Appendix I
Hydrology Study

HYDROLOGY STUDY

PROVIDENCE SAINT JOHN'S HEALTH CENTER PHASE II PROJECT

KPFF Job # 114230

OWNER:

Providence Saint John's Health Center
2121 Santa Monica Blvd
Santa Monica, California 90404

PREPARED BY:

KPFF Consulting Engineers
700 South Flower Street, Suite 2100
Los Angeles, California 90017
(213) 418-0201

Table of Contents

LIST OF APPENDICES

1.0 INTRODUCTION

The primary objective of this report is to analyze and compare the existing and proposed surface storm drainage at the Providence Saint John's Health Center (the Campus) in the City of Santa Monica for drainage from the building sites to the public right-of-way to demonstrate adequacy of the City's existing storm drain system. The project site is approximately 9.2 acres and is currently developed with health care buildings, parking lots and landscaped areas. Providence Saint John's has proposed a Phase II master plan that includes ten new buildings for health care uses, medical research, child care, replacement housing, visitor housing and ground floor neighborhood-serving commercial uses to be located on its campus.

1.1 Storm Drain Conveyance Data and Assumptions

Information regarding the existing storm drain pipe sizes, materials, invert elevations, and manhole depths was compiled using the available utility survey and record drawings provided by the jurisdictional agencies. This information served as a basis to analyze the City's existing storm drain system capacity.

2.0 EXISTING CONDITIONS

2.1 Existing Site Description

The Campus is part of the larger Ballona Creek watershed. The site is bound by Arizona Ave to the north, 23rd St on the east, Broadway on the south, 20th St to the west and Santa Monica Blvd runs through the center of the site. The site is currently developed with health buildings, parking lots and landscaped areas.

The Campus topography is relatively flat with grades sloping from north to south generally from 1.5% to 2.0%. The high point of the Campus is at the northeast corner at an elevation of 166-ft. The low point of the Campus occurs at the southwest tip at an elevation of approximately 147-ft.

The Campus is designated as Zone X in the Flood Insurance Rate Map (Map #06037C1590F), dated September 26, 2008. Please refer to Appendix C.

2.2 Existing Offsite Description

Existing storm drain system information was gathered from the Los Angeles County Storm Drain System. Based on the provided information, the drainage for the Campus was divided into a north and south section and each section was subdivided into four drainage subareas.

The north section and one subarea (S3-4A) of the south section consists of approximately 4.5 acres. Storm water from this combined section of the campus outlets onto Santa Monica Blvd. From there it flows southwest until reaching a drain inlet at the northeast corner of the Santa Monica Blvd and 20th St intersection. The drain inlet feeds into a 27" storm drain line that flows southwest within Santa Monica Blvd which ultimately drains to the Pico Kenter outfall. The diversion system at Pico Kenter diverts dry-weather runoff to the Santa Monica Urban Runoff Recycling Facility (SMURRF); however, any significant runoff from storm events will bypass the diversion system and discharge directly to the Santa Monica Bay.

The remaining south section consists of approximately 5.0 acres. Storm water from the south section of the Campus outlets onto Broadway. From there it flows southwest until reaching a drain inlet at the northeast corner of Broadway and 20th St intersection. The drain inlet feeds into a 30" RCP storm drain line maintained by the Los Angeles County Flood Control District that flows southwest within Broadway which ultimately drains to the Pico Kenter outfall which operates as described above.

3.0 EXISTING & PROPOSED DRAINAGE AREA PEAK FLOWS

LA County's *HydroCalc Calculator* was used to determine the existing and proposed peak runoff rates for the 25 and 50-yr storm events for each of the drainage subareas; it is industry standard to assess both the 25-year and 50-year events. *HydroCalc* is a software based on the Modified Rational Method (MODRAT), as outlined by the *Los Angeles County Public Works Department Hydrology Manual, dated January 2006.* The runoff equation for the Rational Method is as follows:

$$\mathbf{Q = C\ I\ A}$$

where: Q = Peak runoff rate (cfs)
C = Runoff coefficient
I = Average rainfall intensity (in/hr)
A = Drainage area (acres)

The 50-year, 24-hour rainfall depth for the campus ranges between 6.0 to 6.2-inches, 6.1 inches was used for the analysis. The 25-yr, 24-hour rainfall depth was determined by applying a factor of .878 to the 50-yr, 24-hour rainfall depth per the *Los Angeles County Public Works Department Hydrology Manual/Table 5.3.1.* The 25-yr, 24-hour rainfall depth ranges between 5.44 and 5.26 inches, 5.36 inches was used for the analysis. The soil type is 013 for the north section of the Campus and 016 for the south section.

The peak flow rate for each of the drainage areas was calculated using estimated impervious and pervious runoff coefficient and time of concentrations. Input parameters are provided on the existing and proposed hydrology exhibits in Appendix A and the percent of imperviousness has been summarized in Table 3.1 below.

TABLE 3.1: SUMMARY OF PERCENT IMPERVIOUSNESS

Drainage Area (DA)	Existing Drainage Area (SF)	Proposed Drainage Area (SF)	Existing Percent Impervious (%)	Proposed Percent Impervious (%)	Percent Impervious Delta (%)
Santa Monica Blvd Tributary Area					
2I-A	24,400	24,400	81	90	9
2I-B	24,400	24,400	82	90	8
2C	47,100	47,100	56	83	27
2D-E	44,000	35,700	83	93	10
Mullin	56,200	65,800	26	31	5
S3-4A	54,500	54,000	85	80	-5
Subtotal	250,500	251,300	66	71	5
Broadway Tributary Area					
S1	52,700	52,700	85	78	-7
S2-5	46,200	46,200	95	62	-33
S3-4B	118,000	117,200	89	86	-3
Subtotal	216,900	216,100	89	79	-10
Total	467,400	467,400	77	75	-2

The 25 and 50-yr existing and proposed peak discharges for the Campus are summarized in Table 3.2 and 3.3 below respectively. The *HydroCalc* peak flow hydrologic analysis outputs are provided in Appendix D.

TABLE 3.2: SUMMARY OF 25-YR PEAK FLOWS

Drainage Area (DA)	Existing 25-Yr Storm (CFS)	Proposed 25-Yr Storm (CFS)	Peak Flow Delta
Santa Monica Blvd Tributary Area			
2I-A	1.48	1.48	0.00
2I-B	1.48	1.48	0.00
2C	3.11	3.11	0.00
2D-E	3.36	2.36	-1.00
Mullin Plaza	3.71	4.54	0.83
S3-4A	3.57	3.53	-0.04
Subtotal	16.71	16.50	-0.21
Broadway Tributary Area			
S1	3.46	3.15	-0.31
S2-5	3.05	3.00	-0.05
S3-4B	6.60	6.10	-0.95
Subtotal	13.11	12.25	-0.86
Total	29.82	28.75	-1.07

TABLE 3.3: SUMMARY OF 50-YR PEAK FLOWS

Drainage Area (DA)	Existing 50-Yr Storm (CFS)	Proposed 50-Yr Storm (CFS)	Peak Flow Delta
Santa Monica Blvd Tributary Area			
2I-A	1.83	1.83	0.00
2I-B	1.68	1.68	0.00
2C	3.54	3.54	0.00
2D-E	3.83	2.69	-1.14
Mullin Plaza	4.23	5.18	0.95
S3-4A	4.08	4.05	-0.03
Subtotal	19.19	18.97	-0.22
Broadway Tributary Area			
S1	3.95	3.61	-0.34
S2-5	3.47	3.45	-0.02
S3-4B	8.11	7.44	-0.67
Subtotal	15.53	14.50	-1.03
Total	34.72	33.47	-1.25

4.0 SUMMARY OF EXISTING & PROPOSED STORM DRAIN CONVEYANCE CONDITIONS

A comparison of existing and proposed percent of imperviousness shows that the subareas from the Campus that discharge to Santa Monica Blvd will increase from approximately 66% to 71% and the subareas that discharge to Broadway will decrease from 89% to 79%. When all subareas are combined, the overall percent of imperviousness decreases from 77% to 75%.

With the change in percent of imperviousness, the 25 and 50-yr peak flow discharges that flow to Santa Monica Blvd and Broadway changed between the existing and proposed conditions.

The existing and proposed 25 and 50-yr peak flow that discharges to Santa Monica Blvd decreases from 16.71 and 19.19 cfs to 16.50 and 18.97 cfs. That is a delta of -0.21 and -0.22 cfs respectively. When compared to existing storm water conditions, runoff volume to Santa Monica Blvd decreased by 1.3% with the proposed improvements. The proposed runoff decreases even though the impervious is greater due to the decrease in drainage area for site 2D/2E which is added to a more pervious area (Mullin Plaza).

The existing and proposed 25 and 50-yr peak flow that discharges to Broadway decreases from 13.11 and 15.53 cfs to 12.25 and 14.50 cfs. That is a delta of -0.86 and -1.03 cfs respectively. When compared to existing storm water conditions, runoff volume to Broadway decreased by 6.6% with the proposed improvements.

In conclusion, the peak flow rate would have a net decrease of 1.3% for Santa Monica Blvd and a net decrease of 6.6% for Broadway. Runoff would continue to follow the same discharge paths and drain to the same existing storm water systems.

APPENDIX A

Hydrology Exhibits

SANTA MONICA BLVD TRIBUTARY AREA				
DRAIN AREA	AREA (AC)	IMPERVIOUS (%)	Q_{25} (CFS)	Q_{50} (CFS)
2I-A	0.56	81	1.48	1.83
2I-B	0.56	82	1.48	1.68
2C	0.88	69	2.53	2.88
2D-E	1.01	83	2.91	3.31
MULLIN PL	1.29	26	3.71	4.23
S3-4A	1.24	85	3.57	4.08
TOTAL	5.64	68	16.13	18.53

BROADWAY TRIBUTARY AREA				
DRAIN AREA	AREA (AC)	IMPERVIOUS (%)	Q_{25} (CFS)	Q_{50} (CFS)
S1	1.21	85	3.46	3.95
S2-5	1.06	95	3.05	3.47
S3-4B	2.71	89	6.60	8.11
TOTAL	4.98	89	13.11	15.53

LEGEND

DRAINAGE PATH OF TRAVEL

SANTA MONICA BLVD DRAINAGE SUBAREA

BROADWAY DRAINAGE SUBAREA

23RD STREET

20TH STREET

21ST STREET

ARIZONA AVENUE

SANTA MONICA BOULEVARD

BROADWAY

SD

SUBAREA 2D-E
AREA = 1.01 AC
ESTIMATED IMP% = 83%
SOIL TYPE = 013
Q_{25} = 2.91 CFS
Q_{50} = 3.31 CFS

SUBAREA S3-4A
AREA = 1.25 AC
ESTIMATED IMP% = 85%
SOIL TYPE = 016
Q_{25} = 3.57 CFS
Q_{50} = 4.08 CFS

SUBAREA S3-4B
AREA = 2.71 AC
ESTIMATED IMP% = 89%
SOIL TYPE = 016
Q_{25} = 6.60 CFS
Q_{50} = 8.11 CFS

SUBAREA S2-5
AREA = 1.06 AC
ESTIMATED IMP% = 95%
SOIL TYPE = 016
Q_{25} = 3.05 CFS
Q_{50} = 3.47 CFS

SUBAREA MULLIN PLAZA
AREA = 1.29 AC
ESTIMATED IMP% = 26%
SOIL TYPE = 013
Q_{25} = 3.71 CFS
Q_{50} = 4.23 CFS

SUBAREA 2C
AREA = 1.08 AC
ESTIMATED IMP% = 56%
SOIL TYPE = 013
Q_{25} = 3.11 CFS
Q_{50} = 3.54 CFS

46,911 ± sf

SUBAREA S1
AREA = 1.21 AC
ESTIMATED IMP% = 85%
SOIL TYPE = 016
Q_{25} = 3.46 CFS
Q_{50} = 3.95 CFS

SUBAREA 2I-B
AREA = 0.56 AC
ESTIMATED IMP% = 82%
SOIL TYPE = 013
Q_{25} = 1.48 CFS
Q_{50} = 1.68 CFS

SUBAREA 2I-A
AREA = 0.56 AC
ESTIMATED IMP% = 81%
SOIL TYPE = 013
Q_{25} = 1.48 CFS
Q_{50} = 1.83 CFS

27" Storm Drain

30" Storm Drain

30" Storm Drain

NORTH

SCALE 1 INCH = 60 FEET

60 0 60 120

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Engineer's Stamp

Project

PROVIDENCE SAINT JOHN'S HEALTH CENTER
HYDROLOGY STUDY
SANTA MONICA, CALIFORNIA

Sheet Title

DRAINAGE STUDY EXHIBIT (EXISTING)

DATE	4/19/2017
Designed	MP
Drawn	MP
Checked	MP
JOB NO.	C17-036
Drawing No.	EX01

File: C17-036_Drainage Study Exhibits.dwg TAB:EX01
Plotted: 4/18/17 at 2:04pm By: rroy
XREFs: CS17-036 xtb 114230V-St Johns base - POST DEMO SURVEY 114230C-SPBASE

SANTA MONICA BLVD TRIBUTARY AREA				
DRAIN AREA	AREA (AC)	IMPERVIOUS (%)	Q_{25} (CFS)	Q_{50} (CFS)
2I-A	0.56	90	1.48	1.83
2I-B	0.56	90	1.48	1.68
2C	0.88	91	2.53	2.88
2D-E	0.82	93	2.36	2.69
MULLIN PL	1.58	31	4.54	5.18
S3-4A	1.24	80	3.53	4.05
TOTAL	5.64	72	15.92	18.31

BROADWAY TRIBUTARY AREA				
DRAIN AREA	AREA (AC)	IMPERVIOUS (%)	Q_{25} (CFS)	Q_{50} (CFS)
S1	1.21	78	3.15	3.61
S2-5	1.06	62	3.00	3.45
S3-4B	2.68	86	6.10	7.44
TOTAL	4.95	79	12.25	14.50

LEGEND

- DRAINAGE PATH OF TRAVEL
- SANTA MONICA BLVD DRAINAGE SUBAREA
- BROADWAY DRAINAGE SUBAREA
- ZONE FOR POTENTIAL FUTURE CONNECTIONS TO EXISTING BUILDINGS

SUBAREA 2D-E
AREA = 0.82 AC
ESTIMATED IMP% = 93%
SOIL TYPE = 013
Q_{25} = 2.36 CFS
Q_{50} = 2.69 CFS

SUBAREA MULLIN PLAZA
AREA = 1.58 AC
ESTIMATED IMP% = 31%
SOIL TYPE = 013
Q_{25} = 4.54 CFS
Q_{50} = 5.18 CFS

SUBAREA 2C
AREA = 1.08 AC
ESTIMATED IMP% = 83%
SOIL TYPE = 013
Q_{25} = 3.11 CFS
Q_{50} = 3.54 CFS

SUBAREA 2I-B
AREA = 0.56 AC
ESTIMATED IMP% = 90%
SOIL TYPE = 013
Q_{25} = 1.48 CFS
Q_{50} = 1.68 CFS

SUBAREA 2I-A
AREA = 0.56 AC
ESTIMATED IMP% = 90%
SOIL TYPE = 013
Q_{25} = 1.48 CFS
Q_{50} = 1.83 CFS

SUBAREA S3-4A
AREA = 1.24 AC
ESTIMATED IMP% = 80%
SOIL TYPE = 016
Q_{25} = 3.53 CFS
Q_{50} = 4.05 CFS

SUBAREA S3-4B
AREA = 2.68 AC
ESTIMATED IMP% = 86%
SOIL TYPE = 016
Q_{25} = 6.10 CFS
Q_{50} = 7.44 CFS

SUBAREA S2-5
AREA = 1.06 AC
ESTIMATED IMP% = 62%
SOIL TYPE = 016
Q_{25} = 3.00 CFS
Q_{50} = 3.45 CFS

SUBAREA S1
AREA = 1.21 AC
ESTIMATED IMP% = 78%
SOIL TYPE = 016
Q_{25} = 3.15 CFS
Q_{50} = 3.61 CFS

30" Storm Drain

30" Storm Drain

NORTH

SCALE 1 INCH = 60 FEET
60 0 60 120

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Project

PROVIDENCE SAINT JOHN'S HEALTH CENTER
HYDROLOGY STUDY
SANTA MONICA, CALIFORNIA

Sheet Title

DRAINAGE STUDY EXHIBIT (PROPOSED)

DATE	4/19/2017
Designed	MP
Drawn	MP
Checked	MP
JOB NO.	C17-036

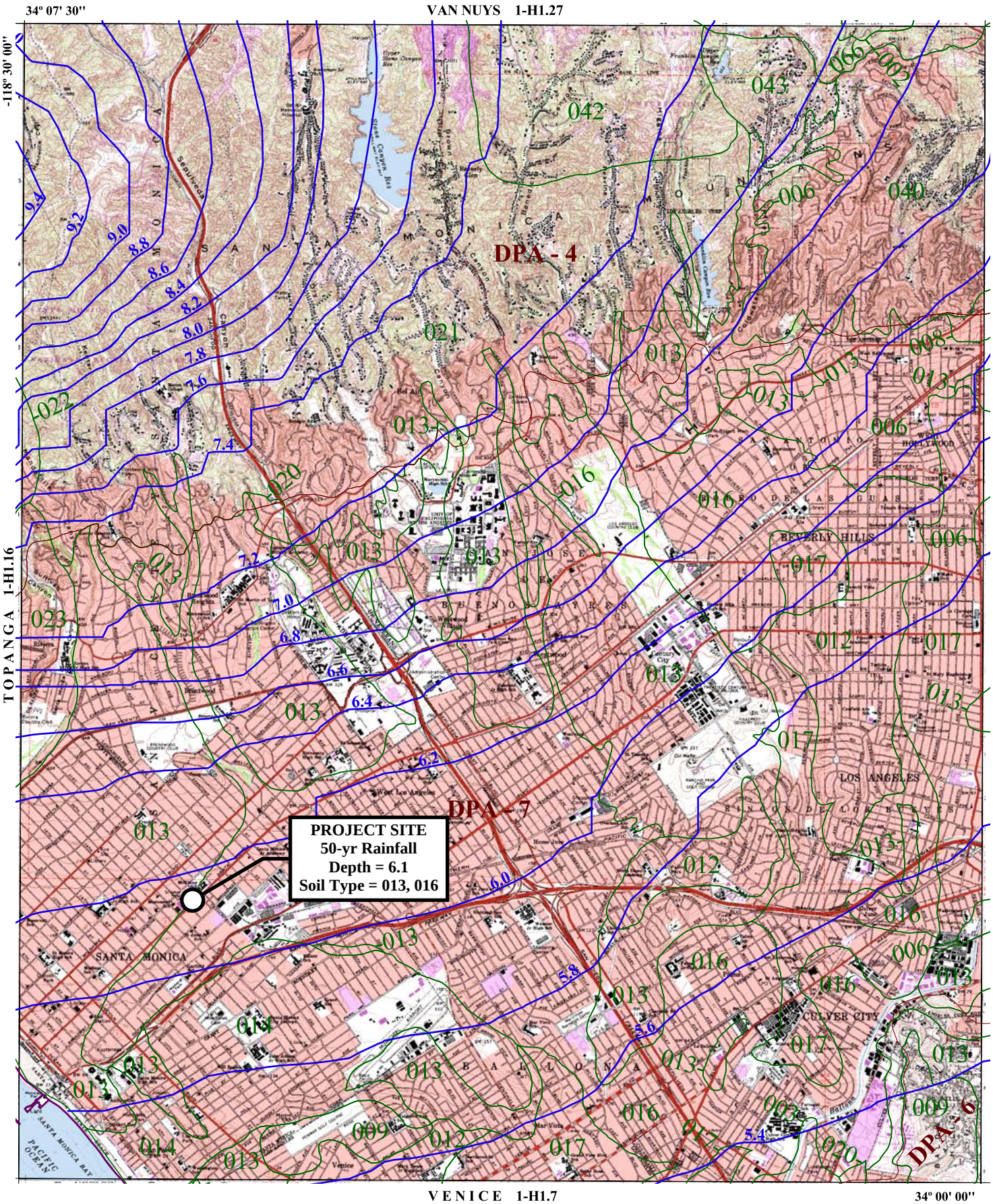
Drawing No.

