

STORMWATER MANAGEMENT REPORT

PREPARED FOR

**DAUGHTERS OF ISRAEL
1155 PLEASANT VALLEY WAY
LOT 12, BLOCK 171**

SUBMITTED TO:

WEST ORANGE ZONING BOARD OF ADJUSTMENT

PREPARED BY:

**PETRY ENGINEERING, LLC
155 PASSAIC AVENUE
FAIRFIELD, NEW JERSEY 07004**



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OCTOBER 29, 2021
REVISED: MAY 20, 2022**



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INTRODUCTION

Daughters of Israel is a licensed nursing home that includes a total of 303 beds. The facility sits on a campus setting that contains approximately 18 acres of land. It is located along the westerly side of Pleasant Valley Way, just south of its intersection with Route 10 (See Fig. 1). The parcel is directly across the street from the Essex County Golf Course (Byrne) and includes two separate driveways for ingress and egress (See Fig. 2).

The parcel is bordered to the south by Kessler Institute for Rehabilitation as well as the Kessler Foundation. It is bordered to the north and to the west by a residential development that includes Parson Drive and Skyline Drive. Approximately 60 percent of the property is currently developed, while the remaining 40 percent is primarily wooded buffer located along the abutting properties (See Fig. 3).

Within the developed portion of the property, there are a series of buildings that are interconnected, having been constructed over several decades. These buildings are serviced by an asphalt parking lot that includes a total of 236 parking stalls.

PROPOSED IMPROVEMENTS

The proposed development has been designed to accommodate an Age-in-Place community that will allow its community members the opportunity to be part of a continuum of care facility that offers independent living, assisted living, and skilled nursing units all under one roof. The goal of the project is to allow the existing nursing home to remain functional while the remainder of the project is constructed. This will require the removal of a number of the existing buildings and a staged coordination of the development. The project will be completed in several phases, which will remove and replace the existing buildings on the site as the existing buildings are able to be isolated and removed. The construction will include a complete reconstruction of the parking area.

The proposed development will be completed within the same general development limits as the existing development. The new development will be comprised of the following: 85 one-bedroom independent living units, 97 two-bedroom independent living units, 64 assisted living beds, and 80 skilled nursing beds. It will include parking for 266 vehicles in a surface lot as well as 115 parking spaces for Independent Living residents in a covered parking lot beneath the building (See Fig. 4).

The proposed development will be serviced by four detention basins, one subsurface, and three surface basins.



METHODOLOGY

The USDA Natural Resources Conservation Service (NRCS) methodology described in the Technical Release 55 – Urban Hydrology for Small Water Sheds (TR-55) is used for computing stormwater runoff rates, volumes, and hydrographs for both existing and proposed conditions. In computing stormwater runoff from all design storms, the relative stormwater runoff rates and volumes of pervious and impervious surfaces are analyzed separately. The rainfall-duration-frequency data was taken from the NOAA National Weather Service. (See attached.) A minimum time of concentration of 6 minutes was used to model overland flow paths, and the NRCS Type D Design Storm Rainfall Distribution was used to analyze both pre-and post-conditions. Hydraflow Hydrographs Extension 2021 Modeling Software was used to compute the site's pre and post-development runoff.

EXISTING CONDITIONS

The existing conditions was analyzed to include the entire property and any offsite areas that currently drain onto the property. The existing drainage area was broken into 7 drainage areas totaling 20.16 acres. It should be noted that all open space within the existing Limit of Disturbance was modeled as Open Space – D, since it was already previously disturbed. Each of these drainage areas is explained in further detail below.

DRAINAGE AREA 1A (DA-1A)

Drainage Area 1A consists of 6.97 acres of both pervious and impervious surfaces that drain via storm sewers to the existing detention basin onsite. See below for a more detailed analysis of the existing detention basin. The pervious surface, 6.09 acres, consists of wooded and landscaped areas. The impervious surface, 0.88 was calculated for this drainage area. A time of concentration of 14.25 minutes was calculated for this drainage area.

DRAINAGE AREA 1B (DA-1B)

Drainage Area 1B consists of 0.24 acres of pervious surface that drains directly into the existing surface basin. These pervious areas are comprised primarily of existing wooded areas. A time of concentration of 9.78 minutes was calculated for this drainage area.

DRAINAGE AREA 2 (DA-2)

Drainage Area 2 consists of 0.60 acres of pervious area, which currently flows from the subject property and onto Kessler's driveway before making its way into the storm sewer system on Pleasant Valley Way. This drainage area includes both wooded areas along with some landscaped and lawn areas. A time of concentration of 10.14 minutes was calculated for this drainage area.



DRAINAGE AREA 3 (DA-3)

Drainage Area 3 consists of 4.54 acres of both pervious and impervious surfaces that drain to via onsite storm sewers directly into the storm sewer located in Pleasant Valley Way. The pervious area, 2.44 acres, consists of a large wooded area along with onsite landscape islands, lawns, and planting beds. The impervious area, 2.10 acres, consists of parking lots, drive aisles, and sidewalks. A time of concentration of 10.47 minutes was calculated for this drainage area.

DRAINAGE AREA 4 (DA-4)

Drainage Area 4 consists of 1.25 acres of mostly pervious surfaces which drain directly onto Pleasant Valley Way, where it will ultimately flow into the storm sewers in the road. The pervious area, 1.22 acres, consists primarily of lawn and landscaped areas, with some wooded sections as well. The impervious area, 0.03 acres, consists of a small portion of the existing driveway that bypasses the onsite storm sewers. A time of concentration of 9.59 minutes was calculated for this drainage area.

DRAINAGE AREA 5 (DA-5)

Drainage Area 5 consists of 3.13 acres of both pervious and impervious surfaces, which are collected through a series of storm sewers that ultimately connect directly to the existing storm sewers within Pleasant Valley Way. The pervious area, 2.59 acres, consists predominately of wooded areas and along with some landscaped and lawn areas. The impervious surfaces, 0.54 acres, include portions of the existing parking lot and sidewalks. A time of concentration of 13.63 minutes was calculated for this drainage area.

DRAINAGE AREA 6 (DA-6)

Drainage Area 6 consists entirely of the existing roof area, 3.43 acres. The existing roof appears to be tied directly into the existing storm sewers within Pleasant Valley Way. A time of concentration of 6 minutes was used in the analysis, which is the minimum time used for this analysis.

EXISTING BASIN

Currently, the subject property contains a detention basin. This detention basin is served by a series of storm sewers that collect runoff from the existing parking lot and wooded areas in the rear of the site. It should be noted that based on record documents, this basin had existed on site since at least 1981, before the current stormwater regulations were in effect. Nevertheless, we have included the basin routing into our existing conditions model.

The existing detention basin has 14,340 cubic feet of storage. Over the years, the basin has become severely degraded and filled with debris and overgrowth, which has resulted in the outlet structure silting up. Based on historic mapping, the outlet structure has an orifice at the bottom, and a wier at the top. Our model reflects this same setup however the size of the bottom orifice is unknown. As such, we have assumed, conservatively, that



the existing basin is served only by a 3" orifice located at the bottom. This assumption results in the least amount of runoff in the pre-construction conditions.

CURVE NUMBERS

Table 1 – Curve Number (Existing Conditions)

Description	Hydrologic Group	Curve Number
Woods	A	30
Woods	C	70
Woods	D	77
Open Space	C	74
Open Space	D	80
Impervious	A/B/C/D	98

PEAK FLOWS

Using the information described above, the peak flows during the 2-, 10-, and 100-year storm events were calculated. Table 2 below summarizes the peak flows during each storm event. (See attached Hydraflow Output for Existing Conditions Hydrographs, CN Values, and Time of Concentration Calculations.)

Table 2 – Existing Peak Runoff Rates

Storm Event	Existing Site Runoff
2 Year	20.81 cfs
10 Year	46.25 cfs
100 Year	92.10 cfs

POST-DEVELOPMENT RUNOFF TARGET

Since the improvements on the site are considered a major development, proposed runoff rates shall meet the NJDEP Stormwater regulations and reductions for the 2, 10, and 100-year storm events. NJ standards require that the preconstruction runoff rates are to be reduced to at least 50, 75, and 80, respectively, for the areas which are to be disturbed or developed.

The proposed reductions will only account for the areas of the site, which are being disturbed as a result of the proposed development. The equations below were used to determine the reductions based on the limit of disturbance, as shown on the Soil Erosion and Sediment Control Plan.

$$2 \text{ Year Reduction} = \frac{10.50(0.50)}{20.16} = \mathbf{0.260}$$



$$10 \text{ Year Reduction} = \frac{10.50(0.25)}{20.16} = \mathbf{0.130}$$

$$100 \text{ Year Reduction} = \frac{10.50(0.20)}{20.16} = \mathbf{0.104}$$

Table 3 – Target Runoff Rates

Storm Event (Yr.)	Existing Runoff Rates (cfs)	Percent Reduction	Offsite Runoff Reduction (cfs)	Total Post-Development Target Runoff (cfs)
2 Year	20.81 cfs	26.0%	20.81 (0.260) = 5.419 cfs	20.81 – 5.419 = 15.391 cfs
10 Year	46.25 cfs	13.0%	46.25 (0.130) = 6.022 cfs	46.25 – 6.022 = 40.228 cfs
100 Year	92.10 cfs	10.4%	92.10 (0.104) = 9.594 cfs	92.10 – 9.594 = 82.506 cfs

PROPOSED CONDITIONS

The same overall drainage area used in existing conditions was used for proposed conditions. This drainage area was modeled as 5 drainage areas totaling 20.16 acres. (See Fig.-2 Proposed Drainage Area Map.)

DRAINAGE AREA 1A (DA-1A)

Drainage Area 1A consists of the portion of the building to be constructed under phase I, 1.14 acres. This roofed area drains to proposed Basin #1A, a subsurface detention basin. See below for a detailed description of the basin. A time of concentration of 6 minutes was used for this drainage area, which is the minimum time that can be used.

DRAINAGE AREA 1B (DA-1B)

Drainage Area 1A consists of the portion of the building to be constructed under phase II, 1.75 acres. This roofed area drains to proposed Basin #1B, a subsurface detention basin. See below for a detailed description of the basin. A time of concentration of 6 minutes was used for this drainage area, which is the minimum time that can be used.

DRAINAGE AREA 2 (DA-2)

Drainage Area 2 consists of both pervious and impervious surfaces, which will bypass the proposed basins onsite and drain into the Pleasant Valley Way ROW. The pervious area, 3.19 acres, consists of mostly landscape and grass areas along with some existing wooded areas, which are to remain. The impervious area, 1.22 acres, consists of parking areas, drive aisles, and sidewalks. A time of concentration of 10.14 minutes was calculated for this drainage area.



DRAINAGE AREA 3 (DA-3)

Drainage Area 3 consists of both pervious and impervious surfaces which drain to Basin #2. The pervious area, 5.56 acres, consist primarily of the wooded areas in the rear of the site along with some landscaped area around the proposed parking lot. The impervious area, 1.38 acres, is mainly comprised of the proposed parking lot. A time of concentration of 14.46 minutes was calculated for this drainage area.

DRAINAGE AREA 4 (DA-4)

Drainage Area 4 consists of both pervious and impervious surfaces which drain to Basin #3. The pervious area, 4.84 acres, consists primarily of the wooded area located to the rear of the site, along with some lawn and landscape areas around the proposed building and parking lot. The impervious area, 1.08 acres, is comprised of the portion of building to be constructed in phase III, as well as some proposed parking lots, drive aisles, sidewalks, and patios. A time of concentration of 14.30 minutes was calculated for this drainage area.

CURVE NUMBERS

Table 4 – Curve Number (Existing Conditions)

Description	Hydrologic Group	Curve Number
Woods	A	30
Woods	C	70
Woods	D	77
Open Space	A	39
Open Space	C	74
Open Space	D	80
Impervious	A/B/C/D	98

WATER QUANTITY

BASIN #1A – 3,230 CF

Detention Basin #1A is a subsurface detention basin with 3,230 cubic feet of storage. The system is comprised of 3 rows of 48" diameter HDPE pipe, each 75 feet in length. The bottom of the basin is at elevation 418.00, along with 1 – 4" x 6.5" orifice. At elevation 420.50, 1 – 8" x 12" orifice will also be placed, followed by a 4' weir at an elevation of 421.30.



BASIN #1B – 4,474 CF

Detention Basin #1B is a subsurface detention basin with 4,474 cubic feet of storage. The system is comprised of 4 rows of 48" diameter HDPE pipe, totaling 240 feet in length. The bottom of the basin is at elevation 404.00, along with 2 – 4" x 7" orifices. At elevation 406.00, 1 – 6" x 18" orifice will also be placed, followed by a 4' weir at an elevation of 407.25.

BASIN #2 – 16,898 CF

Detention Basin #2 is a surface basin with 16,898 cubic feet of storage. The bottom of the basin is set at elevation 414.00 along with 1 – 8" x 13" rectangular orifice. 2 – 13" x 22" orifices will be placed at elevation 416.00, and a 10' weir is placed at elevation 418.00. It should be noted that the 100-year storm event reaches an elevation of 417.97, just below the elevation of the weir. The top of the basin is set at 419, which allows for 1 foot of freeboard.

BASIN #3 – 11,200 CF

Detention Basin #3 is another surface basin with 11,200 cubic feet of storage. The bottom of the basin is set at elevation 416.00, where 1 – 4" x 10" orifice will also be placed. 2 – 6" x 10" orifices will be placed at elevation 417.00, and 2 – 6" x 10" orifices will be placed at an elevation of 418.00. Finally, a 6' weir will be placed at elevation 420.00. It should be noted that the 100-year storm event reaches an elevation of 419.98, just below the elevation of the weir. The top of the basin is set at 421.00, which allows for 1 foot of freeboard.

POST-DEVELOPMENT RUNOFF

Using the information described above, the peak flows during the 2-, 10-, and 100-year storm events were calculated. Table 5 below summarizes the peak flows during each storm event. (See attached Hydraflow Output for Proposed Conditions Hydrographs, CN Values, and Time of Concentration Calculation.)

Table 5 – Proposed Peak Runoff Rates

Storm Event	Target Site Runoff	Proposed Site Runoff
2 Year	15.391 cfs	15.38 cfs
10 Year	40.228 cfs	40.20 cfs
100 Year	82.506 cfs	82.37 cfs

DRAIN TIME

As shown by the Hydraflow Hydrographs attached to this report, the detention time of the system is below 72 hours and is broken down as follows:

Detention Basin #1 – 27 hrs.
Detention Basin #2 – 27 hrs.
Detention Basin #3 – 27 hrs.
Detention Basin #4 – 27 hrs.



WATER QUALITY

Water quality is not required for the proposed development as there is a reduction in the total motor vehicle surface onsite from existing conditions.

GROUNDWATER RECHARGE

The subject property is located within the metropolitan planning area and has been previously developed. As such, the proposed development is not required to meet the groundwater recharge standards.

STORM SEWER COMPUTATIONS

A storm sewer system has been designed to collect the runoff associated with the proposed parking lot and roof. The system's primary purpose is to properly drain the proposed site and deliver the runoff to the proposed stormwater management system for water quantity. See attached Storm Sewer Computations in the appendix of this report. The pipes flowing into the systems were designed for a 25-year storm event. The rational method was used to calculate the runoff rates, and the Manning's equation was used to determine the capacity of each system.

The majority of the site is mapped with soils considered Hydrologic Group A & C. For this analysis it was assumed the entire site was Hydrologic Group C. Runoff coefficients (C values) for hydrologic soil group C were 0.51 and 0.99 for woods - good condition and pavement respectively. In addition, all areas were assumed to have a time of concentration of 6 minutes for a conservative model.

As shown, all pipes were designed with adequate capacity to handle the proposed flows.

CONCLUSION

To summarize, a stormwater management strategy has been incorporated to satisfy both the structural and non-structural water quality and water quantity requirements. This is in keeping with the design and performance standards set forth in the West Orange Stormwater Management Ordinance and New Jersey DEP Regulations.



