APPENDIX K

Hydrology and Hydraulics Calculations

Thienes Engineering, Inc.
CIVIL ENGINEERING • LAND SURVEYING

HYDROLOGY & HYDRAULIC CALCULATIONS

FOR

CHERRY LOGISTICS CENTER
5910 CHERRY AVENUE
LONG BEACH, CA

PREPARED FOR

B9 CHERRY AVE OWNER LLC
3333 MICHELSON DRIVE, SUITE 725
IRVINE, CA 92612
PHONE: (949) 344-2209

SEPTEMBER 01, 2022
REVISED JANUARY 3, 2023

JOB NO. 3938

PREPARED BY

THIENES ENGINEERING
14349 FIRESTONE BLVD.
LA MIRADA, CALIFORNIA 90638
(714) 521-4811

HYDROLOGY & HYDRAULIC CALCULATIONS

FOR

CHERRY LOGISTICS CENTER



UNDER THE SUPERVISION OF

1/3/2023

REINHARD STENZEL DATE:
R.C.E. 56155
EXP. 12/31/24

INTRODUCTION

A: PROJECT LOCATION

The project site is located on the easterly side of Cherry Avenue north of the prolongation of 59th Street in the city of Long Beach. See following page for vicinity map.

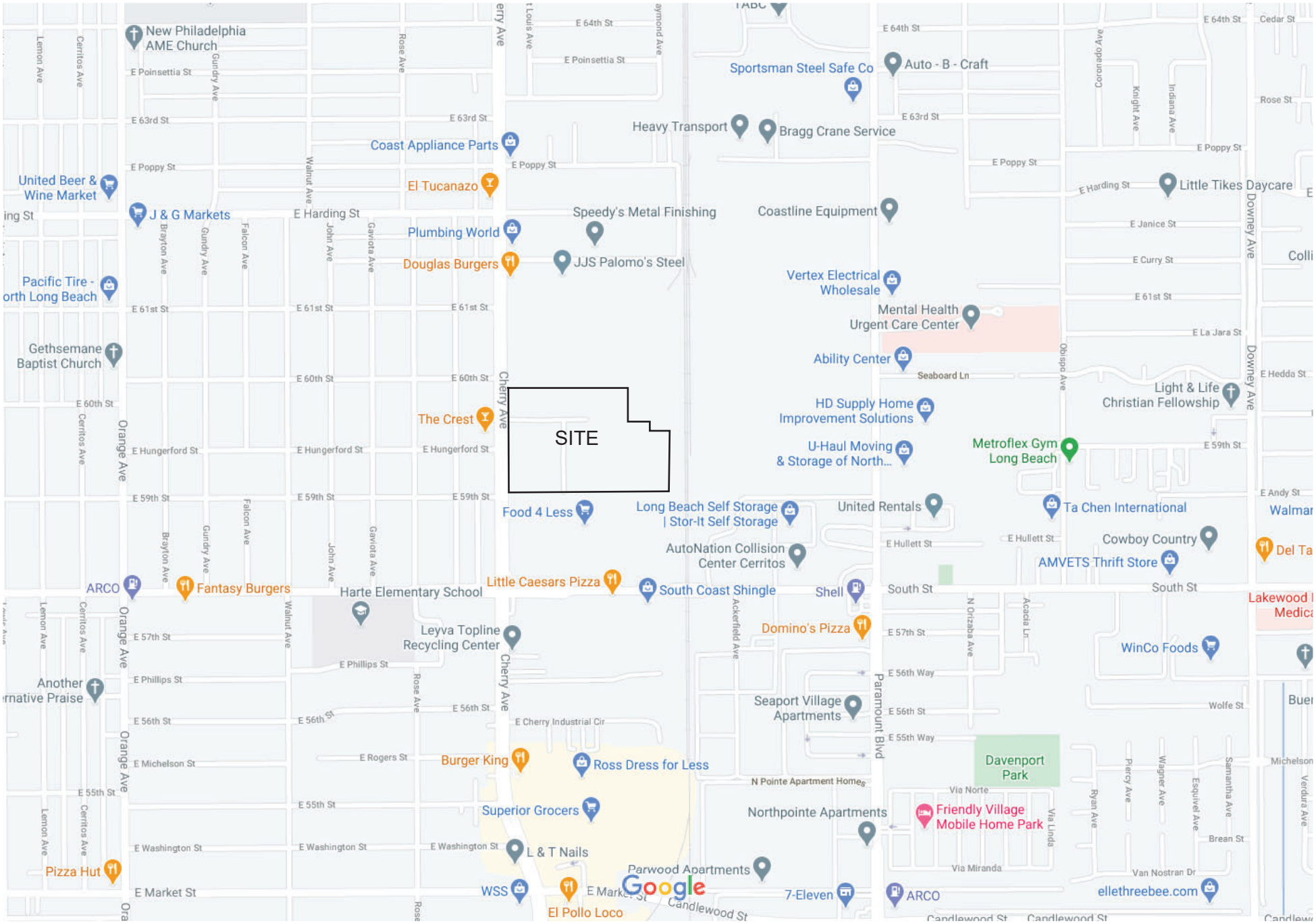
B: STUDY PURPOSE

The purpose of this study is to determine existing and proposed condition 50-year peak flow rates for the project site. The project site ultimately drains to an existing Los Angeles County storm drain system in Cherry Avenue and 59th Street (L.A.C.D.P.W. North Long Beach Storm Drain District Project No. 129).

C: PROJECT STAFF:

Thienes Engineering staff involved in this study include:

Reinhard Stenzel
Corey Berman


SITE
New Philadelphia AME Church
Sportsman Steel Safe Co
Auto - B - Craft
Heavy Transport
Bragg Crane Service
Coast Appliance Parts
El Tucanazo
United Beer & Wine Market
J & G Markets
Speedy's Metal Finishing
Coastline Equipment
Plumbing World
Douglas Burgers
JJS Palomo's Steel
Little Tikes Daycare
Pacific Tire - orth Long Beach
Vertex Electrical Wholesale
Mental Health Urgent Care Center
Gethsemane Baptist Church
Ability Center
Light & Life Christian Fellowship
HD Supply Home Improvement Solutions
The Crest
U-Haul Moving & Storage of North...
Metroflex Gym Long Beach
Food 4 Less
Long Beach Self Storage | Stor-It Self Storage
United Rentals
Ta Chen International
AutoNation Collision Center Cerritos
Cowboy Country
AMVETS Thrift Store
ARCO
Fantasy Burgers
Harte Elementary School
Little Caesars Pizza
South Coast Shingle
Shell
Leyva Topline Recycling Center
Domino's Pizza
WinCo Foods
Another rnative Praise
Seaport Village Apartments
Davenport Park
Burger King
Ross Dress for Less
Superior Grocers
Northpointe Apartments
Friendly Village Mobile Home Park
L & T Nails
Parwood Apartments
Pizza Hut
WSS
El Pollo Loco
7-Eleven
ARCO
ellethreebee.com
Google
E 64th St
E Poinsettia St
E 63rd St
E Poppy St
E Harding St
E Janice St
E Curry St
E 61st St
E La Jara St
E 60th St
E Hedda St
E Hungerford St
E 59th St
E Andy St
E Hullett St
South St
E 57th St
E Phillips St
E 56th Way
E 56th St
E Cherry Industrial Cir
E 55th Way
E Rogers St
E Michelson St
E 55th St
E Washington St
Via Norte
Via Linda
Via Miranda
Van Nostran Dr
Brean St
Wolfe St
Michelson
Candlewood St
E Market St
N Pointe Apartment Homes
Cherry Ave
Orange Ave
Walnut Ave
Rose Ave
Gundry Ave
Falcon Ave
Brayton Ave
John Ave
Gaviota Ave
Cerritos Ave
Lemon Ave
Ackerfield Ave
Paramount Blvd
Downey Ave
Obispo Ave
Seaboard Ln
Map data ©2020 500 ft

DISCUSSION

The project site encompasses approximately 14.20 acres. Proposed improvements include a single warehouse type building with approximately 298,270 square feet. There is a truck yard on the southerly side of the building, with vehicle parking located on the westerly side of the project site and a combination of vehicle and trailer parking on the easterly side. There will be landscaping adjacent to Cherry Avenue.

Los Angeles County Correspondence

Los Angeles County Department of Public Works has provided hydrology calculations and drainage map for the existing storm drain system in Cherry Avenue and 59th Street (L.A.C.D.P.W. Project No. 129). The County has provided an allowable "Q" of 1.0 cfs/acre. In addition, the hydraulic grade line in the County facility is assumed to be 2.0' below street surface elevation. This information will be used for the proposed connection to this storm drain under proposed conditions.

See Appendix "A" for reference material.

Existing Condition

The project site currently consists of a paved commercial site with several small buildings, parking areas and outdoor storage areas. Under existing conditions, runoff from the site generally drains from east to west and discharges to Cherry Avenue via the existing driveways (at Cherry Avenue) located on the northerly and southerly portions of the site. Once in the street, flow travels to two existing curb-opening catch basins, then to the public 24" RCP located in Cherry Avenue.

The areas east of the project site and beyond, to the existing wall separating the railroad tracks, appear to surface drain to the project site. These areas are conservatively added to the onsite hydrologic model.

Proposed Condition

Under proposed conditions, runoff from the southern portion of the building, easterly parking areas, and southerly truck yard (Areas 1A-6A) drain to catch basin located in the truck yard and parking areas. A proposed storm drain will convey flow from east to west ultimately connecting with existing public 24" RCP.

Runoff from the northern area of the building and northerly drive aisle (Area 7A) will be collected in a proposed catch basin along the northern project boundary near the northwest corner of the proposed building. From here, a storm drain will convey the runoff southerly and then runoff from the western vehicle parking (Area 8A-9A) is added to the flow. The storm drain will continue southerly until its confluence with the east-west storm drain from the southerly truck yard. The combined storm drain will then connect to the existing public lateral near the Cherry Avenue proposed south driveway. The total 50-year peak flow rate from the project site is approximately 37.2 cfs, undetained. This is the sum of the individual subarea peak flow rates.

Off-Site Runoff

There is potential for off-site run-on from properties directly to the east of the project site (Areas 1B-3B). Catch basins will be installed along the easterly portion of the project site to collect this run-off. The storm drain will convey this runoff westerly and will confluence with the on-site storm drain flow after the required BMP flow has been treated. The 50-year peak flow rate for these areas is approximately 3.8 cfs.

See Appendix "B" for onsite and offsite hydrology calculations.

Existing Public Catch Basin

There is an existing public catch basin and east-west lateral along the eastern side of Cherry Avenue which is located where the southern drive aisle is proposed. This will require the existing public catch basin to removed and a proposed replacement public catch basin will be located approximately 60-feet north of the existing catch basin. A new storm drain lateral connecting the proposed catch basin to the existing 24-inch public storm drain will be required. The existing lateral will be removed and sized appropriately for the allowable peak flow rate from the site (as detailed below).

Detention

To meet the County's criteria of 1.0 cfs/acre, detention will be required. This will require limiting the flow from the site to be equal or less than 15.7 cfs (based on area of the project site tributary to the connection plus the offsite areas to the east). This will be achieved detaining runoff in the southern truck yard. The runoff from on-site subareas 7A-9A and run-on from off-site areas 1B and 2B will discharge from the site without detention. The total peak runoff from these areas is approximately 11.4 cfs for the 50-year storm event. This will allow the remaining portions of the site to have a maximum discharge of 4.3 cfs. This will be achieved by limiting the flow out of the storm drain downstream of the truckyard (based on pipes sizes, see hydraulic section). This will force runoff to be stored above ground in the truckyard. Limiting the discharge to 4.2 cfs

will required approximately 17,748 cubic feet of storage. This can be achieved in the truck yard with a ponding depth of approximately 1.0'.

See Appendix "D" for detention calculations.

Hydraulic Calculations

The controlling hydraulic grade line at the existing County storm drain was assumed to be 2.0' below the finished surface as noted from correspondence from the County. The onsite storm drain was sized to convey only the allowable peak flow rate from the project site. This was achieved by properly sizing the onsite storm drain such that only so much flow could discharge. Flows not allowed into the County storm drain will be stored in the truck yard. Hydraulic calculations show that pipe sizes ranging from 15"-24" can convey no more than the allowable peak flow rate of 15.7 cfs.

The hydraulic model for Line "A" shows that the h.g.l. in the storm drain at the downstream catch basin in the truck yard is about equal to the volume necessary to store the remaining flow not allowed into the storm drain system.

See Appendix "C" for all hydraulic calculations.

Catch Basin Calculations

The capacity of all onsite catch basins was calculated using a weir equation. To be conservative, each catch basin was assumed to have a clogging factor of 50%. Therefore, it was assumed that each catch basin could only accept half of its flow capacity. Available head in the parking areas is allowed to be 0.50', while the truck yard uses 0.67' of head. Curb opening catch basins in a sump condition and uses the Bureau of Public Works Nomograph for capacity of curb table.

See Appendix "E" for catch basin calculations.

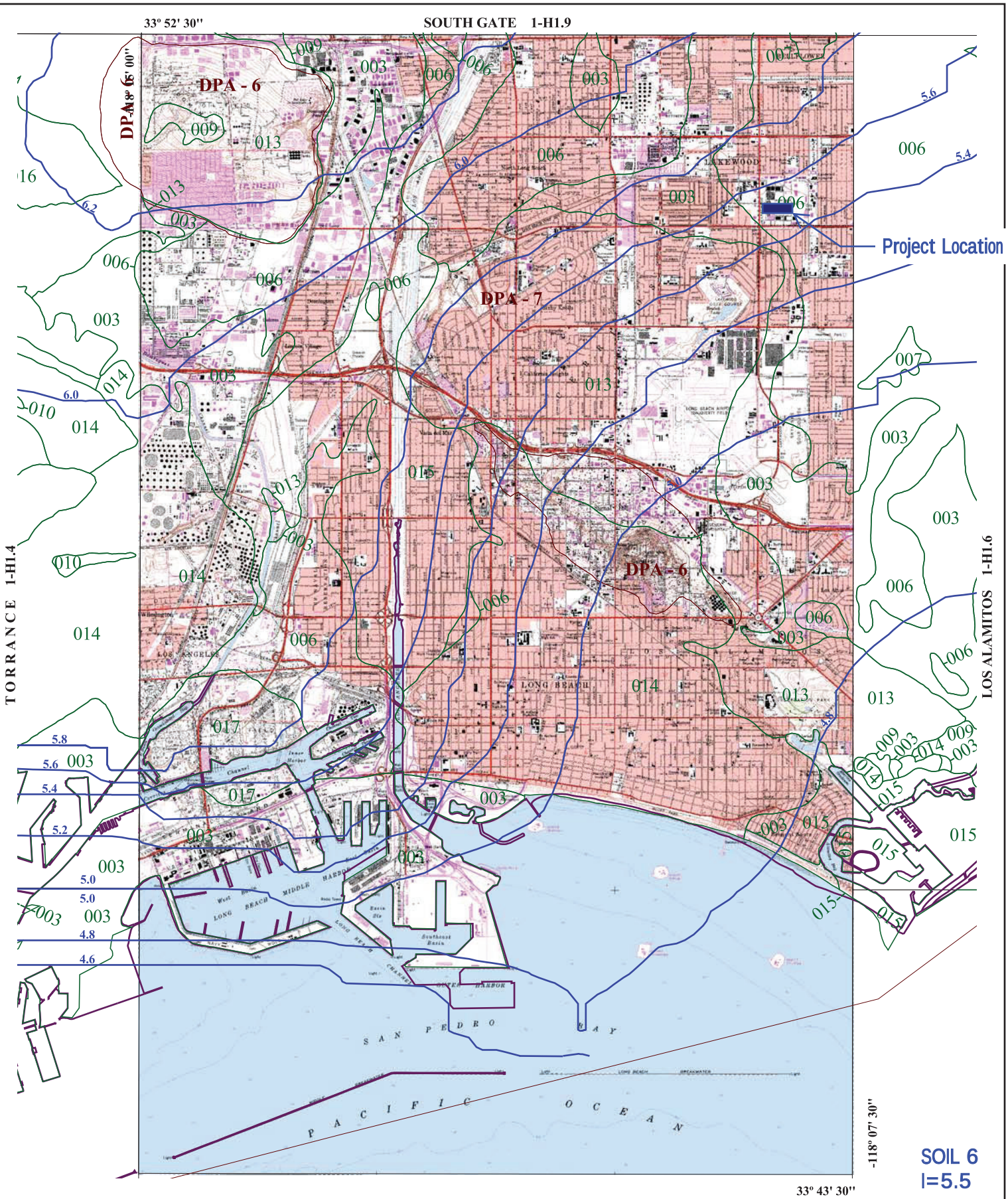
Methodology

Hydrology calculations were computed using Los Angeles County Hydrocalc spreadsheet. The Rainfall zone is 5.5 and the soil type is 006 per the Los Angeles County Hydrology Manual. See Appendix "A" for reference material from the Hydrology Manual.

APPENDIX	DESCRIPTION
A	REFERENCE MATERIALS
B	HYDROLOGY CALCULATIONS
C	HYDRAULIC CALCULATIONS
D	DETENTION ANALYSIS
E	CATCH BASIN CALCULATIONS
F	HYDROLOGY MAP

APPENDIX A

REFERENCE MATERIALS



016 SOIL CLASSIFICATION AREA

7.2 INCHES OF RAINFALL

DPA - 6 DEBRIS POTENTIAL AREA

N W E S

1 0 1 2 Miles

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

LONG BEACH
50-YEAR 24-HOUR ISOHYET

1-H1.5

LOS ANGELES COUNTY PUBLIC WORKS Public Service That Works

Angie Maldonado

From: DPW-designinfo <designinfo@dpw.lacounty.gov>
Sent: Monday, February 8, 2021 2:54 PM
To: Angie Maldonado; DPW-designinfo
Subject: RE: Hydrology Request - 5900 Cherry Ave Long Beach - TEI 3938
Attachments: Project No. 129 Cherry Avenue.pdf

Good afternoon Angie

Attached Project No. 129 Line Information Request Summary, Hydrology Map, Location Map, As Built Drawing, Assessor Map.
Subareas No. 105 and 106 Allowable Discharge Flow Limited to Q=1.0cfs/acre.
HGL within Cherry Avenue limit is 2feet below street surface elevation.
If You have any question, please let us know.

Thank You

George K Aintablian
Los Angeles County Public Works,
Design Division
Tel. 626-4587959

Office Use Only
☐ Sent Initials: _____
☐ Fax ☐ Email ☐ Other: _____
Date: _____ Time: _____

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
DESIGN DIVISION – HYDRAULIC ANALYSIS UNIT

INFORMATION REQUEST SUMMARY

INFORMATION REQUESTED BY

*Requester's Name: Angie Maldonado
Company: Thienes Engineering, Inc
*Phone Number: (714) 521-4811 Fax Number: (714) 521-4173
*Email: Angie@ThienesEng.com

Method of Contact: ☐ Walk-in ☐ Phone ☐ Fax ☒ Email ☐ Prelim. Mtg. Date: 12/31/20

Intended Use: Research

Proposed Project Type: Industrial Acreage Involved: _____

*Will information be used in any litigation? ☐ YES ☒ NO
Case Info. Name: _____ No: _____ Location: _____

INFORMATION REQUESTED (Attach Assessor Map)

LACFCD Facility: Name: PROJECT 129
Unit: _____ Line: A Station: 87+00
City: LONG BEACH
*Street/Cross-street: 5900 CHERRY AVE
*Thomas Guide: Page: 765 Grid: G1 G2 ☒ Site Map/Plans Submitted
Info. Requested:
- Hydrology
- Allowable Q
- Calcs

***Required Information. See Page 2 of 2 for Instructions.**

BELOW SECTION TO BE COMPLETED BY THE HYDRAULIC ANALYSIS UNIT

INFORMATION PROVIDED: Drainage Map, Hydrology Data, As Built Drawing, Allowable Q,

REFERENCES SEARCHED:
Project No. 129 Files

COMMENTS, ETC:
1) Subarea No. 105 Allowable Q = 40 cfs
2) Subarea No. 106 Allowable Q = 1.0 cfs/acre
3) HGL within Project No. 129 Use 2 feet Freeboard

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS DESIGN DIVISION Hydraulic Analysis Unit OFFICIAL RECORD DOCUMENT Issued By: GKA Date: 2/08/2021

INFORMATION PROVIDED BY: George K. Aintablian Date: 2/8/2021
INFORMATION REVIEWED BY: Date:

Print Save a Copy

Note:
Subareas Nos. 105 & 106
Allowable Q = 1.0 cfs/acre
per George, use allowable Q provided,
original study not accurate.

104
14.8 AC
Q25 22.3 CFS

105
16.2 AC
Q25 23.0 CFS

106
10 AC
Q25 14.8 CFS

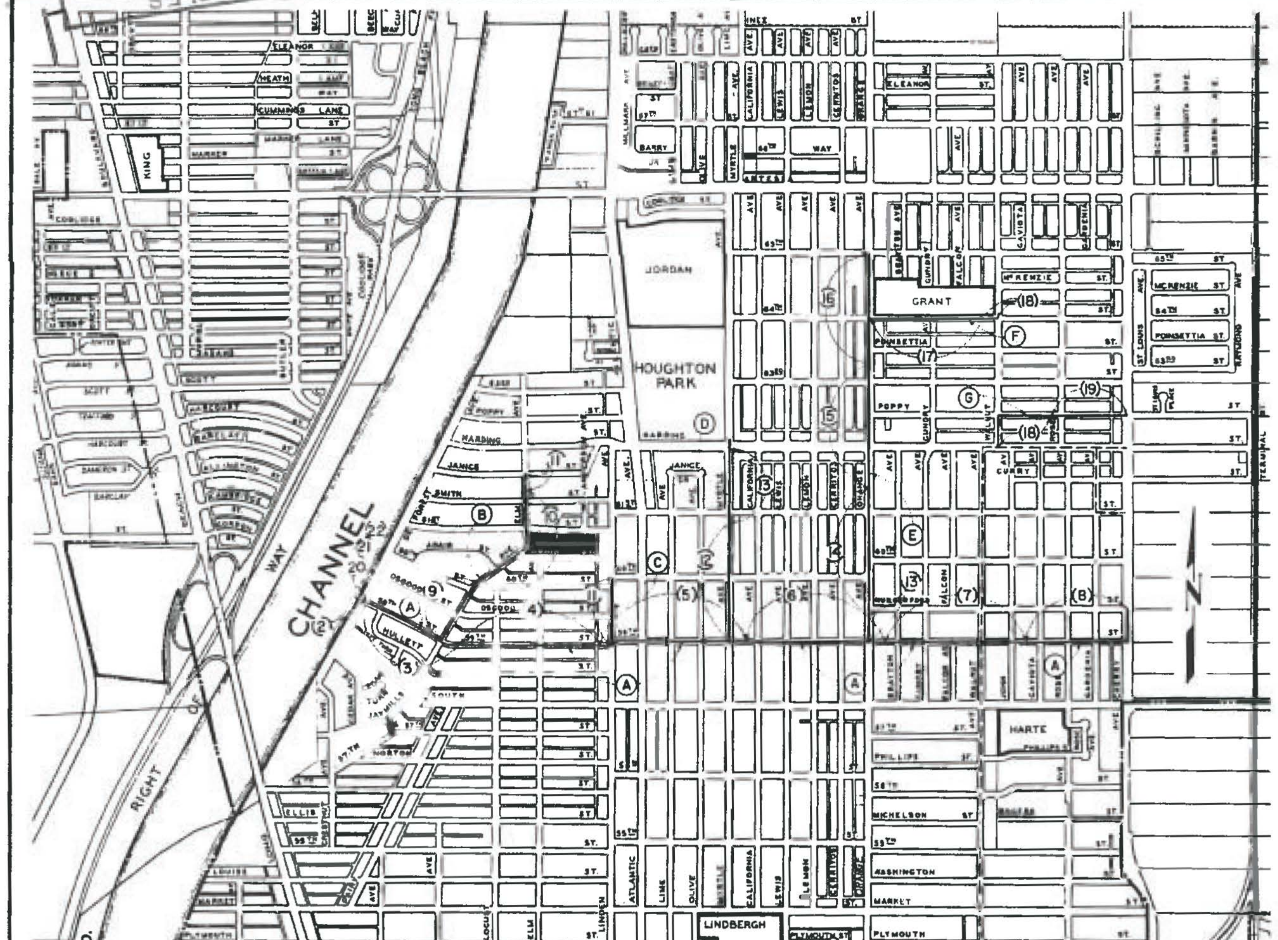
SITE

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
DESIGN DIVISION
Hydraulic Analysis Unit
OFFICIAL
RECORD DOCUMENT
Issued By: GKH
Date: 02/08/2024

Legend
As proposed in the Los Angeles County Storm Drain Bond Issue
Future lines to be constructed by the City of Long Beach
Existing Walnut Avenue Drain

CITY ENGINEER'S OFFICE, LONG BEACH, CA.
NORTH LONG BEACH
STORM DRAIN DISTRICT
PROJECT 129
NO R 2892
DATE
RECOMMENDED BY
APPROVED
DEPUTY CITY ENGINEER
CITY ENGINEER
JOB NO 52-219
FIELD BOOK
PAGE
SHEET OF
DWG. NO B-1756

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
DESIGN DIVISION
Hydraulic Analysis Unit
OFFICIAL
RECORD DOCUMENT
Issued By:
Date: / /
Public Service That Works

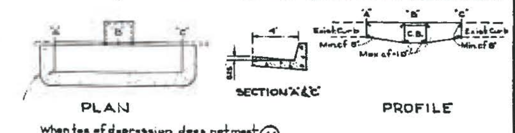


VICINITY MAP
Scale: 1"=600'

NUMBER	INDEX TO DRAWINGS
1	GENERAL PLAN
2	PLAN, PROFILE, OUTLET STRUCTURE - LINE A
3	PLAN, PROFILE AND SECTIONS - LINE A
4	PLAN, PROFILE AND SECTIONS - LINE A
5	PLAN, PROFILE AND SECTIONS - LINE A
6	PLAN, PROFILE AND SECTIONS - LINE A
7	PLAN, PROFILE AND SECTIONS - LINE A
8	PLAN, PROFILE AND SECTIONS - LINE A
9	PLAN, PROFILE AND SECTIONS - LINE B
10	PLAN, PROFILE AND SECTIONS - LINE [illegible]
11	PLAN, PROFILE AND SECTIONS - LINE [illegible] B.C
12	PLAN, PROFILE AND SECTIONS - LINE D
13	PLAN, PROFILE AND SECTIONS - LINE D & E
14	PLAN, PROFILE AND SECTIONS - LINE [illegible]
15	PLAN, PROFILE AND SECTIONS - LINE [illegible]
16	PLAN, PROFILE AND SECTIONS - LINE [illegible]
17	PLAN, PROFILE AND SECTIONS - LINE F
[illegible]	PLAN, PROFILE AND SECTIONS - LINE F & G
[illegible]	PLAN, PROFILE AND SECTIONS - LINE G
20,21,22	SANITARY SEWER RECONSTRUCTION - LINE A
23	ALTERNATE R.C. BOX STRUCT. DETAILS - LINE A
NUMBER	STANDARD DRAWINGS
	LOS ANGELES COUNTY FLOOD CONTROL DISTRICT STD.
2-D88	LOCAL DEPRESSION NO. 2
2-D96	STANDARD DROP STEP
2-D102	MANHOLE NO. 1
2-D107	CONCRETE RINGS REDUCER & PIPE FOR M.H. SHAFT
2-D112	JUNCTION STRUCTURE NO. 2
2-D113	MANHOLE NO. 4
2-D250	REMODELING OF SANITARY SEWER H.C.
2-D156	MANHOLE FRAME & COVER FOR CATCH BASINS
2-D157	CATCH BASIN REINFORCEMENT FOR ROUND M.H.
2-D158	DETAIL OF BOLT SUPPORT FOR CATCH BASINS
2-D160	CATCH BASIN NO. 1
2-D161	DETAIL OF ANGLE & ANCHOR FOR CATCH BASINS
2-D162	CATCH BASIN NO. 2
2-D171	CONCRETE REINFORCING STEEL
2-D172	CATCH BASIN REINFORCEMENT
2-D173.1	PIPE SUPPORT ACROSS TRENCHES
2-D173.2	PIPE SUPPORT ACROSS TRENCHES
2-D173.3	PIPE SUPPORT ACROSS TRENCHES
2-D175	REMOVABLE PROTECTION BAR FOR CATCH BASINS
2-D177	PIPE BEDDING IN TRENCHES
2-D181	STD. NON-ROCKING MANHOLE FRAME & COVER
2-D184	MANHOLE NO. 2
2-D190	PIPE CONNECTIONS TO EXISTING STORM DRAINS
2-D191	JUNCTION STRUCTURE NO. 3
2-D193	JUNCTION STRUCTURE NO. 4
2-D231 & 2	D-LOAD TABLE FOR DESIGN OF R.C.P.
2-D264	ADJUSTABLE PROTECTION BAR STIRRUP
2-D224	PIPE CONNECTION TO CATCH BASINS
2-D104	MANHOLE NO. 3
2-D251	PROTECTION FOR MAIN LINE & H.C. SEWERS
2-D189	JUNCTION STRUCTURE NO. 1
2-D235	TRANSITION STRUCTURE NO. 1
2-D239	TRANSITION STRUCTURE NO. 2
	CITY OF LONG BEACH STANDARDS
S-SD-1	STANDARD MANHOLE TYPE A
S-SD-11	STD. M.H. FRAME & COVER FOR SEWER & STORM DRAIN
S-SD-8	STANDARD DROP MANHOLE
S-SD-9	STANDARD STEPS
	L.A. CO. SANITATION DISTRICTS STD.
S-a-207	STANDARD MANHOLE FRAME & COVER

GENERAL NOTES

1. Numbers in circles indicate items under which payment will be made.
2. Elevations shown are in feet above the U.S.G.S. datum.
3. Stations shown on Profile are along centerline of conduit or on a line normal to centerline of conduit.
4. Stations & invert elevations of pipe inlets shown on profiles are at the inside face of the conduit wall unless otherwise shown.
5. All pipe shall be bedded as per Standard Drawing 2-D177, Case III, except bell & spigot pipe which shall have Case II bedding, unless otherwise shown.
6. Pipe connections shall conform to Standard Drawing 2-D191 or 193, unless otherwise shown.
7. Existing utilities shall be maintained in place by Contractor, unless otherwise shown.
8. Sanitary sewer & house lateral reconstruction encasement or Blanket shall be per Std. Dwg. 2-D250 & Std. Dwg. 2-D251, except that the use of cast iron pipe as called for on Dwg. 2-D251 will not be allowed. Support across trenches shall be per Std. Dwg. 2-D173.1, .2, .3.
9. All nonreinforced concrete pipe shall be extra strength, unless otherwise shown.
10. All Street Centerlines shown on Plans are located from curb splits.
11. Interfering portions of utilities are to be relocated or abandoned in place. Before excavating in vicinity of such utility, Contractor shall contact the utility company involved to make sure interfering portion has in fact been abandoned.
12. Where P.C.C. curb & gutter exist, Local Depressions shall be constructed as per Standard Drawing 2-D88. Where P.C.C. curb only or no curb exists, Local Depressions shall be constructed as per Standard Drawing 2-D88 with the following conditions & dimensions



13. See Sheet 23 For Structural Notes
14. Locations of C.B. Connector Pipes-Junctions with C.Basin's as shown on the drawings are schematic. It is the intent that such junctions be located at the downstream ends of the C.B's. unless otherwise shown. In all cases the exact locations will be determined in the field by the Engineer to meet field conditions.
15. Resurfacing Schedule except for Orange Ave.: All removed pavements except 7"-9" P.C.C. are to be resurfaced with 4" P.M.. 7"-9" P.C.C. shall be replaced with 8" P.C.C. All Crusher Run Rock Bases shall be replaced with same thickness of Crusher Run Rock.
16. Orange Ave. Resurfacing: 1½" P.M. on native soil.