EX02

File: C17-036_Drainage Study Exhibits-2017-10-03.dwg TAB:EX02
Plotted: 10/4/17 at 9:40am By: avorwald
XREFs: C517-036 xtb 114230V-St Johns base - POST DEMO SURVEY 114230C-SPBASE

APPENDIX B

Isohyet Map



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

BEVERLY HILLS 50-YEAR 24-HOUR ISOHYET

1-H1.17

LOS ANGELES COUNTY PUBLIC WORKS Public Service That Works

APPENDIX C

Flood Insurance Rate Map

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 11. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was derived from U.S. Geological Survey Digital Orthophoto Quadrangles produced at a scale of 1:12,000 from photography dated 1994 or later and from National Geospatial Intelligence Agency imagery produced at a scale of 1:4,000 from photography dated 2003 or later.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables *in the Flood Insurance Study report (which contains authoritative hydraulic data)* may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, *a Flood Insurance Study report*, and/or digital versions of this **map.** The FEMA Map Service Center may also be reached by Fax at **1-800-358-9620** and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/.

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equalled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary
0.2% annual chance floodplain boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513 — Base Flood Elevation line and value; elevation in feet*
(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

A — A Cross section line
23 — 23 Transect line
97°07'30", 32°22'30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
4275000mN 1000-meter Universal Transverse Mercator grid values, zone 11
6000000 FT 5000-foot grid ticks: California State Plane coordinate system, V zone (FIPSZONE 0405), Lambert Conformal Conic
DX5510 × Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5 River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
September 26, 2008
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'
500 0 1000 2000 FEET
300 0 300 600 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1590F

FIRM
FLOOD INSURANCE RATE MAP
LOS ANGELES COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 1590 OF 2350
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LOS ANGELES COUNTY	065043	1590	F
LOS ANGELES, CITY OF	060137	1590	F
SANTA MONICA, CITY OF	060159	1590	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06037C1590F
EFFECTIVE DATE
SEPTEMBER 26, 2008

Federal Emergency Management Agency

APPENDIX D

HydroCalc Peak Flow Hydrologic Analysis (25 & 50-yr Existing)

Peak Flow Hydrologic Analysis

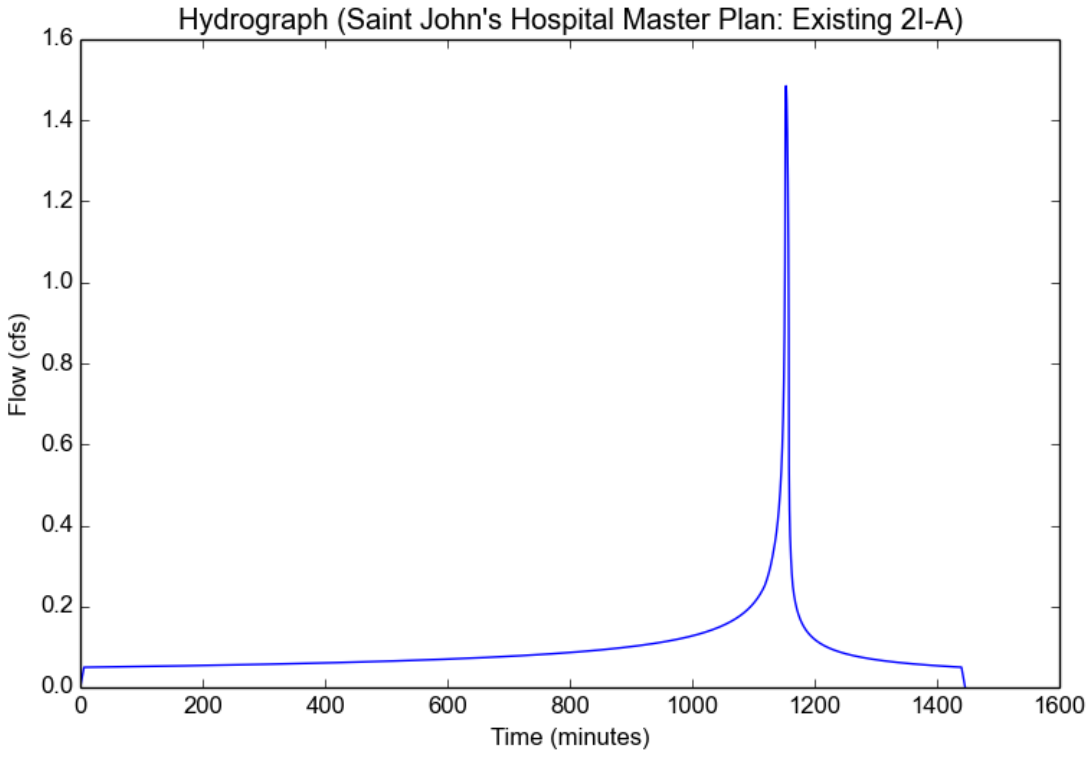
File location: X:/2017-Civil Projects/CS17-036 - Providence Saint John's Health Center Hydrology Study (LA Civil)/CIVIL/HYDROCALC/25-YR PDFS/Exis
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital Master Plan
Subarea ID	Existing 2I-A
Area (ac)	0.56
Flow Path Length (ft)	382.0
Flow Path Slope (vft/hft)	0.018
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.81
Soil Type	13
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.3558
Peak Intensity (in/hr)	2.933
Undeveloped Runoff Coefficient (Cu)	0.922
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	1.4782
Burned Peak Flow Rate (cfs)	1.4782
24-Hr Clear Runoff Volume (ac-ft)	0.1889
24-Hr Clear Runoff Volume (cu-ft)	8230.2313



Peak Flow Hydrologic Analysis

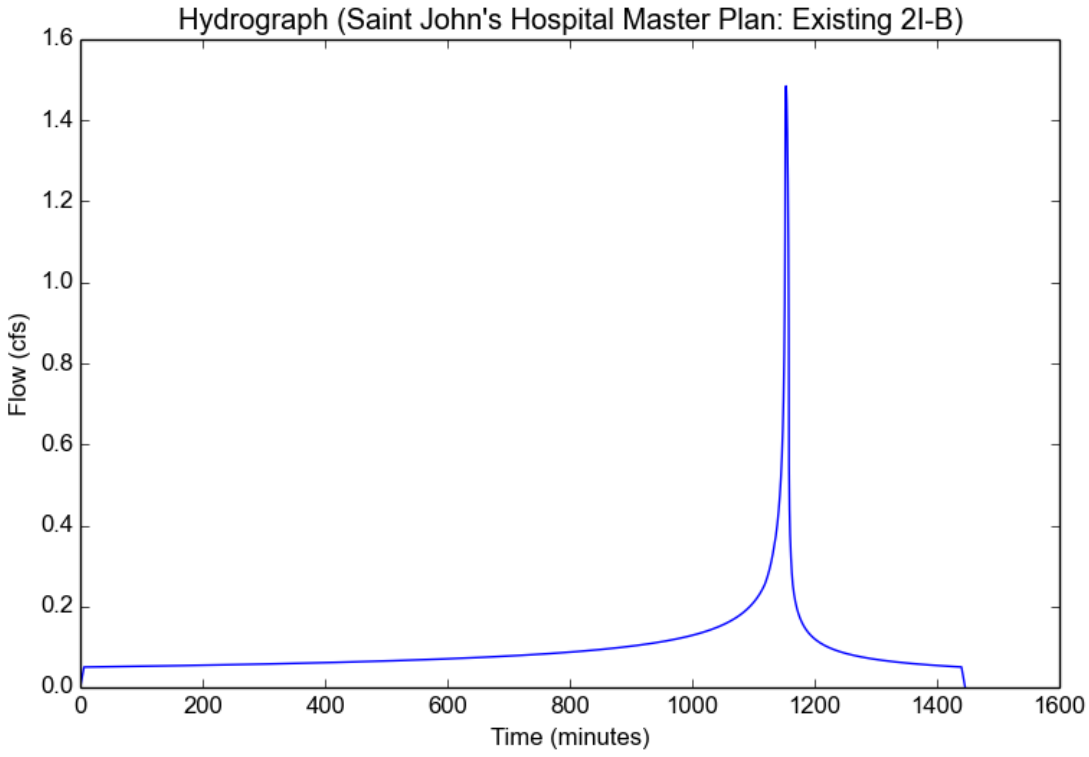
File location: X:/2017-Civil Projects/CS17-036 - Providence Saint John's Health Center Hydrology Study (LA Civil)/CIVIL/HYDROCALC/25-YR PDFS/Exis
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital Master Plan
Subarea ID	Existing 2I-B
Area (ac)	0.56
Flow Path Length (ft)	382.0
Flow Path Slope (vft/hft)	0.012
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.82
Soil Type	13
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.3558
Peak Intensity (in/hr)	2.933
Undeveloped Runoff Coefficient (Cu)	0.922
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	1.4782
Burned Peak Flow Rate (cfs)	1.4782
24-Hr Clear Runoff Volume (ac-ft)	0.1907
24-Hr Clear Runoff Volume (cu-ft)	8308.5122



Peak Flow Hydrologic Analysis

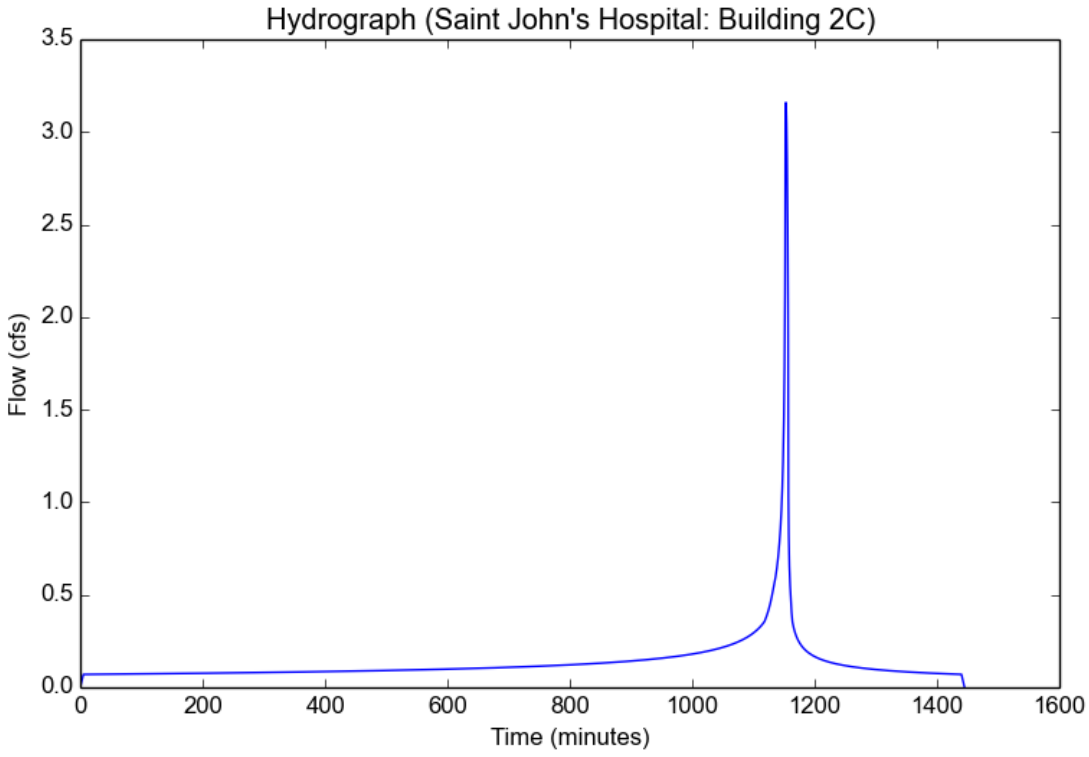
File location: P:/2014/114230 Saint John's Hospital Master Plan/ENGR/Stormwater/Calcs/Saint John's Hospital - Building 2C - 25-Year.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital
Subarea ID	Building 2C
Area (ac)	1.08
Flow Path Length (ft)	275.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.56
Soil Type	13
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.3558
Peak Intensity (in/hr)	3.1954
Undeveloped Runoff Coefficient (Cu)	0.935
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.1059
Burned Peak Flow Rate (cfs)	3.1059
24-Hr Clear Runoff Volume (ac-ft)	0.2777
24-Hr Clear Runoff Volume (cu-ft)	12097.4213



Peak Flow Hydrologic Analysis

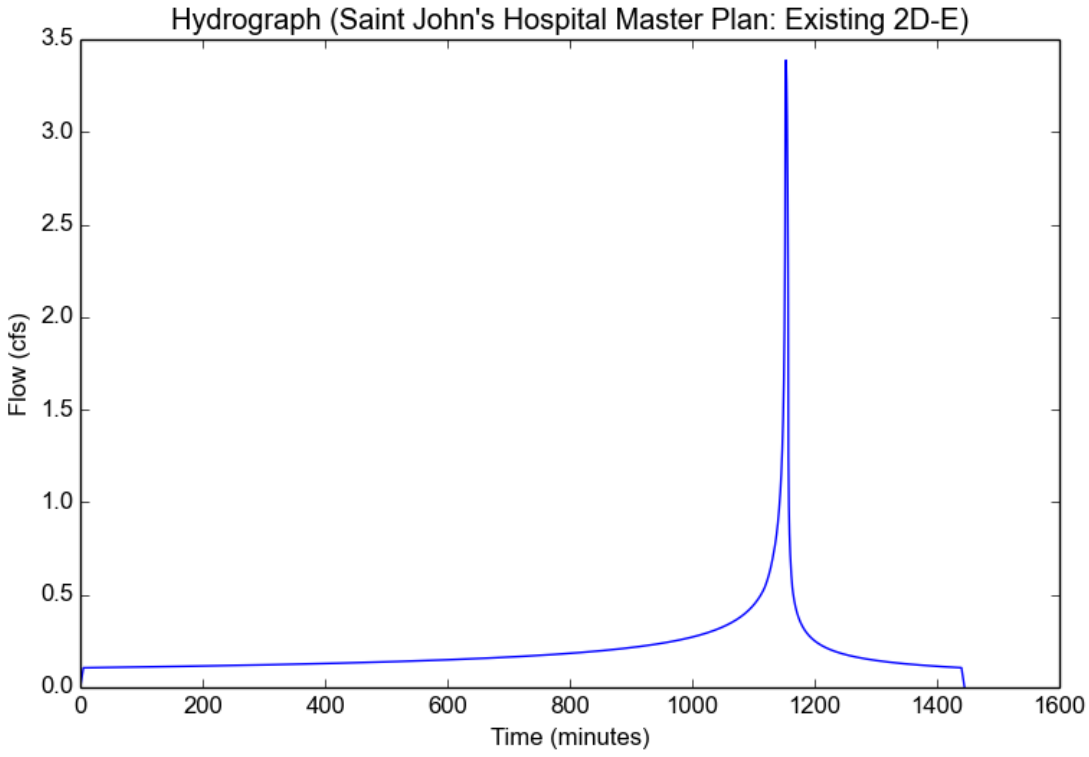
File location: P:/2014/114230 Saint John's Hospital Master Plan/ENGR/Stormwater/Saint John's Hospital Master Plan - Existing 2D-E 25-year.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital Master Plan
Subarea ID	Existing 2D-E
Area (ac)	1.17
Flow Path Length (ft)	186.0
Flow Path Slope (vft/hft)	0.017
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.83
Soil Type	13
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.3558
Peak Intensity (in/hr)	3.1954
Undeveloped Runoff Coefficient (Cu)	0.935
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.3648
Burned Peak Flow Rate (cfs)	3.3648
24-Hr Clear Runoff Volume (ac-ft)	0.4023
24-Hr Clear Runoff Volume (cu-ft)	17522.0238