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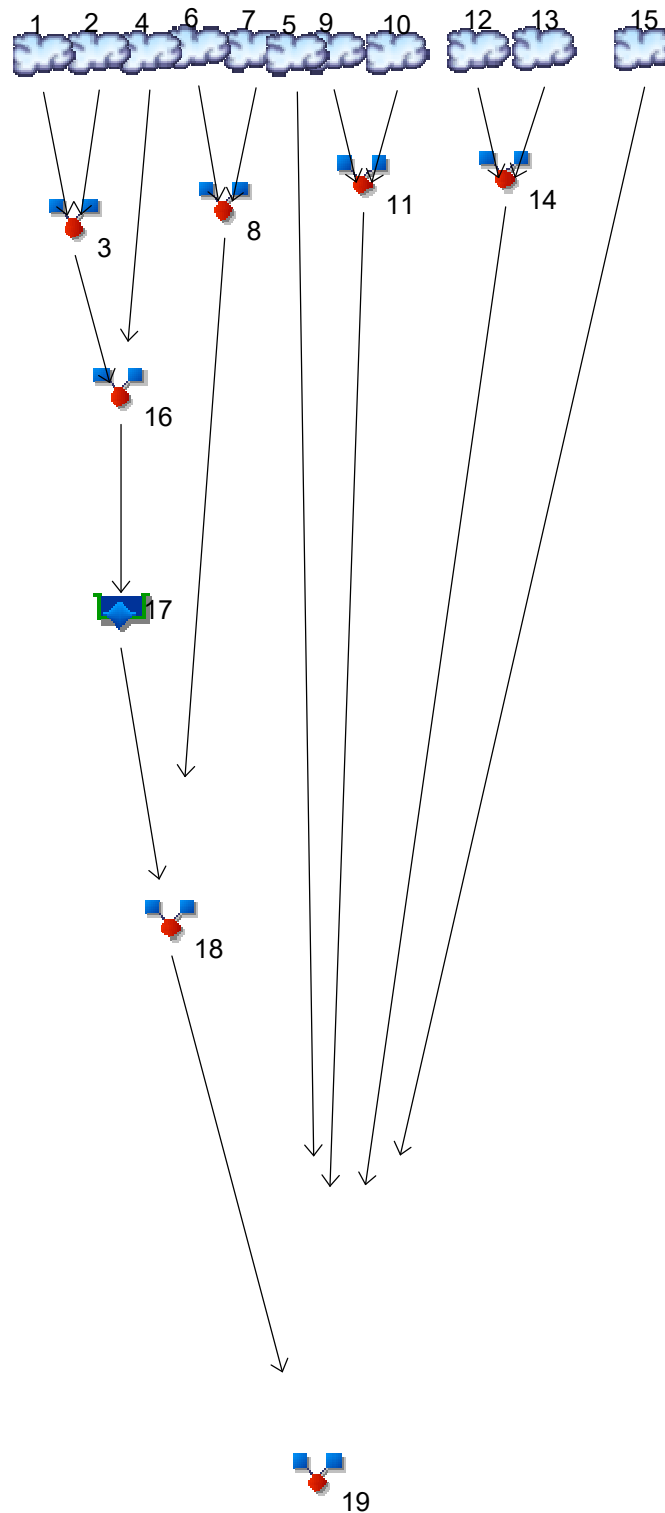
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Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4



Legend

Hyd.	Origin	Description
1	SCS Runoff	DA-1A (Impervious)
2	SCS Runoff	DA-1A (Pervious)
3	Combine	DA-1A
4	SCS Runoff	DA-1B
5	SCS Runoff	DA-2
6	SCS Runoff	DA-3 (Impervious)
7	SCS Runoff	DA-3 (Pervious)
8	Combine	DA-3
9	SCS Runoff	DA-4 (Impervious)
10	SCS Runoff	DA-4 (Pervious)
11	Combine	DA-4
12	SCS Runoff	DA-5 (Impervious)
13	SCS Runoff	DA-5 (Pervious)
14	Combine	DA-5
15	SCS Runoff	DA-6
16	Combine	To Basin #1
17	Reservoir	Basin #1
18	Combine	Combined - SS Southern Driveway
19	Combine	Total Offsite

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	-----	-----	2.553	-----	-----	3.801	4.629	-----	6.077	DA-1A (Impervious)
2	SCS Runoff	-----	-----	4.360	-----	-----	10.69	15.43	-----	24.27	DA-1A (Pervious)
3	Combine	1, 2	-----	6.511	-----	-----	13.93	19.42	-----	29.61	DA-1A
4	SCS Runoff	-----	-----	0.185	-----	-----	0.440	0.630	-----	0.981	DA-1B
5	SCS Runoff	-----	-----	0.463	-----	-----	1.100	1.574	-----	2.453	DA-2
6	SCS Runoff	-----	-----	6.093	-----	-----	9.071	11.05	-----	14.50	DA-3 (Impervious)
7	SCS Runoff	-----	-----	1.485	-----	-----	3.903	5.743	-----	9.213	DA-3 (Pervious)
8	Combine	6, 7	-----	7.278	-----	-----	12.53	16.27	-----	23.06	DA-3
9	SCS Runoff	-----	-----	0.087	-----	-----	0.130	0.158	-----	0.207	DA-4 (Impervious)
10	SCS Runoff	-----	-----	1.450	-----	-----	3.016	4.133	-----	6.173	DA-4 (Pervious)
11	Combine	9, 10	-----	1.535	-----	-----	3.141	4.286	-----	6.380	DA-4
12	SCS Runoff	-----	-----	1.567	-----	-----	2.333	2.840	-----	3.729	DA-5 (Impervious)
13	SCS Runoff	-----	-----	0.051	-----	-----	0.815	1.996	-----	4.593	DA-5 (Pervious)
14	Combine	12, 13	-----	1.567	-----	-----	2.870	4.505	-----	7.885	DA-5
15	SCS Runoff	-----	-----	9.951	-----	-----	14.82	18.04	-----	23.69	DA-6
16	Combine	3, 4,	-----	6.683	-----	-----	14.35	20.03	-----	30.57	To Basin #1
17	Reservoir	16	-----	1.847	-----	-----	14.12	19.78	-----	30.22	Basin #1
18	Combine	8, 17	-----	7.642	-----	-----	24.77	35.27	-----	52.45	Combined - SS Southern Driveway
19	Combine	5, 11, 14, 15, 18	-----	20.81	-----	-----	46.25	63.12	-----	92.10	Total Offsite
Proj. file: Existing Conditions.gpw										Monday, 05 / 9 / 2022	

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

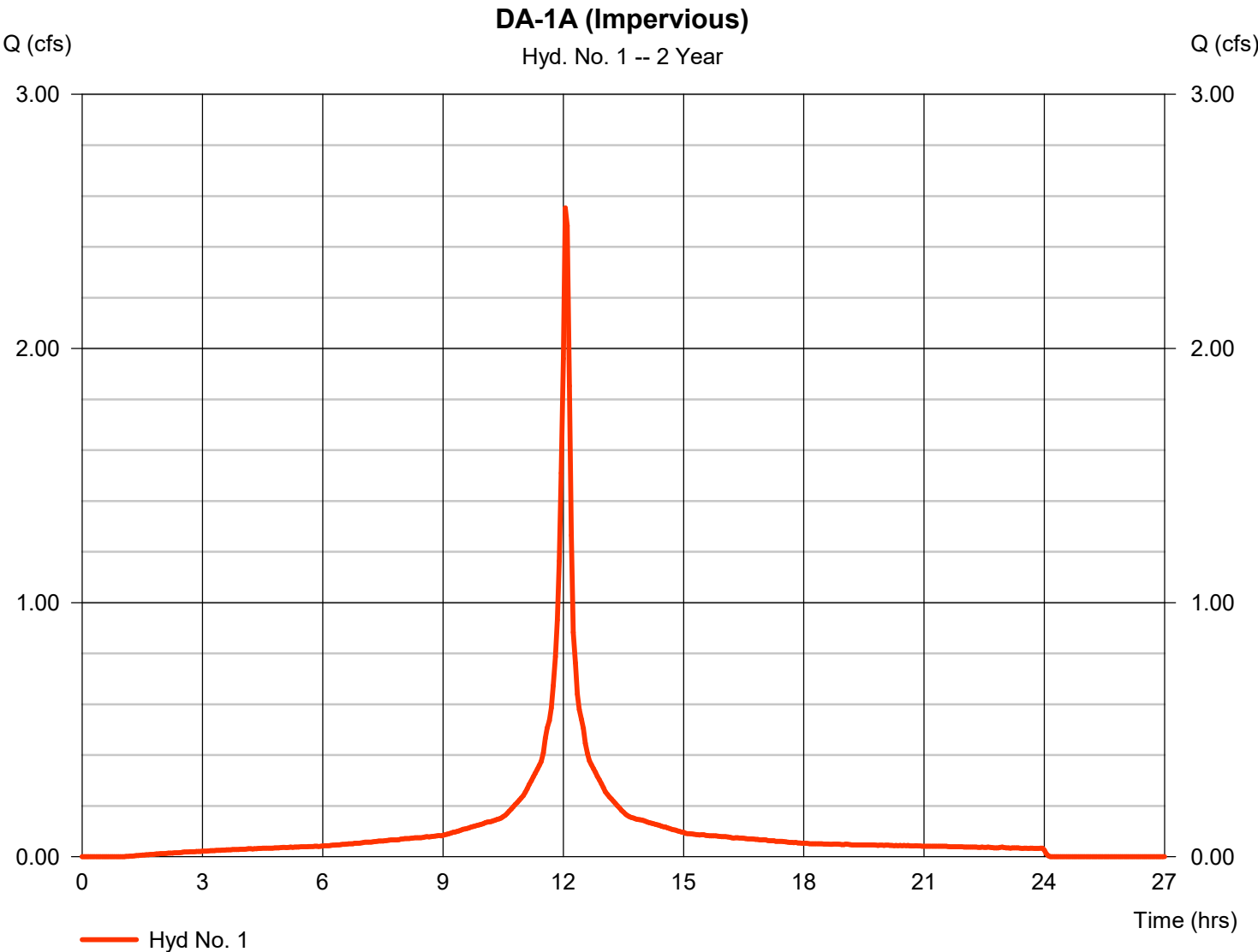
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	2.553	3	723	9,902	-----	-----	-----	DA-1A (Impervious)
2	SCS Runoff	4.360	3	729	19,291	-----	-----	-----	DA-1A (Pervious)
3	Combine	6.511	3	726	29,193	1, 2	-----	-----	DA-1A
4	SCS Runoff	0.185	3	729	806	-----	-----	-----	DA-1B
5	SCS Runoff	0.463	3	729	2,014	-----	-----	-----	DA-2
6	SCS Runoff	6.093	3	723	23,629	-----	-----	-----	DA-3 (Impervious)
7	SCS Runoff	1.485	3	729	6,847	-----	-----	-----	DA-3 (Pervious)
8	Combine	7.278	3	726	30,476	6, 7	-----	-----	DA-3
9	SCS Runoff	0.087	3	723	338	-----	-----	-----	DA-4 (Impervious)
10	SCS Runoff	1.450	3	726	5,010	-----	-----	-----	DA-4 (Pervious)
11	Combine	1.535	3	726	5,347	9, 10	-----	-----	DA-4
12	SCS Runoff	1.567	3	723	6,076	-----	-----	-----	DA-5 (Impervious)
13	SCS Runoff	0.051	3	780	1,235	-----	-----	-----	DA-5 (Pervious)
14	Combine	1.567	3	723	7,311	12, 13	-----	-----	DA-5
15	SCS Runoff	9.951	3	723	38,594	-----	-----	-----	DA-6
16	Combine	6.683	3	726	29,998	3, 4,	-----	-----	To Basin #1
17	Reservoir	1.847	3	756	29,991	16	419.08	10,391	Basin #1
18	Combine	7.642	3	726	60,467	8, 17	-----	-----	Combined - SS Southern Driveway
19	Combine	20.81	3	726	113,733	5, 11, 14, 15, 18	-----	-----	Total Offsite
Existing Conditions.gpw					Return Period: 2 Year			Monday, 05 / 9 / 2022	

Hydrograph Report

Hyd. No. 1

DA-1A (Impervious)

Hydrograph type	= SCS Runoff	Peak discharge	= 2.553 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.05 hrs
Time interval	= 3 min	Hyd. volume	= 9,902 cuft
Drainage area	= 0.880 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.54 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\191010\0265 Daughters of Israel - West Orange		



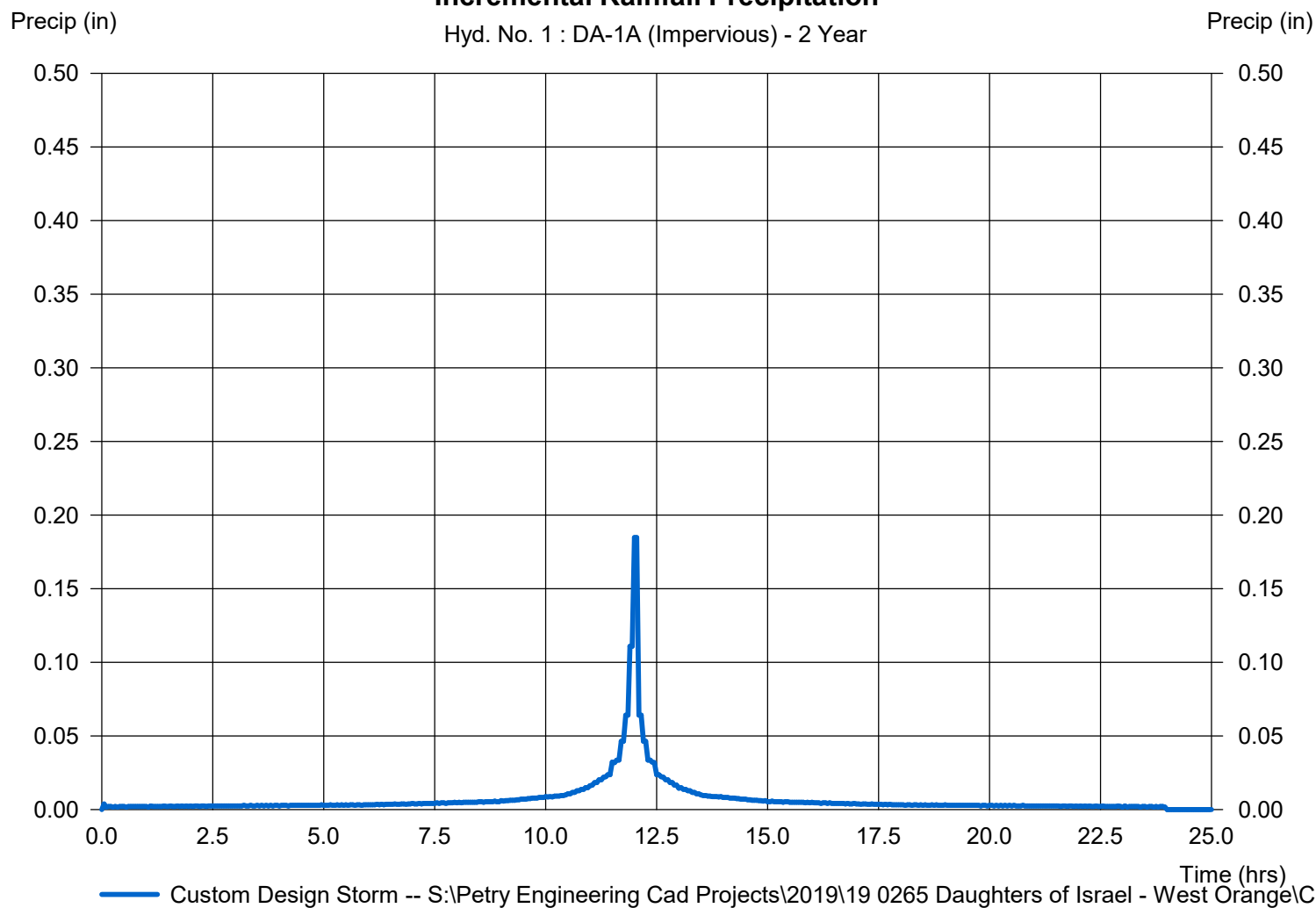
Hyd. No. 1

DA-1A (Impervious)

Storm Frequency = 2 yrs Time interval = 3 min
Total precip. = 3.5400 in Distribution = Custom
Storm duration = S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora



Hyd. No. 1 : DA-1A (Impervious) - 2 Year



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

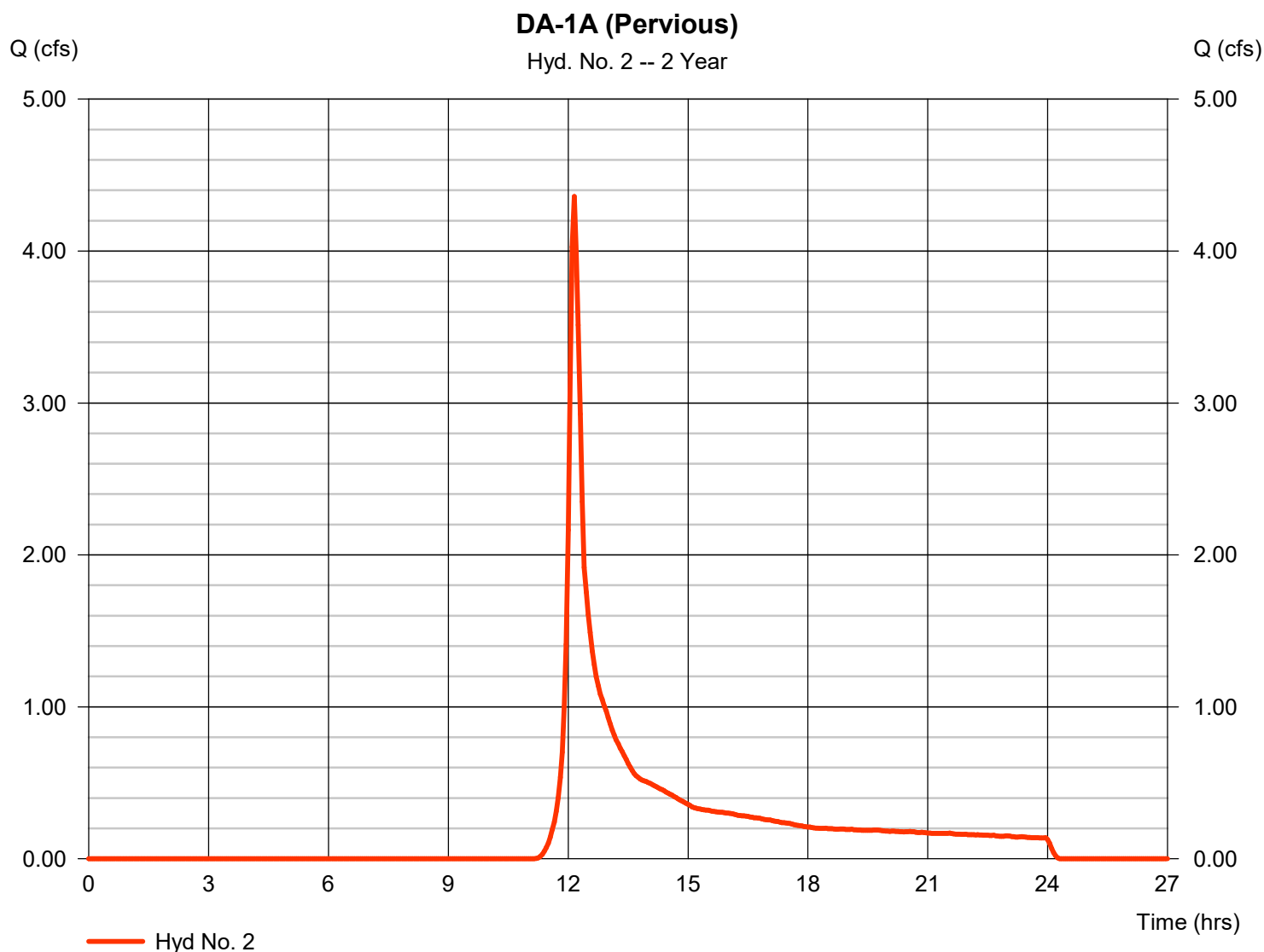
Monday, 05 / 9 / 2022

Hyd. No. 2

DA-1A (Pervious)