FIELD BOOK REFERENCES
City of Long Beach Field Book No C-162
Pages 15-79 Inclusive

CHAS. P. MORGAN & ASSOCIATES
ENGINEERS LONG BEACH
JOB NO. 754

CITY OF LONG BEACH, CALIF.
JESS R. GILKERSON, CITY ENGINEER

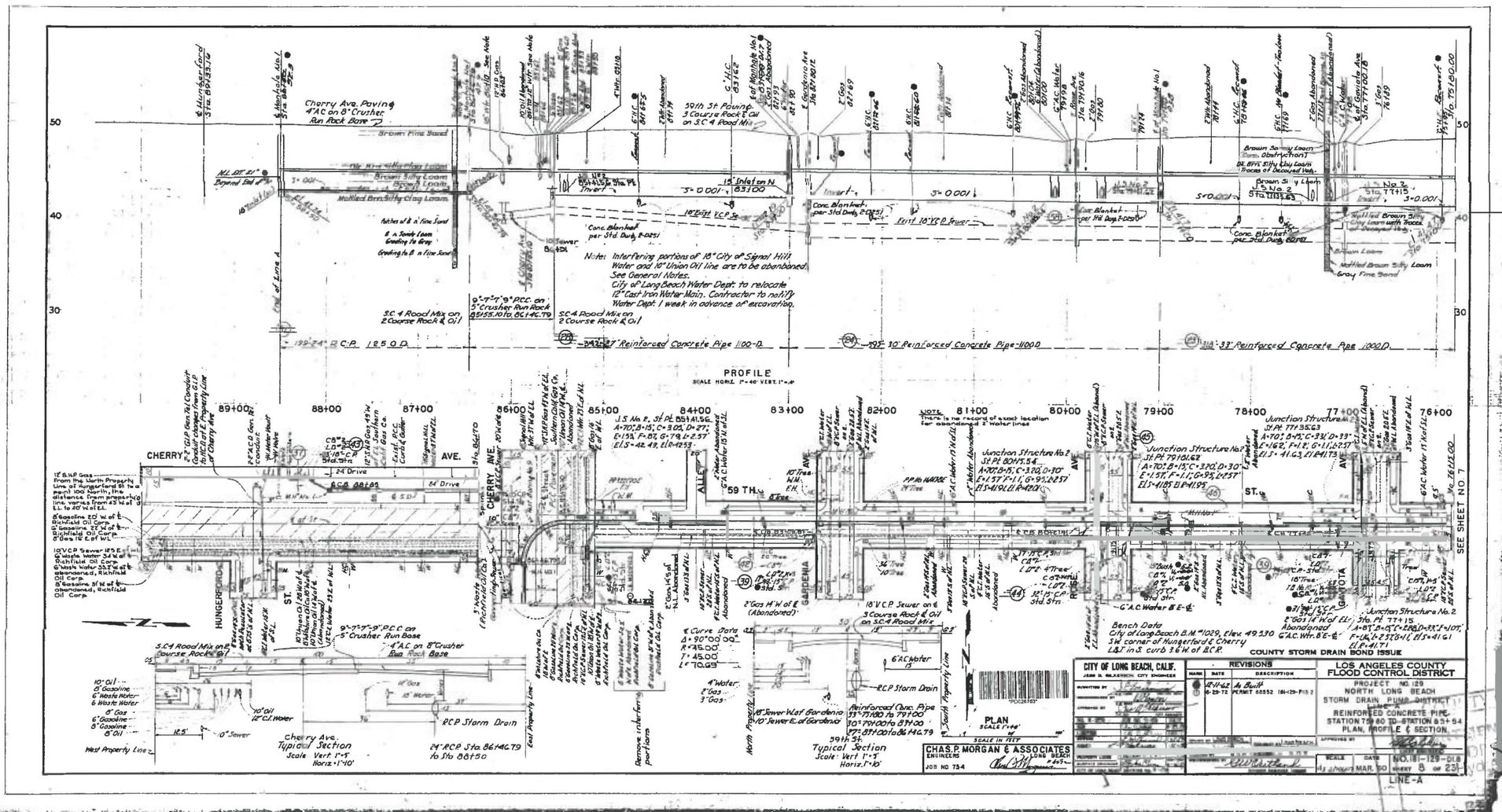
COUNTY STORM DRAIN BOND ISSUE

REVISIONS
MARK	DATE	DESCRIPTION

LOS ANGELES COUNTY
FLOOD CONTROL DISTRICT
PROJECT NO. 129
NORTH LONG BEACH
STORM DRAIN PUMP DISTRICT
LOCATION MAP
INDEX TO PLANS
& GENERAL NOTES

SCALE 1"=600' | DATE MAR '60 | NO. 181-129-D1.1 | SHEET 1 OF 23

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
DESIGN DIVISION
Hydraulic Analysis Unit
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RECORD DOCUMENT
Issued By: CKA
Date: 2 8 2021
Public Service That Works



CITY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
BUREAU OF ENGINEERING
DESIGN DIVISION
Public Analysis Unit
OFFICIAL
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Issued By: CKA
Date: 02/08/2024
Public Service That Works

APPENDIX B

HYDROLOGY CALCULATIONS

Peak Flow Hydrologic Analysis

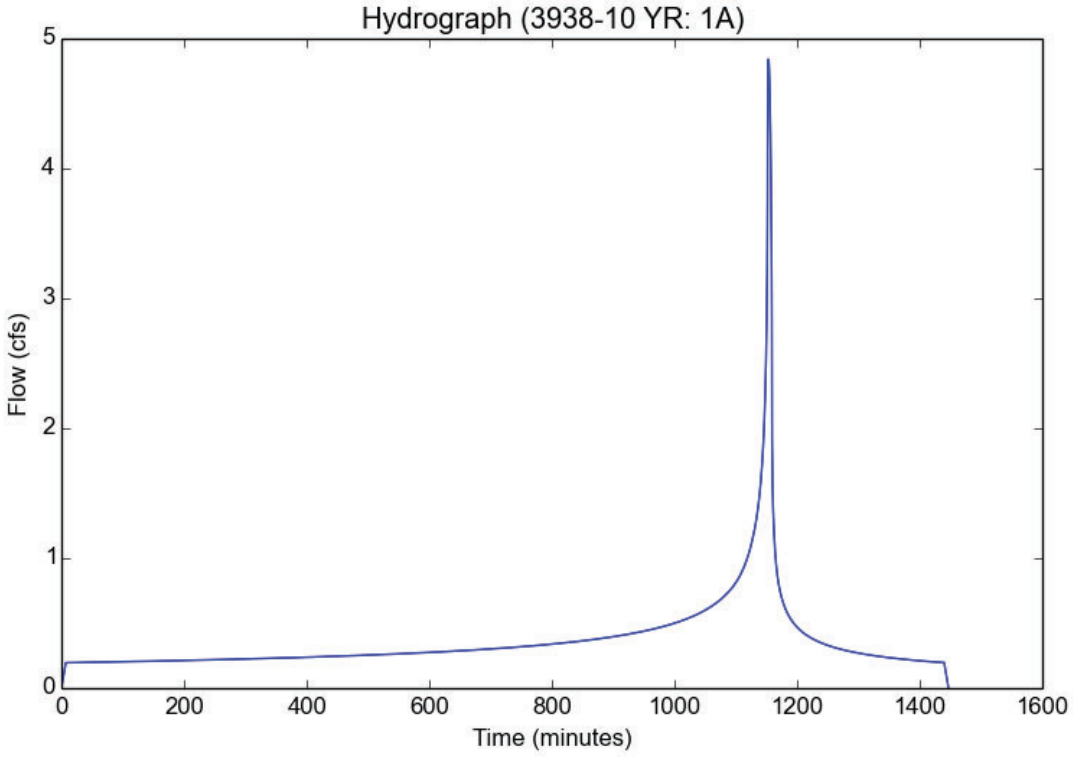
File location: O:/3900-3999/3938/hydrology/APPENDIX B TC CALCULATOR/3938-10 YR Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938-10 YR
Subarea ID	1A
Area (ac)	2.74
Flow Path Length (ft)	355.0
Flow Path Slope (vft/hft)	0.0125
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.9
Soil Type	6
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	3.927
Peak Intensity (in/hr)	2.0002
Undeveloped Runoff Coefficient (Cu)	0.7323
Developed Runoff Coefficient (Cd)	0.8832
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	4.8407
Burned Peak Flow Rate (cfs)	4.8407
24-Hr Clear Runoff Volume (ac-ft)	0.7355
24-Hr Clear Runoff Volume (cu-ft)	32036.7681



Peak Flow Hydrologic Analysis

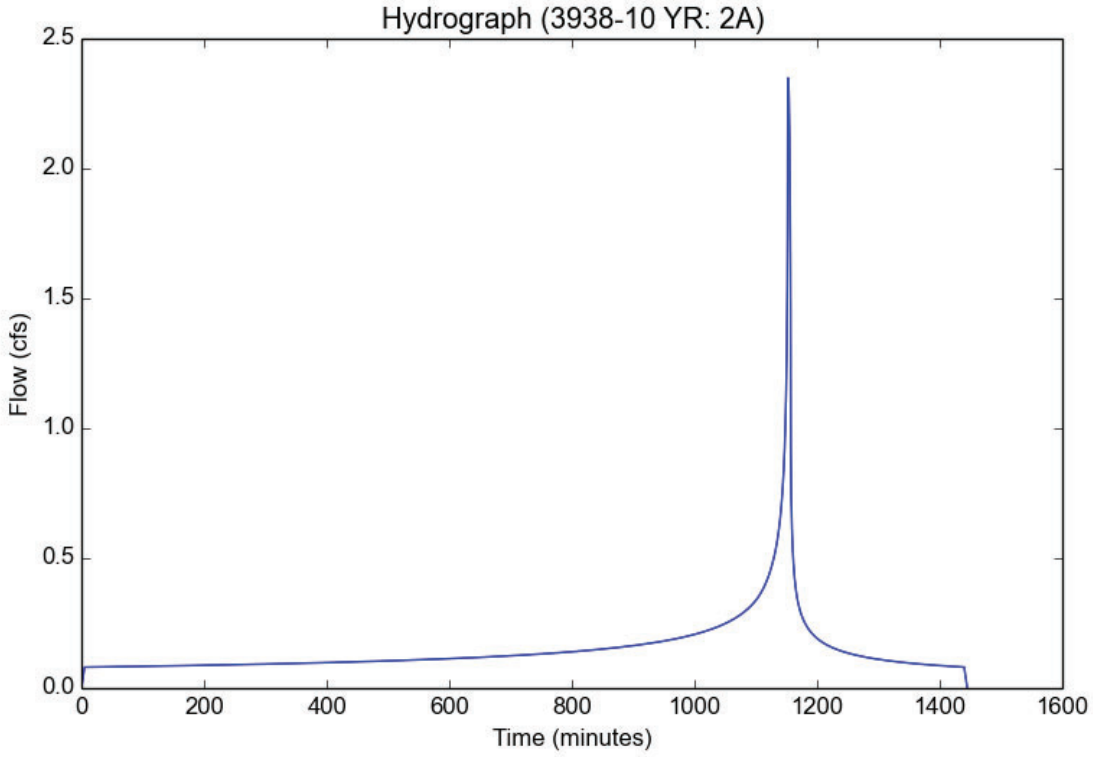
File location: O:/3900-3999/3938/hydrology/APPENDIX B TC CALCULATOR/3938-10 YR Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938-10 YR
Subarea ID	2A
Area (ac)	1.13
Flow Path Length (ft)	100.0
Flow Path Slope (vft/hft)	0.0109
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.9
Soil Type	6
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	3.927
Peak Intensity (in/hr)	2.343
Undeveloped Runoff Coefficient (Cu)	0.7699
Developed Runoff Coefficient (Cd)	0.887
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.3484
Burned Peak Flow Rate (cfs)	2.3484
24-Hr Clear Runoff Volume (ac-ft)	0.3033
24-Hr Clear Runoff Volume (cu-ft)	13213.1491



Peak Flow Hydrologic Analysis

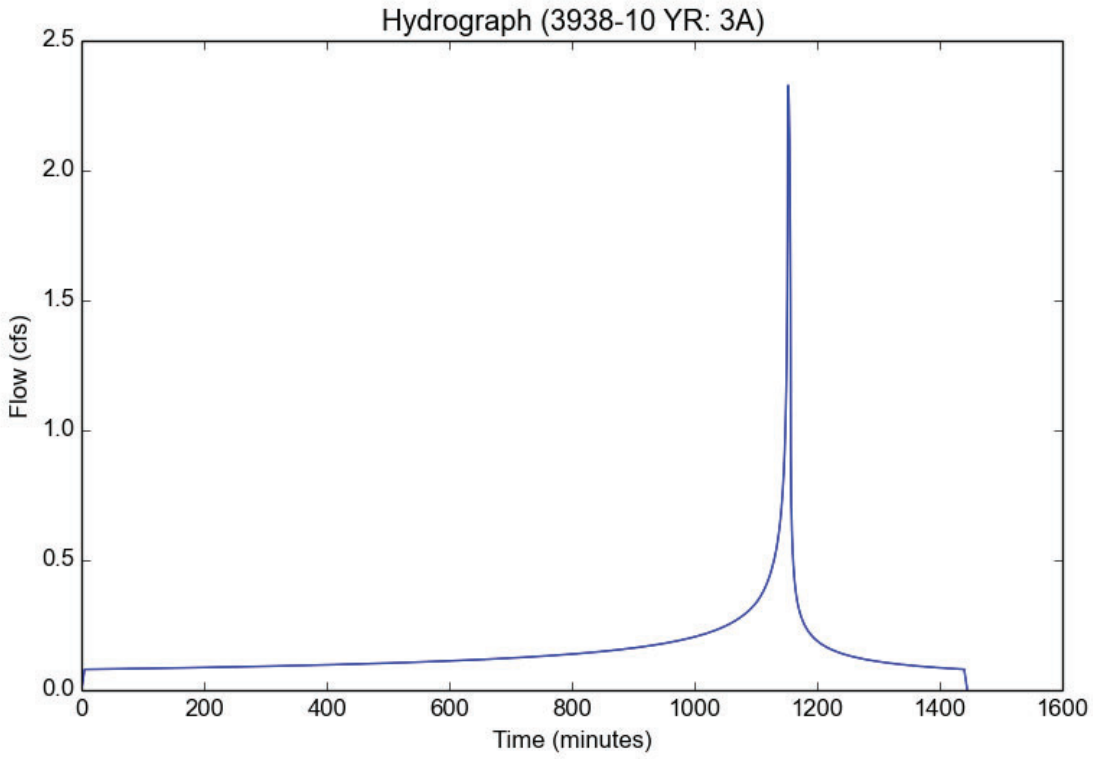
File location: O:/3900-3999/3938/hydrology/APPENDIX B TC CALCULATOR/3938-10 YR Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938-10 YR
Subarea ID	3A
Area (ac)	1.12
Flow Path Length (ft)	100.0
Flow Path Slope (vft/hft)	0.0109
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.9
Soil Type	6
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	3.927
Peak Intensity (in/hr)	2.343
Undeveloped Runoff Coefficient (Cu)	0.7699
Developed Runoff Coefficient (Cd)	0.887
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.3276
Burned Peak Flow Rate (cfs)	2.3276
24-Hr Clear Runoff Volume (ac-ft)	0.3006
24-Hr Clear Runoff Volume (cu-ft)	13096.2186



Peak Flow Hydrologic Analysis

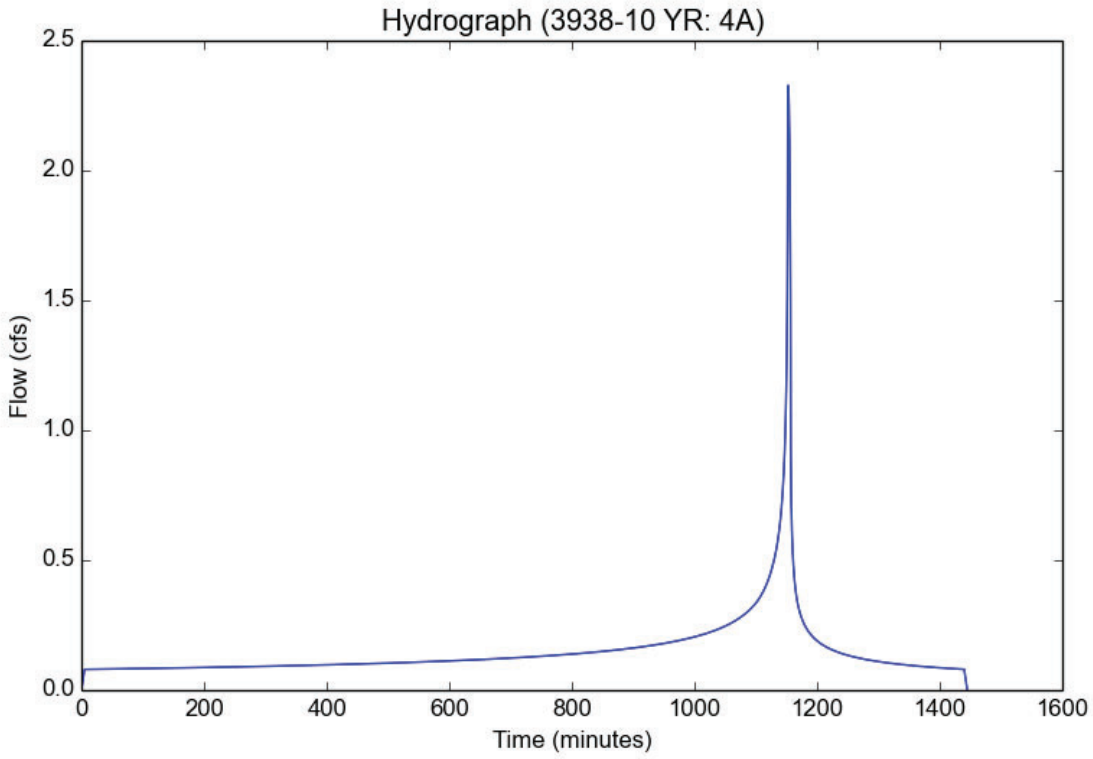
File location: O:/3900-3999/3938/hydrology/APPENDIX B TC CALCULATOR/3938-10 YR Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938-10 YR
Subarea ID	4A
Area (ac)	1.12
Flow Path Length (ft)	100.0
Flow Path Slope (vft/hft)	0.0109
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.9
Soil Type	6
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	3.927
Peak Intensity (in/hr)	2.343
Undeveloped Runoff Coefficient (Cu)	0.7699
Developed Runoff Coefficient (Cd)	0.887
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.3276
Burned Peak Flow Rate (cfs)	2.3276
24-Hr Clear Runoff Volume (ac-ft)	0.3006
24-Hr Clear Runoff Volume (cu-ft)	13096.2186



Peak Flow Hydrologic Analysis

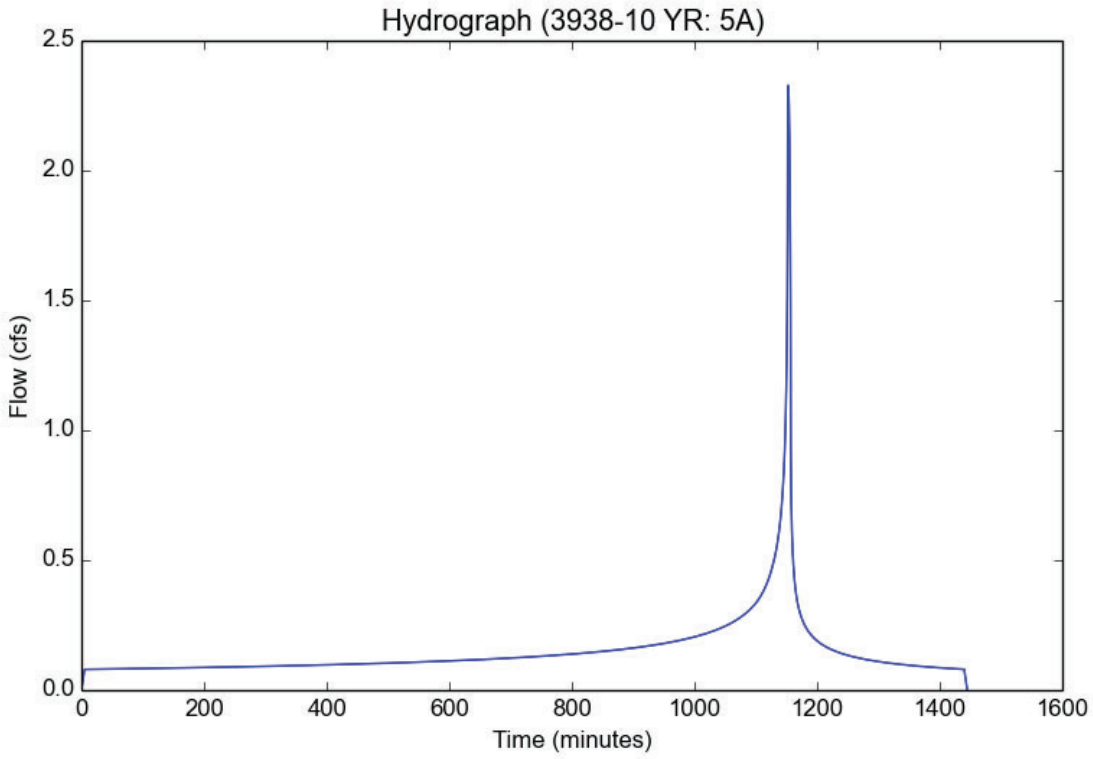
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938-10 YR
Subarea ID	5A
Area (ac)	1.12
Flow Path Length (ft)	100.0
Flow Path Slope (vft/hft)	0.0109
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.9
Soil Type	6
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	3.927
Peak Intensity (in/hr)	2.343
Undeveloped Runoff Coefficient (Cu)	0.7699
Developed Runoff Coefficient (Cd)	0.887
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.3276
Burned Peak Flow Rate (cfs)	2.3276
24-Hr Clear Runoff Volume (ac-ft)	0.3006
24-Hr Clear Runoff Volume (cu-ft)	13096.2186



Peak Flow Hydrologic Analysis

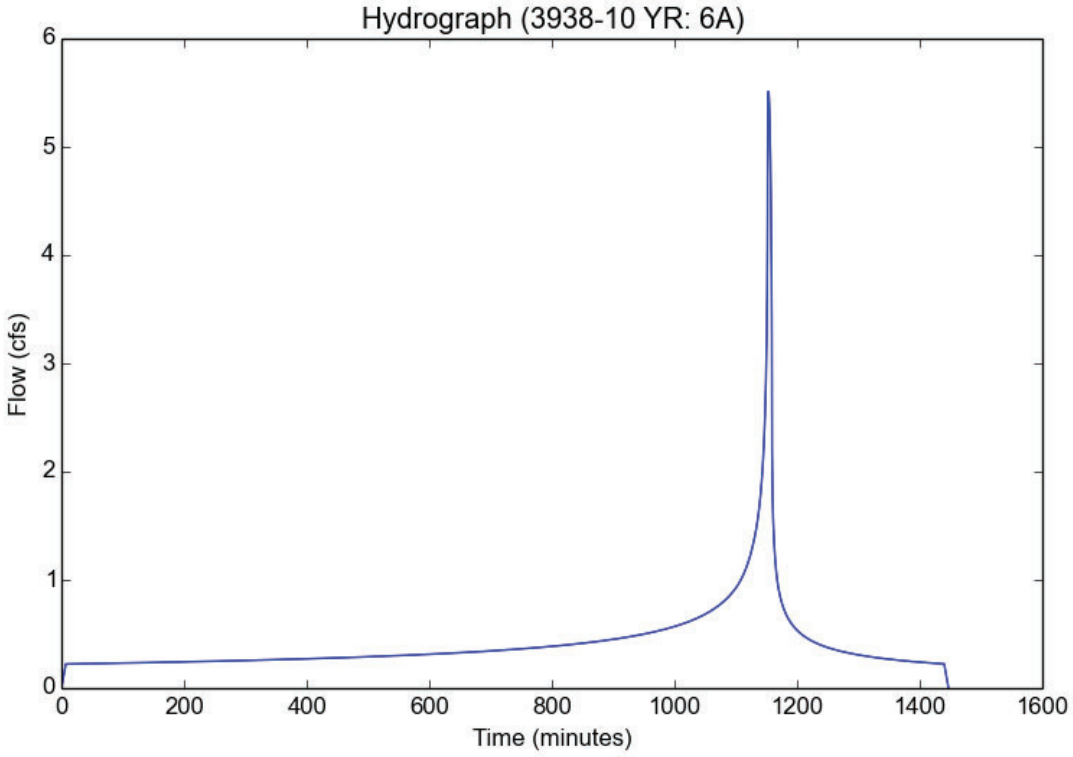
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938-10 YR
Subarea ID	6A
Area (ac)	3.12
Flow Path Length (ft)	284.0
Flow Path Slope (vft/hft)	0.0067
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.9
Soil Type	6
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	3.927
Peak Intensity (in/hr)	2.0002
Undeveloped Runoff Coefficient (Cu)	0.7323
Developed Runoff Coefficient (Cd)	0.8832
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	5.5121
Burned Peak Flow Rate (cfs)	5.5121
24-Hr Clear Runoff Volume (ac-ft)	0.8375
24-Hr Clear Runoff Volume (cu-ft)	36479.8235



Peak Flow Hydrologic Analysis

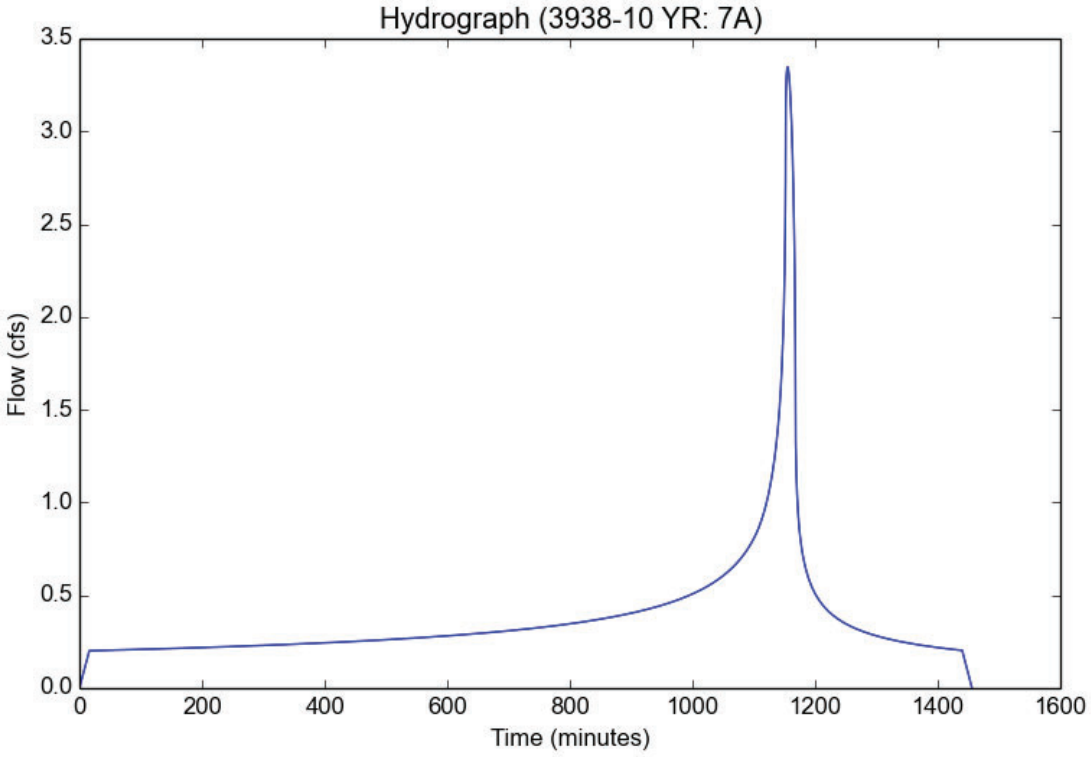
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938-10 YR
Subarea ID	7A
Area (ac)	2.82
Flow Path Length (ft)	996.0
Flow Path Slope (vft/hft)	0.0058
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.9
Soil Type	6
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	3.927
Peak Intensity (in/hr)	1.3563
Undeveloped Runoff Coefficient (Cu)	0.6509
Developed Runoff Coefficient (Cd)	0.8751
Time of Concentration (min)	16.0
Clear Peak Flow Rate (cfs)	3.3469
Burned Peak Flow Rate (cfs)	3.3469
24-Hr Clear Runoff Volume (ac-ft)	0.7568
24-Hr Clear Runoff Volume (cu-ft)	32967.7437



Peak Flow Hydrologic Analysis

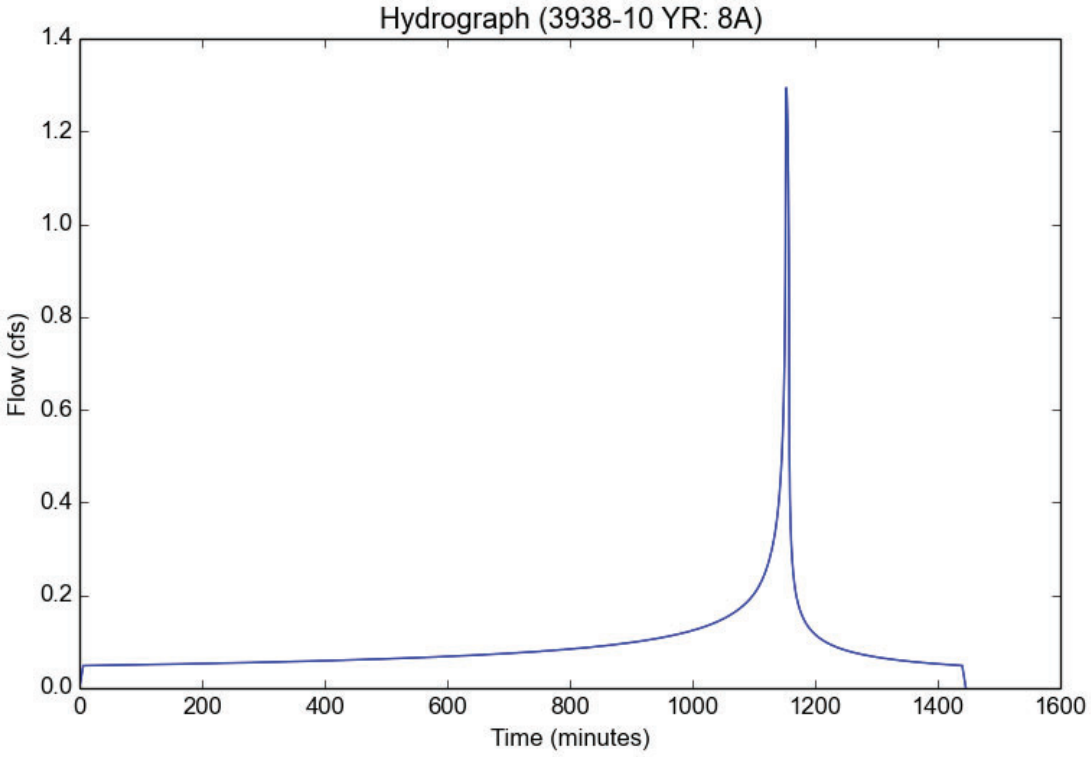
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938-10 YR
Subarea ID	8A
Area (ac)	0.68
Flow Path Length (ft)	244.0
Flow Path Slope (vft/hft)	0.0089
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.9
Soil Type	6
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	3.927
Peak Intensity (in/hr)	2.1505
Undeveloped Runoff Coefficient (Cu)	0.7488
Developed Runoff Coefficient (Cd)	0.8849
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	1.294
Burned Peak Flow Rate (cfs)	1.294
24-Hr Clear Runoff Volume (ac-ft)	0.1825
24-Hr Clear Runoff Volume (cu-ft)	7950.9629



