
43.000	0.00	1.09	0.317	O	|	|	|	|	0.86
43.083	0.00	1.06	0.310	O	|	|	|	|	0.84
43.167	0.00	1.04	0.303	O	|	|	|	|	0.82
43.250	0.00	1.01	0.295	O	|	|	|	|	0.80
43.333	0.00	0.99	0.289	O	|	|	|	|	0.78
43.417	0.00	0.97	0.282	O	|	|	|	|	0.76
43.500	0.00	0.94	0.275	O	|	|	|	|	0.74
43.583	0.00	0.92	0.269	O	|	|	|	|	0.73
43.667	0.00	0.90	0.263	O	|	|	|	|	0.71
43.750	0.00	0.88	0.256	O	|	|	|	|	0.69
43.833	0.00	0.86	0.250	O	|	|	|	|	0.68
43.917	0.00	0.84	0.245	O	|	|	|	|	0.66
44.000	0.00	0.82	0.239	O	|	|	|	|	0.65
44.083	0.00	0.80	0.233	O	|	|	|	|	0.63
44.167	0.00	0.78	0.228	O	|	|	|	|	0.62
44.250	0.00	0.76	0.222	O	|	|	|	|	0.60
44.333	0.00	0.75	0.217	O	|	|	|	|	0.59
44.417	0.00	0.73	0.212	O	|	|	|	|	0.57
44.500	0.00	0.71	0.207	O	|	|	|	|	0.56
44.583	0.00	0.69	0.202	O	|	|	|	|	0.55
44.667	0.00	0.68	0.198	O	|	|	|	|	0.53

Storm drainage remaining in the basin is the part of the DCV Volume (Water Quality) which allows a 48-hour drawdown time.

44.750	0.00	0.66	0.193	O	|	|	|	|	0.52
44.833	0.00	0.65	0.189	O	|	|	|	|	0.51
44.917	0.00	0.63	0.184	O	|	|	|	|	0.50
45.000	0.00	0.62	0.180	O	|	|	|	|	0.49
45.083	0.00	0.60	0.176	O	|	|	|	|	0.47
45.167	0.00	0.59	0.172	O	|	|	|	|	0.46
45.250	0.00	0.58	0.168	O	|	|	|	|	0.45
45.333	0.00	0.56	0.164	O	|	|	|	|	0.44
45.417	0.00	0.55	0.160	O	|	|	|	|	0.43
45.500	0.00	0.54	0.156	O	|	|	|	|	0.42
45.583	0.00	0.52	0.152	O	|	|	|	|	0.41
45.667	0.00	0.51	0.149	O	|	|	|	|	0.40
45.750	0.00	0.50	0.145	O	|	|	|	|	0.39
45.833	0.00	0.49	0.142	O	|	|	|	|	0.38
45.917	0.00	0.48	0.139	O	|	|	|	|	0.37
46.000	0.00	0.46	0.135	O	|	|	|	|	0.36
46.083	0.00	0.44	0.129	O	|	|	|	|	0.35
46.167	0.00	0.43	0.126	O	|	|	|	|	0.34
46.250	0.00	0.42	0.120	O	|	|	|	|	0.32
46.333	0.00	0.38	0.112	O	|	|	|	|	0.30
46.417	0.00	0.35	0.107	O	|	|	|	|	0.28
46.500	0.00	0.34	0.100	O	|	|	|	|	0.27
46.583	0.00	0.32	0.093	O	|	|	|	|	0.25
46.667	0.00	0.29	0.084	O	|	|	|	|	0.23
46.750	0.00	0.28	0.081	O	|	|	|	|	0.22
46.833	0.00	0.26	0.077	O	|	|	|	|	0.21
46.917	0.00	0.25	0.073	O	|	|	|	|	0.20
47.000	0.00	0.22	0.065	O	|	|	|	|	0.18
47.083	0.00	0.21	0.062	O	|	|	|	|	0.17
47.167	0.00	0.18	0.054	O	|	|	|	|	0.15
47.250	0.00	0.17	0.050	O	|	|	|	|	0.14
47.333	0.00	0.16	0.047	O	|	|	|	|	0.13
47.417	0.00	0.15	0.044	O	|	|	|	|	0.12
47.500	0.00	0.12	0.035	O	|	|	|	|	0.10
47.583	0.00	0.10	0.028	O	|	|	|	|	0.08
47.667	0.00	0.08	0.024	O	|	|	|	|	0.07
47.750	0.00	0.06	0.017	O	|	|	|	|	0.05
47.833	0.00	0.04	0.013	O	|	|	|	|	0.04
47.917	0.00	0.02	0.006	O	|	|	|	|	0.02
48.000	0.00	0.00	0.000	O	|	|	|	|	0.00
48.083	0.00	0.00	0.000	O	|	|	|	|	0.00
48.167	0.00	0.00	0.000	O	|	|	|	|	0.00
48.250	0.00	0.00	0.000	O	|	|	|	|	0.00
48.333	0.00	0.00	0.000	O	|	|	|	|	0.00
48.417	0.00	0.00	0.000	O	|	|	|	|	0.00
48.500	0.00	0.00	0.000	O	|	|	|	|	0.00

**********HYDROGRAPH DATA**********

Number of intervals = 582
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 23.295 (CFS)
Total volume = 10.233 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

APPENDIX D.5

BASIN ROUTING ANALYSIS

DRAINAGE AREA B – 2 YEAR

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
Study date: 01/25/23

JOB NO. 2022-318
11115 HEMLOCK AVE
2 YEAR, BASIN ROUTING
POST-CONDITION, CHAMBER B

Program License Serial Number 6277

********** HYDROGRAPH INFORMATION **********

From study/file name: 2022318UH2POSTB.rte
**********HYDROGRAPH DATA**********
Number of intervals = 292
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 17.810 (CFS)
Total volume = 2.220 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

++
Process from Point/Station 5.300 to Point/Station 5.300
**** RETARDING BASIN ROUTING ****
_____

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 292
Hydrograph time unit = 5.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)
Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
1.000	0.210	1.000	0.207	0.213
2.000	0.520	1.000	0.517	0.523
3.000	0.900	1.000	0.897	0.903
4.000	1.320	1.040	1.316	1.324

5.000	1.760	4.580	1.744	1.776
6.000	2.190	6.510	2.168	2.212
7.000	2.610	7.980	2.583	2.637
8.000	2.900	9.220	2.868	2.932
9.000	3.310	10.320	3.274	3.346

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 4.5 8.91 13.36 17.81	Depth (Ft.)
0.083	0.05	0.00	0.000	O | | | |	0.00
0.167	0.28	0.01	0.001	O | | | |	0.01
0.250	0.44	0.02	0.004	O | | | |	0.02
0.333	0.47	0.03	0.007	O | | | |	0.03
0.417	0.48	0.05	0.010	O | | | |	0.05
0.500	0.48	0.06	0.012	O | | | |	0.06
0.583	0.48	0.07	0.015	O | | | |	0.07
0.667	0.48	0.09	0.018	O | | | |	0.09
0.750	0.48	0.10	0.021	O | | | |	0.10
0.833	0.48	0.11	0.023	O | | | |	0.11
0.917	0.48	0.12	0.026	O | | | |	0.12
1.000	0.49	0.13	0.028	O | | | |	0.13
1.083	0.49	0.15	0.031	O | | | |	0.15
1.167	0.49	0.16	0.033	O | | | |	0.16
1.250	0.49	0.17	0.035	O | | | |	0.17
1.333	0.49	0.18	0.037	O | | | |	0.18
1.417	0.49	0.19	0.040	O | | | |	0.19
1.500	0.50	0.20	0.042	O | | | |	0.20
1.583	0.50	0.21	0.044	O | | | |	0.21
1.667	0.50	0.22	0.046	O | | | |	0.22
1.750	0.50	0.23	0.048	O | | | |	0.23
1.833	0.50	0.24	0.049	O | | | |	0.24
1.917	0.50	0.24	0.051	O | | | |	0.24
2.000	0.51	0.25	0.053	O | | | |	0.25
2.083	0.51	0.26	0.055	O | | | |	0.26
2.167	0.51	0.27	0.056	O | | | |	0.27
2.250	0.51	0.28	0.058	O | | | |	0.28
2.333	0.51	0.28	0.060	O | | | |	0.28
2.417	0.51	0.29	0.061	O | | | |	0.29
2.500	0.52	0.30	0.063	O | | | |	0.30
2.583	0.52	0.31	0.064	O | | | |	0.31
2.667	0.52	0.31	0.066	O | | | |	0.31
2.750	0.52	0.32	0.067	O | | | |	0.32
2.833	0.52	0.33	0.068	O | | | |	0.33
2.917	0.52	0.33	0.070	O | | | |	0.33
3.000	0.53	0.34	0.071	O | | | |	0.34
3.083	0.53	0.34	0.072	O | | | |	0.34
3.167	0.53	0.35	0.074	O | | | |	0.35
3.250	0.53	0.36	0.075	O | | | |	0.36
3.333	0.53	0.36	0.076	O | | | |	0.36
3.417	0.54	0.37	0.077	O | | | |	0.37
3.500	0.54	0.37	0.078	O | | | |	0.37
3.583	0.54	0.38	0.079	O | | | |	0.38
3.667	0.54	0.38	0.081	O | | | |	0.38
3.750	0.54	0.39	0.082	O | | | |	0.39
3.833	0.55	0.39	0.083	O | | | |	0.39
3.917	0.55	0.40	0.084	O | | | |	0.40
4.000	0.55	0.40	0.085	O | | | |	0.40

4.083	0.55	0.41	0.086	O	|	|	|	0.41
4.167	0.56	0.41	0.087	O	|	|	|	0.41
4.250	0.56	0.42	0.088	OI	|	|	|	0.42
4.333	0.56	0.42	0.089	OI	|	|	|	0.42
4.417	0.56	0.43	0.090	OI	|	|	|	0.43
4.500	0.56	0.43	0.091	OI	|	|	|	0.43
4.583	0.57	0.44	0.091	OI	|	|	|	0.44
4.667	0.57	0.44	0.092	OI	|	|	|	0.44
4.750	0.57	0.44	0.093	OI	|	|	|	0.44
4.833	0.57	0.45	0.094	OI	|	|	|	0.45
4.917	0.58	0.45	0.095	OI	|	|	|	0.45
5.000	0.58	0.46	0.096	OI	|	|	|	0.46
5.083	0.58	0.46	0.097	OI	|	|	|	0.46
5.167	0.58	0.46	0.098	OI	|	|	|	0.46
5.250	0.59	0.47	0.098	OI	|	|	|	0.47
5.333	0.59	0.47	0.099	OI	|	|	|	0.47
5.417	0.59	0.48	0.100	OI	|	|	|	0.48
5.500	0.59	0.48	0.101	OI	|	|	|	0.48
5.583	0.60	0.48	0.102	OI	|	|	|	0.48
5.667	0.60	0.49	0.102	OI	|	|	|	0.49
5.750	0.60	0.49	0.103	OI	|	|	|	0.49
5.833	0.61	0.49	0.104	OI	|	|	|	0.49
5.917	0.61	0.50	0.105	OI	|	|	|	0.50
6.000	0.61	0.50	0.105	OI	|	|	|	0.50
6.083	0.61	0.51	0.106	OI	|	|	|	0.51
6.167	0.62	0.51	0.107	OI	|	|	|	0.51
6.250	0.62	0.51	0.108	OI	|	|	|	0.51
6.333	0.62	0.52	0.108	OI	|	|	|	0.52
6.417	0.63	0.52	0.109	OI	|	|	|	0.52
6.500	0.63	0.52	0.110	OI	|	|	|	0.52
6.583	0.63	0.53	0.111	OI	|	|	|	0.53
6.667	0.63	0.53	0.111	OI	|	|	|	0.53
6.750	0.64	0.53	0.112	OI	|	|	|	0.53
6.833	0.64	0.54	0.113	OI	|	|	|	0.54
6.917	0.64	0.54	0.113	OI	|	|	|	0.54
7.000	0.65	0.54	0.114	OI	|	|	|	0.54
7.083	0.65	0.55	0.115	OI	|	|	|	0.55
7.167	0.65	0.55	0.116	OI	|	|	|	0.55
7.250	0.66	0.55	0.116	OI	|	|	|	0.55
7.333	0.66	0.56	0.117	|O	|	|	|	0.56
7.417	0.67	0.56	0.118	|O	|	|	|	0.56
7.500	0.67	0.56	0.118	|O	|	|	|	0.56
7.583	0.67	0.57	0.119	|O	|	|	|	0.57
7.667	0.68	0.57	0.120	|O	|	|	|	0.57
7.750	0.68	0.57	0.121	|O	|	|	|	0.57
7.833	0.68	0.58	0.121	|O	|	|	|	0.58
7.917	0.69	0.58	0.122	|O	|	|	|	0.58
8.000	0.69	0.58	0.123	|O	|	|	|	0.58
8.083	0.70	0.59	0.124	|O	|	|	|	0.59
8.167	0.70	0.59	0.124	|O	|	|	|	0.59
8.250	0.70	0.60	0.125	|O	|	|	|	0.60
8.333	0.71	0.60	0.126	|O	|	|	|	0.60
8.417	0.71	0.60	0.127	|O	|	|	|	0.60
8.500	0.72	0.61	0.127	|O	|	|	|	0.61
8.583	0.72	0.61	0.128	|O	|	|	|	0.61
8.667	0.73	0.61	0.129	|O	|	|	|	0.61
8.750	0.73	0.62	0.130	|O	|	|	|	0.62
8.833	0.74	0.62	0.130	|O	|	|	|	0.62
8.917	0.74	0.63	0.131	|O	|	|	|	0.63
9.000	0.75	0.63	0.132	|O	|	|	|	0.63
9.083	0.75	0.63	0.133	|O	|	|	|	0.63

9.167	0.76	0.64	0.134	O				0.64
9.250	0.76	0.64	0.135	O				0.64
9.333	0.77	0.64	0.135	O				0.64
9.417	0.77	0.65	0.136	O				0.65
9.500	0.78	0.65	0.137	O				0.65
9.583	0.78	0.66	0.138	O				0.66
9.667	0.79	0.66	0.139	O				0.66
9.750	0.79	0.67	0.140	O				0.67
9.833	0.80	0.67	0.141	O				0.67
9.917	0.81	0.67	0.141	O				0.67
10.000	0.81	0.68	0.142	O				0.68
10.083	0.82	0.68	0.143	O				0.68
10.167	0.83	0.69	0.144	O				0.69
10.250	0.83	0.69	0.145	O				0.69
10.333	0.84	0.70	0.146	O				0.70
10.417	0.85	0.70	0.147	O				0.70
10.500	0.85	0.71	0.148	O				0.71
10.583	0.86	0.71	0.149	O				0.71
10.667	0.87	0.72	0.150	O				0.72
10.750	0.87	0.72	0.151	O				0.72
10.833	0.88	0.73	0.152	O				0.73
10.917	0.89	0.73	0.153	O				0.73
11.000	0.90	0.74	0.155	O				0.74
11.083	0.91	0.74	0.156	O				0.74
11.167	0.92	0.75	0.157	O				0.75
11.250	0.92	0.75	0.158	O				0.75
11.333	0.93	0.76	0.159	O				0.76
11.417	0.94	0.76	0.160	O				0.76
11.500	0.95	0.77	0.162	O				0.77
11.583	0.96	0.78	0.163	O				0.78
11.667	0.97	0.78	0.164	O				0.78
11.750	0.98	0.79	0.166	O				0.79
11.833	0.99	0.80	0.167	O				0.80
11.917	1.00	0.80	0.168	O				0.80
12.000	1.02	0.81	0.170	O				0.81
12.083	1.06	0.82	0.171	O				0.82
12.167	1.20	0.83	0.173	OI				0.83
12.250	1.30	0.84	0.176	OI				0.84
12.333	1.33	0.85	0.180	OI				0.85
12.417	1.35	0.87	0.183	OI				0.87
12.500	1.37	0.89	0.186	OI				0.89
12.583	1.38	0.90	0.189	OI				0.90
12.667	1.39	0.92	0.193	OI				0.92
12.750	1.41	0.93	0.196	OI				0.93
12.833	1.43	0.95	0.199	OI				0.95
12.917	1.44	0.96	0.203	OI				0.96
13.000	1.46	0.98	0.206	OI				0.98
13.083	1.48	1.00	0.209	OI				1.00
13.167	1.50	1.00	0.213	OI				1.01
13.250	1.52	1.00	0.216	OI				1.02
13.333	1.54	1.00	0.220	OI				1.03
13.417	1.56	1.00	0.223	OI				1.04
13.500	1.58	1.00	0.227	OI				1.06
13.583	1.60	1.00	0.231	OI				1.07
13.667	1.63	1.00	0.236	OI				1.08
13.750	1.65	1.00	0.240	OI				1.10
13.833	1.68	1.00	0.245	O I				1.11
13.917	1.71	1.00	0.249	O I				1.13
14.000	1.74	1.00	0.254	O I				1.14
14.083	1.77	1.00	0.260	O I				1.16
14.167	1.80	1.00	0.265	O I				1.18

14.250	1.84	1.00	0.271	O I				1.20
14.333	1.88	1.00	0.277	O I				1.21
14.417	1.92	1.00	0.283	O I				1.23
14.500	1.96	1.00	0.289	O I				1.26
14.583	2.01	1.00	0.296	O I				1.28
14.667	2.06	1.00	0.303	O I				1.30
14.750	2.11	1.00	0.311	O I				1.32
14.833	2.17	1.00	0.318	O I				1.35
14.917	2.23	1.00	0.327	O I				1.38
15.000	2.31	1.00	0.335	O I				1.40
15.083	2.38	1.00	0.345	O I				1.43
15.167	2.48	1.00	0.355	O I				1.47
15.250	2.57	1.00	0.365	O I				1.50
15.333	2.69	1.00	0.376	O I				1.54
15.417	2.74	1.00	0.388	O I				1.57
15.500	2.52	1.00	0.399	O I				1.61
15.583	2.44	1.00	0.409	O I				1.64
15.667	2.63	1.00	0.420	O I				1.68
15.750	2.90	1.00	0.432	O I				1.72
15.833	3.34	1.00	0.447	O I				1.76
15.917	3.96	1.00	0.465	O I				1.82
16.000	5.29	1.00	0.490	O I				1.90
16.083	9.26	1.00	0.533	O	I			2.03
16.167	17.81	1.00	0.620	O			I	2.26
16.250	12.75	1.00	0.718	O		I		2.52
16.333	5.34	1.00	0.773	O I				2.67
16.417	3.35	1.00	0.796	O I				2.73
16.500	2.84	1.00	0.811	O I				2.77
16.583	2.74	1.00	0.823	O I				2.80
16.667	2.55	1.00	0.834	O I				2.83
16.750	2.37	1.00	0.844	O I				2.85
16.833	2.22	1.00	0.853	O I				2.88
16.917	2.10	1.00	0.861	O I				2.90
17.000	2.00	1.00	0.869	O I				2.92
17.083	1.91	1.00	0.875	O I				2.93
17.167	1.83	1.00	0.881	O I				2.95
17.250	1.76	1.00	0.887	O I				2.96
17.333	1.70	1.00	0.892	O I				2.98
17.417	1.65	1.00	0.896	OI				2.99
17.500	1.60	1.00	0.901	OI				3.00
17.583	1.55	1.00	0.904	OI				3.01
17.667	1.51	1.00	0.908	OI				3.02
17.750	1.47	1.00	0.912	OI				3.03
17.833	1.44	1.00	0.915	OI				3.03
17.917	1.41	1.00	0.918	OI				3.04
18.000	1.38	1.00	0.920	OI				3.05
18.083	1.32	1.00	0.923	OI				3.05
18.167	1.16	1.00	0.924	OI				3.06
18.250	1.05	1.00	0.925	O				3.06
18.333	1.01	1.00	0.925	O				3.06
18.417	0.98	1.00	0.925	O				3.06
18.500	0.96	1.00	0.925	O				3.06
18.583	0.94	1.00	0.924	O				3.06
18.667	0.92	1.00	0.924	O				3.06
18.750	0.91	1.00	0.923	O				3.06
18.833	0.89	1.00	0.923	O				3.05
18.917	0.87	1.00	0.922	O				3.05
19.000	0.86	1.00	0.921	O				3.05
19.083	0.84	1.00	0.920	O				3.05
19.167	0.83	1.00	0.919	O				3.04
19.250	0.82	1.00	0.917	O				3.04

19.333	0.80	1.00	0.916	|O	|	|	|	3.04
19.417	0.79	1.00	0.915	|O	|	|	|	3.04
19.500	0.78	1.00	0.913	|O	|	|	|	3.03
19.583	0.77	1.00	0.912	|O	|	|	|	3.03
19.667	0.76	1.00	0.910	|O	|	|	|	3.02
19.750	0.75	1.00	0.908	|O	|	|	|	3.02
19.833	0.74	1.00	0.907	|O	|	|	|	3.02
19.917	0.73	1.00	0.905	|O	|	|	|	3.01
20.000	0.72	1.00	0.903	|O	|	|	|	3.01
20.083	0.71	1.00	0.901	|O	|	|	|	3.00
20.167	0.70	1.00	0.899	|O	|	|	|	3.00
20.250	0.70	1.00	0.897	|O	|	|	|	2.99
20.333	0.69	1.00	0.895	|O	|	|	|	2.99
20.417	0.68	1.00	0.893	|O	|	|	|	2.98
20.500	0.67	1.00	0.890	|O	|	|	|	2.97
20.583	0.66	1.00	0.888	|O	|	|	|	2.97
20.667	0.66	1.00	0.886	|O	|	|	|	2.96
20.750	0.65	1.00	0.883	|O	|	|	|	2.96
20.833	0.64	1.00	0.881	|O	|	|	|	2.95
20.917	0.64	1.00	0.878	|O	|	|	|	2.94
21.000	0.63	1.00	0.876	|O	|	|	|	2.94
21.083	0.62	1.00	0.873	|O	|	|	|	2.93
21.167	0.62	1.00	0.871	|O	|	|	|	2.92
21.250	0.61	1.00	0.868	|O	|	|	|	2.92
21.333	0.61	1.00	0.865	|O	|	|	|	2.91
21.417	0.60	1.00	0.863	|O	|	|	|	2.90
21.500	0.60	1.00	0.860	|O	|	|	|	2.89
21.583	0.59	1.00	0.857	|O	|	|	|	2.89
21.667	0.59	1.00	0.854	|O	|	|	|	2.88
21.750	0.58	1.00	0.851	|O	|	|	|	2.87
21.833	0.58	1.00	0.849	|O	|	|	|	2.86
21.917	0.57	1.00	0.846	|O	|	|	|	2.86
22.000	0.57	1.00	0.843	|O	|	|	|	2.85
22.083	0.56	1.00	0.840	|O	|	|	|	2.84
22.167	0.56	1.00	0.837	|O	|	|	|	2.83
22.250	0.55	1.00	0.833	IO	|	|	|	2.82
22.333	0.55	1.00	0.830	IO	|	|	|	2.82
22.417	0.54	1.00	0.827	IO	|	|	|	2.81
22.500	0.54	1.00	0.824	IO	|	|	|	2.80
22.583	0.54	1.00	0.821	IO	|	|	|	2.79
22.667	0.53	1.00	0.818	IO	|	|	|	2.78
22.750	0.53	1.00	0.814	IO	|	|	|	2.77
22.833	0.52	1.00	0.811	IO	|	|	|	2.77
22.917	0.52	1.00	0.808	IO	|	|	|	2.76
23.000	0.52	1.00	0.805	IO	|	|	|	2.75
23.083	0.51	1.00	0.801	IO	|	|	|	2.74
23.167	0.51	1.00	0.798	IO	|	|	|	2.73
23.250	0.51	1.00	0.795	IO	|	|	|	2.72
23.333	0.50	1.00	0.791	IO	|	|	|	2.71
23.417	0.50	1.00	0.788	IO	|	|	|	2.70
23.500	0.50	1.00	0.784	IO	|	|	|	2.70
23.583	0.49	1.00	0.781	IO	|	|	|	2.69
23.667	0.49	1.00	0.777	IO	|	|	|	2.68
23.750	0.49	1.00	0.774	IO	|	|	|	2.67
23.833	0.48	1.00	0.770	IO	|	|	|	2.66
23.917	0.48	1.00	0.767	IO	|	|	|	2.65
24.000	0.48	1.00	0.763	IO	|	|	|	2.64
24.083	0.43	1.00	0.759	IO	|	|	|	2.63
24.167	0.19	1.00	0.755	IO	|	|	|	2.62
24.250	0.04	1.00	0.748	IO	|	|	|	2.60
24.333	0.01	1.00	0.742	IO	|	|	|	2.58

24.417	0.00	1.00	0.735	IO				2.57
24.500	0.00	1.00	0.728	IO				2.55
24.583	0.00	1.00	0.721	IO				2.53
24.667	0.00	1.00	0.714	IO				2.51
24.750	0.00	1.00	0.707	IO				2.49
24.833	0.00	1.00	0.700	IO				2.47
24.917	0.00	1.00	0.694	IO				2.46
25.000	0.00	1.00	0.687	IO				2.44
25.083	0.00	1.00	0.680	IO				2.42
25.167	0.00	1.00	0.673	IO				2.40
25.250	0.00	1.00	0.666	IO				2.38
25.333	0.00	1.00	0.659	IO				2.37
25.417	0.00	1.00	0.652	IO				2.35
25.500	0.00	1.00	0.645	IO				2.33
25.583	0.00	1.00	0.638	IO				2.31
25.667	0.00	1.00	0.632	IO				2.29
25.750	0.00	1.00	0.625	IO				2.28
25.833	0.00	1.00	0.618	IO				2.26
25.917	0.00	1.00	0.611	IO				2.24
26.000	0.00	1.00	0.604	IO				2.22
26.083	0.00	1.00	0.597	IO				2.20
26.167	0.00	1.00	0.590	IO				2.18
26.250	0.00	1.00	0.583	IO				2.17
26.333	0.00	1.00	0.576	IO				2.15
26.417	0.00	1.00	0.570	IO				2.13
26.500	0.00	1.00	0.563	IO				2.11
26.583	0.00	1.00	0.556	IO				2.09
26.667	0.00	1.00	0.549	IO				2.08
26.750	0.00	1.00	0.542	IO				2.06
26.833	0.00	1.00	0.535	IO				2.04
26.917	0.00	1.00	0.528	IO				2.02
27.000	0.00	1.00	0.521	IO				2.00
27.083	0.00	1.00	0.514	IO				1.98
27.167	0.00	1.00	0.508	IO				1.96
27.250	0.00	1.00	0.501	IO				1.94
27.333	0.00	1.00	0.494	IO				1.92
27.417	0.00	1.00	0.487	IO				1.89
27.500	0.00	1.00	0.480	IO				1.87
27.583	0.00	1.00	0.473	IO				1.85
27.667	0.00	1.00	0.466	IO				1.83
27.750	0.00	1.00	0.459	IO				1.80
27.833	0.00	1.00	0.452	IO				1.78
27.917	0.00	1.00	0.446	IO				1.76
28.000	0.00	1.00	0.439	IO				1.74
28.083	0.00	1.00	0.432	IO				1.72
28.167	0.00	1.00	0.425	IO				1.69
28.250	0.00	1.00	0.418	IO				1.67
28.333	0.00	1.00	0.411	IO				1.65
28.417	0.00	1.00	0.404	IO				1.63
28.500	0.00	1.00	0.397	IO				1.60
28.583	0.00	1.00	0.390	IO				1.58
28.667	0.00	1.00	0.384	IO				1.56
28.750	0.00	1.00	0.377	IO				1.54
28.833	0.00	1.00	0.370	IO				1.52
28.917	0.00	1.00	0.363	IO				1.49
29.000	0.00	1.00	0.356	IO				1.47
29.083	0.00	1.00	0.349	IO				1.45
29.167	0.00	1.00	0.342	IO				1.43
29.250	0.00	1.00	0.335	IO				1.40
29.333	0.00	1.00	0.329	IO				1.38
29.417	0.00	1.00	0.322	IO				1.36

29.500	0.00	1.00	0.315	IO				1.34
29.583	0.00	1.00	0.308	IO				1.32
29.667	0.00	1.00	0.301	IO				1.29
29.750	0.00	1.00	0.294	IO				1.27
29.833	0.00	1.00	0.287	IO				1.25
29.917	0.00	1.00	0.280	IO				1.23
30.000	0.00	1.00	0.273	IO				1.20
30.083	0.00	1.00	0.267	IO				1.18
30.167	0.00	1.00	0.260	IO				1.16
30.250	0.00	1.00	0.253	IO				1.14
30.333	0.00	1.00	0.246	IO				1.12
30.417	0.00	1.00	0.239	IO				1.09
30.500	0.00	1.00	0.232	IO				1.07
30.583	0.00	1.00	0.225	IO				1.05
30.667	0.00	1.00	0.218	IO				1.03
30.750	0.00	1.00	0.211	IO				1.00
30.833	0.00	0.97	0.205	IO				0.97
30.917	0.00	0.94	0.198	IO				0.94
31.000	0.00	0.91	0.192	IO				0.91
31.083	0.00	0.88	0.185	IO				0.88
31.167	0.00	0.85	0.179	IO				0.85
31.250	0.00	0.83	0.174	IO				0.83
31.333	0.00	0.80	0.168	IO				0.80
31.417	0.00	0.77	0.163	IO				0.77
31.500	0.00	0.75	0.157	IO				0.75
31.583	0.00	0.73	0.152	IO				0.73
31.667	0.00	0.70	0.147	IO				0.70
31.750	0.00	0.68	0.143	IO				0.68
31.833	0.00	0.66	0.138	IO				0.66
31.917	0.00	0.64	0.134	IO				0.64
32.000	0.00	0.62	0.129	IO				0.62
32.083	0.00	0.60	0.125	IO				0.60
32.167	0.00	0.58	0.121	IO				0.58
32.250	0.00	0.56	0.117	IO				0.56
32.333	0.00	0.54	0.113	O				0.54
32.417	0.00	0.52	0.110	O				0.52
32.500	0.00	0.51	0.106	O				0.51
32.583	0.00	0.49	0.103	O				0.49
32.667	0.00	0.47	0.099	O				0.47
32.750	0.00	0.46	0.096	O				0.46
32.833	0.00	0.44	0.093	O				0.44
32.917	0.00	0.43	0.090	O				0.43
33.000	0.00	0.42	0.087	O				0.42
33.083	0.00	0.40	0.084	O				0.40
33.167	0.00	0.39	0.082	O				0.39
33.250	0.00	0.38	0.079	O				0.38
33.333	0.00	0.36	0.076	O				0.36
33.417	0.00	0.35	0.074	O				0.35
33.500	0.00	0.34	0.072	O				0.34
33.583	0.00	0.33	0.069	O				0.33
33.667	0.00	0.32	0.067	O				0.32
33.750	0.00	0.31	0.065	O				0.31
33.833	0.00	0.30	0.063	O				0.30
33.917	0.00	0.29	0.061	O				0.29
34.000	0.00	0.28	0.059	O				0.28
34.083	0.00	0.27	0.057	O				0.27
34.167	0.00	0.26	0.055	O				0.26
34.250	0.00	0.25	0.053	O				0.25
34.333	0.00	0.25	0.052	O				0.25
34.417	0.00	0.24	0.050	O				0.24
34.500	0.00	0.23	0.048	O				0.23

