

PRELIMINARY HYDROLOGY REPORT

For

NPP – Lugonia at California

APN: 0292-033-11 & 13

PROJECT LOCATION

Southwest corner of Lugonia Avenue and California Street
in City of Redlands

DEVELOPER

CRP-NPP Redlands Industrial Owners, LLC
1330 Factory Place #105
Los Angeles, CA 90013
310-242-1612

PREPARED BY

Huitt-Zollars, Inc.
David White, P.E.
3990 Concours Suite 330
Ontario, CA 91764
Ph: 909.941.7799
Fax: 909.941.7789

PREPARATION DATE

November 10, 2023

HZ PROJECT NUMBER

R316302.02

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C52921, Exp 12/31/2024

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Introduction

This preliminary hydrology analysis has been prepared for CRP-NPP Redlands Industrial Owners, LLC. The project is a new development of an industrial warehouse facility located at the southwest corner of Lugonia Avenue and California Street in the City of Redlands, California. The proposed building is approximately 357,610 square feet in size on approximately 16 acres of developed land. The new development is expected to have 14.32 acres of impervious land, about 89 percent, and 1.72 acres of pervious land, about 11 percent, totaling to approximately 16 acres

Purpose

The purpose of this report is to present the drainage concept for the project and to determine the design flow rates for the project site. The hydrology maps and calculations reflect the tributary areas and 100-year storm event runoff flows.

Existing Condition

The project site is a rectangular-shape parcel and is currently developed as an amusement/water park. The project site generally slopes $\pm 1.0\%$ from the southeast corner to the northwest corner of the property. The maximum site elevation, located at the southeast property corner, is approximately 1163 \pm feet mean sea level (msl). The minimum site elevation located at the southwest property corner is 1151 \pm feet msl. There are existing low points throughout the site due to the pools but this is being disregarded for general site drainage purposes. Runoff from the existing site discharges into an existing 66-inch storm drain lateral located at the northwest corner in Lugonia Avenue.

Proposed Condition

For the proposed condition, the project area runoff will be directed to the on-site underground infiltration system located on the west side of the site. The overflow from the underground infiltration system will be discharged through storm drain Line C to the existing storm drain in Lugonia Avenue. See Appendix A for proposed on-site hydrology map.

Site runoff from the east half of the building roof, east drive aisle, and east parking lot will be collected by catch basin #1-3. The collected runoff will then be conveyed through the proposed on-site storm drain Line A and discharged to the underground infiltration system on the west side of the project site.

Site runoff from the west half of the building roof, west landscaping area, south landscaping and parking area, and the west truck docks will be collected catch basin #4-6. The collected runoff will then be conveyed through the proposed on-site storm drain Line B and discharged to the underground infiltration system on the west side of the project site.

Hydrologic Analysis

A hydrologic analysis was prepared using the methodology outlined in the San Bernardino County Flood Control District (SBCFCD) Hydrology Manual. A rational method analysis was completed for the proposed 100-year return event using Civild software.

The 100-year, 1-hour rainfall rate was taken from the NOAA Atlas 14 Map. The hydrologic soils type for the site is "B" and was taken from the soil map in the Hydrology Manual (see Appendix C for reference maps). A "commercial" land use was used with an AMC of III.

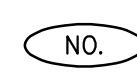
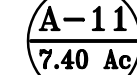
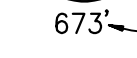

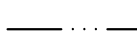

Results

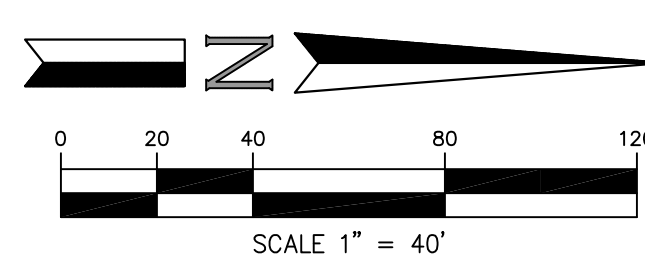
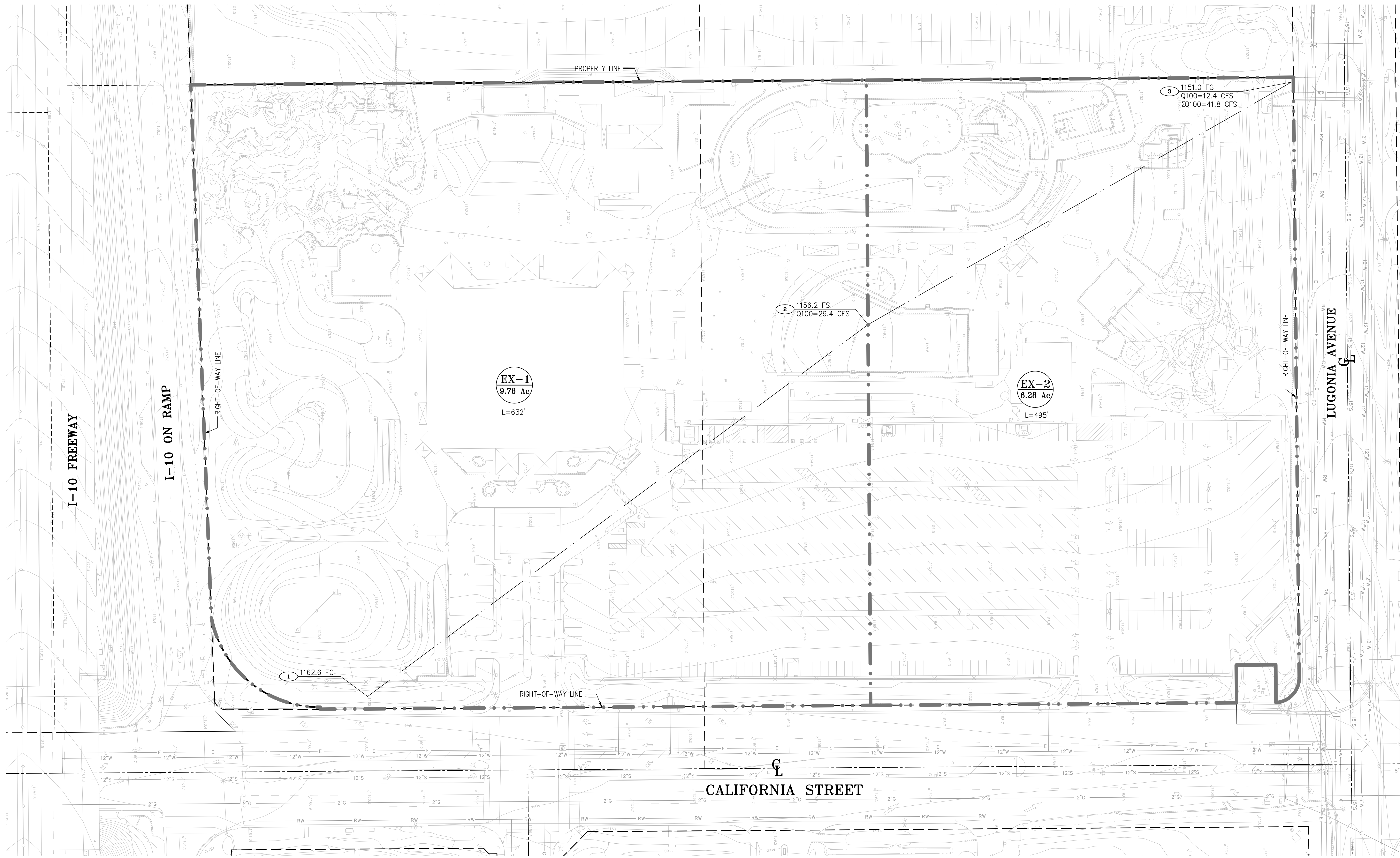
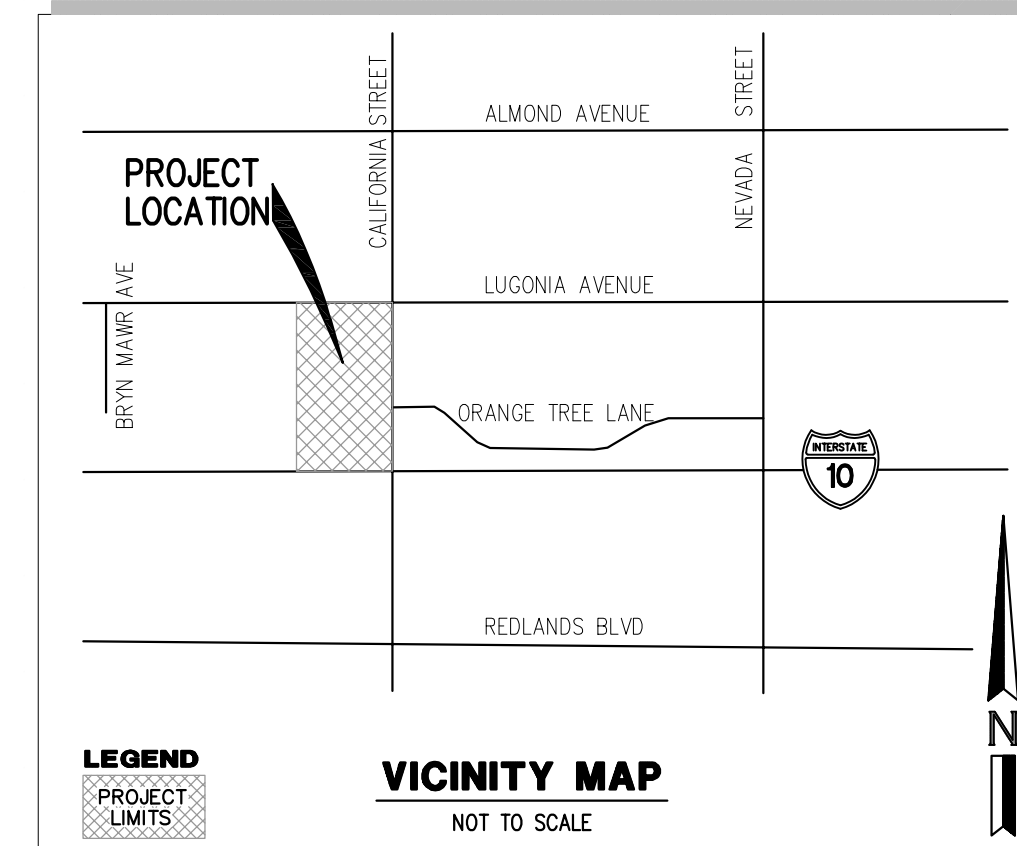
The existing area has an initial subarea of 16 acres and an initial subarea runoff of 41.8 (CFS)