Peak Flow Hydrologic Analysis

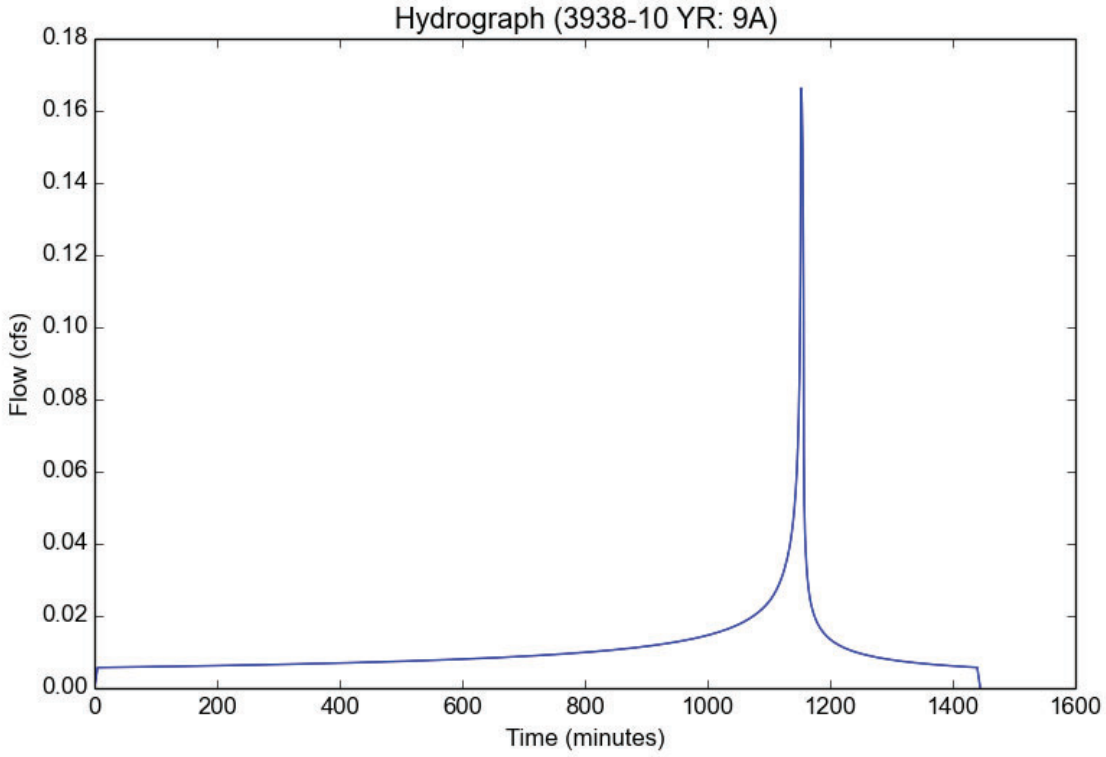
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938-10 YR
Subarea ID	9A
Area (ac)	0.08
Flow Path Length (ft)	65.0
Flow Path Slope (vft/hft)	0.0086
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.9
Soil Type	6
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	3.927
Peak Intensity (in/hr)	2.343
Undeveloped Runoff Coefficient (Cu)	0.7699
Developed Runoff Coefficient (Cd)	0.887
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.1663
Burned Peak Flow Rate (cfs)	0.1663
24-Hr Clear Runoff Volume (ac-ft)	0.0215
24-Hr Clear Runoff Volume (cu-ft)	935.4442



Peak Flow Hydrologic Analysis

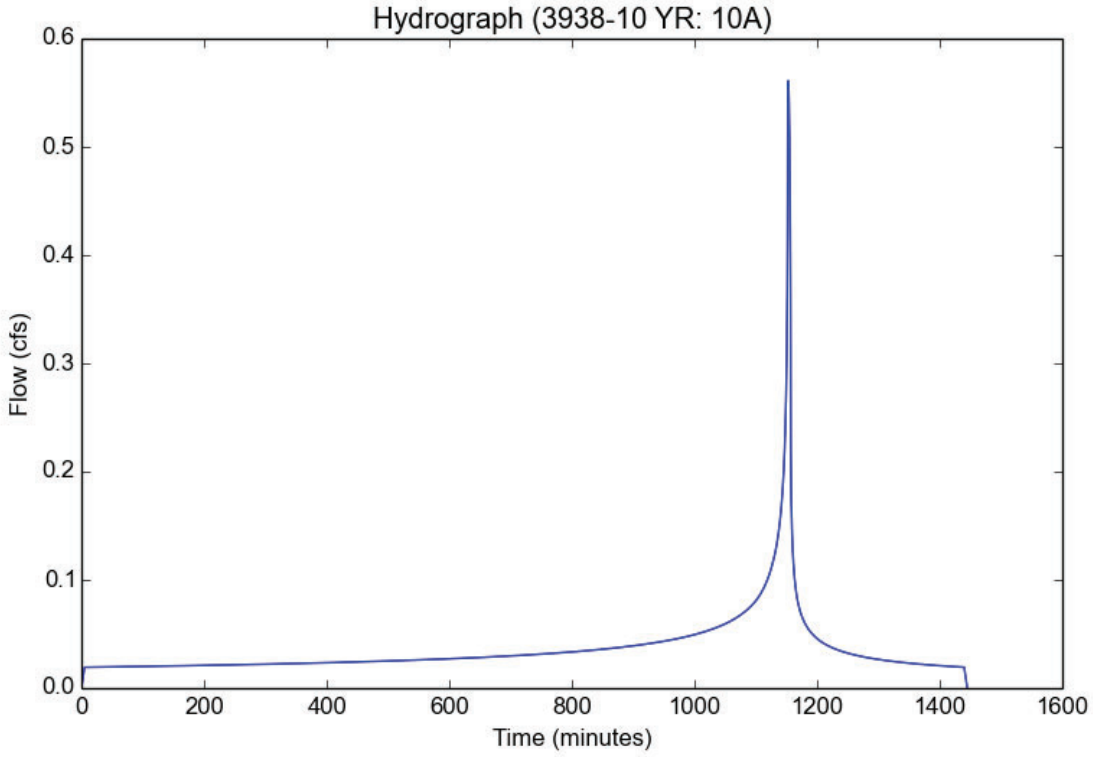
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938-10 YR
Subarea ID	10A
Area (ac)	0.27
Flow Path Length (ft)	59.0
Flow Path Slope (vft/hft)	0.0286
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.9
Soil Type	6
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	3.927
Peak Intensity (in/hr)	2.343
Undeveloped Runoff Coefficient (Cu)	0.7699
Developed Runoff Coefficient (Cd)	0.887
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.5611
Burned Peak Flow Rate (cfs)	0.5611
24-Hr Clear Runoff Volume (ac-ft)	0.0725
24-Hr Clear Runoff Volume (cu-ft)	3157.1241



Peak Flow Hydrologic Analysis

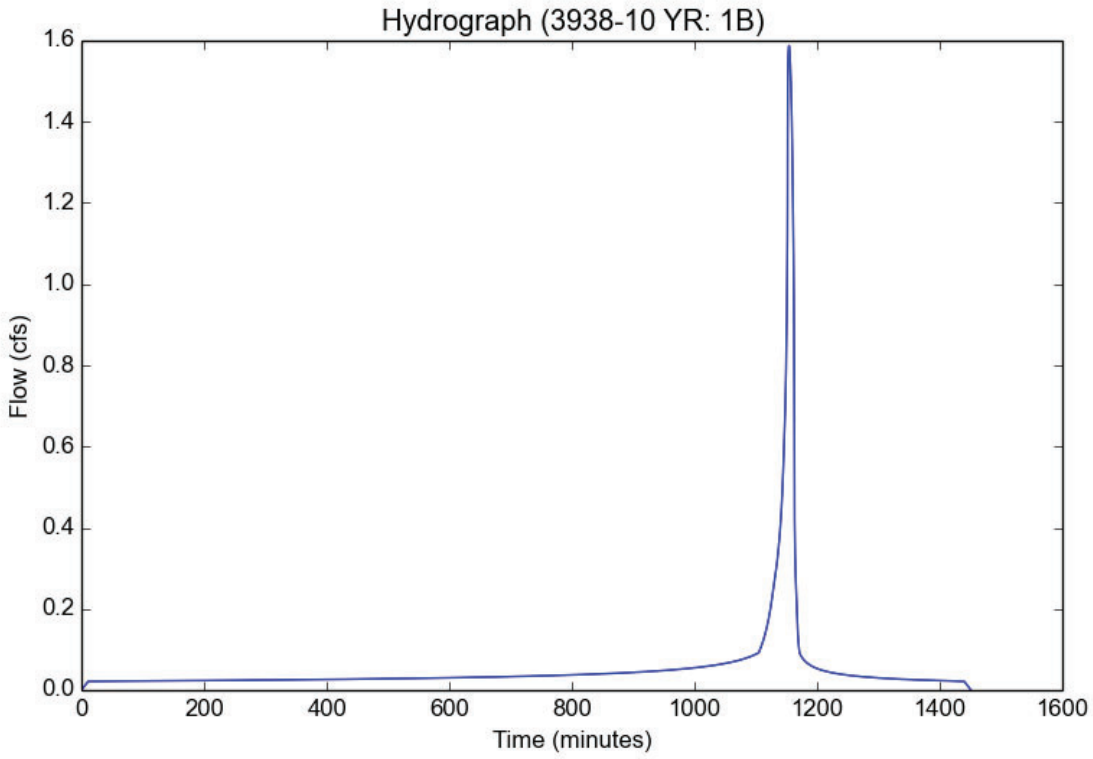
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938-10 YR
Subarea ID	1B
Area (ac)	1.38
Flow Path Length (ft)	426.0
Flow Path Slope (vft/hft)	0.0058
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.1
Soil Type	6
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	3.927
Peak Intensity (in/hr)	1.6174
Undeveloped Runoff Coefficient (Cu)	0.6903
Developed Runoff Coefficient (Cd)	0.7113
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	1.5876
Burned Peak Flow Rate (cfs)	1.5876
24-Hr Clear Runoff Volume (ac-ft)	0.1089
24-Hr Clear Runoff Volume (cu-ft)	4742.0218



Peak Flow Hydrologic Analysis

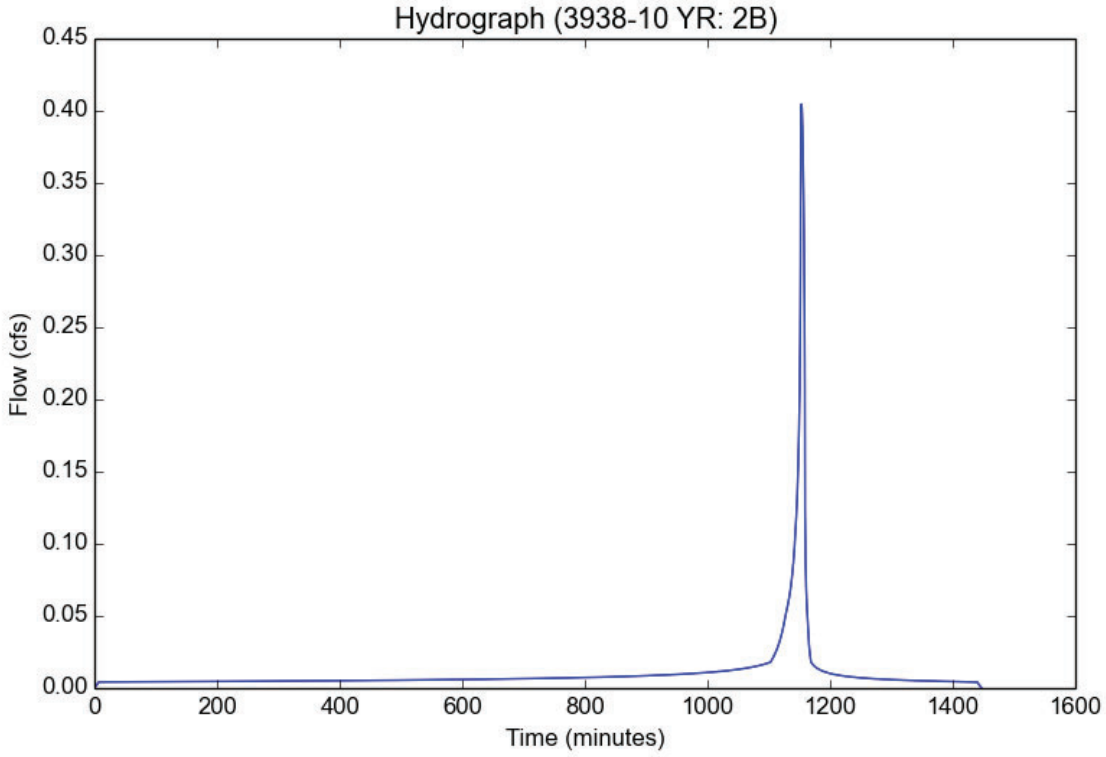
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938-10 YR
Subarea ID	2B
Area (ac)	0.27
Flow Path Length (ft)	231.0
Flow Path Slope (vft/hft)	0.0079
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.1
Soil Type	6
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	3.927
Peak Intensity (in/hr)	2.0002
Undeveloped Runoff Coefficient (Cu)	0.7323
Developed Runoff Coefficient (Cd)	0.7491
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	0.4046
Burned Peak Flow Rate (cfs)	0.4046
24-Hr Clear Runoff Volume (ac-ft)	0.0213
24-Hr Clear Runoff Volume (cu-ft)	929.4365



Peak Flow Hydrologic Analysis

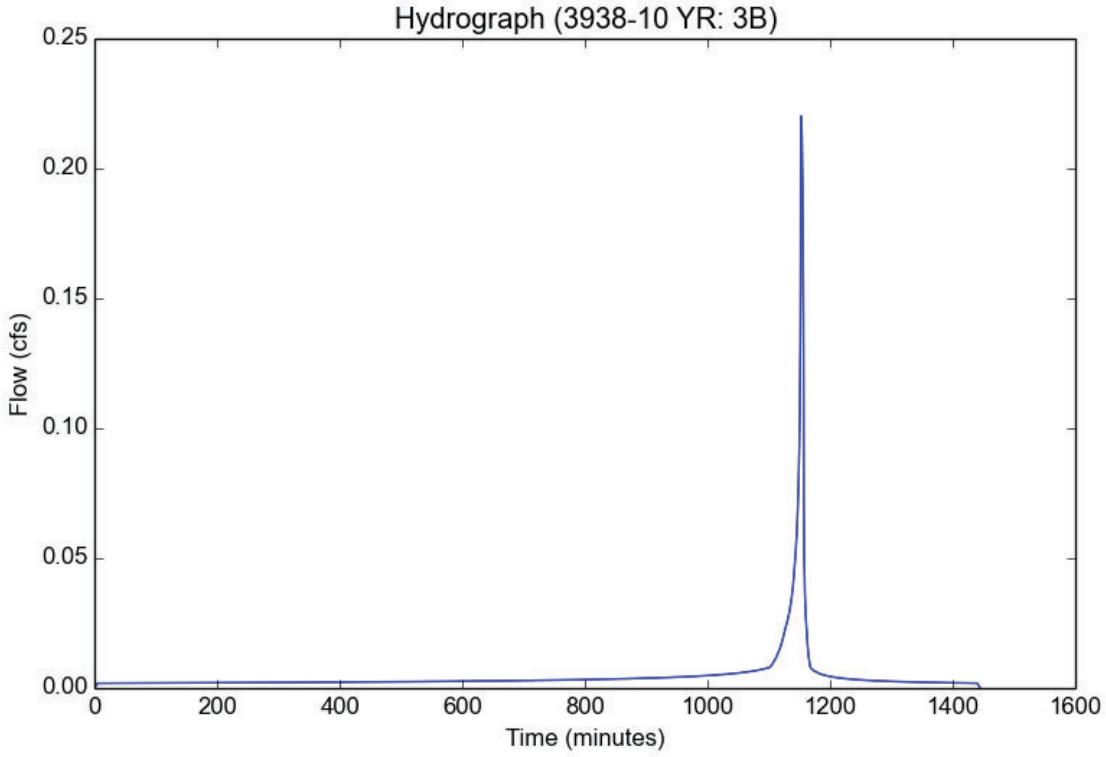
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938-10 YR
Subarea ID	3B
Area (ac)	0.12
Flow Path Length (ft)	95.0
Flow Path Slope (vft/hft)	0.0104
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.1
Soil Type	6
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	3.927
Peak Intensity (in/hr)	2.343
Undeveloped Runoff Coefficient (Cu)	0.7699
Developed Runoff Coefficient (Cd)	0.7829
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.2201
Burned Peak Flow Rate (cfs)	0.2201
24-Hr Clear Runoff Volume (ac-ft)	0.0095
24-Hr Clear Runoff Volume (cu-ft)	413.9519



Peak Flow Hydrologic Analysis

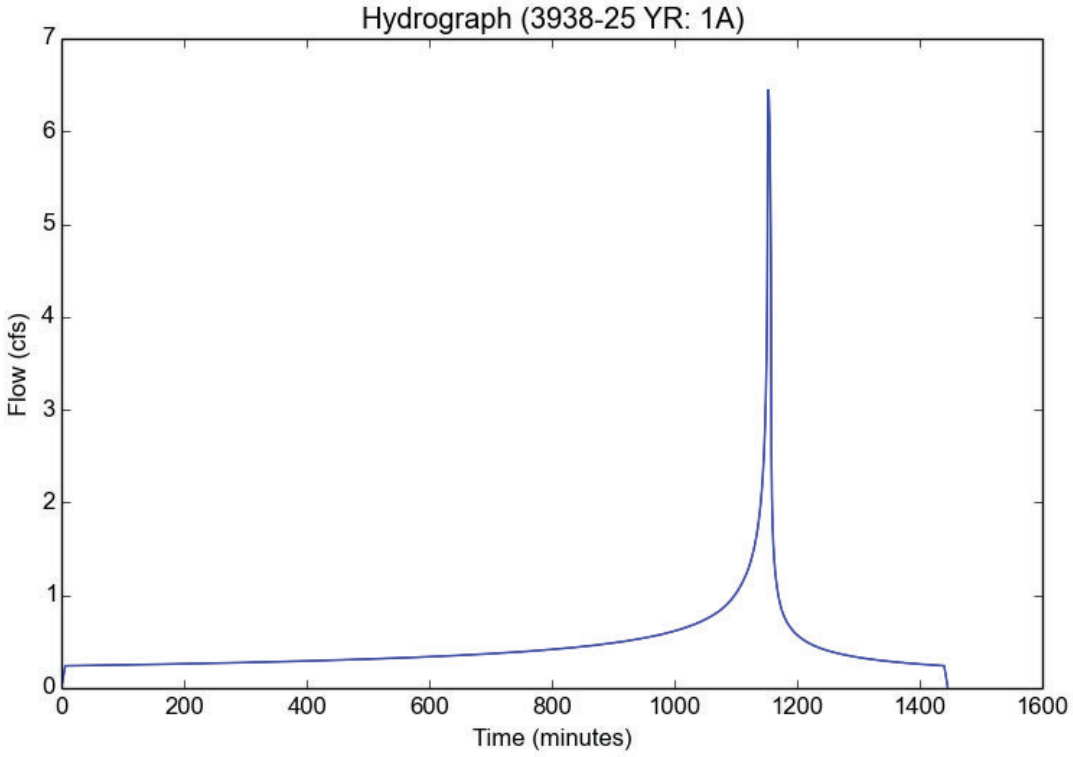
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938-25 YR
Subarea ID	1A
Area (ac)	2.74
Flow Path Length (ft)	355.0
Flow Path Slope (vft/hft)	0.0125
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.9
Soil Type	6
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	4.829
Peak Intensity (in/hr)	2.6445
Undeveloped Runoff Coefficient (Cu)	0.7973
Developed Runoff Coefficient (Cd)	0.8897
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	6.447
Burned Peak Flow Rate (cfs)	6.447
24-Hr Clear Runoff Volume (ac-ft)	0.9066
24-Hr Clear Runoff Volume (cu-ft)	39489.716



Peak Flow Hydrologic Analysis

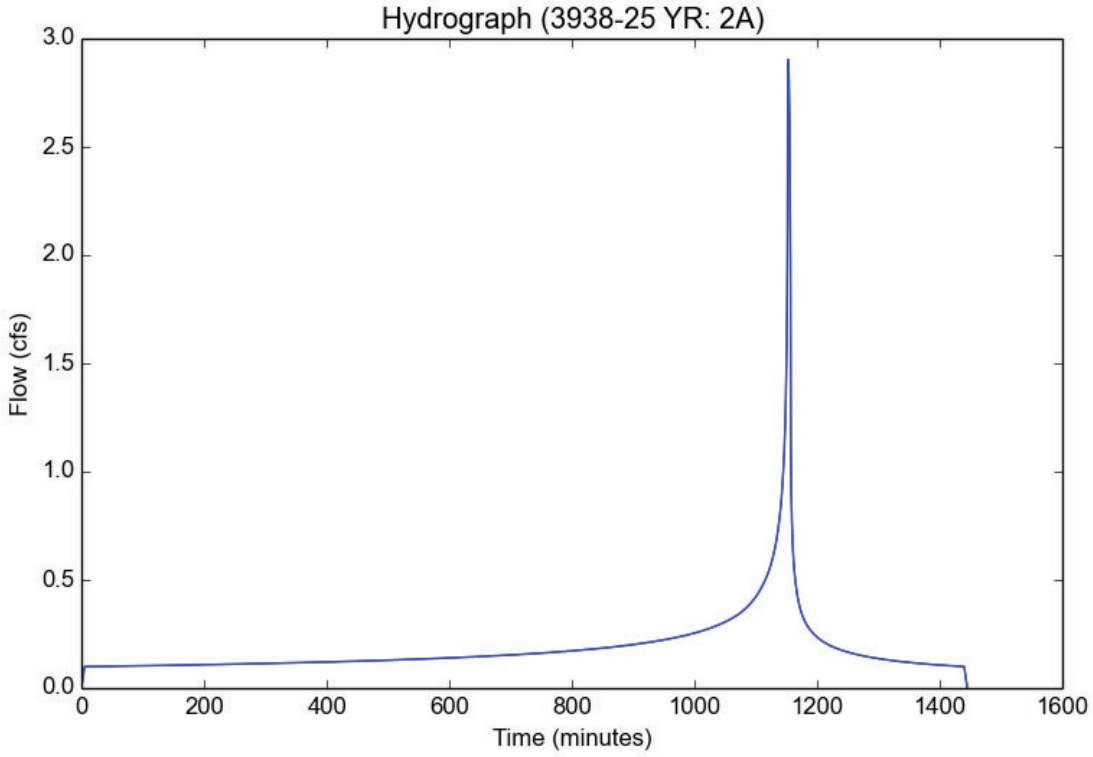
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938-25 YR
Subarea ID	2A
Area (ac)	1.13
Flow Path Length (ft)	100.0
Flow Path Slope (vft/hft)	0.0109
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.9
Soil Type	6
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	4.829
Peak Intensity (in/hr)	2.8811
Undeveloped Runoff Coefficient (Cu)	0.8139
Developed Runoff Coefficient (Cd)	0.8914
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.9021
Burned Peak Flow Rate (cfs)	2.9021
24-Hr Clear Runoff Volume (ac-ft)	0.3739
24-Hr Clear Runoff Volume (cu-ft)	16286.4273



Peak Flow Hydrologic Analysis

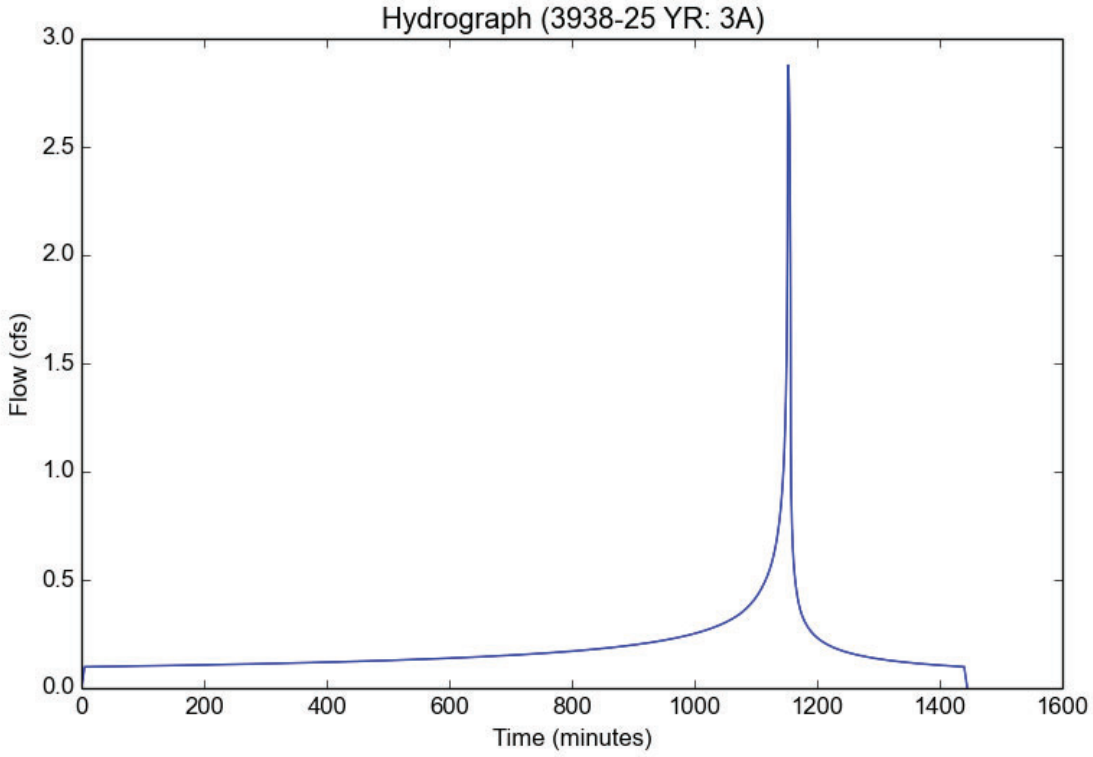
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938-25 YR
Subarea ID	3A
Area (ac)	1.12
Flow Path Length (ft)	100.0
Flow Path Slope (vft/hft)	0.0109
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.9
Soil Type	6
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	4.829
Peak Intensity (in/hr)	2.8811
Undeveloped Runoff Coefficient (Cu)	0.8139
Developed Runoff Coefficient (Cd)	0.8914
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.8764
Burned Peak Flow Rate (cfs)	2.8764
24-Hr Clear Runoff Volume (ac-ft)	0.3706
24-Hr Clear Runoff Volume (cu-ft)	16142.2997



Peak Flow Hydrologic Analysis

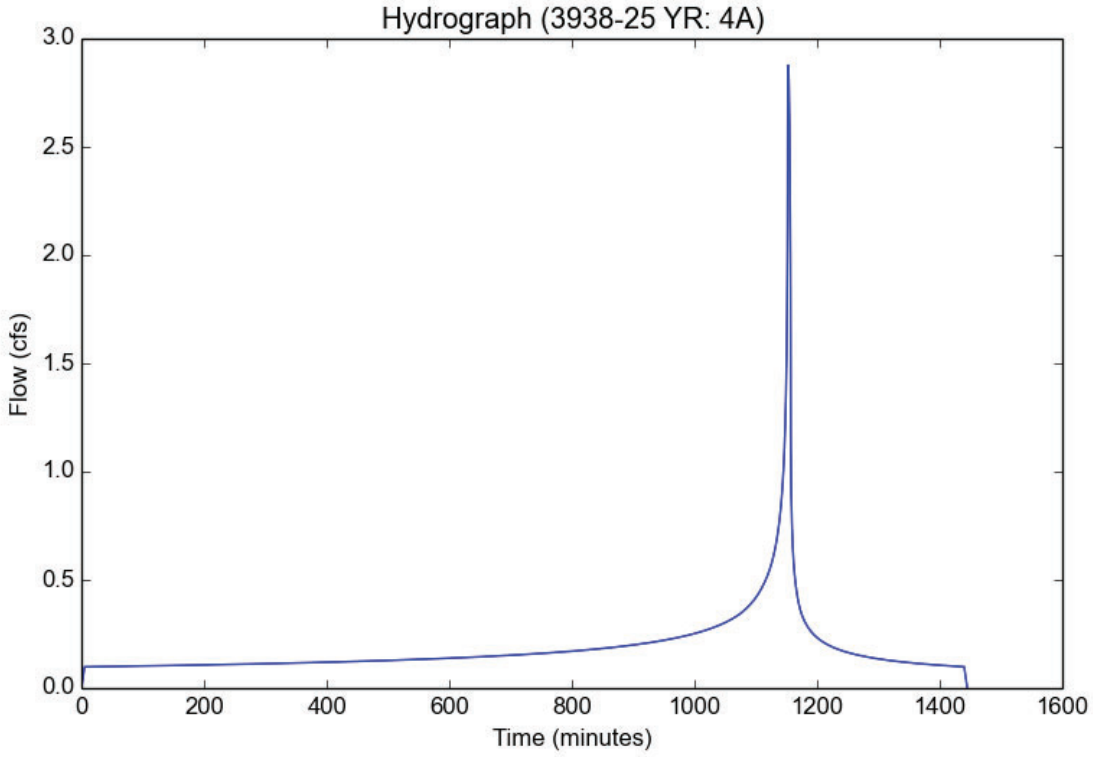
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938-25 YR
Subarea ID	4A
Area (ac)	1.12
Flow Path Length (ft)	100.0
Flow Path Slope (vft/hft)	0.0109
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.9
Soil Type	6
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	4.829
Peak Intensity (in/hr)	2.8811
Undeveloped Runoff Coefficient (Cu)	0.8139
Developed Runoff Coefficient (Cd)	0.8914
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.8764
Burned Peak Flow Rate (cfs)	2.8764
24-Hr Clear Runoff Volume (ac-ft)	0.3706
24-Hr Clear Runoff Volume (cu-ft)	16142.2997



Peak Flow Hydrologic Analysis

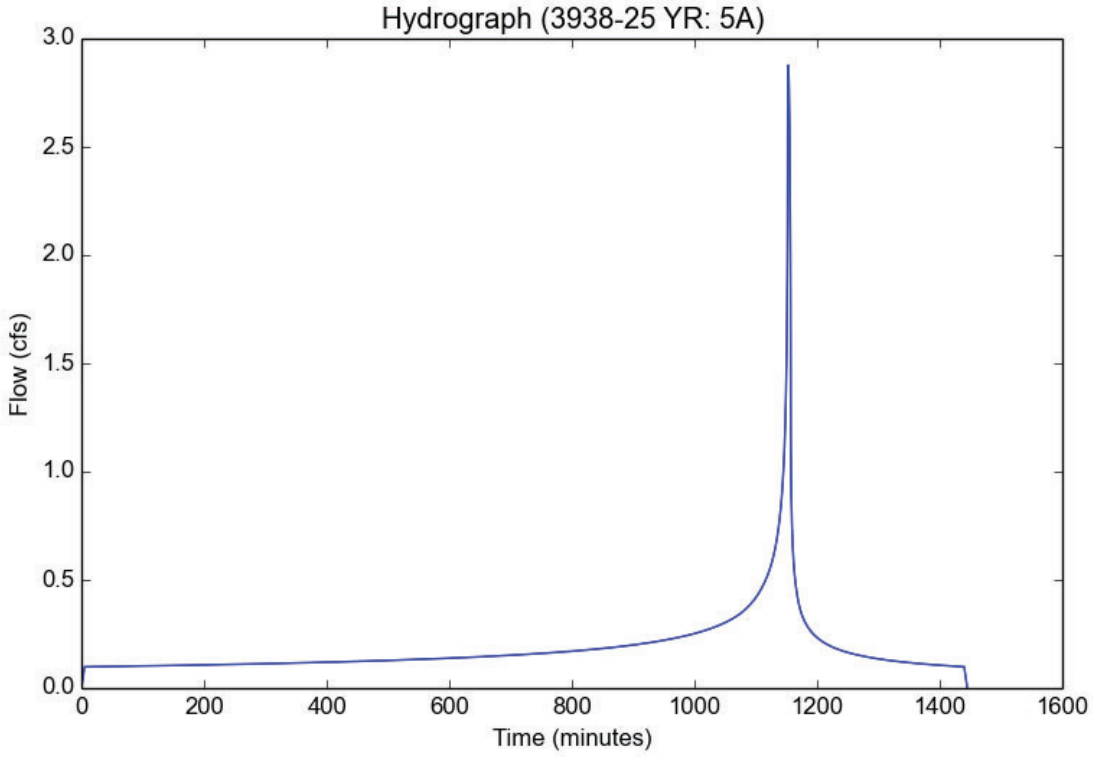
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938-25 YR
Subarea ID	5A
Area (ac)	1.12
Flow Path Length (ft)	100.0
Flow Path Slope (vft/hft)	0.0109
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.9
Soil Type	6
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	4.829
Peak Intensity (in/hr)	2.8811
Undeveloped Runoff Coefficient (Cu)	0.8139
Developed Runoff Coefficient (Cd)	0.8914
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.8764
Burned Peak Flow Rate (cfs)	2.8764
24-Hr Clear Runoff Volume (ac-ft)	0.3706
24-Hr Clear Runoff Volume (cu-ft)	16142.2997