Hydrograph type	= SCS Runoff	Peak discharge	= 4.360 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.15 hrs
Time interval	= 3 min	Hyd. volume	= 19,291 cuft
Drainage area	= 6.090 ac	Curve number	= 67*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 14.30 min
Total precip.	= 3.54 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\191019 0265 Daughters of Israel - West Orange		

* Composite (Area/CN) = $[(0.500 \times 30) + (4.740 \times 70) + (0.280 \times 77) + (0.010 \times 80) + (0.560 \times 74)] / 6.090$



Precipitation Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Monday, 05 / 9 / 2022

Hyd. No. 2

DA-1A (Pervious)

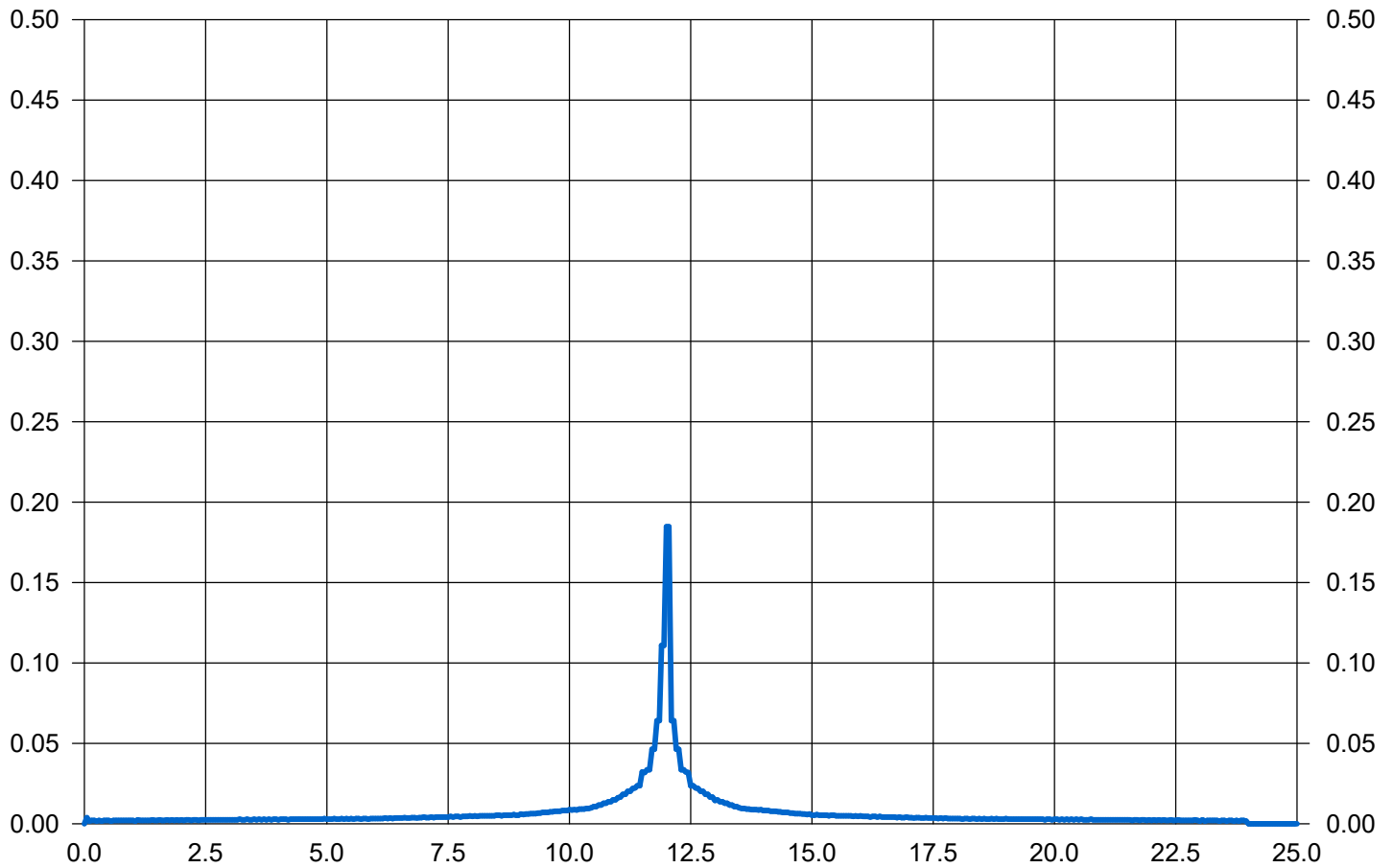
Storm Frequency	= 2 yrs	Time interval	= 3 min
Total precip.	= 3.5400 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Orange\		

Incremental Rainfall Precipitation

Hyd. No. 2 : DA-1A (Pervious) - 2 Year

Precip (in)

Precip (in)



Time (hrs)

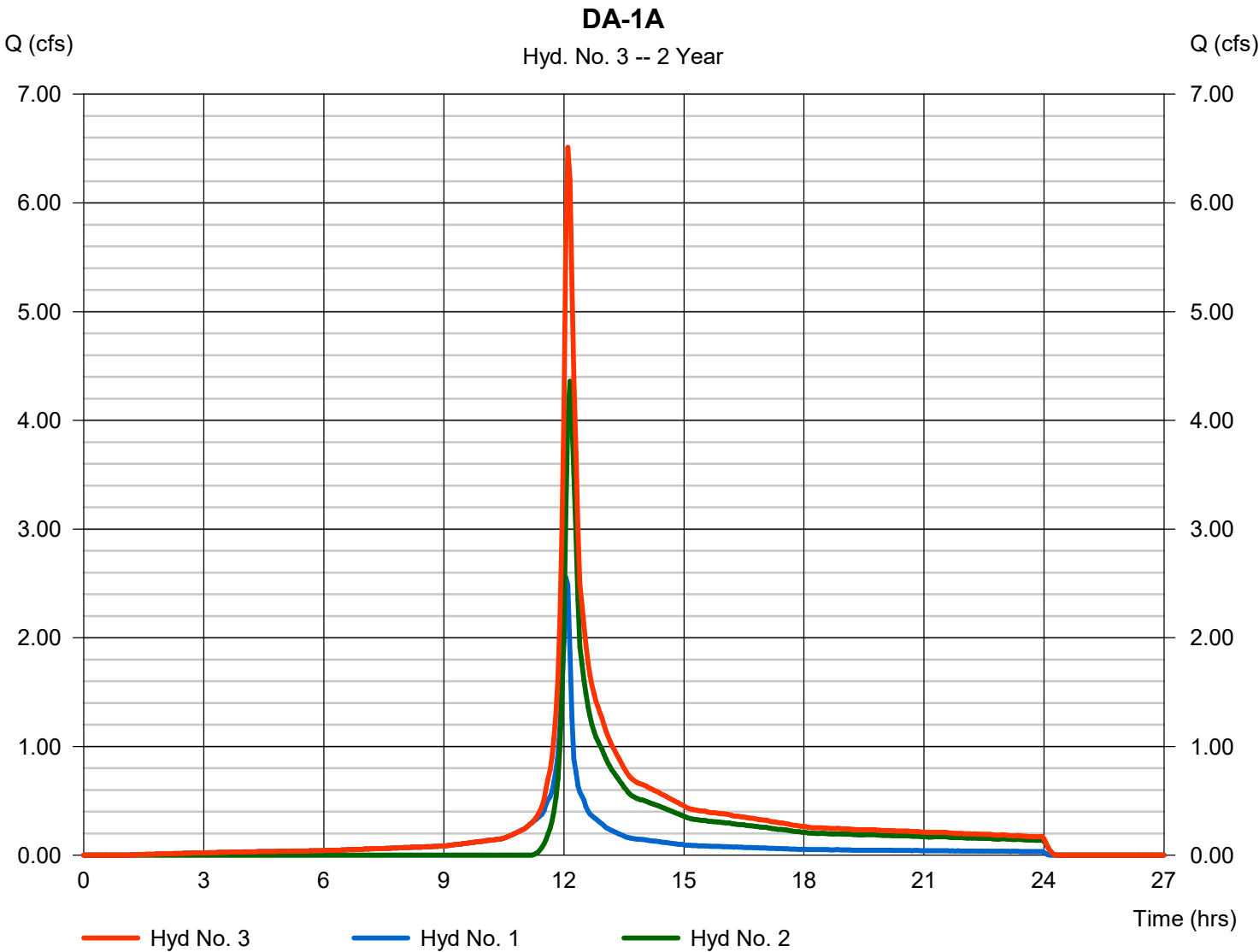
— Custom Design Storm -- S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Orange\Civil\Cu

Hydrograph Report

Hyd. No. 3

DA-1A

Hydrograph type	= Combine	Peak discharge	= 6.511 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 29,193 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 6.970 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

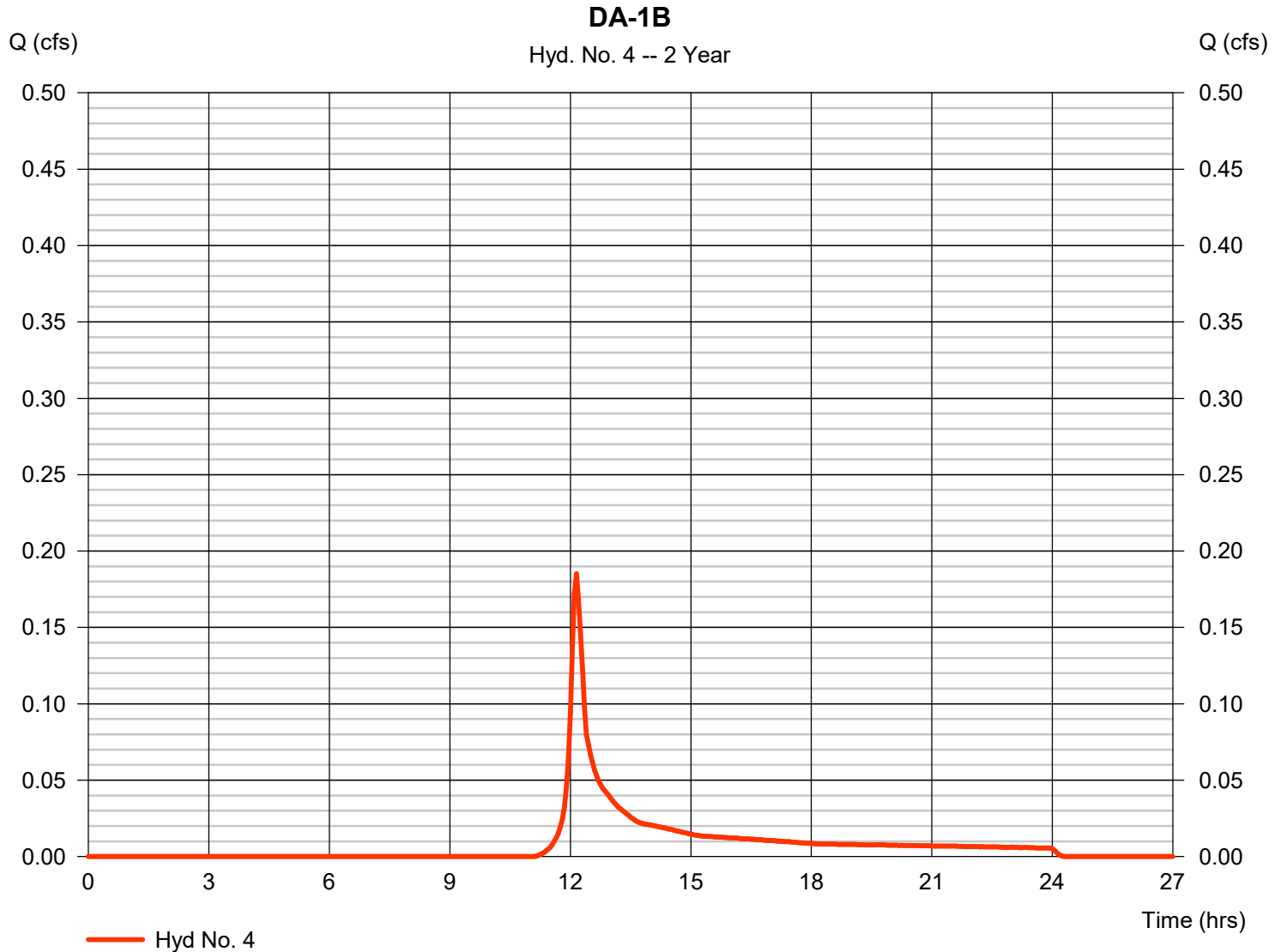
Monday, 05 / 9 / 2022

Hyd. No. 4

DA-1B

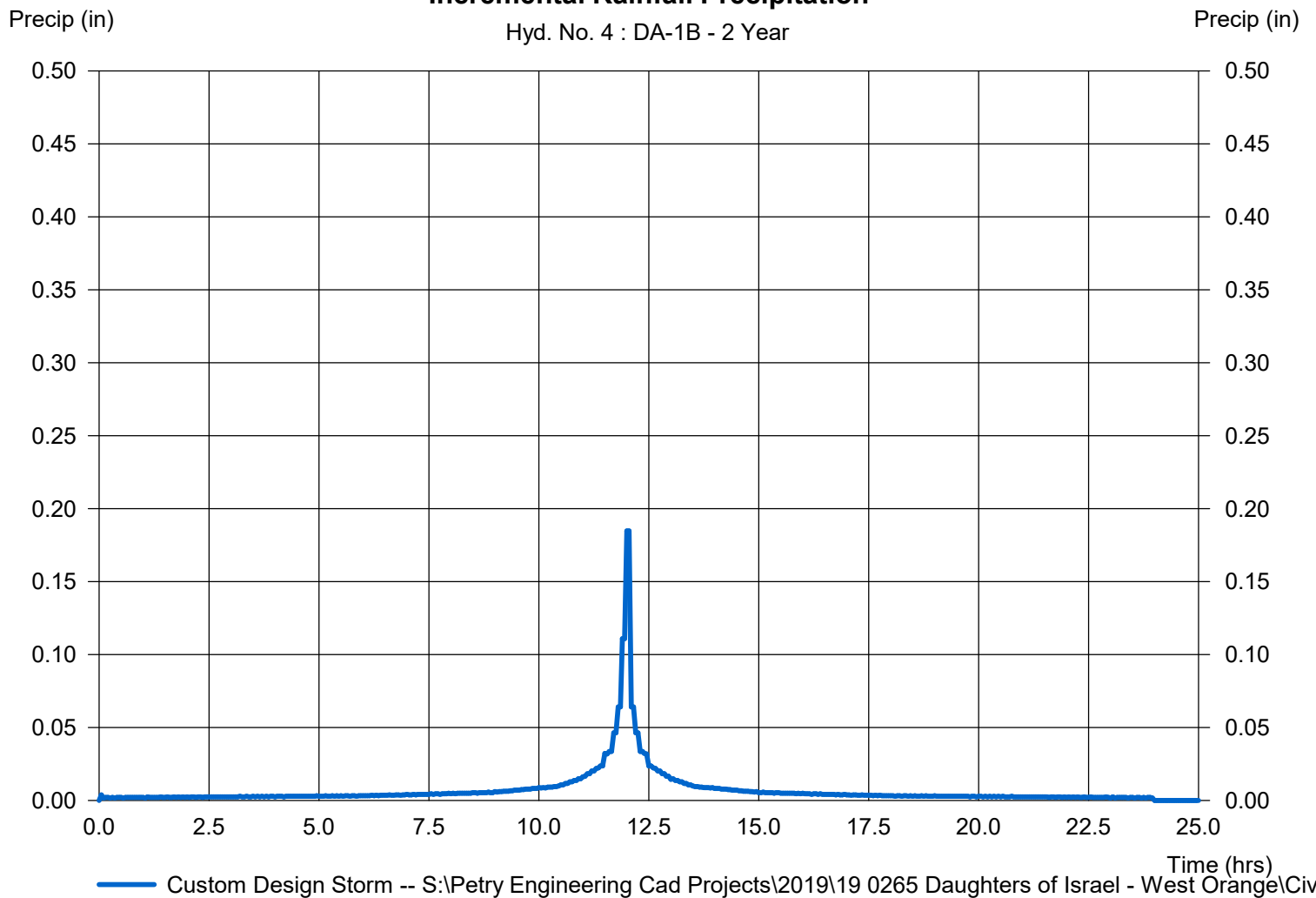
Hydrograph type	= SCS Runoff	Peak discharge	= 0.185 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.15 hrs
Time interval	= 3 min	Hyd. volume	= 806 cuft
Drainage area	= 0.240 ac	Curve number	= 68*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.80 min
Total precip.	= 3.54 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\19-01-0265 Daughters of Israel - West Orange		