The underground infiltration system provides 57,698 cf of storage for water quality purposes. From the hydrologic analysis (see Appendix B), the proposed Q_{100} generated from the project site is 44.0 cfs.

All proposed on-site drainage and storm drain facilities will be sized adequately for the 100-year storm event. Additional calculations will be provided in final drainage report including storm drain hydraulics and catch basin sizing.

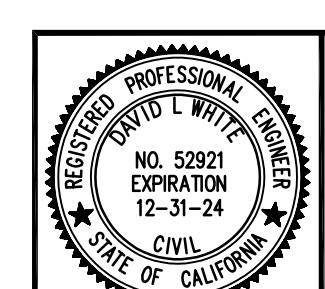
Appendix A
Preliminary Hydrology Map

- LEGEND**
-  NO. HYDROLOGY MODEL NODE NUMBER
 -  TRIBUTARY AREA IN ACRES
 -  LENGTH OF FLOW
 -  DRAINAGE BOUNDARY
 -  FLOW LINE
 -  FLOW DIRECTION



OWNER/DEVELOPER
 CRP-NPP REDLANDS
 INDUSTRIAL OWNERS, LLC
 1330 FACTORY PLACE #105
 LOS ANGELES, CA 90013
 PHONE (310)-242-1612
 CONTACT PERSON: BRIAN WONG

CIVIL ENGINEER
 HUITT-ZOLLARS, INC.
 3990 CONCOURS, SUITE 330
 ONTARIO, CALIFORNIA 91764
 PHONE: (909) 941-7799, X11420
 CONTACT PERSON: DAVID WHITE