Peak Flow Hydrologic Analysis

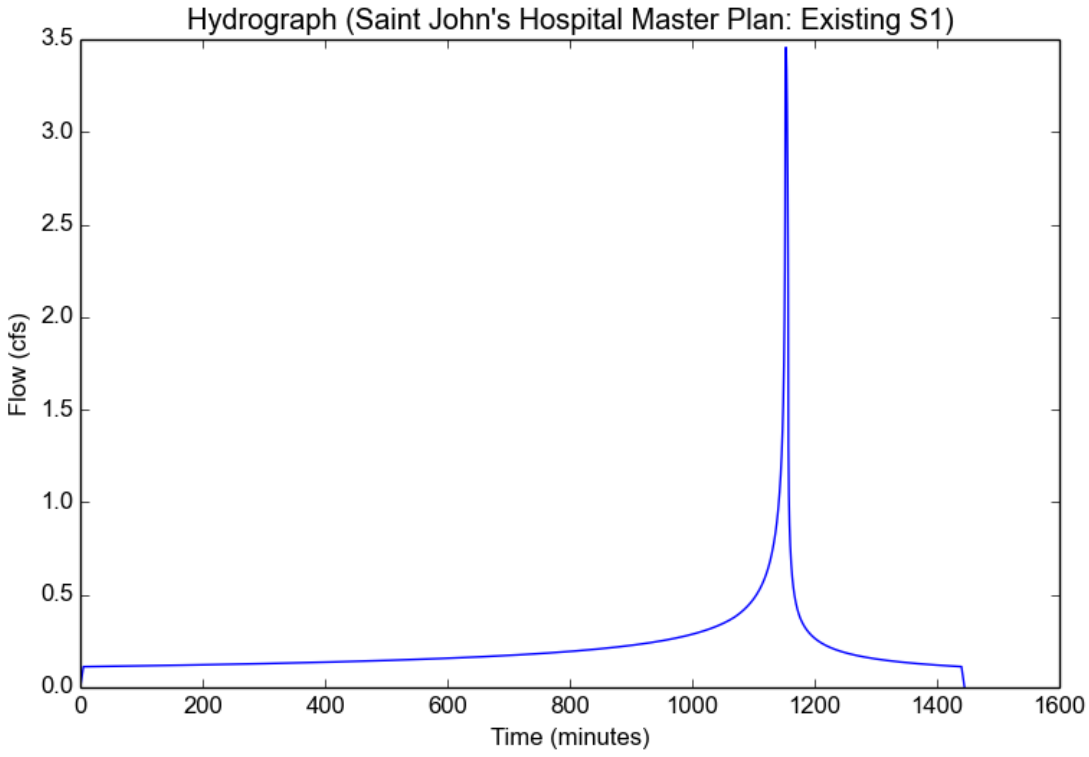
File location: X:/2017-Civil Projects/CS17-036 - Providence Saint John's Health Center Hydrology Study (LA Civil)/CIVIL/HYDROCALC/25-YR PDFS/Exis
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital Master Plan
Subarea ID	Existing S1
Area (ac)	1.21
Flow Path Length (ft)	271.0
Flow Path Slope (vft/hft)	0.006
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.85
Soil Type	16
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.3558
Peak Intensity (in/hr)	3.1954
Undeveloped Runoff Coefficient (Cu)	0.8594
Developed Runoff Coefficient (Cd)	0.8939
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.4563
Burned Peak Flow Rate (cfs)	3.4563
24-Hr Clear Runoff Volume (ac-ft)	0.4247
24-Hr Clear Runoff Volume (cu-ft)	18501.9832



Peak Flow Hydrologic Analysis

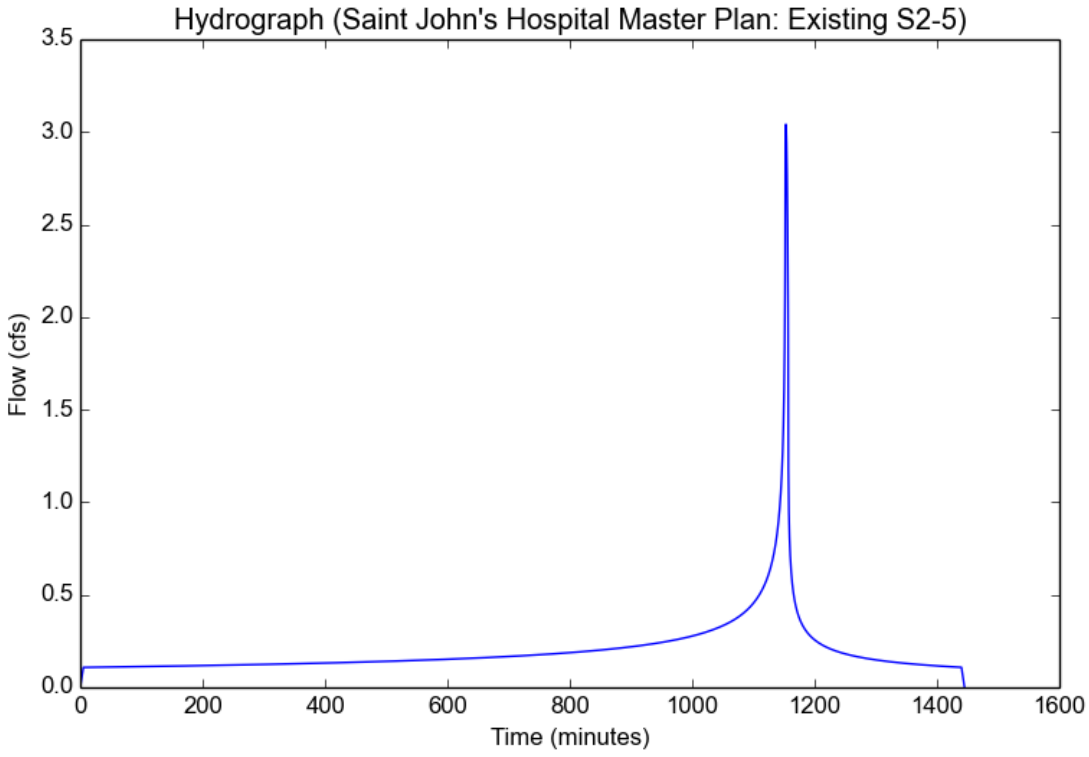
File location: X:/2017-Civil Projects/CS17-036 - Providence Saint John's Health Center Hydrology Study (LA Civil)/CIVIL/HYDROCALC/25-YR PDFS/Exis
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital Master Plan
Subarea ID	Existing S2-5
Area (ac)	1.06
Flow Path Length (ft)	178.0
Flow Path Slope (vft/hft)	0.016
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.95
Soil Type	16
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.3558
Peak Intensity (in/hr)	3.1954
Undeveloped Runoff Coefficient (Cu)	0.8594
Developed Runoff Coefficient (Cd)	0.898
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.0416
Burned Peak Flow Rate (cfs)	3.0416
24-Hr Clear Runoff Volume (ac-ft)	0.4055
24-Hr Clear Runoff Volume (cu-ft)	17665.4265



Peak Flow Hydrologic Analysis

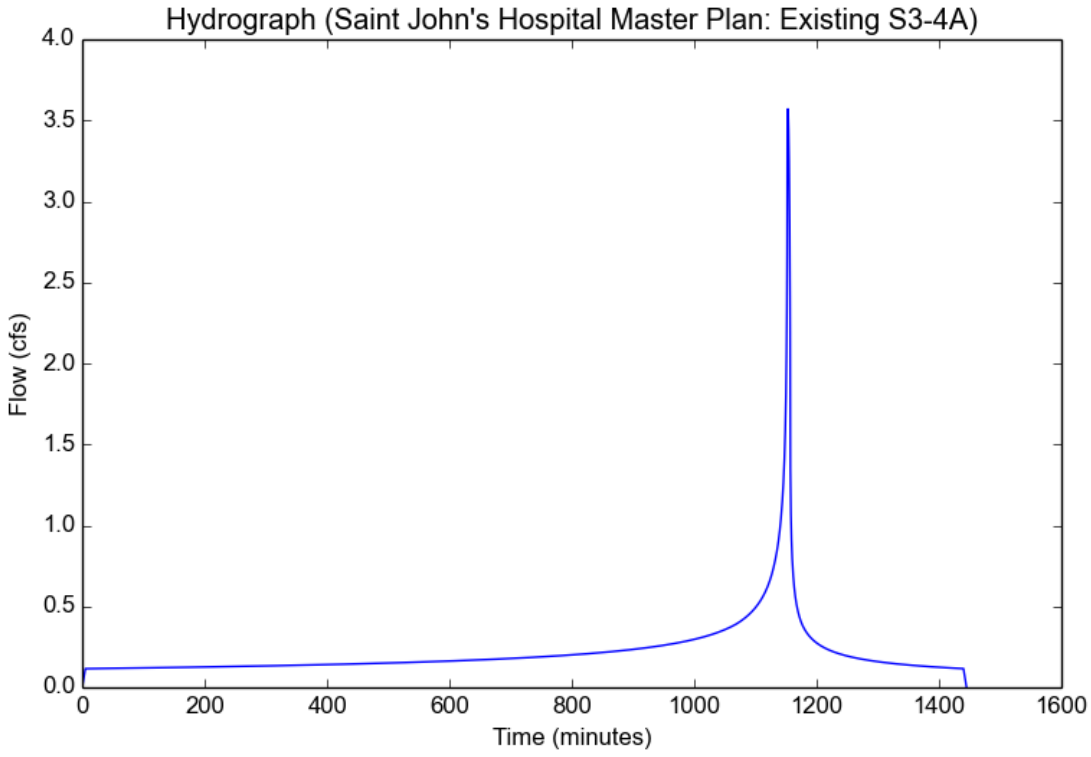
File location: X:/2017-Civil Projects/CS17-036 - Providence Saint John's Health Center Hydrology Study (LA Civil)/CIVIL/HYDROCALC/25-YR PDFS/Exis
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital Master Plan
Subarea ID	Existing S3-4A
Area (ac)	1.25
Flow Path Length (ft)	225.0
Flow Path Slope (vft/hft)	0.015
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.85
Soil Type	16
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.3558
Peak Intensity (in/hr)	3.1954
Undeveloped Runoff Coefficient (Cu)	0.8594
Developed Runoff Coefficient (Cd)	0.8939
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.5705
Burned Peak Flow Rate (cfs)	3.5705
24-Hr Clear Runoff Volume (ac-ft)	0.4388
24-Hr Clear Runoff Volume (cu-ft)	19113.619



Peak Flow Hydrologic Analysis

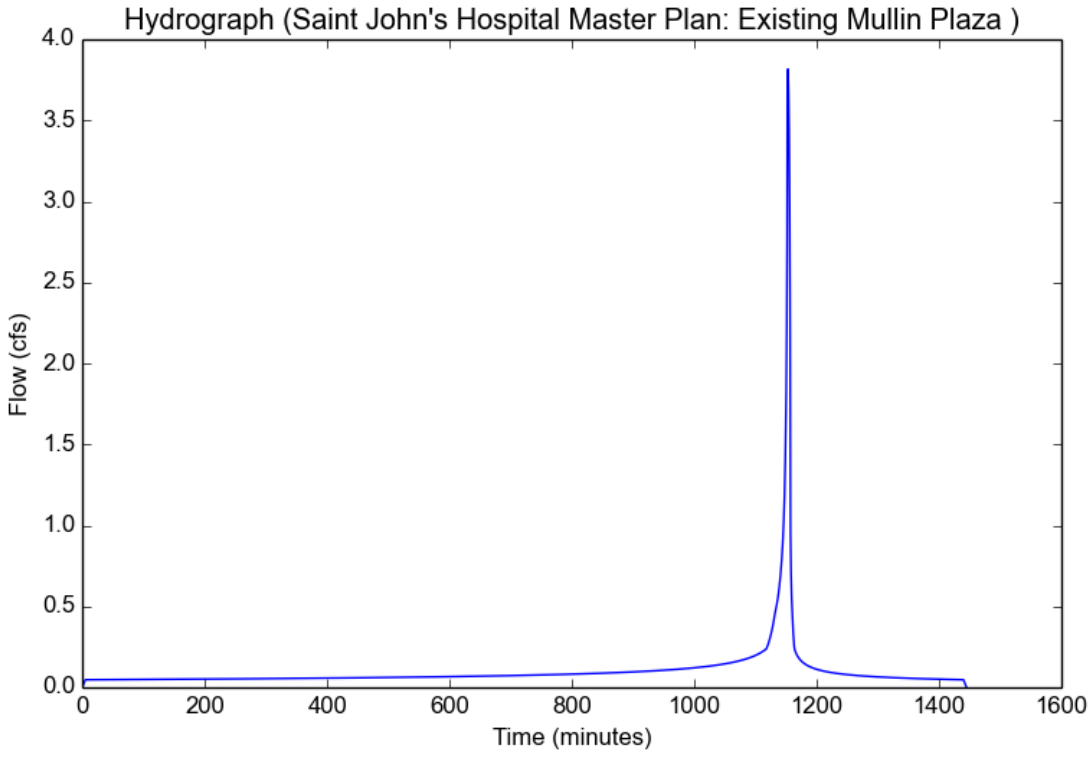
File location: P:/2014/114230 Saint John's Hospital Master Plan/ENGR/Stormwater/Providence St John's - Mullin Plaza Existing 25-year.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital Master Plan
Subarea ID	Existing Mullin Plaza
Area (ac)	1.29
Flow Path Length (ft)	230.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.26
Soil Type	13
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.3558
Peak Intensity (in/hr)	3.1954
Undeveloped Runoff Coefficient (Cu)	0.935
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.7099
Burned Peak Flow Rate (cfs)	3.7099
24-Hr Clear Runoff Volume (ac-ft)	0.2075
24-Hr Clear Runoff Volume (cu-ft)	9039.1902



Peak Flow Hydrologic Analysis

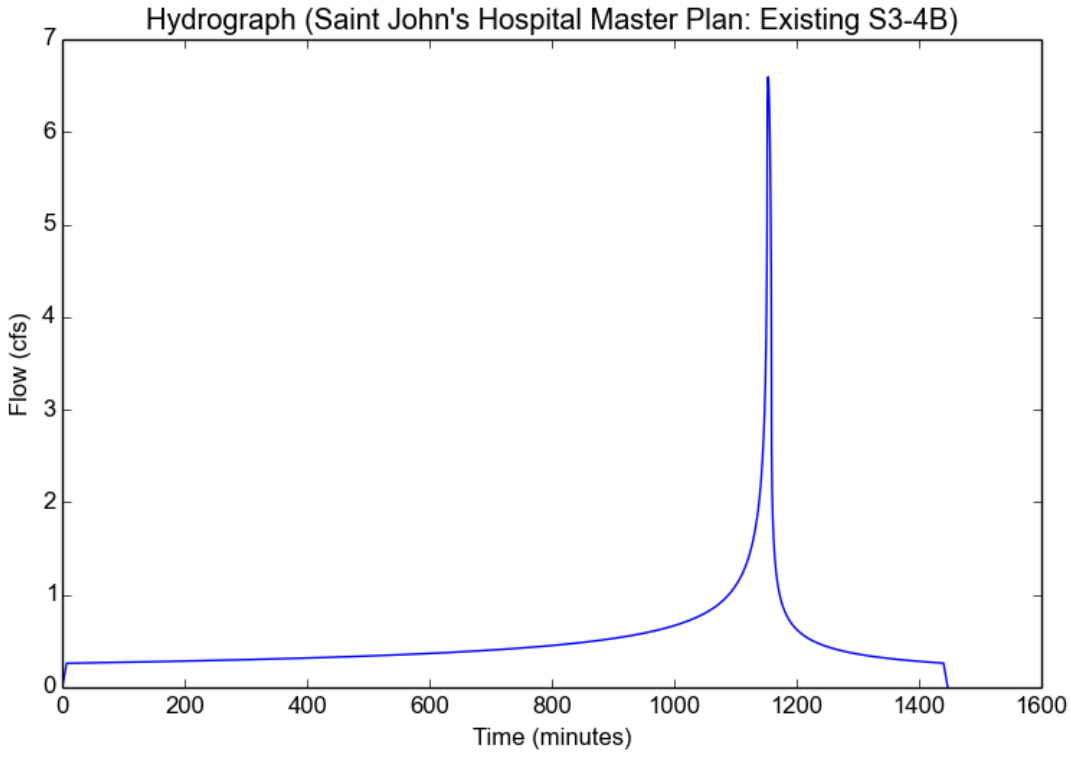
File location: X:/2017-Civil Projects/CS17-036 - Providence Saint John's Health Center Hydrology Study (LA Civil)/CIVIL/HYDROCALC/25-YR PDFS/Exis
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital Master Plan
Subarea ID	Existing S3-4B
Area (ac)	2.71
Flow Path Length (ft)	375.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.89
Soil Type	16
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.3558
Peak Intensity (in/hr)	2.728
Undeveloped Runoff Coefficient (Cu)	0.8284
Developed Runoff Coefficient (Cd)	0.8921
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	6.5954
Burned Peak Flow Rate (cfs)	6.5954
24-Hr Clear Runoff Volume (ac-ft)	0.9855
24-Hr Clear Runoff Volume (cu-ft)	42926.4279