* Composite (Area/CN) = $[(0.020 \times 30) + (0.170 \times 70) + (0.050 \times 77)] / 0.240$



DA-1B

Storm Frequency = 2 yrs Time interval = 3 min
Total precip. = 3.5400 in Distribution = Custom
Storm duration = S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

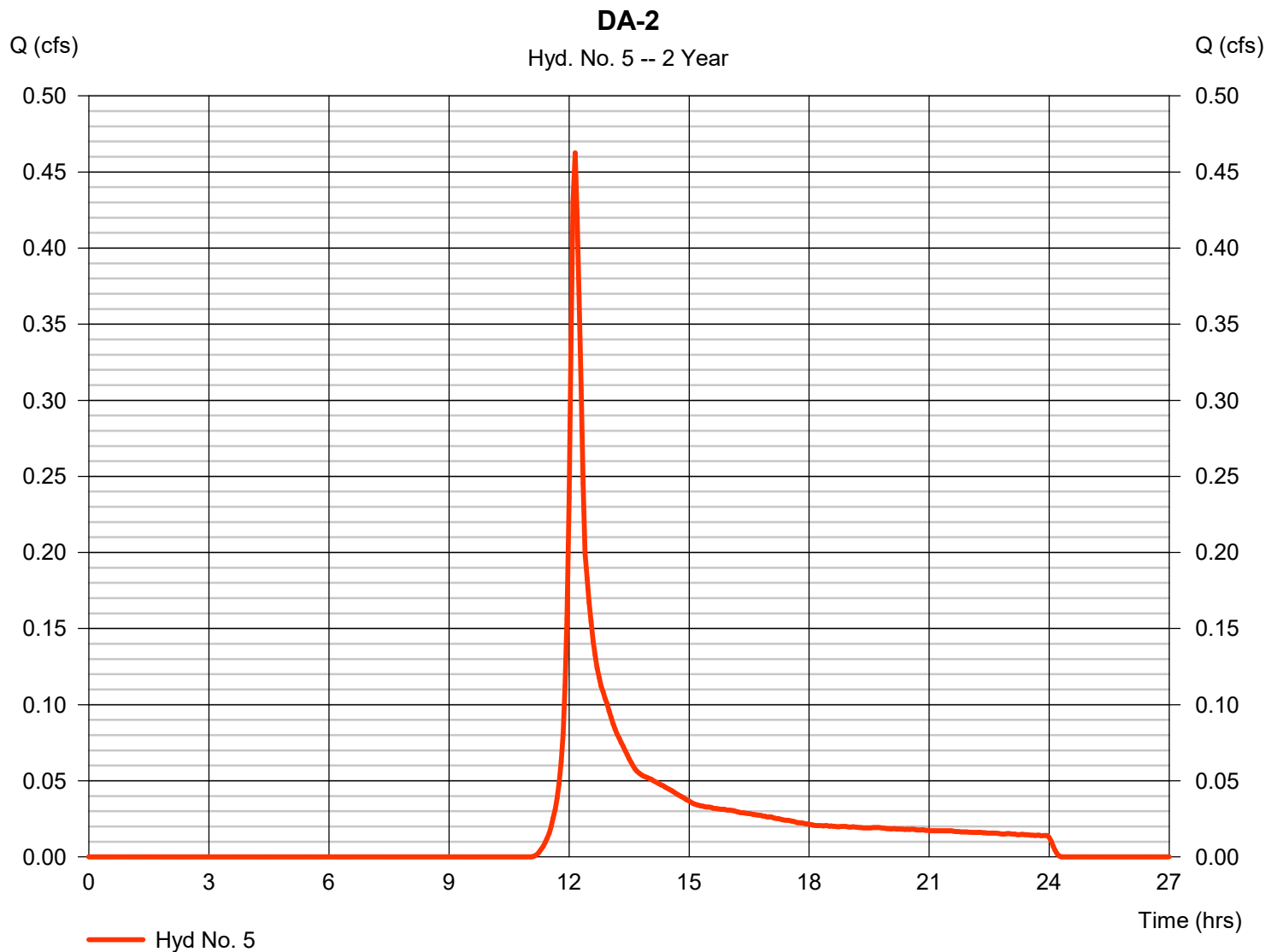
Monday, 05 / 9 / 2022

Hyd. No. 5

DA-2

Hydrograph type	= SCS Runoff	Peak discharge	= 0.463 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.15 hrs
Time interval	= 3 min	Hyd. volume	= 2,014 cuft
Drainage area	= 0.600 ac	Curve number	= 68*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.10 min
Total precip.	= 3.54 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\2019\19-0265 Daughters of Israel - West Orange		

* Composite (Area/CN) = $[(0.100 \times 77) + (0.140 \times 70) + (0.250 \times 80) + (0.110 \times 30)] / 0.600$



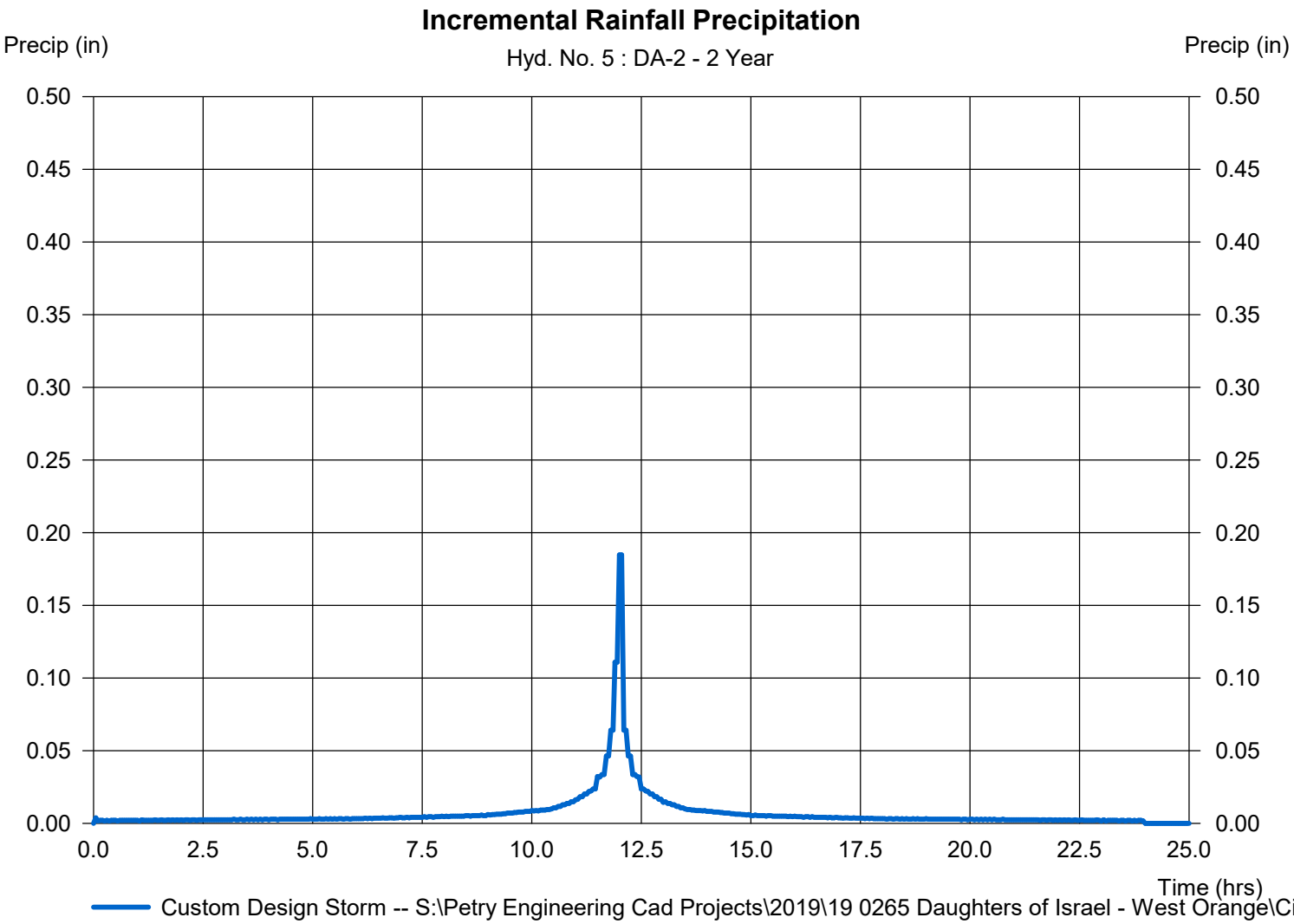
Precipitation Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Monday, 05 / 9 / 2022

Hyd. No. 5

DA-2			
Storm Frequency	= 2 yrs	Time interval	= 3 min
Total precip.	= 3.5400 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Orange\19 0265 Daughters of Israel - West Orange.dwg		

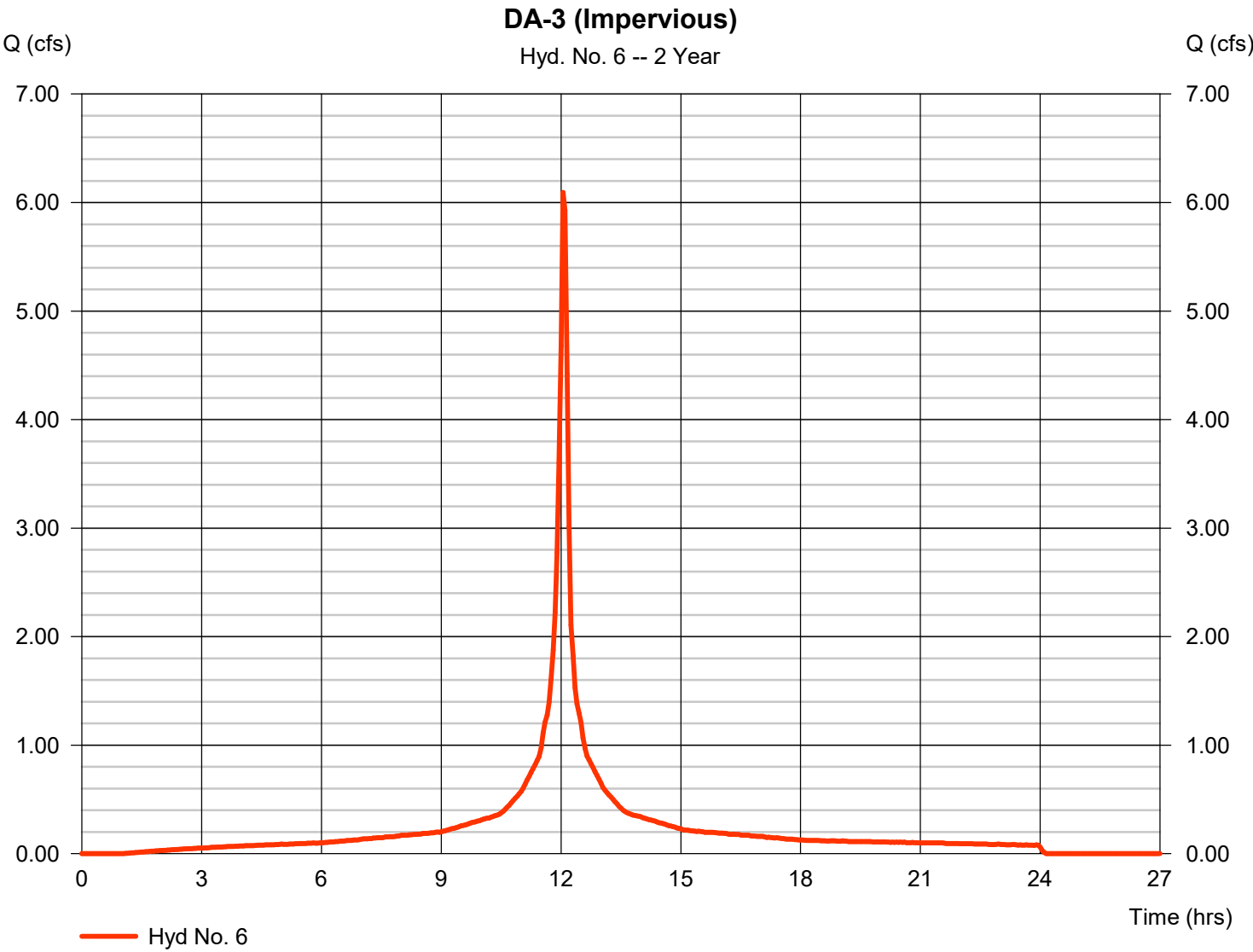


Hydrograph Report

Hyd. No. 6

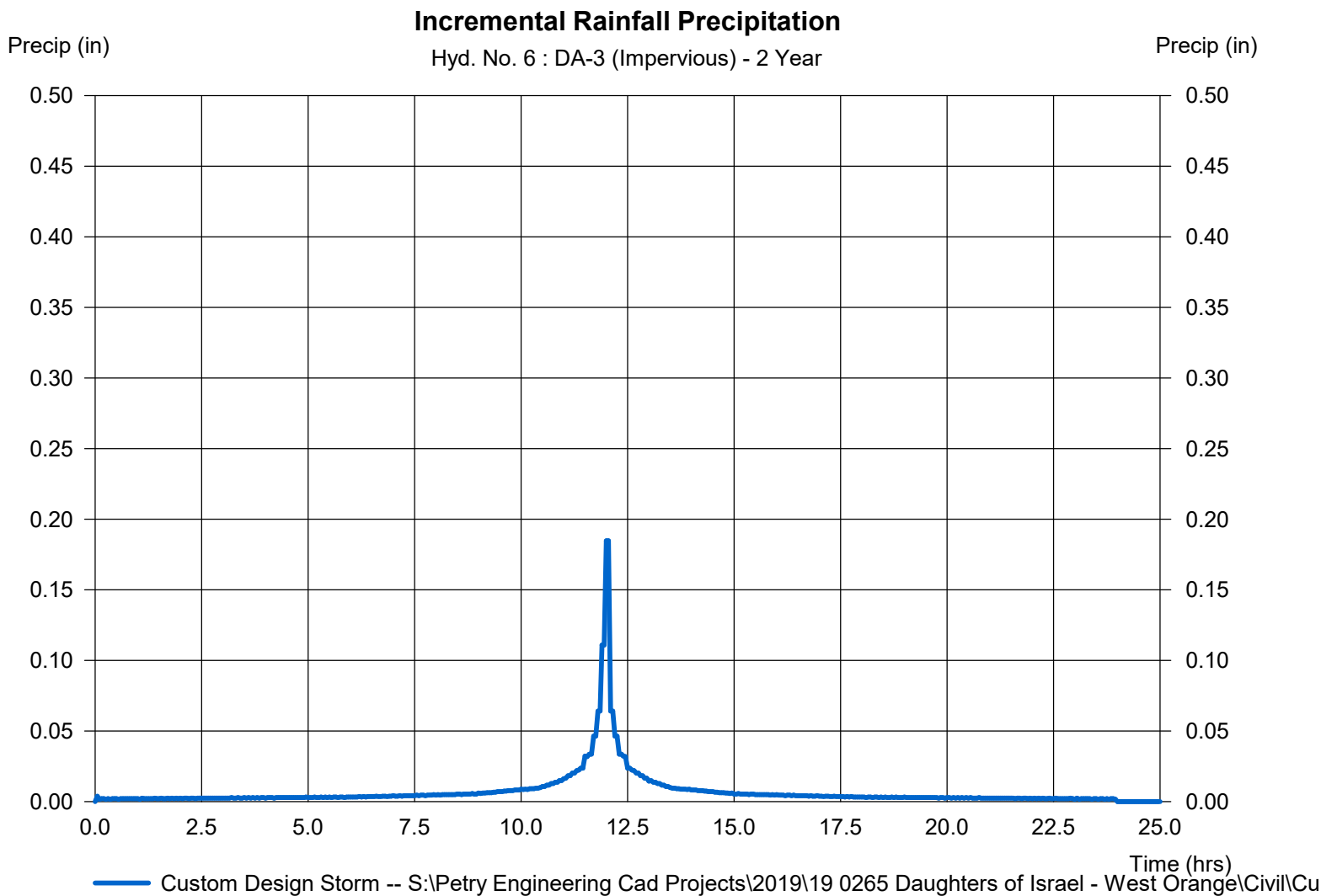
DA-3 (Impervious)

Hydrograph type	= SCS Runoff	Peak discharge	= 6.093 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.05 hrs
Time interval	= 3 min	Hyd. volume	= 23,629 cuft
Drainage area	= 2.100 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.54 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\19-0265 Daughters of Israel - West Orange, NJ\19-0265.Dwg		



DA-3 (Impervious)

Storm Frequency = 2 yrs Time interval = 3 min
Total precip. = 3.5400 in Distribution = Custom
Storm duration = S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