34.583	0.00	0.22	0.047	O	|	|	|	0.22
34.667	0.00	0.22	0.045	O	|	|	|	0.22
34.750	0.00	0.21	0.044	O	|	|	|	0.21
34.833	0.00	0.20	0.042	O	|	|	|	0.20
34.917	0.00	0.20	0.041	O	|	|	|	0.20
35.000	0.00	0.19	0.040	O	|	|	|	0.19
35.083	0.00	0.18	0.038	O	|	|	|	0.18
35.167	0.00	0.18	0.037	O	|	|	|	0.18
35.250	0.00	0.17	0.036	O	|	|	|	0.17
35.333	0.00	0.17	0.035	O	|	|	|	0.17
35.417	0.00	0.16	0.034	O	|	|	|	0.16
35.500	0.00	0.16	0.033	O	|	|	|	0.16
35.583	0.00	0.15	0.032	O	|	|	|	0.15
35.667	0.00	0.15	0.031	O	|	|	|	0.15
35.750	0.00	0.14	0.030	O	|	|	|	0.14
35.833	0.00	0.14	0.029	O	|	|	|	0.14
35.917	0.00	0.13	0.028	O	|	|	|	0.13
36.000	0.00	0.13	0.027	O	|	|	|	0.13
36.083	0.00	0.12	0.026	O	|	|	|	0.12
36.167	0.00	0.12	0.025	O	|	|	|	0.12
36.250	0.00	0.12	0.024	O	|	|	|	0.12
36.333	0.00	0.11	0.023	O	|	|	|	0.11
36.417	0.00	0.11	0.023	O	|	|	|	0.11
36.500	0.00	0.10	0.022	O	|	|	|	0.10
36.583	0.00	0.10	0.021	O	|	|	|	0.10
36.667	0.00	0.10	0.021	O	|	|	|	0.10
36.750	0.00	0.09	0.020	O	|	|	|	0.09
36.833	0.00	0.09	0.019	O	|	|	|	0.09
36.917	0.00	0.09	0.019	O	|	|	|	0.09
37.000	0.00	0.09	0.018	O	|	|	|	0.09
37.083	0.00	0.08	0.017	O	|	|	|	0.08
37.167	0.00	0.08	0.017	O	|	|	|	0.08
37.250	0.00	0.08	0.016	O	|	|	|	0.08
37.333	0.00	0.08	0.016	O	|	|	|	0.08
37.417	0.00	0.07	0.015	O	|	|	|	0.07
37.500	0.00	0.07	0.015	O	|	|	|	0.07
37.583	0.00	0.07	0.014	O	|	|	|	0.07
37.667	0.00	0.07	0.014	O	|	|	|	0.07
37.750	0.00	0.06	0.013	O	|	|	|	0.06
37.833	0.00	0.06	0.013	O	|	|	|	0.06
37.917	0.00	0.06	0.013	O	|	|	|	0.06
38.000	0.00	0.06	0.012	O	|	|	|	0.06
38.083	0.00	0.06	0.012	O	|	|	|	0.06
38.167	0.00	0.05	0.011	O	|	|	|	0.05
38.250	0.00	0.05	0.011	O	|	|	|	0.05
38.333	0.00	0.05	0.011	O	|	|	|	0.05
38.417	0.00	0.05	0.010	O	|	|	|	0.05
38.500	0.00	0.05	0.010	O	|	|	|	0.05
38.583	0.00	0.05	0.010	O	|	|	|	0.05
38.667	0.00	0.04	0.009	O	|	|	|	0.04
38.750	0.00	0.04	0.009	O	|	|	|	0.04
38.833	0.00	0.04	0.009	O	|	|	|	0.04
38.917	0.00	0.04	0.008	O	|	|	|	0.04
39.000	0.00	0.04	0.008	O	|	|	|	0.04
39.083	0.00	0.04	0.008	O	|	|	|	0.04
39.167	0.00	0.04	0.008	O	|	|	|	0.04
39.250	0.00	0.04	0.007	O	|	|	|	0.04
39.333	0.00	0.03	0.007	O	|	|	|	0.03
39.417	0.00	0.03	0.007	O	|	|	|	0.03
39.500	0.00	0.03	0.007	O	|	|	|	0.03
39.583	0.00	0.03	0.007	O	|	|	|	0.03

39.667	0.00	0.03	0.006	O	|	|	|	0.03
39.750	0.00	0.03	0.006	O	|	|	|	0.03
39.833	0.00	0.03	0.006	O	|	|	|	0.03
39.917	0.00	0.03	0.006	O	|	|	|	0.03
40.000	0.00	0.03	0.006	O	|	|	|	0.03
40.083	0.00	0.03	0.005	O	|	|	|	0.03
40.167	0.00	0.02	0.005	O	|	|	|	0.02
40.250	0.00	0.02	0.005	O	|	|	|	0.02
40.333	0.00	0.02	0.005	O	|	|	|	0.02
40.417	0.00	0.02	0.005	O	|	|	|	0.02
40.500	0.00	0.02	0.005	O	|	|	|	0.02
40.583	0.00	0.02	0.004	O	|	|	|	0.02
40.667	0.00	0.02	0.004	O	|	|	|	0.02
40.750	0.00	0.02	0.004	O	|	|	|	0.02
40.833	0.00	0.02	0.004	O	|	|	|	0.02
40.917	0.00	0.02	0.004	O	|	|	|	0.02
41.000	0.00	0.02	0.004	O	|	|	|	0.02
41.083	0.00	0.02	0.004	O	|	|	|	0.02
41.167	0.00	0.02	0.004	O	|	|	|	0.02
41.250	0.00	0.02	0.003	O	|	|	|	0.02
41.333	0.00	0.02	0.003	O	|	|	|	0.02
41.417	0.00	0.02	0.003	O	|	|	|	0.02
41.500	0.00	0.01	0.003	O	|	|	|	0.01
41.583	0.00	0.01	0.003	O	|	|	|	0.01
41.667	0.00	0.01	0.003	O	|	|	|	0.01
41.750	0.00	0.01	0.003	O	|	|	|	0.01
41.833	0.00	0.01	0.003	O	|	|	|	0.01
41.917	0.00	0.01	0.003	O	|	|	|	0.01
42.000	0.00	0.01	0.003	O	|	|	|	0.01
42.083	0.00	0.01	0.002	O	|	|	|	0.01
42.167	0.00	0.01	0.002	O	|	|	|	0.01
42.250	0.00	0.01	0.002	O	|	|	|	0.01
42.333	0.00	0.01	0.002	O	|	|	|	0.01
42.417	0.00	0.01	0.002	O	|	|	|	0.01
42.500	0.00	0.01	0.002	O	|	|	|	0.01
42.583	0.00	0.01	0.002	O	|	|	|	0.01
42.667	0.00	0.01	0.002	O	|	|	|	0.01
42.750	0.00	0.01	0.002	O	|	|	|	0.01
42.833	0.00	0.01	0.002	O	|	|	|	0.01
42.917	0.00	0.01	0.002	O	|	|	|	0.01
43.000	0.00	0.01	0.002	O	|	|	|	0.01
43.083	0.00	0.01	0.002	O	|	|	|	0.01
43.167	0.00	0.01	0.002	O	|	|	|	0.01
43.250	0.00	0.01	0.002	O	|	|	|	0.01
43.333	0.00	0.01	0.001	O	|	|	|	0.01
43.417	0.00	0.01	0.001	O	|	|	|	0.01
43.500	0.00	0.01	0.001	O	|	|	|	0.01
43.583	0.00	0.01	0.001	O	|	|	|	0.01
43.667	0.00	0.01	0.001	O	|	|	|	0.01
43.750	0.00	0.01	0.001	O	|	|	|	0.01
43.833	0.00	0.01	0.001	O	|	|	|	0.01
43.917	0.00	0.01	0.001	O	|	|	|	0.01
44.000	0.00	0.01	0.001	O	|	|	|	0.01
44.083	0.00	0.01	0.001	O	|	|	|	0.01
44.167	0.00	0.01	0.001	O	|	|	|	0.01
44.250	0.00	0.00	0.001	O	|	|	|	0.00
44.333	0.00	0.00	0.001	O	|	|	|	0.00
44.417	0.00	0.00	0.001	O	|	|	|	0.00
44.500	0.00	0.00	0.001	O	|	|	|	0.00
44.583	0.00	0.00	0.001	O	|	|	|	0.00
44.667	0.00	0.00	0.001	O	|	|	|	0.00

Storm drainage remaining in the basin is the part of the DCV Volume (Water Quality) which allows a 48-hour drawdown time.

44.750	0.00	0.00	0.001	O	|	|	|	0.00
44.833	0.00	0.00	0.001	O	|	|	|	0.00
44.917	0.00	0.00	0.001	O	|	|	|	0.00
45.000	0.00	0.00	0.001	O	|	|	|	0.00
45.083	0.00	0.00	0.001	O	|	|	|	0.00
45.167	0.00	0.00	0.001	O	|	|	|	0.00
45.250	0.00	0.00	0.001	O	|	|	|	0.00
45.333	0.00	0.00	0.001	O	|	|	|	0.00
45.417	0.00	0.00	0.001	O	|	|	|	0.00
45.500	0.00	0.00	0.001	O	|	|	|	0.00
45.583	0.00	0.00	0.001	O	|	|	|	0.00
45.667	0.00	0.00	0.001	O	|	|	|	0.00
45.750	0.00	0.00	0.001	O	|	|	|	0.00
45.833	0.00	0.00	0.001	O	|	|	|	0.00
45.917	0.00	0.00	0.001	O	|	|	|	0.00
46.000	0.00	0.00	0.001	O	|	|	|	0.00
46.083	0.00	0.00	0.001	O	|	|	|	0.00
46.167	0.00	0.00	0.000	O	|	|	|	0.00
46.250	0.00	0.00	0.000	O	|	|	|	0.00
46.333	0.00	0.00	0.000	O	|	|	|	0.00
46.417	0.00	0.00	0.000	O	|	|	|	0.00
46.500	0.00	0.00	0.000	O	|	|	|	0.00
46.583	0.00	0.00	0.000	O	|	|	|	0.00
46.667	0.00	0.00	0.000	O	|	|	|	0.00
46.750	0.00	0.00	0.000	O	|	|	|	0.00
46.833	0.00	0.00	0.000	O	|	|	|	0.00
46.917	0.00	0.00	0.000	O	|	|	|	0.00
47.000	0.00	0.00	0.000	O	|	|	|	0.00
47.083	0.00	0.00	0.000	O	|	|	|	0.00
47.167	0.00	0.00	0.000	O	|	|	|	0.00
47.250	0.00	0.00	0.000	O	|	|	|	0.00
47.333	0.00	0.00	0.000	O	|	|	|	0.00
47.417	0.00	0.00	0.000	O	|	|	|	0.00
47.500	0.00	0.00	0.000	O	|	|	|	0.00
47.583	0.00	0.00	0.000	O	|	|	|	0.00
47.667	0.00	0.00	0.000	O	|	|	|	0.00
47.750	0.00	0.00	0.000	O	|	|	|	0.00
47.833	0.00	0.00	0.000	O	|	|	|	0.00
47.917	0.00	0.00	0.000	O	|	|	|	0.00
48.000	0.00	0.00	0.000	O	|	|	|	0.00

**********HYDROGRAPH DATA**********

Number of intervals = 576
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 1.002 (CFS)
Total volume = 2.220 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

APPENDIX D.6

BASIN ROUTING ANALYSIS

DRAINAGE AREA B– 10 YEAR

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
Study date: 01/25/23

JOB NO. 2022-318
11115 HEMLOCK AVE
10 YEAR, BASIN ROUTING
POST-CONDITION, CHAMBER B

Program License Serial Number 6277

********** HYDROGRAPH INFORMATION **********

From study/file name: 2022318UH10POSTB.rte
**********HYDROGRAPH DATA**********
Number of intervals = 292
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 29.240 (CFS)
Total volume = 3.559 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

++
Process from Point/Station 5.300 to Point/Station 5.300
**** RETARDING BASIN ROUTING ****
_____

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 292
Hydrograph time unit = 5.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)
Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
1.000	0.210	1.000	0.207	0.213
2.000	0.520	1.000	0.517	0.523
3.000	0.900	1.000	0.897	0.903
4.000	1.320	1.040	1.316	1.324

5.000	1.760	4.580	1.744	1.776
6.000	2.190	6.510	2.168	2.212
7.000	2.610	7.980	2.583	2.637
8.000	2.900	9.220	2.868	2.932
9.000	3.310	10.320	3.274	3.346

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 7.3 14.62 21.93 29.24	Depth (Ft.)
0.083	0.08	0.00	0.000	O | | | |	0.00
0.167	0.47	0.01	0.002	O | | | |	0.01
0.250	0.72	0.03	0.006	O | | | |	0.03
0.333	0.77	0.05	0.011	O | | | |	0.05
0.417	0.78	0.08	0.016	O | | | |	0.08
0.500	0.79	0.10	0.021	O | | | |	0.10
0.583	0.79	0.12	0.025	O | | | |	0.12
0.667	0.79	0.14	0.030	O | | | |	0.14
0.750	0.79	0.16	0.034	O | | | |	0.16
0.833	0.80	0.18	0.039	O | | | |	0.18
0.917	0.80	0.20	0.043	O | | | |	0.20
1.000	0.80	0.22	0.047	O | | | |	0.22
1.083	0.80	0.24	0.051	O | | | |	0.24
1.167	0.81	0.26	0.055	O | | | |	0.26
1.250	0.81	0.28	0.058	O | | | |	0.28
1.333	0.81	0.29	0.062	O | | | |	0.29
1.417	0.81	0.31	0.065	O | | | |	0.31
1.500	0.82	0.33	0.069	O | | | |	0.33
1.583	0.82	0.34	0.072	O | | | |	0.34
1.667	0.82	0.36	0.075	O | | | |	0.36
1.750	0.82	0.37	0.078	O | | | |	0.37
1.833	0.83	0.39	0.082	O | | | |	0.39
1.917	0.83	0.40	0.085	O | | | |	0.40
2.000	0.83	0.42	0.087	O | | | |	0.42
2.083	0.84	0.43	0.090	O | | | |	0.43
2.167	0.84	0.44	0.093	O | | | |	0.44
2.250	0.84	0.46	0.096	O | | | |	0.46
2.333	0.84	0.47	0.098	O | | | |	0.47
2.417	0.85	0.48	0.101	O | | | |	0.48
2.500	0.85	0.49	0.103	O | | | |	0.49
2.583	0.85	0.50	0.106	O | | | |	0.50
2.667	0.86	0.52	0.108	O | | | |	0.52
2.750	0.86	0.53	0.110	O | | | |	0.53
2.833	0.86	0.54	0.113	O | | | |	0.54
2.917	0.86	0.55	0.115	O | | | |	0.55
3.000	0.87	0.56	0.117	O | | | |	0.56
3.083	0.87	0.57	0.119	O | | | |	0.57
3.167	0.87	0.58	0.121	O | | | |	0.58
3.250	0.88	0.59	0.123	O | | | |	0.59
3.333	0.88	0.60	0.125	O | | | |	0.60
3.417	0.88	0.61	0.127	O | | | |	0.61
3.500	0.89	0.61	0.129	O | | | |	0.61
3.583	0.89	0.62	0.131	O | | | |	0.62
3.667	0.89	0.63	0.133	O | | | |	0.63
3.750	0.90	0.64	0.135	O | | | |	0.64
3.833	0.90	0.65	0.136	O | | | |	0.65
3.917	0.90	0.66	0.138	O | | | |	0.66
4.000	0.91	0.66	0.140	O | | | |	0.66

4.083	0.91	0.67	0.141	O	|	|	|	0.67
4.167	0.91	0.68	0.143	O	|	|	|	0.68
4.250	0.92	0.69	0.144	OI	|	|	|	0.69
4.333	0.92	0.70	0.146	OI	|	|	|	0.70
4.417	0.92	0.70	0.148	OI	|	|	|	0.70
4.500	0.93	0.71	0.149	OI	|	|	|	0.71
4.583	0.93	0.72	0.151	OI	|	|	|	0.72
4.667	0.94	0.72	0.152	OI	|	|	|	0.72
4.750	0.94	0.73	0.154	OI	|	|	|	0.73
4.833	0.94	0.74	0.155	OI	|	|	|	0.74
4.917	0.95	0.74	0.156	OI	|	|	|	0.74
5.000	0.95	0.75	0.158	OI	|	|	|	0.75
5.083	0.95	0.76	0.159	OI	|	|	|	0.76
5.167	0.96	0.76	0.160	OI	|	|	|	0.76
5.250	0.96	0.77	0.162	OI	|	|	|	0.77
5.333	0.97	0.78	0.163	OI	|	|	|	0.78
5.417	0.97	0.78	0.164	OI	|	|	|	0.78
5.500	0.98	0.79	0.166	OI	|	|	|	0.79
5.583	0.98	0.80	0.167	OI	|	|	|	0.80
5.667	0.98	0.80	0.168	OI	|	|	|	0.80
5.750	0.99	0.81	0.169	OI	|	|	|	0.81
5.833	0.99	0.81	0.171	OI	|	|	|	0.81
5.917	1.00	0.82	0.172	OI	|	|	|	0.82
6.000	1.00	0.82	0.173	OI	|	|	|	0.82
6.083	1.01	0.83	0.174	OI	|	|	|	0.83
6.167	1.01	0.84	0.176	OI	|	|	|	0.84
6.250	1.02	0.84	0.177	OI	|	|	|	0.84
6.333	1.02	0.85	0.178	OI	|	|	|	0.85
6.417	1.03	0.85	0.179	OI	|	|	|	0.85
6.500	1.03	0.86	0.180	OI	|	|	|	0.86
6.583	1.04	0.86	0.182	OI	|	|	|	0.86
6.667	1.04	0.87	0.183	OI	|	|	|	0.87
6.750	1.05	0.88	0.184	OI	|	|	|	0.88
6.833	1.05	0.88	0.185	OI	|	|	|	0.88
6.917	1.06	0.89	0.186	OI	|	|	|	0.89
7.000	1.06	0.89	0.187	OI	|	|	|	0.89
7.083	1.07	0.90	0.189	OI	|	|	|	0.90
7.167	1.07	0.90	0.190	OI	|	|	|	0.90
7.250	1.08	0.91	0.191	OI	|	|	|	0.91
7.333	1.08	0.91	0.192	|O	|	|	|	0.91
7.417	1.09	0.92	0.193	|O	|	|	|	0.92
7.500	1.10	0.93	0.194	|O	|	|	|	0.93
7.583	1.10	0.93	0.196	|O	|	|	|	0.93
7.667	1.11	0.94	0.197	|O	|	|	|	0.94
7.750	1.11	0.94	0.198	|O	|	|	|	0.94
7.833	1.12	0.95	0.199	|O	|	|	|	0.95
7.917	1.13	0.95	0.200	|O	|	|	|	0.95
8.000	1.13	0.96	0.201	|O	|	|	|	0.96
8.083	1.14	0.97	0.203	|O	|	|	|	0.97
8.167	1.15	0.97	0.204	|O	|	|	|	0.97
8.250	1.15	0.98	0.205	|O	|	|	|	0.98
8.333	1.16	0.98	0.206	|O	|	|	|	0.98
8.417	1.17	0.99	0.208	|O	|	|	|	0.99
8.500	1.17	0.99	0.209	|O	|	|	|	0.99
8.583	1.18	1.00	0.210	|O	|	|	|	1.00
8.667	1.19	1.00	0.211	|O	|	|	|	1.00
8.750	1.19	1.00	0.213	|O	|	|	|	1.01
8.833	1.20	1.00	0.214	|O	|	|	|	1.01
8.917	1.21	1.00	0.215	|O	|	|	|	1.02
9.000	1.22	1.00	0.217	|O	|	|	|	1.02
9.083	1.23	1.00	0.218	|O	|	|	|	1.03

9.167	1.23	1.00	0.220	O				1.03
9.250	1.24	1.00	0.222	O				1.04
9.333	1.25	1.00	0.223	O				1.04
9.417	1.26	1.00	0.225	O				1.05
9.500	1.27	1.00	0.227	O				1.05
9.583	1.28	1.00	0.229	O				1.06
9.667	1.29	1.00	0.231	O				1.07
9.750	1.30	1.00	0.233	O				1.07
9.833	1.31	1.00	0.235	O				1.08
9.917	1.31	1.00	0.237	O				1.09
10.000	1.33	1.00	0.239	O				1.09
10.083	1.33	1.00	0.241	O				1.10
10.167	1.35	1.00	0.244	O				1.11
10.250	1.36	1.00	0.246	O				1.12
10.333	1.37	1.00	0.249	O				1.12
10.417	1.38	1.00	0.251	O				1.13
10.500	1.39	1.00	0.254	O				1.14
10.583	1.40	1.00	0.257	O				1.15
10.667	1.41	1.00	0.259	O				1.16
10.750	1.42	1.00	0.262	O				1.17
10.833	1.44	1.00	0.265	O				1.18
10.917	1.45	1.00	0.268	O				1.19
11.000	1.46	1.00	0.271	O				1.20
11.083	1.48	1.00	0.275	O				1.21
11.167	1.49	1.00	0.278	O				1.22
11.250	1.50	1.00	0.281	O				1.23
11.333	1.52	1.00	0.285	O				1.24
11.417	1.53	1.00	0.289	O				1.25
11.500	1.55	1.00	0.292	O				1.27
11.583	1.56	1.00	0.296	O				1.28
11.667	1.58	1.00	0.300	O				1.29
11.750	1.60	1.00	0.304	O				1.30
11.833	1.61	1.00	0.308	O				1.32
11.917	1.63	1.00	0.312	O				1.33
12.000	1.65	1.00	0.317	O				1.34
12.083	1.70	1.00	0.322	O				1.36
12.167	1.86	1.00	0.327	OI				1.38
12.250	1.97	1.00	0.333	OI				1.40
12.333	2.01	1.00	0.340	OI				1.42
12.417	2.04	1.00	0.347	OI				1.44
12.500	2.06	1.00	0.354	OI				1.47
12.583	2.08	1.00	0.362	OI				1.49
12.667	2.11	1.00	0.369	OI				1.51
12.750	2.13	1.00	0.377	OI				1.54
12.833	2.16	1.00	0.385	OI				1.56
12.917	2.18	1.00	0.393	OI				1.59
13.000	2.21	1.00	0.401	OI				1.62
13.083	2.24	1.00	0.410	OI				1.64
13.167	2.27	1.00	0.418	OI				1.67
13.250	2.30	1.00	0.427	OI				1.70
13.333	2.33	1.00	0.436	OI				1.73
13.417	2.36	1.00	0.445	OI				1.76
13.500	2.40	1.00	0.455	OI				1.79
13.583	2.44	1.00	0.465	OI				1.82
13.667	2.48	1.00	0.475	OI				1.85
13.750	2.52	1.00	0.485	OI				1.89
13.833	2.56	1.00	0.496	OI				1.92
13.917	2.60	1.00	0.506	OI				1.96
14.000	2.65	1.00	0.518	OI				1.99
14.083	2.70	1.00	0.529	OI				2.02
14.167	2.76	1.00	0.541	O I				2.06

14.250	2.82	1.00	0.554	O I				2.09
14.333	2.88	1.00	0.566	O I				2.12
14.417	2.94	1.00	0.579	O I				2.16
14.500	3.01	1.00	0.593	O I				2.19
14.583	3.09	1.00	0.607	O I				2.23
14.667	3.17	1.00	0.622	O I				2.27
14.750	3.26	1.00	0.637	O I				2.31
14.833	3.36	1.00	0.653	O I				2.35
14.917	3.46	1.00	0.670	O I				2.39
15.000	3.58	1.00	0.687	O I				2.44
15.083	3.70	1.00	0.705	O I				2.49
15.167	3.85	1.00	0.724	O I				2.54
15.250	4.01	1.00	0.744	O I				2.59
15.333	4.21	1.00	0.766	O I				2.65
15.417	4.30	1.00	0.788	O I				2.71
15.500	4.04	1.00	0.810	O I				2.76
15.583	3.99	1.00	0.831	O I				2.82
15.667	4.33	1.00	0.853	O I				2.88
15.750	4.78	1.00	0.877	O I				2.94
15.833	5.51	1.00	0.906	O I				3.01
15.917	6.58	1.00	0.940	O I				3.10
16.000	8.97	1.01	0.987	O	I			3.21
16.083	15.53	1.02	1.064	O		I		3.39
16.167	29.24	1.03	1.211	O			I	3.74
16.250	20.51	1.48	1.374	O		I		4.12
16.333	8.60	2.18	1.462	O	I			4.32
16.417	5.42	2.44	1.494	O I				4.40
16.500	4.53	2.58	1.511	O I				4.43
16.583	4.30	2.68	1.524	O I				4.46
16.667	3.96	2.76	1.533	OI				4.48
16.750	3.67	2.81	1.540	OI				4.50
16.833	3.43	2.85	1.545	O				4.51
16.917	3.23	2.88	1.549	O				4.52
17.000	3.07	2.89	1.550	O				4.52
17.083	2.92	2.90	1.551	O				4.53
17.167	2.80	2.90	1.551	O				4.52
17.250	2.69	2.89	1.550	IO				4.52
17.333	2.59	2.88	1.548	IO				4.52
17.417	2.50	2.86	1.546	IO				4.51
17.500	2.43	2.84	1.543	IO				4.51
17.583	2.35	2.81	1.540	IO				4.50
17.667	2.29	2.79	1.537	IO				4.49
17.750	2.23	2.76	1.534	IO				4.49
17.833	2.17	2.73	1.530	O				4.48
17.917	2.12	2.70	1.526	O				4.47
18.000	2.07	2.66	1.522	O				4.46
18.083	2.00	2.63	1.518	O				4.45
18.167	1.81	2.59	1.513	IO				4.44
18.250	1.68	2.55	1.507	IO				4.43
18.333	1.63	2.50	1.501	IO				4.41
18.417	1.59	2.45	1.495	IO				4.40
18.500	1.56	2.40	1.489	IO				4.39
18.583	1.53	2.36	1.484	IO				4.37
18.667	1.50	2.31	1.478	IO				4.36
18.750	1.47	2.27	1.472	IO				4.35
18.833	1.45	2.22	1.467	IO				4.33
18.917	1.42	2.18	1.462	IO				4.32
19.000	1.40	2.14	1.457	IO				4.31
19.083	1.37	2.10	1.452	IO				4.30
19.167	1.35	2.06	1.447	IO				4.29
19.250	1.33	2.02	1.442	IO				4.28

19.333	1.31	1.98	1.437	IO				4.27
19.417	1.29	1.95	1.433	IO				4.26
19.500	1.27	1.91	1.428	IO				4.25
19.583	1.26	1.88	1.424	IO				4.24
19.667	1.24	1.84	1.420	IO				4.23
19.750	1.22	1.81	1.416	O				4.22
19.833	1.21	1.78	1.412	O				4.21
19.917	1.19	1.75	1.408	O				4.20
20.000	1.18	1.72	1.404	O				4.19
20.083	1.16	1.69	1.400	O				4.18
20.167	1.15	1.66	1.397	O				4.17
20.250	1.14	1.63	1.393	O				4.17
20.333	1.12	1.60	1.390	O				4.16
20.417	1.11	1.58	1.387	O				4.15
20.500	1.10	1.55	1.384	O				4.14
20.583	1.09	1.53	1.380	O				4.14
20.667	1.08	1.50	1.377	O				4.13
20.750	1.07	1.48	1.375	O				4.12
20.833	1.05	1.46	1.372	O				4.12
20.917	1.04	1.43	1.369	O				4.11
21.000	1.03	1.41	1.366	O				4.11
21.083	1.02	1.39	1.364	O				4.10
21.167	1.01	1.37	1.361	O				4.09
21.250	1.01	1.35	1.359	O				4.09
21.333	1.00	1.33	1.357	O				4.08
21.417	0.99	1.32	1.354	O				4.08
21.500	0.98	1.30	1.352	O				4.07
21.583	0.97	1.28	1.350	O				4.07
21.667	0.96	1.26	1.348	O				4.06
21.750	0.95	1.25	1.346	O				4.06
21.833	0.95	1.23	1.344	O				4.05
21.917	0.94	1.22	1.342	O				4.05
22.000	0.93	1.20	1.340	O				4.05
22.083	0.92	1.19	1.338	O				4.04
22.167	0.92	1.17	1.336	O				4.04
22.250	0.91	1.16	1.335	IO				4.03
22.333	0.90	1.14	1.333	IO				4.03
22.417	0.89	1.13	1.331	IO				4.03
22.500	0.89	1.12	1.330	IO				4.02
22.583	0.88	1.10	1.328	IO				4.02
22.667	0.88	1.09	1.327	IO				4.01
22.750	0.87	1.08	1.325	IO				4.01
22.833	0.86	1.07	1.324	IO				4.01
22.917	0.86	1.06	1.322	IO				4.01
23.000	0.85	1.05	1.321	IO				4.00
23.083	0.85	1.04	1.320	IO				4.00
23.167	0.84	1.04	1.318	IO				4.00
23.250	0.83	1.04	1.317	IO				3.99
23.333	0.83	1.04	1.315	IO				3.99
23.417	0.82	1.04	1.314	IO				3.99
23.500	0.82	1.04	1.312	IO				3.98
23.583	0.81	1.04	1.311	IO				3.98
23.667	0.81	1.04	1.309	IO				3.97
23.750	0.80	1.04	1.308	IO				3.97
23.833	0.80	1.04	1.306	IO				3.97
23.917	0.79	1.04	1.304	IO				3.96
24.000	0.79	1.04	1.303	IO				3.96
24.083	0.70	1.04	1.301	IO				3.95
24.167	0.31	1.04	1.297	IO				3.95
24.250	0.06	1.04	1.291	IO				3.93
24.333	0.01	1.04	1.284	IO				3.91