Peak Flow Hydrologic Analysis

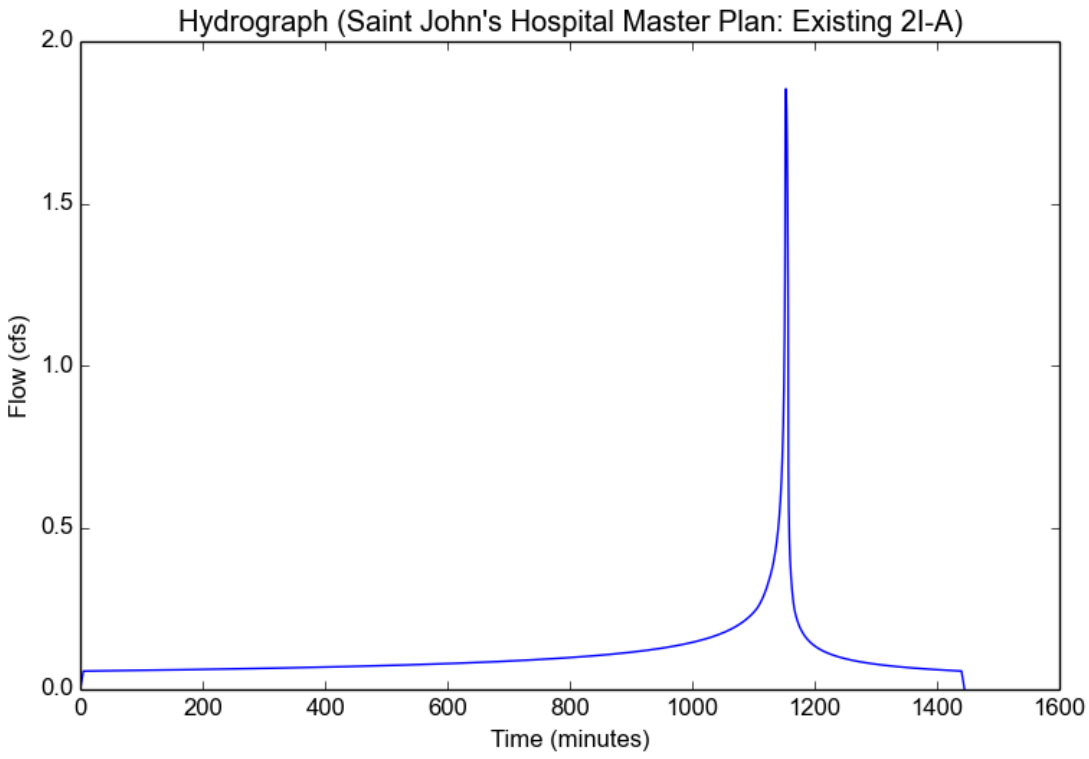
File location: X:/2017-Civil Projects/CS17-036 - Providence Saint John's Health Center Hydrology Study (LA Civil)/CIVIL/HYDROCALC/50-YR PDFS/Exis
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital Master Plan
Subarea ID	Existing 2I-A
Area (ac)	0.56
Flow Path Length (ft)	382.0
Flow Path Slope (vft/hft)	0.018
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.81
Soil Type	13
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	3.6394
Undeveloped Runoff Coefficient (Cu)	0.9504
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.8343
Burned Peak Flow Rate (cfs)	1.8343
24-Hr Clear Runoff Volume (ac-ft)	0.2158
24-Hr Clear Runoff Volume (cu-ft)	9400.5481



Peak Flow Hydrologic Analysis

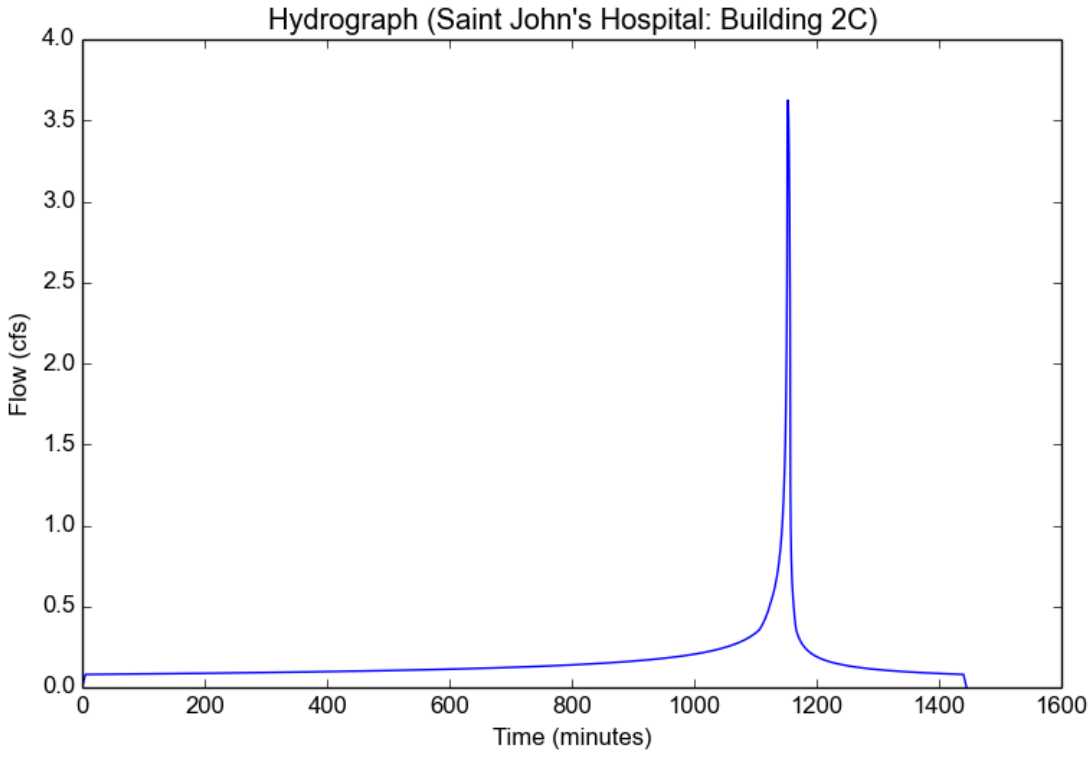
File location: P:/2014/114230 Saint John's Hospital Master Plan/ENGR/Stormwater/Calcs/Saint John's Hospital - Building 2C.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital
Subarea ID	Building 2C
Area (ac)	1.08
Flow Path Length (ft)	275.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.56
Soil Type	13
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	3.6394
Undeveloped Runoff Coefficient (Cu)	0.9504
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.5375
Burned Peak Flow Rate (cfs)	3.5375
24-Hr Clear Runoff Volume (ac-ft)	0.3191
24-Hr Clear Runoff Volume (cu-ft)	13898.71



Peak Flow Hydrologic Analysis

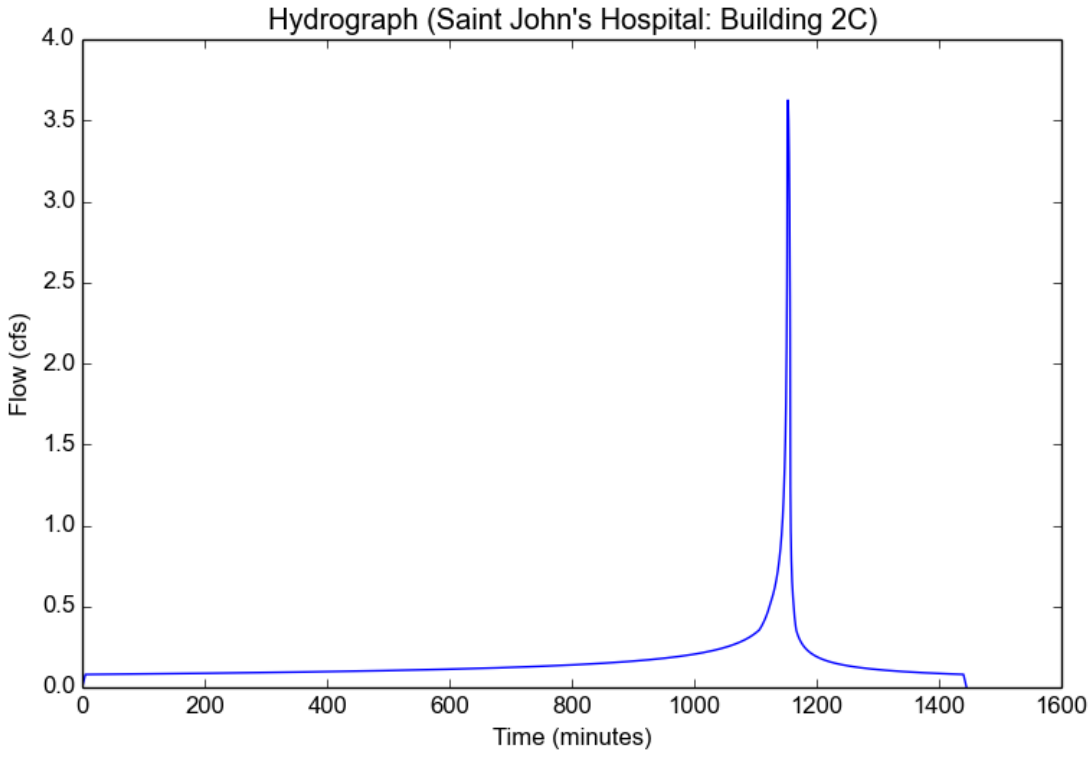
File location: P:/2014/114230 Saint John's Hospital Master Plan/ENGR/Stormwater/Calcs/Saint John's Hospital - Building 2C.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital
Subarea ID	Building 2C
Area (ac)	1.08
Flow Path Length (ft)	275.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.56
Soil Type	13
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	3.6394
Undeveloped Runoff Coefficient (Cu)	0.9504
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.5375
Burned Peak Flow Rate (cfs)	3.5375
24-Hr Clear Runoff Volume (ac-ft)	0.3191
24-Hr Clear Runoff Volume (cu-ft)	13898.71



Peak Flow Hydrologic Analysis

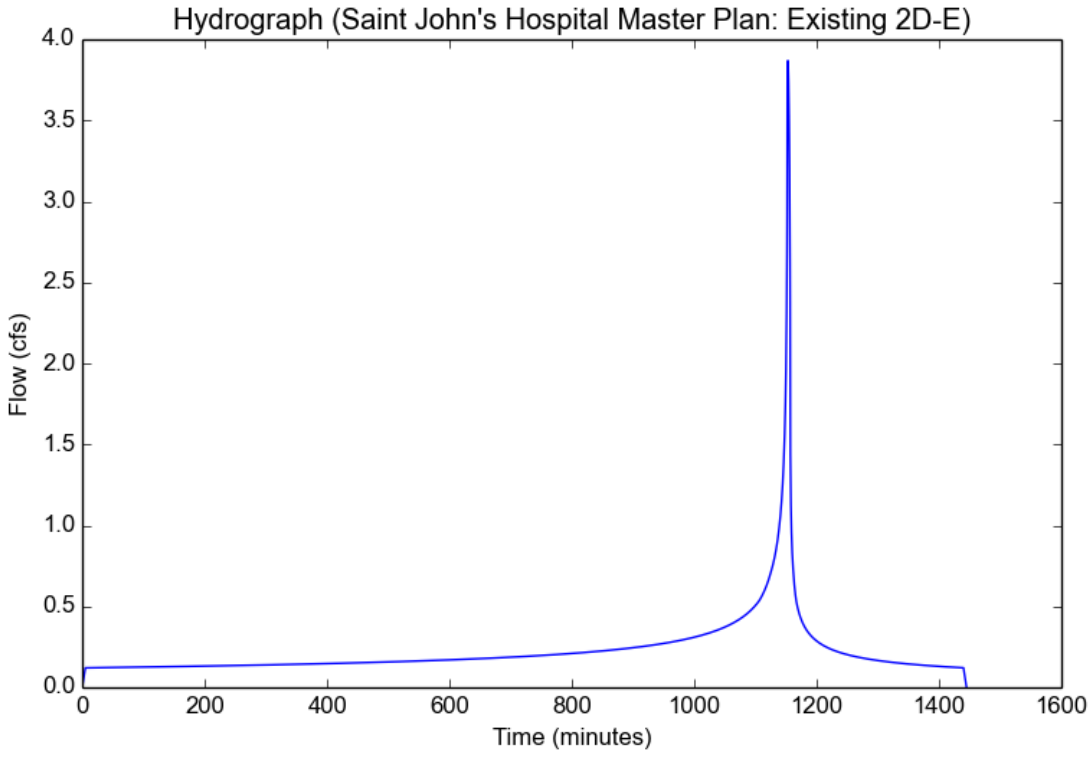
File location: P:/2014/114230 Saint John's Hospital Master Plan/ENGR/Stormwater/Saint John's Hospital Master Plan - Existing 2D-E 50-year.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital Master Plan
Subarea ID	Existing 2D-E
Area (ac)	1.17
Flow Path Length (ft)	186.0
Flow Path Slope (vft/hft)	0.017
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.83
Soil Type	13
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	3.6394
Undeveloped Runoff Coefficient (Cu)	0.9504
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.8323
Burned Peak Flow Rate (cfs)	3.8323
24-Hr Clear Runoff Volume (ac-ft)	0.4593
24-Hr Clear Runoff Volume (cu-ft)	20007.1106



Peak Flow Hydrologic Analysis

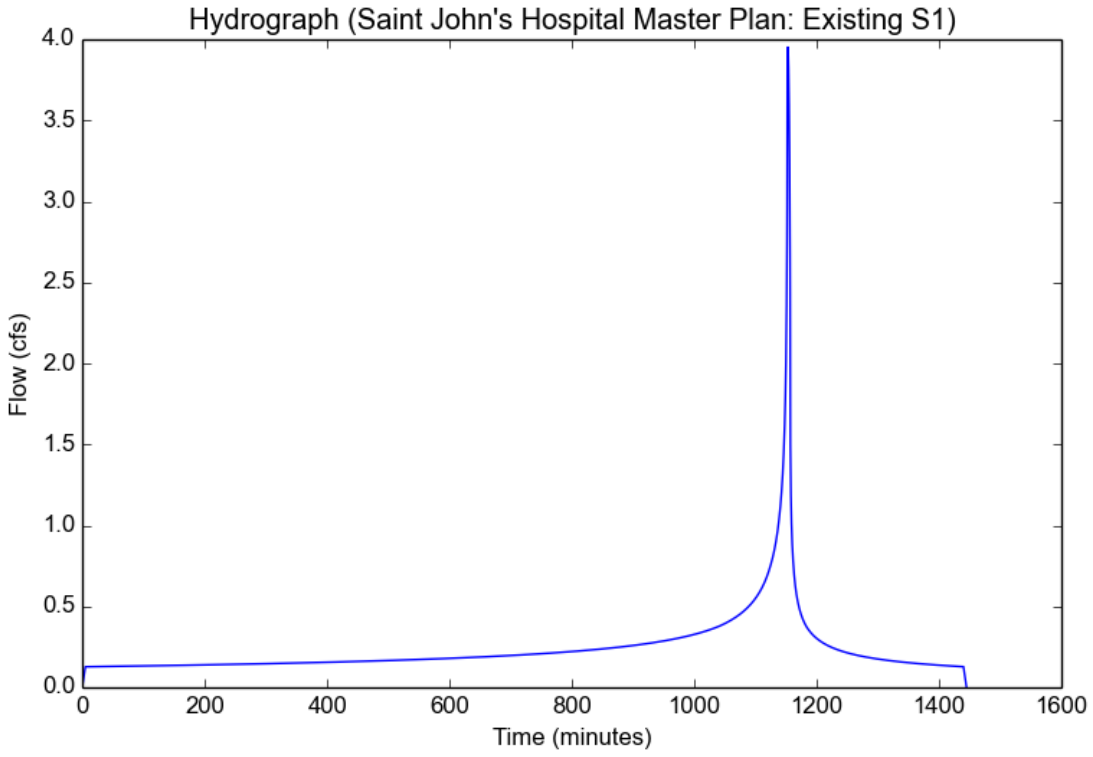
File location: X:/2017-Civil Projects/CS17-036 - Providence Saint John's Health Center Hydrology Study (LA Civil)/CIVIL/HYDROCALC/50-YR PDFS/Exis
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital Master Plan
Subarea ID	Existing S1
Area (ac)	1.21
Flow Path Length (ft)	271.0
Flow Path Slope (vft/hft)	0.006
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.85
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	3.6394
Undeveloped Runoff Coefficient (Cu)	0.8822
Developed Runoff Coefficient (Cd)	0.8973
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.9516
Burned Peak Flow Rate (cfs)	3.9516
24-Hr Clear Runoff Volume (ac-ft)	0.485
24-Hr Clear Runoff Volume (cu-ft)	21128.4088