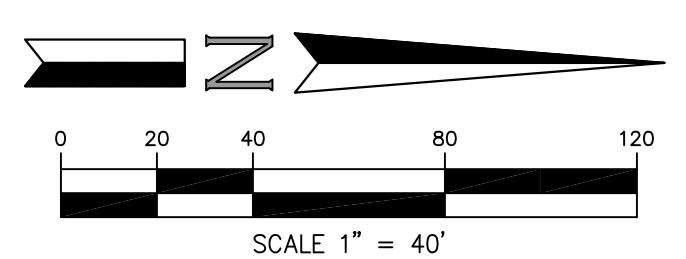
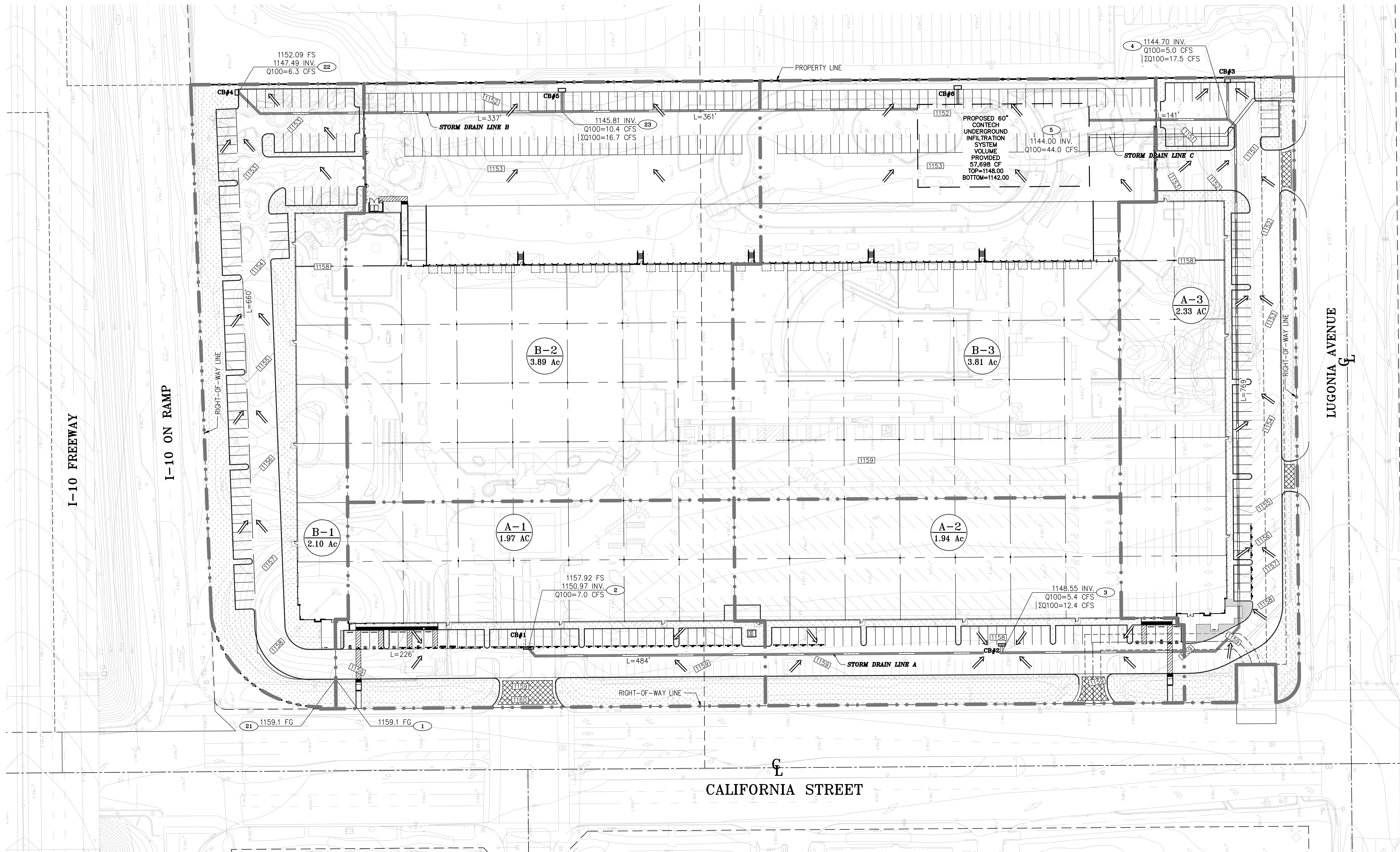
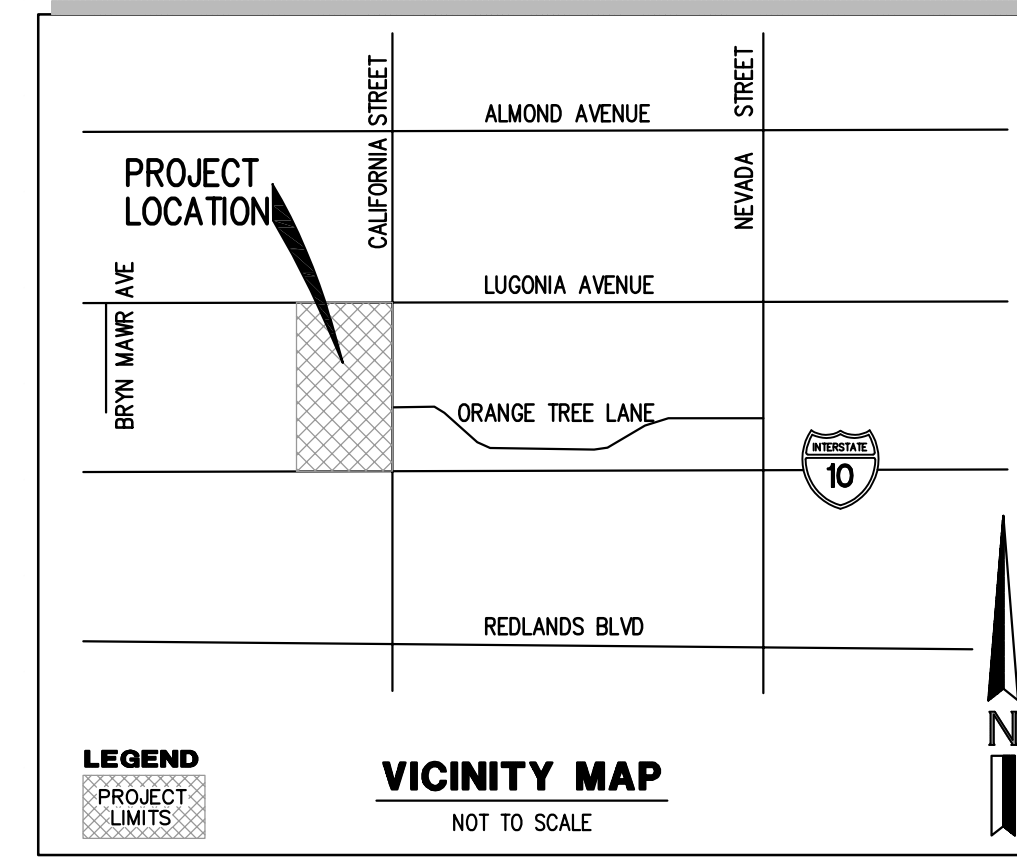
EXISTING HYDROLOGY MAP
 FOR
NPP - CALIFORNIA STREET INDUSTRIAL
 CITY OF REDLANDS

HUITT-ZOLLARS
 HUITT-ZOLLARS, INC.
 3990 CONCOURSE, SUITE 330 • ONTARIO, CALIFORNIA 91764 • (909) 941-7799

DESIGNED BY HZ STAFF	SHEET 1
DRAWN BY HZ STAFF	OF 1
CHECKED BY D.W.	SHEETS
FIELD BOOK	JOB NO. R316302.02

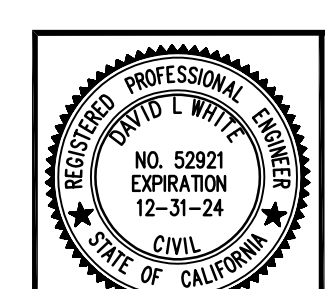
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- LEGEND**
- NO. HYDROLOGY MODEL NODE NUMBER
 - A-11
7.40 AC TRIBUTARY AREA IN ACRES
 - 675' LENGTH OF FLOW
 - DRAINAGE BOUNDARY
 - FLOW LINE
 - ▲ FLOW DIRECTION



OWNER/DEVELOPER
 CRP-NPP REDLANDS
 INDUSTRIAL OWNERS, LLC
 1330 FACTORY PLACE #105
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CIVIL ENGINEER
 HUITT-ZOLLARS, INC.
 3990 CONCOURS, SUITE 330
 ONTARIO, CALIFORNIA 91764
 PHONE: (909) 941-7799, X11420
 CONTACT PERSON: DAVID WHITE



PROPOSED HYDROLOGY MAP
 FOR
NPP - CALIFORNIA STREET INDUSTRIAL
 CITY OF REDLANDS

HUITT-ZOLLARS
 HUITT-ZOLLARS, INC.
 3990 CONCOURSE, SUITE 330 • ONTARIO, CALIFORNIA 91764 • (909) 941-7799

DESIGNED BY HZ STAFF	SHEET 1 OF 1 SHEETS
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Appendix B

10-year Rational Method Hydrologic Analysis
100-year Rational Method Hydrologic Analysis

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2019 Version 9.1
Rational Hydrology Study Date: 11/09/23

NPP - CALIFORNIA STREET INDUSTRIAL
10 YEAR STORM - EXISTING CONDITION
6302Q10E
BP

Program License Serial Number 6530

***** Hydrology Study Control Information *****

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.734 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