24.417	0.00	1.04	1.277	IO	|	|	|	3.90
24.500	0.00	1.04	1.270	IO	|	|	|	3.88
24.583	0.00	1.03	1.263	IO	|	|	|	3.86
24.667	0.00	1.03	1.256	IO	|	|	|	3.85
24.750	0.00	1.03	1.249	IO	|	|	|	3.83
24.833	0.00	1.03	1.241	IO	|	|	|	3.81
24.917	0.00	1.03	1.234	IO	|	|	|	3.80
25.000	0.00	1.03	1.227	IO	|	|	|	3.78
25.083	0.00	1.03	1.220	IO	|	|	|	3.76
25.167	0.00	1.03	1.213	IO	|	|	|	3.75
25.250	0.00	1.03	1.206	IO	|	|	|	3.73
25.333	0.00	1.03	1.199	IO	|	|	|	3.71
25.417	0.00	1.03	1.192	IO	|	|	|	3.69
25.500	0.00	1.03	1.185	IO	|	|	|	3.68
25.583	0.00	1.03	1.178	IO	|	|	|	3.66
25.667	0.00	1.03	1.171	IO	|	|	|	3.64
25.750	0.00	1.03	1.163	IO	|	|	|	3.63
25.833	0.00	1.02	1.156	IO	|	|	|	3.61
25.917	0.00	1.02	1.149	IO	|	|	|	3.59
26.000	0.00	1.02	1.142	IO	|	|	|	3.58
26.083	0.00	1.02	1.135	IO	|	|	|	3.56
26.167	0.00	1.02	1.128	IO	|	|	|	3.54
26.250	0.00	1.02	1.121	IO	|	|	|	3.53
26.333	0.00	1.02	1.114	IO	|	|	|	3.51
26.417	0.00	1.02	1.107	IO	|	|	|	3.49
26.500	0.00	1.02	1.100	IO	|	|	|	3.48
26.583	0.00	1.02	1.093	IO	|	|	|	3.46
26.667	0.00	1.02	1.086	IO	|	|	|	3.44
26.750	0.00	1.02	1.079	IO	|	|	|	3.43
26.833	0.00	1.02	1.072	IO	|	|	|	3.41
26.917	0.00	1.02	1.065	IO	|	|	|	3.39
27.000	0.00	1.02	1.058	IO	|	|	|	3.38
27.083	0.00	1.01	1.051	IO	|	|	|	3.36
27.167	0.00	1.01	1.044	IO	|	|	|	3.34
27.250	0.00	1.01	1.037	IO	|	|	|	3.33
27.333	0.00	1.01	1.030	IO	|	|	|	3.31
27.417	0.00	1.01	1.023	IO	|	|	|	3.29
27.500	0.00	1.01	1.016	IO	|	|	|	3.28
27.583	0.00	1.01	1.009	IO	|	|	|	3.26
27.667	0.00	1.01	1.002	IO	|	|	|	3.24
27.750	0.00	1.01	0.995	IO	|	|	|	3.23
27.833	0.00	1.01	0.988	IO	|	|	|	3.21
27.917	0.00	1.01	0.981	IO	|	|	|	3.19
28.000	0.00	1.01	0.975	IO	|	|	|	3.18
28.083	0.00	1.01	0.968	IO	|	|	|	3.16
28.167	0.00	1.01	0.961	IO	|	|	|	3.14
28.250	0.00	1.01	0.954	IO	|	|	|	3.13
28.333	0.00	1.00	0.947	IO	|	|	|	3.11
28.417	0.00	1.00	0.940	IO	|	|	|	3.10
28.500	0.00	1.00	0.933	IO	|	|	|	3.08
28.583	0.00	1.00	0.926	IO	|	|	|	3.06
28.667	0.00	1.00	0.919	IO	|	|	|	3.05
28.750	0.00	1.00	0.912	IO	|	|	|	3.03
28.833	0.00	1.00	0.905	IO	|	|	|	3.01
28.917	0.00	1.00	0.899	IO	|	|	|	3.00
29.000	0.00	1.00	0.892	IO	|	|	|	2.98
29.083	0.00	1.00	0.885	IO	|	|	|	2.96
29.167	0.00	1.00	0.878	IO	|	|	|	2.94
29.250	0.00	1.00	0.871	IO	|	|	|	2.92
29.333	0.00	1.00	0.864	IO	|	|	|	2.91
29.417	0.00	1.00	0.857	IO	|	|	|	2.89

29.500	0.00	1.00	0.850	IO				2.87
29.583	0.00	1.00	0.843	IO				2.85
29.667	0.00	1.00	0.837	IO				2.83
29.750	0.00	1.00	0.830	IO				2.81
29.833	0.00	1.00	0.823	IO				2.80
29.917	0.00	1.00	0.816	IO				2.78
30.000	0.00	1.00	0.809	IO				2.76
30.083	0.00	1.00	0.802	IO				2.74
30.167	0.00	1.00	0.795	IO				2.72
30.250	0.00	1.00	0.788	IO				2.71
30.333	0.00	1.00	0.781	IO				2.69
30.417	0.00	1.00	0.775	IO				2.67
30.500	0.00	1.00	0.768	IO				2.65
30.583	0.00	1.00	0.761	IO				2.63
30.667	0.00	1.00	0.754	IO				2.62
30.750	0.00	1.00	0.747	IO				2.60
30.833	0.00	1.00	0.740	IO				2.58
30.917	0.00	1.00	0.733	IO				2.56
31.000	0.00	1.00	0.726	IO				2.54
31.083	0.00	1.00	0.719	IO				2.52
31.167	0.00	1.00	0.713	IO				2.51
31.250	0.00	1.00	0.706	IO				2.49
31.333	0.00	1.00	0.699	IO				2.47
31.417	0.00	1.00	0.692	IO				2.45
31.500	0.00	1.00	0.685	IO				2.43
31.583	0.00	1.00	0.678	IO				2.42
31.667	0.00	1.00	0.671	IO				2.40
31.750	0.00	1.00	0.664	IO				2.38
31.833	0.00	1.00	0.657	IO				2.36
31.917	0.00	1.00	0.651	IO				2.34
32.000	0.00	1.00	0.644	IO				2.33
32.083	0.00	1.00	0.637	IO				2.31
32.167	0.00	1.00	0.630	IO				2.29
32.250	0.00	1.00	0.623	IO				2.27
32.333	0.00	1.00	0.616	IO				2.25
32.417	0.00	1.00	0.609	IO				2.23
32.500	0.00	1.00	0.602	IO				2.22
32.583	0.00	1.00	0.596	IO				2.20
32.667	0.00	1.00	0.589	IO				2.18
32.750	0.00	1.00	0.582	IO				2.16
32.833	0.00	1.00	0.575	IO				2.14
32.917	0.00	1.00	0.568	IO				2.13
33.000	0.00	1.00	0.561	IO				2.11
33.083	0.00	1.00	0.554	IO				2.09
33.167	0.00	1.00	0.547	IO				2.07
33.250	0.00	1.00	0.540	IO				2.05
33.333	0.00	1.00	0.534	IO				2.04
33.417	0.00	1.00	0.527	IO				2.02
33.500	0.00	1.00	0.520	IO				2.00
33.583	0.00	1.00	0.513	IO				1.98
33.667	0.00	1.00	0.506	IO				1.95
33.750	0.00	1.00	0.499	IO				1.93
33.833	0.00	1.00	0.492	IO				1.91
33.917	0.00	1.00	0.485	IO				1.89
34.000	0.00	1.00	0.478	IO				1.87
34.083	0.00	1.00	0.472	IO				1.84
34.167	0.00	1.00	0.465	IO				1.82
34.250	0.00	1.00	0.458	IO				1.80
34.333	0.00	1.00	0.451	IO				1.78
34.417	0.00	1.00	0.444	IO				1.75
34.500	0.00	1.00	0.437	IO				1.73

34.583	0.00	1.00	0.430	IO				1.71
34.667	0.00	1.00	0.423	IO				1.69
34.750	0.00	1.00	0.416	IO				1.67
34.833	0.00	1.00	0.410	IO				1.64
34.917	0.00	1.00	0.403	IO				1.62
35.000	0.00	1.00	0.396	IO				1.60
35.083	0.00	1.00	0.389	IO				1.58
35.167	0.00	1.00	0.382	IO				1.55
35.250	0.00	1.00	0.375	IO				1.53
35.333	0.00	1.00	0.368	IO				1.51
35.417	0.00	1.00	0.361	IO				1.49
35.500	0.00	1.00	0.354	IO				1.47
35.583	0.00	1.00	0.348	IO				1.44
35.667	0.00	1.00	0.341	IO				1.42
35.750	0.00	1.00	0.334	IO				1.40
35.833	0.00	1.00	0.327	IO				1.38
35.917	0.00	1.00	0.320	IO				1.35
36.000	0.00	1.00	0.313	IO				1.33
36.083	0.00	1.00	0.306	IO				1.31
36.167	0.00	1.00	0.299	IO				1.29
36.250	0.00	1.00	0.292	IO				1.27
36.333	0.00	1.00	0.286	IO				1.24
36.417	0.00	1.00	0.279	IO				1.22
36.500	0.00	1.00	0.272	IO				1.20
36.583	0.00	1.00	0.265	IO				1.18
36.667	0.00	1.00	0.258	IO				1.15
36.750	0.00	1.00	0.251	IO				1.13
36.833	0.00	1.00	0.244	IO				1.11
36.917	0.00	1.00	0.237	IO				1.09
37.000	0.00	1.00	0.230	IO				1.07
37.083	0.00	1.00	0.224	IO				1.04
37.167	0.00	1.00	0.217	IO				1.02
37.250	0.00	1.00	0.210	IO				1.00
37.333	0.00	0.97	0.203	IO				0.97
37.417	0.00	0.94	0.197	IO				0.94
37.500	0.00	0.91	0.190	O				0.91
37.583	0.00	0.88	0.184	O				0.88
37.667	0.00	0.85	0.178	O				0.85
37.750	0.00	0.82	0.172	O				0.82
37.833	0.00	0.79	0.167	O				0.79
37.917	0.00	0.77	0.161	O				0.77
38.000	0.00	0.74	0.156	O				0.74
38.083	0.00	0.72	0.151	O				0.72
38.167	0.00	0.70	0.146	O				0.70
38.250	0.00	0.67	0.142	O				0.67
38.333	0.00	0.65	0.137	O				0.65
38.417	0.00	0.63	0.133	O				0.63
38.500	0.00	0.61	0.128	O				0.61
38.583	0.00	0.59	0.124	O				0.59
38.667	0.00	0.57	0.120	O				0.57
38.750	0.00	0.55	0.116	O				0.55
38.833	0.00	0.54	0.113	O				0.54
38.917	0.00	0.52	0.109	O				0.52
39.000	0.00	0.50	0.105	O				0.50
39.083	0.00	0.49	0.102	O				0.49
39.167	0.00	0.47	0.099	O				0.47
39.250	0.00	0.45	0.096	O				0.45
39.333	0.00	0.44	0.092	O				0.44
39.417	0.00	0.43	0.089	O				0.43
39.500	0.00	0.41	0.087	O				0.41
39.583	0.00	0.40	0.084	O				0.40

39.667	0.00	0.39	0.081	O	|	|	|	|	0.39
39.750	0.00	0.37	0.078	O	|	|	|	|	0.37
39.833	0.00	0.36	0.076	O	|	|	|	|	0.36
39.917	0.00	0.35	0.073	O	|	|	|	|	0.35
40.000	0.00	0.34	0.071	O	|	|	|	|	0.34
40.083	0.00	0.33	0.069	O	|	|	|	|	0.33
40.167	0.00	0.32	0.067	O	|	|	|	|	0.32
40.250	0.00	0.31	0.064	O	|	|	|	|	0.31
40.333	0.00	0.30	0.062	O	|	|	|	|	0.30
40.417	0.00	0.29	0.060	O	|	|	|	|	0.29
40.500	0.00	0.28	0.058	O	|	|	|	|	0.28
40.583	0.00	0.27	0.057	O	|	|	|	|	0.27
40.667	0.00	0.26	0.055	O	|	|	|	|	0.26
40.750	0.00	0.25	0.053	O	|	|	|	|	0.25
40.833	0.00	0.24	0.051	O	|	|	|	|	0.24
40.917	0.00	0.24	0.050	O	|	|	|	|	0.24
41.000	0.00	0.23	0.048	O	|	|	|	|	0.23
41.083	0.00	0.22	0.046	O	|	|	|	|	0.22
41.167	0.00	0.21	0.045	O	|	|	|	|	0.21
41.250	0.00	0.21	0.043	O	|	|	|	|	0.21
41.333	0.00	0.20	0.042	O	|	|	|	|	0.20
41.417	0.00	0.19	0.041	O	|	|	|	|	0.19
41.500	0.00	0.19	0.039	O	|	|	|	|	0.19
41.583	0.00	0.18	0.038	O	|	|	|	|	0.18
41.667	0.00	0.18	0.037	O	|	|	|	|	0.18
41.750	0.00	0.17	0.036	O	|	|	|	|	0.17
41.833	0.00	0.16	0.035	O	|	|	|	|	0.16
41.917	0.00	0.16	0.033	O	|	|	|	|	0.16
42.000	0.00	0.15	0.032	O	|	|	|	|	0.15
42.083	0.00	0.15	0.031	O	|	|	|	|	0.15
42.167	0.00	0.14	0.030	O	|	|	|	|	0.14
42.250	0.00	0.14	0.029	O	|	|	|	|	0.14
42.333	0.00	0.14	0.028	O	|	|	|	|	0.14
42.417	0.00	0.13	0.027	O	|	|	|	|	0.13
42.500	0.00	0.13	0.027	O	|	|	|	|	0.13
42.583	0.00	0.12	0.026	O	|	|	|	|	0.12
42.667	0.00	0.12	0.025	O	|	|	|	|	0.12
42.750	0.00	0.11	0.024	O	|	|	|	|	0.11
42.833	0.00	0.11	0.023	O	|	|	|	|	0.11
42.917	0.00	0.11	0.023	O	|	|	|	|	0.11
43.000	0.00	0.10	0.022	O	|	|	|	|	0.10
43.083	0.00	0.10	0.021	O	|	|	|	|	0.10
43.167	0.00	0.10	0.020	O	|	|	|	|	0.10
43.250	0.00	0.09	0.020	O	|	|	|	|	0.09
43.333	0.00	0.09	0.019	O	|	|	|	|	0.09
43.417	0.00	0.09	0.019	O	|	|	|	|	0.09
43.500	0.00	0.09	0.018	O	|	|	|	|	0.09
43.583	0.00	0.08	0.017	O	|	|	|	|	0.08
43.667	0.00	0.08	0.017	O	|	|	|	|	0.08
43.750	0.00	0.08	0.016	O	|	|	|	|	0.08
43.833	0.00	0.07	0.016	O	|	|	|	|	0.07
43.917	0.00	0.07	0.015	O	|	|	|	|	0.07
44.000	0.00	0.07	0.015	O	|	|	|	|	0.07
44.083	0.00	0.07	0.014	O	|	|	|	|	0.07
44.167	0.00	0.07	0.014	O	|	|	|	|	0.07
44.250	0.00	0.06	0.013	O	|	|	|	|	0.06
44.333	0.00	0.06	0.013	O	|	|	|	|	0.06
44.417	0.00	0.06	0.012	O	|	|	|	|	0.06
44.500	0.00	0.06	0.012	O	|	|	|	|	0.06
44.583	0.00	0.06	0.012	O	|	|	|	|	0.06
44.667	0.00	0.05	0.011	O	|	|	|	|	0.05

Storm drainage remaining in the basin is the part of the DCV Volume (Water Quality) which allows a 48-hour drawdown time.

44.750	0.00	0.05	0.011	O	|	|	|	|	0.05
44.833	0.00	0.05	0.011	O	|	|	|	|	0.05
44.917	0.00	0.05	0.010	O	|	|	|	|	0.05
45.000	0.00	0.05	0.010	O	|	|	|	|	0.05
45.083	0.00	0.05	0.010	O	|	|	|	|	0.05
45.167	0.00	0.04	0.009	O	|	|	|	|	0.04
45.250	0.00	0.04	0.009	O	|	|	|	|	0.04
45.333	0.00	0.04	0.009	O	|	|	|	|	0.04
45.417	0.00	0.04	0.008	O	|	|	|	|	0.04
45.500	0.00	0.04	0.008	O	|	|	|	|	0.04
45.583	0.00	0.04	0.008	O	|	|	|	|	0.04
45.667	0.00	0.04	0.008	O	|	|	|	|	0.04
45.750	0.00	0.04	0.007	O	|	|	|	|	0.04
45.833	0.00	0.03	0.007	O	|	|	|	|	0.03
45.917	0.00	0.03	0.007	O	|	|	|	|	0.03
46.000	0.00	0.03	0.007	O	|	|	|	|	0.03
46.083	0.00	0.03	0.006	O	|	|	|	|	0.03
46.167	0.00	0.03	0.006	O	|	|	|	|	0.03
46.250	0.00	0.03	0.006	O	|	|	|	|	0.03
46.333	0.00	0.03	0.006	O	|	|	|	|	0.03
46.417	0.00	0.03	0.006	O	|	|	|	|	0.03
46.500	0.00	0.03	0.006	O	|	|	|	|	0.03
46.583	0.00	0.03	0.005	O	|	|	|	|	0.03
46.667	0.00	0.02	0.005	O	|	|	|	|	0.02
46.750	0.00	0.02	0.005	O	|	|	|	|	0.02
46.833	0.00	0.02	0.005	O	|	|	|	|	0.02
46.917	0.00	0.02	0.005	O	|	|	|	|	0.02
47.000	0.00	0.02	0.005	O	|	|	|	|	0.02
47.083	0.00	0.02	0.004	O	|	|	|	|	0.02
47.167	0.00	0.02	0.004	O	|	|	|	|	0.02
47.250	0.00	0.02	0.004	O	|	|	|	|	0.02
47.333	0.00	0.02	0.004	O	|	|	|	|	0.02
47.417	0.00	0.02	0.004	O	|	|	|	|	0.02
47.500	0.00	0.02	0.004	O	|	|	|	|	0.02
47.583	0.00	0.02	0.003	O	|	|	|	|	0.02
47.667	0.00	0.02	0.003	O	|	|	|	|	0.02
47.750	0.00	0.02	0.002	O	|	|	|	|	0.02
47.833	0.00	0.02	0.002	O	|	|	|	|	0.01
47.917	0.00	0.01	0.001	O	|	|	|	|	0.01
48.000	0.00	0.00	0.000	O	|	|	|	|	0.00

**********HYDROGRAPH DATA**********

Number of intervals = 576
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 2.899 (CFS)
Total volume = 3.558 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

APPENDIX D.7

BASIN ROUTING ANALYSIS

DRAINAGE AREA B– 25 YEAR

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
Study date: 01/25/23

JOB NO. 2022-318
11115 HEMLOCK AVE
25 YEAR, BASIN ROUTING
POST-CONDITION, CHAMBER B

Program License Serial Number 6277

********** HYDROGRAPH INFORMATION **********

From study/file name: 2022318UH25POSTB.rte
**********HYDROGRAPH DATA**********
Number of intervals = 292
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 36.692 (CFS)
Total volume = 4.318 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

++
Process from Point/Station 5.300 to Point/Station 5.300
**** RETARDING BASIN ROUTING ****
_____

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 292
Hydrograph time unit = 5.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)
Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
1.000	0.210	1.000	0.207	0.213
2.000	0.520	1.000	0.517	0.523
3.000	0.900	1.000	0.897	0.903
4.000	1.320	1.040	1.316	1.324

5.000	1.760	4.580	1.744	1.776
6.000	2.190	6.510	2.168	2.212
7.000	2.610	7.980	2.583	2.637
8.000	2.900	9.220	2.868	2.932
9.000	3.310	10.320	3.274	3.346

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 9.2 18.35 27.52 36.69	Depth (Ft.)
0.083	0.10	0.00	0.000	O | | | |	0.00
0.167	0.57	0.01	0.003	O | | | |	0.01
0.250	0.87	0.04	0.007	O | | | |	0.04
0.333	0.93	0.06	0.013	O | | | |	0.06
0.417	0.95	0.09	0.019	O | | | |	0.09
0.500	0.95	0.12	0.025	O | | | |	0.12
0.583	0.95	0.15	0.031	O | | | |	0.15
0.667	0.96	0.17	0.036	O | | | |	0.17
0.750	0.96	0.20	0.041	O | | | |	0.20
0.833	0.96	0.22	0.047	O | | | |	0.22
0.917	0.96	0.25	0.052	O | | | |	0.25
1.000	0.97	0.27	0.057	O | | | |	0.27
1.083	0.97	0.29	0.061	O | | | |	0.29
1.167	0.97	0.31	0.066	O | | | |	0.31
1.250	0.98	0.33	0.070	O | | | |	0.33
1.333	0.98	0.36	0.075	O | | | |	0.36
1.417	0.98	0.38	0.079	O | | | |	0.38
1.500	0.99	0.40	0.083	O | | | |	0.40
1.583	0.99	0.41	0.087	O | | | |	0.41
1.667	0.99	0.43	0.091	O | | | |	0.43
1.750	0.99	0.45	0.095	O | | | |	0.45
1.833	1.00	0.47	0.098	O | | | |	0.47
1.917	1.00	0.49	0.102	O | | | |	0.49
2.000	1.00	0.50	0.106	O | | | |	0.50
2.083	1.01	0.52	0.109	O | | | |	0.52
2.167	1.01	0.53	0.112	O | | | |	0.53
2.250	1.01	0.55	0.116	O | | | |	0.55
2.333	1.02	0.57	0.119	O | | | |	0.57
2.417	1.02	0.58	0.122	O | | | |	0.58
2.500	1.03	0.59	0.125	O | | | |	0.59
2.583	1.03	0.61	0.128	O | | | |	0.61
2.667	1.03	0.62	0.131	O | | | |	0.62
2.750	1.04	0.63	0.133	O | | | |	0.63
2.833	1.04	0.65	0.136	O | | | |	0.65
2.917	1.04	0.66	0.139	O | | | |	0.66
3.000	1.05	0.67	0.141	O | | | |	0.67
3.083	1.05	0.69	0.144	O | | | |	0.69
3.167	1.05	0.70	0.146	O | | | |	0.70
3.250	1.06	0.71	0.149	O | | | |	0.71
3.333	1.06	0.72	0.151	O | | | |	0.72
3.417	1.07	0.73	0.154	O | | | |	0.73
3.500	1.07	0.74	0.156	O | | | |	0.74
3.583	1.07	0.75	0.158	O | | | |	0.75
3.667	1.08	0.76	0.160	O | | | |	0.76
3.750	1.08	0.77	0.162	O | | | |	0.77
3.833	1.09	0.78	0.164	O | | | |	0.78
3.917	1.09	0.79	0.167	O | | | |	0.79
4.000	1.09	0.80	0.169	O | | | |	0.80

4.083	1.10	0.81	0.171	O				0.81
4.167	1.10	0.82	0.173	O				0.82
4.250	1.11	0.83	0.174	O				0.83
4.333	1.11	0.84	0.176	O				0.84
4.417	1.12	0.85	0.178	O				0.85
4.500	1.12	0.86	0.180	O				0.86
4.583	1.12	0.87	0.182	O				0.87
4.667	1.13	0.87	0.184	O				0.87
4.750	1.13	0.88	0.185	O				0.88
4.833	1.14	0.89	0.187	O				0.89
4.917	1.14	0.90	0.189	O				0.90
5.000	1.15	0.91	0.190	OI				0.91
5.083	1.15	0.91	0.192	OI				0.91
5.167	1.16	0.92	0.194	OI				0.92
5.250	1.16	0.93	0.195	OI				0.93
5.333	1.17	0.94	0.197	OI				0.94
5.417	1.17	0.95	0.198	OI				0.95
5.500	1.18	0.95	0.200	OI				0.95
5.583	1.18	0.96	0.202	OI				0.96
5.667	1.19	0.97	0.203	OI				0.97
5.750	1.19	0.97	0.205	OI				0.97
5.833	1.20	0.98	0.206	OI				0.98
5.917	1.20	0.99	0.208	OI				0.99
6.000	1.21	1.00	0.209	OI				1.00
6.083	1.22	1.00	0.211	OI				1.00
6.167	1.22	1.00	0.212	OI				1.01
6.250	1.23	1.00	0.214	OI				1.01
6.333	1.23	1.00	0.215	OI				1.02
6.417	1.24	1.00	0.217	OI				1.02
6.500	1.25	1.00	0.219	OI				1.03
6.583	1.25	1.00	0.220	OI				1.03
6.667	1.26	1.00	0.222	OI				1.04
6.750	1.26	1.00	0.224	OI				1.04
6.833	1.27	1.00	0.226	OI				1.05
6.917	1.28	1.00	0.227	OI				1.06
7.000	1.28	1.00	0.229	OI				1.06
7.083	1.29	1.00	0.231	OI				1.07
7.167	1.30	1.00	0.233	OI				1.08
7.250	1.30	1.00	0.235	OI				1.08
7.333	1.31	1.00	0.238	OI				1.09
7.417	1.32	1.00	0.240	OI				1.10
7.500	1.32	1.00	0.242	OI				1.10
7.583	1.33	1.00	0.244	OI				1.11
7.667	1.34	1.00	0.246	OI				1.12
7.750	1.35	1.00	0.249	OI				1.13
7.833	1.35	1.00	0.251	OI				1.13
7.917	1.36	1.00	0.254	OI				1.14
8.000	1.37	1.00	0.256	OI				1.15
8.083	1.38	1.00	0.259	OI				1.16
8.167	1.38	1.00	0.261	OI				1.17
8.250	1.39	1.00	0.264	OI				1.17
8.333	1.40	1.00	0.267	OI				1.18
8.417	1.41	1.00	0.270	OI				1.19
8.500	1.42	1.00	0.272	OI				1.20
8.583	1.43	1.00	0.275	OI				1.21
8.667	1.44	1.00	0.278	OI				1.22
8.750	1.44	1.00	0.281	OI				1.23
8.833	1.45	1.00	0.284	OI				1.24
8.917	1.46	1.00	0.288	OI				1.25
9.000	1.47	1.00	0.291	OI				1.26
9.083	1.48	1.00	0.294	OI				1.27

9.167	1.49	1.00	0.297	OI	|	|	|	1.28
9.250	1.50	1.00	0.301	OI	|	|	|	1.29
9.333	1.51	1.00	0.304	OI	|	|	|	1.30
9.417	1.52	1.00	0.308	OI	|	|	|	1.32
9.500	1.53	1.00	0.312	OI	|	|	|	1.33
9.583	1.54	1.00	0.315	OI	|	|	|	1.34
9.667	1.56	1.00	0.319	OI	|	|	|	1.35
9.750	1.57	1.00	0.323	OI	|	|	|	1.36
9.833	1.58	1.00	0.327	OI	|	|	|	1.38
9.917	1.59	1.00	0.331	OI	|	|	|	1.39
10.000	1.60	1.00	0.335	OI	|	|	|	1.40
10.083	1.61	1.00	0.339	OI	|	|	|	1.42
10.167	1.63	1.00	0.343	OI	|	|	|	1.43
10.250	1.64	1.00	0.348	OI	|	|	|	1.44
10.333	1.65	1.00	0.352	OI	|	|	|	1.46
10.417	1.67	1.00	0.357	OI	|	|	|	1.47
10.500	1.68	1.00	0.361	OI	|	|	|	1.49
10.583	1.69	1.00	0.366	OI	|	|	|	1.50
10.667	1.71	1.00	0.371	OI	|	|	|	1.52
10.750	1.72	1.00	0.376	OI	|	|	|	1.54
10.833	1.74	1.00	0.381	OI	|	|	|	1.55
10.917	1.75	1.00	0.386	OI	|	|	|	1.57
11.000	1.77	1.00	0.391	OI	|	|	|	1.58
11.083	1.78	1.00	0.397	OI	|	|	|	1.60
11.167	1.80	1.00	0.402	OI	|	|	|	1.62
11.250	1.82	1.00	0.408	OI	|	|	|	1.64
11.333	1.84	1.00	0.413	OI	|	|	|	1.66
11.417	1.85	1.00	0.419	OI	|	|	|	1.67
11.500	1.87	1.00	0.425	OI	|	|	|	1.69
11.583	1.89	1.00	0.431	OI	|	|	|	1.71
11.667	1.91	1.00	0.437	OI	|	|	|	1.73
11.750	1.93	1.00	0.444	OI	|	|	|	1.75
11.833	1.95	1.00	0.450	OI	|	|	|	1.78
11.917	1.97	1.00	0.457	OI	|	|	|	1.80
12.000	2.00	1.00	0.464	OI	|	|	|	1.82
12.083	2.05	1.00	0.471	OI	|	|	|	1.84
12.167	2.21	1.00	0.478	OI	|	|	|	1.87
12.250	2.33	1.00	0.487	O I	|	|	|	1.89
12.333	2.37	1.00	0.497	O I	|	|	|	1.92
12.417	2.40	1.00	0.506	O I	|	|	|	1.95
12.500	2.43	1.00	0.516	O I	|	|	|	1.99
12.583	2.45	1.00	0.526	O I	|	|	|	2.01
12.667	2.48	1.00	0.536	O I	|	|	|	2.04
12.750	2.51	1.00	0.546	O I	|	|	|	2.07
12.833	2.54	1.00	0.557	O I	|	|	|	2.10
12.917	2.58	1.00	0.567	O I	|	|	|	2.12
13.000	2.61	1.00	0.578	O I	|	|	|	2.15
13.083	2.64	1.00	0.590	O I	|	|	|	2.18
13.167	2.68	1.00	0.601	O I	|	|	|	2.21
13.250	2.72	1.00	0.613	O I	|	|	|	2.24
13.333	2.76	1.00	0.625	O I	|	|	|	2.28
13.417	2.80	1.00	0.637	O I	|	|	|	2.31
13.500	2.84	1.00	0.649	O I	|	|	|	2.34
13.583	2.89	1.00	0.662	O I	|	|	|	2.37
13.667	2.94	1.00	0.676	O I	|	|	|	2.41
13.750	2.99	1.00	0.689	O I	|	|	|	2.44
13.833	3.04	1.00	0.703	O I	|	|	|	2.48
13.917	3.09	1.00	0.717	O I	|	|	|	2.52
14.000	3.16	1.00	0.732	O I	|	|	|	2.56
14.083	3.22	1.00	0.747	O I	|	|	|	2.60
14.167	3.29	1.00	0.762	O I	|	|	|	2.64