Peak Flow Hydrologic Analysis

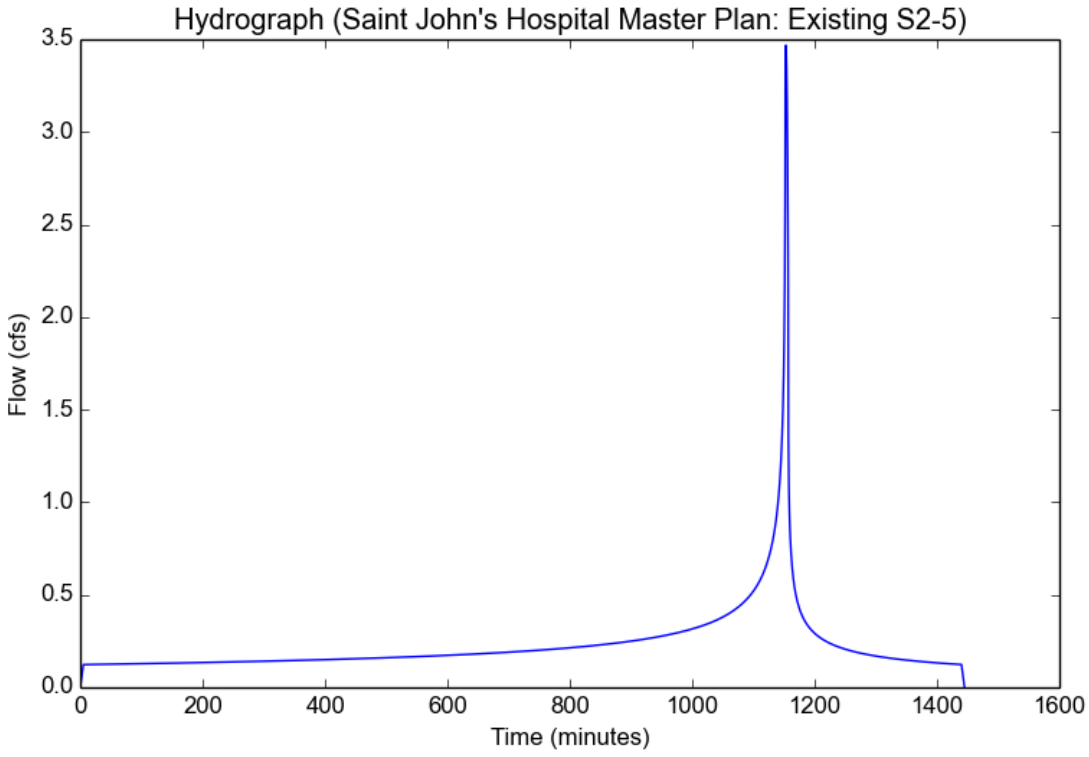
File location: X:/2017-Civil Projects/CS17-036 - Providence Saint John's Health Center Hydrology Study (LA Civil)/CIVIL/HYDROCALC/50-YR PDFS/Exis
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital Master Plan
Subarea ID	Existing S2-5
Area (ac)	1.06
Flow Path Length (ft)	178.0
Flow Path Slope (vft/hft)	0.016
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.95
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	3.6394
Undeveloped Runoff Coefficient (Cu)	0.8822
Developed Runoff Coefficient (Cd)	0.8991
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.4686
Burned Peak Flow Rate (cfs)	3.4686
24-Hr Clear Runoff Volume (ac-ft)	0.4623
24-Hr Clear Runoff Volume (cu-ft)	20136.2926



Peak Flow Hydrologic Analysis

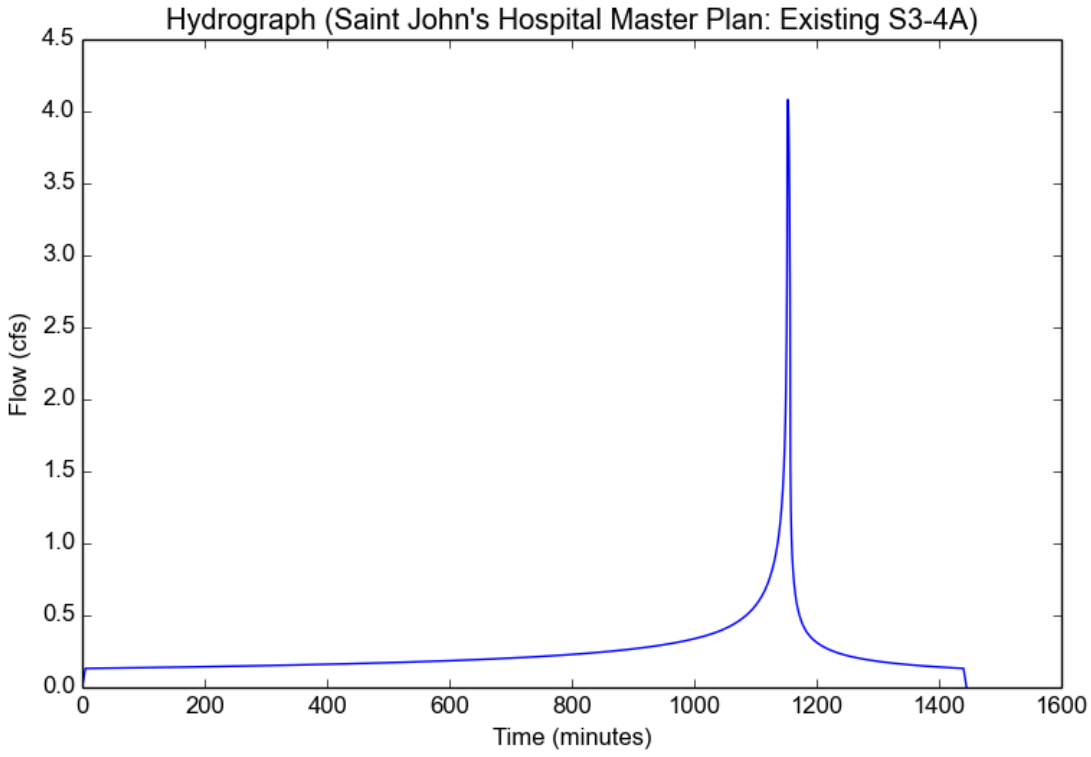
File location: X:/2017-Civil Projects/CS17-036 - Providence Saint John's Health Center Hydrology Study (LA Civil)/CIVIL/HYDROCALC/50-YR PDFS/Exis
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital Master Plan
Subarea ID	Existing S3-4A
Area (ac)	1.25
Flow Path Length (ft)	225.0
Flow Path Slope (vft/hft)	0.015
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.85
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	3.6394
Undeveloped Runoff Coefficient (Cu)	0.8822
Developed Runoff Coefficient (Cd)	0.8973
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.0822
Burned Peak Flow Rate (cfs)	4.0822
24-Hr Clear Runoff Volume (ac-ft)	0.5011
24-Hr Clear Runoff Volume (cu-ft)	21826.8686



Peak Flow Hydrologic Analysis

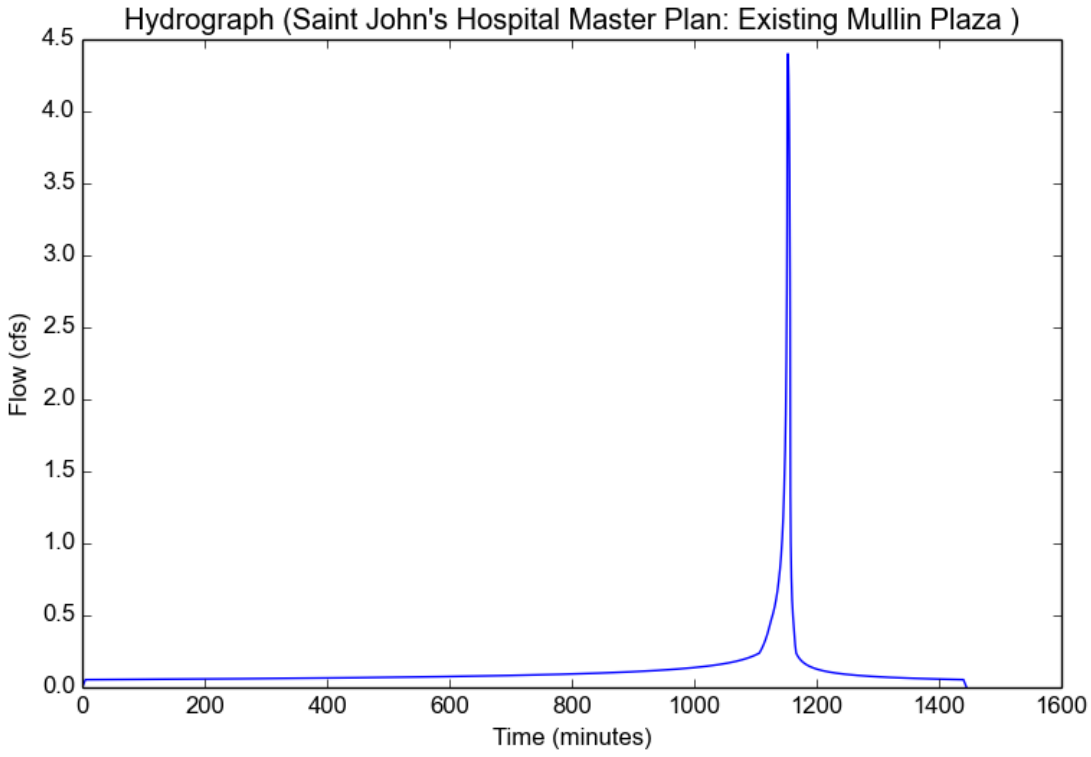
File location: P:/2014/114230 Saint John's Hospital Master Plan/ENGR/Stormwater/Providence St John's - Mullin Plaza Existing 50-year.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital Master Plan
Subarea ID	Existing Mullin Plaza
Area (ac)	1.29
Flow Path Length (ft)	230.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.26
Soil Type	13
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	3.6394
Undeveloped Runoff Coefficient (Cu)	0.9504
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.2254
Burned Peak Flow Rate (cfs)	4.2254
24-Hr Clear Runoff Volume (ac-ft)	0.2419
24-Hr Clear Runoff Volume (cu-ft)	10536.9203



Peak Flow Hydrologic Analysis

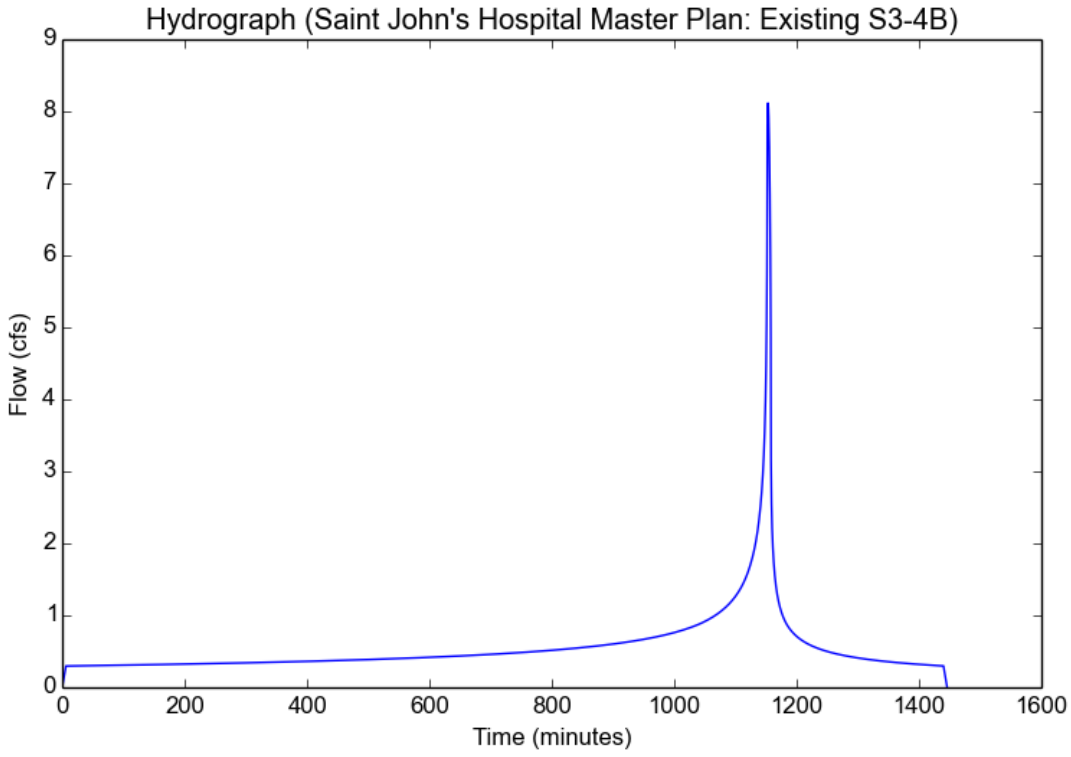
File location: X:/2017-Civil Projects/CS17-036 - Providence Saint John's Health Center Hydrology Study (LA Civil)/CIVIL/HYDROCALC/50-YR PDFS/Exis
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital Master Plan
Subarea ID	Existing S3-4B
Area (ac)	2.71
Flow Path Length (ft)	375.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.89
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	3.3405
Undeveloped Runoff Coefficient (Cu)	0.8669
Developed Runoff Coefficient (Cd)	0.8964
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	8.1146
Burned Peak Flow Rate (cfs)	8.1146
24-Hr Clear Runoff Volume (ac-ft)	1.1245
24-Hr Clear Runoff Volume (cu-ft)	48983.827



APPENDIX E

HydroCalc Peak Flow Hydrologic Analysis (25 & 50-yr Proposed)

Peak Flow Hydrologic Analysis

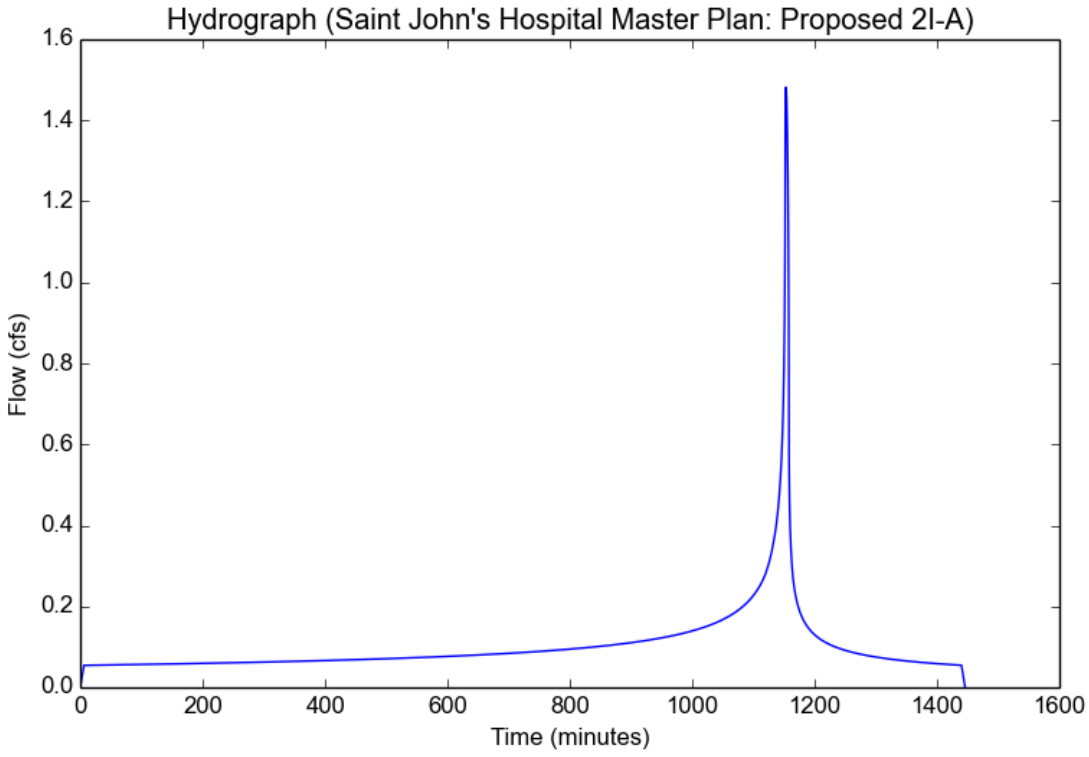
File location: X:/2017-Civil Projects/CS17-036 - Providence Saint John's Health Center Hydrology Study (LA Civil)/CIVIL/HYDROCALC/25-YR PDFS/Pro
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital Master Plan
Subarea ID	Proposed 2I-A
Area (ac)	0.56
Flow Path Length (ft)	382.0
Flow Path Slope (vft/hft)	0.018
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.9
Soil Type	13
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.3558
Peak Intensity (in/hr)	2.933
Undeveloped Runoff Coefficient (Cu)	0.922
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	1.4782
Burned Peak Flow Rate (cfs)	1.4782
24-Hr Clear Runoff Volume (ac-ft)	0.2051
24-Hr Clear Runoff Volume (cu-ft)	8934.7592



Peak Flow Hydrologic Analysis

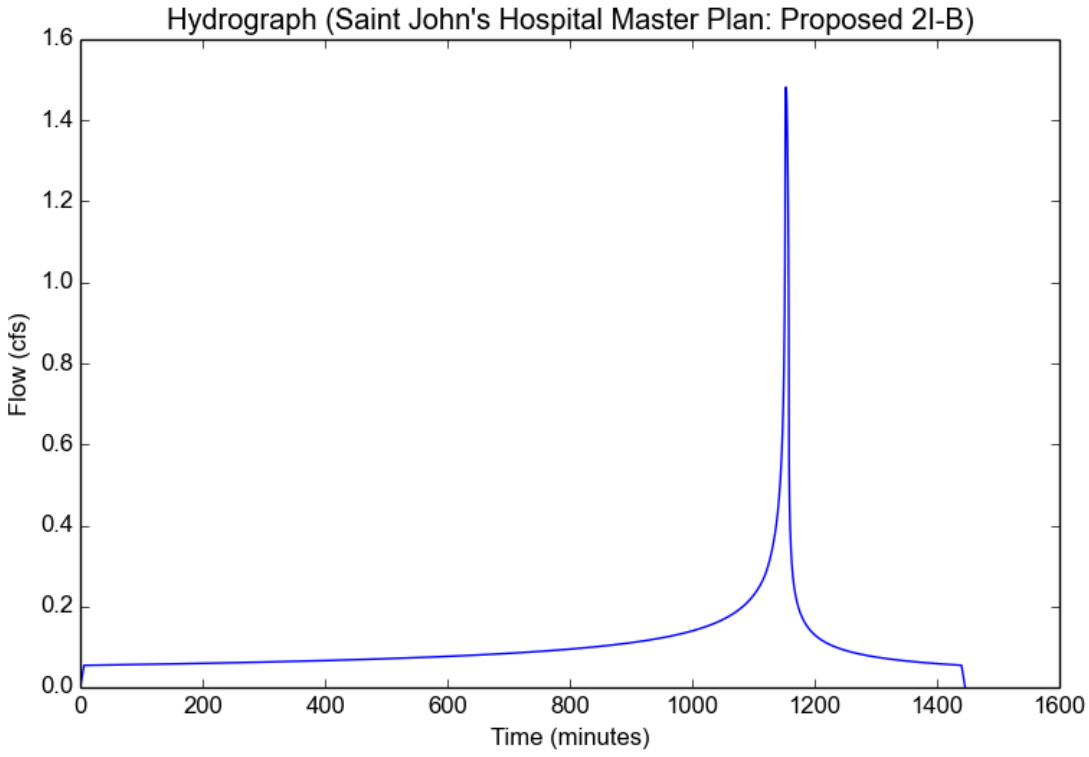
File location: X:/2017-Civil Projects/CS17-036 - Providence Saint John's Health Center Hydrology Study (LA Civil)/CIVIL/HYDROCALC/25-YR PDFS/Pro
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital Master Plan
Subarea ID	Proposed 2I-B
Area (ac)	0.56
Flow Path Length (ft)	382.0
Flow Path Slope (vft/hft)	0.012
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.9
Soil Type	13
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.3558
Peak Intensity (in/hr)	2.933
Undeveloped Runoff Coefficient (Cu)	0.922
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	1.4782
Burned Peak Flow Rate (cfs)	1.4782
24-Hr Clear Runoff Volume (ac-ft)	0.2051
24-Hr Clear Runoff Volume (cu-ft)	8934.7592