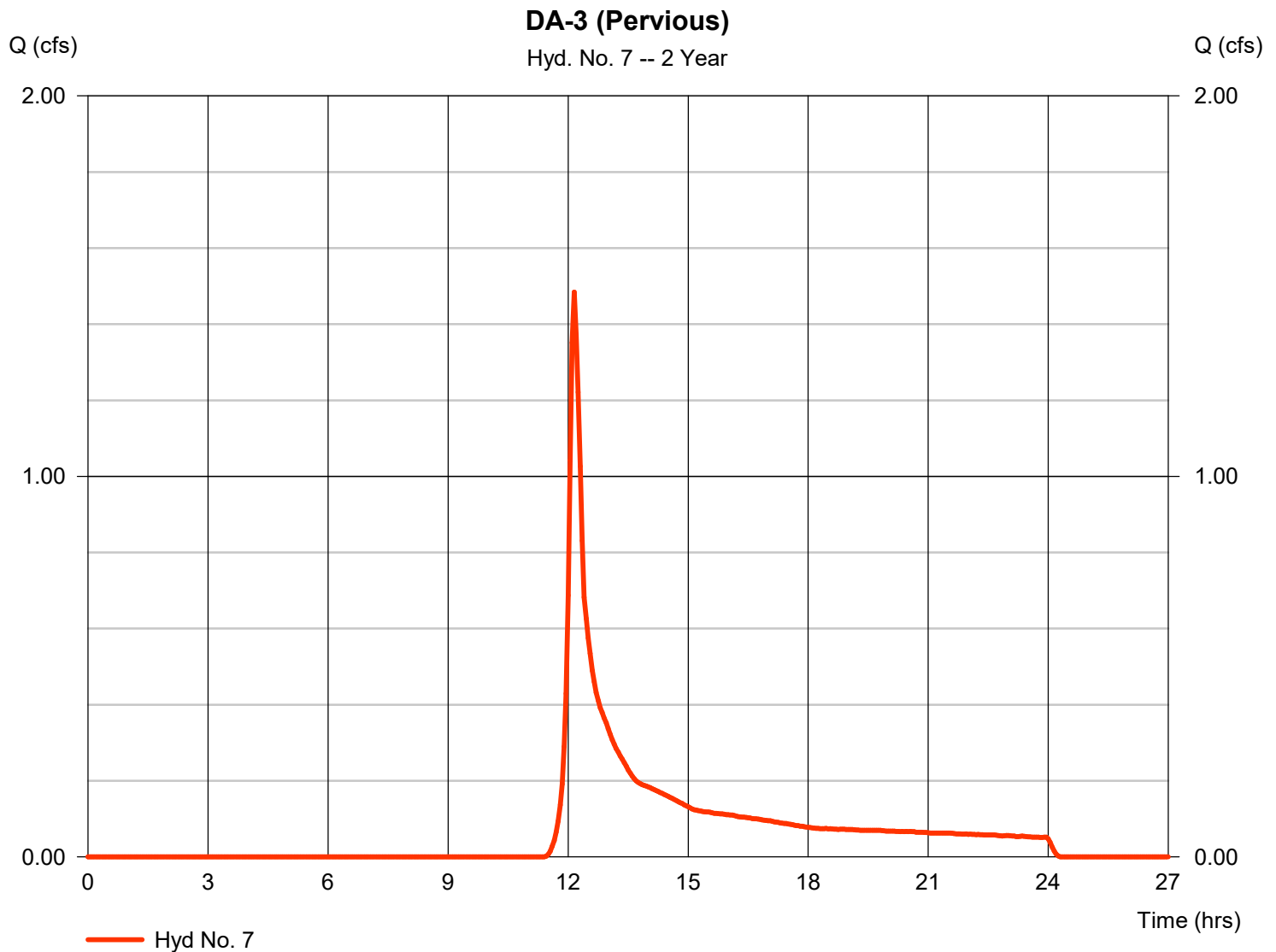
Monday, 05 / 9 / 2022

Hyd. No. 7

DA-3 (Pervious)

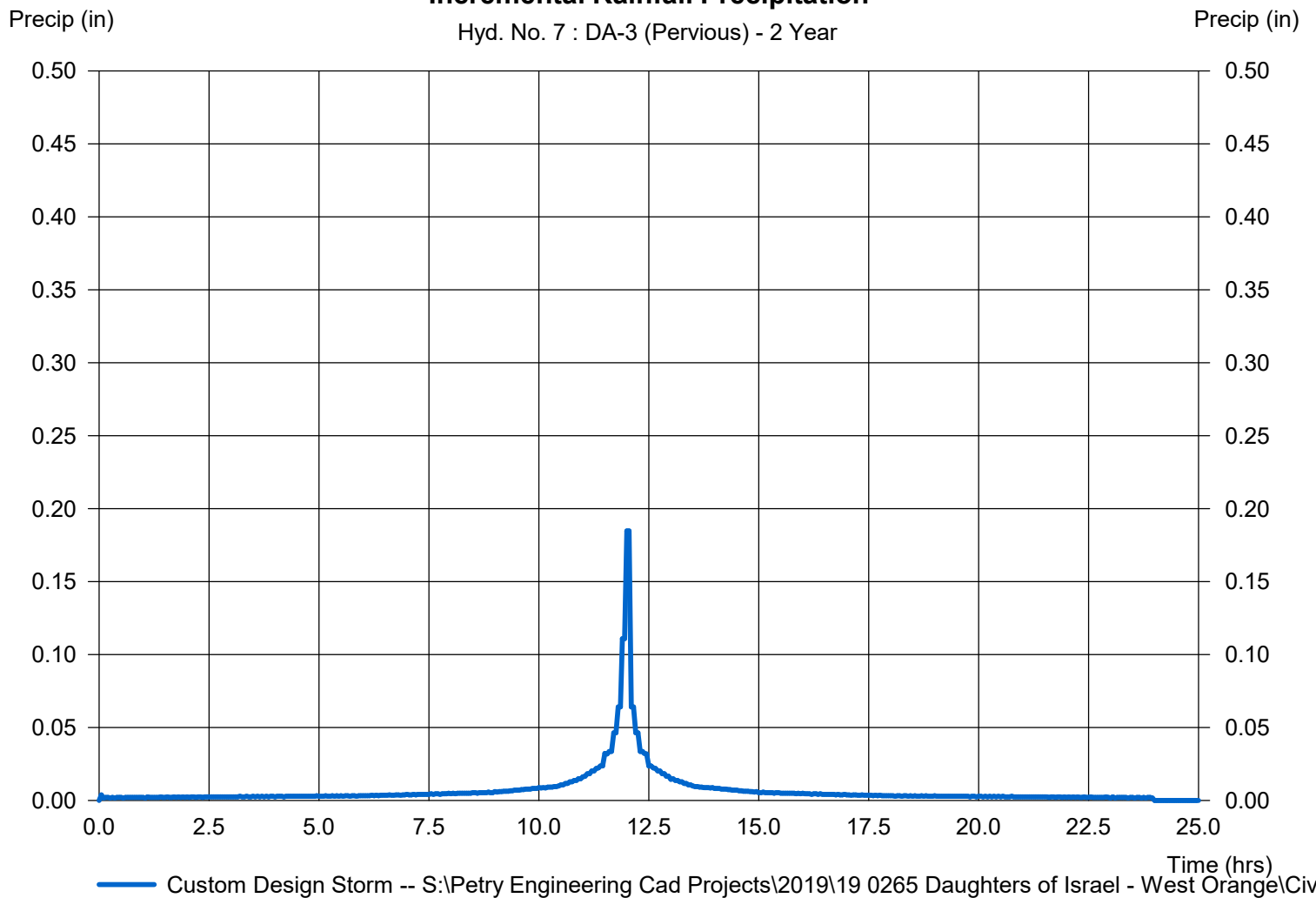
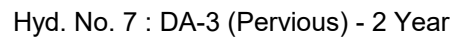
Hydrograph type	= SCS Runoff	Peak discharge	= 1.485 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.15 hrs
Time interval	= 3 min	Hyd. volume	= 6,847 cuft
Drainage area	= 2.440 ac	Curve number	= 65*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.50 min
Total precip.	= 3.54 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\191019 0265 Daughters of Israel - West Orange		

* Composite (Area/CN) = $[(0.890 \times 80) + (0.210 \times 74) + (0.550 \times 30) + (0.760 \times 70) + (0.030 \times 77)] / 2.440$



DA-3 (Pervious)

Storm Frequency = 2 yrs Time interval = 3 min
Total precip. = 3.5400 in Distribution = Custom
Storm duration = S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora

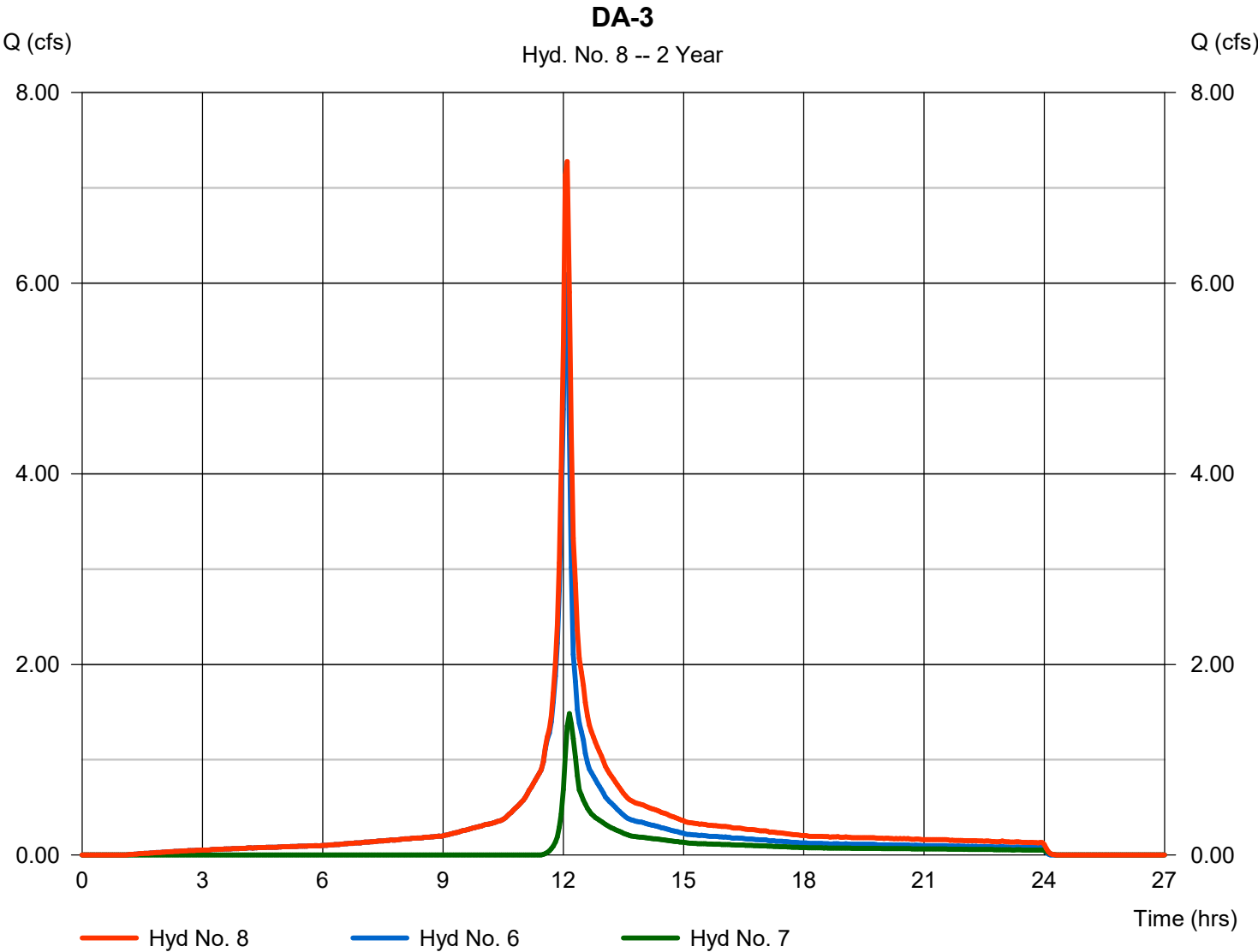


Hydrograph Report

Hyd. No. 8

DA-3

Hydrograph type	= Combine	Peak discharge	= 7.278 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 30,476 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 4.540 ac



Hydrograph Report

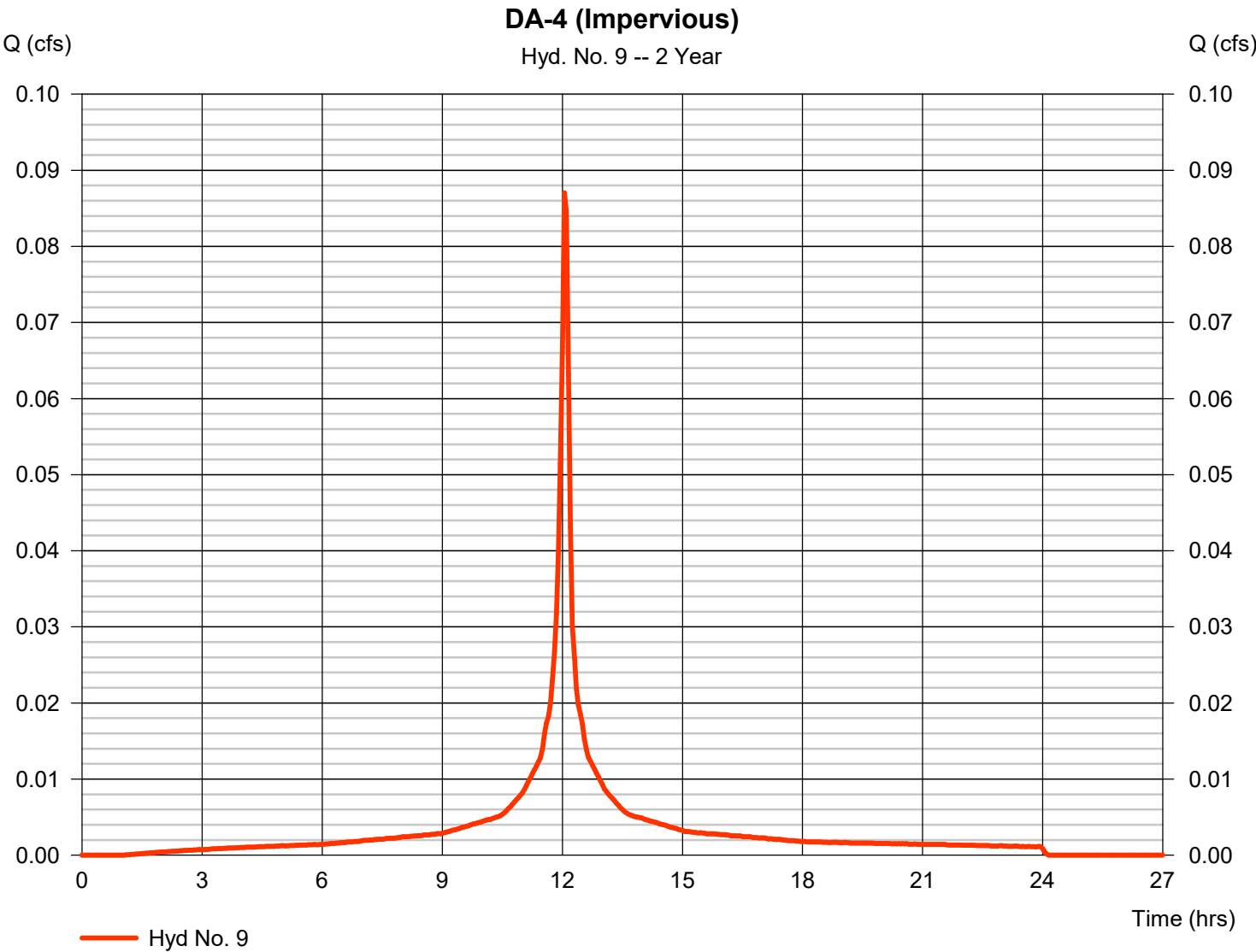
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Monday, 05 / 9 / 2022

Hyd. No. 9

DA-4 (Impervious)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.087 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.05 hrs
Time interval	= 3 min	Hyd. volume	= 338 cuft
Drainage area	= 0.030 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.54 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\19-010-0265 Daughters of Israel - West Orange		



Precipitation Report

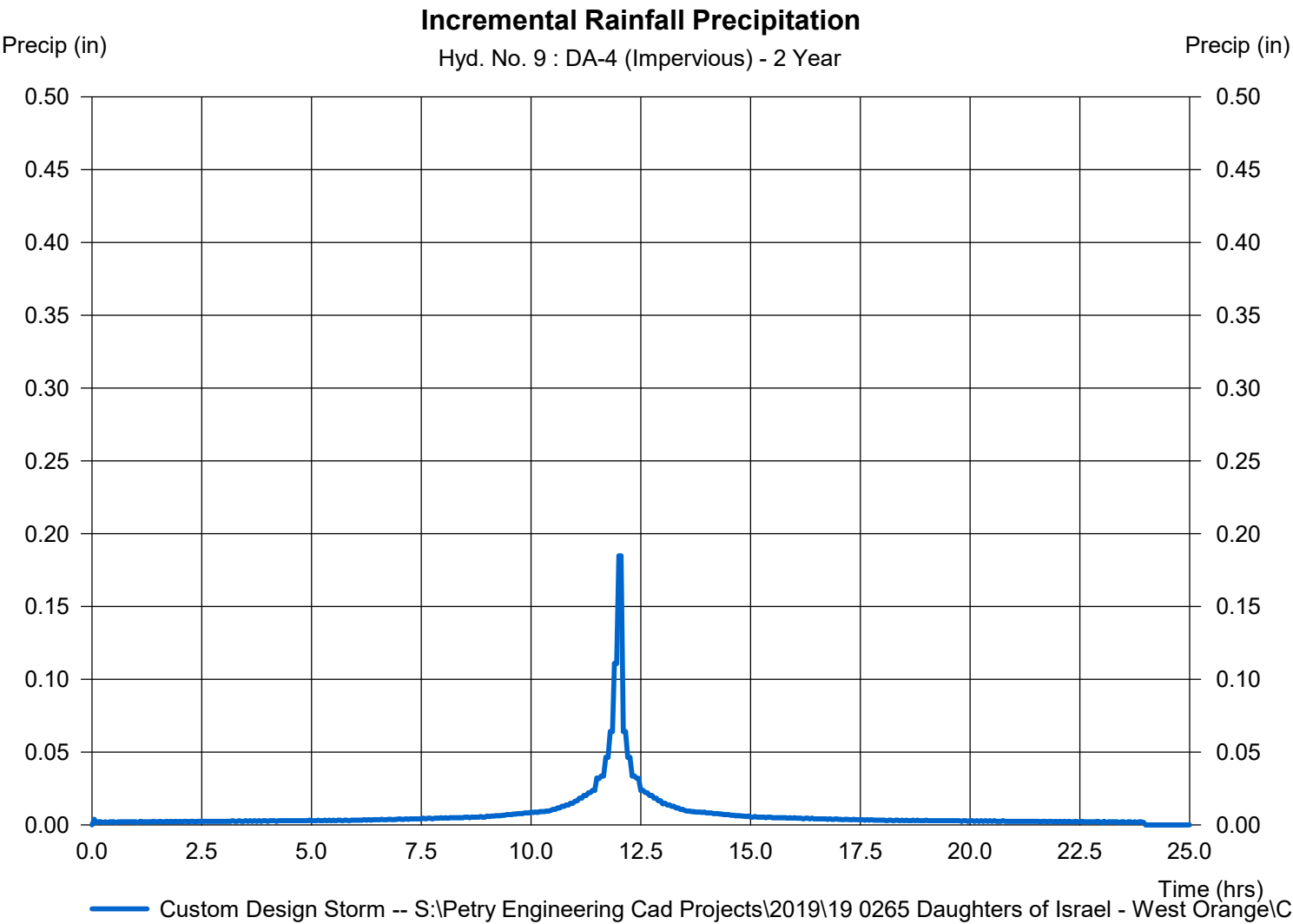
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Monday, 05 / 9 / 2022