Peak Flow Hydrologic Analysis

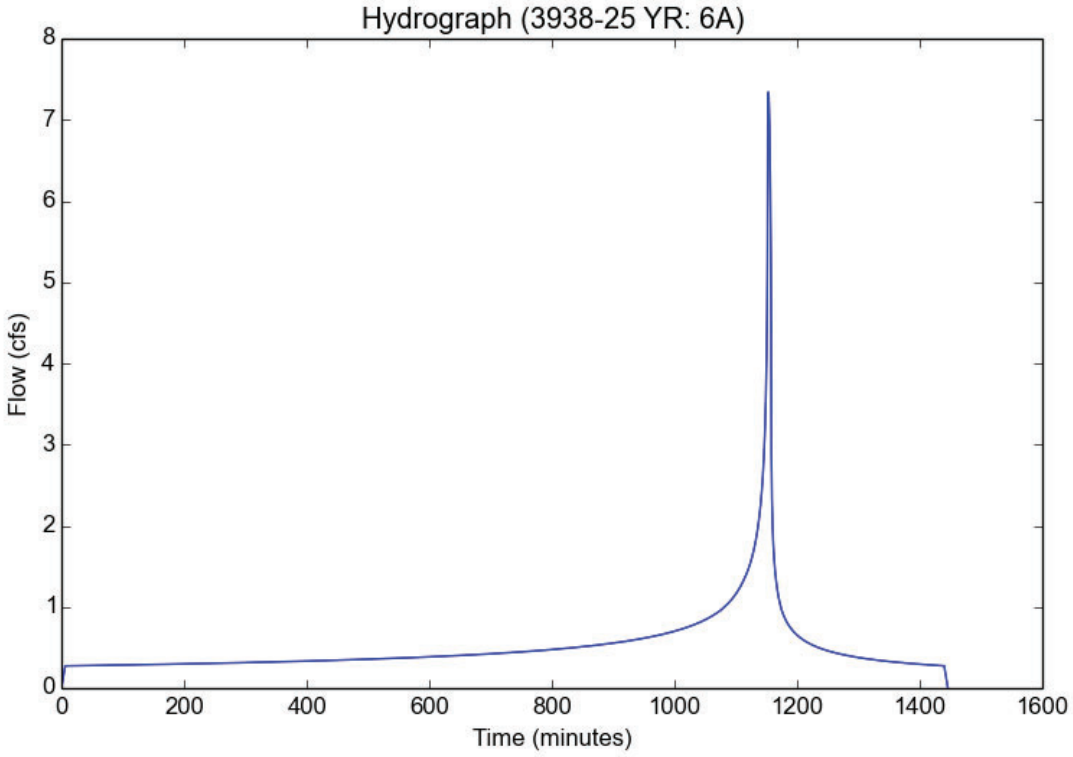
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938-25 YR
Subarea ID	6A
Area (ac)	3.12
Flow Path Length (ft)	284.0
Flow Path Slope (vft/hft)	0.0067
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.9
Soil Type	6
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	4.829
Peak Intensity (in/hr)	2.6445
Undeveloped Runoff Coefficient (Cu)	0.7973
Developed Runoff Coefficient (Cd)	0.8897
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	7.3411
Burned Peak Flow Rate (cfs)	7.3411
24-Hr Clear Runoff Volume (ac-ft)	1.0323
24-Hr Clear Runoff Volume (cu-ft)	44966.3919



Peak Flow Hydrologic Analysis

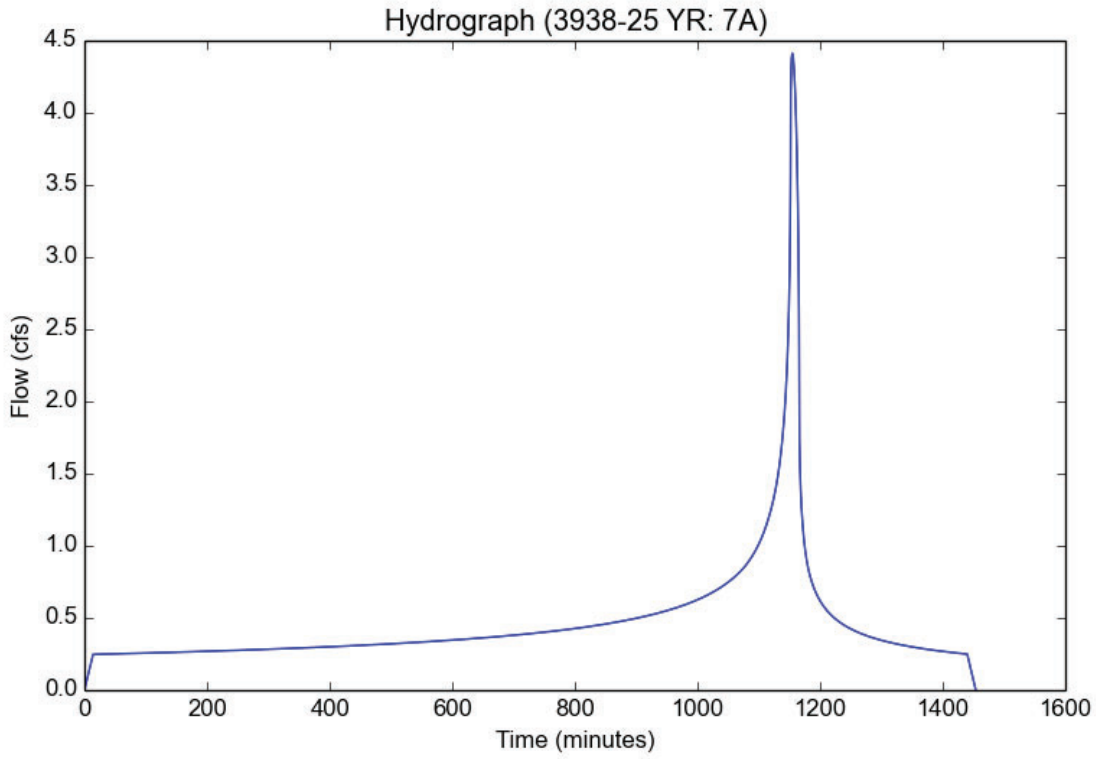
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938-25 YR
Subarea ID	7A
Area (ac)	2.82
Flow Path Length (ft)	996.0
Flow Path Slope (vft/hft)	0.0058
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.9
Soil Type	6
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	4.829
Peak Intensity (in/hr)	1.7758
Undeveloped Runoff Coefficient (Cu)	0.7077
Developed Runoff Coefficient (Cd)	0.8808
Time of Concentration (min)	14.0
Clear Peak Flow Rate (cfs)	4.4107
Burned Peak Flow Rate (cfs)	4.4107
24-Hr Clear Runoff Volume (ac-ft)	0.9328
24-Hr Clear Runoff Volume (cu-ft)	40634.576



Peak Flow Hydrologic Analysis

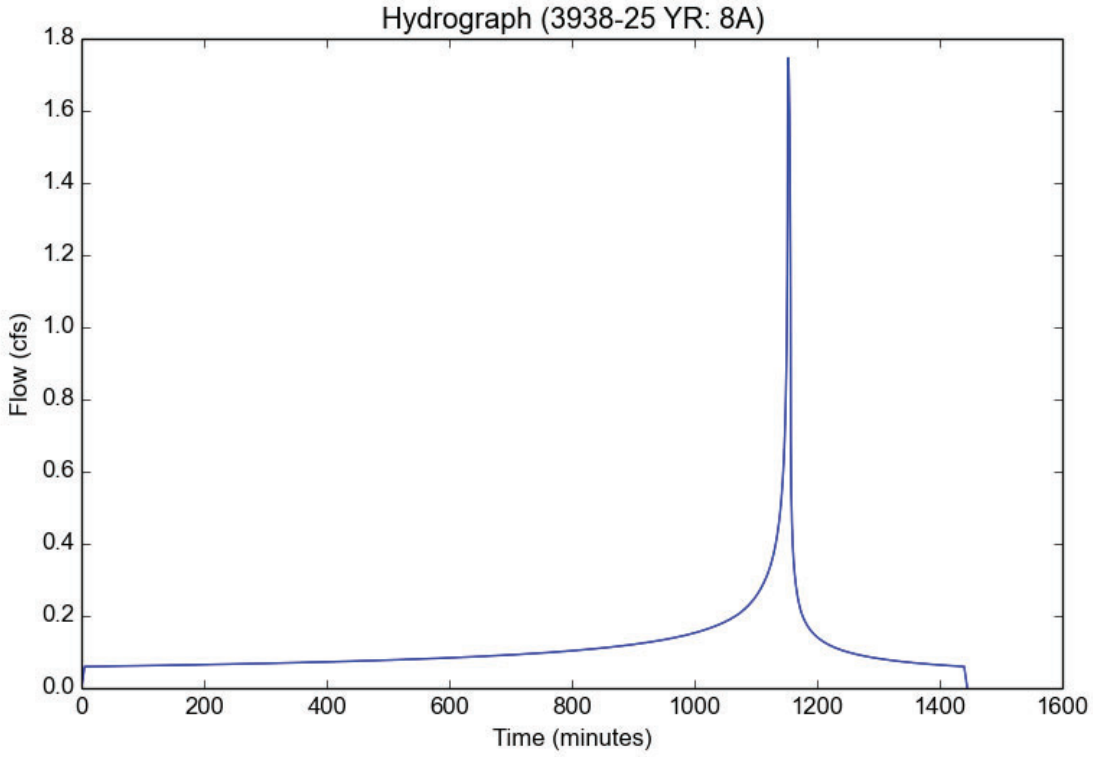
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938-25 YR
Subarea ID	8A
Area (ac)	0.68
Flow Path Length (ft)	244.0
Flow Path Slope (vft/hft)	0.0089
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.9
Soil Type	6
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	4.829
Peak Intensity (in/hr)	2.8811
Undeveloped Runoff Coefficient (Cu)	0.8139
Developed Runoff Coefficient (Cd)	0.8914
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.7464
Burned Peak Flow Rate (cfs)	1.7464
24-Hr Clear Runoff Volume (ac-ft)	0.225
24-Hr Clear Runoff Volume (cu-ft)	9800.6819



Peak Flow Hydrologic Analysis

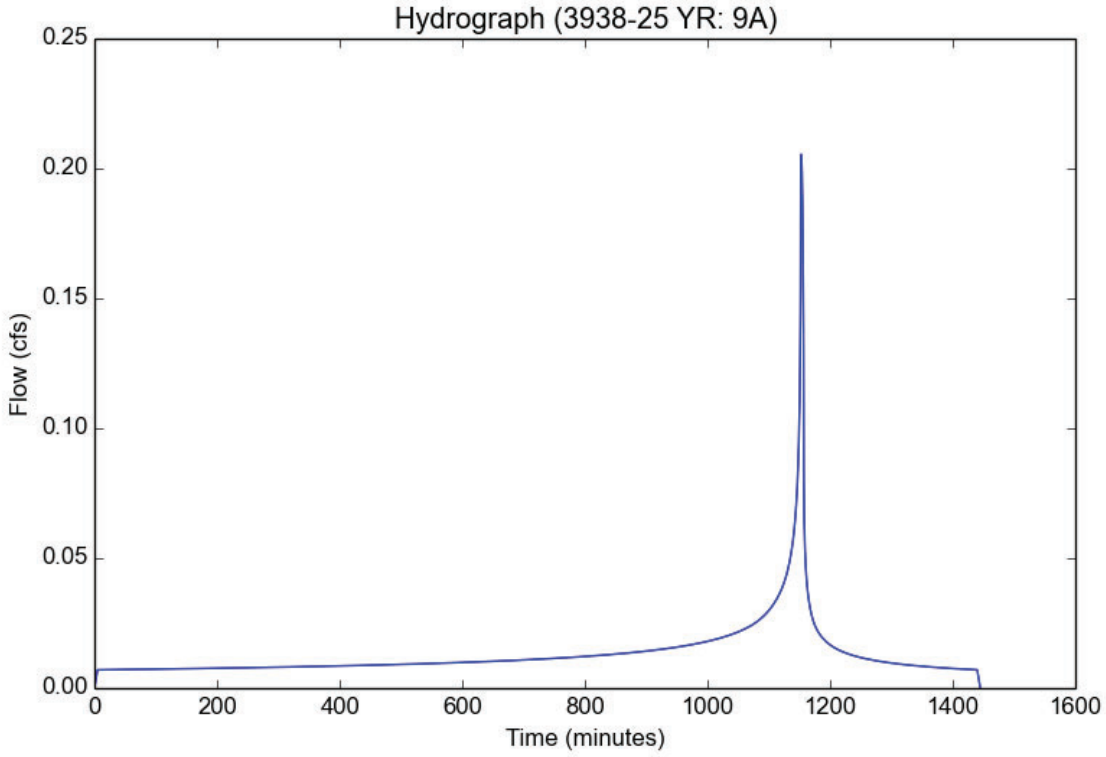
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938-25 YR
Subarea ID	9A
Area (ac)	0.08
Flow Path Length (ft)	65.0
Flow Path Slope (vft/hft)	0.0086
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.9
Soil Type	6
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	4.829
Peak Intensity (in/hr)	2.8811
Undeveloped Runoff Coefficient (Cu)	0.8139
Developed Runoff Coefficient (Cd)	0.8914
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.2055
Burned Peak Flow Rate (cfs)	0.2055
24-Hr Clear Runoff Volume (ac-ft)	0.0265
24-Hr Clear Runoff Volume (cu-ft)	1153.0214



Peak Flow Hydrologic Analysis

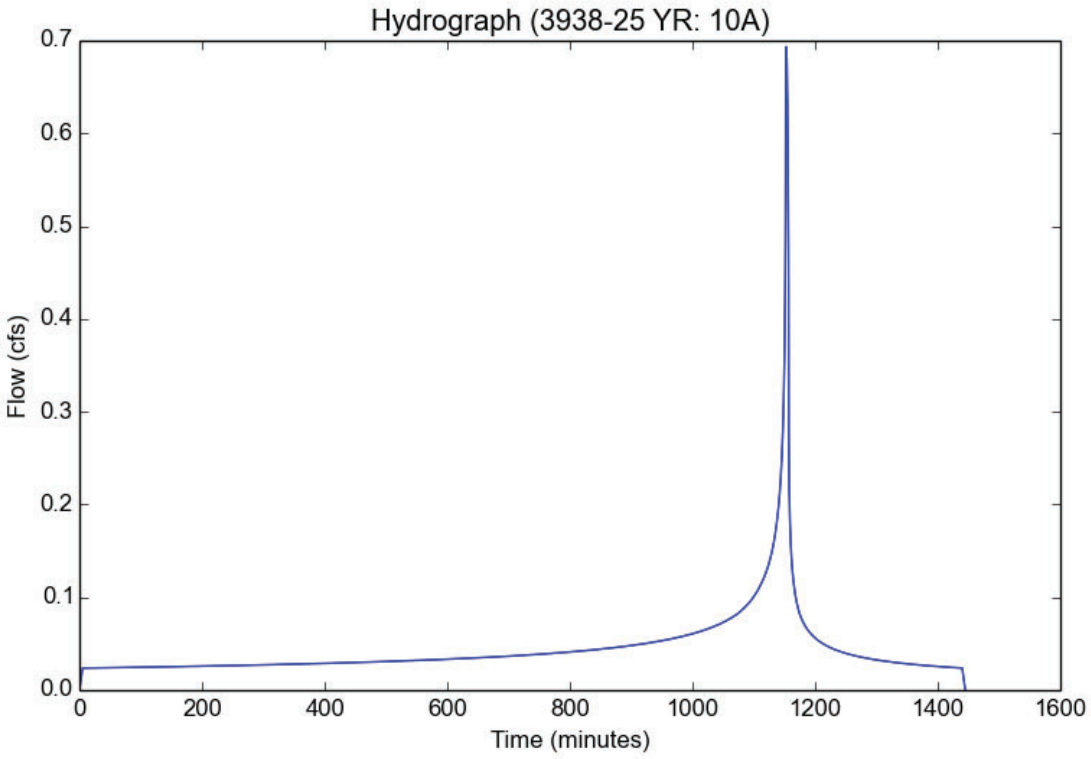
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938-25 YR
Subarea ID	10A
Area (ac)	0.27
Flow Path Length (ft)	59.0
Flow Path Slope (vft/hft)	0.0286
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.9
Soil Type	6
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	4.829
Peak Intensity (in/hr)	2.8811
Undeveloped Runoff Coefficient (Cu)	0.8139
Developed Runoff Coefficient (Cd)	0.8914
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.6934
Burned Peak Flow Rate (cfs)	0.6934
24-Hr Clear Runoff Volume (ac-ft)	0.0893
24-Hr Clear Runoff Volume (cu-ft)	3891.4472



Peak Flow Hydrologic Analysis

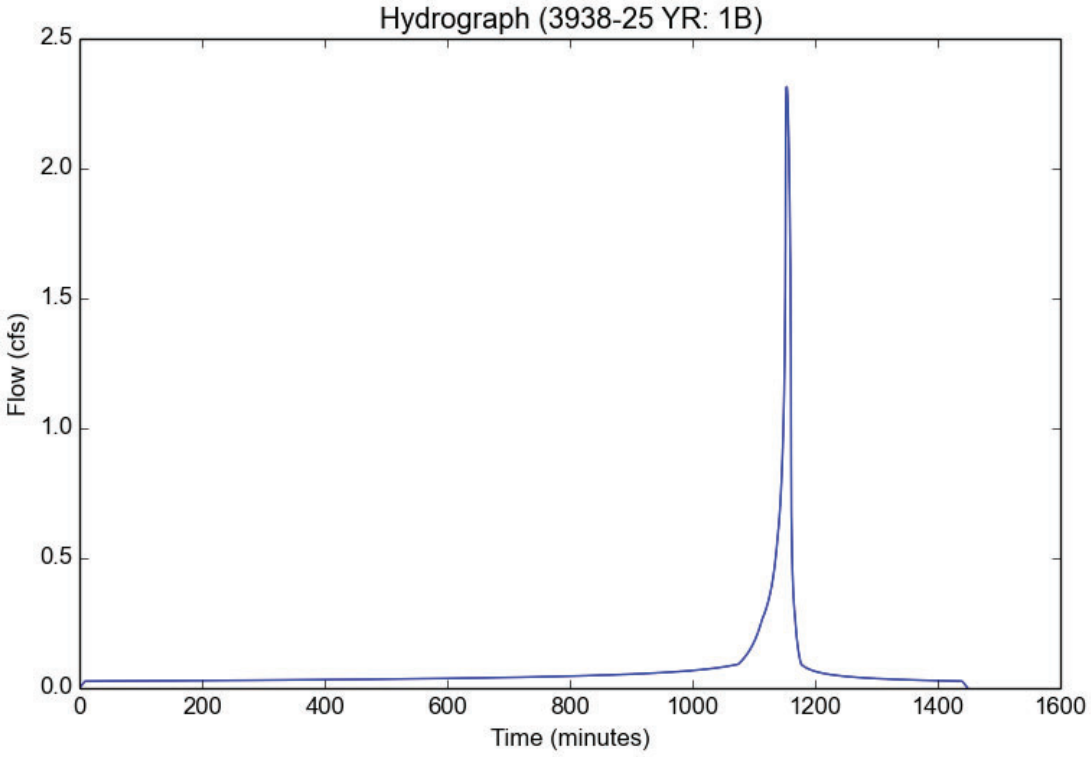
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938-25 YR
Subarea ID	1B
Area (ac)	1.38
Flow Path Length (ft)	426.0
Flow Path Slope (vft/hft)	0.0058
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.1
Soil Type	6
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	4.829
Peak Intensity (in/hr)	2.1857
Undeveloped Runoff Coefficient (Cu)	0.7527
Developed Runoff Coefficient (Cd)	0.7674
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	2.3146
Burned Peak Flow Rate (cfs)	2.3146
24-Hr Clear Runoff Volume (ac-ft)	0.1435
24-Hr Clear Runoff Volume (cu-ft)	6249.7397



Peak Flow Hydrologic Analysis

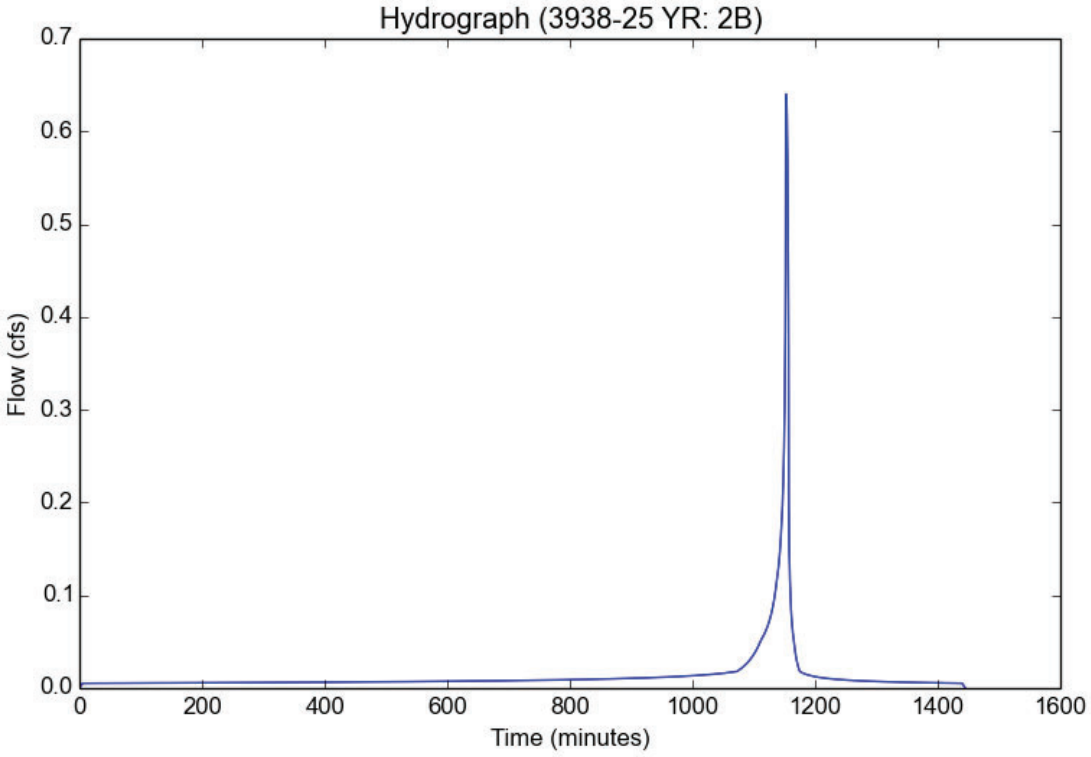
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938-25 YR
Subarea ID	2B
Area (ac)	0.27
Flow Path Length (ft)	231.0
Flow Path Slope (vft/hft)	0.0079
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.1
Soil Type	6
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	4.829
Peak Intensity (in/hr)	2.8811
Undeveloped Runoff Coefficient (Cu)	0.8139
Developed Runoff Coefficient (Cd)	0.8225
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.6399
Burned Peak Flow Rate (cfs)	0.6399
24-Hr Clear Runoff Volume (ac-ft)	0.0282
24-Hr Clear Runoff Volume (cu-ft)	1227.741



Peak Flow Hydrologic Analysis

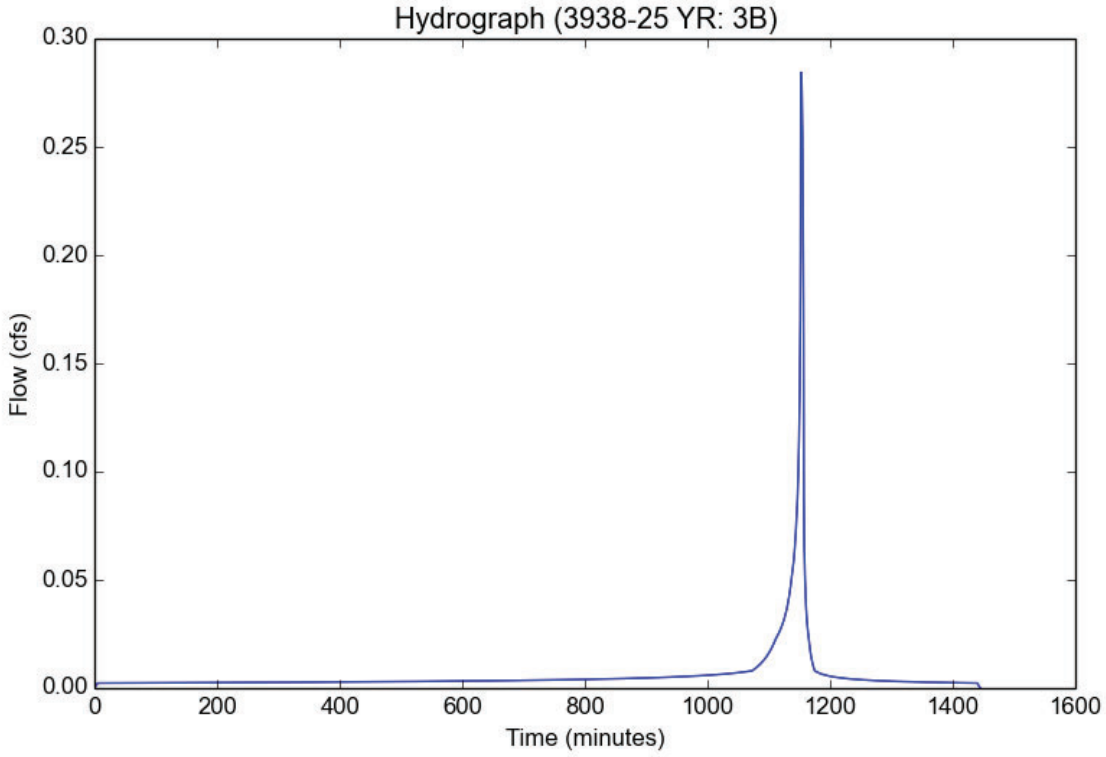
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938-25 YR
Subarea ID	3B
Area (ac)	0.12
Flow Path Length (ft)	95.0
Flow Path Slope (vft/hft)	0.0104
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.1
Soil Type	6
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	4.829
Peak Intensity (in/hr)	2.8811
Undeveloped Runoff Coefficient (Cu)	0.8139
Developed Runoff Coefficient (Cd)	0.8225
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.2844
Burned Peak Flow Rate (cfs)	0.2844
24-Hr Clear Runoff Volume (ac-ft)	0.0125
24-Hr Clear Runoff Volume (cu-ft)	545.6627



Peak Flow Hydrologic Analysis

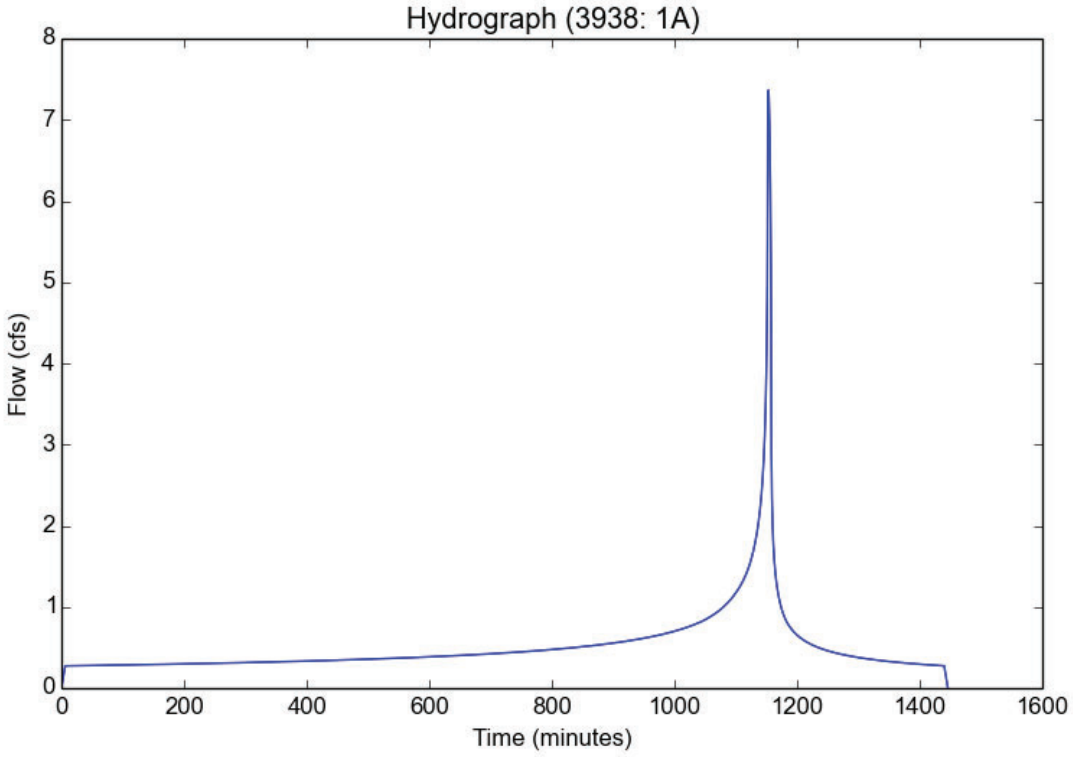
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938
Subarea ID	1A
Area (ac)	2.74
Flow Path Length (ft)	355.0
Flow Path Slope (vft/hft)	0.0125
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.9
Soil Type	6
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.5
Peak Intensity (in/hr)	3.012
Undeveloped Runoff Coefficient (Cu)	0.8231
Developed Runoff Coefficient (Cd)	0.8923
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	7.3641
Burned Peak Flow Rate (cfs)	7.3641
24-Hr Clear Runoff Volume (ac-ft)	1.0344
24-Hr Clear Runoff Volume (cu-ft)	45056.8837



Peak Flow Hydrologic Analysis

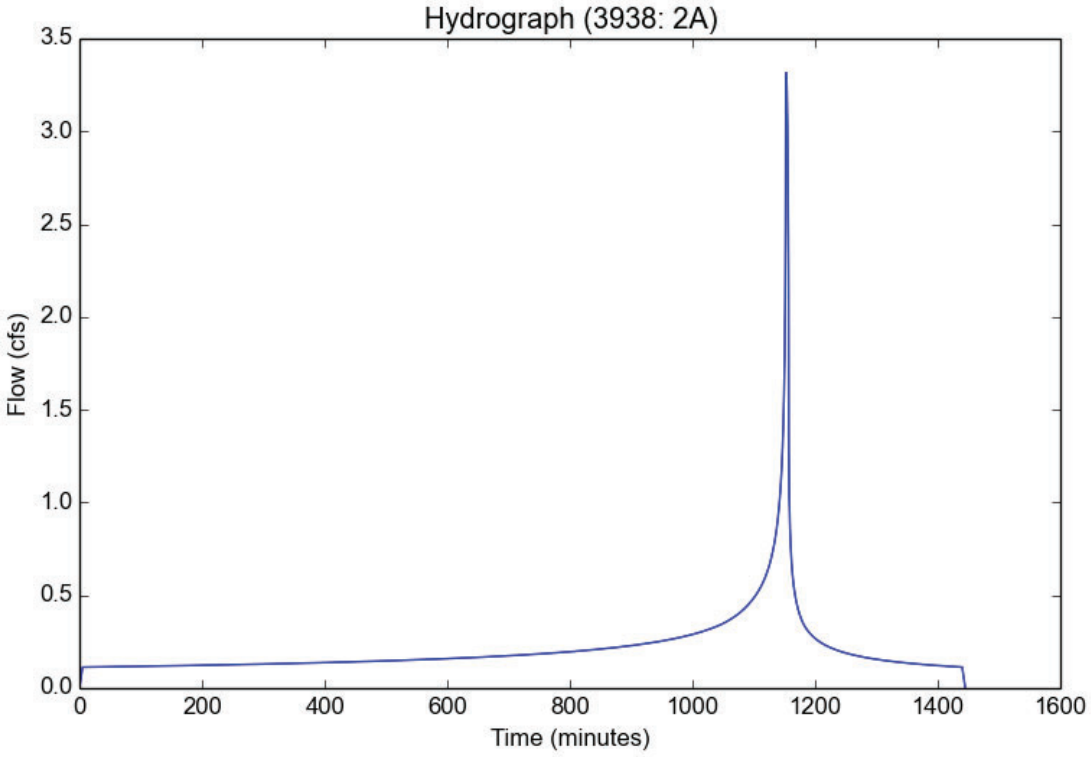
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938
Subarea ID	2A
Area (ac)	1.13
Flow Path Length (ft)	100.0
Flow Path Slope (vft/hft)	0.0109
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.9
Soil Type	6
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.5
Peak Intensity (in/hr)	3.2815
Undeveloped Runoff Coefficient (Cu)	0.842
Developed Runoff Coefficient (Cd)	0.8942
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.3157
Burned Peak Flow Rate (cfs)	3.3157
24-Hr Clear Runoff Volume (ac-ft)	0.4266
24-Hr Clear Runoff Volume (cu-ft)	18582.564