Peak Flow Hydrologic Analysis

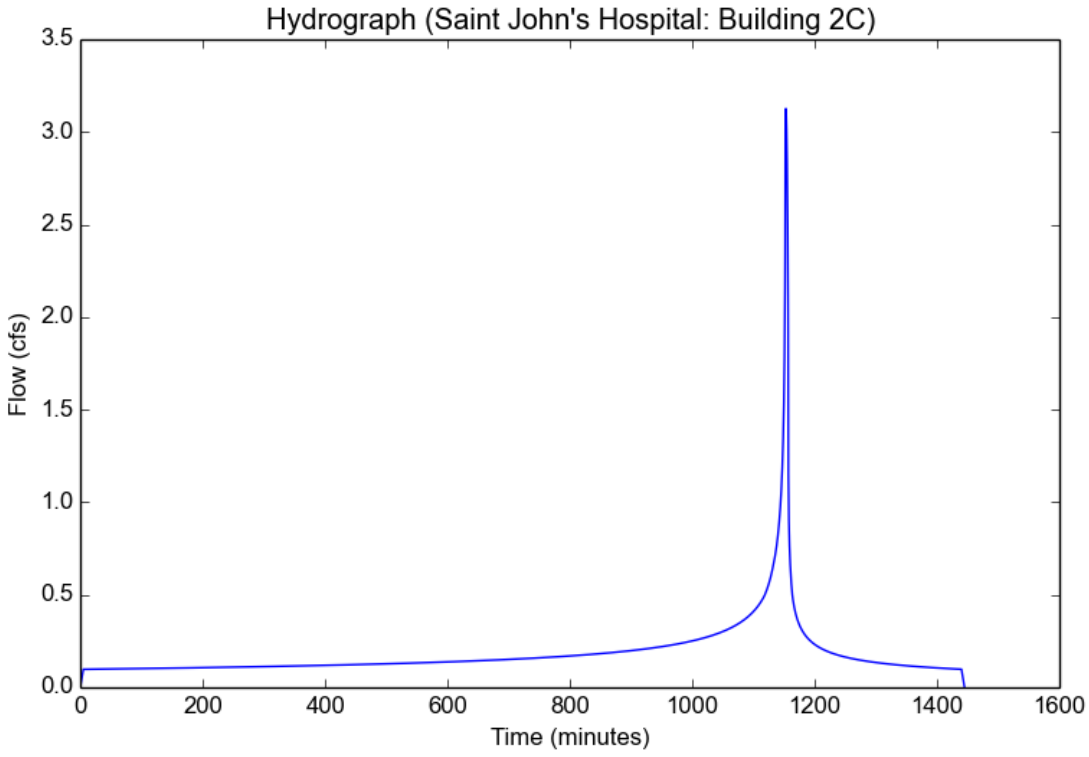
File location: P:/2014/114230 Saint John's Hospital Master Plan/ENGR/Stormwater/Calcs/Saint John's Hospital - Building 2C - Proposed 25 year.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital
Subarea ID	Building 2C
Area (ac)	1.08
Flow Path Length (ft)	350.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.83
Soil Type	13
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.3558
Peak Intensity (in/hr)	3.1954
Undeveloped Runoff Coefficient (Cu)	0.935
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.1059
Burned Peak Flow Rate (cfs)	3.1059
24-Hr Clear Runoff Volume (ac-ft)	0.3713
24-Hr Clear Runoff Volume (cu-ft)	16174.1758



Peak Flow Hydrologic Analysis

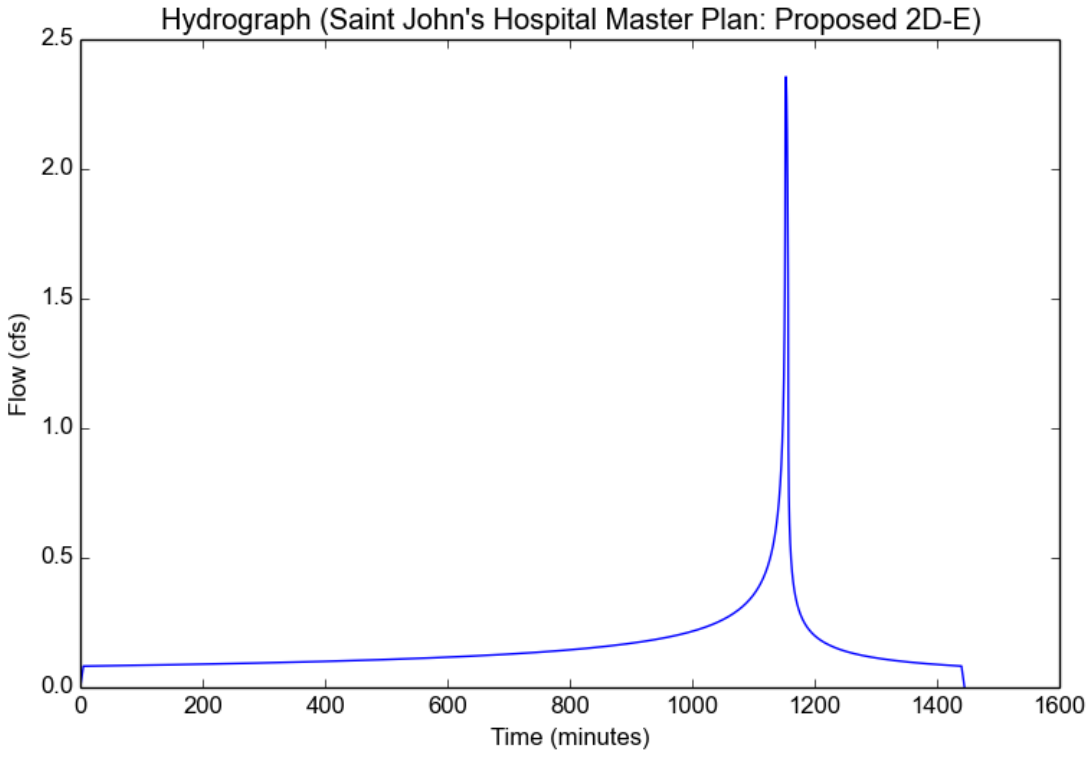
File location: P:/2014/114230 Saint John's Hospital Master Plan/ENGR/Stormwater/Saint John's Hospital Master Plan - Proposed 2D-E 25-year.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital Master Plan
Subarea ID	Proposed 2D-E
Area (ac)	0.82
Flow Path Length (ft)	200.0
Flow Path Slope (vft/hft)	0.013
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.93
Soil Type	2
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.3558
Peak Intensity (in/hr)	3.1954
Undeveloped Runoff Coefficient (Cu)	0.8884
Developed Runoff Coefficient (Cd)	0.8992
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.3561
Burned Peak Flow Rate (cfs)	2.3561
24-Hr Clear Runoff Volume (ac-ft)	0.3133
24-Hr Clear Runoff Volume (cu-ft)	13646.1519



Peak Flow Hydrologic Analysis

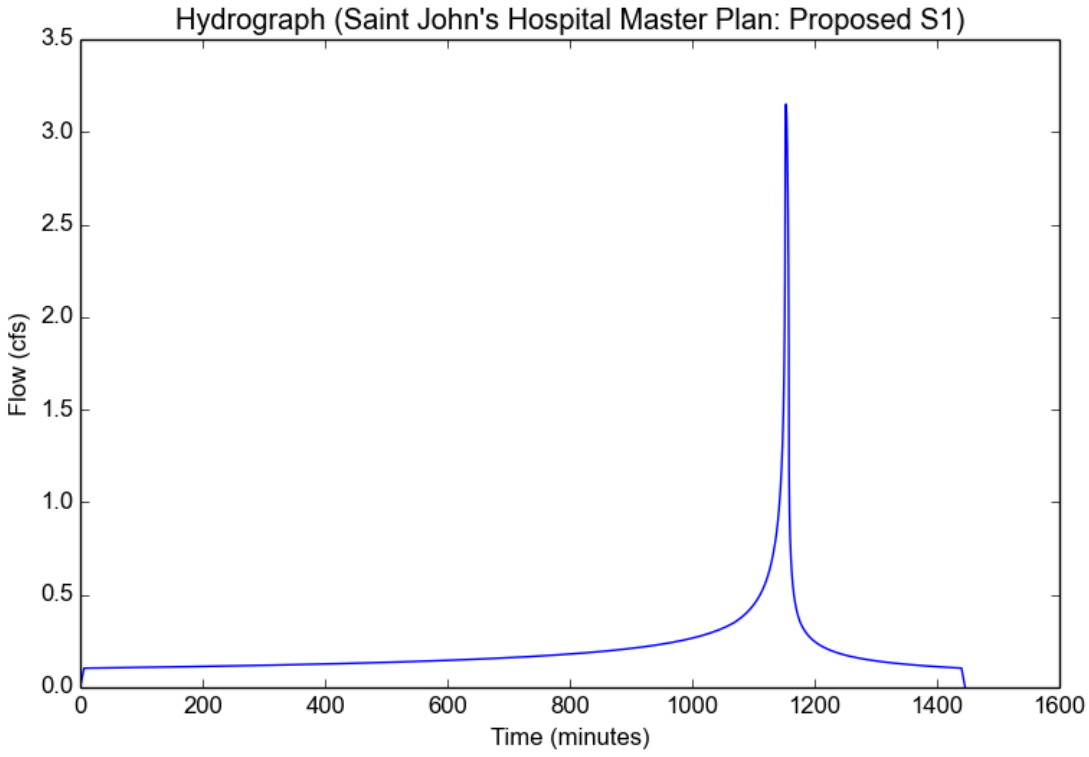
File location: X:/2017-Civil Projects/CS17-036 - Providence Saint John's Health Center Hydrology Study (LA Civil)/CIVIL/HYDROCALC/25-YR PDFS/Pro
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital Master Plan
Subarea ID	Proposed S1
Area (ac)	1.21
Flow Path Length (ft)	330.0
Flow Path Slope (vft/hft)	0.006
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.78
Soil Type	16
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.3558
Peak Intensity (in/hr)	2.933
Undeveloped Runoff Coefficient (Cu)	0.8442
Developed Runoff Coefficient (Cd)	0.8877
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	3.1505
Burned Peak Flow Rate (cfs)	3.1505
24-Hr Clear Runoff Volume (ac-ft)	0.398
24-Hr Clear Runoff Volume (cu-ft)	17336.8642



Peak Flow Hydrologic Analysis

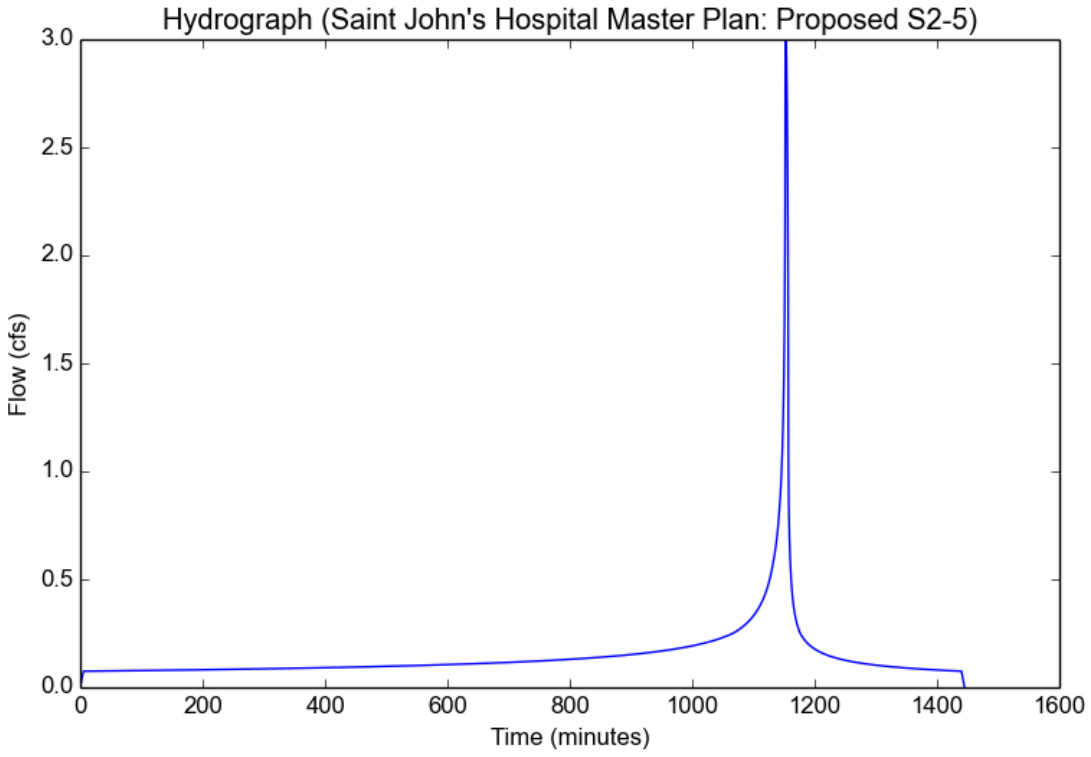
File location: X:/2017-Civil Projects/CS17-036 - Providence Saint John's Health Center Hydrology Study (LA Civil)/CIVIL/HYDROCALC/25-YR PDFS/Pro
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital Master Plan
Subarea ID	Proposed S2-5
Area (ac)	1.06
Flow Path Length (ft)	240.0
Flow Path Slope (vft/hft)	0.012
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.62
Soil Type	16
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.3558
Peak Intensity (in/hr)	3.1954
Undeveloped Runoff Coefficient (Cu)	0.8594
Developed Runoff Coefficient (Cd)	0.8846
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.9962
Burned Peak Flow Rate (cfs)	2.9962
24-Hr Clear Runoff Volume (ac-ft)	0.2952
24-Hr Clear Runoff Volume (cu-ft)	12857.0705



Peak Flow Hydrologic Analysis

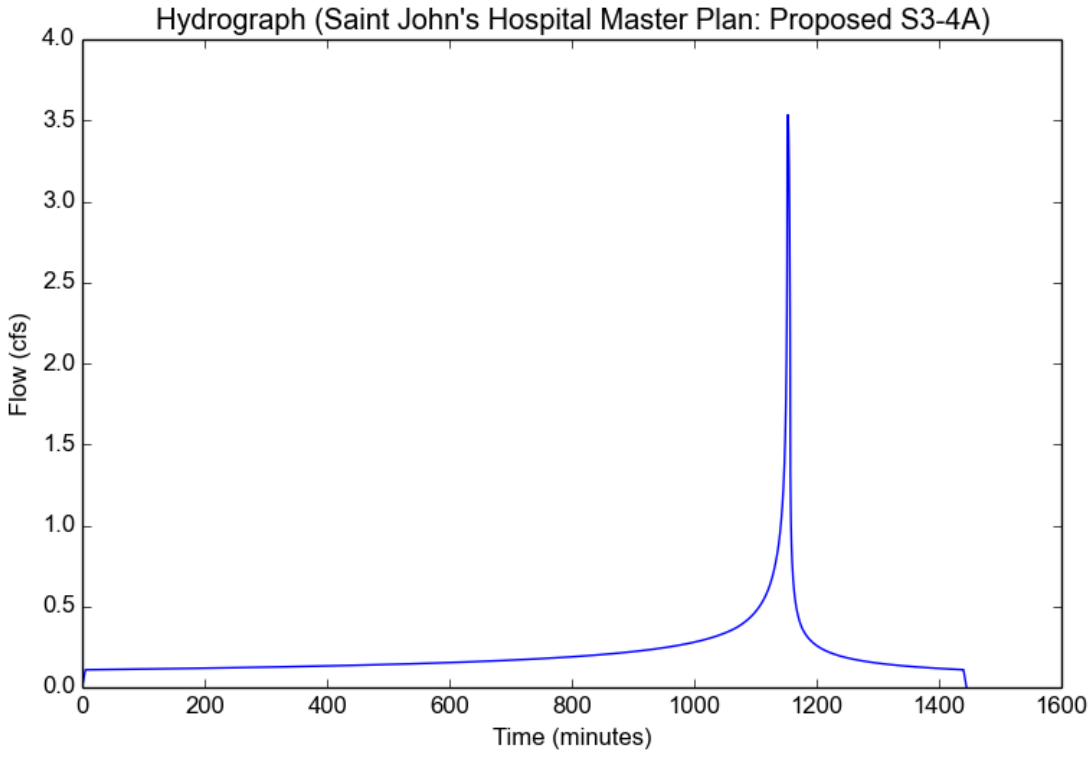
File location: X:/2017-Civil Projects/CS17-036 - Providence Saint John's Health Center Hydrology Study (LA Civil)/CIVIL/HYDROCALC/25-YR PDFS/Pro
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital Master Plan
Subarea ID	Proposed S3-4A
Area (ac)	1.24
Flow Path Length (ft)	220.0
Flow Path Slope (vft/hft)	0.008
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.8
Soil Type	16
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.3558
Peak Intensity (in/hr)	3.1954
Undeveloped Runoff Coefficient (Cu)	0.8594
Developed Runoff Coefficient (Cd)	0.8919
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.5339
Burned Peak Flow Rate (cfs)	3.5339
24-Hr Clear Runoff Volume (ac-ft)	0.4157
24-Hr Clear Runoff Volume (cu-ft)	18108.4571