Hyd. No. 9

DA-4 (Impervious)

Storm Frequency	= 2 yrs	Time interval	= 3 min
Total precip.	= 3.5400 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Orange\19 0265 Daughters of Israel - West Orange.dwg		



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

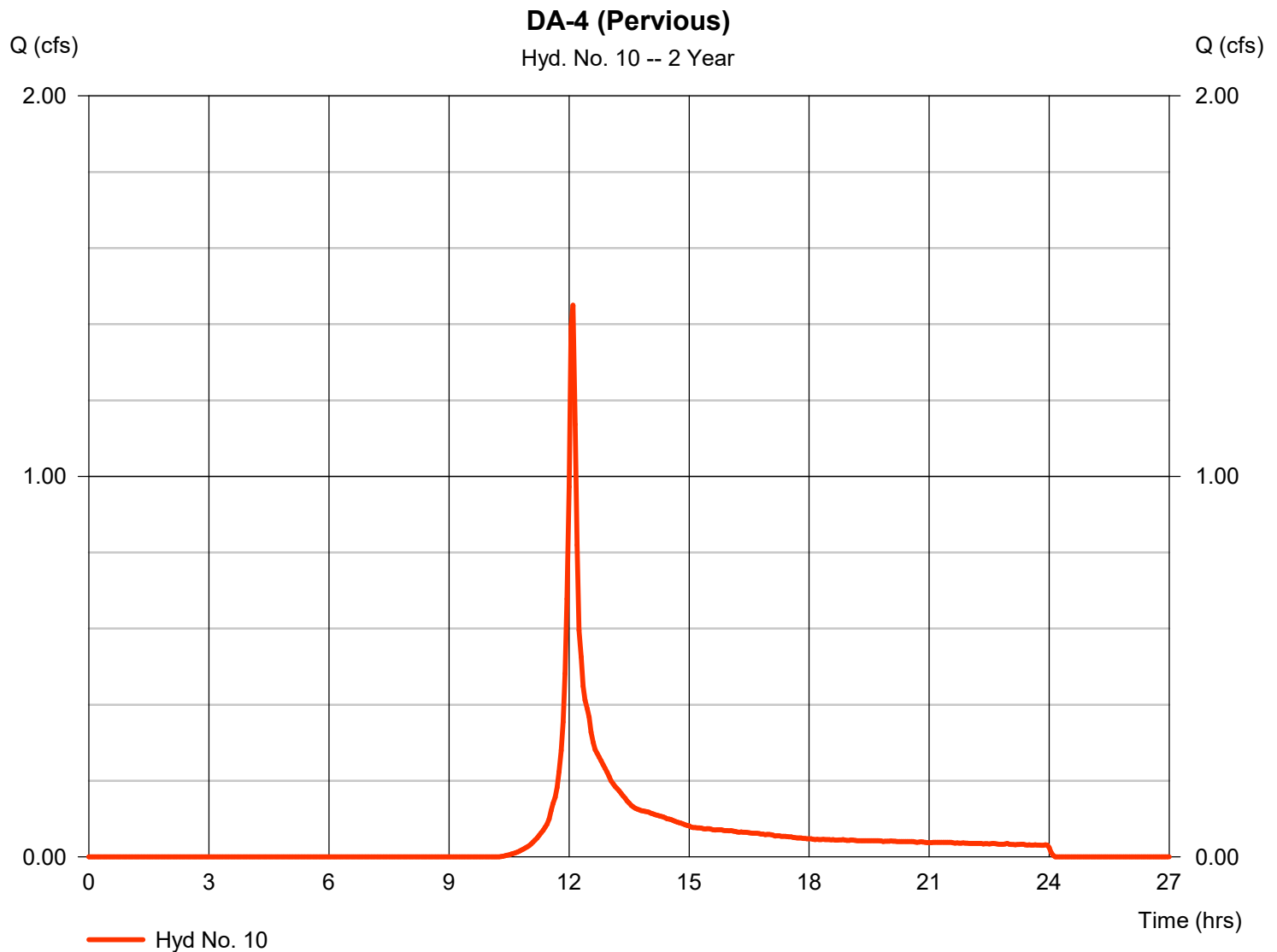
Monday, 05 / 9 / 2022

Hyd. No. 10

DA-4 (Pervious)

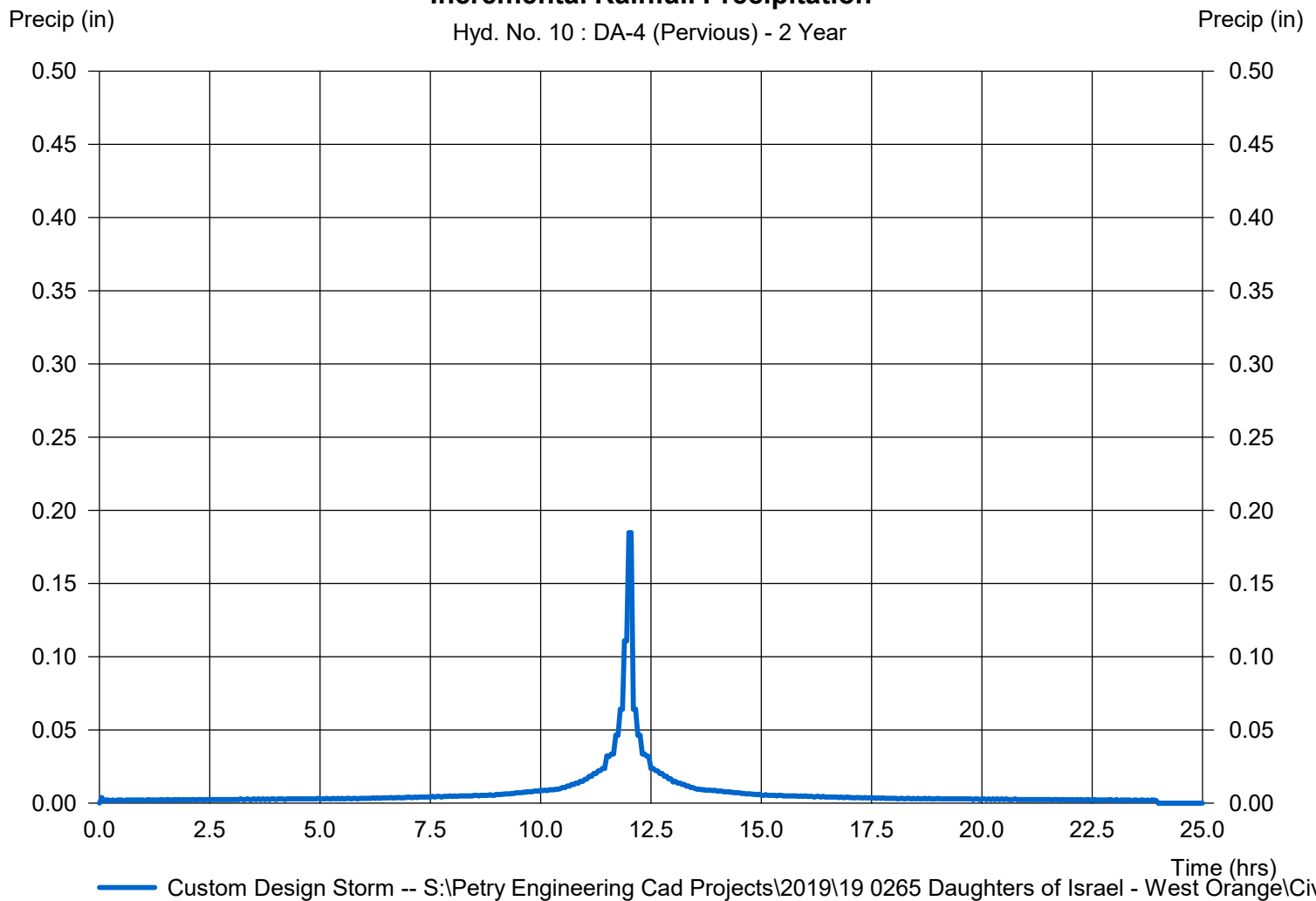
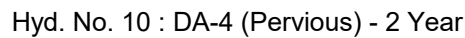
Hydrograph type	= SCS Runoff	Peak discharge	= 1.450 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 5,010 cuft
Drainage area	= 1.220 ac	Curve number	= 73*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.60 min
Total precip.	= 3.54 in	Distribution	= Custom
Storm duration	= S:\Petty Engineering Cad Projects\19010265 Daughters of Israel - West Orange		

* Composite (Area/CN) = $[(1.060 \times 80) + (0.160 \times 30)] / 1.220$



DA-4 (Pervious)

Storm Frequency = 2 yrs Time interval = 3 min
Total precip. = 3.5400 in Distribution = Custom
Storm duration = S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

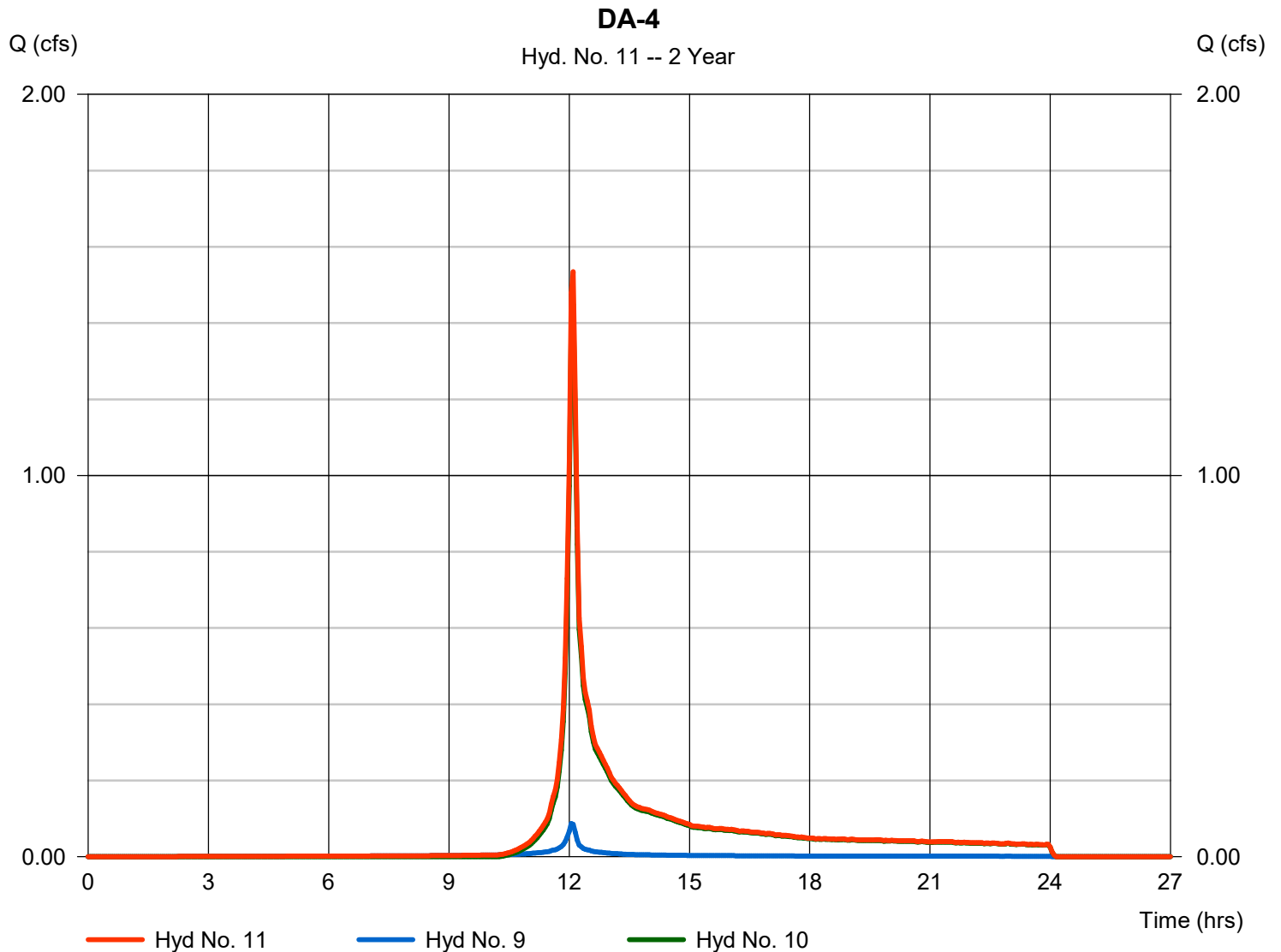
Monday, 05 / 9 / 2022

Hyd. No. 11

DA-4

Hydrograph type = Combine
 Storm frequency = 2 yrs
 Time interval = 3 min
 Inflow hyds. = 9, 10

Peak discharge = 1.535 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 5,347 cuft
 Contrib. drain. area = 1.250 ac