+++++
Process from Point/Station 1.000 to Point/Station 2.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.073 (In/Hr)
Initial subarea data:
Initial area flow distance = 632.000 (Ft.)
Top (of initial area) elevation = 1162.600 (Ft.)
Bottom (of initial area) elevation = 1156.200 (Ft.)
Difference in elevation = 6.400 (Ft.)
Slope = 0.01013 s(%)= 1.01
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 10.048 min.
Rainfall intensity = 2.145 (In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.869
Subarea runoff = 18.231 (CFS)
Total initial stream area = 9.780 (Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.073 (In/Hr)

+++++
Process from Point/Station 2.000 to Point/Station 3.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 0.000 (CFS)
Depth of flow = 0.284 (Ft.), Average velocity = 2.710 (Ft/s)
***** Irregular Channel Data *****

Information entered for subchannel number 1 :
Point number 'X' coordinate 'Y' coordinate
1 0.00 1.00
2 100.00 0.00
3 200.00 1.00

Manning's 'N' friction factor = 0.015

Sub-Channel flow = 21.848 (CFS)
' ' flow top width = 56.791 (Ft.)
' ' velocity = 2.710 (Ft/s)
' ' area = 8.063 (Sq.Ft)
' ' Froude number = 1.267

Upstream point elevation = 1156.200 (Ft.)
Downstream point elevation = 1151.200 (Ft.)
Flow length = 495.000 (Ft.)
Travel time = 3.04 min.
Time of concentration = 13.09 min.
Depth of flow = 0.284 (Ft.)
Average velocity = 2.710 (Ft/s)
Total irregular channel flow = 21.847 (CFS)
Irregular channel normal depth above invert elev. = 0.284 (Ft.)
Average velocity of channel(s) = 2.710 (Ft/s)
Adding area flow to channel
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil (AMC 2) = 56.00
Pervious ratio (Ap) = 0.1000 Max loss rate (Fm) = 0.073 (In/Hr)
Rainfall intensity = 1.830 (In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method) (Q=K CIA) is C = 0.864
Subarea runoff = 7.155 (CFS) for 6.280 (Ac.)
Total runoff = 25.385 (CFS)
Effective area this stream = 16.06 (Ac.)
Total Study Area (Main Stream No. 1) = 16.06 (Ac.)
Area averaged Fm value = 0.073 (In/Hr)
Depth of flow = 0.300 (Ft.), Average velocity = 2.813 (Ft/s)
End of computations, Total Study Area = 16.06 (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) = 0.100
Area averaged SCS curve number = 56.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2019 Version 9.1
Rational Hydrology Study Date: 11/09/23

NPP - CALIFORNIA STREET INDUSTRIAL
10 YEAR STORM EVENT PROPOSED CONDITION
6302Q10P
BP

Program License Serial Number 6530

***** Hydrology Study Control Information *****

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.734 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

+++++
Process from Point/Station 1.000 to Point/Station 2.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.073 (In/Hr)
Initial subarea data:
Initial area flow distance = 226.000 (Ft.)
Top (of initial area) elevation = 1159.100 (Ft.)
Bottom (of initial area) elevation = 1157.920 (Ft.)
Difference in elevation = 1.180 (Ft.)
Slope = 0.00522 s(%) = 0.52
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 7.603 min.
Rainfall intensity = 2.535 (In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.874
Subarea runoff = 4.365 (CFS)
Total initial stream area = 1.970 (Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.073 (In/Hr)

+++++
Process from Point/Station 2.000 to Point/Station 3.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1150.970 (Ft.)
Downstream point/station elevation = 1148.550 (Ft.)
Pipe length = 484.00 (Ft.) Manning's N = 0.012
No. of pipes = 1 Required pipe flow = 4.365 (CFS)

Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 4.365(CFS)
Normal flow depth in pipe = 10.95(In.)
Flow top width inside pipe = 13.32(In.)
Critical Depth = 10.16(In.)
Pipe flow velocity = 4.55(Ft/s)
Travel time through pipe = 1.77 min.
Time of concentration (TC) = 9.37 min.

++++
Process from Point/Station 3.000 to Point/Station 3.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.073(In/Hr)
Time of concentration = 9.37 min.
Rainfall intensity = 2.236(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method) (Q=KCIA) is C = 0.870
Subarea runoff = 3.244(CFS) for 1.940(Ac.)
Total runoff = 7.609(CFS)
Effective area this stream = 3.91(Ac.)
Total Study Area (Main Stream No. 1) = 3.91(Ac.)
Area averaged Fm value = 0.073(In/Hr)

++++
Process from Point/Station 3.000 to Point/Station 4.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1148.550(Ft.)
Downstream point/station elevation = 1144.700(Ft.)
Pipe length = 769.00(Ft.) Manning's N = 0.012
No. of pipes = 1 Required pipe flow = 7.609(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 7.609(CFS)
Normal flow depth in pipe = 13.95(In.)
Flow top width inside pipe = 15.04(In.)
Critical Depth = 12.82(In.)
Pipe flow velocity = 5.18(Ft/s)
Travel time through pipe = 2.47 min.
Time of concentration (TC) = 11.85 min.

++++
Process from Point/Station 4.000 to Point/Station 4.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.073(In/Hr)
Time of concentration = 11.85 min.
Rainfall intensity = 1.943(In/Hr) for a 10.0 year storm

Effective runoff coefficient used for area, (total area with modified rational method) (Q=KCIA) is C = 0.866
Subarea runoff = 2.889(CFS) for 2.330(Ac.)
Total runoff = 10.498(CFS)
Effective area this stream = 6.24(Ac.)
Total Study Area (Main Stream No. 1) = 6.24(Ac.)
Area averaged Fm value = 0.073(In/Hr)

++++
Process from Point/Station 4.000 to Point/Station 5.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1144.700(Ft.)
Downstream point/station elevation = 1144.000(Ft.)
Pipe length = 141.00(Ft.) Manning's N = 0.012
No. of pipes = 1 Required pipe flow = 10.498(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 10.498(CFS)
Normal flow depth in pipe = 15.12(In.)
Flow top width inside pipe = 18.86(In.)
Critical Depth = 14.49(In.)
Pipe flow velocity = 5.66(Ft/s)
Travel time through pipe = 0.42 min.
Time of concentration (TC) = 12.26 min.

++++
Process from Point/Station 5.000 to Point/Station 5.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.073(In/Hr)
Time of concentration = 12.26 min.
Rainfall intensity = 1.903(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method) (Q=KCIA) is C = 0.865
Subarea runoff = 6.051(CFS) for 3.810(Ac.)
Total runoff = 16.549(CFS)
Effective area this stream = 10.05(Ac.)
Total Study Area (Main Stream No. 1) = 10.05(Ac.)
Area averaged Fm value = 0.073(In/Hr)

++++
Process from Point/Station 1.000 to Point/Station 5.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area = 10.050(Ac.)
Runoff from this stream = 16.549(CFS)
Time of concentration = 12.26 min.
Rainfall intensity = 1.903(In/Hr)
Area averaged loss rate (Fm) = 0.0734(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 2

Process from Point/Station 21.000 to Point/Station 22.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.073(In/Hr)
Initial subarea data:
Initial area flow distance = 660.000(Ft.)
Top (of initial area) elevation = 1159.100(Ft.)
Bottom (of initial area) elevation = 1152.090(Ft.)
Difference in elevation = 7.010(Ft.)
Slope = 0.01062 s(%)= 1.06
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 10.126 min.
Rainfall intensity = 2.135(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.869
Subarea runoff = 3.896(CFS)
Total initial stream area = 2.100(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.073(In/Hr)

Process from Point/Station 22.000 to Point/Station 23.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1147.490(Ft.)
Downstream point/station elevation = 1145.810(Ft.)
Pipe length = 361.00(Ft.) Manning's N = 0.012
No. of pipes = 1 Required pipe flow = 3.896(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 3.896(CFS)
Normal flow depth in pipe = 10.30(In.)
Flow top width inside pipe = 13.91(In.)
Critical Depth = 9.57(In.)
Pipe flow velocity = 4.34(Ft/s)
Travel time through pipe = 1.39 min.
Time of concentration (TC) = 11.51 min.