Peak Flow Hydrologic Analysis

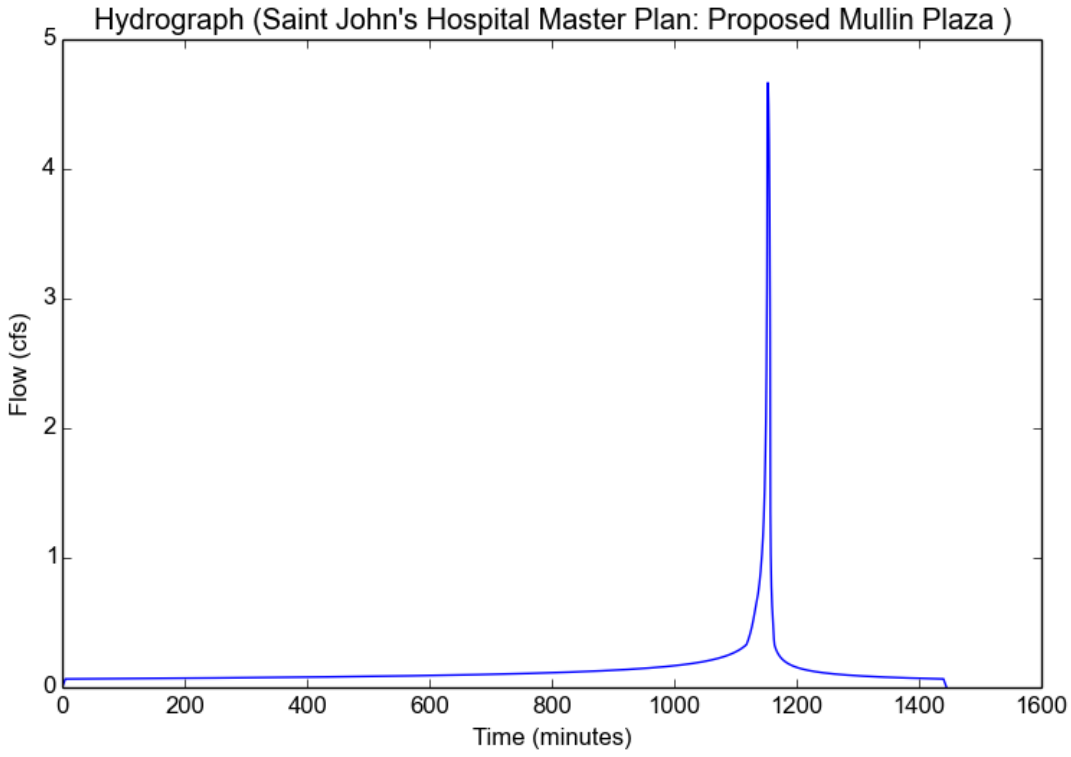
File location: P:/2014/114230 Saint John's Hospital Master Plan/ENGR/Stormwater/Providence St John's - Mullin Plaza Proposed 25-year.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital Master Plan
Subarea ID	Proposed Mullin Plaza
Area (ac)	1.58
Flow Path Length (ft)	230.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.31
Soil Type	13
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.3558
Peak Intensity (in/hr)	3.1954
Undeveloped Runoff Coefficient (Cu)	0.935
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.5439
Burned Peak Flow Rate (cfs)	4.5439
24-Hr Clear Runoff Volume (ac-ft)	0.2795
24-Hr Clear Runoff Volume (cu-ft)	12175.7267



Peak Flow Hydrologic Analysis

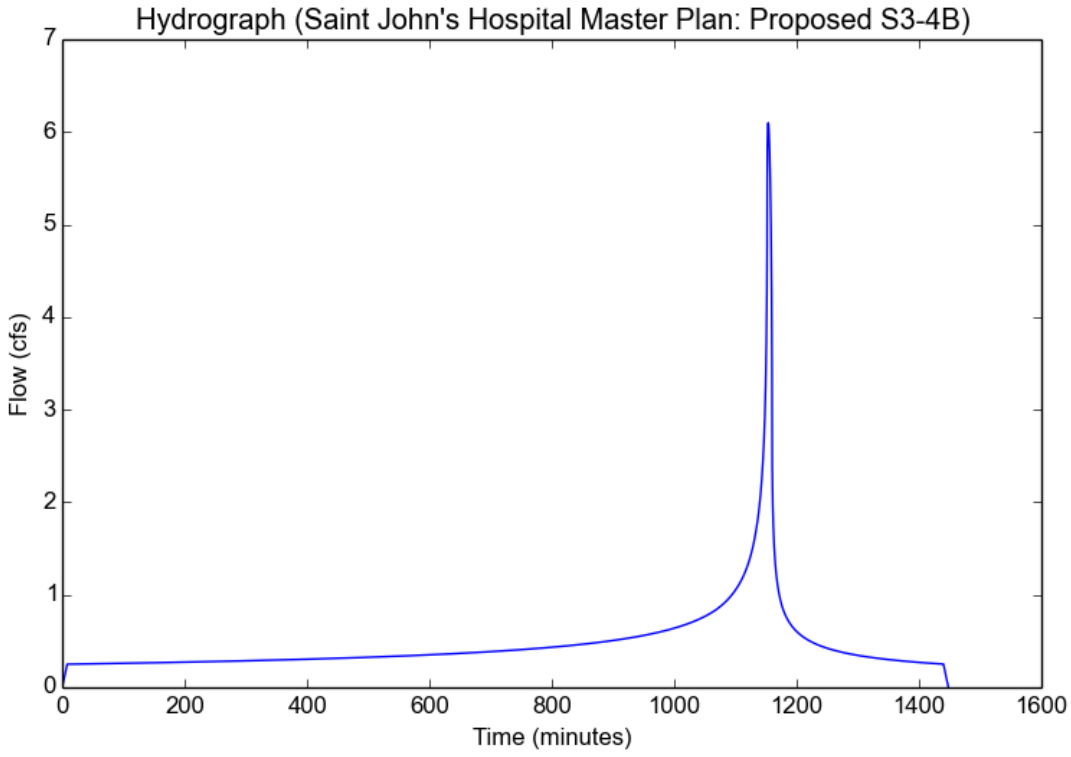
File location: X:/2017-Civil Projects/CS17-036 - Providence Saint John's Health Center Hydrology Study (LA Civil)/CIVIL/HYDROCALC/25-YR PDFS/Pro
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital Master Plan
Subarea ID	Proposed S3-4B
Area (ac)	2.68
Flow Path Length (ft)	430.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.86
Soil Type	16
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.3558
Peak Intensity (in/hr)	2.5621
Undeveloped Runoff Coefficient (Cu)	0.8155
Developed Runoff Coefficient (Cd)	0.8882
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	6.0985
Burned Peak Flow Rate (cfs)	6.0985
24-Hr Clear Runoff Volume (ac-ft)	0.9491
24-Hr Clear Runoff Volume (cu-ft)	41344.4045



Peak Flow Hydrologic Analysis

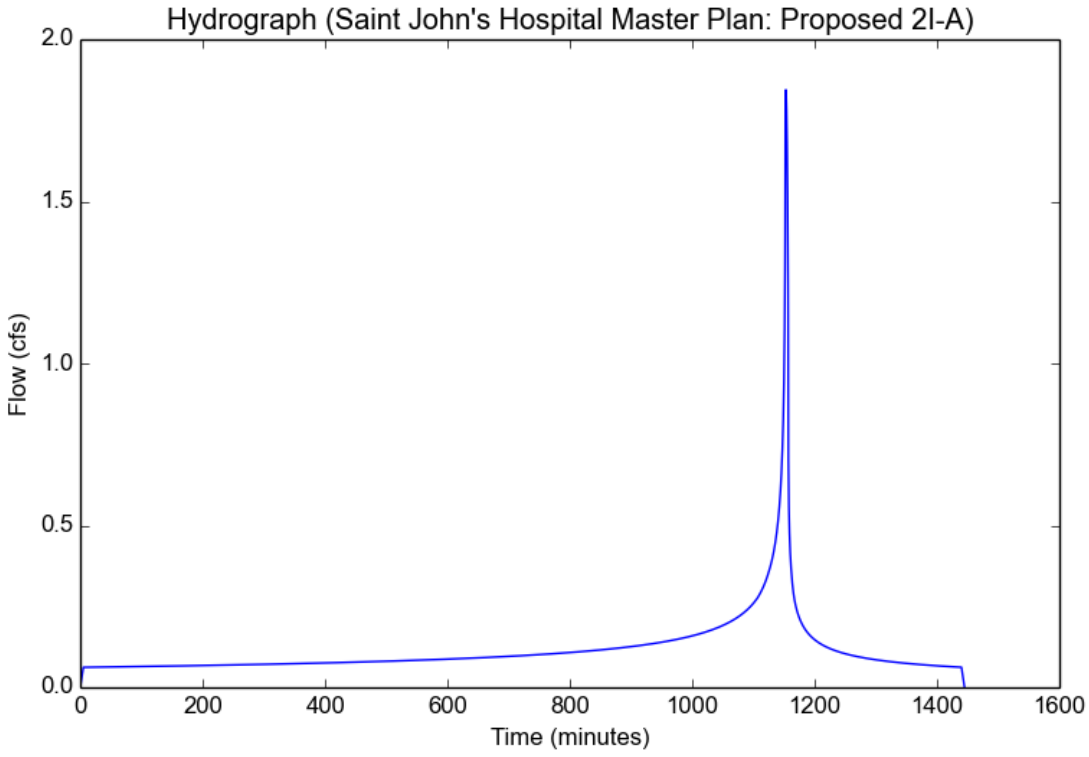
File location: X:/2017-Civil Projects/CS17-036 - Providence Saint John's Health Center Hydrology Study (LA Civil)/CIVIL/HYDROCALC/50-YR PDFS/Pro
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital Master Plan
Subarea ID	Proposed 2I-A
Area (ac)	0.56
Flow Path Length (ft)	382.0
Flow Path Slope (vft/hft)	0.018
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.9
Soil Type	13
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	3.6394
Undeveloped Runoff Coefficient (Cu)	0.9504
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.8343
Burned Peak Flow Rate (cfs)	1.8343
24-Hr Clear Runoff Volume (ac-ft)	0.2339
24-Hr Clear Runoff Volume (cu-ft)	10190.3196



Peak Flow Hydrologic Analysis

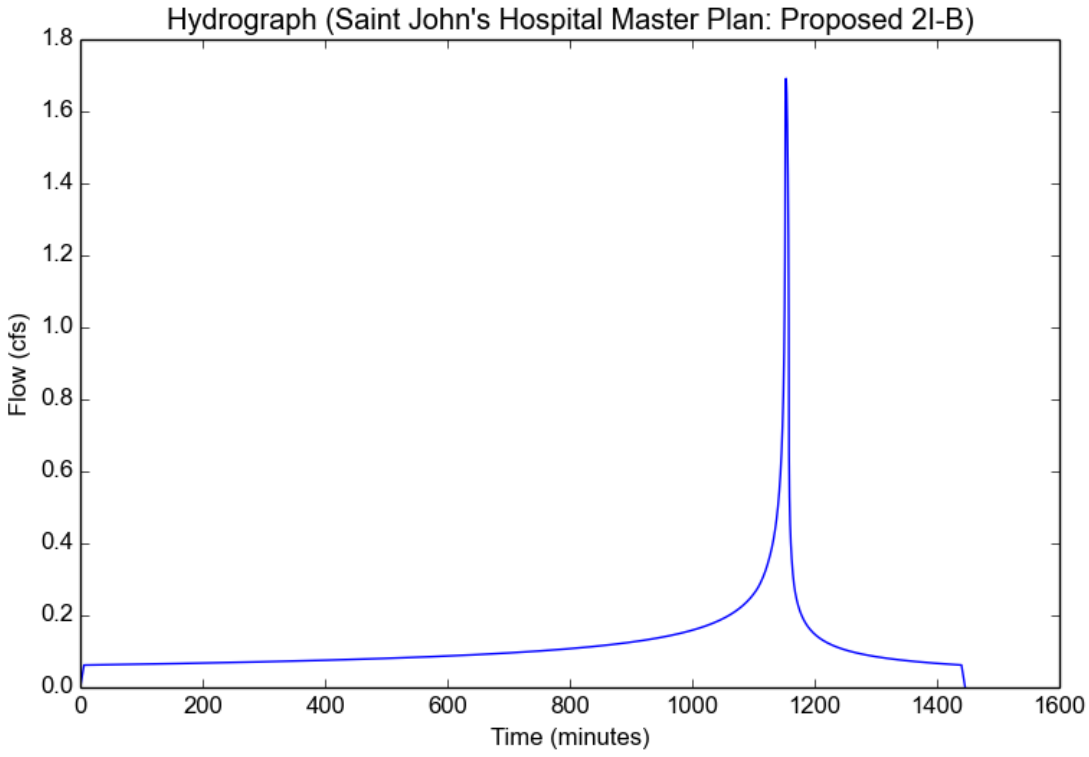
File location: X:/2017-Civil Projects/CS17-036 - Providence Saint John's Health Center Hydrology Study (LA Civil)/CIVIL/HYDROCALC/50-YR PDFS/Pro
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital Master Plan
Subarea ID	Proposed 2I-B
Area (ac)	0.56
Flow Path Length (ft)	382.0
Flow Path Slope (vft/hft)	0.012
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.9
Soil Type	13
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	3.3405
Undeveloped Runoff Coefficient (Cu)	0.9411
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	1.6836
Burned Peak Flow Rate (cfs)	1.6836
24-Hr Clear Runoff Volume (ac-ft)	0.2339
24-Hr Clear Runoff Volume (cu-ft)	10190.571



Peak Flow Hydrologic Analysis

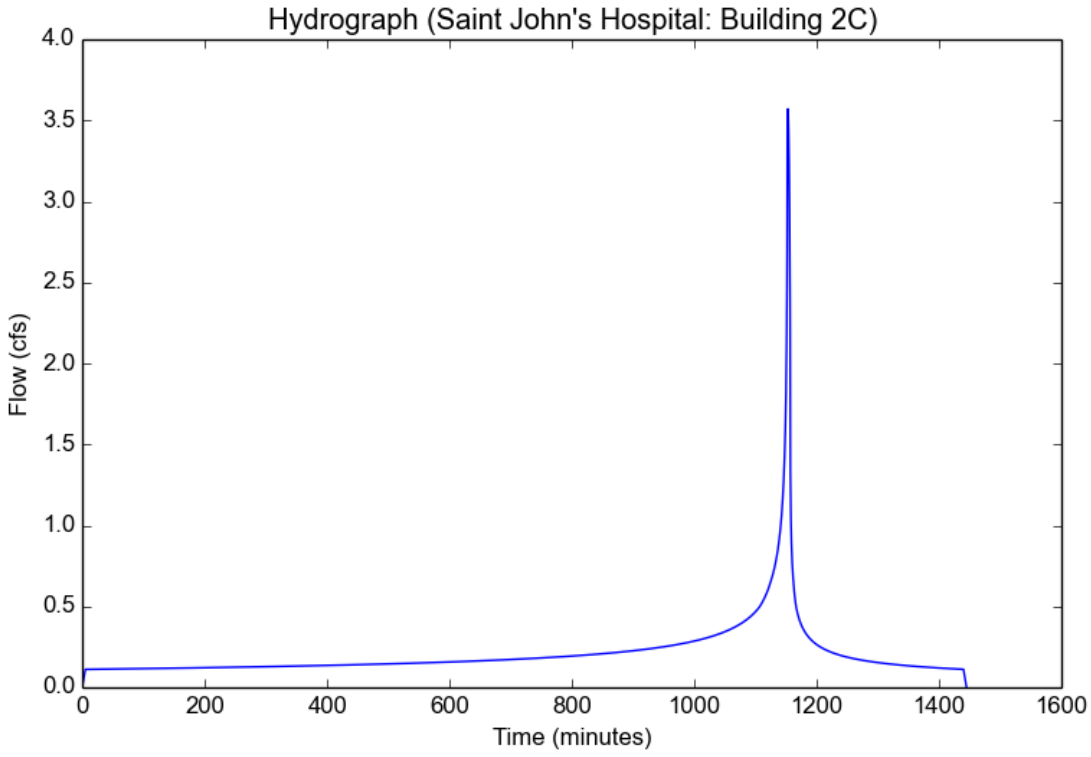
File location: P:/2014/114230 Saint John's Hospital Master Plan/ENGR/Stormwater/Calcs/Saint John's Hospital - Building 2C - Proposed 50 year.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital
Subarea ID	Building 2C
Area (ac)	1.08
Flow Path Length (ft)	350.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.83
Soil Type	13
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	3.6394
Undeveloped Runoff Coefficient (Cu)	0.9504
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.5375
Burned Peak Flow Rate (cfs)	3.5375
24-Hr Clear Runoff Volume (ac-ft)	0.424
24-Hr Clear Runoff Volume (cu-ft)	18468.1021