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14.250    3.35    1.00      0.778  O I     |       |       |       |     2.68
14.333    3.43    1.00      0.795  O I     |       |       |       |     2.72
14.417    3.51    1.00      0.812  O  I    |       |       |       |     2.77
14.500    3.60    1.00      0.829  O  I    |       |       |       |     2.81
14.583    3.69    1.00      0.848  O  I    |       |       |       |     2.86
14.667    3.79    1.00      0.866  O  I    |       |       |       |     2.91
14.750    3.90    1.00      0.886  O  I    |       |       |       |     2.96
14.833    4.02    1.00      0.906  O  I    |       |       |       |     3.02
14.917    4.15    1.00      0.928  O  I    |       |       |       |     3.07
15.000    4.30    1.00      0.950  O  I    |       |       |       |     3.12
15.083    4.45    1.01      0.973  O  I    |       |       |       |     3.17
15.167    4.64    1.01      0.997  O   I   |       |       |       |     3.23
15.250    4.84    1.01      1.023  O   I   |       |       |       |     3.29
15.333    5.08    1.01      1.050  O   I   |       |       |       |     3.36
15.417    5.22    1.02      1.079  O   I   |       |       |       |     3.43
15.500    4.99    1.02      1.107  O   I   |       |       |       |     3.49
15.583    4.99    1.02      1.134  O   I   |       |       |       |     3.56
15.667    5.42    1.03      1.163  O   I   |       |       |       |     3.63
15.750    6.00    1.03      1.195  O    I  |       |       |       |     3.70
15.833    6.93    1.03      1.233  O     I |       |       |       |     3.79
15.917    8.36    1.04      1.278  O      I|       |       |       |     3.90
16.000   11.40    1.19      1.339  |O      |I      |       |       |     4.04
16.083   19.62    1.96      1.435  |O      |       |I      |       |     4.26
16.167   36.69    3.37      1.610  | O     |       |       |       I    4.66
16.250   25.49    4.74      1.796  |   O   |       |     I |       |     5.08
16.333   10.69    5.15      1.887  |   O   |I      |       |       |     5.29
16.417    6.74    5.26      1.911  |   OI  |       |       |       |     5.35
16.500    5.56    5.28      1.917  |   O   |       |       |       |     5.37
16.583    5.21    5.29      1.918  |   O   |       |       |       |     5.37
16.667    4.77    5.28      1.916  |   O   |       |       |       |     5.36
16.750    4.41    5.26      1.911  |  IO   |       |       |       |     5.35
16.833    4.11    5.23      1.904  |  IO   |       |       |       |     5.34
16.917    3.87    5.19      1.896  |  IO   |       |       |       |     5.32
17.000    3.66    5.15      1.886  |  IO   |       |       |       |     5.29
17.083    3.48    5.10      1.876  |  IO   |       |       |       |     5.27
17.167    3.33    5.05      1.864  | I O   |       |       |       |     5.24
17.250    3.20    4.99      1.852  | I O   |       |       |       |     5.21
17.333    3.08    4.94      1.839  | I O   |       |       |       |     5.18
17.417    2.97    4.88      1.826  | I O   |       |       |       |     5.15
17.500    2.87    4.82      1.813  | I O   |       |       |       |     5.12
17.583    2.79    4.76      1.800  | I O   |       |       |       |     5.09
17.667    2.71    4.70      1.786  | I O   |       |       |       |     5.06
17.750    2.63    4.63      1.772  | I O   |       |       |       |     5.03
17.833    2.56    4.57      1.758  | IO    |       |       |       |     5.00
17.917    2.50    4.46      1.745  | IO    |       |       |       |     4.97
18.000    2.44    4.35      1.732  | IO    |       |       |       |     4.94
18.083    2.36    4.25      1.718  | IO    |       |       |       |     4.91
18.167    2.17    4.14      1.705  |I O    |       |       |       |     4.88
18.250    2.03    4.03      1.691  |I O    |       |       |       |     4.84
18.333    1.97    3.92      1.678  |I O    |       |       |       |     4.81
18.417    1.92    3.81      1.665  |I O    |       |       |       |     4.78
18.500    1.88    3.71      1.652  |I O    |       |       |       |     4.75
18.583    1.85    3.61      1.640  |I O    |       |       |       |     4.73
18.667    1.81    3.51      1.628  |I O    |       |       |       |     4.70
18.750    1.78    3.42      1.616  |IO     |       |       |       |     4.67
18.833    1.75    3.33      1.605  |IO     |       |       |       |     4.65
18.917    1.72    3.25      1.594  |IO     |       |       |       |     4.62
19.000    1.69    3.16      1.584  |IO     |       |       |       |     4.60
19.083    1.66    3.08      1.574  |IO     |       |       |       |     4.58
19.167    1.63    3.01      1.564  |IO     |       |       |       |     4.56
19.250    1.61    2.93      1.555  |IO     |       |       |       |     4.53
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19.333	1.59	2.86	1.546	|IO	|	|	|	4.51
19.417	1.56	2.79	1.537	|IO	|	|	|	4.49
19.500	1.54	2.72	1.529	|IO	|	|	|	4.48
19.583	1.52	2.66	1.521	|IO	|	|	|	4.46
19.667	1.50	2.60	1.513	|IO	|	|	|	4.44
19.750	1.48	2.54	1.506	|IO	|	|	|	4.42
19.833	1.46	2.48	1.499	|IO	|	|	|	4.41
19.917	1.44	2.42	1.492	|IO	|	|	|	4.39
20.000	1.42	2.37	1.485	|IO	|	|	|	4.38
20.083	1.41	2.32	1.479	|IO	|	|	|	4.36
20.167	1.39	2.27	1.473	|O	|	|	|	4.35
20.250	1.37	2.22	1.467	|O	|	|	|	4.33
20.333	1.36	2.18	1.461	|O	|	|	|	4.32
20.417	1.34	2.13	1.456	|O	|	|	|	4.31
20.500	1.33	2.09	1.450	|O	|	|	|	4.30
20.583	1.31	2.05	1.445	|O	|	|	|	4.28
20.667	1.30	2.01	1.440	|O	|	|	|	4.27
20.750	1.29	1.97	1.435	|O	|	|	|	4.26
20.833	1.27	1.93	1.431	|O	|	|	|	4.25
20.917	1.26	1.90	1.426	|O	|	|	|	4.24
21.000	1.25	1.86	1.422	|O	|	|	|	4.23
21.083	1.24	1.83	1.418	|O	|	|	|	4.22
21.167	1.23	1.80	1.414	|O	|	|	|	4.21
21.250	1.21	1.76	1.410	|O	|	|	|	4.20
21.333	1.20	1.73	1.406	|O	|	|	|	4.20
21.417	1.19	1.71	1.403	|O	|	|	|	4.19
21.500	1.18	1.68	1.399	|O	|	|	|	4.18
21.583	1.17	1.65	1.396	|O	|	|	|	4.17
21.667	1.16	1.62	1.393	|O	|	|	|	4.17
21.750	1.15	1.60	1.389	|O	|	|	|	4.16
21.833	1.14	1.57	1.386	IO	|	|	|	4.15
21.917	1.13	1.55	1.384	IO	|	|	|	4.14
22.000	1.12	1.53	1.381	IO	|	|	|	4.14
22.083	1.11	1.51	1.378	IO	|	|	|	4.13
22.167	1.11	1.48	1.375	IO	|	|	|	4.13
22.250	1.10	1.46	1.373	IO	|	|	|	4.12
22.333	1.09	1.44	1.370	IO	|	|	|	4.11
22.417	1.08	1.42	1.368	IO	|	|	|	4.11
22.500	1.07	1.41	1.365	IO	|	|	|	4.10
22.583	1.06	1.39	1.363	IO	|	|	|	4.10
22.667	1.06	1.37	1.361	IO	|	|	|	4.09
22.750	1.05	1.35	1.359	IO	|	|	|	4.09
22.833	1.04	1.34	1.357	IO	|	|	|	4.08
22.917	1.03	1.32	1.355	IO	|	|	|	4.08
23.000	1.03	1.30	1.353	IO	|	|	|	4.07
23.083	1.02	1.29	1.351	IO	|	|	|	4.07
23.167	1.01	1.27	1.349	IO	|	|	|	4.07
23.250	1.01	1.26	1.347	IO	|	|	|	4.06
23.333	1.00	1.25	1.346	IO	|	|	|	4.06
23.417	0.99	1.23	1.344	IO	|	|	|	4.05
23.500	0.99	1.22	1.342	IO	|	|	|	4.05
23.583	0.98	1.21	1.341	IO	|	|	|	4.05
23.667	0.97	1.19	1.339	IO	|	|	|	4.04
23.750	0.97	1.18	1.338	IO	|	|	|	4.04
23.833	0.96	1.17	1.336	IO	|	|	|	4.04
23.917	0.96	1.16	1.335	IO	|	|	|	4.03
24.000	0.95	1.15	1.334	IO	|	|	|	4.03
24.083	0.85	1.14	1.332	O	|	|	|	4.03
24.167	0.37	1.11	1.328	O	|	|	|	4.02
24.250	0.07	1.06	1.322	O	|	|	|	4.01
24.333	0.01	1.04	1.315	O	|	|	|	3.99

24.417	0.00	1.04	1.308	O	|	|	|	3.97
24.500	0.00	1.04	1.301	O	|	|	|	3.96
24.583	0.00	1.04	1.294	O	|	|	|	3.94
24.667	0.00	1.04	1.287	O	|	|	|	3.92
24.750	0.00	1.04	1.280	O	|	|	|	3.90
24.833	0.00	1.04	1.273	O	|	|	|	3.89
24.917	0.00	1.03	1.265	O	|	|	|	3.87
25.000	0.00	1.03	1.258	O	|	|	|	3.85
25.083	0.00	1.03	1.251	O	|	|	|	3.84
25.167	0.00	1.03	1.244	O	|	|	|	3.82
25.250	0.00	1.03	1.237	O	|	|	|	3.80
25.333	0.00	1.03	1.230	O	|	|	|	3.79
25.417	0.00	1.03	1.223	O	|	|	|	3.77
25.500	0.00	1.03	1.216	O	|	|	|	3.75
25.583	0.00	1.03	1.209	O	|	|	|	3.73
25.667	0.00	1.03	1.201	O	|	|	|	3.72
25.750	0.00	1.03	1.194	O	|	|	|	3.70
25.833	0.00	1.03	1.187	O	|	|	|	3.68
25.917	0.00	1.03	1.180	O	|	|	|	3.67
26.000	0.00	1.03	1.173	O	|	|	|	3.65
26.083	0.00	1.03	1.166	O	|	|	|	3.63
26.167	0.00	1.02	1.159	O	|	|	|	3.62
26.250	0.00	1.02	1.152	O	|	|	|	3.60
26.333	0.00	1.02	1.145	O	|	|	|	3.58
26.417	0.00	1.02	1.138	O	|	|	|	3.57
26.500	0.00	1.02	1.131	O	|	|	|	3.55
26.583	0.00	1.02	1.124	O	|	|	|	3.53
26.667	0.00	1.02	1.117	O	|	|	|	3.52
26.750	0.00	1.02	1.110	O	|	|	|	3.50
26.833	0.00	1.02	1.103	O	|	|	|	3.48
26.917	0.00	1.02	1.096	O	|	|	|	3.47
27.000	0.00	1.02	1.089	O	|	|	|	3.45
27.083	0.00	1.02	1.082	O	|	|	|	3.43
27.167	0.00	1.02	1.075	O	|	|	|	3.42
27.250	0.00	1.02	1.068	O	|	|	|	3.40
27.333	0.00	1.02	1.061	O	|	|	|	3.38
27.417	0.00	1.01	1.054	O	|	|	|	3.37
27.500	0.00	1.01	1.047	O	|	|	|	3.35
27.583	0.00	1.01	1.040	O	|	|	|	3.33
27.667	0.00	1.01	1.033	O	|	|	|	3.32
27.750	0.00	1.01	1.026	O	|	|	|	3.30
27.833	0.00	1.01	1.019	O	|	|	|	3.28
27.917	0.00	1.01	1.012	O	|	|	|	3.27
28.000	0.00	1.01	1.005	O	|	|	|	3.25
28.083	0.00	1.01	0.998	O	|	|	|	3.23
28.167	0.00	1.01	0.991	O	|	|	|	3.22
28.250	0.00	1.01	0.984	O	|	|	|	3.20
28.333	0.00	1.01	0.977	O	|	|	|	3.18
28.417	0.00	1.01	0.970	O	|	|	|	3.17
28.500	0.00	1.01	0.963	O	|	|	|	3.15
28.583	0.00	1.01	0.956	O	|	|	|	3.13
28.667	0.00	1.00	0.949	O	|	|	|	3.12
28.750	0.00	1.00	0.943	O	|	|	|	3.10
28.833	0.00	1.00	0.936	O	|	|	|	3.08
28.917	0.00	1.00	0.929	O	|	|	|	3.07
29.000	0.00	1.00	0.922	O	|	|	|	3.05
29.083	0.00	1.00	0.915	O	|	|	|	3.04
29.167	0.00	1.00	0.908	O	|	|	|	3.02
29.250	0.00	1.00	0.901	O	|	|	|	3.00
29.333	0.00	1.00	0.894	O	|	|	|	2.98
29.417	0.00	1.00	0.887	O	|	|	|	2.97

29.500	0.00	1.00	0.880	O	|	|	|	2.95
29.583	0.00	1.00	0.874	O	|	|	|	2.93
29.667	0.00	1.00	0.867	O	|	|	|	2.91
29.750	0.00	1.00	0.860	O	|	|	|	2.89
29.833	0.00	1.00	0.853	O	|	|	|	2.88
29.917	0.00	1.00	0.846	O	|	|	|	2.86
30.000	0.00	1.00	0.839	O	|	|	|	2.84
30.083	0.00	1.00	0.832	O	|	|	|	2.82
30.167	0.00	1.00	0.825	O	|	|	|	2.80
30.250	0.00	1.00	0.818	O	|	|	|	2.79
30.333	0.00	1.00	0.812	O	|	|	|	2.77
30.417	0.00	1.00	0.805	O	|	|	|	2.75
30.500	0.00	1.00	0.798	O	|	|	|	2.73
30.583	0.00	1.00	0.791	O	|	|	|	2.71
30.667	0.00	1.00	0.784	O	|	|	|	2.69
30.750	0.00	1.00	0.777	O	|	|	|	2.68
30.833	0.00	1.00	0.770	O	|	|	|	2.66
30.917	0.00	1.00	0.763	O	|	|	|	2.64
31.000	0.00	1.00	0.756	O	|	|	|	2.62
31.083	0.00	1.00	0.750	O	|	|	|	2.60
31.167	0.00	1.00	0.743	O	|	|	|	2.59
31.250	0.00	1.00	0.736	O	|	|	|	2.57
31.333	0.00	1.00	0.729	O	|	|	|	2.55
31.417	0.00	1.00	0.722	O	|	|	|	2.53
31.500	0.00	1.00	0.715	O	|	|	|	2.51
31.583	0.00	1.00	0.708	O	|	|	|	2.50
31.667	0.00	1.00	0.701	O	|	|	|	2.48
31.750	0.00	1.00	0.694	O	|	|	|	2.46
31.833	0.00	1.00	0.688	O	|	|	|	2.44
31.917	0.00	1.00	0.681	O	|	|	|	2.42
32.000	0.00	1.00	0.674	O	|	|	|	2.40
32.083	0.00	1.00	0.667	O	|	|	|	2.39
32.167	0.00	1.00	0.660	O	|	|	|	2.37
32.250	0.00	1.00	0.653	O	|	|	|	2.35
32.333	0.00	1.00	0.646	O	|	|	|	2.33
32.417	0.00	1.00	0.639	O	|	|	|	2.31
32.500	0.00	1.00	0.633	O	|	|	|	2.30
32.583	0.00	1.00	0.626	O	|	|	|	2.28
32.667	0.00	1.00	0.619	O	|	|	|	2.26
32.750	0.00	1.00	0.612	O	|	|	|	2.24
32.833	0.00	1.00	0.605	O	|	|	|	2.22
32.917	0.00	1.00	0.598	O	|	|	|	2.21
33.000	0.00	1.00	0.591	O	|	|	|	2.19
33.083	0.00	1.00	0.584	O	|	|	|	2.17
33.167	0.00	1.00	0.577	O	|	|	|	2.15
33.250	0.00	1.00	0.571	O	|	|	|	2.13
33.333	0.00	1.00	0.564	O	|	|	|	2.11
33.417	0.00	1.00	0.557	O	|	|	|	2.10
33.500	0.00	1.00	0.550	O	|	|	|	2.08
33.583	0.00	1.00	0.543	O	|	|	|	2.06
33.667	0.00	1.00	0.536	O	|	|	|	2.04
33.750	0.00	1.00	0.529	O	|	|	|	2.02
33.833	0.00	1.00	0.522	O	|	|	|	2.01
33.917	0.00	1.00	0.515	O	|	|	|	1.99
34.000	0.00	1.00	0.509	O	|	|	|	1.96
34.083	0.00	1.00	0.502	O	|	|	|	1.94
34.167	0.00	1.00	0.495	O	|	|	|	1.92
34.250	0.00	1.00	0.488	O	|	|	|	1.90
34.333	0.00	1.00	0.481	O	|	|	|	1.87
34.417	0.00	1.00	0.474	O	|	|	|	1.85
34.500	0.00	1.00	0.467	O	|	|	|	1.83

34.583	0.00	1.00	0.460	O	|	|	|	|	1.81
34.667	0.00	1.00	0.453	O	|	|	|	|	1.79
34.750	0.00	1.00	0.447	O	|	|	|	|	1.76
34.833	0.00	1.00	0.440	O	|	|	|	|	1.74
34.917	0.00	1.00	0.433	O	|	|	|	|	1.72
35.000	0.00	1.00	0.426	O	|	|	|	|	1.70
35.083	0.00	1.00	0.419	O	|	|	|	|	1.67
35.167	0.00	1.00	0.412	O	|	|	|	|	1.65
35.250	0.00	1.00	0.405	O	|	|	|	|	1.63
35.333	0.00	1.00	0.398	O	|	|	|	|	1.61
35.417	0.00	1.00	0.391	O	|	|	|	|	1.59
35.500	0.00	1.00	0.385	O	|	|	|	|	1.56
35.583	0.00	1.00	0.378	O	|	|	|	|	1.54
35.667	0.00	1.00	0.371	O	|	|	|	|	1.52
35.750	0.00	1.00	0.364	O	|	|	|	|	1.50
35.833	0.00	1.00	0.357	O	|	|	|	|	1.47
35.917	0.00	1.00	0.350	O	|	|	|	|	1.45
36.000	0.00	1.00	0.343	O	|	|	|	|	1.43
36.083	0.00	1.00	0.336	O	|	|	|	|	1.41
36.167	0.00	1.00	0.329	O	|	|	|	|	1.39
36.250	0.00	1.00	0.323	O	|	|	|	|	1.36
36.333	0.00	1.00	0.316	O	|	|	|	|	1.34
36.417	0.00	1.00	0.309	O	|	|	|	|	1.32
36.500	0.00	1.00	0.302	O	|	|	|	|	1.30
36.583	0.00	1.00	0.295	O	|	|	|	|	1.27
36.667	0.00	1.00	0.288	O	|	|	|	|	1.25
36.750	0.00	1.00	0.281	O	|	|	|	|	1.23
36.833	0.00	1.00	0.274	O	|	|	|	|	1.21
36.917	0.00	1.00	0.267	O	|	|	|	|	1.19
37.000	0.00	1.00	0.261	O	|	|	|	|	1.16
37.083	0.00	1.00	0.254	O	|	|	|	|	1.14
37.167	0.00	1.00	0.247	O	|	|	|	|	1.12
37.250	0.00	1.00	0.240	O	|	|	|	|	1.10
37.333	0.00	1.00	0.233	O	|	|	|	|	1.07
37.417	0.00	1.00	0.226	O	|	|	|	|	1.05
37.500	0.00	1.00	0.219	O	|	|	|	|	1.03
37.583	0.00	1.00	0.212	O	|	|	|	|	1.01
37.667	0.00	0.98	0.206	O	|	|	|	|	0.98
37.750	0.00	0.95	0.199	O	|	|	|	|	0.95
37.833	0.00	0.92	0.193	O	|	|	|	|	0.92
37.917	0.00	0.89	0.186	O	|	|	|	|	0.89
38.000	0.00	0.86	0.180	O	|	|	|	|	0.86
38.083	0.00	0.83	0.174	O	|	|	|	|	0.83
38.167	0.00	0.80	0.169	O	|	|	|	|	0.80
38.250	0.00	0.78	0.163	O	|	|	|	|	0.78
38.333	0.00	0.75	0.158	O	|	|	|	|	0.75
38.417	0.00	0.73	0.153	O	|	|	|	|	0.73
38.500	0.00	0.71	0.148	O	|	|	|	|	0.71
38.583	0.00	0.68	0.143	O	|	|	|	|	0.68
38.667	0.00	0.66	0.139	O	|	|	|	|	0.66
38.750	0.00	0.64	0.134	O	|	|	|	|	0.64
38.833	0.00	0.62	0.130	O	|	|	|	|	0.62
38.917	0.00	0.60	0.126	O	|	|	|	|	0.60
39.000	0.00	0.58	0.122	O	|	|	|	|	0.58
39.083	0.00	0.56	0.118	O	|	|	|	|	0.56
39.167	0.00	0.54	0.114	O	|	|	|	|	0.54
39.250	0.00	0.52	0.110	O	|	|	|	|	0.52
39.333	0.00	0.51	0.107	O	|	|	|	|	0.51
39.417	0.00	0.49	0.103	O	|	|	|	|	0.49
39.500	0.00	0.48	0.100	O	|	|	|	|	0.48
39.583	0.00	0.46	0.097	O	|	|	|	|	0.46

39.667	0.00	0.45	0.094	0					0.45
39.750	0.00	0.43	0.091	0					0.43
39.833	0.00	0.42	0.088	0					0.42
39.917	0.00	0.40	0.085	0					0.40
40.000	0.00	0.39	0.082	0					0.39
40.083	0.00	0.38	0.079	0					0.38
40.167	0.00	0.37	0.077	0					0.37
40.250	0.00	0.35	0.074	0					0.35
40.333	0.00	0.34	0.072	0					0.34
40.417	0.00	0.33	0.070	0					0.33
40.500	0.00	0.32	0.067	0					0.32
40.583	0.00	0.31	0.065	0					0.31
40.667	0.00	0.30	0.063	0					0.30
40.750	0.00	0.29	0.061	0					0.29
40.833	0.00	0.28	0.059	0					0.28
40.917	0.00	0.27	0.057	0					0.27
41.000	0.00	0.26	0.055	0					0.26
41.083	0.00	0.26	0.054	0					0.26
41.167	0.00	0.25	0.052	0					0.25
41.250	0.00	0.24	0.050	0					0.24
41.333	0.00	0.23	0.049	0					0.23
41.417	0.00	0.22	0.047	0					0.22
41.500	0.00	0.22	0.045	0					0.22
41.583	0.00	0.21	0.044	0					0.21
41.667	0.00	0.20	0.043	0					0.20
41.750	0.00	0.20	0.041	0					0.20
41.833	0.00	0.19	0.040	0					0.19
41.917	0.00	0.18	0.039	0					0.18
42.000	0.00	0.18	0.037	0					0.18
42.083	0.00	0.17	0.036	0					0.17
42.167	0.00	0.17	0.035	0					0.17
42.250	0.00	0.16	0.034	0					0.16
42.333	0.00	0.16	0.033	0					0.16
42.417	0.00	0.15	0.032	0					0.15
42.500	0.00	0.15	0.031	0					0.15
42.583	0.00	0.14	0.030	0					0.14
42.667	0.00	0.14	0.029	0					0.14
42.750	0.00	0.13	0.028	0					0.13
42.833	0.00	0.13	0.027	0					0.13
42.917	0.00	0.12	0.026	0					0.12
43.000	0.00	0.12	0.025	0					0.12
43.083	0.00	0.12	0.024	0					0.12
43.167	0.00	0.11	0.024	0					0.11
43.250	0.00	0.11	0.023	0					0.11
43.333	0.00	0.11	0.022	0					0.11
43.417	0.00	0.10	0.021	0					0.10
43.500	0.00	0.10	0.021	0					0.10
43.583	0.00	0.10	0.020	0					0.10
43.667	0.00	0.09	0.019	0					0.09
43.750	0.00	0.09	0.019	0					0.09
43.833	0.00	0.09	0.018	0					0.09
43.917	0.00	0.08	0.018	0					0.08
44.000	0.00	0.08	0.017	0					0.08
44.083	0.00	0.08	0.016	0					0.08
44.167	0.00	0.08	0.016	0					0.08
44.250	0.00	0.07	0.015	0					0.07
44.333	0.00	0.07	0.015	0					0.07
44.417	0.00	0.07	0.014	0					0.07
44.500	0.00	0.07	0.014	0					0.07
44.583	0.00	0.06	0.014	0					0.06
44.667	0.00	0.06	0.013	0					0.06

Storm drainage remaining in the basin is the part of the DCV Volume (Water Quality) which allows a 48-hour drawdown time.

44.750	0.00	0.06	0.013	O	|	|	|	|	0.06
44.833	0.00	0.06	0.012	O	|	|	|	|	0.06
44.917	0.00	0.06	0.012	O	|	|	|	|	0.06
45.000	0.00	0.05	0.011	O	|	|	|	|	0.05
45.083	0.00	0.05	0.011	O	|	|	|	|	0.05
45.167	0.00	0.05	0.011	O	|	|	|	|	0.05
45.250	0.00	0.05	0.010	O	|	|	|	|	0.05
45.333	0.00	0.05	0.010	O	|	|	|	|	0.05
45.417	0.00	0.05	0.010	O	|	|	|	|	0.05
45.500	0.00	0.04	0.009	O	|	|	|	|	0.04
45.583	0.00	0.04	0.009	O	|	|	|	|	0.04
45.667	0.00	0.04	0.009	O	|	|	|	|	0.04
45.750	0.00	0.04	0.009	O	|	|	|	|	0.04
45.833	0.00	0.04	0.008	O	|	|	|	|	0.04
45.917	0.00	0.04	0.008	O	|	|	|	|	0.04
46.000	0.00	0.04	0.008	O	|	|	|	|	0.04
46.083	0.00	0.04	0.007	O	|	|	|	|	0.04
46.167	0.00	0.03	0.007	O	|	|	|	|	0.03
46.250	0.00	0.03	0.007	O	|	|	|	|	0.03
46.333	0.00	0.03	0.007	O	|	|	|	|	0.03
46.417	0.00	0.03	0.007	O	|	|	|	|	0.03
46.500	0.00	0.03	0.006	O	|	|	|	|	0.03
46.583	0.00	0.03	0.006	O	|	|	|	|	0.03
46.667	0.00	0.03	0.006	O	|	|	|	|	0.03
46.750	0.00	0.03	0.006	O	|	|	|	|	0.03
46.833	0.00	0.03	0.006	O	|	|	|	|	0.03
46.917	0.00	0.03	0.005	O	|	|	|	|	0.03
47.000	0.00	0.02	0.005	O	|	|	|	|	0.02
47.083	0.00	0.02	0.005	O	|	|	|	|	0.02
47.167	0.00	0.02	0.005	O	|	|	|	|	0.02
47.250	0.00	0.02	0.005	O	|	|	|	|	0.02
47.333	0.00	0.02	0.004	O	|	|	|	|	0.02
47.417	0.00	0.02	0.004	O	|	|	|	|	0.02
47.500	0.00	0.02	0.001	O	|	|	|	|	0.02
47.583	0.00	0.02	0.003	O	|	|	|	|	0.02
47.667	0.00	0.02	0.002	O	|	|	|	|	0.02
47.750	0.00	0.02	0.002	O	|	|	|	|	0.02
47.833	0.00	0.01	0.001	O	|	|	|	|	0.01
47.917	0.00	0.01	0.001	O	|	|	|	|	0.01
48.000	0.00	0.00	0.000	O	|	|	|	|	0.00

**********HYDROGRAPH DATA**********

Number of intervals = 576
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 5.288 (CFS)
Total volume = 4.317 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

APPENDIX D.8

BASIN ROUTING ANALYSIS

DRAINAGE AREA B– 100 YEAR

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
Study date: 01/24/23

JOB NO. 2022-318
11115 HEMLOCK AVE
100 YEAR, BASIN ROUTING
POST-CONDITION, CHAMBER B

Program License Serial Number 6277

********** HYDROGRAPH INFORMATION **********

From study/file name: 2022318UH100POSTB.rte
**********HYDROGRAPH DATA**********
Number of intervals = 292
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 48.644 (CFS)
Total volume = 5.540 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

++
Process from Point/Station 5.300 to Point/Station 5.300
**** RETARDING BASIN ROUTING ****
_____

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 292
Hydrograph time unit = 5.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)
Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
1.000	0.210	1.000	0.207	0.213
2.000	0.520	1.000	0.517	0.523
3.000	0.900	1.000	0.897	0.903
4.000	1.320	1.040	1.316	1.324

5.000	1.760	4.580	1.744	1.776
6.000	2.190	6.510	2.168	2.212
7.000	2.610	7.980	2.583	2.637
8.000	2.900	9.220	2.868	2.932
9.000	3.310	10.320	3.274	3.346