Process from Point/Station 23.000 to Point/Station 23.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.073(In/Hr)
Time of concentration = 11.51 min.
Rainfall intensity = 1.976(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method) (Q=KCIA) is C = 0.867
Subarea runoff = 6.363(CFS) for 3.890(Ac.)
Total runoff = 10.259(CFS)

Effective area this stream = 5.99(Ac.)
 Total Study Area (Main Stream No. 2) = 16.04(Ac.)
 Area averaged Fm value = 0.073(In/Hr)

Process from Point/Station 23.000 to Point/Station 5.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1145.810(Ft.)
 Downstream point/station elevation = 1144.000(Ft.)
 Pipe length = 361.00(Ft.) Manning's N = 0.012
 No. of pipes = 1 Required pipe flow = 10.259(CFS)
 Nearest computed pipe diameter = 21.00(In.)
 Calculated individual pipe flow = 10.259(CFS)
 Normal flow depth in pipe = 14.79(In.)
 Flow top width inside pipe = 19.17(In.)
 Critical Depth = 14.32(In.)
 Pipe flow velocity = 5.67(Ft/s)
 Travel time through pipe = 1.06 min.
 Time of concentration (TC) = 12.58 min.

Process from Point/Station 21.000 to Point/Station 5.000
 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 2
 Stream flow area = 5.990(Ac.)
 Runoff from this stream = 10.259(CFS)
 Time of concentration = 12.58 min.
 Rainfall intensity = 1.874(In/Hr)
 Area averaged loss rate (Fm) = 0.0734(In/Hr)
 Area averaged Pervious ratio (Ap) = 0.1000
 Summary of stream data:

Stream No.	Flow rate (CFS)	Area (Ac.)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	16.55	10.050	12.26	0.073	1.903
2	10.26	5.990	12.58	0.073	1.874
Qmax(1) =					
	1.000 *	1.000 *	16.549)	+	
	1.016 *	0.975 *	10.259)	+	26.711
Qmax(2) =					
	0.984 *	1.000 *	16.549)	+	
	1.000 *	1.000 *	10.259)	+	26.549

Total of 2 main streams to confluence:

Flow rates before confluence point:
 17.549 11.259

Maximum flow rates at confluence using above data:
 26.711 26.549

Area of streams before confluence:
 10.050 5.990

Effective area values after confluence:
 15.891 16.040

Results of confluence:

Total flow rate = 26.711(CFS)

Time of concentration = 12.263 min.
Effective stream area after confluence = 15.891 (Ac.)
Study area average Pervious fraction(A_p) = 0.100
Study area average soil loss rate(F_m) = 0.073 (In/Hr)
Study area total = 16.04 (Ac.)
End of computations, Total Study Area = 16.04 (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(A_p) = 0.100

Area averaged SCS curve number = 56.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2019 Version 9.1
Rational Hydrology Study Date: 11/09/23

NPP - CALIFORNIA STREET INDUSTRIAL
100 YEAR STORM - EXISTING RATIONAL METHOD
6302Q100E
BP

Program License Serial Number 6530

***** Hydrology Study Control Information *****

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.160 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

+++++
Process from Point/Station 1.000 to Point/Station 2.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.044 (In/Hr)
Initial subarea data:
Initial area flow distance = 632.000 (Ft.)
Top (of initial area) elevation = 1162.600 (Ft.)
Bottom (of initial area) elevation = 1156.200 (Ft.)
Difference in elevation = 6.400 (Ft.)
Slope = 0.01013 s(%)= 1.01
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 10.048 min.
Rainfall intensity = 3.389 (In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.888
Subarea runoff = 29.385 (CFS)
Total initial stream area = 9.760 (Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.044 (In/Hr)

+++++
Process from Point/Station 2.000 to Point/Station 3.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 0.000 (CFS)
Depth of flow = 0.341 (Ft.), Average velocity = 3.062 (Ft/s)
***** Irregular Channel Data *****

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	1.00
2	100.00	0.00
3	200.00	1.00

Manning's 'N' friction factor = 0.015

Sub-Channel flow = 35.617 (CFS)
' ' flow top width = 68.214 (Ft.)
' ' velocity = 3.062 (Ft/s)
' ' area = 11.633 (Sq.Ft)
' ' Froude number = 1.307

Upstream point elevation = 1156.200 (Ft.)
Downstream point elevation = 1151.200 (Ft.)
Flow length = 495.000 (Ft.)
Travel time = 2.69 min.
Time of concentration = 12.74 min.
Depth of flow = 0.341 (Ft.)
Average velocity = 3.062 (Ft/s)
Total irregular channel flow = 35.617 (CFS)
Irregular channel normal depth above invert elev. = 0.341 (Ft.)
Average velocity of channel(s) = 3.062 (Ft/s)
Adding area flow to channel

COMMERCIAL subarea type

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil (AMC 2) = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio (Ap) = 0.1000 Max loss rate (Fm) = 0.044 (In/Hr)
Rainfall intensity = 2.939 (In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method) (Q=KCIA) is C = 0.887
Subarea runoff = 12.407 (CFS) for 6.280 (Ac.)

Total runoff = 41.792 (CFS)

Effective area this stream = 16.04 (Ac.)
Total Study Area (Main Stream No. 1) = 16.04 (Ac.)
Area averaged Fm value = 0.044 (In/Hr)
Depth of flow = 0.362 (Ft.), Average velocity = 3.187 (Ft/s)
End of computations, Total Study Area = 16.04 (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) = 0.100
Area averaged SCS curve number = 56.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2019 Version 9.1
Rational Hydrology Study Date: 11/09/23

NPP - CALIFORNIA STREET INDUSTRIAL
100 YEAR STORM PROPOSED RATIONAL METHOD
6302Q100P
BP

Program License Serial Number 6530

***** Hydrology Study Control Information *****

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.160 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

+++++
Process from Point/Station 1.000 to Point/Station 2.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.044 (In/Hr)
Initial subarea data:
Initial area flow distance = 226.000(Ft.)
Top (of initial area) elevation = 1159.100(Ft.)
Bottom (of initial area) elevation = 1157.920(Ft.)
Difference in elevation = 1.180(Ft.)
Slope = 0.00522 s(%)= 0.52
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 7.603 min.
Rainfall intensity = 4.007(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.890
Subarea runoff = 7.026(CFS)
Total initial stream area = 1.970(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.044(In/Hr)

+++++
Process from Point/Station 2.000 to Point/Station 3.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1150.970(Ft.)
Downstream point/station elevation = 1148.550(Ft.)
Pipe length = 484.00(Ft.) Manning's N = 0.012

No. of pipes = 1 Required pipe flow = 7.026(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 7.026(CFS)
Normal flow depth in pipe = 13.03(In.)
Flow top width inside pipe = 16.09(In.)
Critical Depth = 12.30(In.)
Pipe flow velocity = 5.13(Ft/s)
Travel time through pipe = 1.57 min.
Time of concentration (TC) = 9.17 min.