Peak Flow Hydrologic Analysis

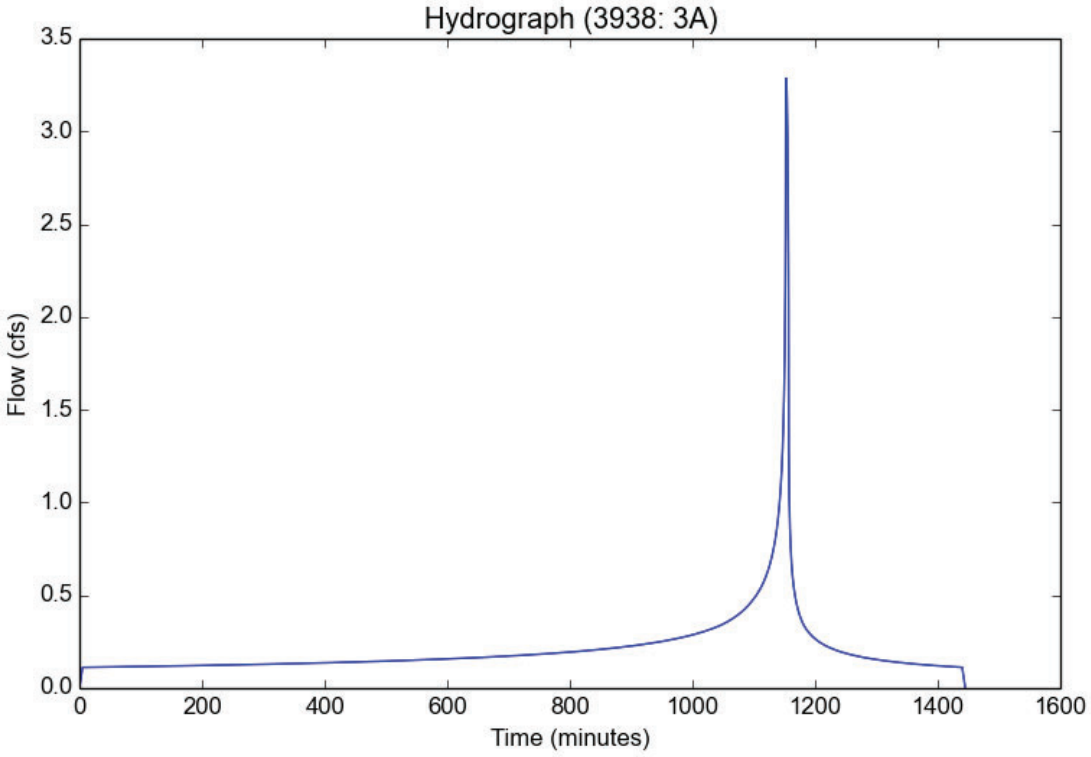
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938
Subarea ID	3A
Area (ac)	1.12
Flow Path Length (ft)	100.0
Flow Path Slope (vft/hft)	0.0109
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.9
Soil Type	6
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.5
Peak Intensity (in/hr)	3.2815
Undeveloped Runoff Coefficient (Cu)	0.842
Developed Runoff Coefficient (Cd)	0.8942
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.2864
Burned Peak Flow Rate (cfs)	3.2864
24-Hr Clear Runoff Volume (ac-ft)	0.4228
24-Hr Clear Runoff Volume (cu-ft)	18418.1165



Peak Flow Hydrologic Analysis

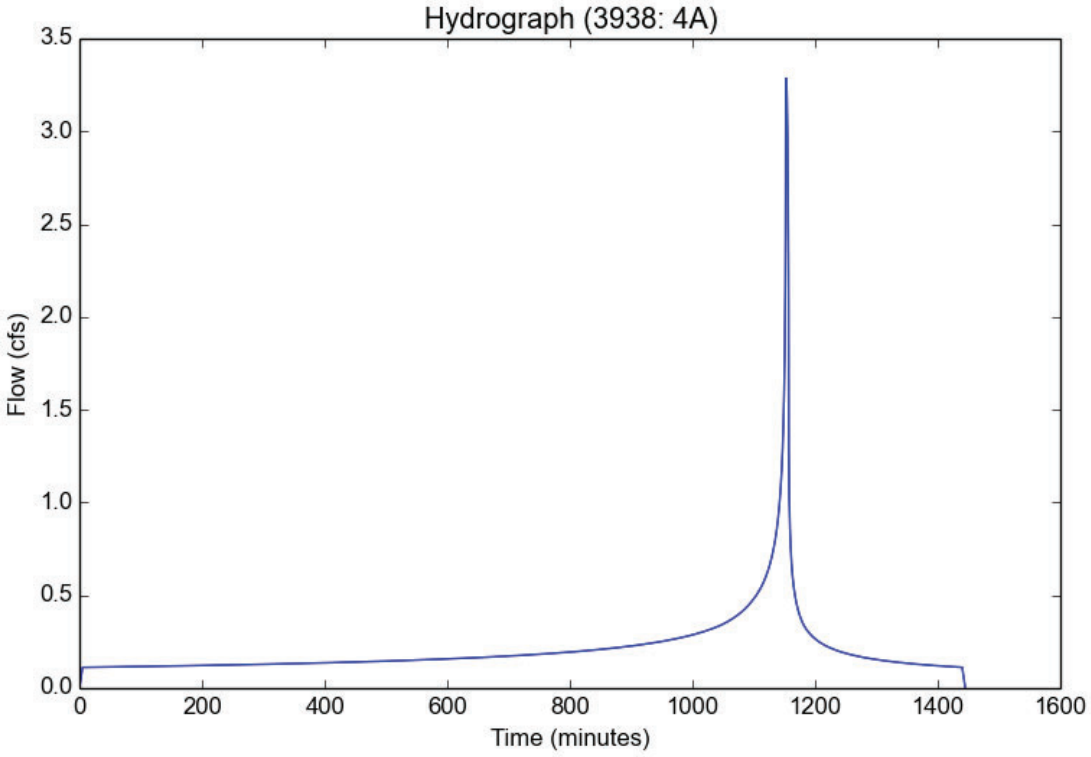
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938
Subarea ID	4A
Area (ac)	1.12
Flow Path Length (ft)	100.0
Flow Path Slope (vft/hft)	0.0109
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.9
Soil Type	6
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.5
Peak Intensity (in/hr)	3.2815
Undeveloped Runoff Coefficient (Cu)	0.842
Developed Runoff Coefficient (Cd)	0.8942
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.2864
Burned Peak Flow Rate (cfs)	3.2864
24-Hr Clear Runoff Volume (ac-ft)	0.4228
24-Hr Clear Runoff Volume (cu-ft)	18418.1165



Peak Flow Hydrologic Analysis

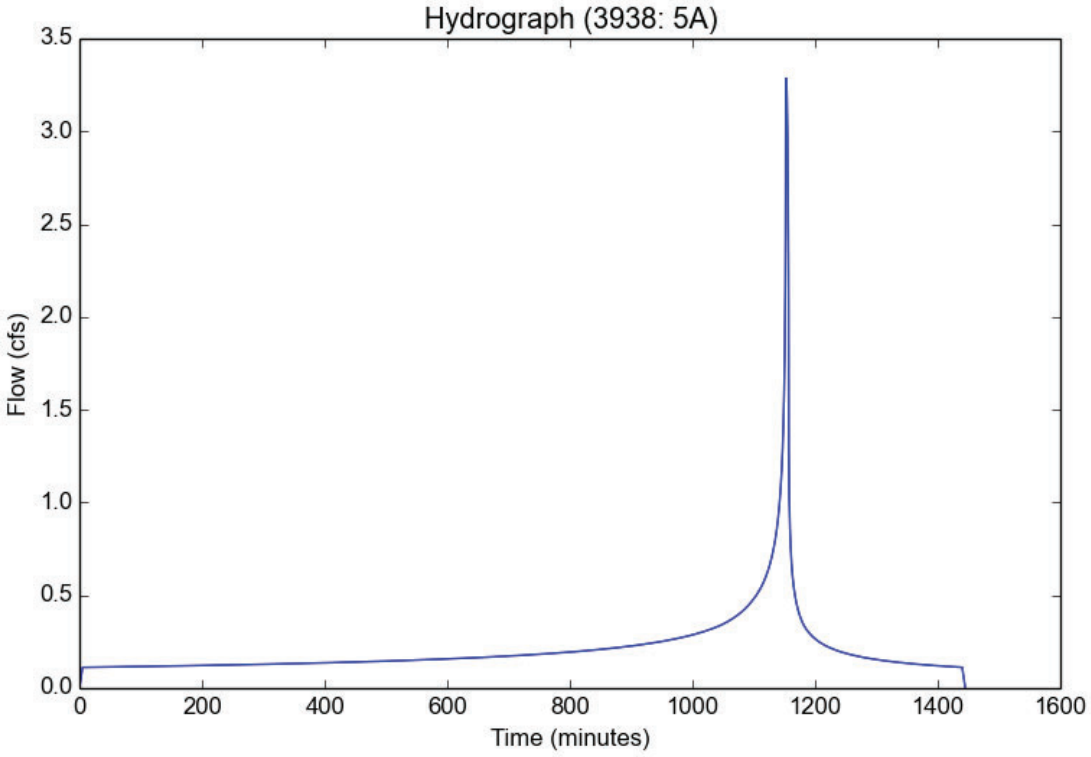
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938
Subarea ID	5A
Area (ac)	1.12
Flow Path Length (ft)	100.0
Flow Path Slope (vft/hft)	0.0109
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.9
Soil Type	6
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.5
Peak Intensity (in/hr)	3.2815
Undeveloped Runoff Coefficient (Cu)	0.842
Developed Runoff Coefficient (Cd)	0.8942
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.2864
Burned Peak Flow Rate (cfs)	3.2864
24-Hr Clear Runoff Volume (ac-ft)	0.4228
24-Hr Clear Runoff Volume (cu-ft)	18418.1165



Peak Flow Hydrologic Analysis

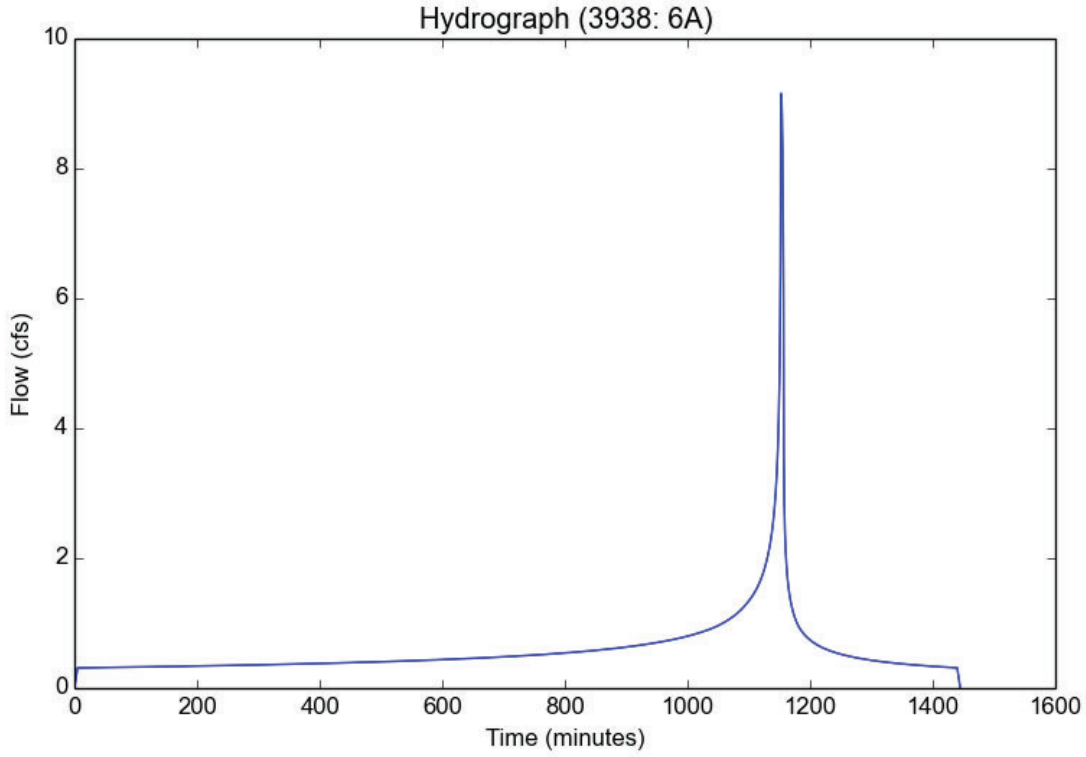
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938
Subarea ID	6A
Area (ac)	3.12
Flow Path Length (ft)	284.0
Flow Path Slope (vft/hft)	0.0067
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.9
Soil Type	6
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.5
Peak Intensity (in/hr)	3.2815
Undeveloped Runoff Coefficient (Cu)	0.842
Developed Runoff Coefficient (Cd)	0.8942
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	9.155
Burned Peak Flow Rate (cfs)	9.155
24-Hr Clear Runoff Volume (ac-ft)	1.1779
24-Hr Clear Runoff Volume (cu-ft)	51307.6103



Peak Flow Hydrologic Analysis

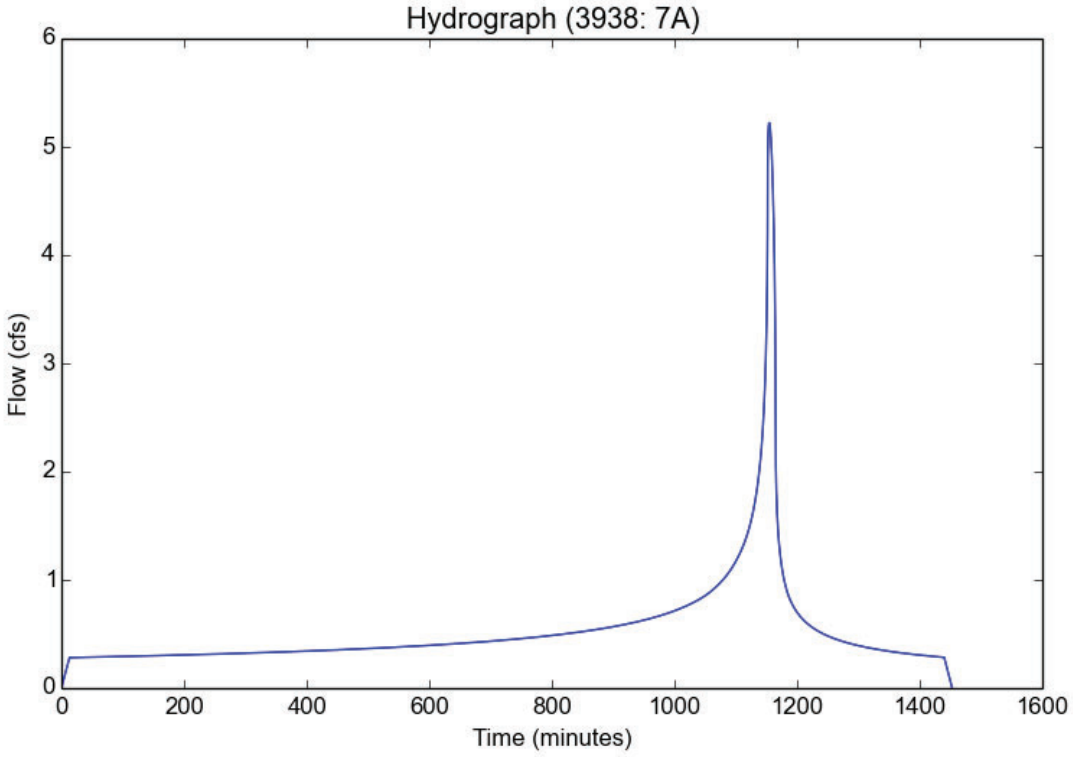
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938
Subarea ID	7A
Area (ac)	2.82
Flow Path Length (ft)	996.0
Flow Path Slope (vft/hft)	0.0058
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.9
Soil Type	6
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.5
Peak Intensity (in/hr)	2.0942
Undeveloped Runoff Coefficient (Cu)	0.7426
Developed Runoff Coefficient (Cd)	0.8843
Time of Concentration (min)	13.0
Clear Peak Flow Rate (cfs)	5.2223
Burned Peak Flow Rate (cfs)	5.2223
24-Hr Clear Runoff Volume (ac-ft)	1.0643
24-Hr Clear Runoff Volume (cu-ft)	46362.7932



Peak Flow Hydrologic Analysis

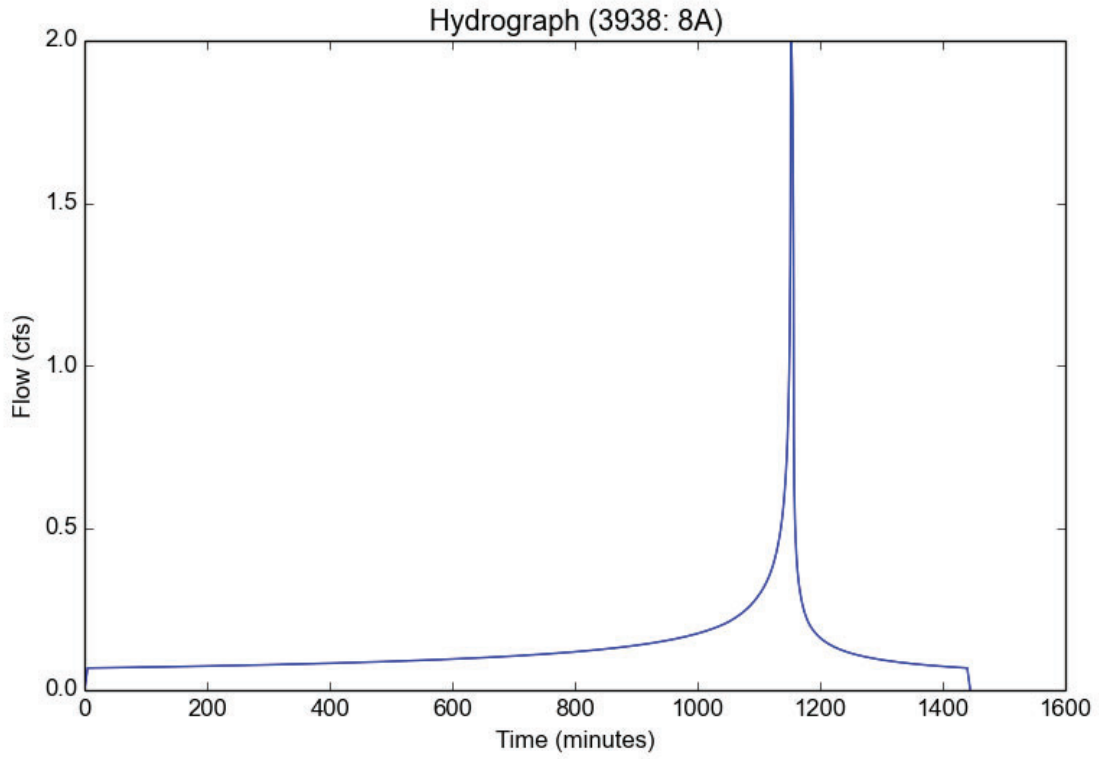
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938
Subarea ID	8A
Area (ac)	0.68
Flow Path Length (ft)	244.0
Flow Path Slope (vft/hft)	0.0089
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.9
Soil Type	6
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.5
Peak Intensity (in/hr)	3.2815
Undeveloped Runoff Coefficient (Cu)	0.842
Developed Runoff Coefficient (Cd)	0.8942
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.9953
Burned Peak Flow Rate (cfs)	1.9953
24-Hr Clear Runoff Volume (ac-ft)	0.2567
24-Hr Clear Runoff Volume (cu-ft)	11182.4279



Peak Flow Hydrologic Analysis

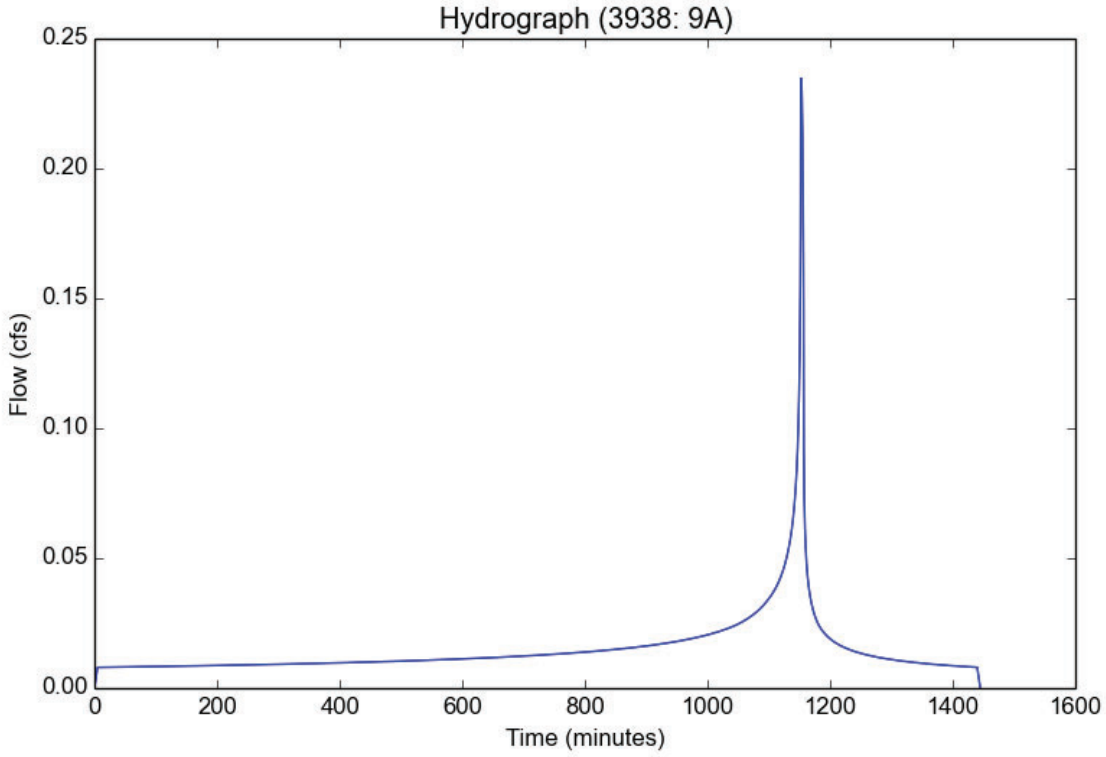
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938
Subarea ID	9A
Area (ac)	0.08
Flow Path Length (ft)	65.0
Flow Path Slope (vft/hft)	0.0086
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.9
Soil Type	6
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.5
Peak Intensity (in/hr)	3.2815
Undeveloped Runoff Coefficient (Cu)	0.842
Developed Runoff Coefficient (Cd)	0.8942
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.2347
Burned Peak Flow Rate (cfs)	0.2347
24-Hr Clear Runoff Volume (ac-ft)	0.0302
24-Hr Clear Runoff Volume (cu-ft)	1315.5798



Peak Flow Hydrologic Analysis

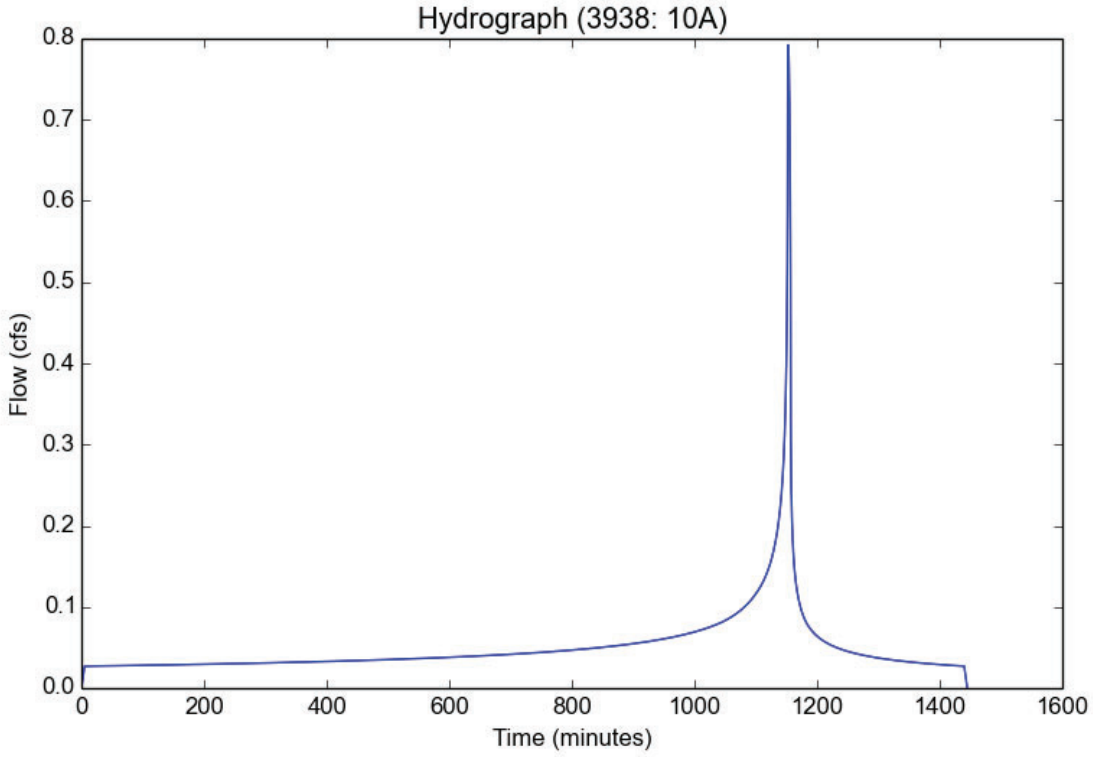
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938
Subarea ID	10A
Area (ac)	0.27
Flow Path Length (ft)	59.0
Flow Path Slope (vft/hft)	0.0286
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.9
Soil Type	6
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.5
Peak Intensity (in/hr)	3.2815
Undeveloped Runoff Coefficient (Cu)	0.842
Developed Runoff Coefficient (Cd)	0.8942
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.7923
Burned Peak Flow Rate (cfs)	0.7923
24-Hr Clear Runoff Volume (ac-ft)	0.1019
24-Hr Clear Runoff Volume (cu-ft)	4440.0817



Peak Flow Hydrologic Analysis

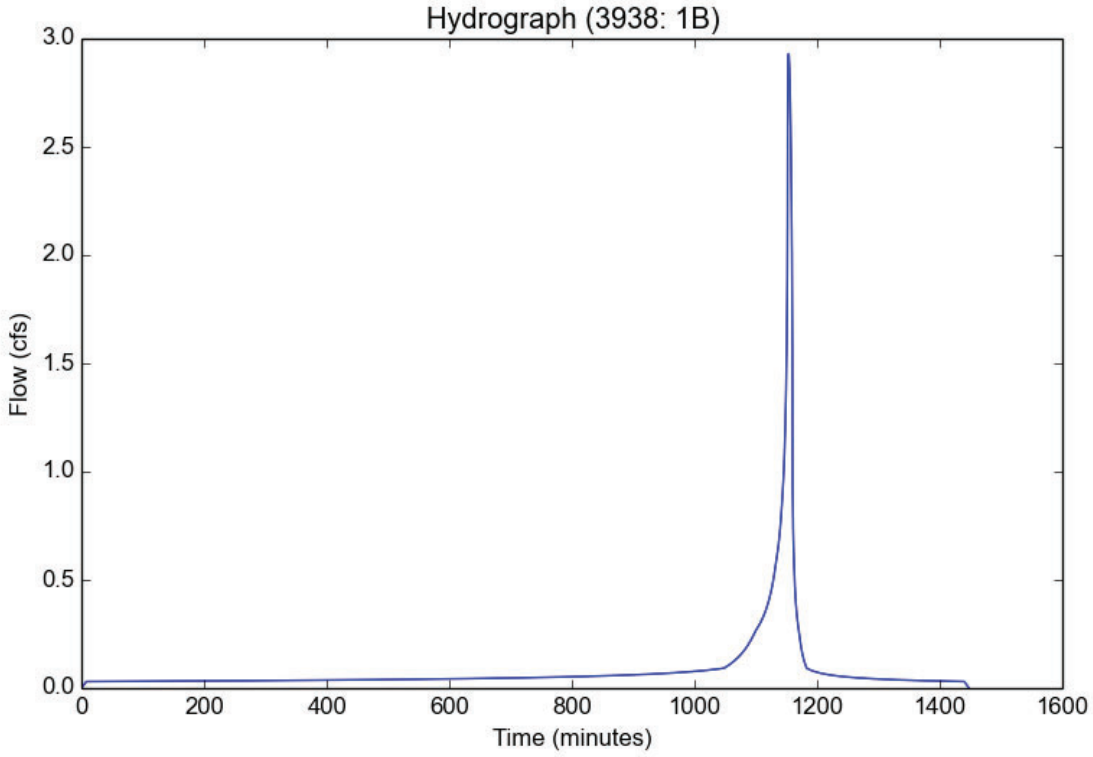
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938
Subarea ID	1B
Area (ac)	1.38
Flow Path Length (ft)	426.0
Flow Path Slope (vft/hft)	0.0058
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.1
Soil Type	6
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.5
Peak Intensity (in/hr)	2.6311
Undeveloped Runoff Coefficient (Cu)	0.7964
Developed Runoff Coefficient (Cd)	0.8067
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	2.9291
Burned Peak Flow Rate (cfs)	2.9291
24-Hr Clear Runoff Volume (ac-ft)	0.172
24-Hr Clear Runoff Volume (cu-ft)	7491.1943



Peak Flow Hydrologic Analysis

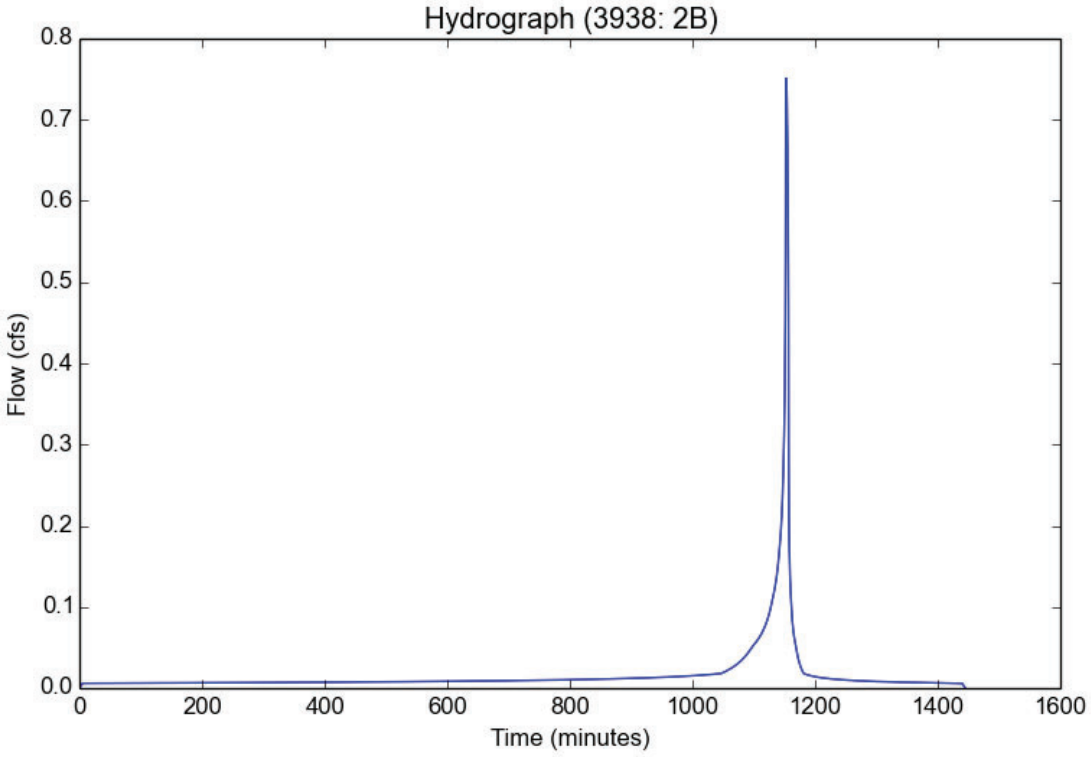
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938
Subarea ID	2B
Area (ac)	0.27
Flow Path Length (ft)	231.0
Flow Path Slope (vft/hft)	0.0079
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.1
Soil Type	6
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.5
Peak Intensity (in/hr)	3.2815
Undeveloped Runoff Coefficient (Cu)	0.842
Developed Runoff Coefficient (Cd)	0.8478
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.7512
Burned Peak Flow Rate (cfs)	0.7512
24-Hr Clear Runoff Volume (ac-ft)	0.0337
24-Hr Clear Runoff Volume (cu-ft)	1469.5229