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	12.2	24.32	36.48	48.64	Depth (Ft.)
0.083	0.13	0.00	0.000	O	|	|	|	|	0.00
0.167	0.74	0.02	0.003	O	|	|	|	|	0.02
0.250	1.12	0.05	0.010	O	|	|	|	|	0.05
0.333	1.19	0.08	0.017	O	|	|	|	|	0.08
0.417	1.21	0.12	0.025	O	|	|	|	|	0.12
0.500	1.21	0.15	0.032	O	|	|	|	|	0.15
0.583	1.22	0.19	0.039	O	|	|	|	|	0.19
0.667	1.22	0.22	0.046	O	|	|	|	|	0.22
0.750	1.22	0.25	0.053	O	|	|	|	|	0.25
0.833	1.23	0.28	0.060	O	|	|	|	|	0.28
0.917	1.23	0.31	0.066	O	|	|	|	|	0.31
1.000	1.23	0.34	0.072	O	|	|	|	|	0.34
1.083	1.24	0.37	0.078	O	|	|	|	|	0.37
1.167	1.24	0.40	0.084	O	|	|	|	|	0.40
1.250	1.25	0.43	0.090	O	|	|	|	|	0.43
1.333	1.25	0.45	0.095	O	|	|	|	|	0.45
1.417	1.25	0.48	0.101	O	|	|	|	|	0.48
1.500	1.26	0.51	0.106	O	|	|	|	|	0.51
1.583	1.26	0.53	0.111	O	|	|	|	|	0.53
1.667	1.27	0.55	0.116	O	|	|	|	|	0.55
1.750	1.27	0.58	0.121	O	|	|	|	|	0.58
1.833	1.27	0.60	0.126	O	|	|	|	|	0.60
1.917	1.28	0.62	0.130	O	|	|	|	|	0.62
2.000	1.28	0.64	0.135	O	|	|	|	|	0.64
2.083	1.29	0.66	0.139	O	|	|	|	|	0.66
2.167	1.29	0.68	0.143	O	|	|	|	|	0.68
2.250	1.30	0.70	0.148	O	|	|	|	|	0.70
2.333	1.30	0.72	0.152	O	|	|	|	|	0.72
2.417	1.30	0.74	0.156	O	|	|	|	|	0.74
2.500	1.31	0.76	0.159	O	|	|	|	|	0.76
2.583	1.31	0.78	0.163	O	|	|	|	|	0.78
2.667	1.32	0.79	0.167	O	|	|	|	|	0.79
2.750	1.32	0.81	0.170	O	|	|	|	|	0.81
2.833	1.33	0.83	0.174	O	|	|	|	|	0.83
2.917	1.33	0.84	0.177	O	|	|	|	|	0.84
3.000	1.34	0.86	0.181	O	|	|	|	|	0.86
3.083	1.34	0.88	0.184	O	|	|	|	|	0.88
3.167	1.35	0.89	0.187	O	|	|	|	|	0.89
3.250	1.35	0.91	0.190	O	|	|	|	|	0.91
3.333	1.36	0.92	0.193	O	|	|	|	|	0.92
3.417	1.36	0.93	0.196	O	|	|	|	|	0.93
3.500	1.37	0.95	0.199	O	|	|	|	|	0.95
3.583	1.37	0.96	0.202	O	|	|	|	|	0.96
3.667	1.38	0.97	0.205	O	|	|	|	|	0.97
3.750	1.38	0.99	0.207	O	|	|	|	|	0.99
3.833	1.39	1.00	0.210	O	|	|	|	|	1.00
3.917	1.39	1.00	0.213	O	|	|	|	|	1.01
4.000	1.40	1.00	0.216	O	|	|	|	|	1.02

4.083	1.40	1.00	0.218	O				1.03
4.167	1.41	1.00	0.221	O				1.04
4.250	1.41	1.00	0.224	O				1.05
4.333	1.42	1.00	0.227	O				1.05
4.417	1.43	1.00	0.230	O				1.06
4.500	1.43	1.00	0.233	O				1.07
4.583	1.44	1.00	0.236	O				1.08
4.667	1.44	1.00	0.239	O				1.09
4.750	1.45	1.00	0.242	O				1.10
4.833	1.46	1.00	0.245	O				1.11
4.917	1.46	1.00	0.248	O				1.12
5.000	1.47	1.00	0.251	O				1.13
5.083	1.47	1.00	0.255	O				1.14
5.167	1.48	1.00	0.258	O				1.15
5.250	1.49	1.00	0.261	O				1.16
5.333	1.49	1.00	0.264	O				1.18
5.417	1.50	1.00	0.268	O				1.19
5.500	1.51	1.00	0.271	O				1.20
5.583	1.51	1.00	0.275	O				1.21
5.667	1.52	1.00	0.278	O				1.22
5.750	1.53	1.00	0.282	OI				1.23
5.833	1.53	1.00	0.286	OI				1.24
5.917	1.54	1.00	0.289	OI				1.26
6.000	1.55	1.00	0.293	OI				1.27
6.083	1.55	1.00	0.297	OI				1.28
6.167	1.56	1.00	0.301	OI				1.29
6.250	1.57	1.00	0.305	OI				1.31
6.333	1.58	1.00	0.309	OI				1.32
6.417	1.58	1.00	0.313	OI				1.33
6.500	1.59	1.00	0.317	OI				1.34
6.583	1.60	1.00	0.321	OI				1.36
6.667	1.61	1.00	0.325	OI				1.37
6.750	1.62	1.00	0.329	OI				1.38
6.833	1.62	1.00	0.333	OI				1.40
6.917	1.63	1.00	0.338	OI				1.41
7.000	1.64	1.00	0.342	OI				1.43
7.083	1.65	1.00	0.347	OI				1.44
7.167	1.66	1.00	0.351	OI				1.45
7.250	1.67	1.00	0.356	OI				1.47
7.333	1.67	1.00	0.360	OI				1.48
7.417	1.68	1.00	0.365	OI				1.50
7.500	1.69	1.00	0.370	OI				1.51
7.583	1.70	1.00	0.374	OI				1.53
7.667	1.71	1.00	0.379	OI				1.55
7.750	1.72	1.00	0.384	OI				1.56
7.833	1.73	1.00	0.389	OI				1.58
7.917	1.74	1.00	0.394	OI				1.59
8.000	1.75	1.00	0.399	OI				1.61
8.083	1.76	1.00	0.405	OI				1.63
8.167	1.77	1.00	0.410	OI				1.64
8.250	1.78	1.00	0.415	OI				1.66
8.333	1.79	1.00	0.421	OI				1.68
8.417	1.80	1.00	0.426	OI				1.70
8.500	1.81	1.00	0.432	OI				1.72
8.583	1.82	1.00	0.437	OI				1.73
8.667	1.84	1.00	0.443	OI				1.75
8.750	1.85	1.00	0.449	OI				1.77
8.833	1.86	1.00	0.455	OI				1.79
8.917	1.87	1.00	0.461	OI				1.81
9.000	1.88	1.00	0.467	OI				1.83
9.083	1.90	1.00	0.473	OI				1.85

9.167	1.91	1.00	0.479	OI	|	|	|	1.87
9.250	1.92	1.00	0.485	OI	|	|	|	1.89
9.333	1.94	1.00	0.492	OI	|	|	|	1.91
9.417	1.95	1.00	0.498	OI	|	|	|	1.93
9.500	1.96	1.00	0.505	OI	|	|	|	1.95
9.583	1.98	1.00	0.512	OI	|	|	|	1.97
9.667	1.99	1.00	0.518	OI	|	|	|	1.99
9.750	2.00	1.00	0.525	OI	|	|	|	2.01
9.833	2.02	1.00	0.532	OI	|	|	|	2.03
9.917	2.03	1.00	0.539	OI	|	|	|	2.05
10.000	2.05	1.00	0.546	OI	|	|	|	2.07
10.083	2.07	1.00	0.554	OI	|	|	|	2.09
10.167	2.08	1.00	0.561	OI	|	|	|	2.11
10.250	2.10	1.00	0.569	OI	|	|	|	2.13
10.333	2.12	1.00	0.576	OI	|	|	|	2.15
10.417	2.13	1.00	0.584	OI	|	|	|	2.17
10.500	2.15	1.00	0.592	OI	|	|	|	2.19
10.583	2.17	1.00	0.600	OI	|	|	|	2.21
10.667	2.19	1.00	0.608	OI	|	|	|	2.23
10.750	2.20	1.00	0.616	OI	|	|	|	2.25
10.833	2.23	1.00	0.624	OI	|	|	|	2.27
10.917	2.24	1.00	0.633	OI	|	|	|	2.30
11.000	2.27	1.00	0.642	OI	|	|	|	2.32
11.083	2.29	1.00	0.650	OI	|	|	|	2.34
11.167	2.31	1.00	0.659	OI	|	|	|	2.37
11.250	2.33	1.00	0.668	OI	|	|	|	2.39
11.333	2.35	1.00	0.678	OI	|	|	|	2.41
11.417	2.37	1.00	0.687	OI	|	|	|	2.44
11.500	2.40	1.00	0.697	OI	|	|	|	2.46
11.583	2.42	1.00	0.706	OI	|	|	|	2.49
11.667	2.45	1.00	0.716	OI	|	|	|	2.52
11.750	2.47	1.00	0.726	OI	|	|	|	2.54
11.833	2.50	1.00	0.736	OI	|	|	|	2.57
11.917	2.53	1.00	0.747	OI	|	|	|	2.60
12.000	2.56	1.00	0.758	OI	|	|	|	2.63
12.083	2.61	1.00	0.768	OI	|	|	|	2.65
12.167	2.76	1.00	0.780	OI	|	|	|	2.68
12.250	2.86	1.00	0.792	OI	|	|	|	2.72
12.333	2.91	1.00	0.805	OI	|	|	|	2.75
12.417	2.94	1.00	0.819	OI	|	|	|	2.79
12.500	2.98	1.00	0.832	OI	|	|	|	2.82
12.583	3.01	1.00	0.846	OI	|	|	|	2.86
12.667	3.05	1.00	0.860	O I	|	|	|	2.89
12.750	3.09	1.00	0.874	O I	|	|	|	2.93
12.833	3.13	1.00	0.889	O I	|	|	|	2.97
12.917	3.17	1.00	0.904	O I	|	|	|	3.01
13.000	3.22	1.00	0.919	O I	|	|	|	3.04
13.083	3.26	1.00	0.934	O I	|	|	|	3.08
13.167	3.31	1.00	0.950	O I	|	|	|	3.12
13.250	3.36	1.01	0.966	O I	|	|	|	3.16
13.333	3.41	1.01	0.982	O I	|	|	|	3.20
13.417	3.46	1.01	0.999	O I	|	|	|	3.24
13.500	3.52	1.01	1.016	O I	|	|	|	3.28
13.583	3.58	1.01	1.034	O I	|	|	|	3.32
13.667	3.64	1.01	1.051	O I	|	|	|	3.36
13.750	3.70	1.02	1.070	O I	|	|	|	3.40
13.833	3.78	1.02	1.088	O I	|	|	|	3.45
13.917	3.84	1.02	1.108	O I	|	|	|	3.49
14.000	3.92	1.02	1.127	O I	|	|	|	3.54
14.083	4.00	1.02	1.148	O I	|	|	|	3.59
14.167	4.09	1.03	1.168	O I	|	|	|	3.64

14.250	4.18	1.03	1.190	O I	|	|	|	|	3.69
14.333	4.29	1.03	1.212	O I	|	|	|	|	3.74
14.417	4.39	1.03	1.235	O I	|	|	|	|	3.80
14.500	4.51	1.03	1.258	O I	|	|	|	|	3.85
14.583	4.62	1.04	1.283	O I	|	|	|	|	3.91
14.667	4.76	1.04	1.308	O I	|	|	|	|	3.97
14.750	4.90	1.15	1.333	O I	|	|	|	|	4.03
14.833	5.06	1.36	1.359	O I	|	|	|	|	4.09
14.917	5.23	1.56	1.385	O I	|	|	|	|	4.15
15.000	5.43	1.76	1.410	O I	|	|	|	|	4.20
15.083	5.63	1.97	1.435	O I	|	|	|	|	4.26
15.167	5.88	2.17	1.460	O I	|	|	|	|	4.32
15.250	6.14	2.38	1.486	O I	|	|	|	|	4.38
15.333	6.47	2.59	1.513	O I	|	|	|	|	4.44
15.417	6.69	2.80	1.539	O I	|	|	|	|	4.50
15.500	6.56	3.01	1.565	O I	|	|	|	|	4.56
15.583	6.68	3.20	1.589	O I	|	|	|	|	4.61
15.667	7.31	3.41	1.614	O I	|	|	|	|	4.67
15.750	8.15	3.64	1.643	O I	|	|	|	|	4.74
15.833	9.53	3.92	1.678	O I	|	|	|	|	4.81
15.917	11.48	4.28	1.722	O I	|	|	|	|	4.91
16.000	15.48	4.69	1.784	O	I	|	|	|	5.06
16.083	26.29	5.18	1.894	O	|	I	|	|	5.31
16.167	48.64	6.17	2.113	O	|	|	|	I	5.82
16.250	33.56	7.07	2.351	O	|	|	I |	|	6.38
16.333	14.26	7.47	2.465	O	I	|	|	|	6.66
16.417	9.02	7.57	2.494	OI	|	|	|	|	6.72
16.500	7.26	7.59	2.497	O	|	|	|	|	6.73
16.583	6.66	7.57	2.493	O	|	|	|	|	6.72
16.667	6.06	7.54	2.485	IO	|	|	|	|	6.70
16.750	5.57	7.50	2.473	IO	|	|	|	|	6.67
16.833	5.18	7.45	2.459	IO	|	|	|	|	6.64
16.917	4.85	7.39	2.442	IO	|	|	|	|	6.60
17.000	4.58	7.33	2.424	IO	|	|	|	|	6.56
17.083	4.35	7.26	2.404	I O	|	|	|	|	6.51
17.167	4.15	7.19	2.384	I O	|	|	|	|	6.46
17.250	3.97	7.11	2.363	I O	|	|	|	|	6.41
17.333	3.82	7.04	2.341	I O	|	|	|	|	6.36
17.417	3.68	6.96	2.318	I O	|	|	|	|	6.31
17.500	3.56	6.88	2.296	I O	|	|	|	|	6.25
17.583	3.44	6.80	2.273	I O	|	|	|	|	6.20
17.667	3.34	6.72	2.249	I O	|	|	|	|	6.14
17.750	3.24	6.64	2.226	I O	|	|	|	|	6.09
17.833	3.16	6.55	2.203	I O	|	|	|	|	6.03
17.917	3.08	6.46	2.179	I O	|	|	|	|	5.98
18.000	3.00	6.36	2.156	I O	|	|	|	|	5.92
18.083	2.91	6.25	2.133	I O	|	|	|	|	5.87
18.167	2.72	6.15	2.110	I O	|	|	|	|	5.81
18.250	2.59	6.04	2.086	I O	|	|	|	|	5.76
18.333	2.52	5.94	2.062	I O	|	|	|	|	5.70
18.417	2.46	5.83	2.039	I O	|	|	|	|	5.65
18.500	2.41	5.73	2.016	I O	|	|	|	|	5.60
18.583	2.37	5.63	1.993	I O	|	|	|	|	5.54
18.667	2.32	5.53	1.971	I O	|	|	|	|	5.49
18.750	2.28	5.43	1.949	I O	|	|	|	|	5.44
18.833	2.24	5.33	1.928	I O	|	|	|	|	5.39
18.917	2.20	5.24	1.907	I O	|	|	|	|	5.34
19.000	2.16	5.14	1.886	I O	|	|	|	|	5.29
19.083	2.13	5.05	1.865	I O	|	|	|	|	5.25
19.167	2.09	4.96	1.845	I O	|	|	|	|	5.20
19.250	2.06	4.88	1.826	I O	|	|	|	|	5.15

19.333	2.03	4.79	1.807	|I O	|	|	|	5.11
19.417	2.00	4.71	1.788	|I O	|	|	|	5.06
19.500	1.97	4.62	1.769	|I O	|	|	|	5.02
19.583	1.94	4.51	1.751	|IO	|	|	|	4.98
19.667	1.92	4.37	1.734	|IO	|	|	|	4.94
19.750	1.89	4.24	1.718	|IO	|	|	|	4.90
19.833	1.87	4.11	1.702	|IO	|	|	|	4.87
19.917	1.84	3.99	1.687	|IO	|	|	|	4.83
20.000	1.82	3.87	1.672	|IO	|	|	|	4.80
20.083	1.80	3.76	1.658	|IO	|	|	|	4.77
20.167	1.78	3.66	1.645	|IO	|	|	|	4.74
20.250	1.76	3.55	1.632	|IO	|	|	|	4.71
20.333	1.74	3.46	1.620	|IO	|	|	|	4.68
20.417	1.72	3.36	1.609	|IO	|	|	|	4.66
20.500	1.70	3.27	1.598	|IO	|	|	|	4.63
20.583	1.68	3.19	1.587	|IO	|	|	|	4.61
20.667	1.66	3.11	1.577	|IO	|	|	|	4.58
20.750	1.65	3.03	1.567	|O	|	|	|	4.56
20.833	1.63	2.95	1.558	|O	|	|	|	4.54
20.917	1.61	2.88	1.549	|O	|	|	|	4.52
21.000	1.60	2.81	1.540	|O	|	|	|	4.50
21.083	1.58	2.75	1.532	|O	|	|	|	4.48
21.167	1.57	2.68	1.524	|O	|	|	|	4.46
21.250	1.55	2.62	1.517	|O	|	|	|	4.45
21.333	1.54	2.56	1.510	|O	|	|	|	4.43
21.417	1.52	2.51	1.503	|O	|	|	|	4.41
21.500	1.51	2.46	1.496	IO	|	|	|	4.40
21.583	1.50	2.40	1.490	IO	|	|	|	4.39
21.667	1.48	2.35	1.483	IO	|	|	|	4.37
21.750	1.47	2.31	1.478	IO	|	|	|	4.36
21.833	1.46	2.26	1.472	IO	|	|	|	4.35
21.917	1.45	2.22	1.466	IO	|	|	|	4.33
22.000	1.44	2.18	1.461	IO	|	|	|	4.32
22.083	1.42	2.14	1.456	IO	|	|	|	4.31
22.167	1.41	2.10	1.451	IO	|	|	|	4.30
22.250	1.40	2.06	1.447	IO	|	|	|	4.29
22.333	1.39	2.02	1.442	IO	|	|	|	4.28
22.417	1.38	1.99	1.438	IO	|	|	|	4.27
22.500	1.37	1.96	1.434	IO	|	|	|	4.26
22.583	1.36	1.92	1.430	IO	|	|	|	4.25
22.667	1.35	1.89	1.426	IO	|	|	|	4.24
22.750	1.34	1.86	1.422	IO	|	|	|	4.23
22.833	1.33	1.84	1.419	IO	|	|	|	4.22
22.917	1.32	1.81	1.416	IO	|	|	|	4.22
23.000	1.31	1.78	1.412	IO	|	|	|	4.21
23.083	1.30	1.76	1.409	IO	|	|	|	4.20
23.167	1.29	1.73	1.406	IO	|	|	|	4.20
23.250	1.29	1.71	1.403	IO	|	|	|	4.19
23.333	1.28	1.68	1.400	IO	|	|	|	4.18
23.417	1.27	1.66	1.397	IO	|	|	|	4.18
23.500	1.26	1.64	1.395	IO	|	|	|	4.17
23.583	1.25	1.62	1.392	IO	|	|	|	4.16
23.667	1.24	1.60	1.390	IO	|	|	|	4.16
23.750	1.24	1.58	1.387	IO	|	|	|	4.15
23.833	1.23	1.56	1.385	IO	|	|	|	4.15
23.917	1.22	1.54	1.383	IO	|	|	|	4.14
24.000	1.21	1.53	1.380	IO	|	|	|	4.14
24.083	1.08	1.51	1.378	O	|	|	|	4.13
24.167	0.47	1.47	1.373	O	|	|	|	4.12
24.250	0.08	1.40	1.365	O	|	|	|	4.10
24.333	0.02	1.33	1.356	O	|	|	|	4.08

24.417	0.00	1.26	1.347	O	|	|	|	|	4.06
24.500	0.00	1.19	1.339	O	|	|	|	|	4.04
24.583	0.00	1.13	1.331	O	|	|	|	|	4.02
24.667	0.00	1.07	1.323	O	|	|	|	|	4.01
24.750	0.00	1.04	1.316	O	|	|	|	|	3.99
24.833	0.00	1.04	1.309	O	|	|	|	|	3.97
24.917	0.00	1.04	1.302	O	|	|	|	|	3.96
25.000	0.00	1.04	1.294	O	|	|	|	|	3.94
25.083	0.00	1.04	1.287	O	|	|	|	|	3.92
25.167	0.00	1.04	1.280	O	|	|	|	|	3.91
25.250	0.00	1.04	1.273	O	|	|	|	|	3.89
25.333	0.00	1.03	1.266	O	|	|	|	|	3.87
25.417	0.00	1.03	1.259	O	|	|	|	|	3.85
25.500	0.00	1.03	1.252	O	|	|	|	|	3.84
25.583	0.00	1.03	1.245	O	|	|	|	|	3.82
25.667	0.00	1.03	1.237	O	|	|	|	|	3.80
25.750	0.00	1.03	1.230	O	|	|	|	|	3.79
25.833	0.00	1.03	1.223	O	|	|	|	|	3.77
25.917	0.00	1.03	1.216	O	|	|	|	|	3.75
26.000	0.00	1.03	1.209	O	|	|	|	|	3.74
26.083	0.00	1.03	1.202	O	|	|	|	|	3.72
26.167	0.00	1.03	1.195	O	|	|	|	|	3.70
26.250	0.00	1.03	1.188	O	|	|	|	|	3.69
26.333	0.00	1.03	1.181	O	|	|	|	|	3.67
26.417	0.00	1.03	1.174	O	|	|	|	|	3.65
26.500	0.00	1.03	1.167	O	|	|	|	|	3.63
26.583	0.00	1.02	1.160	O	|	|	|	|	3.62
26.667	0.00	1.02	1.152	O	|	|	|	|	3.60
26.750	0.00	1.02	1.145	O	|	|	|	|	3.58
26.833	0.00	1.02	1.138	O	|	|	|	|	3.57
26.917	0.00	1.02	1.131	O	|	|	|	|	3.55
27.000	0.00	1.02	1.124	O	|	|	|	|	3.53
27.083	0.00	1.02	1.117	O	|	|	|	|	3.52
27.167	0.00	1.02	1.110	O	|	|	|	|	3.50
27.250	0.00	1.02	1.103	O	|	|	|	|	3.48
27.333	0.00	1.02	1.096	O	|	|	|	|	3.47
27.417	0.00	1.02	1.089	O	|	|	|	|	3.45
27.500	0.00	1.02	1.082	O	|	|	|	|	3.43
27.583	0.00	1.02	1.075	O	|	|	|	|	3.42
27.667	0.00	1.02	1.068	O	|	|	|	|	3.40
27.750	0.00	1.02	1.061	O	|	|	|	|	3.38
27.833	0.00	1.01	1.054	O	|	|	|	|	3.37
27.917	0.00	1.01	1.047	O	|	|	|	|	3.35
28.000	0.00	1.01	1.040	O	|	|	|	|	3.33
28.083	0.00	1.01	1.033	O	|	|	|	|	3.32
28.167	0.00	1.01	1.026	O	|	|	|	|	3.30
28.250	0.00	1.01	1.019	O	|	|	|	|	3.28
28.333	0.00	1.01	1.012	O	|	|	|	|	3.27
28.417	0.00	1.01	1.005	O	|	|	|	|	3.25
28.500	0.00	1.01	0.998	O	|	|	|	|	3.23
28.583	0.00	1.01	0.991	O	|	|	|	|	3.22
28.667	0.00	1.01	0.985	O	|	|	|	|	3.20
28.750	0.00	1.01	0.978	O	|	|	|	|	3.18
28.833	0.00	1.01	0.971	O	|	|	|	|	3.17
28.917	0.00	1.01	0.964	O	|	|	|	|	3.15
29.000	0.00	1.01	0.957	O	|	|	|	|	3.14
29.083	0.00	1.00	0.950	O	|	|	|	|	3.12
29.167	0.00	1.00	0.943	O	|	|	|	|	3.10
29.250	0.00	1.00	0.936	O	|	|	|	|	3.09
29.333	0.00	1.00	0.929	O	|	|	|	|	3.07
29.417	0.00	1.00	0.922	O	|	|	|	|	3.05

29.500	0.00	1.00	0.915	O					3.04
29.583	0.00	1.00	0.908	O					3.02
29.667	0.00	1.00	0.902	O					3.00
29.750	0.00	1.00	0.895	O					2.99
29.833	0.00	1.00	0.888	O					2.97
29.917	0.00	1.00	0.881	O					2.95
30.000	0.00	1.00	0.874	O					2.93
30.083	0.00	1.00	0.867	O					2.91
30.167	0.00	1.00	0.860	O					2.90
30.250	0.00	1.00	0.853	O					2.88
30.333	0.00	1.00	0.846	O					2.86
30.417	0.00	1.00	0.840	O					2.84
30.500	0.00	1.00	0.833	O					2.82
30.583	0.00	1.00	0.826	O					2.80
30.667	0.00	1.00	0.819	O					2.79
30.750	0.00	1.00	0.812	O					2.77
30.833	0.00	1.00	0.805	O					2.75
30.917	0.00	1.00	0.798	O					2.73
31.000	0.00	1.00	0.791	O					2.71
31.083	0.00	1.00	0.784	O					2.70
31.167	0.00	1.00	0.778	O					2.68
31.250	0.00	1.00	0.771	O					2.66
31.333	0.00	1.00	0.764	O					2.64
31.417	0.00	1.00	0.757	O					2.62
31.500	0.00	1.00	0.750	O					2.61
31.583	0.00	1.00	0.743	O					2.59
31.667	0.00	1.00	0.736	O					2.57
31.750	0.00	1.00	0.729	O					2.55
31.833	0.00	1.00	0.722	O					2.53
31.917	0.00	1.00	0.716	O					2.51
32.000	0.00	1.00	0.709	O					2.50
32.083	0.00	1.00	0.702	O					2.48
32.167	0.00	1.00	0.695	O					2.46
32.250	0.00	1.00	0.688	O					2.44
32.333	0.00	1.00	0.681	O					2.42
32.417	0.00	1.00	0.674	O					2.41
32.500	0.00	1.00	0.667	O					2.39
32.583	0.00	1.00	0.661	O					2.37
32.667	0.00	1.00	0.654	O					2.35
32.750	0.00	1.00	0.647	O					2.33
32.833	0.00	1.00	0.640	O					2.32
32.917	0.00	1.00	0.633	O					2.30
33.000	0.00	1.00	0.626	O					2.28
33.083	0.00	1.00	0.619	O					2.26
33.167	0.00	1.00	0.612	O					2.24
33.250	0.00	1.00	0.605	O					2.22
33.333	0.00	1.00	0.599	O					2.21
33.417	0.00	1.00	0.592	O					2.19
33.500	0.00	1.00	0.585	O					2.17
33.583	0.00	1.00	0.578	O					2.15
33.667	0.00	1.00	0.571	O					2.13
33.750	0.00	1.00	0.564	O					2.12
33.833	0.00	1.00	0.557	O					2.10
33.917	0.00	1.00	0.550	O					2.08
34.000	0.00	1.00	0.543	O					2.06
34.083	0.00	1.00	0.537	O					2.04
34.167	0.00	1.00	0.530	O					2.03
34.250	0.00	1.00	0.523	O					2.01
34.333	0.00	1.00	0.516	O					1.99
34.417	0.00	1.00	0.509	O					1.96
34.500	0.00	1.00	0.502	O					1.94

34.583	0.00	1.00	0.495	O	|	|	|	|	1.92
34.667	0.00	1.00	0.488	O	|	|	|	|	1.90
34.750	0.00	1.00	0.481	O	|	|	|	|	1.88
34.833	0.00	1.00	0.475	O	|	|	|	|	1.85
34.917	0.00	1.00	0.468	O	|	|	|	|	1.83
35.000	0.00	1.00	0.461	O	|	|	|	|	1.81
35.083	0.00	1.00	0.454	O	|	|	|	|	1.79
35.167	0.00	1.00	0.447	O	|	|	|	|	1.76
35.250	0.00	1.00	0.440	O	|	|	|	|	1.74
35.333	0.00	1.00	0.433	O	|	|	|	|	1.72
35.417	0.00	1.00	0.426	O	|	|	|	|	1.70
35.500	0.00	1.00	0.419	O	|	|	|	|	1.68
35.583	0.00	1.00	0.413	O	|	|	|	|	1.65
35.667	0.00	1.00	0.406	O	|	|	|	|	1.63
35.750	0.00	1.00	0.399	O	|	|	|	|	1.61
35.833	0.00	1.00	0.392	O	|	|	|	|	1.59
35.917	0.00	1.00	0.385	O	|	|	|	|	1.56
36.000	0.00	1.00	0.378	O	|	|	|	|	1.54
36.083	0.00	1.00	0.371	O	|	|	|	|	1.52
36.167	0.00	1.00	0.364	O	|	|	|	|	1.50
36.250	0.00	1.00	0.357	O	|	|	|	|	1.48
36.333	0.00	1.00	0.351	O	|	|	|	|	1.45
36.417	0.00	1.00	0.344	O	|	|	|	|	1.43
36.500	0.00	1.00	0.337	O	|	|	|	|	1.41
36.583	0.00	1.00	0.330	O	|	|	|	|	1.39
36.667	0.00	1.00	0.323	O	|	|	|	|	1.36
36.750	0.00	1.00	0.316	O	|	|	|	|	1.34
36.833	0.00	1.00	0.309	O	|	|	|	|	1.32
36.917	0.00	1.00	0.302	O	|	|	|	|	1.30
37.000	0.00	1.00	0.295	O	|	|	|	|	1.28
37.083	0.00	1.00	0.289	O	|	|	|	|	1.25
37.167	0.00	1.00	0.282	O	|	|	|	|	1.23
37.250	0.00	1.00	0.275	O	|	|	|	|	1.21
37.333	0.00	1.00	0.268	O	|	|	|	|	1.19
37.417	0.00	1.00	0.261	O	|	|	|	|	1.16
37.500	0.00	1.00	0.254	O	|	|	|	|	1.14
37.583	0.00	1.00	0.247	O	|	|	|	|	1.12
37.667	0.00	1.00	0.240	O	|	|	|	|	1.10
37.750	0.00	1.00	0.234	O	|	|	|	|	1.08
37.833	0.00	1.00	0.227	O	|	|	|	|	1.05
37.917	0.00	1.00	0.220	O	|	|	|	|	1.03
38.000	0.00	1.00	0.213	O	|	|	|	|	1.01
38.083	0.00	0.98	0.206	O	|	|	|	|	0.98
38.167	0.00	0.95	0.199	O	|	|	|	|	0.95
38.250	0.00	0.92	0.193	O	|	|	|	|	0.92
38.333	0.00	0.89	0.187	O	|	|	|	|	0.89
38.417	0.00	0.86	0.181	O	|	|	|	|	0.86
38.500	0.00	0.83	0.175	O	|	|	|	|	0.83
38.583	0.00	0.81	0.169	O	|	|	|	|	0.81
38.667	0.00	0.78	0.164	O	|	|	|	|	0.78
38.750	0.00	0.75	0.158	O	|	|	|	|	0.75
38.833	0.00	0.73	0.153	O	|	|	|	|	0.73
38.917	0.00	0.71	0.148	O	|	|	|	|	0.71
39.000	0.00	0.68	0.144	O	|	|	|	|	0.68
39.083	0.00	0.66	0.139	O	|	|	|	|	0.66
39.167	0.00	0.64	0.135	O	|	|	|	|	0.64
39.250	0.00	0.62	0.130	O	|	|	|	|	0.62
39.333	0.00	0.60	0.126	O	|	|	|	|	0.60
39.417	0.00	0.58	0.122	O	|	|	|	|	0.58
39.500	0.00	0.56	0.118	O	|	|	|	|	0.56
39.583	0.00	0.54	0.114	O	|	|	|	|	0.54