++++
Process from Point/Station 3.000 to Point/Station 3.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.044(In/Hr)
Time of concentration = 9.17 min.
Rainfall intensity = 3.579(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method) (Q=KCIA) is C = 0.889
Subarea runoff = 5.415(CFS) for 1.940(Ac.)
Total runoff = 12.441(CFS)
Effective area this stream = 3.91(Ac.)
Total Study Area (Main Stream No. 1) = 3.91(Ac.)
Area averaged Fm value = 0.044(In/Hr)

++++
Process from Point/Station 3.000 to Point/Station 4.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1148.550(Ft.)
Downstream point/station elevation = 1144.700(Ft.)
Pipe length = 769.00(Ft.) Manning's N = 0.012
No. of pipes = 1 Required pipe flow = 12.441(CFS)
Nearest computed pipe diameter = 24.00(In.)
Calculated individual pipe flow = 12.441(CFS)
Normal flow depth in pipe = 15.05(In.)
Flow top width inside pipe = 23.21(In.)
Critical Depth = 15.21(In.)
Pipe flow velocity = 6.00(Ft/s)
Travel time through pipe = 2.13 min.
Time of concentration (TC) = 11.31 min.

++++
Process from Point/Station 4.000 to Point/Station 4.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Adjusted SCS curve number for AMC 3 = 75.80

Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.044(In/Hr)
Time of concentration = 11.31 min.
Rainfall intensity = 3.157(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method) (Q=KCIA) is C = 0.887
Subarea runoff = 5.042(CFS) for 2.330(Ac.)
Total runoff = 17.483(CFS)
Effective area this stream = 6.24(Ac.)
Total Study Area (Main Stream No. 1) = 6.24(Ac.)
Area averaged Fm value = 0.044(In/Hr)

++++
Process from Point/Station 4.000 to Point/Station 5.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1144.700(Ft.)
Downstream point/station elevation = 1144.000(Ft.)
Pipe length = 141.00(Ft.) Manning's N = 0.012
No. of pipes = 1 Required pipe flow = 17.483(CFS)
Nearest computed pipe diameter = 27.00(In.)
Calculated individual pipe flow = 17.483(CFS)
Normal flow depth in pipe = 17.27(In.)
Flow top width inside pipe = 25.92(In.)
Critical Depth = 17.53(In.)
Pipe flow velocity = 6.51(Ft/s)
Travel time through pipe = 0.36 min.
Time of concentration (TC) = 11.67 min.

++++
Process from Point/Station 5.000 to Point/Station 5.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.044(In/Hr)
Time of concentration = 11.67 min.
Rainfall intensity = 3.098(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method) (Q=KCIA) is C = 0.887
Subarea runoff = 10.141(CFS) for 3.810(Ac.)
Total runoff = 27.625(CFS)
Effective area this stream = 10.05(Ac.)
Total Study Area (Main Stream No. 1) = 10.05(Ac.)
Area averaged Fm value = 0.044(In/Hr)

++++
Process from Point/Station 1.000 to Point/Station 5.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area = 10.050(Ac.)
Runoff from this stream = 27.625(CFS)
Time of concentration = 11.67 min.
Rainfall intensity = 3.098(In/Hr)

Area averaged loss rate (Fm) = 0.0440(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 2

++++
Process from Point/Station 21.000 to Point/Station 22.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.044(In/Hr)
Initial subarea data:
Initial area flow distance = 660.000(Ft.)
Top (of initial area) elevation = 1159.100(Ft.)
Bottom (of initial area) elevation = 1152.090(Ft.)
Difference in elevation = 7.010(Ft.)
Slope = 0.01062 s(%)= 1.06
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 10.126 min.
Rainfall intensity = 3.373(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.888
Subarea runoff = 6.293(CFS)
Total initial stream area = 2.100(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.044(In/Hr)

++++
Process from Point/Station 22.000 to Point/Station 23.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1147.490(Ft.)
Downstream point/station elevation = 1145.810(Ft.)
Pipe length = 361.00(Ft.) Manning's N = 0.012
No. of pipes = 1 Required pipe flow = 6.293(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 6.293(CFS)
Normal flow depth in pipe = 12.30(In.)
Flow top width inside pipe = 16.74(In.)
Critical Depth = 11.63(In.)
Pipe flow velocity = 4.89(Ft/s)
Travel time through pipe = 1.23 min.
Time of concentration (TC) = 11.36 min.

++++
Process from Point/Station 23.000 to Point/Station 23.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.044(In/Hr)

Time of concentration = 11.36 min.
 Rainfall intensity = 3.149(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area, (total area with modified
 rational method) (Q=KCIA) is C = 0.887
 Subarea runoff = 10.448(CFS) for 3.890(Ac.)
 Total runoff = 16.741(CFS)
 Effective area this stream = 5.99(Ac.)
 Total Study Area (Main Stream No. 2) = 16.04(Ac.)
 Area averaged Fm value = 0.044(In/Hr)

++++++
 Process from Point/Station 23.000 to Point/Station 5.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1145.810(Ft.)
 Downstream point/station elevation = 1144.000(Ft.)
 Pipe length = 361.00(Ft.) Manning's N = 0.012
 No. of pipes = 1 Required pipe flow = 16.741(CFS)
 Nearest computed pipe diameter = 24.00(In.)
 Calculated individual pipe flow = 16.741(CFS)
 Normal flow depth in pipe = 18.94(In.)
 Flow top width inside pipe = 19.58(In.)
 Critical Depth = 17.70(In.)
 Pipe flow velocity = 6.29(Ft/s)
 Travel time through pipe = 0.96 min.
 Time of concentration (TC) = 12.31 min.

++++++
 Process from Point/Station 21.000 to Point/Station 5.000
 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 2
 Stream flow area = 5.990(Ac.)
 Runoff from this stream = 16.741(CFS)
 Time of concentration = 12.31 min.
 Rainfall intensity = 3.000(In/Hr)
 Area averaged loss rate (Fm) = 0.0440(In/Hr)
 Area averaged Pervious ratio (Ap) = 0.1000
 Summary of stream data:

Stream No.	Flow rate (CFS)	Area (Ac.)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	27.62	10.050	11.67	0.044	3.098
2	16.74	5.990	12.31	0.044	3.000
Qmax(1) =					
	1.000 *	1.000 *	27.625)	+	
	1.033 *	0.948 *	16.741)	+=	44.018
Qmax(2) =					
	0.968 *	1.000 *	27.625)	+	
	1.000 *	1.000 *	16.741)	+=	43.479

Total of 2 main streams to confluence:

Flow rates before confluence point:

28.625 17.741

Maximum flow rates at confluence using above data:

44.018 43.479

Area of streams before confluence:

10.050 5.990

Effective area values after confluence:
15.728 16.040

Results of confluence:

Total flow rate = 44.018 (CFS)

Time of concentration = 11.670 min.

Effective stream area after confluence = 15.728 (Ac.)

Study area average Pervious fraction (Ap) = 0.100

Study area average soil loss rate (Fm) = 0.044 (In/Hr)

Study area total = 16.04 (Ac.)

End of computations, Total Study Area = 16.04 (Ac.)

The following figures may

be used for a unit hydrograph study of the same area.