Peak Flow Hydrologic Analysis

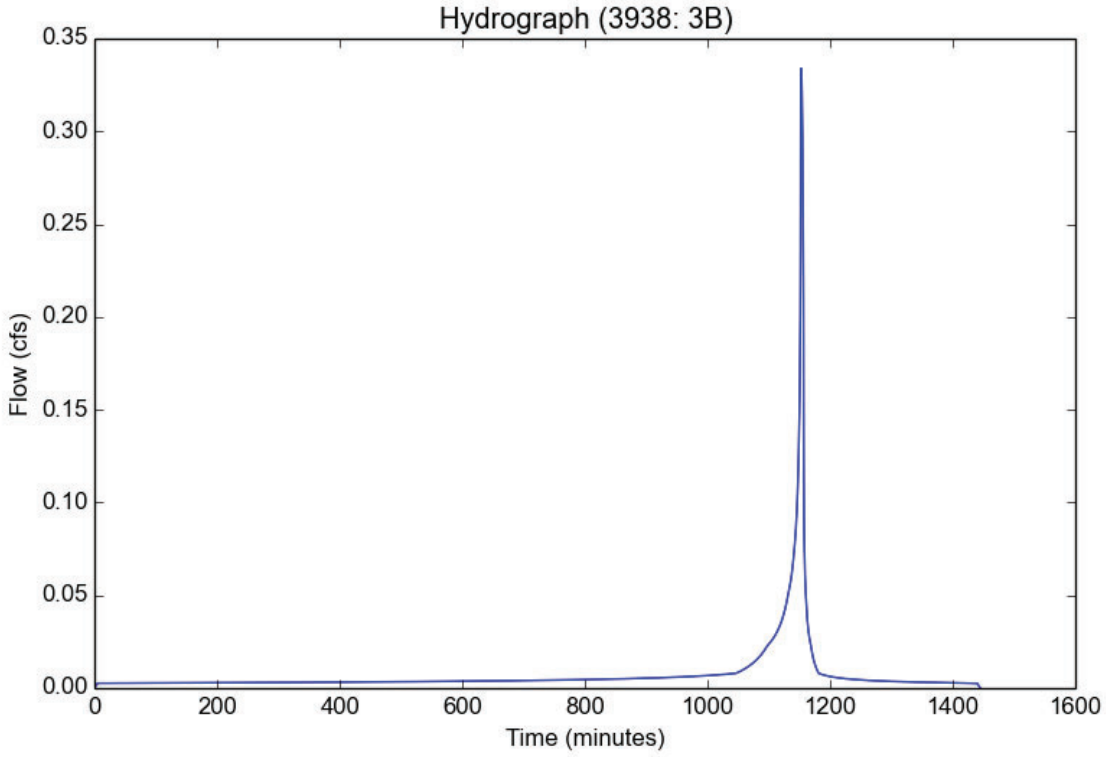
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	3938
Subarea ID	3B
Area (ac)	0.12
Flow Path Length (ft)	95.0
Flow Path Slope (vft/hft)	0.0104
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.1
Soil Type	6
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.5
Peak Intensity (in/hr)	3.2815
Undeveloped Runoff Coefficient (Cu)	0.842
Developed Runoff Coefficient (Cd)	0.8478
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.3339
Burned Peak Flow Rate (cfs)	0.3339
24-Hr Clear Runoff Volume (ac-ft)	0.015
24-Hr Clear Runoff Volume (cu-ft)	653.1213



APPENDIX C

HYDRUALIC CALCULATIONS

DATE: 8/30/2022
TIME: 10: 0

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING PAGE 1

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	12	4			1.00														
CD	15	4			1.25														
CD	18	4			1.50														
CD	24	4			2.00														
CD	30	4			2.50														
CD	36	4			3.00														
CD	42	4			3.50														
CD	48	4			4.00														
CD	54	4			4.50														
CD	60	4			5.00														
CD	66	4			5.50														
CD	72	4			6.00														
CD	78	4			6.50														
CD	84	4			7.00														
CD	90	4			7.50														
CD	96	4			8.00														
CD	99	3	0	0.00	5.04	2.94	0.00	0.00	0.00										

F 0 5 1 5 P PAGE NO 3

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

CHERRY AVENUE INDUSTRIAL - LONG BEACH

HEADING LINE NO 2 IS -

LINE A

HEADING LINE NO 3 IS -

50-YEAR

F 0 5 1 5 P PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1001.50	42.12	24	46.61

ELEMENT NO 2 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1013.92	42.33	24	0.013	0.00	0.00	0.00	0

ELEMENT NO 3 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1035.23	42.70	24	0.013	0.00	0.00	2.00	0

ELEMENT NO 4 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1070.69	43.30	24	0.012	0.00	0.00	2.05	0

ELEMENT NO 5 IS A JUNCTION * * * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	1074.69	43.32	18	24	0	0.012	7.4	0.0	43.32	0.00	90.00	0.00

ELEMENT NO 6 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1169.60	43.56	18	0.012	0.00	0.00	0.00	0

ELEMENT NO 7 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1173.60	43.58	18	0.012	0.00	0.00	0.00	1

ELEMENT NO 8 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1315.02	43.93	18	0.012	0.00	0.00	0.00	0

```
 ELEMENT NO   9 IS A REACH             *         *     *
                     U/S DATA   STATION    INVERT  SECT              N                                  RADIUS  ANGLE  ANG PT  MAN H
                                  1332.69   43.98   18             0.012                                   0.00  45.00    0.00     0

 ELEMENT NO  10 IS A REACH             *         *     *
                     U/S DATA   STATION    INVERT  SECT              N                                  RADIUS  ANGLE  ANG PT  MAN H
                                  1343.21   44.00   18             0.012                                   0.00   0.00    0.00     0

 ELEMENT NO  11 IS A JUNCTION          *         *     *     *                *                  *              *
                     U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3       Q4    INVERT-3 INVERT-4  PHI 3   PHI 4
                                  1347.21   44.01   15    18     0  0.012      4.0      0.0    44.01     0.00  45.00    0.00
                                                       F 0 5 1 5 P                                                    PAGE NO   3

                           WATER SURFACE PROFILE - ELEMENT CARD LISTING

 ELEMENT NO  12 IS A REACH             *         *     *
                     U/S DATA   STATION    INVERT  SECT              N                                  RADIUS  ANGLE  ANG PT  MAN H
                                  1360.60   44.05   15             0.012                                   0.00   0.00    0.00     0

 ELEMENT NO  13 IS A  WALL  ENTRANCE                  *
                     U/S DATA   STATION    INVERT  SECT              FP
                                  1360.60   44.05   99             0.500

 ELEMENT NO  14 IS A SYSTEM HEADWORKS                 *                     *
                     U/S DATA   STATION    INVERT  SECT                                    W S ELEV
                                  1360.60   44.05   99                                        0.00
NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC
LICENSEE: THIENES ENGINEERING                                F0515P                                                        PAGE    1
                                                  WATER SURFACE PROFILE LISTING
                          CHERRY AVENUE INDUSTRIAL - LONG BEACH
                          LINE A
                          50-YEAR

 STATION    INVERT   DEPTH     W.S.        Q       VEL     VEL     ENERGY   SUPER  CRITICAL          HGT/   BASE/    ZL   NO  AVBPR
             ELEV   OF FLOW    ELEV                        HEAD   GRD.EL.   ELEV    DEPTH            DIA    ID NO.       PIER

 L/ELEM      SO                                        SF AVE     HF                    NORM DEPTH                ZR
*************************************************************************************************************************************

  1001.50    42.12    4.490    46.610      15.7    5.00    0.388    46.998   0.00    1.429           2.00    0.00  0.00   0   0.00

    12.42  0.01691                                    .004816     0.06                   1.040                0.00

  1013.92    42.33    4.340    46.670      15.7    5.00    0.388    47.058   0.00    1.429           2.00    0.00  0.00   0   0.00

    21.31  0.01736                                    .004816     0.10                   1.030                0.00

  1035.23    42.70    4.075    46.775      15.7    5.00    0.388    47.163   0.00    1.429           2.00    0.00  0.00   0   0.00

    35.46  0.01692                                    .004104     0.15                   0.990                0.00

  1070.69    43.30    3.623    46.923      15.7    5.00    0.388    47.311   0.00    1.429           2.00    0.00  0.00   0   0.00

JUNCT STR  0.00500                                    .004712     0.02                                        0.00

  1074.69    43.32    4.122    47.442       8.3    4.70    0.343    47.785   0.00    1.116           1.50    0.00  0.00   0   0.00

    94.91  0.00253                                    .005320     0.50                   1.500                0.00

  1169.60    43.56    4.386    47.946       8.3    4.70    0.343    48.289   0.00    1.116           1.50    0.00  0.00   0   0.00

     4.00  0.00500                                    .005320     0.02                   1.270                0.00

  1173.60    43.58    4.405    47.985       8.3    4.70    0.343    48.328   0.00    1.116           1.50    0.00  0.00   0   0.00

   141.42  0.00248                                    .005320     0.75                   1.500                0.00

  1315.02    43.93    4.807    48.737       8.3    4.70    0.343    49.080   0.00    1.116           1.50    0.00  0.00   0   0.00

    17.67  0.00283                                    .005320     0.09                   1.500                0.00

  1332.69    43.98    4.900    48.880       8.3    4.70    0.343    49.223   0.00    1.116           1.50    0.00  0.00   0   0.00

    10.52  0.00190                                    .005320     0.06                   1.500                0.00

  1343.21    44.00    4.936    48.936       8.3    4.70    0.343    49.279   0.00    1.116           1.50    0.00  0.00   0   0.00
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JUNCT STR  0.00250                                    .004548     0.02                                                  0.00

  1347.21    44.01    5.307    49.317       4.3    3.50    0.191    49.508   0.00    0.840            1.25    0.00  0.00   0   0.00

    13.39  0.00299                                    .003776     0.05                    1.250                 0.00          ^
LICENSEE: THIENES ENGINEERING                                F0515P                                                 PAGE    2
                                                WATER SURFACE PROFILE LISTING
                      CHERRY AVENUE INDUSTRIAL - LONG BEACH
                      LINE A
                      50-YEAR

 STATION    INVERT   DEPTH     W.S.        Q       VEL     VEL     ENERGY   SUPER  CRITICAL          HGT/   BASE/    ZL   NO  AVBPR
             ELEV   OF FLOW    ELEV                       HEAD   GRD.EL.   ELEV    DEPTH            DIA    ID NO.       PIER

 L/ELEM      SO                                       SF AVE     HF                   NORM DEPTH                ZR
**********************************************************************************************************************************

  1360.60    44.05    5.318    49.368       4.3    3.50    0.191    49.559   0.00    0.840            1.25    0.00  0.00   0   0.00

 WALL  ENTRANCE                                                                                                    0.00

  1360.60    44.05    5.602    49.652       4.3    0.30    0.001    49.653   0.00    0.405            5.04    2.94  0.00   0   0.00^
                CHERRY AVENUE INDUSTRIAL - LONG BEACH
                LINE A
                50-YEAR


              .        .        .        .        .        .        .        .        .        .        .
   1001.50    .I               C       H                            W    E                                .    R
   1008.83    .                                                                                          .
   1016.16    .  I                C       H                           W    E                             .    R
   1023.49    .                                                                                          .
   1030.81    .                                                                                          .
   1038.14    .       I                C       H                        W    E                          .    R
   1045.47    .                                                                                          .
   1052.80    .                                                                                          .
   1060.13    .                                                                                          .
   1067.46    .                                                                                          .
   1074.79    .               I                C       H                   W    E                      .    JX
   1082.11    .               I             C    H                              W    E                  .    R
   1089.44    .                                                                                          .
   1096.77    .                                                                                          .
   1104.10    .                                                                                          .
   1111.43    .                                                                                          .
   1118.76    .                                                                                          .
   1126.09    .                                                                                          .
   1133.41    .                                                                                          .
   1140.74    .                                                                                          .
   1148.07    .                                                                                          .
   1155.40    .                                                                                          .
   1162.73    .                                                                                          .
   1170.06    .                   I            C     H                                  W   E             .    R
   1177.39    .                   I             C    H                                  W    E            .    R
   1184.71    .                                                                                          .
   1192.04    .                                                                                          .
   1199.37    .                                                                                          .
   1206.70    .                                                                                          .
   1214.03    .                                                                                          .
   1221.36    .                                                                                          .
   1228.69    .                                                                                          .
   1236.01    .                                                                                          .
   1243.34    .                                                                                          .
   1250.67    .                                                                                          .
   1258.00    .                                                                                          .
   1265.33    .                                                                                          .
   1272.66    .                                                                                          .
   1279.99    .                                                                                          .
   1287.31    .                                                                                          .
   1294.64    .                                                                                          .
   1301.97    .                                                                                          .
   1309.30    .                                                                                          .
   1316.63    .                       I            C    H                                  W    E       .    R
   1323.96    .                                                                                          .
   1331.29    .                                                                                          .
   1338.61    .                       I             C    H                                   W    E     .    R
   1345.94    .                       I             C    H                                     W    E   .    JX
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1353.27    .                        I          C    H                                                    W  E  .    R
1360.60    .                        IYYYYYYYYYYCYYYYYH                                                   W E  .    WE
            .         .         .         .         .         .         .         .         .         .         .

            42.12     42.87     43.63     44.38     45.13     45.89     46.64     47.39     48.15     48.90     49.65
```

N O T E S
1. GLOSSARY
   I = INVERT ELEVATION
   C = CRITICAL DEPTH
   W = WATER SURFACE ELEVATION
   H = HEIGHT OF CHANNEL
   E = ENERGY GRADE LINE
   X = CURVES CROSSING OVER
   B = BRIDGE ENTRANCE OR EXIT
   Y = WALL ENTRANCE OR EXIT
2. STATIONS FOR POINTS AT A JUMP MAY NOT BE PLOTTED EXACTLY♠

DATE: 8/30/2022
TIME: 10: 0

F0515P

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING PAGE 1

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	12	4			1.00														
CD	18	4			1.50														
CD	24	4			2.00														
CD	30	4			2.50														
CD	36	4			3.00														
CD	42	4			3.50														
CD	48	4			4.00														
CD	54	4			4.50														
CD	60	4			5.00														
CD	66	4			5.50														
CD	72	4			6.00														
CD	78	4			6.50														
CD	84	4			7.00														
CD	90	4			7.50														
CD	96	4			8.00														
CD	99	3	0	0.00	2.81	3.50	0.00	0.00	0.00										

F 0 5 1 5 P PAGE NO 3

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

CHERRY AVENUE INDUSTRIAL - LONG BEACH

HEADING LINE NO 2 IS -

LINE B

HEADING LINE NO 3 IS -

50-YEAR

F 0 5 1 5 P PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1001.75	43.32	24	47.44

ELEMENT NO 2 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1010.00	43.35	24	0.012	0.00	0.00	0.00	0

ELEMENT NO 3 IS A JUNCTION * * * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	1014.00	43.36	24	12	0	0.012	0.2	0.0	44.60	0.00	90.00	0.00

ELEMENT NO 4 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1221.24	43.88	24	0.012	0.00	0.00	0.00	0

ELEMENT NO 5 IS A JUNCTION * * * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	1225.24	43.90	18	12	0	0.012	2.0	0.0	44.14	0.00	45.00	0.00

ELEMENT NO 6 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1480.71	44.54	18	0.012	0.00	0.00	0.00	0

ELEMENT NO 7 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1484.71	44.56	18	0.012	0.00	0.00	0.00	1

ELEMENT NO 8 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1520.05	44.65	18	0.012	0.00	90.00	0.00	0

ELEMENT NO 9 IS A REACH * * *

	U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
		1559.12	44.75	18	0.012	0.00	0.00	0.00	0

ELEMENT NO 10 IS A REACH * * *

	U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
		1576.79	44.79	18	0.012	0.00	45.00	0.00	0

ELEMENT NO 11 IS A REACH * * *

	U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
		1578.46	44.79	18	0.012	0.00	0.00	0.00	0

ELEMENT NO 12 IS A WALL ENTRANCE *

	U/S DATA	STATION	INVERT	SECT	FP
		1578.46	44.79	99	0.500

F 0 5 1 5 P PAGE NO 3

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 13 IS A SYSTEM HEADWORKS * *

	U/S DATA	STATION	INVERT	SECT	W S ELEV
		1578.46	44.79	99	0.00

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING

** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC

LICENSEE: THIENES ENGINEERING F0515P PAGE 1

WATER SURFACE PROFILE LISTING

CHERRY AVENUE INDUSTRIAL - LONG BEACH
LINE B
50-YEAR

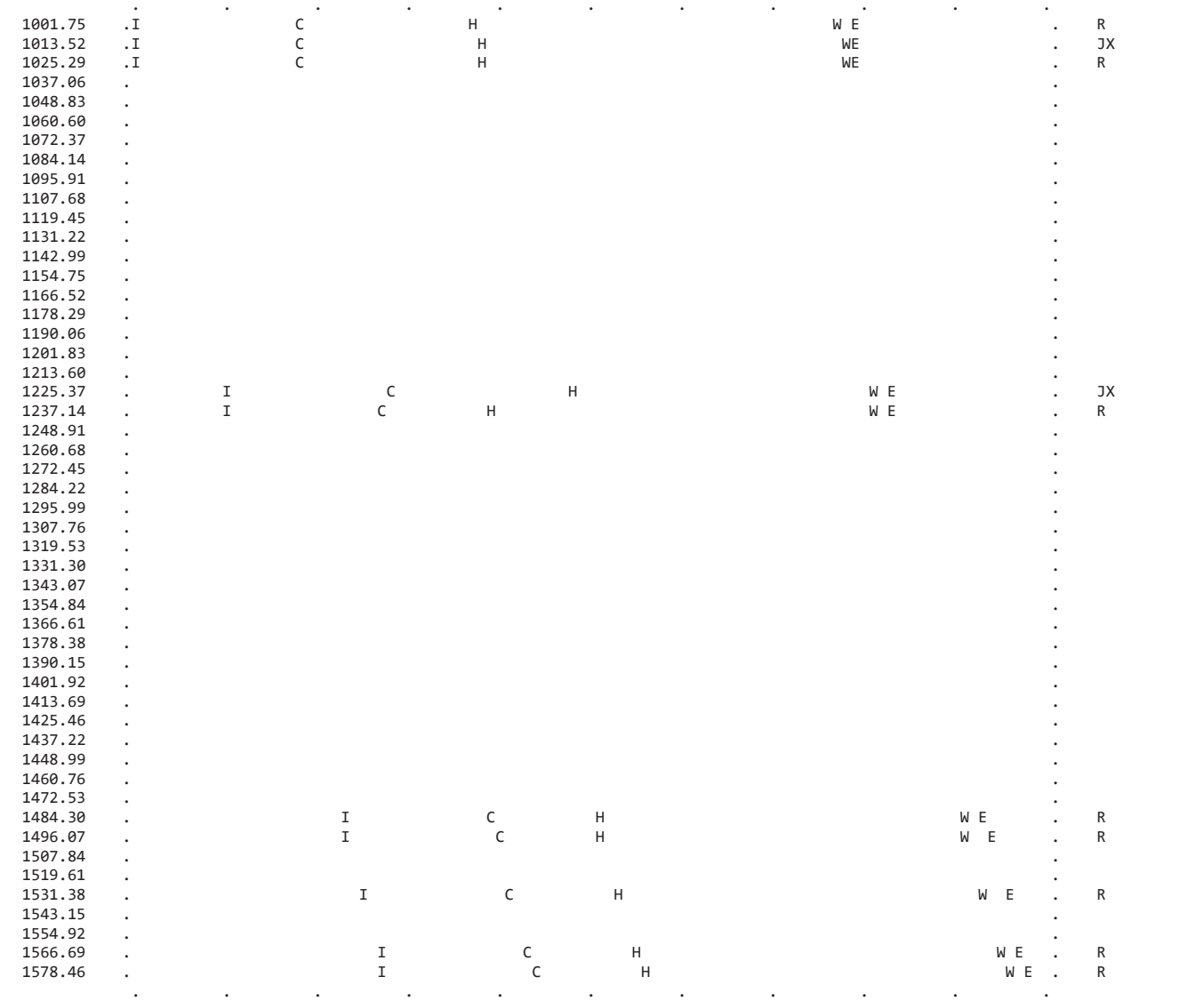
STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF		NORM DEPTH			ZR		
1001.75	43.32	4.120	47.440	7.4	2.36	0.086	47.526	0.00	0.967	2.00	0.00	0.00	0	0.00
8.25	0.00364					.000912	0.01		1.000			0.00		
1010.00	43.35	4.098	47.448	7.4	2.36	0.086	47.534	0.00	0.967	2.00	0.00	0.00	0	0.00
JUNCT STR	0.00250					.000888	0.00					0.00		
1014.00	43.36	4.100	47.460	7.2	2.29	0.082	47.542	0.00	0.953	2.00	0.00	0.00	0	0.00
207.24	0.00251					.000863	0.18		1.100			0.00		
1221.24	43.88	3.759	47.639	7.2	2.29	0.082	47.721	0.00	0.953	2.00	0.00	0.00	0	0.00
JUNCT STR	0.00500					.001476	0.01					0.00		
1225.24	43.90	3.715	47.615	5.2	2.94	0.134	47.749	0.00	0.878	1.50	0.00	0.00	0	0.00
255.47	0.00250					.002088	0.53		1.130			0.00		
1480.71	44.54	3.608	48.148	5.2	2.94	0.134	48.282	0.00	0.878	1.50	0.00	0.00	0	0.00
4.00	0.00500					.002088	0.01		0.880			0.00		
1484.71	44.56	3.603	48.163	5.2	2.94	0.134	48.297	0.00	0.878	1.50	0.00	0.00	0	0.00
35.34	0.00255					.002088	0.07		1.120			0.00		
1520.05	44.65	3.614	48.264	5.2	2.94	0.134	48.398	0.00	0.878	1.50	0.00	0.00	0	0.00
39.07	0.00256					.002088	0.08		1.120			0.00		
1559.12	44.75	3.595	48.345	5.2	2.94	0.134	48.479	0.00	0.878	1.50	0.00	0.00	0	0.00
17.67	0.00226					.002088	0.04		1.180			0.00		
1576.79	44.79	3.611	48.401	5.2	2.94	0.134	48.535	0.00	0.878	1.50	0.00	0.00	0	0.00
1.67	0.00000					.002088	0.00		0.000			0.00		
1578.46	44.79	3.615	48.405	5.2	2.94	0.134	48.539	0.00	0.878	1.50	0.00	0.00	0	0.00

WATER SURFACE PROFILE LISTING

CHERRY AVENUE INDUSTRIAL - LONG BEACH
LINE B
50-YEAR

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF		NORM DEPTH			ZR		
1578.46	44.79	3.810	48.600	5.2	0.54	0.005	48.605	0.00	0.409	2.81	3.50	0.00	0	0.00

CHERRY AVENUE INDUSTRIAL - LONG BEACH
LINE B
50-YEAR



N O T E S
1. GLOSSARY

I = INVERT ELEVATION
C = CRITICAL DEPTH
W = WATER SURFACE ELEVATION
H = HEIGHT OF CHANNEL
E = ENERGY GRADE LINE
X = CURVES CROSSING OVER
B = BRIDGE ENTRANCE OR EXIT
Y = WALL ENTRANCE OR EXIT

2. STATIONS FOR POINTS AT A JUMP MAY NOT BE PLOTTED EXACTLY♠

DATE: 8/30/2022
TIME: 10: 0

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING PAGE 1

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	12	4			1.00														
CD	15	4			1.25														
CD	18	4			1.50														
CD	24	4			2.00														
CD	30	4			2.50														
CD	36	4			3.00														
CD	42	4			3.50														
CD	48	4			4.00														
CD	54	4			4.50														
CD	60	4			5.00														
CD	66	4			5.50														
CD	72	4			6.00														
CD	78	4			6.50														
CD	84	4			7.00														
CD	90	4			7.50														
CD	96	4			8.00														
CD	99	3	0	0.00	5.11	3.50	0.00	0.00	0.00										

F 0 5 1 5 P PAGE NO 3

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

CHERRY AVENUE INDUSTRIAL - LONG BEACH

HEADING LINE NO 2 IS -

LINE C

HEADING LINE NO 3 IS -

50-YEAR

F 0 5 1 5 P PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1002.47	44.01	18	49.32

ELEMENT NO 2 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1350.00	44.88	18	0.012	0.00	0.00	0.00	0

ELEMENT NO 3 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1354.00	44.89	18	0.012	0.00	0.00	0.00	1

ELEMENT NO 4 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1694.89	45.74	18	0.012	0.00	0.00	0.00	0

ELEMENT NO 5 IS A JUNCTION * * * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	1698.89	45.75	12	15	0	0.012	2.9	0.0	45.75	0.00	90.00	0.00

ELEMENT NO 6 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1838.73	47.15	12	0.012	0.00	0.00	0.00	0

ELEMENT NO 7 IS A WALL ENTRANCE *

U/S DATA	STATION	INVERT	SECT	FP
	1838.73	47.15	99	0.500

ELEMENT NO 8 IS A SYSTEM HEADWORKS * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1838.73	47.15	99	0.00

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING

** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC ↟

WATER SURFACE PROFILE LISTING

CHERRY AVENUE INDUSTRIAL - LONG BEACH
LINE C
50-YEAR

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF		NORM DEPTH			ZR		
1002.47	44.01	5.310	49.320	4.0	2.26	0.080	49.400	0.00	0.766	1.50	0.00	0.00	0	0.00
347.53	0.00250					.001236	0.43		0.930			0.00		
1350.00	44.88	4.869	49.749	4.0	2.26	0.080	49.829	0.00	0.766	1.50	0.00	0.00	0	0.00
4.00	0.00250					.001236	0.00		0.930			0.00		
1354.00	44.89	4.868	49.758	4.0	2.26	0.080	49.838	0.00	0.766	1.50	0.00	0.00	0	0.00
340.89	0.00249					.001236	0.42		0.930			0.00		
1694.89	45.74	4.439	50.179	4.0	2.26	0.080	50.259	0.00	0.766	1.50	0.00	0.00	0	0.00
JUNCT STR	0.00250					.001024	0.00					0.00		
1698.89	45.75	4.616	50.366	1.1	1.40	0.030	50.396	0.00	0.441	1.00	0.00	0.00	0	0.00
139.84	0.01001					.000812	0.11		0.360			0.00		
1838.73	47.15	3.330	50.480	1.1	1.40	0.030	50.510	0.00	0.441	1.00	0.00	0.00	0	0.00
WALL	ENTRANCE											0.00		
1838.73	47.15	3.391	50.541	1.1	0.09	0.000	50.541	0.00	0.145	5.11	3.50	0.00	0	0.00↟

CHERRY AVENUE INDUSTRIAL - LONG BEACH
LINE C
50-YEAR

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          .       .       .       .       .       .       .       .       .       .       .
  1002.47 .I      C       H                               WE                      .    R
  1019.54 .                                                                       .
  1036.60 .                                                                       .
  1053.67 .                                                                       .
  1070.74 .                                                                       .
  1087.80 .                                                                       .
  1104.87 .                                                                       .
  1121.94 .                                                                       .
  1139.00 .                                                                       .
  1156.07 .                                                                       .
  1173.14 .                                                                       .
  1190.20 .                                                                       .
  1207.27 .                                                                       .
  1224.33 .                                                                       .
  1241.40 .                                                                       .
  1258.47 .                                                                       .
  1275.53 .                                                                       .
  1292.60 .                                                                       .
  1309.67 .                                                                       .
  1326.73 .                                                                       .
  1343.80 .                                                                       .
  1360.87 .         I       C       H                       WE                    .    R
  1377.93 .         I       C       H                       WE                    .    R
  1395.00 .                                                                       .
  1412.07 .                                                                       .
  1429.13 .                                                                       .
  1446.20 .                                                                       .
  1463.27 .                                                                       .
  1480.33 .                                                                       .
  1497.40 .                                                                       .
  1514.47 .                                                                       .
  1531.53 .                                                                       .
  1548.60 .                                                                       .
```

```
    1565.67    .                                                                                                .
    1582.73    .                                                                                                .
    1599.80    .                                                                                                .
    1616.87    .                                                                                                .
    1633.93    .                                                                                                .
    1651.00    .                                                                                                .
    1668.06    .                                                                                                .
    1685.13    .                                                                                                .
    1702.20    .                    I         C        H                                 WE                     .    JX
    1719.26    .                     I    C      H                                        X                     .    R
    1736.33    .                                                                                                .
    1753.40    .                                                                                                .
    1770.46    .                                                                                                .
    1787.53    .                                                                                                .
    1804.60    .                                                                                                .
    1821.66    .                                                                                                .
    1838.73    .                                   IYYYYCYYYYYYH                          X                     .    WE
                .         .         .         .         .         .         .         .         .         .         .