39.667	0.00	0.53	0.110	O	|	|	|	|	0.53
39.750	0.00	0.51	0.107	O	|	|	|	|	0.51
39.833	0.00	0.49	0.103	O	|	|	|	|	0.49
39.917	0.00	0.48	0.100	O	|	|	|	|	0.48
40.000	0.00	0.46	0.097	O	|	|	|	|	0.46
40.083	0.00	0.45	0.094	O	|	|	|	|	0.45
40.167	0.00	0.43	0.091	O	|	|	|	|	0.43
40.250	0.00	0.42	0.088	O	|	|	|	|	0.42
40.333	0.00	0.40	0.085	O	|	|	|	|	0.40
40.417	0.00	0.39	0.082	O	|	|	|	|	0.39
40.500	0.00	0.38	0.080	O	|	|	|	|	0.38
40.583	0.00	0.37	0.077	O	|	|	|	|	0.37
40.667	0.00	0.35	0.075	O	|	|	|	|	0.35
40.750	0.00	0.34	0.072	O	|	|	|	|	0.34
40.833	0.00	0.33	0.070	O	|	|	|	|	0.33
40.917	0.00	0.32	0.068	O	|	|	|	|	0.32
41.000	0.00	0.31	0.065	O	|	|	|	|	0.31
41.083	0.00	0.30	0.063	O	|	|	|	|	0.30
41.167	0.00	0.29	0.061	O	|	|	|	|	0.29
41.250	0.00	0.28	0.059	O	|	|	|	|	0.28
41.333	0.00	0.27	0.057	O	|	|	|	|	0.27
41.417	0.00	0.26	0.055	O	|	|	|	|	0.26
41.500	0.00	0.26	0.054	O	|	|	|	|	0.26
41.583	0.00	0.25	0.052	O	|	|	|	|	0.25
41.667	0.00	0.24	0.050	O	|	|	|	|	0.24
41.750	0.00	0.23	0.049	O	|	|	|	|	0.23
41.833	0.00	0.22	0.047	O	|	|	|	|	0.22
41.917	0.00	0.22	0.046	O	|	|	|	|	0.22
42.000	0.00	0.21	0.044	O	|	|	|	|	0.21
42.083	0.00	0.20	0.043	O	|	|	|	|	0.20
42.167	0.00	0.20	0.041	O	|	|	|	|	0.20
42.250	0.00	0.19	0.040	O	|	|	|	|	0.19
42.333	0.00	0.18	0.039	O	|	|	|	|	0.18
42.417	0.00	0.18	0.037	O	|	|	|	|	0.18
42.500	0.00	0.17	0.036	O	|	|	|	|	0.17
42.583	0.00	0.17	0.035	O	|	|	|	|	0.17
42.667	0.00	0.16	0.034	O	|	|	|	|	0.16
42.750	0.00	0.16	0.033	O	|	|	|	|	0.16
42.833	0.00	0.15	0.032	O	|	|	|	|	0.15
42.917	0.00	0.15	0.031	O	|	|	|	|	0.15
43.000	0.00	0.14	0.030	O	|	|	|	|	0.14
43.083	0.00	0.14	0.029	O	|	|	|	|	0.14
43.167	0.00	0.13	0.028	O	|	|	|	|	0.13
43.250	0.00	0.13	0.027	O	|	|	|	|	0.13
43.333	0.00	0.12	0.026	O	|	|	|	|	0.12
43.417	0.00	0.12	0.025	O	|	|	|	|	0.12
43.500	0.00	0.12	0.024	O	|	|	|	|	0.12
43.583	0.00	0.11	0.024	O	|	|	|	|	0.11
43.667	0.00	0.11	0.023	O	|	|	|	|	0.11
43.750	0.00	0.11	0.022	O	|	|	|	|	0.11
43.833	0.00	0.10	0.021	O	|	|	|	|	0.10
43.917	0.00	0.10	0.021	O	|	|	|	|	0.10
44.000	0.00	0.10	0.020	O	|	|	|	|	0.10
44.083	0.00	0.09	0.019	O	|	|	|	|	0.09
44.167	0.00	0.09	0.019	O	|	|	|	|	0.09
44.250	0.00	0.09	0.018	O	|	|	|	|	0.09
44.333	0.00	0.08	0.018	O	|	|	|	|	0.08
44.417	0.00	0.08	0.017	O	|	|	|	|	0.08
44.500	0.00	0.08	0.016	O	|	|	|	|	0.08
44.583	0.00	0.08	0.016	O	|	|	|	|	0.08
44.667	0.00	0.07	0.015	O	|	|	|	|	0.07

Storm drainage remaining in the basin is the part of the DCV Volume (Water Quality) which allows a 48-hour drawdown time.

44.750	0.00	0.07	0.015	O	|	|	|	0.07
44.833	0.00	0.07	0.014	O	|	|	|	0.07
44.917	0.00	0.07	0.014	O	|	|	|	0.07
45.000	0.00	0.06	0.014	O	|	|	|	0.06
45.083	0.00	0.06	0.013	O	|	|	|	0.06
45.167	0.00	0.06	0.013	O	|	|	|	0.06
45.250	0.00	0.06	0.012	O	|	|	|	0.06
45.333	0.00	0.06	0.012	O	|	|	|	0.06
45.417	0.00	0.05	0.011	O	|	|	|	0.05
45.500	0.00	0.05	0.011	O	|	|	|	0.05
45.583	0.00	0.05	0.011	O	|	|	|	0.05
45.667	0.00	0.05	0.010	O	|	|	|	0.05
45.750	0.00	0.05	0.010	O	|	|	|	0.05
45.833	0.00	0.05	0.010	O	|	|	|	0.05
45.917	0.00	0.04	0.009	O	|	|	|	0.04
46.000	0.00	0.04	0.009	O	|	|	|	0.04
46.083	0.00	0.04	0.009	O	|	|	|	0.04
46.167	0.00	0.04	0.009	O	|	|	|	0.04
46.250	0.00	0.04	0.008	O	|	|	|	0.04
46.333	0.00	0.04	0.008	O	|	|	|	0.04
46.417	0.00	0.04	0.008	O	|	|	|	0.04
46.500	0.00	0.04	0.008	O	|	|	|	0.04
46.583	0.00	0.03	0.007	O	|	|	|	0.03
46.667	0.00	0.03	0.007	O	|	|	|	0.03
46.750	0.00	0.03	0.007	O	|	|	|	0.03
46.833	0.00	0.03	0.007	O	|	|	|	0.03
46.917	0.00	0.03	0.006	O	|	|	|	0.03
47.000	0.00	0.03	0.006	O	|	|	|	0.03
47.083	0.00	0.03	0.006	O	|	|	|	0.03
47.167	0.00	0.03	0.006	O	|	|	|	0.03
47.250	0.00	0.03	0.006	O	|	|	|	0.03
47.333	0.00	0.03	0.005	O	|	|	|	0.03
47.417	0.00	0.02	0.005	O	|	|	|	0.02
47.500	0.00	0.02	0.005	O	|	|	|	0.02
47.583	0.00	0.02	0.005	O	|	|	|	0.02
47.667	0.00	0.02	0.004	O	|	|	|	0.02
47.750	0.00	0.01	0.002	O	|	|	|	0.01
47.833	0.00	0.01	0.001	O	|	|	|	0.01
47.917	0.00	0.00	0.000	O	|	|	|	0.00
48.000	0.00	0.00	0.000	O	|	|	|	0.00

**********HYDROGRAPH DATA**********

Number of intervals = 576
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 7.586 (CFS)
Total volume = 5.540 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

APPENDIX E

SUPPORTING DOCUMENTS

APPENDIX E.1

SOILS MAP

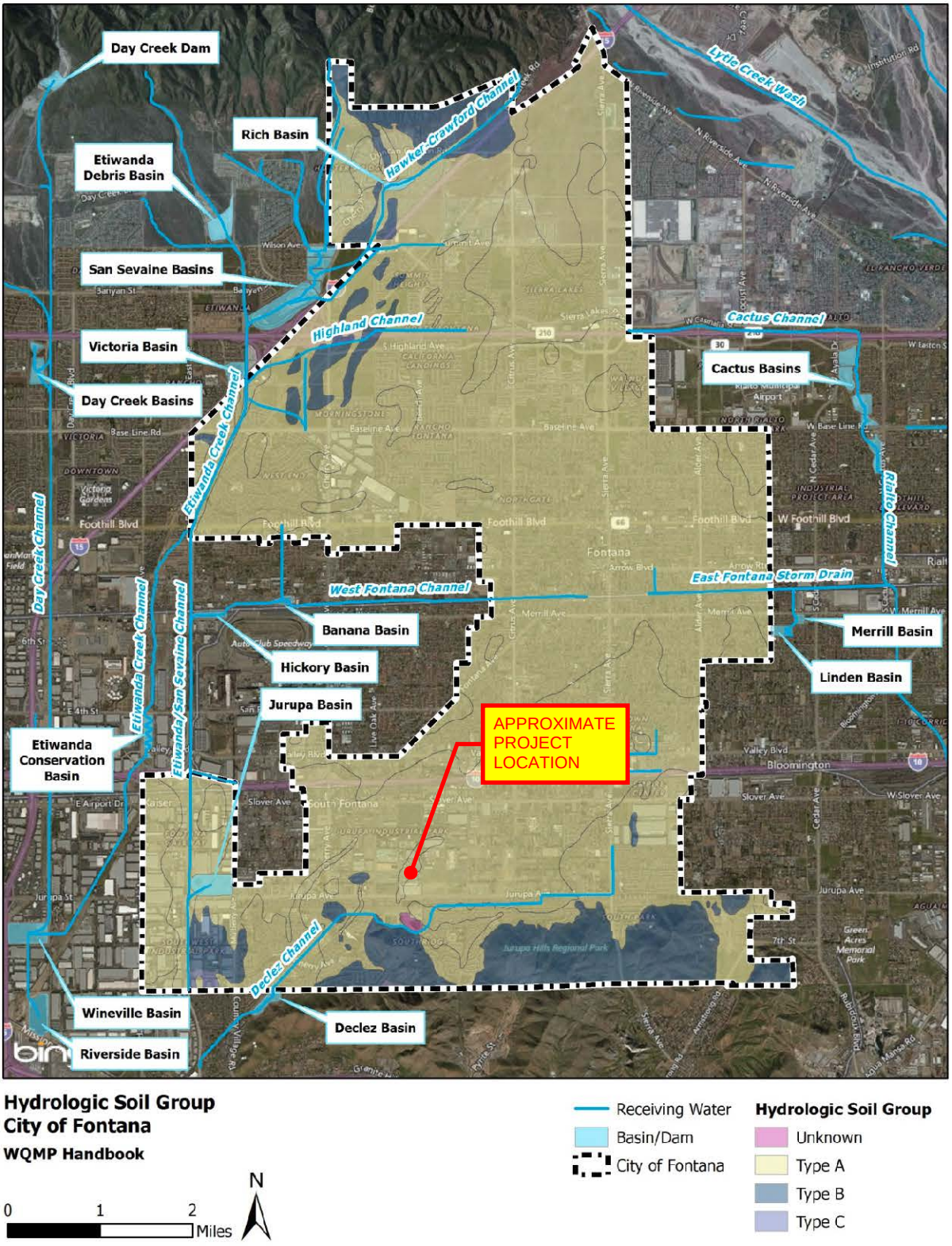


Figure 2-1 Hydrologic Soil Group

APPENDIX E.2

NOAA ATLAS 14 DATA

NOAA Atlas 14, Volume 6, Version 2
Location name: Fontana, California, USA*
Latitude: 34.0522°, Longitude: -117.4735°
Elevation: 987.62 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

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

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.103** (0.086-0.125)	**0.136** (0.113-0.165)	**0.179** (0.149-0.218)	**0.216** (0.177-0.264)	**0.266** (0.212-0.338)	**0.306** (0.238-0.398)	**0.348** (0.264-0.464)	**0.393** (0.289-0.538)	**0.455** (0.321-0.651)	**0.505** (0.344-0.749)
10-min	**0.148** (0.124-0.180)	**0.195** (0.162-0.236)	**0.257** (0.213-0.313)	**0.309** (0.254-0.379)	**0.382** (0.303-0.485)	**0.439** (0.342-0.570)	**0.499** (0.379-0.664)	**0.563** (0.415-0.771)	**0.652** (0.460-0.933)	**0.724** (0.493-1.07)
15-min	**0.179** (0.149-0.217)	**0.235** (0.196-0.286)	**0.311** (0.258-0.378)	**0.374** (0.308-0.458)	**0.461** (0.367-0.586)	**0.531** (0.413-0.689)	**0.603** (0.458-0.803)	**0.680** (0.501-0.933)	**0.789** (0.557-1.13)	**0.876** (0.596-1.30)
30-min	**0.269** (0.224-0.326)	**0.353** (0.294-0.429)	**0.466** (0.387-0.567)	**0.561** (0.462-0.688)	**0.692** (0.551-0.879)	**0.797** (0.620-1.03)	**0.906** (0.687-1.21)	**1.02** (0.753-1.40)	**1.18** (0.835-1.69)	**1.31** (0.895-1.95)
60-min	**0.395** (0.329-0.478)	**0.518** (0.432-0.629)	**0.684** (0.568-0.832)	**0.823** (0.677-1.01)	**1.02** (0.808-1.29)	**1.17** (0.909-1.52)	**1.33** (1.01-1.77)	**1.50** (1.10-2.05)	**1.74** (1.23-2.48)	**1.93** (1.31-2.86)
2-hr	**0.587** (0.490-0.712)	**0.762** (0.635-0.925)	**0.991** (0.823-1.21)	**1.18** (0.970-1.45)	**1.44** (1.14-1.82)	**1.63** (1.27-2.12)	**1.84** (1.39-2.44)	**2.05** (1.51-2.81)	**2.34** (1.65-3.35)	**2.57** (1.75-3.81)
3-hr	**0.745** (0.621-0.902)	**0.962** (0.801-1.17)	**1.24** (1.03-1.51)	**1.47** (1.21-1.81)	**1.78** (1.42-2.26)	**2.02** (1.57-2.62)	**2.26** (1.71-3.01)	**2.51** (1.85-3.44)	**2.84** (2.01-4.07)	**3.10** (2.11-4.60)
6-hr	**1.06** (0.881-1.28)	**1.36** (1.14-1.65)	**1.76** (1.46-2.14)	**2.07** (1.70-2.54)	**2.49** (1.98-3.16)	**2.80** (2.18-3.63)	**3.11** (2.36-4.14)	**3.43** (2.53-4.70)	**3.85** (2.72-5.51)	**4.18** (2.84-6.19)
12-hr	**1.39** (1.16-1.69)	**1.81** (1.51-2.20)	**2.34** (1.94-2.85)	**2.76** (2.27-3.38)	**3.30** (2.63-4.20)	**3.71** (2.88-4.81)	**4.11** (3.11-5.47)	**4.50** (3.32-6.17)	**5.02** (3.54-7.19)	**5.41** (3.69-8.02)
24-hr	**1.86** (1.65-2.15)	**2.46** (2.18-2.84)	**3.22** (2.84-3.72)	**3.81** (3.33-4.44)	**4.57** (3.87-5.51)	**5.14** (4.26-6.32)	**5.69** (4.61-7.17)	**6.24** (4.91-8.07)	**6.95** (5.26-9.37)	**7.47** (5.47-10.4)
2-day	**2.25** (1.99-2.59)	**3.04** (2.69-3.51)	**4.04** (3.56-4.68)	**4.84** (4.23-5.64)	**5.88** (4.98-7.09)	**6.66** (5.52-8.19)	**7.43** (6.01-9.35)	**8.20** (6.46-10.6)	**9.21** (6.97-12.4)	**9.96** (7.29-13.9)
3-day	**2.43** (2.15-2.80)	**3.34** (2.96-3.86)	**4.51** (3.98-5.22)	**5.45** (4.76-6.35)	**6.69** (5.67-8.06)	**7.63** (6.33-9.38)	**8.56** (6.94-10.8)	**9.51** (7.49-12.3)	**10.8** (8.15-14.5)	**11.7** (8.58-16.4)
4-day	**2.63** (2.33-3.03)	**3.65** (3.23-4.21)	**4.97** (4.38-5.75)	**6.04** (5.28-7.04)	**7.46** (6.32-8.99)	**8.55** (7.09-10.5)	**9.63** (7.80-12.1)	**10.7** (8.47-13.9)	**12.2** (9.25-16.5)	**13.4** (9.78-18.6)
7-day	**3.01** (2.67-3.47)	**4.25** (3.76-4.90)	**5.87** (5.17-6.79)	**7.19** (6.29-8.38)	**8.98** (7.60-10.8)	**10.4** (8.59-12.7)	**11.7** (9.52-14.8)	**13.2** (10.4-17.1)	**15.1** (11.4-20.4)	**16.6** (12.2-23.2)
10-day	**3.26** (2.88-3.75)	**4.63** (4.09-5.34)	**6.45** (5.69-7.46)	**7.94** (6.95-9.26)	**9.99** (8.46-12.0)	**11.6** (9.60-14.2)	**13.2** (10.7-16.6)	**14.9** (11.7-19.3)	**17.2** (13.0-23.2)	**19.0** (13.9-26.5)
20-day	**3.86** (3.42-4.45)	**5.56** (4.92-6.42)	**7.86** (6.93-9.10)	**9.79** (8.56-11.4)	**12.5** (10.6-15.0)	**14.6** (12.1-18.0)	**16.8** (13.6-21.2)	**19.2** (15.1-24.8)	**22.4** (17.0-30.2)	**25.0** (18.3-34.9)
30-day	**4.56** (4.03-5.25)	**6.57** (5.80-7.58)	**9.32** (8.21-10.8)	**11.6** (10.2-13.6)	**14.9** (12.7-18.0)	**17.6** (14.6-21.6)	**20.4** (16.5-25.7)	**23.3** (18.4-30.2)	**27.5** (20.8-37.1)	**30.9** (22.6-43.1)
45-day	**5.39** (4.78-6.22)	**7.70** (6.81-8.89)	**10.9** (9.62-12.6)	**13.7** (11.9-15.9)	**17.6** (14.9-21.2)	**20.8** (17.3-25.6)	**24.2** (19.6-30.5)	**27.9** (22.0-36.1)	**33.2** (25.1-44.7)	**37.5** (27.4-52.3)
60-day	**6.34** (5.62-7.31)	**8.93** (7.90-10.3)	**12.6** (11.1-14.5)	**15.7** (13.7-18.3)	**20.3** (17.1-24.4)	**24.0** (19.9-29.5)	**28.0** (22.7-35.3)	**32.4** (25.5-41.9)	**38.6** (29.2-52.1)	**43.8** (32.1-61.1)

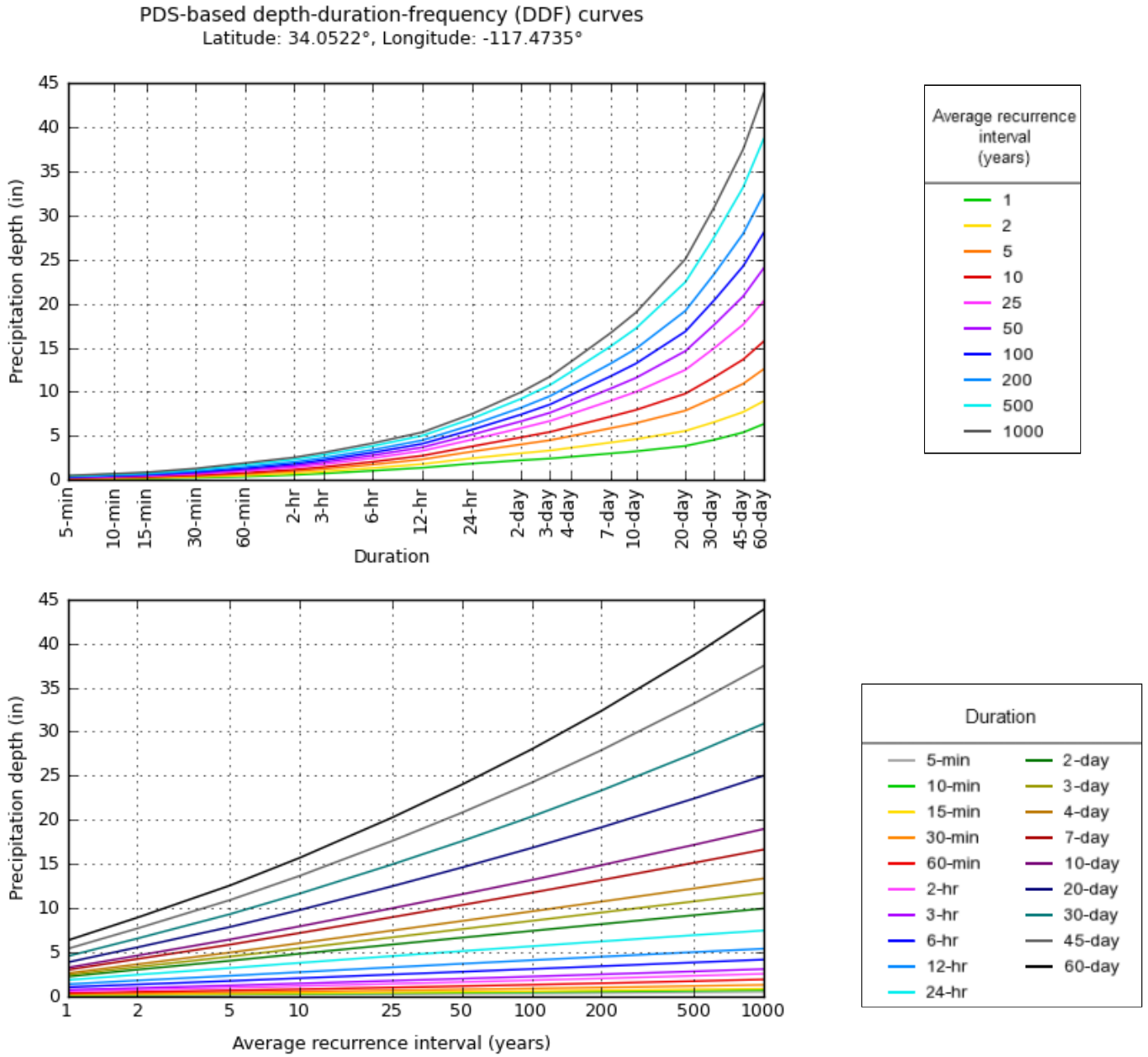
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

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

Please refer to NOAA Atlas 14 document for more information.

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PF graphical



NOAA Atlas 14, Volume 6, Version 2

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Maps & aerials

Small scale terrain

APPENDIX F

INFILTRATION REPORT

June 8, 2016

ProLogis
2817 East Cedar Street, Suite 200
Ontario, California 91761

Attention: Mr. Scott Mulkay

Project No.: **15G177-2**

Subject: **Results of Infiltration Testing**
Proposed Commercial/Industrial Building
11115 Hemlock Avenue
Fontana, California

Reference: Geotechnical Investigation, Proposed Commercial/Industrial Building, 11115 Hemlock Avenue, Fontana, California, prepared for ProLogis by Southern California Geotechnical, Inc. (SCG), SCG Project No. 15G177-1, dated September 4, 2015.

Gentlemen:

In accordance with your request, we have conducted infiltration testing at the subject site. We are pleased to present this report summarizing the results of the infiltration testing and our design recommendations.

Scope of Services

The scope of services performed for this project was in general accordance with our Proposal No. 15P322-2, dated September 16, 2015. The scope of services included surface reconnaissance, subsurface exploration, field testing, and engineering analysis to determine the infiltration rates of the onsite soils. The infiltration testing was performed in general accordance with the Technical Guidance Document for Water Quality Management Plans prepared for the County of San Bernardino Areawide Stormwater Program dated June 7, 2013. The San Bernardino County standards defer to guidelines published by Riverside County Department of Environmental Health (RCDEH).

Site and Project Description

The subject site is located on the east side of Hemlock Avenue, approximately 750 feet north of the intersection of Hemlock Avenue and Jurupa Avenue, at the street address of 11115 Hemlock Avenue in Fontana, California. The site is bounded to the north by an existing commercial/industrial development, to the east by Beech Avenue, to the south by an existing commercial/industrial building, and to the west by Hemlock Avenue. The general location of the site is illustrated on the Site Location Map, included as Plate 1 of this report.

The site consists of a rectangular shaped parcel, 37.21± acres in size. The site is currently utilized as a mobile trailer storage yard, occupied by Modular Space Corporation. Two buildings are present in the west-central area of the site. These buildings are single-story structures,

which are assumed to be supported on shallow foundations with concrete slab-on-grade floors. Ground surface cover throughout the majority of the site consists of open graded gravel with areas of asphaltic concrete pavements surrounding the buildings and near the northwest corner of the site. The easternmost of the two buildings is immediately surrounded by Portland cement concrete. Landscape planters are present along the northern side of the westernmost building, and along the east and west property lines.

Detailed topographic information was not available at the time of this report. Based on visual observations, site grades appear to dip downwards toward the southwest at an estimated gradient of approximately 1 to 2± percent.

Proposed Development

A preliminary site plan, prepared by RGA, was provided to our office. Based on this plan, the site will be developed with one (1) commercial/industrial building. The proposed building will be located in the central portion of the site and will possess a footprint area of 775,200± ft^2. The building will be constructed in a cross-deck configuration with dock high doors on the east and west sides. We expect that the building will be surrounded by asphaltic concrete pavements in the parking and drive areas and Portland cement concrete pavements in the truck court and loading dock areas. It is assumed that several landscape planters and concrete flatwork will be included throughout the site.

We understand the site will utilize an on-site storm water disposal system to dispose of storm water. Based on the infiltration test location plan provided to our office by the project civil engineer, the storm water disposal system will consist of two (2) below grade chamber systems and two (2) infiltration basins. One below grade chamber system will be located in the southeast area of the subject site and the other chamber system will be located in the southwest area of the site. One infiltration basin will be located in the southeast corner of the site and the other basin will be located in the southwest corner. The bottom of the proposed below grade chamber systems will be 8 to 12± feet below the existing site grades and the bottom of the infiltration basins will be 6 to 10± feet below the existing grades.

Previous Studies

Southern California Geotechnical, Inc. (SCG) previously performed a geotechnical investigation at the subject site, which is referenced above. As a part of this study, a total of ten (10) borings were advanced to depths of 5 to 30± feet below the existing site grades. Boring No. B-1 was drilled through existing asphaltic concrete pavements. The pavement section at Boring No. B-1 consisted of 6½± inches of asphaltic concrete with no discernable underlying layer of aggregate base. The remaining borings were drilled in areas paved with crushed miscellaneous base (CMB). At Boring Nos. B-2 through B-10, the ground surface cover consisted of a 3 to 4-inch thick CMB layer. Artificial fill soils were encountered beneath the pavements at Boring No. B-1, and beneath the CMB layer at Boring Nos. B-2 and B-8. The artificial fill soils extend to depths of 2½± feet below the existing site grades and generally consisted of medium dense to dense fine sands with varying amounts of fine to coarse gravel, medium to coarse sands, and silt. Native alluvium was encountered beneath pavements and/or the artificial fill soils at all of the boring locations, extending to at least the maximum depth explored of 30± feet below the existing site grades. The alluvium generally consisted of medium dense to very dense fine sands, silty fine

sands, fine to coarse sands and fine sandy silts with varying amounts of silt, fine to coarse gravel and cobbles. Boring No. B-7 also encountered a layer of very dense gravelly fine to coarse sands between depths of 17 and 25± feet. Groundwater was not encountered at any of the borings.

Subsurface Exploration

Scope of Exploration

The subsurface exploration conducted for this project consisted of a total of six (6) infiltration test borings. The borings were advanced to depths of 8 to 12± feet below existing site grades. The borings were advanced using a truck-mounted drilling rig, equipped with 8-inch diameter hollow stem augers and were logged during drilling by a member of our staff. The approximate locations of the infiltration test borings (identified as I-1 through I-6) are indicated on the Infiltration Test Location Plan, enclosed as Plate 2 of this report.

Upon the completion of each infiltration boring, the bottom of the test holes were covered with 2± inches of clean ¾-inch gravel. A sufficient length of 3-inch-diameter perforated PVC casing was then placed into each test hole so that the PVC casing extended from the bottom of the test hole to the ground surface. Clean ¾-inch gravel was then installed in the annulus surrounding the PVC casing.

Geotechnical Conditions

Ground surface cover at all six (6) of the infiltration boring locations consisted of 1 to 3± inches of open graded gravel. Native alluvium was encountered beneath the open graded gravel layer at all of the infiltration boring locations, extending to at least the maximum explored depth of 12± feet below existing grades. The alluvial soils generally consist of loose to dense fine to medium sands, silty fine to medium sands, and gravelly fine to coarse sands with varying amounts of coarse sand, fine to coarse gravel, silt, and cobble content. The Boring Logs, which illustrate the conditions encountered at the boring locations, are included with this report.

Infiltration Testing

We understand that the results of the testing will be used to prepare a preliminary design for the proposed storm water infiltration system that will be used to dispose of storm water at the subject site. As previously stated, the infiltration testing was performed in general accordance with Technical Guidance Document for Water Quality Management Plans, prepared for the County of San Bernardino Areawide Stormwater Program, dated June 7, 2013.