Peak Flow Hydrologic Analysis

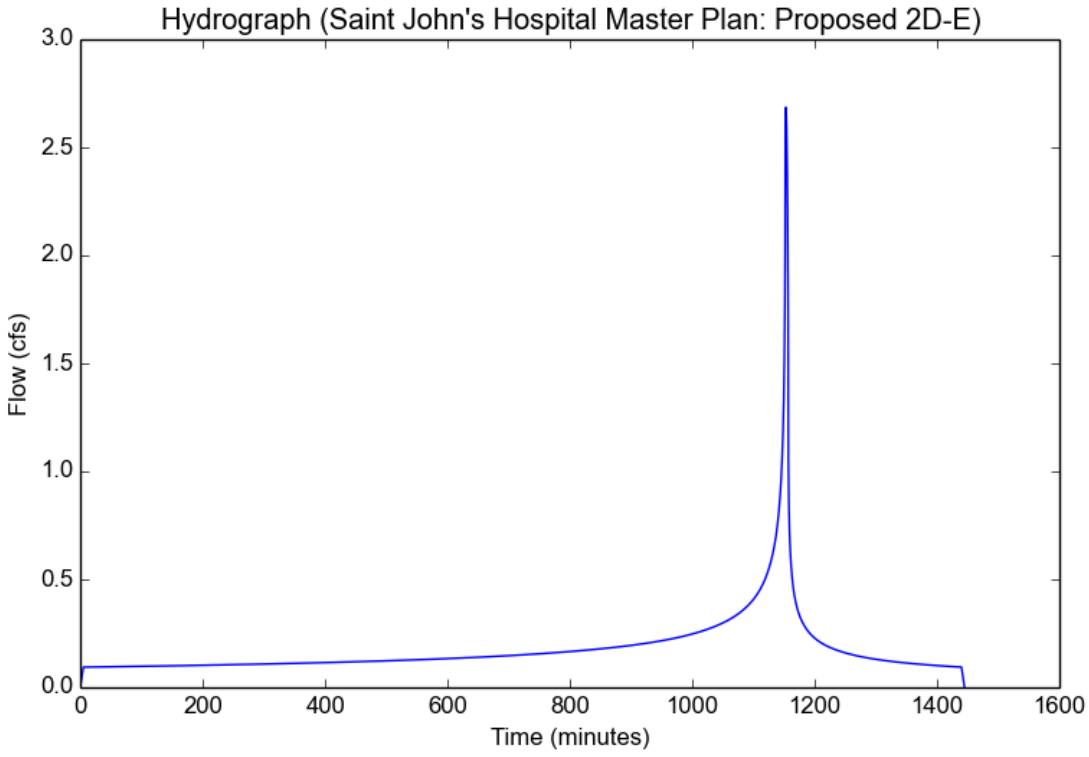
File location: P:/2014/114230 Saint John's Hospital Master Plan/ENGR/Stormwater/Saint John's Hospital Master Plan - Proposed 2D-E.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital Master Plan
Subarea ID	Proposed 2D-E
Area (ac)	0.82
Flow Path Length (ft)	200.0
Flow Path Slope (vft/hft)	0.013
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.93
Soil Type	2
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	3.6394
Undeveloped Runoff Coefficient (Cu)	0.8991
Developed Runoff Coefficient (Cd)	0.8999
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.6857
Burned Peak Flow Rate (cfs)	2.6857
24-Hr Clear Runoff Volume (ac-ft)	0.358
24-Hr Clear Runoff Volume (cu-ft)	15593.779



Peak Flow Hydrologic Analysis

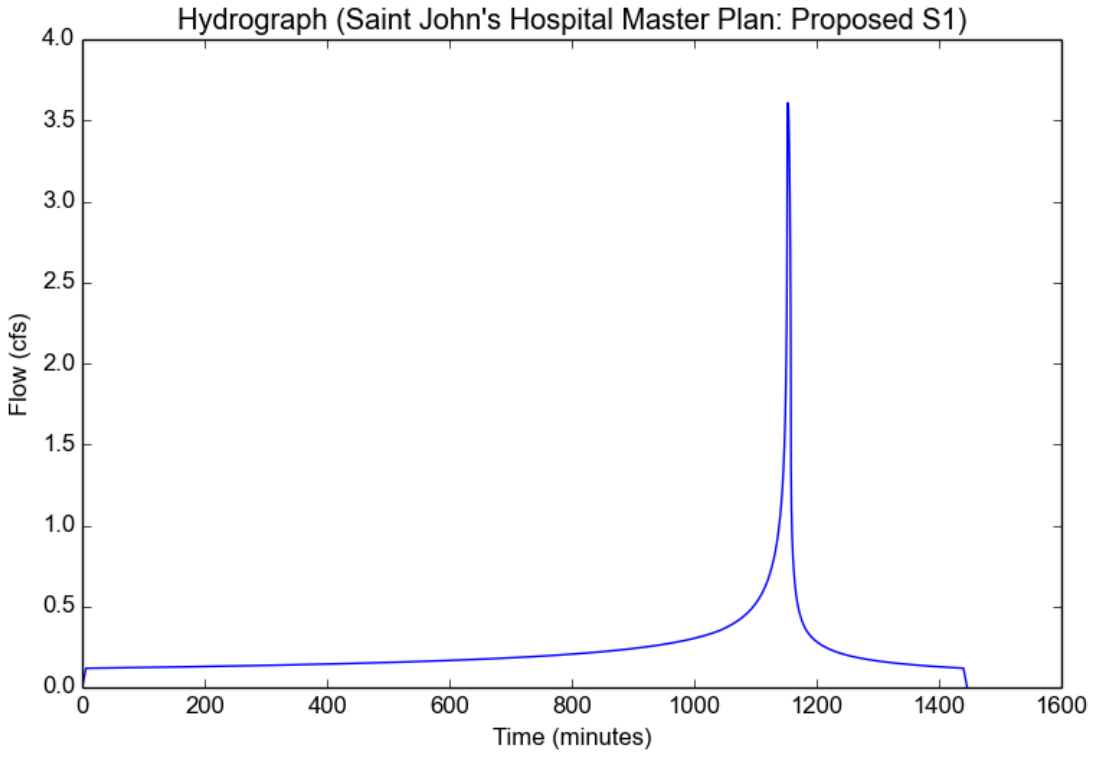
File location: X:/2017-Civil Projects/CS17-036 - Providence Saint John's Health Center Hydrology Study (LA Civil)/CIVIL/HYDROCALC/50-YR PDFS/Pro
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital Master Plan
Subarea ID	Proposed S1
Area (ac)	1.21
Flow Path Length (ft)	330.0
Flow Path Slope (vft/hft)	0.006
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.78
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	3.3405
Undeveloped Runoff Coefficient (Cu)	0.8669
Developed Runoff Coefficient (Cd)	0.8927
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	3.6084
Burned Peak Flow Rate (cfs)	3.6084
24-Hr Clear Runoff Volume (ac-ft)	0.4552
24-Hr Clear Runoff Volume (cu-ft)	19827.5644



Peak Flow Hydrologic Analysis

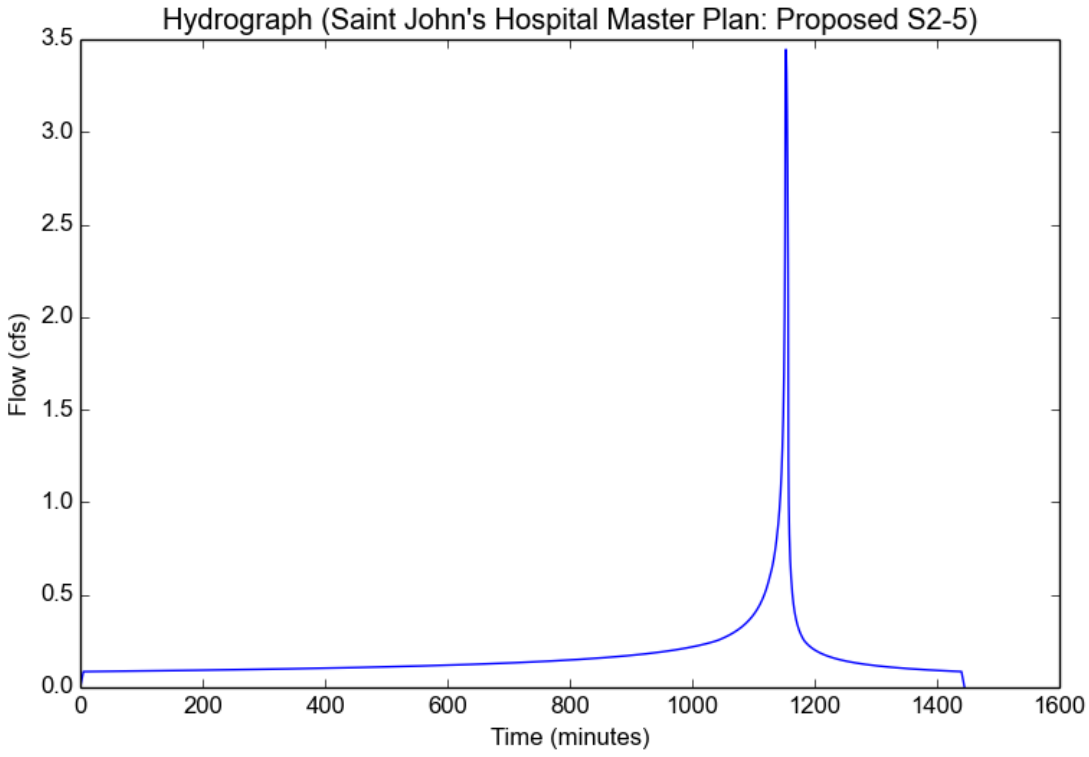
File location: X:/2017-Civil Projects/CS17-036 - Providence Saint John's Health Center Hydrology Study (LA Civil)/CIVIL/HYDROCALC/50-YR PDFS/Pro
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital Master Plan
Subarea ID	Proposed S2-5
Area (ac)	1.06
Flow Path Length (ft)	240.0
Flow Path Slope (vft/hft)	0.012
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.62
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	3.6394
Undeveloped Runoff Coefficient (Cu)	0.8822
Developed Runoff Coefficient (Cd)	0.8932
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.4459
Burned Peak Flow Rate (cfs)	3.4459
24-Hr Clear Runoff Volume (ac-ft)	0.339
24-Hr Clear Runoff Volume (cu-ft)	14766.8363



Peak Flow Hydrologic Analysis

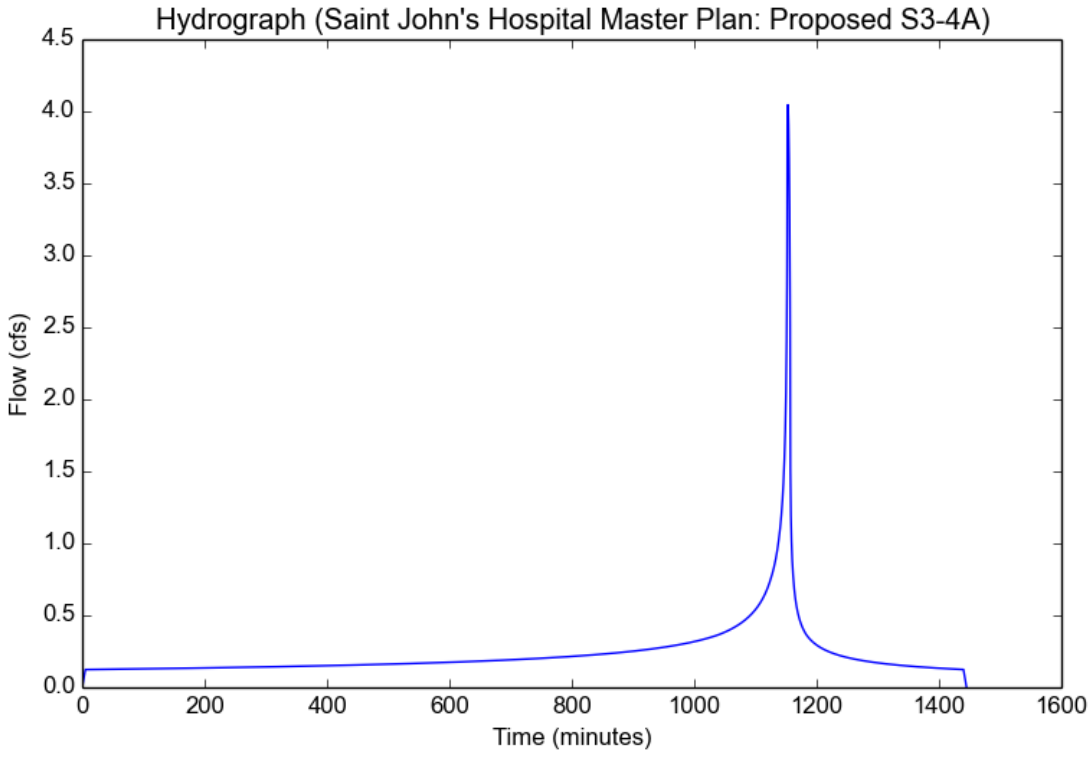
File location: X:/2017-Civil Projects/CS17-036 - Providence Saint John's Health Center Hydrology Study (LA Civil)/CIVIL/HYDROCALC/50-YR PDFS/Pro
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital Master Plan
Subarea ID	Proposed S3-4A
Area (ac)	1.24
Flow Path Length (ft)	220.0
Flow Path Slope (vft/hft)	0.008
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.8
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	3.6394
Undeveloped Runoff Coefficient (Cu)	0.8822
Developed Runoff Coefficient (Cd)	0.8964
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.0455
Burned Peak Flow Rate (cfs)	4.0455
24-Hr Clear Runoff Volume (ac-ft)	0.4752
24-Hr Clear Runoff Volume (cu-ft)	20700.549



Peak Flow Hydrologic Analysis

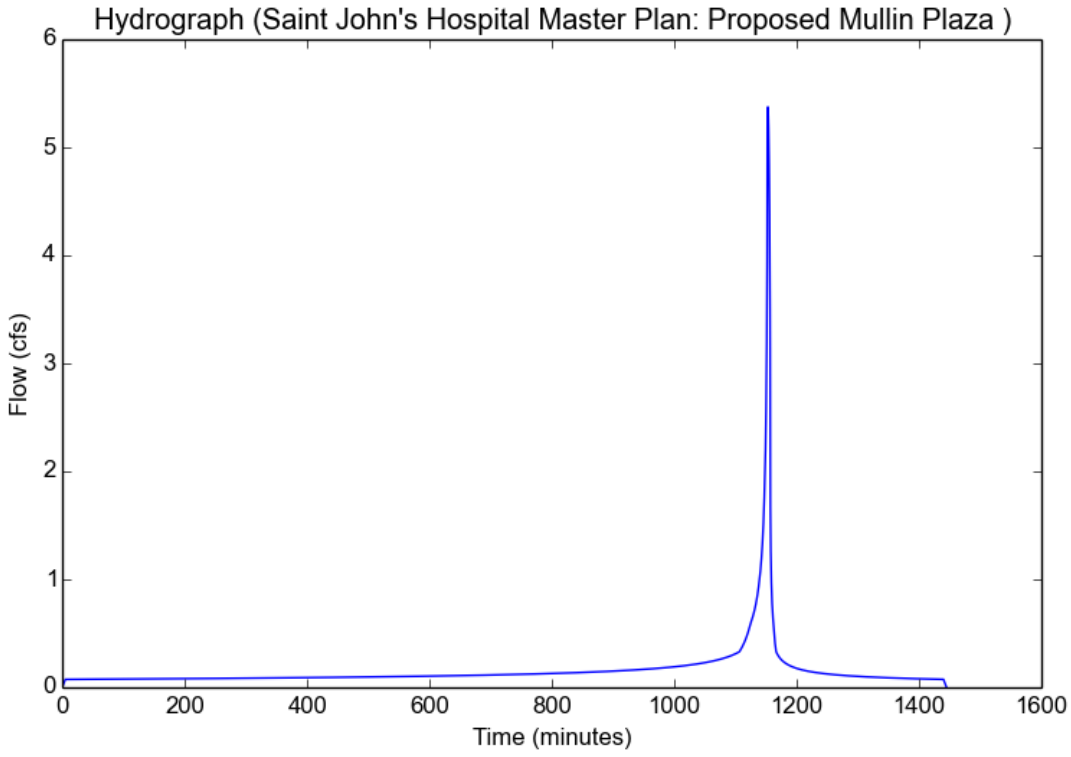
File location: P:/2014/114230 Saint John's Hospital Master Plan/ENGR/Stormwater/Providence St John's - Mullin Plaza Proposed 50-year.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital Master Plan
Subarea ID	Proposed Mullin Plaza
Area (ac)	1.58
Flow Path Length (ft)	230.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.31
Soil Type	13
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	3.6394
Undeveloped Runoff Coefficient (Cu)	0.9504
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	5.1753
Burned Peak Flow Rate (cfs)	5.1753
24-Hr Clear Runoff Volume (ac-ft)	0.3247
24-Hr Clear Runoff Volume (cu-ft)	14143.6208



Peak Flow Hydrologic Analysis

File location: X:/2017-Civil Projects/CS17-036 - Providence Saint John's Health Center Hydrology Study (LA Civil)/CIVIL/HYDROCALC/50-YR PDFS/Pro
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Saint John's Hospital Master Plan
Subarea ID	Proposed S3-4B
Area (ac)	2.68
Flow Path Length (ft)	430.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.86
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	3.1071
Undeveloped Runoff Coefficient (Cu)	0.8549
Developed Runoff Coefficient (Cd)	0.8937
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	7.4417
Burned Peak Flow Rate (cfs)	7.4417
24-Hr Clear Runoff Volume (ac-ft)	1.0837
24-Hr Clear Runoff Volume (cu-ft)	47206.3896