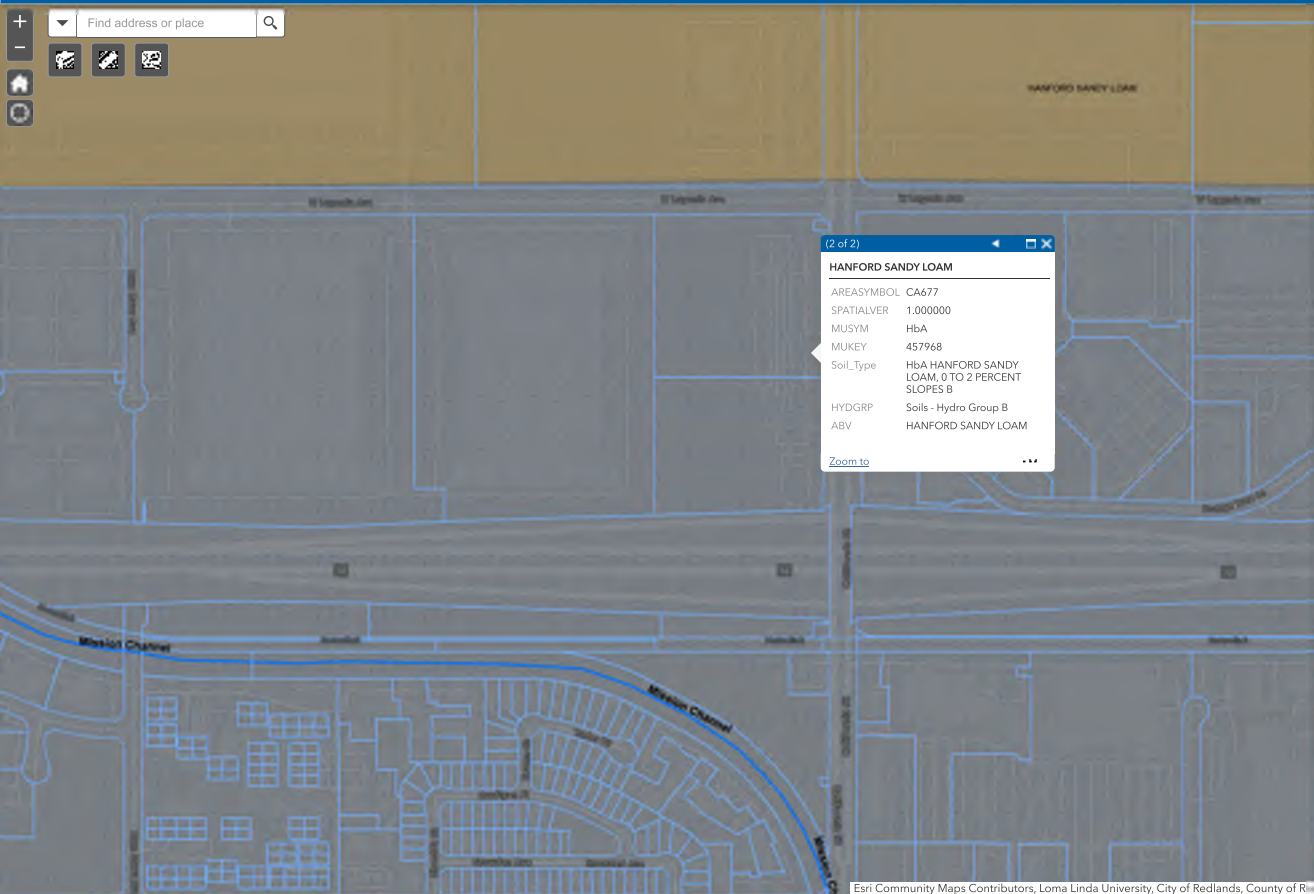
Note: These figures do not consider reduced effective area effects caused by confluences in the rational equation.

Area averaged pervious area fraction (Ap) = 0.100

Area averaged SCS curve number = 56.0

Appendix C
Soil Group Map and NOAA 14 Map

Find address or place



(2 of 2)

HANFORD SANDY LOAM

AREASymbol	CA677
SPATIALVER	1.000000
MUSYM	HbA
MUKEY	457968
Soil_Type	HbA HANFORD SANDY LOAM, 0 TO 2 PERCENT SLOPES B
HYDGRP	Soils - Hydro Group B
ABV	HANFORD SANDY LOAM

[Zoom to](#) ...

Legend

Parcels

County Boundaries

Drainage Facilities

- EHM
- Non-EHM (Low)
- Non-EHM (Medium)
- Non-EHM (High)
- Non-EHM (default-high)

Water Storage Facility

- Interim
- Ultimate
- Other

HCOG Exempt Areas (Original)

Soils

- Soils - Hydro Group A
- Soils - Hydro Group B
- Soils - Hydro Group C
- Soils - Hydro Group D
- Soils - No Hydro Group

Esri Community Maps Contributors, Loma Linda University, City of Redlands, County of R



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Uhruh, 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