                44.01     44.83     45.66     46.49     47.31     48.14     48.96     49.79     50.61     51.44     52.26
```

N O T E S

1. GLOSSARY
   - I = INVERT ELEVATION
   - C = CRITICAL DEPTH
   - W = WATER SURFACE ELEVATION
   - H = HEIGHT OF CHANNEL
   - E = ENERGY GRADE LINE
   - X = CURVES CROSSING OVER
   - B = BRIDGE ENTRANCE OR EXIT
   - Y = WALL ENTRANCE OR EXIT
2. STATIONS FOR POINTS AT A JUMP MAY NOT BE PLOTTED EXACTLY

DATE: 8/30/2022
TIME: 10: 0

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING PAGE 1

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	12	4			1.00														
CD	15	4			1.25														
CD	18	4			1.50														
CD	24	4			2.00														
CD	30	4			2.50														
CD	36	4			3.00														
CD	42	4			3.50														
CD	48	4			4.00														
CD	54	4			4.50														
CD	60	4			5.00														
CD	66	4			5.50														
CD	72	4			6.00														
CD	78	4			6.50														
CD	84	4			7.00														
CD	90	4			7.50														
CD	96	4			8.00														
CD	99	3	0	0.00	3.50	1.50	0.00	0.00	0.00										

F 0 5 1 5 P PAGE NO 3

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

CHERRY AVENUE INDUSTRIAL - LONG BEACH

HEADING LINE NO 2 IS -

LATERAL C1

HEADING LINE NO 3 IS -

50-YEAR

F 0 5 1 5 P PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1001.75	45.75	15	50.37

ELEMENT NO 2 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1023.64	45.82	15	0.012	0.00	0.00	0.00	0

ELEMENT NO 3 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1041.31	45.87	15	0.012	0.00	45.00	0.00	0

ELEMENT NO 4 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1174.46	46.27	15	0.012	0.00	0.00	0.00	0

ELEMENT NO 5 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1178.46	46.28	15	0.012	0.00	0.00	0.00	1

ELEMENT NO 6 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1196.13	46.34	15	0.012	0.00	45.00	0.00	0

ELEMENT NO 7 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1356.44	46.82	15	0.012	0.00	0.00	0.00	0

ELEMENT NO 8 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1360.44	46.83	15	0.012	0.00	0.00	0.00	1

```
 ELEMENT NO   9 IS A REACH             *         *     *
                     U/S DATA   STATION    INVERT  SECT              N                                  RADIUS  ANGLE  ANG PT  MAN H
                                  1527.26   48.55   15             0.012                                   0.00   0.00    0.00     0

 ELEMENT NO  10 IS A REACH             *         *     *
                     U/S DATA   STATION    INVERT  SECT              N                                  RADIUS  ANGLE  ANG PT  MAN H
                                  1544.93   48.73   15             0.012                                   0.00  45.00    0.00     0

 ELEMENT NO  11 IS A REACH             *         *     *
                     U/S DATA   STATION    INVERT  SECT              N                                  RADIUS  ANGLE  ANG PT  MAN H
                                  1547.04   48.75   15             0.012                                   0.00   0.00    0.00     0

 ELEMENT NO  12 IS A  WALL  ENTRANCE                  *
                     U/S DATA   STATION    INVERT  SECT             FP
                                  1547.04   48.75   99             0.500

 ELEMENT NO  13 IS A SYSTEM HEADWORKS                 *                     *
                     U/S DATA   STATION    INVERT  SECT                                  W S ELEV
                                  1547.04   48.75   99                                      0.00
NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC
LICENSEE: THIENES ENGINEERING                          F0515P                                                          PAGE    1
                                        WATER SURFACE PROFILE LISTING
                        CHERRY AVENUE INDUSTRIAL - LONG BEACH
                        LATERAL C1
                        50-YEAR

 STATION    INVERT   DEPTH     W.S.        Q       VEL     VEL     ENERGY   SUPER  CRITICAL          HGT/   BASE/    ZL   NO  AVBPR
             ELEV   OF FLOW    ELEV                       HEAD   GRD.EL.   ELEV    DEPTH            DIA    ID NO.       PIER

 L/ELEM      SO                                    SF AVE     HF                   NORM DEPTH               ZR
*****************************************************************************************************************************

  1001.75    45.75    4.620    50.370       2.9    2.36    0.087    50.457   0.00    0.684           1.25    0.00  0.00   0   0.00

    21.89  0.00320                                .001717     0.04                   0.800                  0.00

  1023.64    45.82    4.588    50.408       2.9    2.36    0.087    50.495   0.00    0.684           1.25    0.00  0.00   0   0.00

    17.67  0.00283                                .001717     0.03                   0.830                  0.00

  1041.31    45.87    4.580    50.450       2.9    2.36    0.087    50.537   0.00    0.684           1.25    0.00  0.00   0   0.00

   133.15  0.00300                                .001717     0.23                   0.810                  0.00

  1174.46    46.27    4.409    50.679       2.9    2.36    0.087    50.766   0.00    0.684           1.25    0.00  0.00   0   0.00

     4.00  0.00250                                .001717     0.01                   0.870                  0.00

  1178.46    46.28    4.410    50.690       2.9    2.36    0.087    50.777   0.00    0.684           1.25    0.00  0.00   0   0.00

    17.67  0.00340                                .001717     0.03                   0.780                  0.00

  1196.13    46.34    4.393    50.733       2.9    2.36    0.087    50.820   0.00    0.684           1.25    0.00  0.00   0   0.00

   160.31  0.00299                                .001717     0.28                   0.810                  0.00

  1356.44    46.82    4.188    51.008       2.9    2.36    0.087    51.095   0.00    0.684           1.25    0.00  0.00   0   0.00

     4.00  0.00250                                .001717     0.01                   0.870                  0.00

  1360.44    46.83    4.189    51.019       2.9    2.36    0.087    51.106   0.00    0.684           1.25    0.00  0.00   0   0.00

   166.82  0.01031                                .001717     0.29                   0.550                  0.00

  1527.26    48.55    2.756    51.306       2.9    2.36    0.087    51.393   0.00    0.684           1.25    0.00  0.00   0   0.00

    17.67  0.01019                                .001717     0.03                   0.560                  0.00

  1544.93    48.73    2.618    51.348       2.9    2.36    0.087    51.435   0.00    0.684           1.25    0.00  0.00   0   0.00

     2.11  0.00948                                .001717     0.00                   0.570                  0.00

  1547.04    48.75    2.602    51.352       2.9    2.36    0.087    51.439   0.00    0.684           1.25    0.00  0.00   0   0.00

 WALL  ENTRANCE                                                                                                      0.00
LICENSEE: THIENES ENGINEERING                          F0515P                                                          PAGE    2
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WATER SURFACE PROFILE LISTING

CHERRY AVENUE INDUSTRIAL - LONG BEACH
LATERAL C1
50-YEAR

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF		NORM DEPTH			ZR		
1547.04	48.75	2.761	51.511	2.9	0.70	0.008	51.519	0.00	0.488	3.50	1.50	0.00	0	0.00

CHERRY AVENUE INDUSTRIAL - LONG BEACH
LATERAL C1
50-YEAR



N O T E S
1. GLOSSARY
   I = INVERT ELEVATION
   C = CRITICAL DEPTH

W = WATER SURFACE ELEVATION
H = HEIGHT OF CHANNEL
E = ENERGY GRADE LINE
X = CURVES CROSSING OVER
B = BRIDGE ENTRANCE OR EXIT
Y = WALL ENTRANCE OR EXIT

2. STATIONS FOR POINTS AT A JUMP MAY NOT BE PLOTTED EXACTLY

APPENDIX D

DETENTION ANALYSIS

TEI JOB NO 3938
PONDING AT SOUTHERLY TRUCK YARD

Elevation	Depth (feet)	Area (sq. ft.)	Volume (c.f.)	Σ Volume (c.f.)	Σ Volume (ac-ft)
48.75	0.00	0			
			5	5	0.00
48.80	0.05	190			
			49	54	0.00
48.90	0.15	786			
			128	182	0.00
49.00	0.25	1774			
			247	428	0.01
49.10	0.35	3156			
			494	923	0.02
49.20	0.45	6733			
			993	1,915	0.04
49.30	0.55	13118			
			1774	3,689	0.08
49.40	0.65	22355			
			2752	6,440	0.15
49.5	0.75	32675			
			3819	10,259	0.24
49.6	0.85	43697			
			5038	15,297	0.35
49.7	0.95	57069			
			6402	21,699	0.50
49.8	1.05	70973			
			7809	29,508	0.68
49.9	1.15	85208			
			9244	38,753	0.89
50	1.25	99677			
			10719	49,472	1.14
50.1	1.35	114711			
			12103	61,574	1.41
50.2	1.45	127339			
			13011	74,586	1.71
50.3	1.55	132884			

Peak Flow Hydrologic Analysis

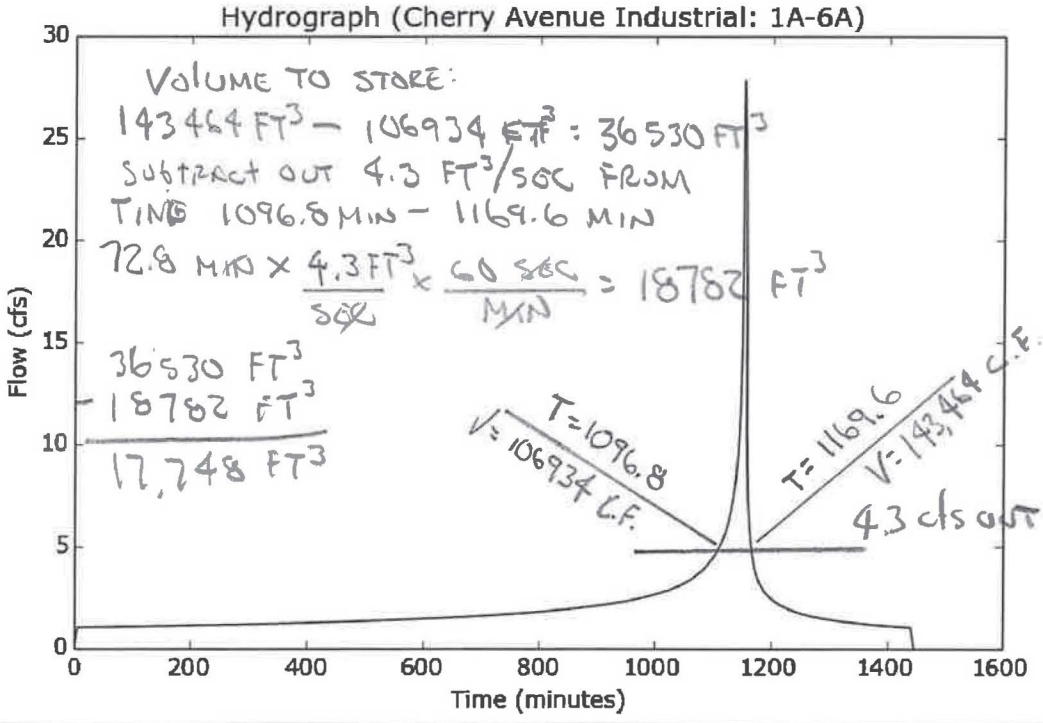
File location: C:/Cherry Avenue Industrial Report.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Cherry Avenue Industrial
Subarea ID	1A-6A
Area (ac)	10.35
Flow Path Length (ft)	355.0
Flow Path Slope (vft/hft)	0.0125
50-yr Rainfall Depth (in)	5.5
Percent Impervious	0.9
Soil Type	6
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.5
Peak Intensity (in/hr)	3.012
Undeveloped Runoff Coefficient (Cu)	0.8231
Developed Runoff Coefficient (Cd)	0.8923
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	27.8168
Burned Peak Flow Rate (cfs)	27.8168
24-Hr Clear Runoff Volume (ac-ft)	3.9072
24-Hr Clear Runoff Volume (cu-ft)	170196.6226



TIME Q30 ΣVOLUME

1094	0.635889	3.497391	0.483422	0.294877	0.839488	4.200304	50.36103	106219.5
1094.2	0.636189	3.499042	0.484169	0.296162	0.839616	4.207444	50.44649	106270
1094.4	0.63649	3.500695	0.48492	0.297452	0.839745	4.21462	50.53238	106320.5
1094.6	0.636791	3.502352	0.485675	0.298749	0.839875	4.221833	50.61872	106371.1
1094.8	0.637093	3.504011	0.486434	0.300053	0.840005	4.229084	50.7055	106421.8
1095	0.637395	3.505673	0.487196	0.301363	0.840136	4.236372	50.79274	106472.6
1095.2	0.637698	3.507337	0.487962	0.302679	0.840268	4.243699	50.88043	106523.5
1095.4	0.638001	3.509004	0.488732	0.304002	0.8404	4.251063	50.96857	106574.5
1095.6	0.638304	3.510674	0.489506	0.305331	0.840533	4.258466	51.05718	106625.5
1095.8	0.638609	3.512347	0.490284	0.306667	0.840667	4.265908	51.14625	106676.7
1096	0.638913	3.514023	0.491065	0.30801	0.840801	4.27339	51.23579	106727.9
1096.2	0.639218	3.515701	0.49185	0.309359	0.840936	4.280911	51.3258	106779.2
1096.4	0.639524	3.517383	0.49264	0.310715	0.841072	4.288472	51.4163	106830.7
1096.6	0.63983	3.519067	0.493433	0.312078	0.841208	4.296073	51.50727	106882.2
1096.8	0.640137	3.520754	0.49423	0.313448	0.841345	4.303715	51.59873	106933.8
1097	0.640444	3.522443	0.495031	0.314825	0.841482	4.311399	51.69068	106985.5
1097.2	0.640752	3.524136	0.495837	0.316208	0.841621	4.319123	51.78313	107037.2
1097.4	0.64106	3.525832	0.496646	0.317599	0.84176	4.32689	51.87608	107089.1
1097.6	0.641369	3.52753	0.49746	0.318997	0.8419	4.334698	51.96953	107141.1
1097.8	0.641679	3.529232	0.498278	0.320403	0.84204	4.342549	52.06348	107193.2
1098	0.641988	3.530936	0.4991	0.321815	0.842181	4.350443	52.15796	107245.3
1098.2	0.642299	3.532644	0.499926	0.323235	0.842323	4.358381	52.25294	107297.6
1098.4	0.64261	3.534354	0.500757	0.323896	0.84239	4.365965	52.34607	107349.9
1098.6	0.642921	3.536068	0.501592	0.324486	0.842449	4.373551	52.4371	107402.3
1098.8	0.643233	3.537784	0.502431	0.325078	0.842508	4.381178	52.52837	107454.9
1099	0.643546	3.539504	0.503275	0.325674	0.842567	4.388846	52.62014	107507.5
1099.2	0.643859	3.541226	0.504123	0.326273	0.842627	4.396555	52.7124	107560.2
1099.4	0.644173	3.542952	0.504976	0.326876	0.842688	4.404306	52.80517	107613
1099.6	0.644487	3.54468	0.505833	0.327481	0.842748	4.4121	52.89844	107665.9
1099.8	0.644802	3.546412	0.506695	0.32809	0.842809	4.419936	52.99222	107718.9
1100	0.645118	3.548147	0.507561	0.328702	0.84287	4.427815	53.08651	107772
1100.2	0.645434	3.549885	0.508432	0.329317	0.842932	4.435738	53.18132	107825.2
1100.4	0.64575	3.551626	0.509308	0.329935	0.842994	4.443705	53.27665	107878.4
1100.6	0.646067	3.553371	0.510189	0.330557	0.843056	4.451715	53.37252	107931.8
1100.8	0.646385	3.555118	0.511074	0.331182	0.843118	4.459771	53.46892	107985.3
1101	0.646703	3.556869	0.511964	0.331811	0.843181	4.467871	53.56585	108038.9
1101.2	0.647022	3.558623	0.512859	0.332443	0.843244	4.476017	53.66333	108092.5
1101.4	0.647342	3.56038	0.513759	0.333079	0.843308	4.484209	53.76136	108146.3
1101.6	0.647662	3.562141	0.514664	0.333718	0.843372	4.492448	53.85994	108200.1
1101.8	0.647983	3.563905	0.515574	0.33436	0.843436	4.500733	53.95908	108254.1
1102	0.648304	3.565672	0.516489	0.335006	0.843501	4.509065	54.05879	108308.2
1102.2	0.648626	3.567442	0.517409	0.335656	0.843566	4.517445	54.15906	108362.3
1102.4	0.648948	3.569216	0.518334	0.33631	0.843631	4.525873	54.25991	108416.6
1102.6	0.649271	3.570993	0.519264	0.336967	0.843697	4.53435	54.36134	108470.9
1102.8	0.649595	3.572774	0.5202	0.337627	0.843763	4.542876	54.46336	108525.4
1103	0.64992	3.574558	0.521141	0.338292	0.843829	4.551452	54.56597	108580
1103.2	0.650245	3.576345	0.522087	0.33896	0.843896	4.560078	54.66918	108634.6

1103.4	0.65057	3.578136	0.523039	0.339632	0.843963	4.568754	54.77299	108689.4
1103.6	0.650896	3.57993	0.523996	0.340308	0.844031	4.577481	54.87741	108744.3
1103.8	0.651223	3.581728	0.524959	0.340988	0.844099	4.58626	54.98244	108799.3
1104	0.651551	3.583529	0.525927	0.341672	0.844167	4.595091	55.0881	108854.4
1104.2	0.651879	3.585334	0.526901	0.34236	0.844236	4.603974	55.19439	108909.6
1104.4	0.652208	3.587142	0.52788	0.343051	0.844305	4.612911	55.30131	108964.9
1104.6	0.652537	3.588954	0.528865	0.343747	0.844375	4.621901	55.40887	109020.3
1104.8	0.652867	3.59077	0.529856	0.344447	0.844445	4.630945	55.51708	109075.8
1105	0.653198	3.592589	0.530853	0.345151	0.844515	4.640044	55.62594	109131.4
1105.2	0.653529	3.594412	0.531856	0.345859	0.844586	4.649199	55.73546	109187.1
1105.4	0.653861	3.596238	0.532865	0.346572	0.844657	4.658409	55.84565	109243
1105.6	0.654194	3.598068	0.533879	0.347288	0.844729	4.667676	55.95651	109298.9
1105.8	0.654528	3.599902	0.5349	0.348009	0.844801	4.676999	56.06805	109355
1106	0.654862	3.60174	0.535927	0.348734	0.844873	4.68638	56.18028	109411.2
1106.2	0.655197	3.603581	0.53696	0.349464	0.844946	4.69582	56.2932	109467.5
1106.4	0.655532	3.605426	0.537999	0.350198	0.84502	4.705318	56.40683	109523.9
1106.6	0.655868	3.607275	0.539045	0.350936	0.845094	4.714876	56.52116	109580.4
1106.8	0.656205	3.609128	0.540097	0.35168	0.845168	4.724493	56.63622	109637
1107	0.656543	3.610985	0.541156	0.352427	0.845243	4.734172	56.75199	109693.8
1107.2	0.656881	3.612845	0.542221	0.353179	0.845318	4.743911	56.8685	109750.7
1107.4	0.65722	3.61471	0.543292	0.353936	0.845394	4.753713	56.98575	109807.7
1107.6	0.65756	3.616578	0.544371	0.354698	0.84547	4.763577	57.10374	109864.8
1107.8	0.6579	3.61845	0.545456	0.355464	0.845546	4.773505	57.22249	109922
1108	0.658241	3.620326	0.546548	0.356235	0.845624	4.783496	57.34201	109979.3
1108.2	0.658583	3.622207	0.547646	0.357011	0.845701	4.793552	57.46229	110036.8
1108.4	0.658926	3.624091	0.548752	0.357792	0.845779	4.803674	57.58336	110094.4
1108.6	0.659269	3.62598	0.549865	0.358578	0.845858	4.813862	57.70521	110152.1
1108.8	0.659613	3.627872	0.550985	0.359369	0.845937	4.824116	57.82787	110209.9
1109	0.659958	3.629769	0.552112	0.360165	0.846016	4.834438	57.95132	110267.9
1109.2	0.660304	3.63167	0.553246	0.360966	0.846097	4.844828	58.0756	110325.9
1109.4	0.66065	3.633574	0.554387	0.361772	0.846177	4.855288	58.2007	110384.1
1109.6	0.660997	3.635484	0.555536	0.362583	0.846258	4.865817	58.32663	110442.5
1109.8	0.661345	3.637397	0.556693	0.3634	0.84634	4.876416	58.4534	110500.9
1110	0.661694	3.639315	0.557857	0.364222	0.846422	4.887088	58.58102	110559.5
1110.2	0.662043	3.641237	0.559028	0.365049	0.846505	4.897831	58.70951	110618.2
1110.4	0.662393	3.643163	0.560208	0.365882	0.846588	4.908647	58.83887	110677
1110.6	0.662744	3.645094	0.561395	0.366721	0.846672	4.919538	58.96911	110736
1110.8	0.663096	3.647029	0.56259	0.367565	0.846756	4.930502	59.10024	110795.1
1111	0.663449	3.648968	0.563794	0.368415	0.846841	4.941543	59.23227	110854.3
1111.2	0.663802	3.650912	0.565005	0.36927	0.846927	4.95266	59.36522	110913.7
1111.4	0.664156	3.652861	0.566224	0.370131	0.847013	4.963854	59.49908	110973.2
1111.6	0.664512	3.654813	0.567452	0.370998	0.8471	4.975127	59.63388	111032.8
1111.8	0.664867	3.656771	0.568688	0.371871	0.847187	4.986478	59.76963	111092.6
1112	0.665224	3.658733	0.569933	0.37275	0.847275	4.99791	59.90633	111152.5
1112.2	0.665582	3.6607	0.571186	0.373636	0.847364	5.009423	60.044	111212.6
1112.4	0.66594	3.662671	0.572448	0.374527	0.847453	5.021018	60.18264	111272.7
1112.6	0.666299	3.664647	0.573718	0.375424	0.847542	5.032695	60.32228	111333.1

1112.8	0.66666	3.666628	0.574998	0.376328	0.847633	5.044457	60.46291	111393.5
1113	0.667021	3.668613	0.576287	0.377238	0.847724	5.056304	60.60456	111454.1
1113.2	0.667382	3.670603	0.577584	0.378154	0.847815	5.068237	60.74724	111514.9
1113.4	0.667745	3.672599	0.578891	0.379077	0.847908	5.080256	60.89096	111575.8
1113.6	0.668109	3.674599	0.580207	0.380006	0.848001	5.092364	61.03572	111636.8
1113.8	0.668473	3.676603	0.581532	0.380943	0.848094	5.104561	61.18155	111698
1114	0.668839	3.678613	0.582868	0.381885	0.848189	5.116849	61.32846	111759.3
1114.2	0.669205	3.680628	0.584212	0.382835	0.848284	5.129228	61.47646	111820.8
1114.4	0.669572	3.682648	0.585567	0.383792	0.848379	5.1417	61.62556	111882.4
1114.6	0.66994	3.684673	0.586931	0.384755	0.848476	5.154265	61.77579	111944.2
1114.8	0.67031	3.686703	0.588305	0.385726	0.848573	5.166925	61.92714	112006.1
1115	0.67068	3.688738	0.58969	0.386704	0.84867	5.179682	62.07964	112068.2
1115.2	0.671051	3.690778	0.591085	0.387689	0.848769	5.192535	62.2333	112130.4
1115.4	0.671422	3.692823	0.59249	0.388681	0.848868	5.205488	62.38814	112192.8
1115.6	0.671795	3.694874	0.593905	0.389681	0.848968	5.21854	62.54417	112255.4
1115.8	0.672169	3.69693	0.595332	0.390688	0.849069	5.231694	62.7014	112318.1
1116	0.672544	3.698992	0.596769	0.391703	0.84917	5.24495	62.85986	112380.9
1116.2	0.67292	3.701058	0.598217	0.392726	0.849273	5.25831	63.01956	112443.9
1116.4	0.673296	3.703131	0.599676	0.393756	0.849376	5.271775	63.18051	112507.1
1116.6	0.673674	3.705208	0.601146	0.394795	0.849479	5.285346	63.34273	112570.5
1116.8	0.674053	3.707292	0.602628	0.395841	0.849584	5.299026	63.50624	112634
1117	0.674433	3.70938	0.604121	0.396896	0.84969	5.312815	63.67105	112697.6
1117.2	0.674814	3.711475	0.605626	0.397958	0.849796	5.326716	63.83719	112761.5
1117.4	0.675195	3.713575	0.607143	0.399029	0.849903	5.340728	64.00466	112825.5
1117.6	0.675578	3.715681	0.608671	0.400109	0.850011	5.354855	64.1735	112889.7
1117.8	0.675962	3.717792	0.610212	0.401197	0.85012	5.369097	64.34371	112954
1118	0.676347	3.71991	0.611765	0.402294	0.850229	5.383456	64.51532	113018.5
1118.2	0.676733	3.722033	0.613331	0.4034	0.85034	5.397935	64.68835	113083.2
1118.4	0.67712	3.724162	0.614909	0.404514	0.850451	5.412533	64.86281	113148.1
1118.6	0.677509	3.726297	0.6165	0.405638	0.850564	5.427254	65.03872	113213.1
1118.8	0.677898	3.728438	0.618104	0.40677	0.850677	5.442098	65.21611	113278.3
1119	0.678288	3.730585	0.619721	0.407912	0.850791	5.457068	65.39499	113343.7
1119.2	0.67868	3.732739	0.621351	0.409064	0.850906	5.472165	65.5754	113409.3
1119.4	0.679072	3.734898	0.622995	0.410225	0.851022	5.487391	65.75734	113475.1
1119.6	0.679466	3.737064	0.624653	0.411395	0.85114	5.502749	65.94084	113541
1119.8	0.679861	3.739236	0.626324	0.412576	0.851258	5.518239	66.12593	113607.1
1120	0.680257	3.741414	0.62801	0.413766	0.851377	5.533864	66.31262	113673.4
1120.2	0.680654	3.743599	0.62971	0.414967	0.851497	5.549626	66.50094	113739.9
1120.4	0.681053	3.74579	0.631424	0.416178	0.851618	5.565527	66.69092	113806.6
1120.6	0.681452	3.747988	0.633153	0.417399	0.85174	5.581569	66.88257	113873.5
1120.8	0.681853	3.750192	0.634898	0.418631	0.851863	5.597753	67.07593	113940.6
1121	0.682255	3.752403	0.636657	0.419873	0.851987	5.614083	67.27102	114007.9
1121.2	0.682658	3.754621	0.638431	0.421127	0.852113	5.63056	67.46786	114075.3
1121.4	0.683063	3.756846	0.640222	0.422391	0.852239	5.647187	67.66648	114143
1121.6	0.683469	3.759077	0.642028	0.423666	0.852367	5.663966	67.86692	114210.9
1121.8	0.683876	3.761315	0.64385	0.424953	0.852495	5.680898	68.06918	114278.9
1122	0.684284	3.76356	0.645688	0.426252	0.852625	5.697988	68.27332	114347.2

1122.2	0.684693	3.765813	0.647543	0.427562	0.852756	5.715236	68.47934	114415.7
1122.4	0.685104	3.768072	0.649415	0.428884	0.852888	5.732646	68.68729	114484.4
1122.6	0.685516	3.770339	0.651304	0.430218	0.853022	5.750219	68.89719	114553.3
1122.8	0.68593	3.772613	0.653211	0.431564	0.853156	5.76796	69.10908	114622.4
1123	0.686344	3.774894	0.655134	0.432923	0.853292	5.785869	69.32298	114691.7
1123.2	0.68676	3.777182	0.657076	0.434294	0.853429	5.803951	69.53892	114761.2
1123.4	0.687178	3.779478	0.659036	0.435678	0.853568	5.822208	69.75695	114831
1123.6	0.687597	3.781782	0.661015	0.437076	0.853708	5.840642	69.9771	114901
1123.8	0.688017	3.784093	0.663012	0.438486	0.853849	5.859256	70.19939	114971.2
1124	0.688439	3.786412	0.665028	0.43991	0.853991	5.878055	70.42387	115041.6
1124.2	0.688862	3.788739	0.667064	0.441348	0.854135	5.897039	70.65056	115112.2
1124.4	0.689286	3.791074	0.669119	0.442799	0.85428	5.916214	70.87952	115183.1
1124.6	0.689712	3.793416	0.671194	0.444265	0.854426	5.935581	71.11077	115254.2
1124.8	0.690139	3.795767	0.67329	0.445745	0.854574	5.955144	71.34435	115325.6
1125	0.690568	3.798126	0.675406	0.447239	0.854724	5.974907	71.58031	115397.2
1125.2	0.690999	3.800493	0.677543	0.448749	0.854875	5.994873	71.81868	115469
1125.4	0.691431	3.802868	0.679702	0.450273	0.855027	6.015045	72.05951	115541
1125.6	0.691864	3.805252	0.681882	0.451813	0.855181	6.035427	72.30283	115613.3
1125.8	0.692299	3.807644	0.684085	0.453369	0.855337	6.056023	72.5487	115685.9
1126	0.692735	3.810045	0.68631	0.45494	0.855494	6.076836	72.79716	115758.7
1126.2	0.693174	3.812455	0.688558	0.456527	0.855653	6.097871	73.04825	115831.7
1126.4	0.693613	3.814873	0.690829	0.458131	0.855813	6.119131	73.30201	115905
1126.6	0.694055	3.8173	0.693124	0.459752	0.855975	6.14062	73.55851	115978.6
1126.8	0.694498	3.819737	0.695443	0.46139	0.856139	6.162343	73.81778	116052.4
1127	0.694942	3.822182	0.697786	0.463045	0.856304	6.184304	74.07988	116126.5
1127.2	0.695388	3.824637	0.700154	0.464717	0.856472	6.206507	74.34486	116200.8
1127.4	0.695836	3.8271	0.702548	0.466408	0.856641	6.228956	74.61278	116275.4
1127.6	0.696286	3.829574	0.704968	0.468117	0.856812	6.251657	74.88368	116350.3
1127.8	0.696738	3.832057	0.707414	0.469845	0.856984	6.274614	75.15762	116425.5
1128	0.697191	3.834549	0.709887	0.471591	0.857159	6.297832	75.43467	116500.9
1128.2	0.697646	3.837052	0.712387	0.473357	0.857336	6.321315	75.71488	116576.6
1128.4	0.698102	3.839564	0.714916	0.475142	0.857514	6.34507	75.99831	116652.6
1128.6	0.698561	3.842086	0.717472	0.476948	0.857695	6.369101	76.28503	116728.9
1128.8	0.699022	3.844618	0.720058	0.478774	0.857877	6.393414	76.57509	116805.5
1129	0.699484	3.847161	0.722673	0.480621	0.858062	6.418014	76.86857	116882.4
1129.2	0.699948	3.849714	0.725318	0.482489	0.858249	6.442907	77.16553	116959.5
1129.4	0.700414	3.852278	0.727993	0.484378	0.858438	6.4681	77.46604	117037
1129.6	0.700882	3.854852	0.7307	0.48629	0.858629	6.493597	77.77018	117114.8
1129.8	0.701352	3.857437	0.733439	0.488224	0.858822	6.519405	78.07801	117192.8
1130	0.701824	3.860033	0.736211	0.490182	0.859018	6.545531	78.38962	117271.2
1130.2	0.702298	3.862641	0.739015	0.492162	0.859216	6.571981	78.70507	117349.9
1130.4	0.702774	3.865259	0.741854	0.494167	0.859417	6.598763	79.02446	117429
1130.6	0.703253	3.867889	0.744727	0.496196	0.85962	6.625882	79.34787	117508.3
1130.8	0.703733	3.870531	0.747635	0.49825	0.859825	6.653346	79.67537	117588
1131	0.704215	3.873184	0.750579	0.500118	0.860012	6.680999	80.00607	117668
1131.2	0.7047	3.875849	0.75356	0.501135	0.860113	6.708327	80.33596	117748.3
1131.4	0.705187	3.878526	0.756579	0.502164	0.860216	6.736005	80.66599	117829

1131.6	0.705676	3.881216	0.759636	0.503207	0.860321	6.764042	81.00028	117910
1131.8	0.706167	3.883918	0.762732	0.504264	0.860426	6.792445	81.33892	117991.3
1132	0.70666	3.886632	0.765868	0.505333	0.860533	6.821222	81.682	118073
1132.2	0.707156	3.889359	0.769045	0.506417	0.860642	6.850382	82.02962	118155
1132.4	0.707654	3.8921	0.772264	0.507515	0.860752	6.879933	82.38189	118237.4
1132.6	0.708155	3.894853	0.775526	0.508628	0.860863	6.909884	82.7389	118320.2
1132.8	0.708658	3.89762	0.778832	0.509756	0.860976	6.940244	83.10077	118403.3
1133	0.709164	3.9004	0.782182	0.510898	0.86109	6.971023	83.4676	118486.7
1133.2	0.709672	3.903194	0.785578	0.512057	0.861206	7.002231	83.83953	118570.6
1133.4	0.710182	3.906003	0.789021	0.513231	0.861323	7.033878	84.21666	118654.8
1133.6	0.710695	3.908825	0.792511	0.514422	0.861442	7.065974	84.59911	118739.4
1133.8	0.711211	3.911662	0.796051	0.51563	0.861563	7.098531	84.98703	118824.4
1134	0.71173	3.914513	0.799641	0.516854	0.861685	7.131558	85.38053	118909.8
1134.2	0.712251	3.91738	0.803283	0.518097	0.86181	7.165069	85.77976	118995.5
1134.4	0.712775	3.920261	0.806978	0.519357	0.861936	7.199074	86.18486	119081.7
1134.6	0.713302	3.923159	0.810726	0.520636	0.862064	7.233588	86.59597	119168.3
1134.8	0.713831	3.926071	0.81453	0.521933	0.862193	7.268621	87.01325	119255.3
1135	0.714364	3.929	0.818391	0.52325	0.862325	7.304188	87.43685	119342.8
1135.2	0.714899	3.931945	0.822309	0.524587	0.862459	7.340303	87.86694	119430.6
1135.4	0.715438	3.934907	0.826288	0.525945	0.862594	7.376979	88.30369	119518.9
1135.6	0.715979	3.937885	0.830328	0.527323	0.862732	7.414232	88.74727	119607.7
1135.8	0.716524	3.94088	0.834431	0.528722	0.862872	7.452078	89.19786	119696.9
1136	0.717072	3.943893	0.838599	0.530144	0.863014	7.490532	89.65566	119786.5
1136.2	0.717623	3.946924	0.842833	0.531588	0.863159	7.52961	90.12085	119876.7
1136.4	0.718177	3.949973	0.847135	0.533056	0.863306	7.569331	90.59365	119967.3
1136.6	0.718735	3.95304	0.851507	0.534548	0.863455	7.609712	91.07426	120058.3
1136.8	0.719296	3.956126	0.855951	0.536064	0.863606	7.650773	91.56291	120149.9
1137	0.71986	3.959231	0.86047	0.537605	0.86376	7.692531	92.05982	120242
1137.2	0.720428	3.962355	0.865064	0.539172	0.863917	7.735009	92.56524	120334.5
1137.4	0.721	3.9655	0.869737	0.540766	0.864077	7.778226	93.07941	120427.6
1137.6	0.721575	3.968665	0.874491	0.542388	0.864239	7.822205	93.60259	120521.2
1137.8	0.722155	3.97185	0.879327	0.544038	0.864404	7.866969	94.13505	120615.3
1138	0.722738	3.975057	0.884249	0.545717	0.864572	7.912542	94.67707	120710
1138.2	0.723325	3.978285	0.889259	0.547426	0.864743	7.958949	95.22895	120805.2
1138.4	0.723916	3.981536	0.894361	0.549166	0.864917	8.006215	95.79098	120901
1138.6	0.724511	3.984809	0.899555	0.550938	0.865094	8.054369	96.36351	120997.4
1138.8	0.72511	3.988105	0.904847	0.552744	0.865274	8.103438	96.94684	121094.3
1139	0.725713	3.991424	0.910238	0.554583	0.865458	8.153453	97.54135	121191.9
1139.2	0.726321	3.994768	0.915733	0.556457	0.865646	8.204445	98.14739	121290
1139.4	0.726934	3.998136	0.921333	0.558368	0.865837	8.256446	98.76534	121388.8
1139.6	0.727551	4.001529	0.927044	0.560316	0.866032	8.309491	99.39562	121488.2
1139.8	0.728172	4.004949	0.932868	0.562303	0.86623	8.363615	100.0386	121588.2
1140	0.728799	4.008394	0.93881	0.56433	0.866433	8.418857	100.6948	121688.9
1140.2	0.72943	4.011867	0.944874	0.566398	0.86664	8.475255	101.3647	121790.3
1140.4	0.730067	4.015368	0.951063	0.568509	0.866851	8.532853	102.0486	121892.3
1140.6	0.730709	4.018897	0.957384	0.570665	0.867067	8.591693	102.7473	121995.1
1140.8	0.731356	4.022455	0.963839	0.572868	0.867287	8.651821	103.4611	122098.5