Pre-soaking

In accordance with the infiltration county standards for sandy soils, the infiltration test borings were pre-soaked 2 hours prior to infiltration testing or until all of the water had percolated through each test hole. The pre-soaking process consisted of filling each test boring by inverting a full 5 gallon bottle of clear water supported over the hole so that the water flow into the hole holds constant at a level at least 5 times the hole's radius above the gravel at the bottom of the hole. Pre-soaking was completed after all of the water had percolated through the test hole.

Infiltration Testing

Following the pre-soaking process of the infiltration test borings, SCG performed the infiltration testing. Each test hole was filled with water to a depth of at least 5 times the hole's radius above the gravel at the bottom of the test hole prior to each test interval. In accordance with the San Bernardino County guidelines, since "sandy soils" were encountered at the bottom of all the infiltration test borings (where 6 inches of water infiltrated into the surrounding soils for two consecutive 25-minute readings), readings were taken at an interval of 10 minutes for a total of 1 hour at the test location. After each reading, water was added to the boring so that the depth of the water was at least 5 times the radius of the hole. The water level readings are presented on the spreadsheets enclosed with this report. The infiltration rates for each of the timed intervals are also tabulated on the spreadsheets.

The infiltration rates for the tests are tabulated in inches per hour. In accordance with typically accepted practice, it is recommended that the most conservative reading from the latter part of the infiltration test be used for design. The rate is summarized below:

Infiltration Test No.	Soil Description	Infiltration Rate (inches/hour)
I-1	Fine to medium Sand, little Silt, trace coarse Sand, little fine Gravel	2.1
I-2	Silty fine to medium Sand, trace coarse Sand, trace fine Gravel	3.6
I-3	Silty fine Sand, trace to little medium to coarse Sand, trace fine Gravel	3.6
I-4	Gravelly fine to coarse Sand, trace Silt	6.4
I-5	Silty fine to medium Sand, little coarse Sand, trace fine Gravel	1.2
I-6	Fine to medium Sand, little coarse Sand, little Silt, little fine Gravel	2.8

Laboratory Testing

Grain Size Analysis

The grain size distribution of selected soils taken from the base of each infiltration test boring has been determined using a range of wire mesh screens. The analysis was performed in general accordance with ASTM D-422 and/or ASTM D-1140. The weight of the portion of the sample retained on each screen is recorded and the percentage finer or coarser of the total weight is calculated. The results of the analysis are presented at the end of this report.

Design Recommendations

A total of six (6) infiltration tests were performed at the subject site. As noted above, the infiltration rates range from 1.2 to 6.4 inches per hour. The primary factors affecting the infiltration rates are the silt content and the varying relative densities of the encountered soils, which vary at different depths and locations at the subject site.

Based on the infiltration test results, we recommend an average infiltration rate of 2 inches per hour be used in the design of the proposed below grade chamber system and proposed infiltration basins.

We recommend that a representative from the geotechnical engineer be on-site during the construction of the proposed infiltration chambers and basins to identify the soil classification at the base of each infiltration system. It should be confirmed that the soils at the base of the proposed infiltration system correspond with those presented in this report to ensure that the performance of each system will be consistent with the rates reported herein.

The design of the proposed infiltration system should be performed by the project civil engineer, in accordance with the city of Fontana and/or San Bernardino County guidelines. **It is recommended that the project civil engineer apply an appropriate factor of safety.** It is recommended that the system be constructed so as to facilitate removal of silt and clay, or other deleterious materials from any water that may enter the systems. The presence of such materials would decrease the effective infiltration rates. **The infiltration rates recommended above are based on the assumption that only clean water will be introduced to the subsurface profile. Any fines, debris, or organic materials could significantly impact the infiltration rate.** It should be noted that the recommended infiltration rates are based on infiltration testing at six (6) discrete locations and that the overall infiltration rate of the infiltration system could vary considerably.

Infiltration versus Permeability

Infiltration rates are based on unsaturated flow. As water is introduced into soils by infiltration, the soils become saturated and the wetting front advances from the unsaturated zone to the saturated zone. Once the soils become saturated, infiltration rates become zero, and water can only move through soils by hydraulic conductivity at a rate determined by pressure head and soil permeability. The infiltration rates presented herein was determined in accordance with the San Bernardino County guidelines, and is considered valid for the time and place of the actual test. Changes in soil moisture content will affect the infiltration rate. Infiltration rates should be expected to decrease until the soils become saturated. Soil permeability values will then govern groundwater movement. Permeability values may be on the order of 10 to 20 times less than infiltration rates. The system designer should incorporate adequate factors of safety and allow for overflow design into appropriate traditional storm drain systems, which would transport storm water off-site.

Location of Infiltration System

The use of on-site storm water infiltration systems carries a risk of creating adverse geotechnical conditions. Increasing the moisture content of the soil can cause the soil to lose internal shear strength and increase its compressibility, resulting in a change in the designed engineering properties. Overlying structures and pavements in the infiltration area could potentially be damaged due to saturation of subgrade soils. If possible, the proposed infiltration system for this site should be located at least 25 feet away from any structures, including retaining walls. Even with this provision of locating the infiltration system at least 25 feet from the buildings, it is possible that infiltrating water into the subsurface soils could have an adverse effect on the proposed or existing structures. It should also be noted that utility trenches which happen to

collect storm water can also serve as conduits to transmit storm water toward the structure, depending on the slope of the utility trench. Therefore, consideration should also be given to the proposed locations of underground utilities which may pass near the proposed infiltration system.

General Comments

This report has been prepared as an instrument of service for use by the client in order to aid in the evaluation of this property and to assist the architects and engineers in the design and preparation of the project plans and specifications. This report may be provided to the contractor(s) and other design consultants to disclose information relative to the project. However, this report is not intended to be utilized as a specification in and of itself, without appropriate interpretation by the project architect, structural engineer, and/or civil engineer. The design of the proposed storm water infiltration systems are the responsibility of the civil engineer. The role of the geotechnical engineer is limited to determination of infiltration rate only. By using the design infiltration rate contained herein, the civil engineer agrees to indemnify, defend, and hold harmless the geotechnical engineer for all aspects of the design and performance of the proposed storm water infiltration system. The reproduction and distribution of this report must be authorized by the client and Southern California Geotechnical, Inc. Furthermore, any reliance on this report by an unauthorized third party is at such party's sole risk, and we accept no responsibility for damage or loss which may occur.

The analysis of this site was based on a subsurface profile interpolated from limited discrete soil samples. While the materials encountered in the project area are considered to be representative of the total area, some variations should be expected between boring locations and testing depths. If the conditions encountered during construction vary significantly from those detailed herein, we should be contacted immediately to determine if the conditions alter the recommendations contained herein.

This report has been based on assumed or provided characteristics of the proposed development. It is recommended that the owner, client, architect, structural engineer, and civil engineer carefully review these assumptions to ensure that they are consistent with the characteristics of the proposed development. If discrepancies exist, they should be brought to our attention to verify that they do not affect the conclusions and recommendations contained herein. We also recommend that the project plans and specifications be submitted to our office for review to verify that our recommendations have been correctly interpreted.

The analysis, conclusions, and recommendations contained within this report have been promulgated in accordance with generally accepted professional geotechnical engineering practice. No other warranty is implied or expressed.

Closure

We sincerely appreciate the opportunity to be of service on this project. We look forward to providing additional consulting services during the course of the project. If we may be of further assistance in any manner, please contact our office.

Respectfully Submitted,

SOUTHERN CALIFORNIA GEOTECHNICAL, INC.

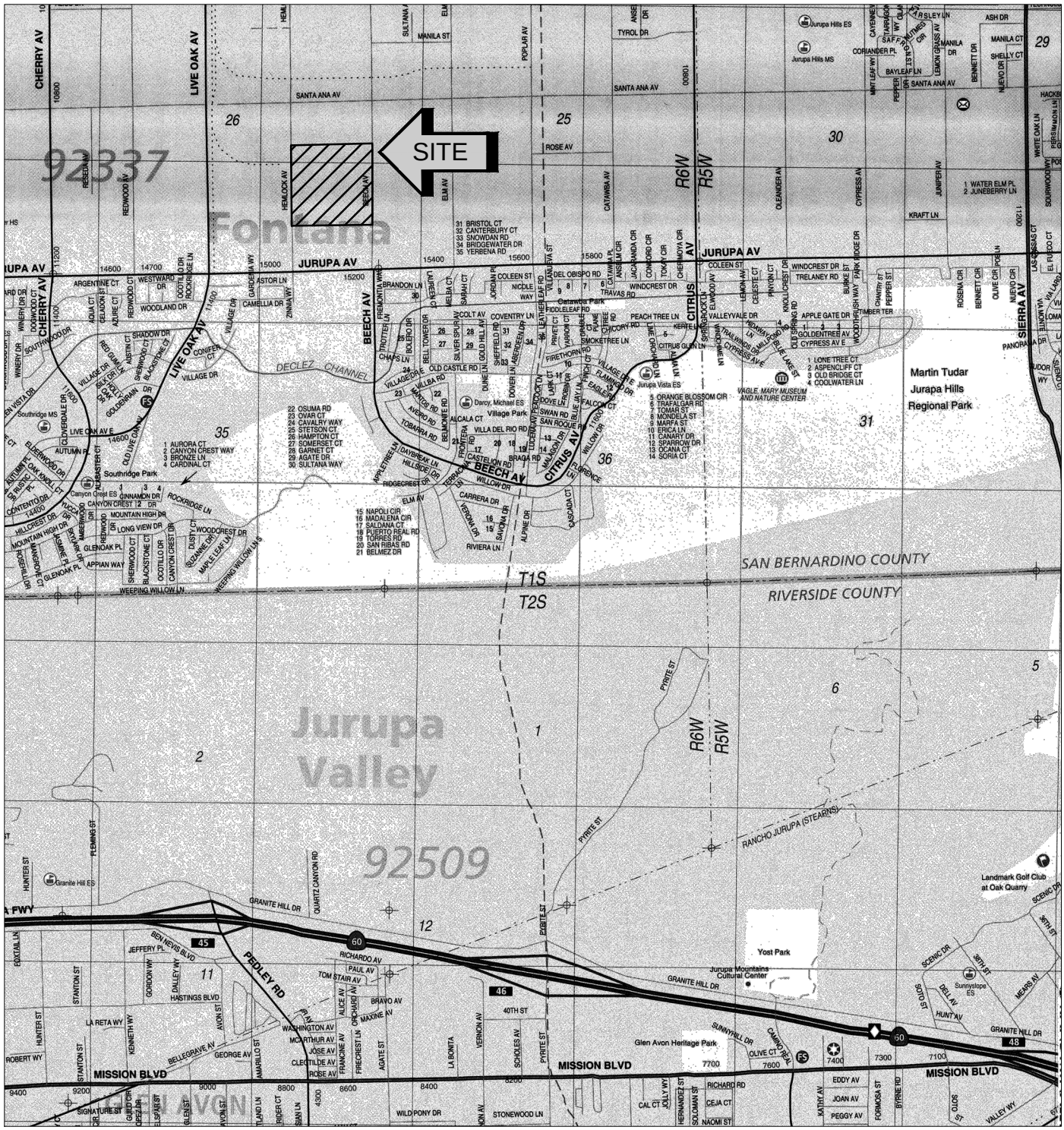
Scott McCann
Staff Scientist

John A. Seminara, GE 2294
Principal Engineer



Distribution: (1) Addressee

Enclosures: Plate 1 - Site Location Map
Plate 2 - Infiltration Test Location Plan
Boring Log Legend and Logs (8 pages)
Infiltration Test Results Spreadsheet (6 pages)
Grain Size Distribution Graph (6 pages)



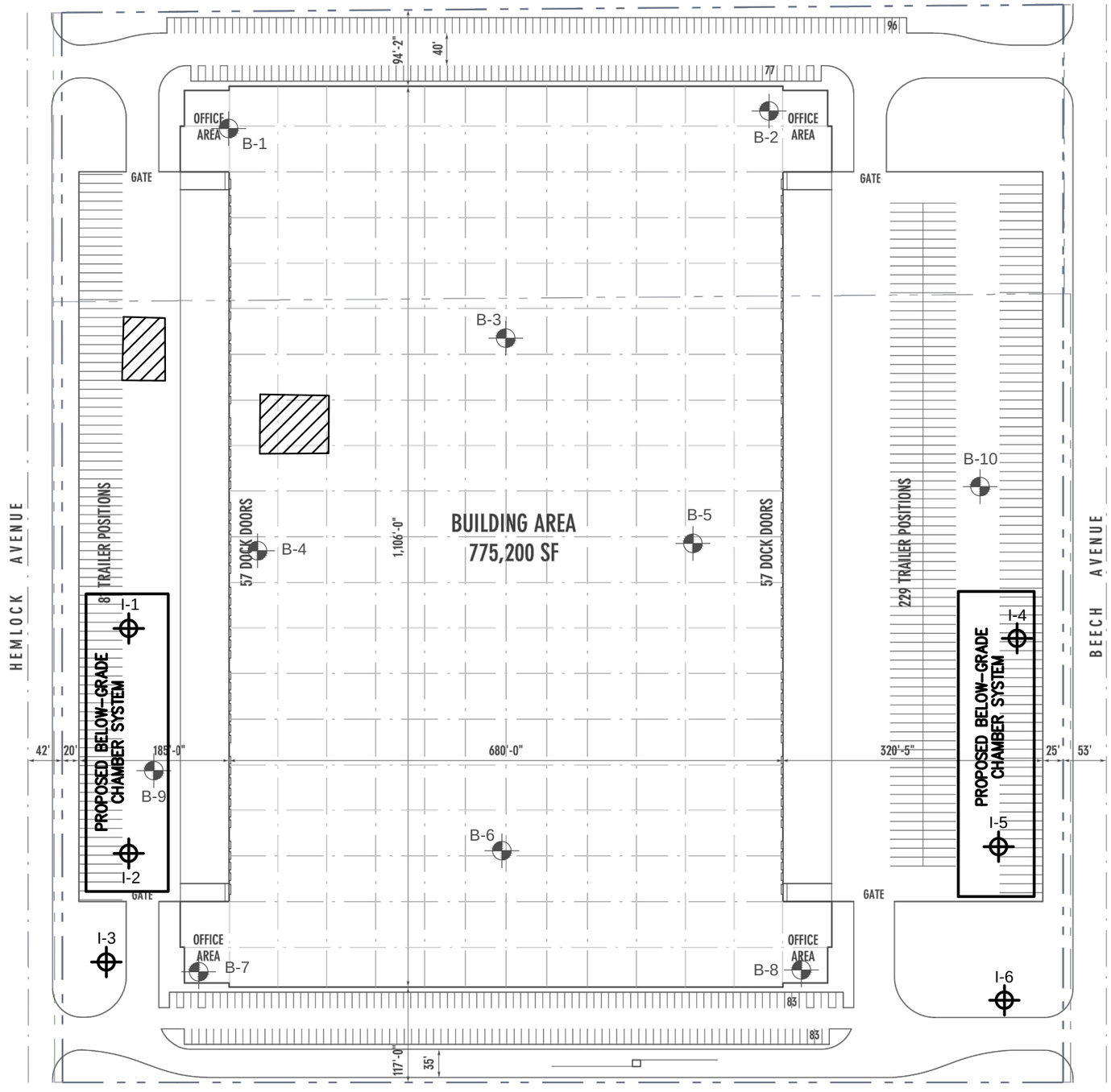
SOURCE: SAN BERNARDINO COUNTY
THOMAS GUIDE, 2013

SITE LOCATION MAP

PROPOSED COMMERCIAL/INDUSTRIAL BUILDING

FONTANA, CALIFORNIA

SCALE: 1" = 2400'	
DRAWN: JLH CHKD: JAS	
SCG PROJECT 15G177-2	
PLATE 1	



NORTH

SoCalGeo

GEOTECHNICAL LEGEND

- APPROXIMATE INFILTRATION TEST LOCATION
- APPROXIMATE BORING LOCATION FROM PREVIOUS STUDY (SCG PROJECT NO. 15G177-1)
- EXISTING BUILDING TO BE DEMOLISHED

NOTE: BASE MAP PREPARED BY RGA

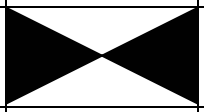
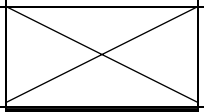
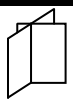
INFILTRATION TEST LOCATION PLAN

PROPOSED COMMERCIAL/INDUSTRIAL BUILDING

FONTANA, CALIFORNIA

SCALE: 1" = 150'	SOUTHERN CALIFORNIA GEOTECHNICAL
DRAWN: SAM CHKD: JAS	
SCG PROJECT 15G177-2	
PLATE 2	

BORING LOG LEGEND

SAMPLE TYPE	GRAPHICAL SYMBOL	SAMPLE DESCRIPTION
AUGER		SAMPLE COLLECTED FROM AUGER CUTTINGS, NO FIELD MEASUREMENT OF SOIL STRENGTH. (DISTURBED)
CORE		ROCK CORE SAMPLE: TYPICALLY TAKEN WITH A DIAMOND-TIPPED CORE BARREL. TYPICALLY USED ONLY IN HIGHLY CONSOLIDATED BEDROCK.
GRAB		SOIL SAMPLE TAKEN WITH NO SPECIALIZED EQUIPMENT, SUCH AS FROM A STOCKPILE OR THE GROUND SURFACE. (DISTURBED)
CS		CALIFORNIA SAMPLER: 2-1/2 INCH I.D. SPLIT BARREL SAMPLER, LINED WITH 1-INCH HIGH BRASS RINGS. DRIVEN WITH SPT HAMMER. (RELATIVELY UNDISTURBED)
NSR		NO RECOVERY: THE SAMPLING ATTEMPT DID NOT RESULT IN RECOVERY OF ANY SIGNIFICANT SOIL OR ROCK MATERIAL.
SPT		STANDARD PENETRATION TEST: SAMPLER IS A 1.4 INCH INSIDE DIAMETER SPLIT BARREL, DRIVEN 18 INCHES WITH THE SPT HAMMER. (DISTURBED)
SH		SHELBY TUBE: TAKEN WITH A THIN WALL SAMPLE TUBE, PUSHED INTO THE SOIL AND THEN EXTRACTED. (UNDISTURBED)
VANE		VANE SHEAR TEST: SOIL STRENGTH OBTAINED USING A 4 BLADED SHEAR DEVICE. TYPICALLY USED IN SOFT CLAYS-NO SAMPLE RECOVERED.

COLUMN DESCRIPTIONS

DEPTH: Distance in feet below the ground surface.

SAMPLE: Sample Type as depicted above.

BLOW COUNT: Number of blows required to advance the sampler 12 inches using a 140 lb hammer with a 30-inch drop. 50/3" indicates penetration refusal (>50 blows) at 3 inches. WH indicates that the weight of the hammer was sufficient to push the sampler 6 inches or more.

POCKET PEN.: Approximate shear strength of a cohesive soil sample as measured by pocket penetrometer.

GRAPHIC LOG: Graphic Soil Symbol as depicted on the following page.

DRY DENSITY: Dry density of an undisturbed or relatively undisturbed sample in lbs/ft^3.

MOISTURE CONTENT: Moisture content of a soil sample, expressed as a percentage of the dry weight.

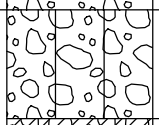
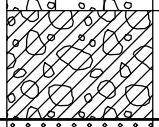
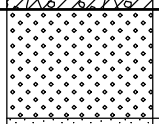
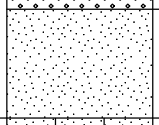
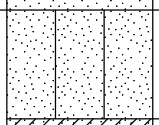
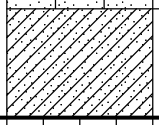
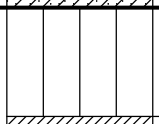
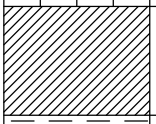
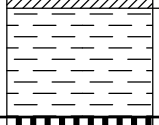
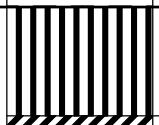
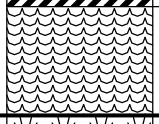
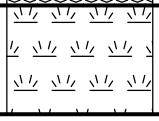
LIQUID LIMIT: The moisture content above which a soil behaves as a liquid.

PLASTIC LIMIT: The moisture content above which a soil behaves as a plastic.

PASSING #200 SIEVE: The percentage of the sample finer than the #200 standard sieve.

UNCONFINED SHEAR: The shear strength of a cohesive soil sample, as measured in the unconfined state.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-1

JOB NO.: 15G177-2
PROJECT: C/I Development
LOCATION: Fontana, California

DRILLING DATE: 5/20/16
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jason Hiskey

WATER DEPTH:
CAVE DEPTH:
READING TAKEN:

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					3± inches Open-graded Gravel							
		21			ALLUVIUM: Light Gray fine Sand, trace Silt, trace medium Sand, trace fine Gravel, medium dense-dry to damp		2					
		10			Light Gray Brown fine Sand, little Silt, trace medium to coarse Sand, loose to medium dense-damp to moist		7					
5												
		31			Light Gray Brown Silty fine Sand, trace coarse Sand, dense-damp		6					
					Light Gray fine to medium Sand, trace to little Silt, little coarse Sand, dense-dry to damp		2					
		34					3					
10												
		43			Light Gray fine to medium Sand, trace coarse Sand, little fine Gravel, little Silt, dense-dry to damp		2					
					Boring Terminated at 12'							

TBL 15G177-2.GPJ SOCALGEO.GDT 6/8/16

TEST BORING LOG **PLATE I-1**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-2

JOB NO.: 15G177-2
PROJECT: C/I Development
LOCATION: Fontana, California

DRILLING DATE: 5/20/16
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jason Hiskey

WATER DEPTH:
CAVE DEPTH:
READING TAKEN:

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					2½± inches Open-graded Gravel							
		33			ALLUVIUM: Light Gray fine to medium Sand, little Silt, little coarse Sand, occasional Cobbles, dense-dry to damp		2					
		44			Light Gray Silty fine to medium Sand, little coarse Sand, some fine to coarse Gravel, occasional Cobbles, dense-dry to damp		2					
5												
		18			Light Gray Brown fine Sand, trace coarse Sand, little Silt, medium dense-damp		5					
		27			Light Brown Silty fine to medium Sand, trace coarse Sand, trace fine Gravel, medium dense-damp		3					
10												
					Boring Terminated at 10'							

TBL 15G177-2.GPJ SOCALGEO.GDT 6/8/16

TEST BORING LOG **PLATE I-2**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-3

JOB NO.: 15G177-2
PROJECT: C/I Development
LOCATION: Fontana, California

DRILLING DATE: 5/20/16
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jason Hiskey

WATER DEPTH:
CAVE DEPTH:
READING TAKEN:

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					3± inches Open-graded Gravel							
		19			Gray to Gray Brown fine to medium Sand, trace Silt, little coarse Sand, medium dense-dry to damp		2					
		12			@ 3½ feet, trace fine Gravel		2					
5												
		16			ALLUVIUM: Light Brown Silty fine Sand, trace to little medium to coarse Sand, trace fine Gravel, medium dense-damp		5					
					Boring Terminated at 8'							

TBL 15G177-2.GPJ SOCALGEO.GDT 6/8/16

TEST BORING LOG **PLATE I-3**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-4

JOB NO.: 15G177-2 | DRILLING DATE: 5/20/16 | WATER DEPTH:
PROJECT: C/I Development | DRILLING METHOD: Hollow Stem Auger | CAVE DEPTH:
LOCATION: Fontana, California | LOGGED BY: Jason Hiskey | READING TAKEN:

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					1± inch Open-graded Gravel							
		24			ALLUVIUM: Light Gray Brown fine to medium Sand, little Silt, some coarse Sand, little fine to coarse Gravel, medium dense-dry to damp		2					
		23			Light Brown fine to coarse Sand, trace Silt, some fine to coarse Gravel, medium dense-dry to damp		2					
5												
		22			Light Gray Brown fine to medium Sand, trace Silt, little coarse Sand, little fine to corase Gravel, medium dense-dry to damp		2					
		13			Gray Brown Silty fine Sand, trace medium Sand, medium dense-moist		10					
10												
		31			Gray Brown Silty fine to medium Sand, little coarse Sand, trace fine Gravel, dense-damp to moist		7					
					Light Gray Gravelly fine to coarse Sand, trace Silt, occasional Cobbles, dense-dry to damp		2					
					Boring Terminated at 12'							

TBL 15G177-2.GPJ SOCALGEO.GDT 6/8/16

TEST BORING LOG **PLATE I-4**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-5

JOB NO.: 15G177-2
PROJECT: C/I Development
LOCATION: Fontana, California

DRILLING DATE: 5/20/16
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jason Hiskey

WATER DEPTH:
CAVE DEPTH:
READING TAKEN:

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					2½± inches Open-graded Gravel							
		9			ALLUVIUM: Brown Silty fine Sand, little medium Sand, loose-damp to moist		6					
		13			Brown Silty fine to medium Sand, little coarse Sand, trace fine Gravel, medium dense-damp to moist		7					
5		15			Brown fine Sand, trace coarse Sand, little medium Sand, little Silt, medium dense-damp to moist		7					
		49			Brown Silty fine to medium Sand, little coarse Sand, trace fine Gravel, occasional Cobbles, dense-damp to moist		6					
10					Boring Terminated at 10'							

TBL 15G177-2.GPJ SOCALGEO.GDT 6/8/16

TEST BORING LOG **PLATE I-5**

SOUTHERN CALIFORNIA GEOTECHNICAL
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BORING NO. I-6

JOB NO.: 15G177-2 | DRILLING DATE: 5/20/16 | WATER DEPTH:
PROJECT: C/I Development | DRILLING METHOD: Hollow Stem Auger | CAVE DEPTH:
LOCATION: Fontana, California | LOGGED BY: Jason Hiskey | READING TAKEN:

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					3± inches Open-graded Gravel							
		13			ALLUVIUM: Brown Silty fine Sand, trace fine Gravel, little medium to coarse Sand, medium dense-damp to moist		6					
		8			Gray Brown Silty fine Sand, trace medium Sand, loose-moist		9					
5												
		21			Light Gray fine to medium Sand, little coarse Sand, little Silt, little fine Gravel, medium dense-dry to damp		2					
					Boring Terminated at 8'							

TBL 15G177-2.GPJ SOCALGEO.GDT 6/8/16

TEST BORING LOG **PLATE I-6**

INFILTRATION CALCULATIONS

Project Name	Proposed C/I Building
Project Location	Fontana, CA
Project Number	15G177-2
Engineer	SM

Test Hole Radius	4	(in)
Test Depth	9.4	(ft)

Infiltration Test Hole: I-1

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)	
P1	Initial	12:40 PM	16.0	7.42	0.53	1.72	2.11	Pre-Sat
	Final	12:56 PM		7.95				
P2	Initial	12:57 PM	16.0	7.26	0.56	1.86	2.07	
	Final	1:13 PM		7.82				
1	Initial	1:25 PM	10.0	7.30	0.37	1.92	2.13	Infiltration Testing
	Final	1:35 PM		7.67				
2	Initial	1:36 PM	10.0	7.28	0.36	1.94	2.05	
	Final	1:46 PM		7.64				
3	Initial	1:47 PM	10.0	7.35	0.36	1.87	2.12	
	Final	1:57 PM		7.71				
4	Initial	1:58 PM	10.0	7.39	0.36	1.83	2.16	
	Final	2:08 PM		7.75				
5	Initial	2:09 PM	10.0	7.29	0.37	1.93	2.12	
	Final	2:19 PM		7.66				
6	Initial	2:20 PM	10.0	7.33	0.36	1.89	2.10	
	Final	2:30 PM		7.69				

Per County Standards, Infiltration Rate calculated as follows:

$$Q = \frac{\Delta H(60r)}{\Delta t(r + 2H_{avg})}$$

Where: Q = Infiltration Rate (in inches per hour)
ΔH = Change in Height (Water Level) over the time interval
r = Test Hole (Borehole) Radius
Δt = Time Interval H above GS= 2
H_{avg} = Average Head Height over the time interval

INFILTRATION CALCULATIONS

Project Name	Proposed C/I Building
Project Location	Fontana, CA
Project Number	15G177-2
Engineer	SM

Test Hole Radius	4	(in)
Test Depth	7.8	(ft)

Infiltration Test Hole: I-2

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)	
P1	Initial	12:45 PM	14.0	5.52	1.16	1.73	5.24	Pre-Sat
	Final	12:59 PM		6.68				
P2	Initial	1:00 PM	14.0	5.69	0.92	1.68	4.27	
	Final	1:14 PM		6.61				
1	Initial	1:29 PM	10.0	5.48	0.54	2.08	2.88	Infiltration Testing
	Final	1:39 PM		6.02				
2	Initial	1:40 PM	10.0	5.69	0.60	1.84	3.59	
	Final	1:50 PM		6.29				
3	Initial	1:51 PM	10.0	5.66	0.57	1.89	3.31	
	Final	2:01 PM		6.23				
4	Initial	2:02 PM	10.0	5.71	0.56	1.84	3.35	
	Final	2:12 PM		6.27				
5	Initial	2:13 PM	10.0	5.75	0.56	1.80	3.42	
	Final	2:23 PM		6.31				
6	Initial	2:24 PM	10.0	5.83	0.56	1.72	3.56	
	Final	2:34 PM		6.39				

Per County Standards, Infiltration Rate calculated as follows:

$$Q = \frac{\Delta H(60r)}{\Delta t(r + 2H_{avg})}$$

Where: Q = Infiltration Rate (in inches per hour)
ΔH = Change in Height (Water Level) over the time interval
r = Test Hole (Borehole) Radius
Δt = Time Interval H above GS= 0.67
H_{avg} = Average Head Height over the time interval

INFILTRATION CALCULATIONS

Project Name	Proposed C/I Building
Project Location	Fontana, CA
Project Number	15G177-2
Engineer	SM

Test Hole Radius	4	(in)
Test Depth	6.9	(ft)