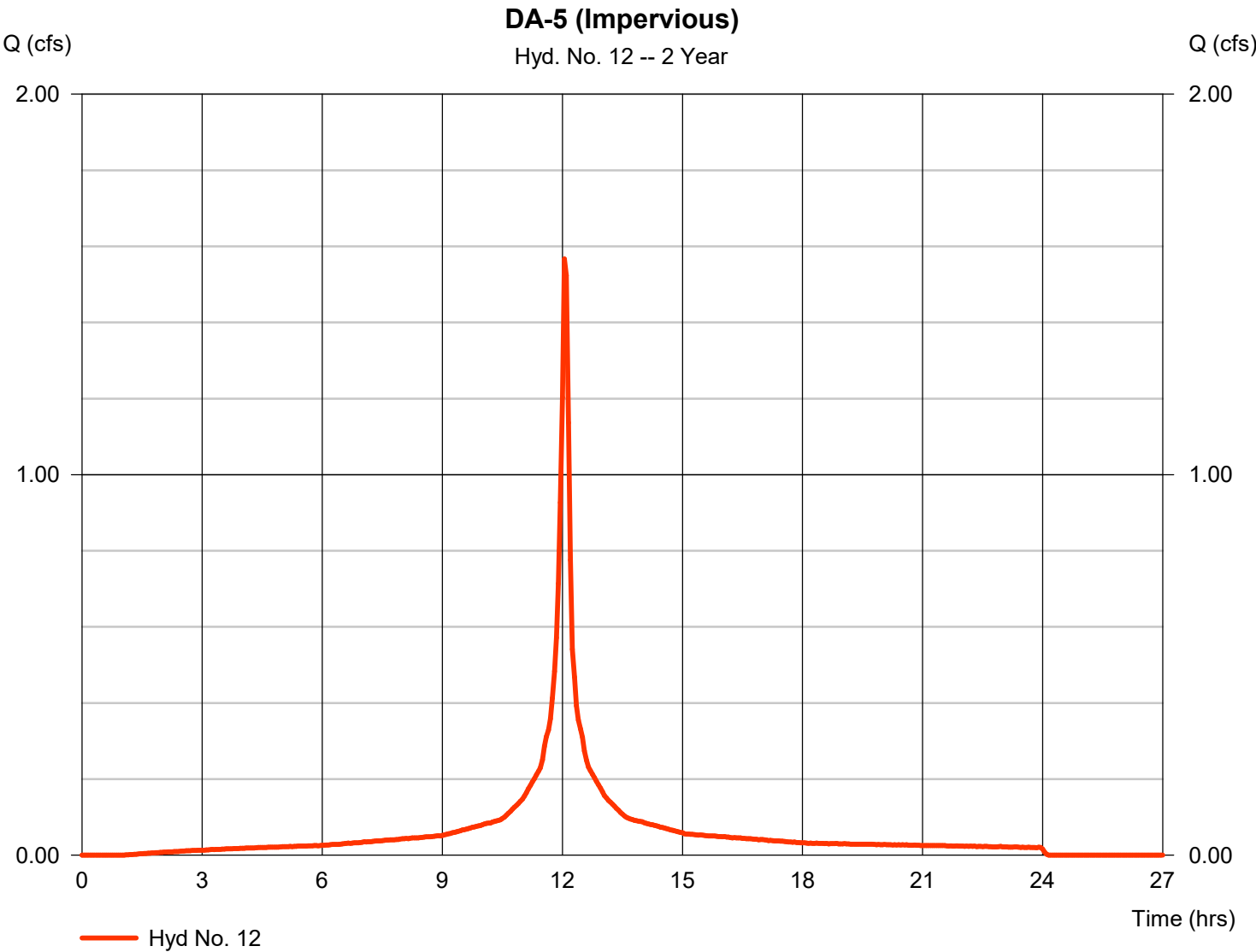


Hydrograph Report

Hyd. No. 12

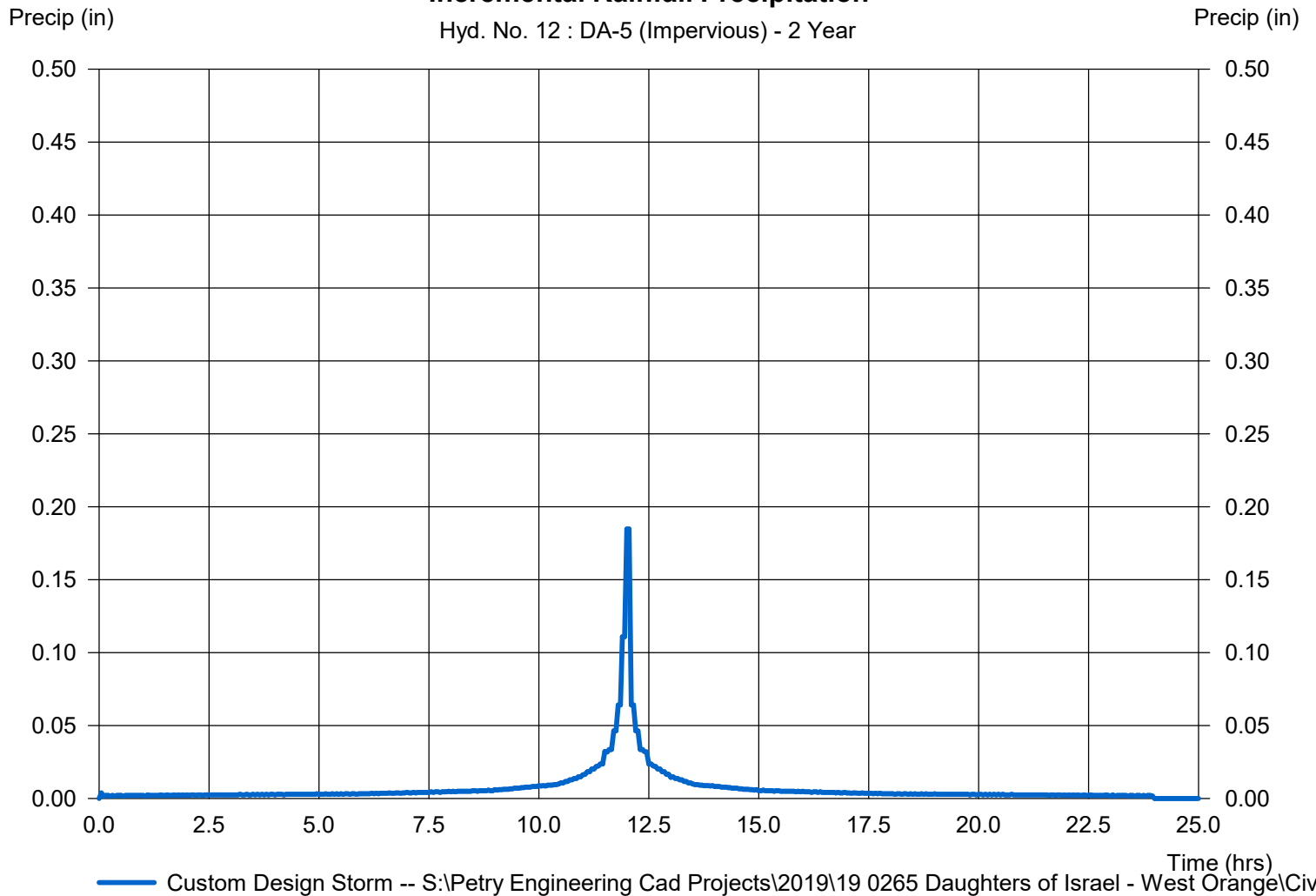
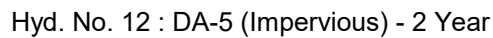
DA-5 (Impervious)

Hydrograph type	= SCS Runoff	Peak discharge	= 1.567 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.05 hrs
Time interval	= 3 min	Hyd. volume	= 6,076 cuft
Drainage area	= 0.540 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.54 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\191019 0265 Daughters of Israel - West Orange		



DA-5 (Impervious)

Storm Frequency = 2 yrs Time interval = 3 min
 Total precip. = 3.5400 in Distribution = Custom
 Storm duration = S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

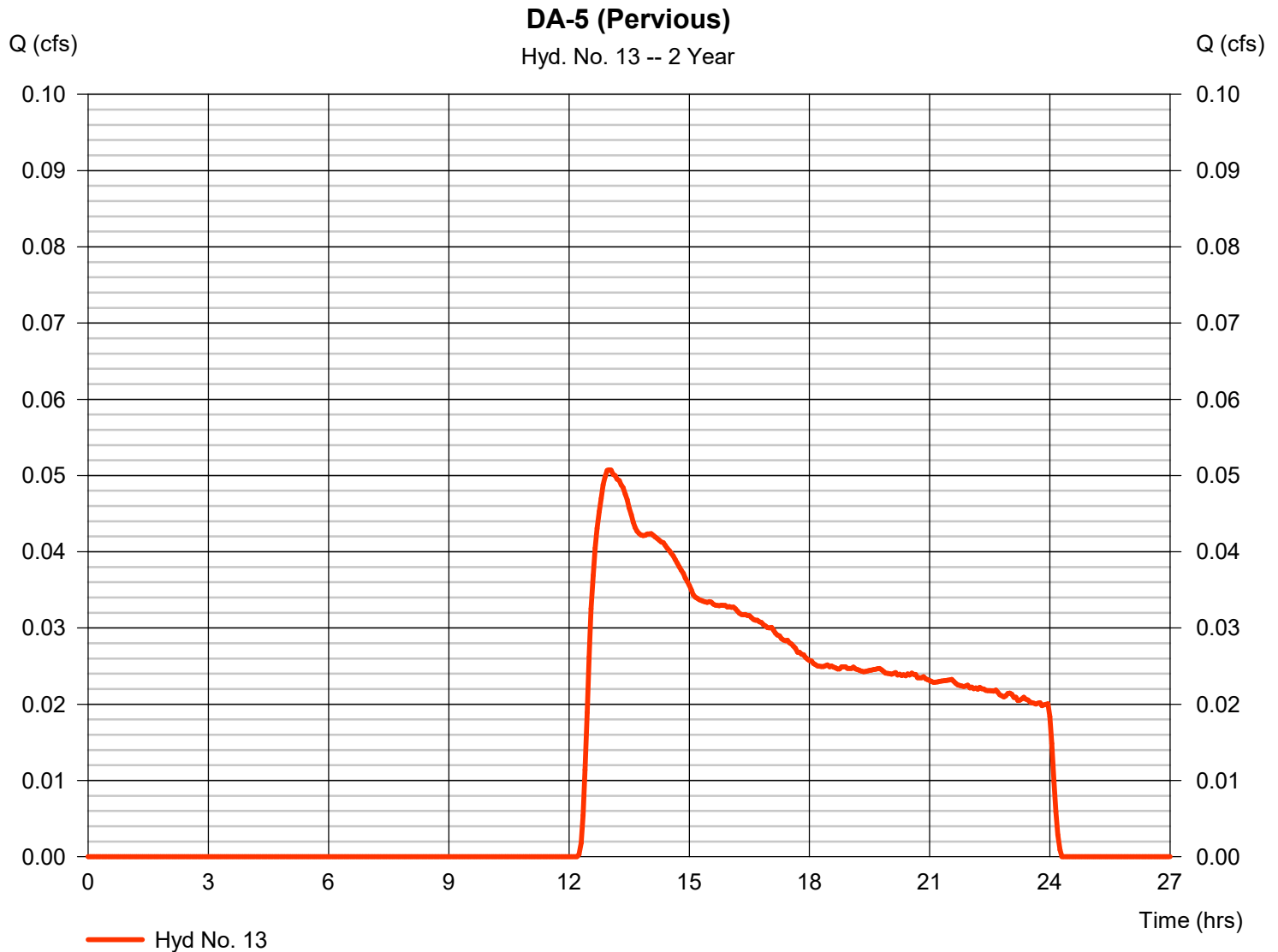
Monday, 05 / 9 / 2022

Hyd. No. 13

DA-5 (Pervious)

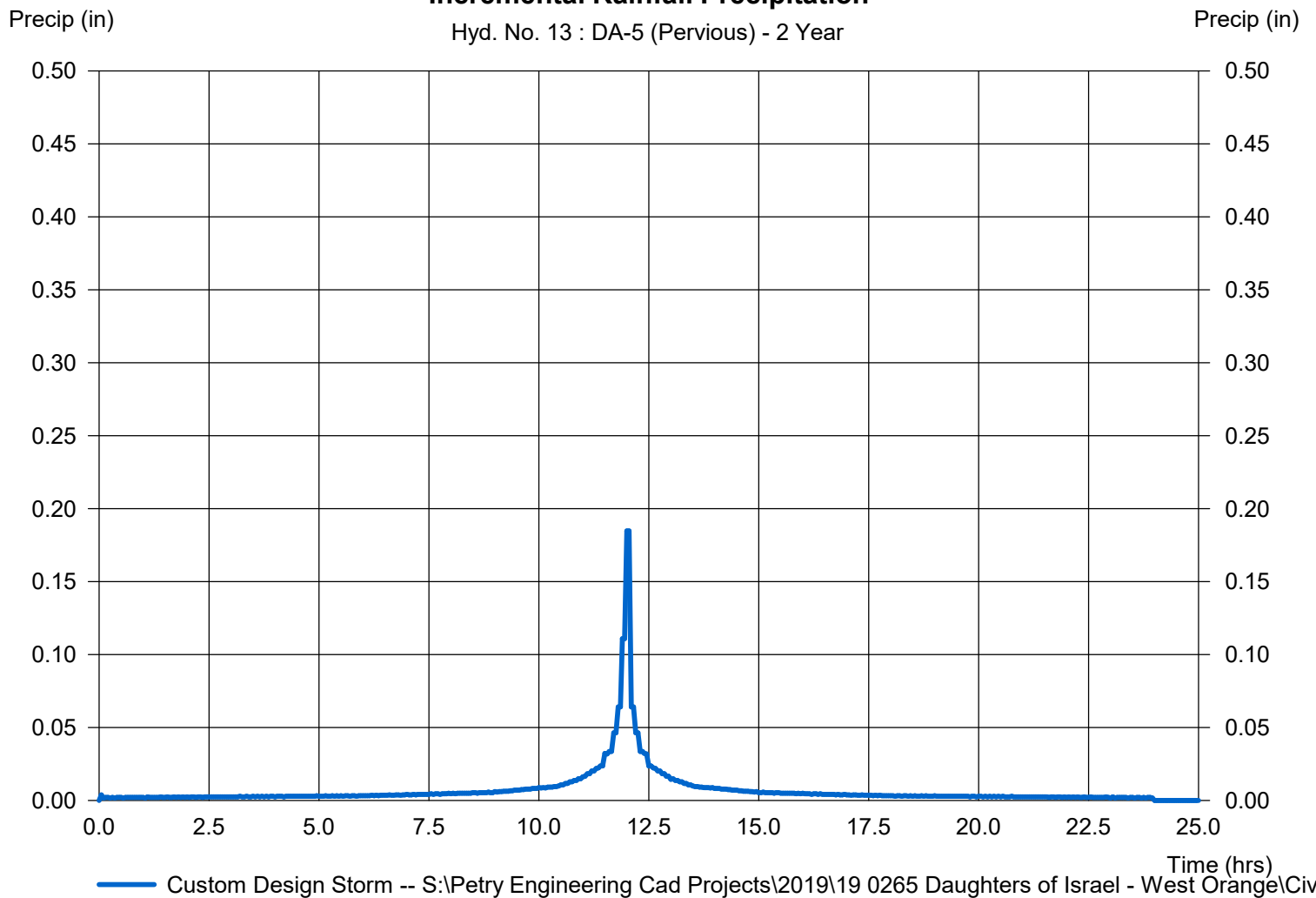
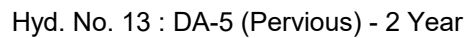
Hydrograph type	= SCS Runoff	Peak discharge	= 0.051 cfs
Storm frequency	= 2 yrs	Time to peak	= 13.00 hrs
Time interval	= 3 min	Hyd. volume	= 1,235 cuft
Drainage area	= 2.590 ac	Curve number	= 47*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.60 min
Total precip.	= 3.54 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\191019 0265 Daughters of Israel - West Orange		

* Composite (Area/CN) = $[(0.760 \times 80) + (1.700 \times 30) + (0.130 \times 70)] / 2.590$



DA-5 (Pervious)

Storm Frequency = 2 yrs Time interval = 3 min
 Total precip. = 3.5400 in Distribution = Custom
 Storm duration = S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

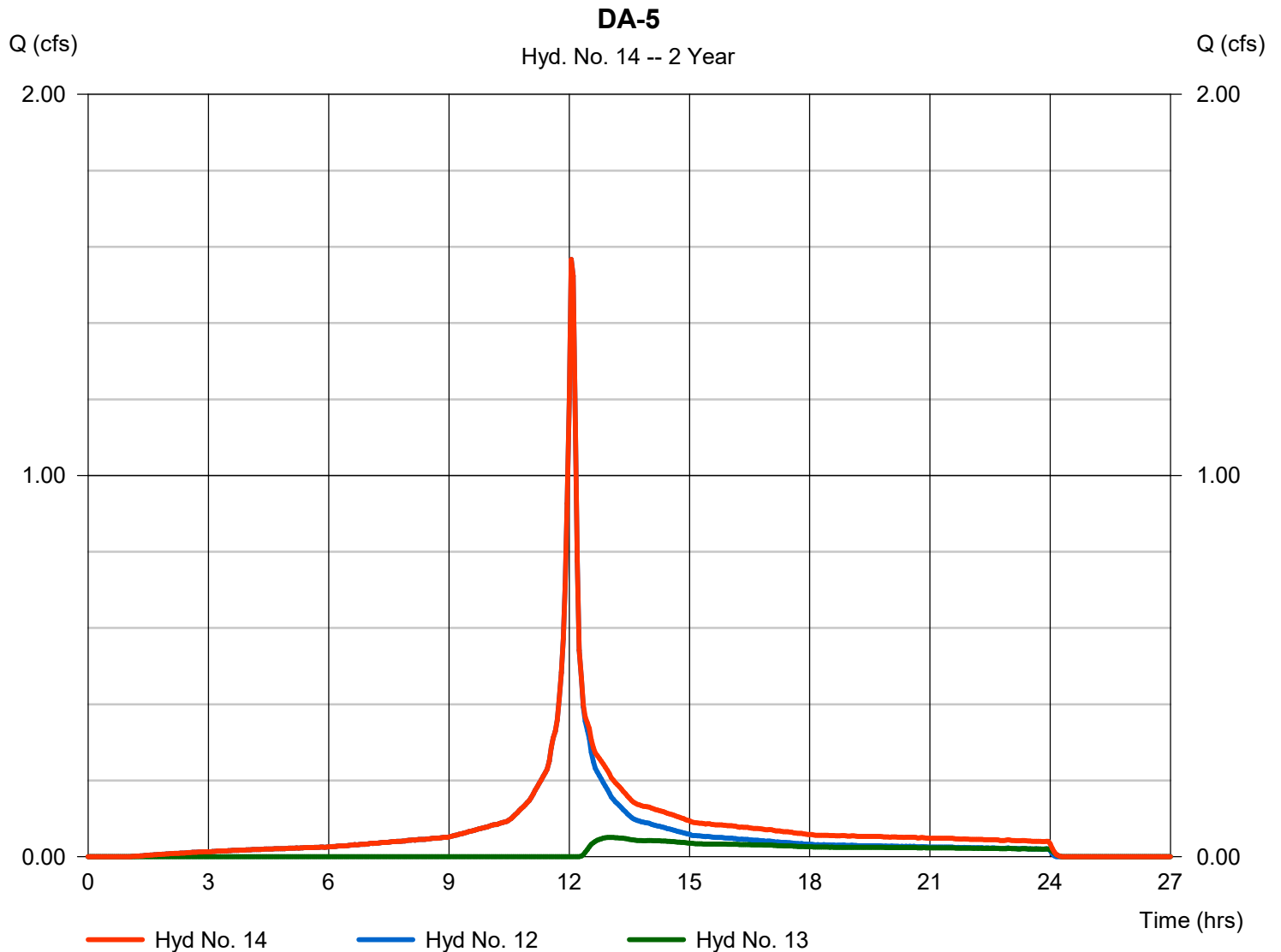
Monday, 05 / 9 / 2022

Hyd. No. 14

DA-5

Hydrograph type = Combine
 Storm frequency = 2 yrs
 Time interval = 3 min
 Inflow hyds. = 12, 13

Peak discharge = 1.567 cfs
 Time to peak = 12.05 hrs
 Hyd. volume = 7,311 cuft
 Contrib. drain. area = 3.130 ac