1141	0.732008	4.026044	0.970435	0.575118	0.867512	8.713287	104.1906	122202.7
1141.2	0.732666	4.029663	0.977176	0.577417	0.867742	8.776141	104.9366	122307.7
1141.4	0.73333	4.033313	0.984068	0.579769	0.867977	8.840437	105.6995	122413.4
1141.6	0.733999	4.036997	0.991118	0.582173	0.868217	8.906233	106.48	122519.9
1141.8	0.734675	4.040713	0.99833	0.584634	0.868463	8.973589	107.2789	122627.1
1142	0.735357	4.044465	1.005713	0.586257	0.868626	9.041637	108.0914	122735.2
1142.2	0.736046	4.048251	1.013272	0.587651	0.868765	9.111058	108.9162	122844.1
1142.4	0.736741	4.052074	1.021016	0.589079	0.868908	9.182194	109.7595	122953.9
1142.6	0.737443	4.055935	1.028951	0.590542	0.869054	9.255116	110.6239	123064.5
1142.8	0.738152	4.059834	1.037086	0.592043	0.869204	9.329904	111.5101	123176
1143	0.738868	4.063774	1.045431	0.593582	0.869358	9.40664	112.4193	123288.5
1143.2	0.739592	4.067755	1.053994	0.595161	0.869516	9.485412	113.3523	123401.8
1143.4	0.740323	4.071778	1.062786	0.596782	0.869678	9.566316	114.3104	123516.1
1143.6	0.741063	4.075846	1.071817	0.598448	0.869845	9.64945	115.2946	123631.4
1143.8	0.741811	4.07996	1.081098	0.600159	0.870016	9.734924	116.3062	123747.7
1144	0.742567	4.084121	1.090642	0.601919	0.870192	9.822851	117.3466	123865.1
1144.2	0.743333	4.088331	1.100462	0.60373	0.870373	9.913356	118.4172	123983.5
1144.4	0.744108	4.092593	1.110571	0.605595	0.870559	10.00657	119.5196	124103
1144.6	0.744892	4.096907	1.120986	0.607515	0.870752	10.10264	120.6553	124223.7
1144.8	0.745687	4.101277	1.131722	0.609495	0.87095	10.20171	121.8261	124345.5
1145	0.746492	4.105704	1.142797	0.611538	0.871154	10.30396	123.034	124468.5
1145.2	0.747307	4.110191	1.154229	0.613646	0.871365	10.40956	124.2811	124592.8
1145.4	0.748135	4.11474	1.16604	0.615824	0.871582	10.5187	125.5696	124718.4
1145.6	0.748974	4.119354	1.178251	0.618076	0.871808	10.6316	126.9018	124845.3
1145.8	0.749825	4.124037	1.190886	0.620406	0.872041	10.74849	128.2805	124973.5
1146	0.750689	4.128792	1.203973	0.62282	0.872282	10.86961	129.7086	125103.3
1146.2	0.751567	4.133621	1.21754	0.625322	0.872532	10.99524	131.1891	125234.4
1146.4	0.75246	4.13853	1.231618	0.627918	0.872792	11.12569	132.7256	125367.2
1146.6	0.753367	4.143521	1.246242	0.630615	0.873061	11.26128	134.3218	125501.5
1146.8	0.754291	4.1486	1.261451	0.63342	0.873342	11.40237	135.9819	125637.5
1147	0.755231	4.153772	1.277287	0.63634	0.873634	11.54937	137.7104	125775.2
1147.2	0.75619	4.159042	1.293796	0.639385	0.873938	11.70273	139.5126	125914.7
1147.4	0.757167	4.164417	1.311032	0.642563	0.874256	11.86295	141.3941	126056.1
1147.6	0.758164	4.169902	1.329053	0.645887	0.874589	12.03058	143.3611	126199.5
1147.8	0.759183	4.175506	1.347924	0.649367	0.874937	12.20626	145.421	126344.9
1148	0.760225	4.181237	1.36772	0.653018	0.875302	12.39069	147.5817	126492.5
1148.2	0.761292	4.187104	1.388525	0.656855	0.875685	12.58468	149.8522	126642.3
1148.4	0.762385	4.193118	1.410436	0.660895	0.87609	12.78916	152.2431	126794.5
1148.6	0.763507	4.199291	1.433562	0.66516	0.876516	13.00519	154.7661	126949.3
1148.8	0.764661	4.205638	1.458032	0.669673	0.876967	13.23399	157.435	127106.8
1149	0.76585	4.212173	1.483995	0.674461	0.877446	13.477	160.2659	127267
1149.2	0.767076	4.218917	1.511626	0.678689	0.877869	13.73455	163.2693	127430.3
1149.4	0.768344	4.225892	1.541135	0.681927	0.878193	14.00783	166.4543	127596.7
1149.6	0.769659	4.233124	1.572773	0.6854	0.87854	14.30105	169.8533	127766.6
1149.8	0.771026	4.240645	1.606845	0.68914	0.878914	14.61708	173.5088	127940.1
1150	0.772454	4.248494	1.643732	0.693188	0.879319	14.95953	177.4597	128117.6
1150.2	0.77395	4.256723	1.683913	0.697599	0.87976	15.33289	181.7545	128299.3

1150.4	0.775526	4.265393	1.728006	0.702438	0.880244	15.74304	186.4556	128485.8
1150.6	0.777198	4.27459	1.776833	0.707797	0.88078	16.19773	191.6446	128677.4
1150.8	0.778987	4.284429	1.831523	0.7138	0.88138	16.70767	197.4324	128874.8
1151	0.780923	4.295074	1.893704	0.720625	0.882063	17.28828	203.9757	129078.8
1151.2	0.78305	4.306778	1.96587	0.728546	0.882855	17.96323	211.509	129290.3
1151.4	0.785447	4.319961	2.052209	0.738022	0.883802	18.77228	220.4131	129510.7
1151.6	0.788262	4.335438	2.16084	0.749946	0.884995	19.79263	231.3895	129742.1
1151.8	0.79187	4.355288	2.312503	0.766592	0.886659	21.22166	246.0857	129988.2
1152	0.8	4.4	2.712083	0.802063	0.890206	24.98815	277.2588	130265.5
1152.2	0.804237	4.423306	2.896844	0.815035	0.891504	26.72936	310.305	130575.8
1152.4	0.806118	4.433652	2.95122	0.818853	0.891885	27.24276	323.8327	130899.6
1152.6	0.807585	4.441719	2.981979	0.821013	0.892101	27.53336	328.6567	131228.3
1152.8	0.808835	4.448591	2.999902	0.822272	0.892227	27.70275	331.4167	131559.7
1153	0.809944	4.454691	3.009186	0.822923	0.892292	27.79051	332.9596	131892.7
1153.2	0.810953	4.460239	3.011971	0.823119	0.892312	27.81684	333.6441	132226.3
1153.4	0.811885	4.465368	3.009509	0.822946	0.892295	27.79357	333.6624	132560
1153.6	0.812757	4.470161	3.002594	0.822461	0.892246	27.72819	333.1305	132893.1
1153.8	0.813578	4.474681	2.99175	0.821699	0.89217	27.62569	332.1233	133225.2
1154	0.814358	4.47897	2.977331	0.820687	0.892069	27.48943	330.6907	133555.9
1154.2	0.815102	4.483061	2.959576	0.81944	0.891944	27.32168	328.8667	133884.8
1154.4	0.815815	4.486981	2.938637	0.81797	0.891797	27.12391	326.6736	134211.4
1154.6	0.8165	4.490751	2.914597	0.816282	0.891628	26.89693	324.125	134535.6
1154.8	0.817161	4.494386	2.887486	0.814378	0.891438	26.64105	321.2279	134856.8
1155	0.8178	4.497901	2.85728	0.812258	0.891226	26.35609	317.9828	135174.8
1155.2	0.81842	4.501308	2.823907	0.809914	0.890991	26.04139	314.3849	135489.2
1155.4	0.819021	4.504616	2.787241	0.80734	0.890734	25.69584	310.4234	135799.6
1155.6	0.819606	4.507834	2.747102	0.804521	0.890452	25.31778	306.0818	136105.7
1155.8	0.820176	4.510969	2.70324	0.801442	0.890144	24.90493	301.3363	136407
1156	0.820732	4.514027	2.655323	0.798077	0.889808	24.45422	296.1549	136703.2
1156.2	0.821275	4.517014	2.60291	0.794397	0.88944	23.96161	290.495	136993.7
1156.4	0.821806	4.519935	2.545413	0.79036	0.889036	23.42167	284.2997	137278
1156.6	0.822326	4.522794	2.482033	0.7852	0.88852	22.82523	277.4814	137555.4
1156.8	0.822835	4.525595	2.411661	0.777475	0.887748	22.15879	269.9041	137825.3
1157	0.823335	4.528342	2.332679	0.768807	0.886881	21.41216	261.4257	138086.8
1157.2	0.823825	4.531038	2.242602	0.75892	0.885892	20.56238	251.8473	138338.6
1157.4	0.824306	4.533685	2.137245	0.747356	0.884736	19.57078	240.7989	138579.4
1157.6	0.824779	4.536287	2.008486	0.733223	0.883322	18.36236	227.5988	138807
1157.8	0.825245	4.538845	1.835579	0.714245	0.881425	16.74552	210.6472	139017.7
1158	0.825702	4.541363	1.413627	0.661484	0.876148	12.81896	177.3869	139195
1158.2	0.826153	4.543841	1.205352	0.623074	0.872307	10.88238	142.2081	139337.3
1158.4	0.826597	4.546282	1.126301	0.608496	0.87085	10.15168	126.2044	139463.5
1158.6	0.827034	4.548687	1.069679	0.598053	0.869805	9.629769	118.6887	139582.1
1158.8	0.827465	4.551058	1.024676	0.589754	0.868975	9.215831	113.0736	139695.2
1159	0.82789	4.553397	0.987061	0.580789	0.868079	8.868362	108.5052	139803.7
1159.2	0.82831	4.555704	0.95465	0.569733	0.866973	8.566239	104.6076	139908.3
1159.4	0.828724	4.557982	0.926144	0.560009	0.866001	8.301125	101.2042	140009.5
1159.6	0.829133	4.560231	0.900694	0.551327	0.865133	8.06492	98.19628	140107.7

1159.8	0.829537	4.562452	0.877711	0.543487	0.864349	7.852008	95.50157	140203.2
1160	0.829936	4.564646	0.856767	0.536342	0.863634	7.658312	93.06192	140296.3
1160.2	0.83033	4.566815	0.837541	0.529783	0.862978	7.480766	90.83447	140387.1
1160.4	0.83072	4.56896	0.819781	0.523725	0.862372	7.316999	88.78659	140475.9
1160.6	0.831105	4.57108	0.80329	0.518099	0.86181	7.165135	86.8928	140562.8
1160.8	0.831487	4.573177	0.787909	0.512852	0.861285	7.023661	85.13277	140647.9
1161	0.831864	4.575252	0.773507	0.507939	0.860794	6.89134	83.49001	140731.4
1161.2	0.832237	4.577306	0.759974	0.503323	0.860332	6.767143	81.9509	140813.4
1161.4	0.832607	4.579338	0.74722	0.497956	0.859796	6.649421	80.49938	140893.9
1161.6	0.832973	4.58135	0.735165	0.489443	0.858944	6.535675	79.11057	140973
1161.8	0.833335	4.583343	0.723745	0.481378	0.858138	6.428105	77.78268	141050.8
1162	0.833694	4.585317	0.712901	0.473719	0.857372	6.326138	76.52546	141127.3
1162.2	0.834049	4.587272	0.702582	0.466432	0.856643	6.229276	75.33249	141202.6
1162.4	0.834402	4.589209	0.692746	0.459485	0.855949	6.137085	74.19817	141276.8
1162.6	0.834751	4.591129	0.683353	0.452852	0.855285	6.04918	73.11759	141350
1162.8	0.835097	4.593032	0.674369	0.446507	0.854651	5.965224	72.08643	141422
1163	0.83544	4.594918	0.665764	0.44043	0.854043	5.884916	71.10084	141493.1
1163.2	0.83578	4.596789	0.65751	0.4346	0.85346	5.807988	70.15743	141563.3
1163.4	0.836117	4.598643	0.649582	0.429002	0.8529	5.734199	69.25312	141632.5
1163.6	0.836451	4.600483	0.64196	0.423618	0.852362	5.663333	68.38519	141700.9
1163.8	0.836783	4.602308	0.634622	0.418436	0.851844	5.595193	67.55116	141768.5
1164	0.837112	4.604118	0.62755	0.413442	0.851344	5.529604	66.74879	141835.2
1164.2	0.837439	4.605914	0.620729	0.408625	0.850862	5.466405	65.97606	141901.2
1164.4	0.837763	4.607696	0.614143	0.403973	0.850397	5.405448	65.23112	141966.4
1164.6	0.838085	4.609465	0.607778	0.399478	0.849948	5.3466	64.51229	142031
1164.8	0.838404	4.61122	0.601622	0.395131	0.849513	5.289739	63.81803	142094.8
1165	0.838721	4.612963	0.595663	0.390922	0.849092	5.234751	63.14694	142157.9
1165.2	0.839035	4.614693	0.589891	0.386845	0.848685	5.181533	62.4977	142220.4
1165.4	0.839348	4.616411	0.584295	0.382893	0.848289	5.129989	61.86913	142282.3
1165.6	0.839658	4.618117	0.578866	0.37906	0.847906	5.080031	61.26012	142343.5
1165.8	0.839966	4.619812	0.573597	0.375338	0.847534	5.031577	60.66965	142404.2
1166	0.840272	4.621494	0.568478	0.371723	0.847172	4.984551	60.09677	142464.3
1166.2	0.840576	4.623166	0.563504	0.36821	0.846821	4.938883	59.54061	142523.9
1166.4	0.840877	4.624826	0.558666	0.364793	0.846479	4.894507	59.00034	142582.9
1166.6	0.841177	4.626476	0.553959	0.361469	0.846147	4.851362	58.47522	142641.3
1166.8	0.841475	4.628115	0.549376	0.358233	0.845823	4.80939	57.96451	142699.3
1167	0.841772	4.629743	0.544913	0.355081	0.845508	4.768539	57.46758	142756.8
1167.2	0.842066	4.631362	0.540564	0.352009	0.845201	4.728758	56.98378	142813.7
1167.4	0.842358	4.63297	0.536323	0.349014	0.844901	4.69	56.51255	142870.3
1167.6	0.842649	4.634569	0.532187	0.346093	0.844609	4.652221	56.05333	142926.3
1167.8	0.842938	4.636158	0.528151	0.343243	0.844324	4.615381	55.60561	142981.9
1168	0.843225	4.637738	0.524211	0.34046	0.844046	4.579439	55.16892	143037.1
1168.2	0.843511	4.639308	0.520363	0.337742	0.843774	4.54436	54.74279	143091.8
1168.4	0.843794	4.64087	0.516603	0.335087	0.843509	4.510108	54.32681	143146.2
1168.6	0.844077	4.642422	0.512929	0.332492	0.843249	4.476652	53.92056	143200.1
1168.8	0.844357	4.643966	0.509336	0.329955	0.842996	4.44396	53.52367	143253.6
1169	0.844636	4.645501	0.505822	0.327474	0.842747	4.412003	53.13578	143306.7

1169.2	0.844914	4.647027	0.502385	0.325046	0.842505	4.380754	52.75654	143359.5
1169.4	0.84519	4.648545	0.49902	0.321677	0.842168	4.349674	52.38257	143411.9
1169.6	0.845465	4.650055	0.495726	0.316017	0.841602	4.318056	52.00638	143463.9
1169.8	0.845738	4.651557	0.492499	0.310474	0.841047	4.287128	51.6311	143515.5
1170	0.846009	4.653052	0.489339	0.305044	0.840504	4.256866	51.26396	143566.8
1170.2	0.84628	4.654538	0.486242	0.299722	0.839972	4.227245	50.90466	143617.7
1170.4	0.846548	4.656017	0.483206	0.294506	0.839451	4.198244	50.55293	143668.2
1170.6	0.846816	4.657488	0.480229	0.289392	0.838939	4.16984	50.2085	143718.4
1170.8	0.847082	4.658951	0.47731	0.284376	0.838438	4.142014	49.87113	143768.3
1171	0.847347	4.660408	0.474446	0.279456	0.837946	4.114746	49.54056	143817.9
1171.2	0.84761	4.661857	0.471636	0.274627	0.837463	4.088018	49.21659	143867.1
1171.4	0.847873	4.663299	0.468878	0.269889	0.836989	4.061812	48.89898	143916
1171.6	0.848134	4.664734	0.46617	0.265236	0.836524	4.03611	48.58753	143964.6
1171.8	0.848393	4.666163	0.463511	0.260668	0.836067	4.010898	48.28205	144012.8
1172	0.848652	4.667584	0.4609	0.256181	0.835618	3.986159	47.98234	144060.8

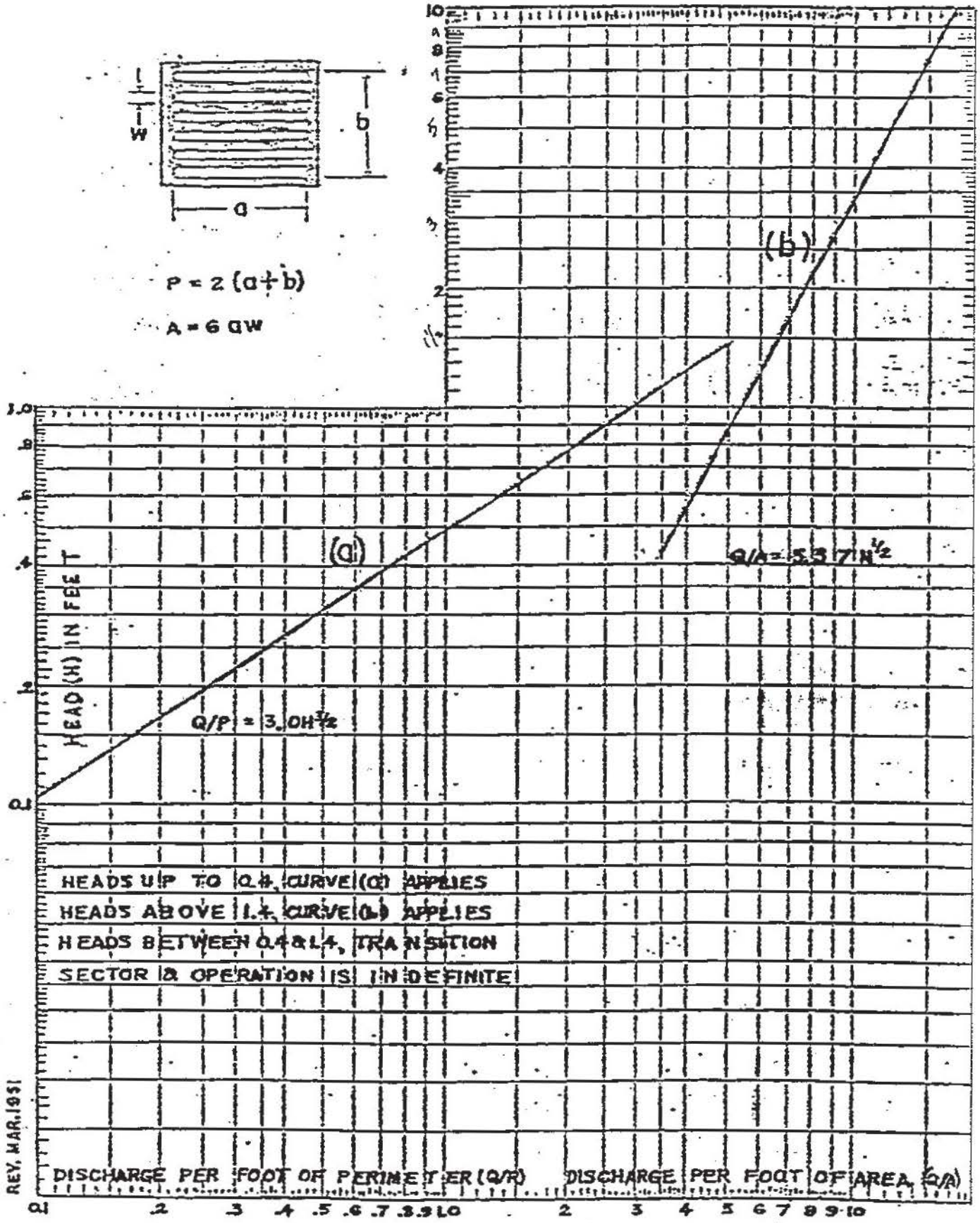
APPENDIX E

CATCH BASIN CALCULATIONS

Cherry Avenue Industrial - Long Beach
Grate Inlet Analysis

Subarea Number (#)	Grate Length (a) (ft)	Grate Width (b) (ft)	Allowable Ponding Depth (ft)	Q50 (Q) (cfs)	Clogging (%)	Perimeter (ft)	Effective Perimeter (P) (ft)	Q/P (cfs/ft)	Calculated Ponding (H) (ft)
1A	4.29	2.94	0.67	7.4	50	14.46	7.23	1.02	0.49
2A	4.29	2.94	0.67	3.3	50	14.46	7.23	0.46	0.28
3A	4.29	2.94	0.67	3.3	50	14.46	7.23	0.46	0.28
4A	4.29	2.94	0.67	3.3	50	14.46	7.23	0.46	0.28
5A	4.29	2.94	0.67	3.3	50	14.46	7.23	0.46	0.28
6A	4.29	2.94	0.67	9.2	50	14.46	7.23	1.27	0.56
8A	4.29	2.94	0.50	2.0	50	14.46	7.23	0.28	0.20
9A	2.95	2.12	0.07	0.2	50	10.14	5.07	0.04	0.06

Bureau of Public Roads "Capacity of Grate Inlet in Sump"



BUREAU OF PUBLIC ROADS
DIVISION TWO WASH, D.C.

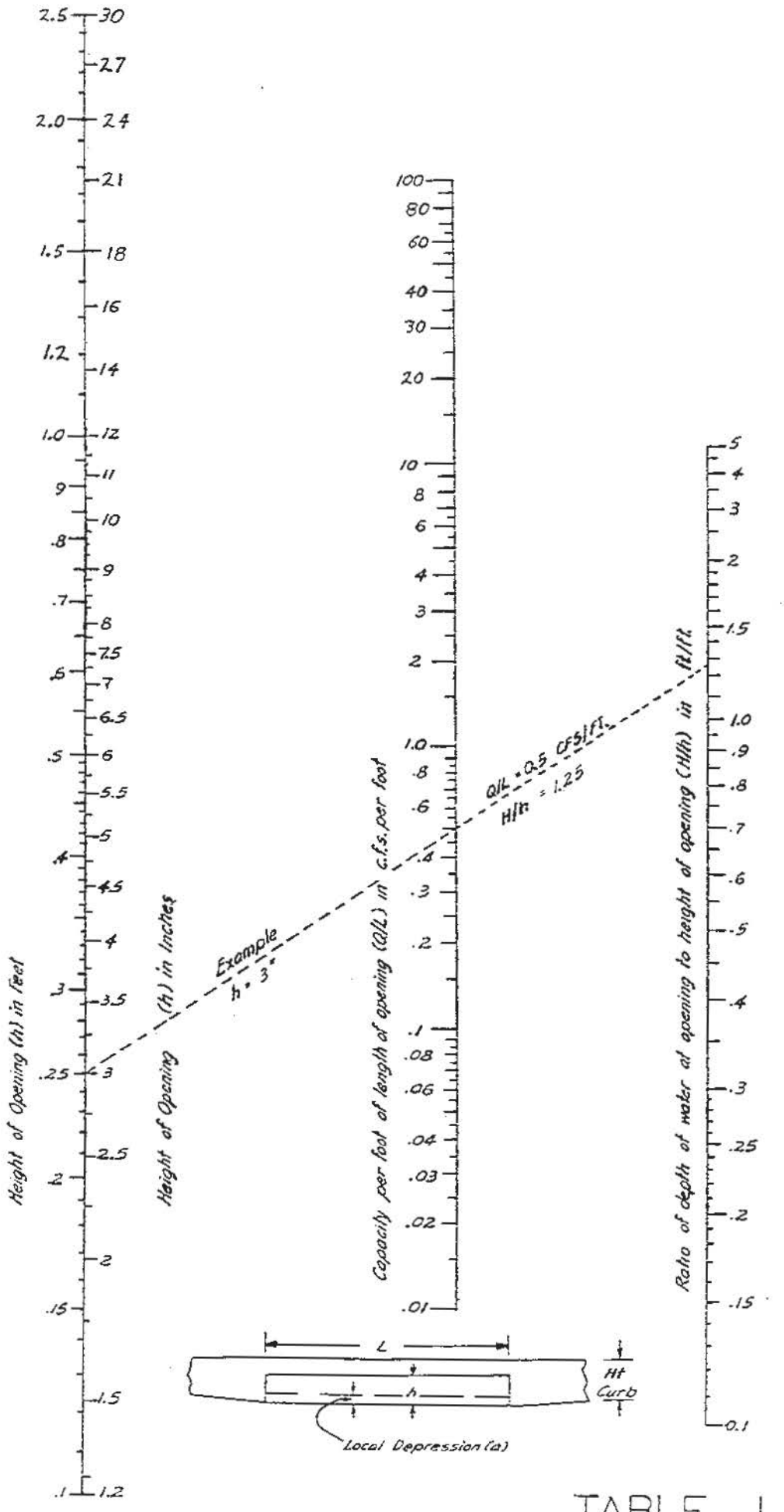
CAPACITY OF GRATE INLET IN SUMP
WATER PONDED ON GRATE

ASSUME 25% CLOGGING

Cherry Avenue Industrial - Long Beach
Curb Inlet Analysis

Node Number (#)	Opening Length (L) (ft)	Opening Height (h) (ft)	Allowable Ponding Depth (ft)	Q50 (Q) (cfs)	Q/L (cfs/ft)	H/h (Nomograph) (ft/ft)	Calculated Ponding (H) (ft)
7A	3.50	0.50	0.67	5.2	1.49	1.25	0.63

Bureau of Public Roads "Nomograph for Capacity of Curb - Sump Condition - Table L"



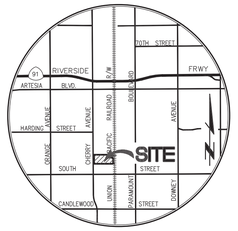
Sump Condition

TABLE L

Nomograph for capacity of curb

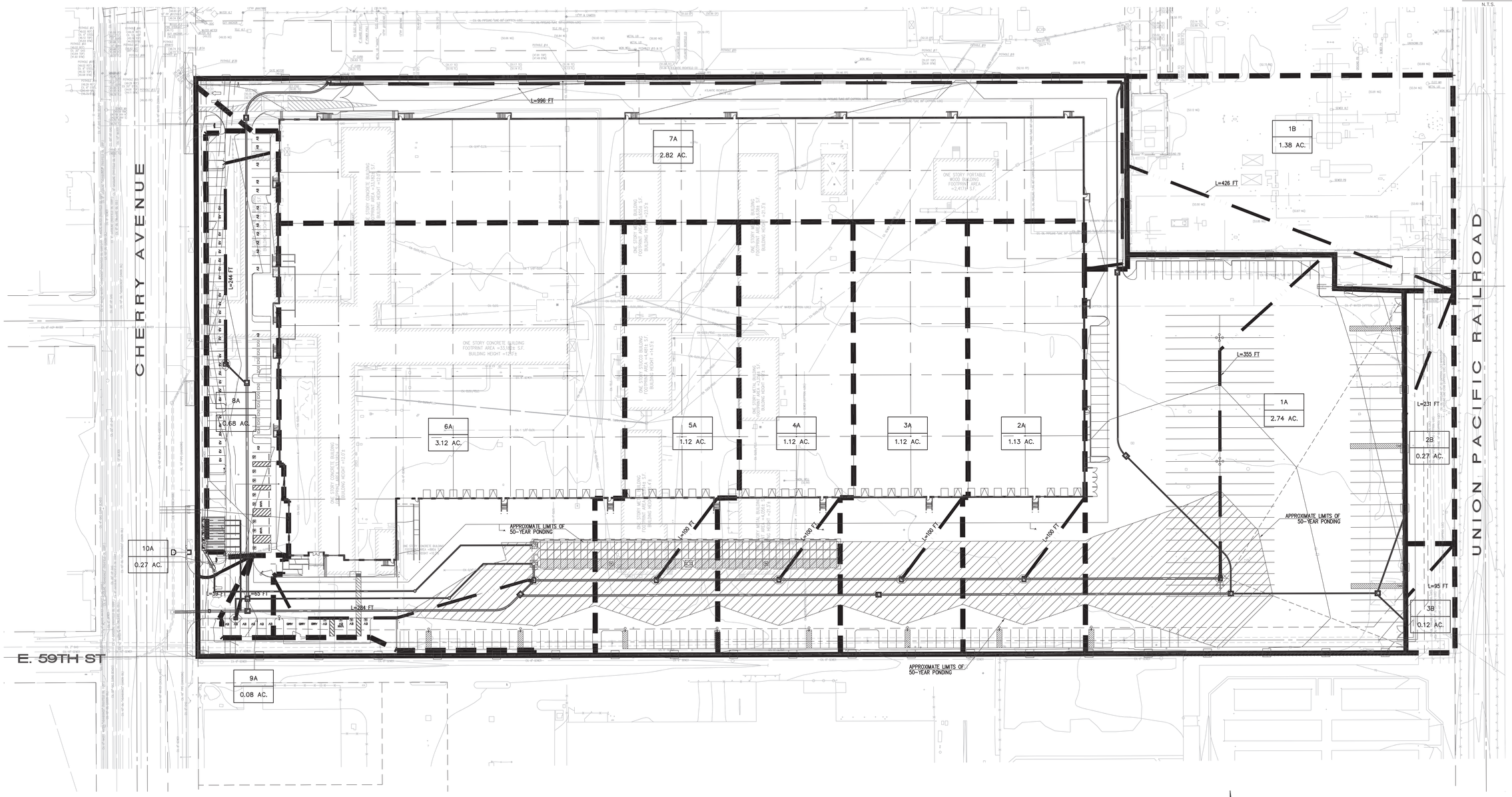
APPENDIX F

HYDROLOGY MAPS



VICINITY MAP

N.T.S.



LEGEND

- PROJECT BOUNDARY
- SUBAREA BOUNDARY
- FLOW PATH
- 1A / 4.10 AC. — SUBAREA NAME / SUBAREA ACREAGE
- PONDING LIMITS

0 20 40 80 120

SCALE: 1"=40'

Last Update:1/3/23
O:\3900-3999\3938\3938HYD.dwg

CITY OF LONG BEACH

PUBLIC WORKS DEPARTMENT

PROPOSED CONDITION HYDROLOGY MAP

CHERRY LOGISTICS CENTER
5910 CHERRY AVENUE,
LONG BEACH, CA

PREPARED FOR:

B9 CHERRY AVE OWNER LLC
3333 MICHELSON DRIVE, SUITE 725
IRVINE, CA 92612
PHONE: (949) 344-2209

Thienes Engineering, Inc.
CIVIL ENGINEERING • LAND SURVEYING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PH:(714)521-4811 FAX:(714)521-4173

Designed by _____ Date _____
Checked by _____ Date _____
Designed by _____ Date _____
Checked by _____ Date _____

Approved by _____ Date _____

Public Works Director _____ R.C.E. _____

Sheet 1 of 1 Sheets

3938/ 1 OF 1 SHEET