Infiltration Test Hole	I-3

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)	
P1	Initial	12:50 PM	13.0	4.74	0.76	1.75	3.66	Pre-Sat
	Final	1:03 PM		5.50				
P2	Initial	1:04 PM	13.0	5.11	0.83	1.35	5.07	
	Final	1:17 PM		5.94				
1	Initial	1:32 PM	10.0	4.70	0.63	1.86	3.74	Infiltration Testing
	Final	1:42 PM		5.33				
2	Initial	1:43 PM	10.0	4.64	0.64	1.91	3.70	
	Final	1:53 PM		5.28				
3	Initial	1:54 PM	10.0	4.75	0.60	1.82	3.62	
	Final	2:04 PM		5.35				
4	Initial	2:05 PM	10.0	4.83	0.59	1.75	3.70	
	Final	2:15 PM		5.42				
5	Initial	2:16 PM	10.0	4.85	0.57	1.74	3.60	
	Final	2:26 PM		5.42				
6	Initial	2:27 PM	10.0	4.81	0.58	1.77	3.59	
	Final	2:37 PM		5.39				

Per County Standards, Infiltration Rate calculated as follows:

$$Q = \frac{\Delta H(60r)}{\Delta t(r + 2H_{avg})}$$

Where: Q = Infiltration Rate (in inches per hour)
ΔH = Change in Height (Water Level) over the time interval
r = Test Hole (Borehole) Radius
Δt = Time Interval H above GS= 0.83
H_{avg} = Average Head Height over the time interval

INFILTRATION CALCULATIONS

Project Name	Proposed C/I Building
Project Location	Fontana, CA
Project Number	15G177-2
Engineer	SM

Test Hole Radius	4	(in)
Test Depth	9.8	(ft)

Infiltration Test Hole	I-4

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)	
P1	Initial	8:15 AM	7.0	7.70	0.76	1.72	6.91	Pre-Sat
	Final	8:22 AM		8.46				
P2	Initial	8:23 AM	7.0	7.70	0.72	1.74	6.47	
	Final	8:30 AM		8.42				
1	Initial	8:31 AM	10.0	7.74	1.13	1.50	8.16	Infiltration Testing
	Final	8:41 AM		8.87				
2	Initial	8:42 AM	10.0	7.76	1.12	1.48	8.16	
	Final	8:52 AM		8.88				
3	Initial	8:53 AM	10.0	7.70	1.05	1.58	7.23	
	Final	9:03 AM		8.75				
4	Initial	9:04 AM	10.0	7.69	1.02	1.60	6.93	
	Final	9:14 AM		8.71				
5	Initial	9:15 AM	10.0	7.70	1.02	1.59	6.97	
	Final	9:25 AM		8.72				
6	Initial	9:26 AM	10.0	7.65	0.98	1.66	6.44	
	Final	9:36 AM		8.63				

Per County Standards, Infiltration Rate calculated as follows:

$$Q = \frac{\Delta H(60r)}{\Delta t(r + 2H_{avg})}$$

Where: Q = Infiltration Rate (in inches per hour)
ΔH = Change in Height (Water Level) over the time interval
r = Test Hole (Borehole) Radius
Δt = Time Interval H above GS= 0
H_{avg} = Average Head Height over the time interval

INFILTRATION CALCULATIONS

Project Name	Proposed C/I Building
Project Location	Fontana, CA
Project Number	15G177-2
Engineer	SM

Test Hole Radius	4	(in)
Test Depth	8.0	(ft)

Infiltration Test Hole	I-5

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)	
P1	Initial	10:40 AM	18.0	5.48	0.52	2.29	1.41	Pre-Sat
	Final	10:58 AM		6.00				
P2	Initial	10:59 AM	25.0	5.97	0.50	1.81	1.21	
	Final	11:24 AM		6.47				
1	Initial	11:25 AM	10.0	5.98	2.22	0.94	24.07	Infiltration Testing
	Final	11:35 AM		8.20				
2	Initial	11:36 AM	10.0	5.97	0.22	1.95	1.25	
	Final	11:46 AM		6.19				
3	Initial	11:47 AM	10.0	5.97	0.22	1.95	1.25	
	Final	11:57 AM		6.19				
4	Initial	11:58 AM	10.0	5.94	0.23	1.98	1.29	
	Final	12:08 PM		6.17				
5	Initial	12:09 PM	10.0	6.01	0.21	1.92	1.21	
	Final	12:19 PM		6.22				
6	Initial	12:20 PM	10.0	6.02	0.21	1.91	1.22	
	Final	12:30 PM		6.23				

Per County Standards, Infiltration Rate calculated as follows:

$$Q = \frac{\Delta H(60r)}{\Delta t(r + 2H_{avg})}$$

Where: Q = Infiltration Rate (in inches per hour)
ΔH = Change in Height (Water Level) over the time interval
r = Test Hole (Borehole) Radius
Δt = Time Interval H above GS= 0.67
H_{avg} = Average Head Height over the time interval

INFILTRATION CALCULATIONS

Project Name	Proposed C/I Building
Project Location	Fontana, CA
Project Number	15G177-2
Engineer	SM

Test Hole Radius	4	(in)
Test Depth	6.7	(ft)

Infiltration Test Hole	I-6

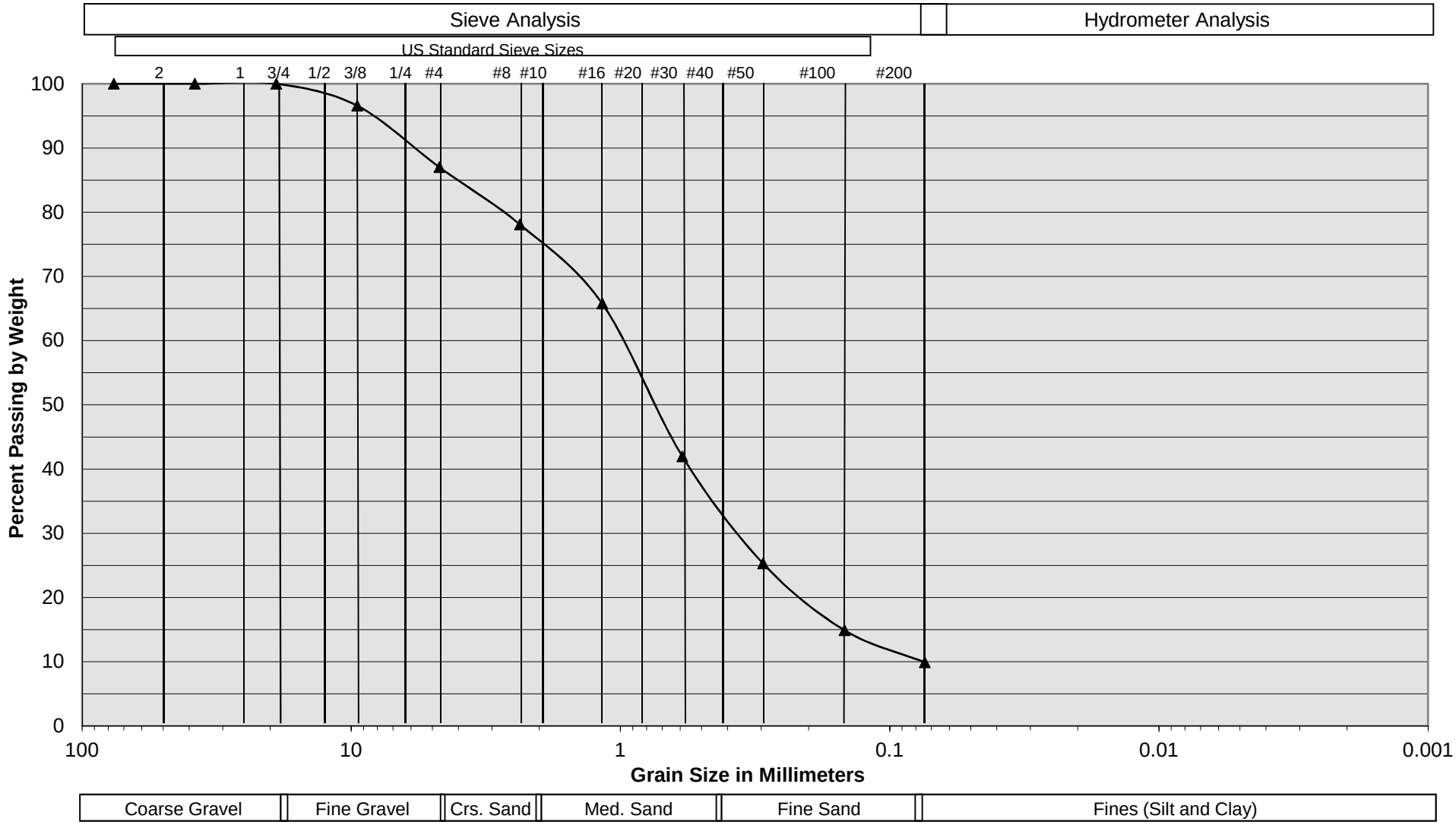
Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)	
P1	Initial	10:50 AM	14.0	4.20	0.73	2.11	2.75	Pre-Sat
	Final	11:04 AM		4.93				
P2	Initial	11:05 AM	14.0	4.50	0.69	1.83	2.97	
	Final	11:19 AM		5.19				
1	Initial	11:30 AM	10.0	4.67	0.49	1.76	3.06	Infiltration Testing
	Final	11:40 AM		5.16				
2	Initial	11:41 AM	10.0	4.49	0.51	1.93	2.93	
	Final	11:51 AM		5.00				
3	Initial	11:52 AM	10.0	4.63	0.47	1.81	2.86	
	Final	12:02 PM		5.10				
4	Initial	12:03 PM	10.0	4.61	0.46	1.83	2.76	
	Final	12:13 PM		5.07				
5	Initial	12:14 PM	10.0	4.66	0.45	1.79	2.77	
	Final	12:24 PM		5.11				
6	Initial	12:25 PM	10.0	4.67	0.45	1.78	2.78	
	Final	12:35 PM		5.12				

Per County Standards, Infiltration Rate calculated as follows:

$$Q = \frac{\Delta H(60r)}{\Delta t(r + 2H_{avg})}$$

Where: Q = Infiltration Rate (in inches per hour)
ΔH = Change in Height (Water Level) over the time interval
r = Test Hole (Borehole) Radius
Δt = Time Interval H above GS= 1.33
H_{avg} = Average Head Height over the time interval

Grain Size Distribution

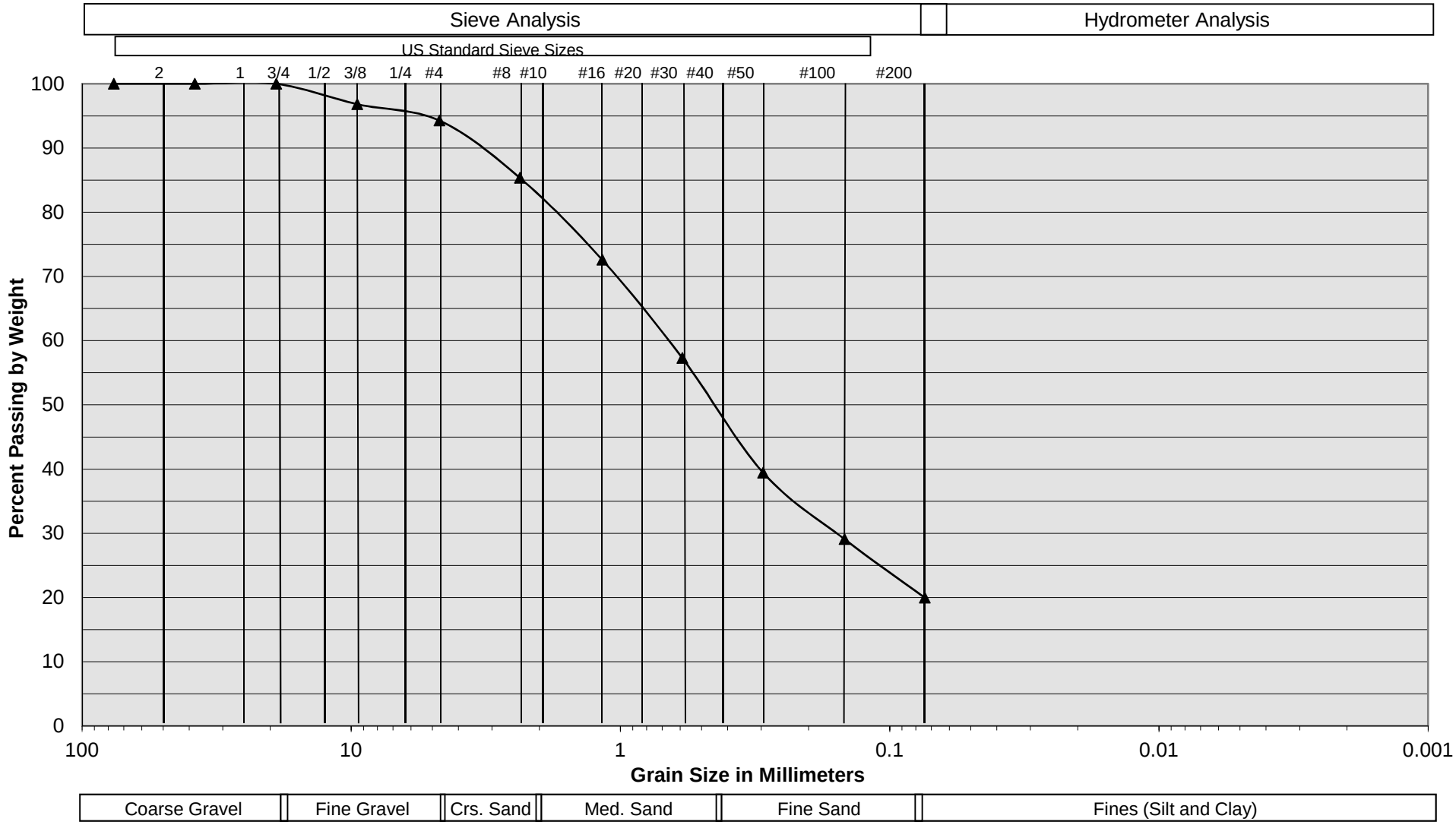


Sample Description	I-1 @ 9.5 feet
Soil Classification	Light Gray Brown fine to medium Sand, little Silt, trace coarse Sand, little fine Gravel

Proposed Commercial/Industrial Building
Fontana, California
Project No. 15G177-2
PLATE C-1

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Grain Size Distribution

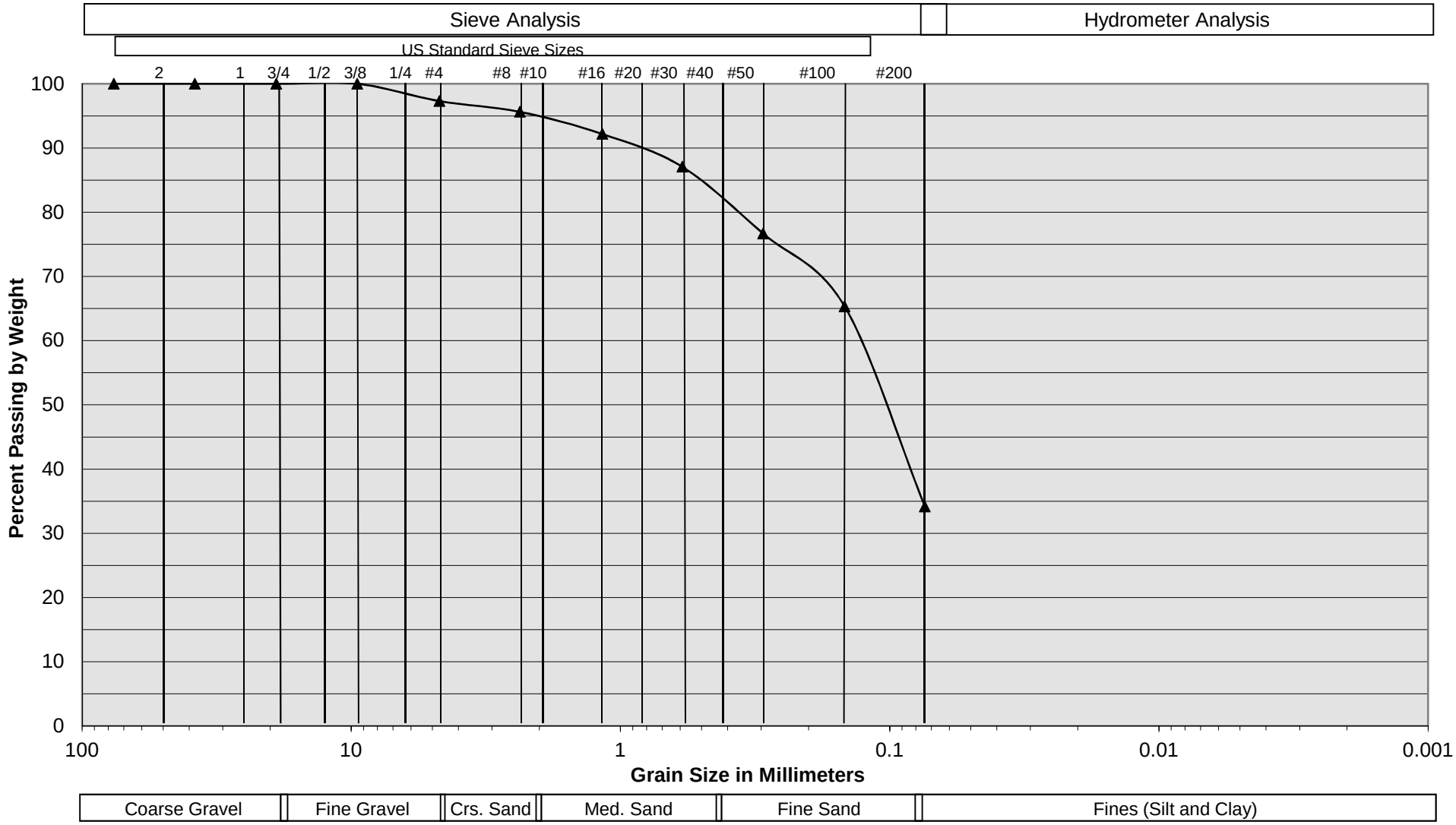


Sample Description	I-2 @ 7 feet
Soil Classification	Light Brown Silty fine to medium Sand, trace coarse Sand, trace fine Gravel

Proposed Commercial/Industrial Building
Fontana, California
Project No. 15G177-2
PLATE C-2

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Grain Size Distribution

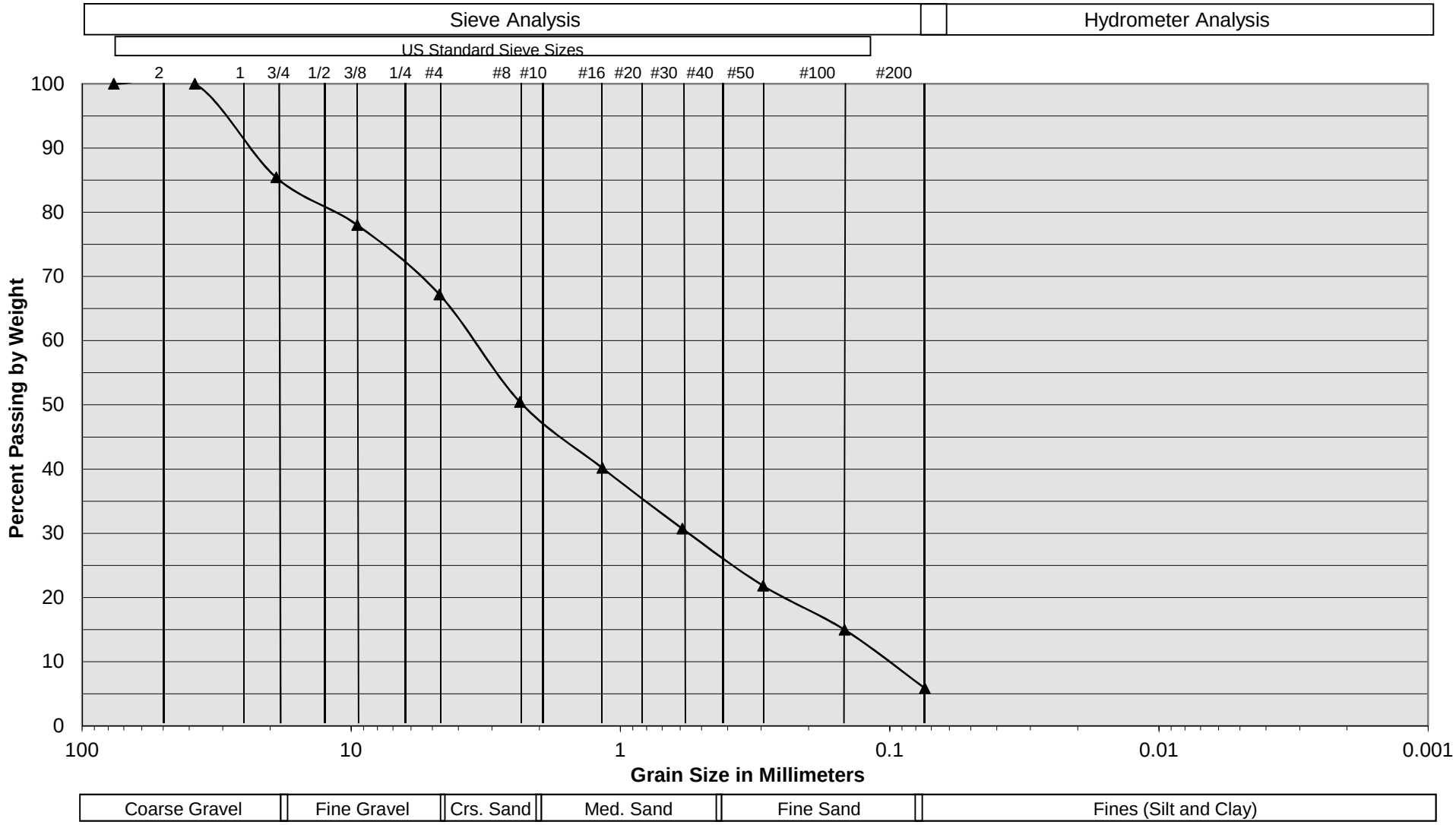


Sample Description	I-3 @ 9.5 feet
Soil Classification	Light Brown Silty fine Sand, trace to little medium to coarse Sand, trace fine Gravel

Proposed Commercial/Industrial Building
Fontana, California
Project No. 15G177-2
PLATE C-3

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Grain Size Distribution

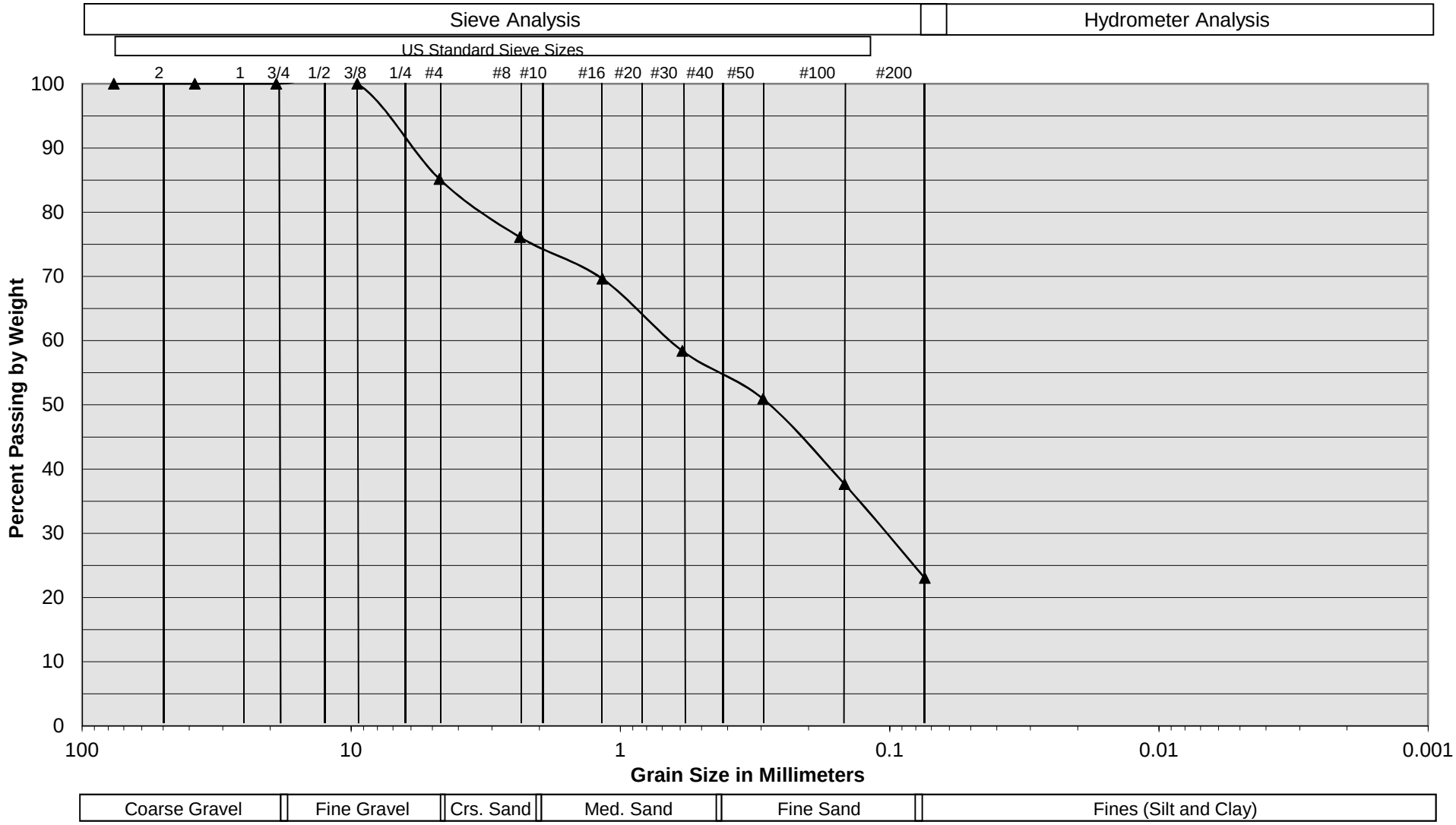


Sample Description	I-4 @ 10 feet
Soil Classification	Light Gray Gravelly fine to coarse Sand, trace Silt

Proposed Commercial/Industrial Building
Fontana, California
Project No. 15G177-2
PLATE C-4

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Grain Size Distribution

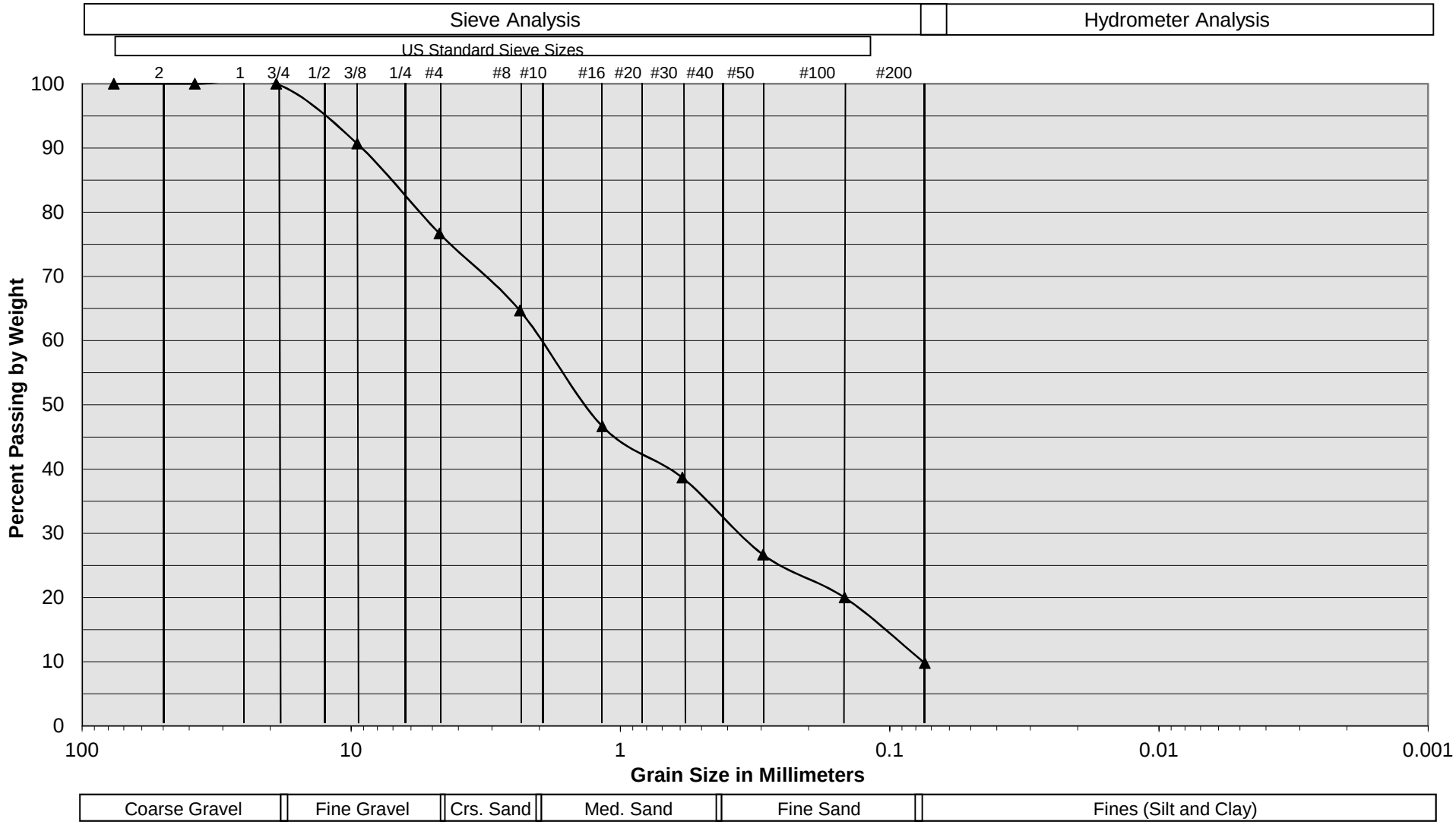


Sample Description	I-5 @ 8 feet
Soil Classification	Brown Silty fine to medium Sand, little coarse Sand, trace fine Gravel

Proposed Commercial/Industrial Building
Fontana, California
Project No. 15G177-2
PLATE C-5

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Grain Size Distribution



Sample Description	I-6 @ 6.5 feet
Soil Classification	Light Gray fine to medium Sand, little coarse Sand, little Silt, little fine Gravel

Proposed Commercial/Industrial Building
Fontana, California
Project No. 15G177-2
PLATE C-6

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