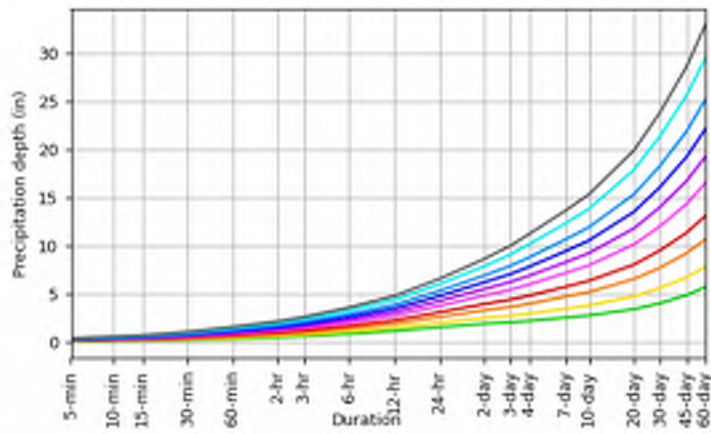
PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.097 (0.081-0.118)	0.126 (0.104-0.153)	0.164 (0.136-0.200)	0.195 (0.161-0.240)	0.239 (0.190-0.304)	0.273 (0.212-0.355)	0.308 (0.233-0.410)	0.344 (0.254-0.472)	0.395 (0.279-0.565)	0.434 (0.296-0.644)
10-min	0.139 (0.116-0.169)	0.180 (0.150-0.219)	0.235 (0.195-0.286)	0.280 (0.230-0.344)	0.342 (0.272-0.435)	0.391 (0.304-0.508)	0.441 (0.335-0.588)	0.494 (0.364-0.677)	0.566 (0.399-0.810)	0.623 (0.424-0.923)
15-min	0.168 (0.140-0.204)	0.218 (0.181-0.265)	0.284 (0.235-0.346)	0.339 (0.278-0.416)	0.414 (0.329-0.527)	0.473 (0.368-0.615)	0.534 (0.405-0.711)	0.597 (0.440-0.819)	0.684 (0.483-0.979)	0.753 (0.513-1.12)
30-min	0.249 (0.207-0.302)	0.322 (0.268-0.392)	0.420 (0.348-0.512)	0.501 (0.412-0.616)	0.613 (0.487-0.779)	0.700 (0.544-0.909)	0.790 (0.599-1.05)	0.883 (0.651-1.21)	1.01 (0.715-1.45)	1.11 (0.759-1.65)
60-min	0.364 (0.303-0.442)	0.472 (0.393-0.574)	0.616 (0.511-0.750)	0.734 (0.604-0.902)	0.898 (0.713-1.14)	1.03 (0.797-1.33)	1.16 (0.877-1.54)	1.30 (0.954-1.78)	1.48 (1.05-2.12)	1.63 (1.11-2.42)
2-hr	0.523 (0.435-0.634)	0.669 (0.556-0.813)	0.863 (0.716-1.05)	1.02 (0.841-1.26)	1.24 (0.986-1.58)	1.41 (1.10-1.83)	1.59 (1.20-2.11)	1.77 (1.30-2.42)	2.01 (1.42-2.88)	2.21 (1.50-3.27)
3-hr	0.644 (0.536-0.781)	0.821 (0.683-0.997)	1.06 (0.874-1.28)	1.25 (1.02-1.53)	1.51 (1.20-1.92)	1.71 (1.33-2.22)	1.92 (1.46-2.56)	2.14 (1.57-2.93)	2.43 (1.72-3.48)	2.66 (1.81-3.94)
6-hr	0.902 (0.751-1.09)	1.15 (0.953-1.39)	1.47 (1.22-1.79)	1.73 (1.42-2.13)	2.09 (1.66-2.66)	2.37 (1.84-3.08)	2.65 (2.01-3.53)	2.94 (2.17-4.03)	3.34 (2.36-4.78)	3.65 (2.48-5.40)
12-hr	1.19 (0.994-1.45)	1.52 (1.27-1.85)	1.96 (1.62-2.38)	2.31 (1.90-2.84)	2.79 (2.22-3.54)	3.16 (2.45-4.10)	3.53 (2.68-4.70)	3.91 (2.88-5.36)	4.43 (3.13-6.34)	4.83 (3.29-7.16)
24-hr	1.59 (1.41-1.83)	2.05 (1.82-2.37)	2.65 (2.34-3.07)	3.14 (2.75-3.66)	3.80 (3.22-4.58)	4.31 (3.57-5.30)	4.82 (3.90-6.07)	5.34 (4.21-6.92)	6.05 (4.58-8.16)	6.60 (4.83-9.20)
2-day	1.95 (1.73-2.25)	2.55 (2.26-2.95)	3.35 (2.95-3.87)	4.00 (3.50-4.66)	4.88 (4.13-5.88)	5.56 (4.61-6.83)	6.25 (5.06-7.87)	6.96 (5.49-9.01)	7.93 (6.00-10.7)	8.68 (6.35-12.1)
3-day	2.10 (1.86-2.42)	2.79 (2.47-3.22)	3.70 (3.26-4.28)	4.45 (3.90-5.19)	5.49 (4.65-6.61)	6.29 (5.22-7.74)	7.11 (5.76-8.96)	7.97 (6.28-10.3)	9.14 (6.92-12.3)	10.1 (7.36-14.0)
4-day	2.24 (1.98-2.58)	3.01 (2.66-3.47)	4.02 (3.55-4.66)	4.87 (4.26-5.68)	6.03 (5.11-7.27)	6.94 (5.76-8.54)	7.88 (6.38-9.92)	8.86 (6.98-11.5)	10.2 (7.72-13.8)	11.3 (8.25-15.7)
7-day	2.59 (2.29-2.99)	3.52 (3.11-4.06)	4.76 (4.20-5.51)	5.79 (5.07-6.76)	7.22 (6.12-8.70)	8.34 (6.92-10.3)	9.50 (7.70-12.0)	10.7 (8.44-13.9)	12.4 (9.37-16.7)	13.7 (10.0-19.1)
10-day	2.81 (2.49-3.24)	3.85 (3.41-4.45)	5.25 (4.63-6.07)	6.41 (5.60-7.47)	8.02 (6.79-9.66)	9.28 (7.70-11.4)	10.6 (8.58-13.3)	12.0 (9.43-15.5)	13.9 (10.5-18.7)	15.4 (11.3-21.4)
20-day	3.46 (3.06-3.99)	4.79 (4.24-5.53)	6.59 (5.81-7.62)	8.09 (7.08-9.44)	10.2 (8.63-12.3)	11.8 (9.83-14.6)	13.6 (11.0-17.1)	15.4 (12.1-19.9)	17.9 (13.6-24.2)	19.9 (14.6-27.8)
30-day	4.08 (3.62-4.71)	5.66 (5.01-6.53)	7.79 (6.87-9.02)	9.58 (8.39-11.2)	12.1 (10.2-14.6)	14.1 (11.7-17.3)	16.2 (13.1-20.4)	18.4 (14.5-23.8)	21.5 (16.2-28.9)	23.9 (17.5-33.4)
45-day	4.91 (4.35-5.66)	6.76 (5.98-7.80)	9.28 (8.19-10.7)	11.4 (9.98-13.3)	14.4 (12.2-17.3)	16.8 (13.9-20.6)	19.3 (15.6-24.3)	21.9 (17.3-28.4)	25.7 (19.4-34.6)	28.7 (21.0-40.0)
60-day	5.77 (5.11-6.65)	7.87 (6.96-9.08)	10.7 (9.46-12.4)	13.1 (11.5-15.3)	16.6 (14.0-20.0)	19.3 (16.0-23.7)	22.2 (18.0-27.9)	25.2 (19.9-32.7)	29.5 (22.3-39.8)	33.0 (24.1-46.0)

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.

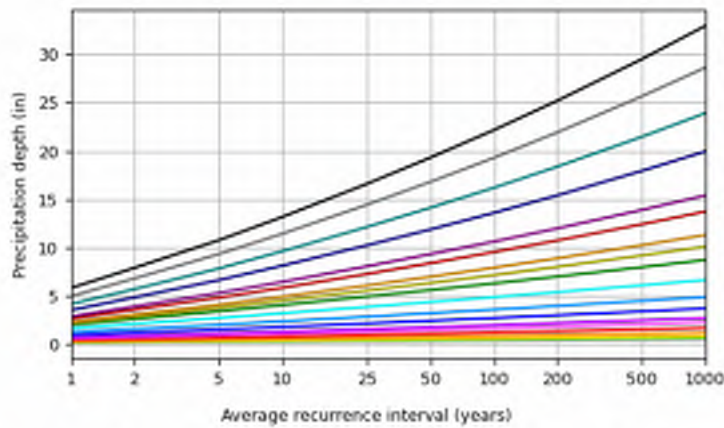
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PF graphical

PDS-based depth-duration-frequency (DDF) curves
 Latitude: 34.0687°, Longitude: -117.2275°



Average recurrence interval (years)
1
2
5
10
25
50
100
200
500
1000



Duration
5-min
10-min
15-min
30-min
60-min
2-hr
3-hr
6-hr
12-hr
24-hr
2-day
3-day
4-day
7-day
10-day
20-day
30-day
45-day
60-day

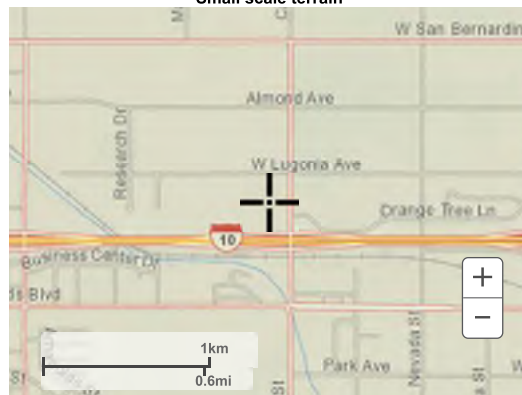
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Maps & aerials

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



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1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

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