Hydrograph Report

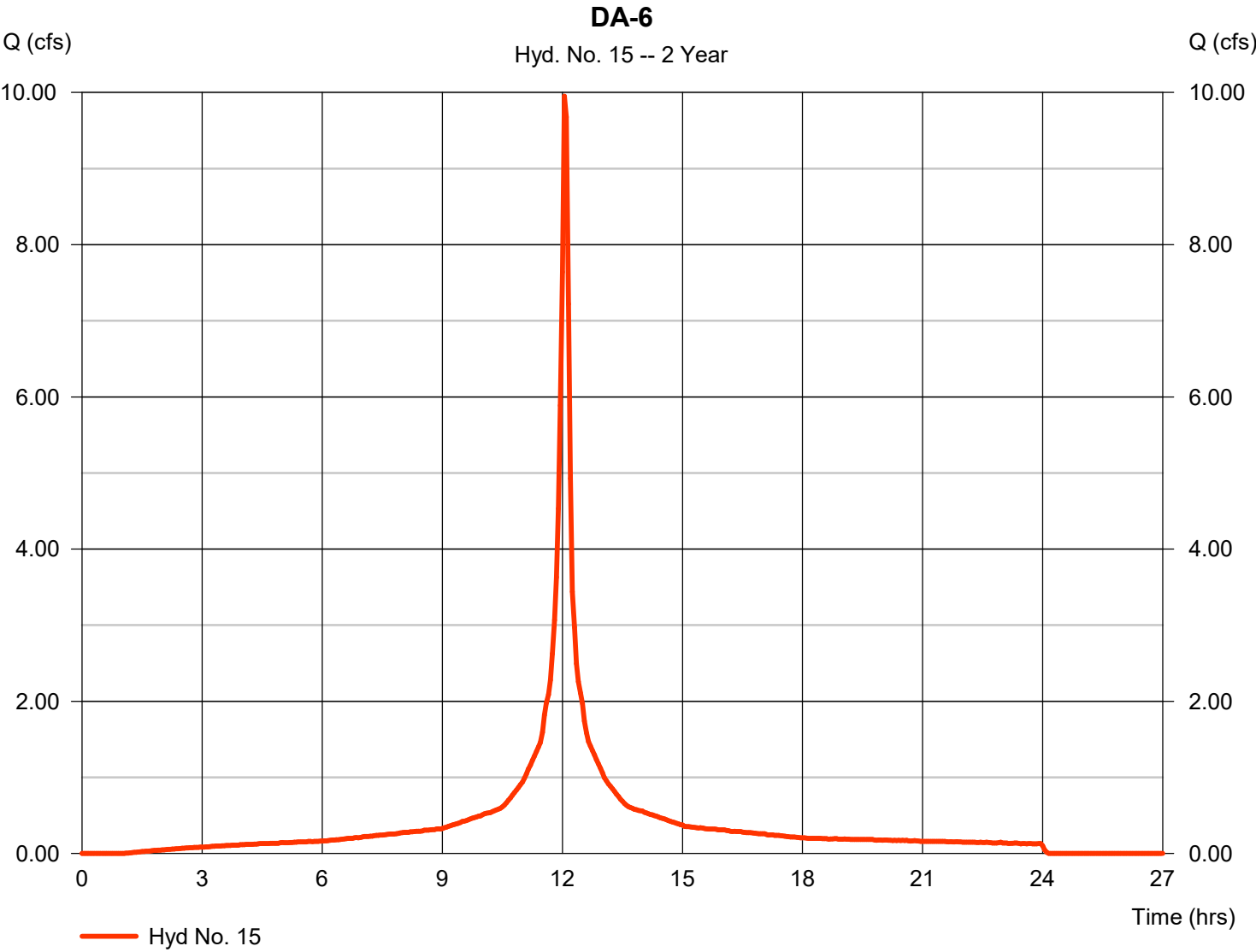
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Monday, 05 / 9 / 2022

Hyd. No. 15

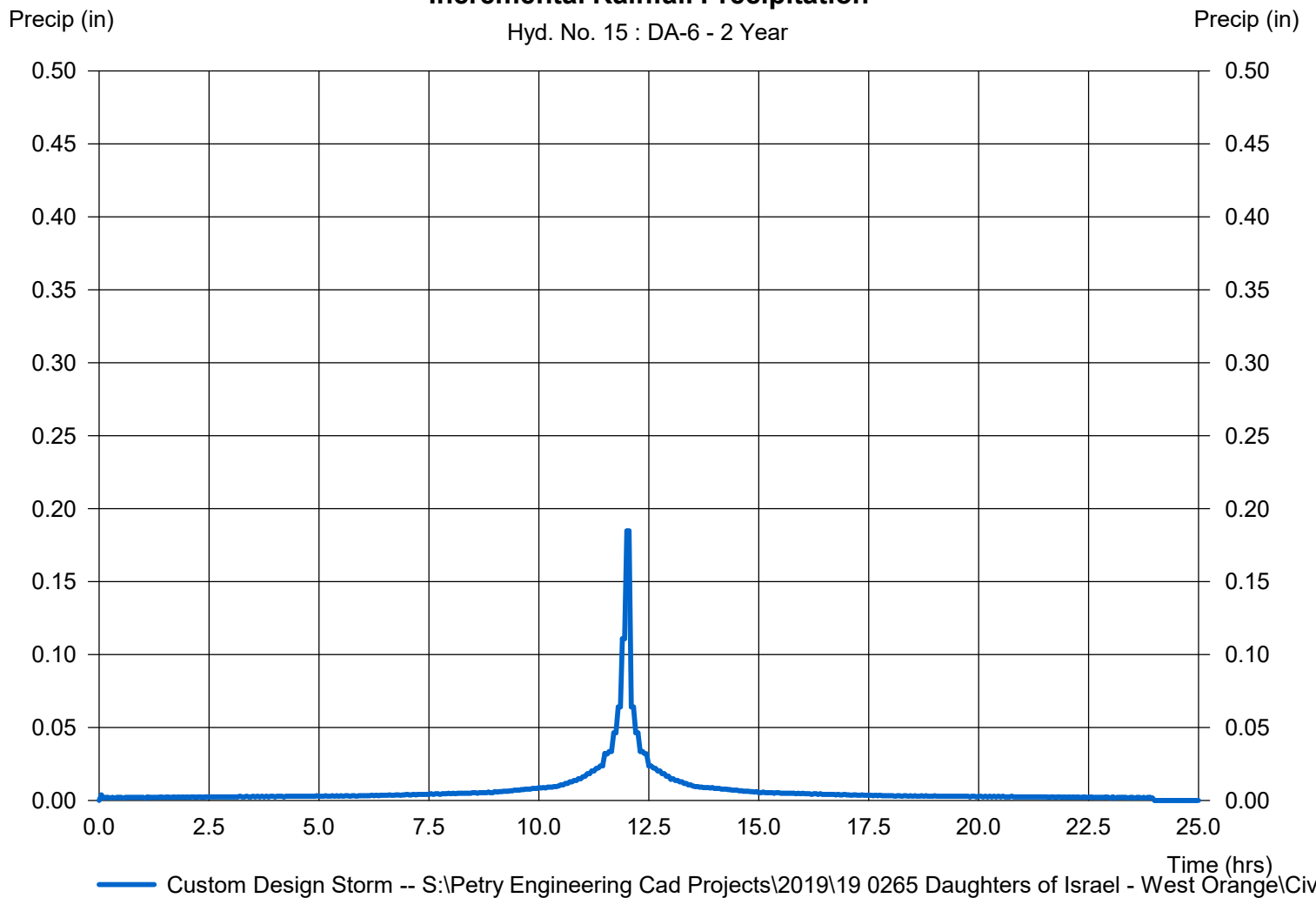
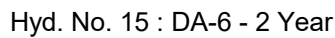
DA-6

Hydrograph type	= SCS Runoff	Peak discharge	= 9.951 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.05 hrs
Time interval	= 3 min	Hyd. volume	= 38,594 cuft
Drainage area	= 3.430 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.54 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\19-010-0265 Daughters of Israel - West Orange, NJ\19-010-0265.dwg		



DA-6

Storm Frequency = 2 yrs Time interval = 3 min
Total precip. = 3.5400 in Distribution = Custom
Storm duration = S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

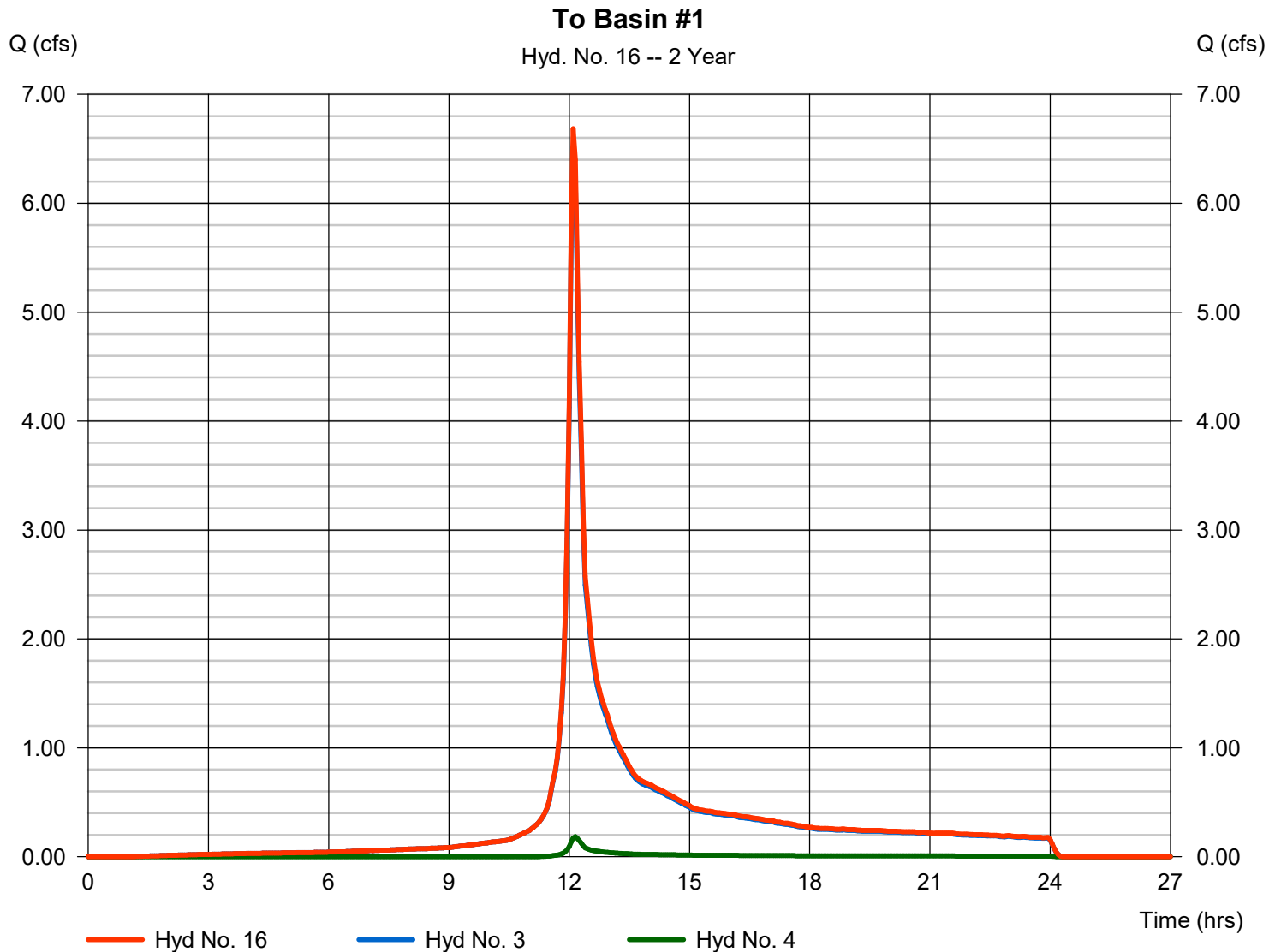
Monday, 05 / 9 / 2022

Hyd. No. 16

To Basin #1

Hydrograph type = Combine
Storm frequency = 2 yrs
Time interval = 3 min
Inflow hyds. = 3, 4

Peak discharge = 6.683 cfs
Time to peak = 12.10 hrs
Hyd. volume = 29,998 cuft
Contrib. drain. area = 0.240 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

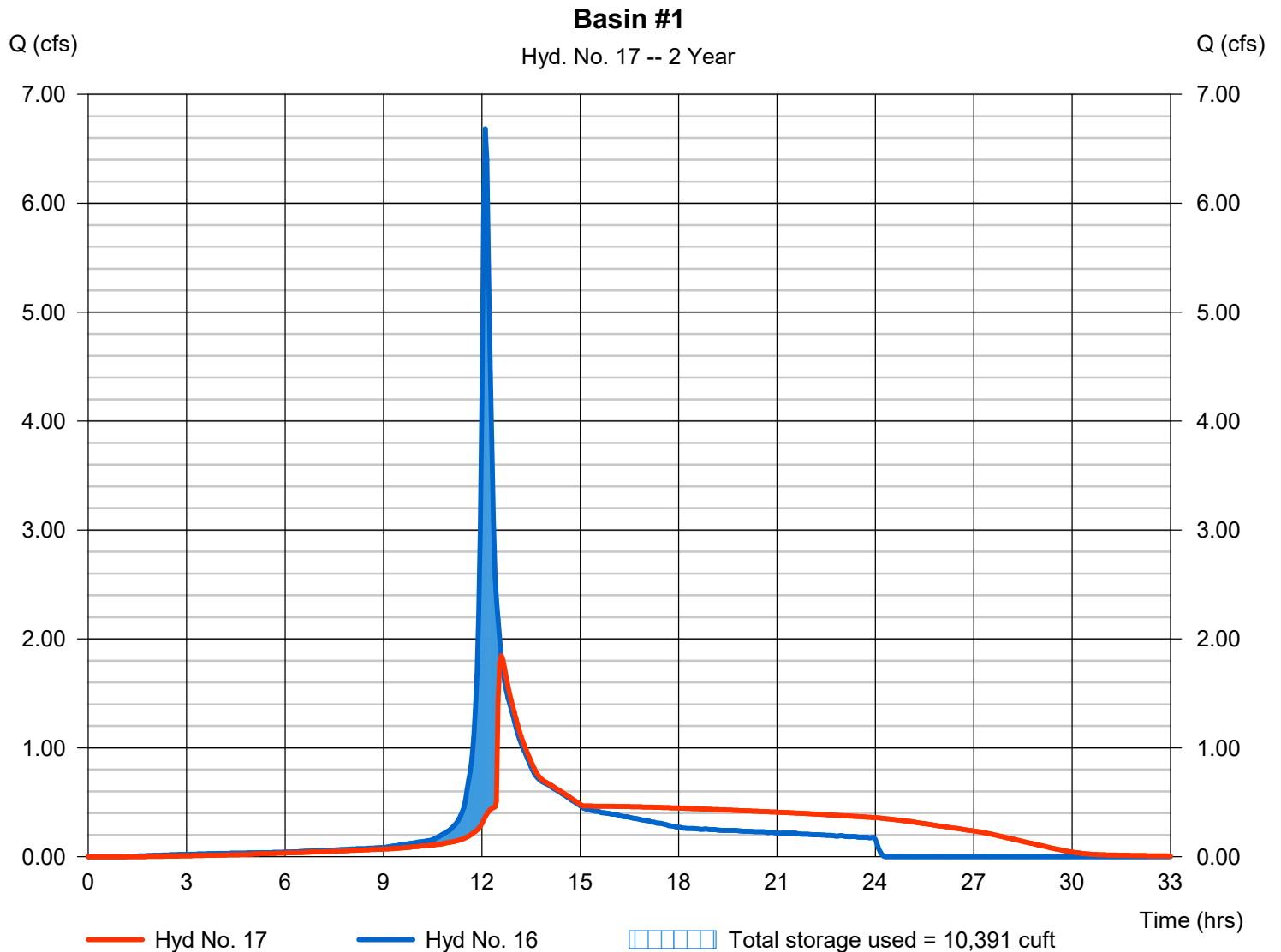
Monday, 05 / 9 / 2022

Hyd. No. 17

Basin #1

Hydrograph type	= Reservoir	Peak discharge	= 1.847 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.60 hrs
Time interval	= 3 min	Hyd. volume	= 29,991 cuft
Inflow hyd. No.	= 16 - To Basin #1	Max. Elevation	= 419.08 ft
Reservoir name	= Basin #1	Max. Storage	= 10,391 cuft

Storage Indication method used.



Pond No. 1 - Basin #1

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Beginning Elevation = 415.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	415.00	1,040	0	0
1.00	416.00	1,900	1,470	1,470
2.00	417.00	2,550	2,225	3,695
3.00	418.00	3,170	2,860	6,555
4.00	419.00	3,800	3,485	10,040
5.00	420.00	4,800	4,300	14,340

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 3.00	0.00	0.00	0.00
Span (in)	= 3.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 415.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 16.00	0.00	0.00	0.00
Crest El. (ft)	= 419.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No
Exfil.(in/hr)	= 0.000 (by Contour)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	415.00	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.00	1,470	416.00	0.22 ic	---	---	---	0.00	---	---	---	---	---	0.221
2.00	3,695	417.00	0.32 ic	---	---	---	0.00	---	---	---	---	---	0.324
3.00	6,555	418.00	0.40 ic	---	---	---	0.00	---	---	---	---	---	0.401
4.00	10,040	419.00	0.47 ic	---	---	---	0.00	---	---	---	---	---	0.465
5.00	14,340	420.00	0.52 ic	---	---	---	53.28	---	---	---	---	---	53.80

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

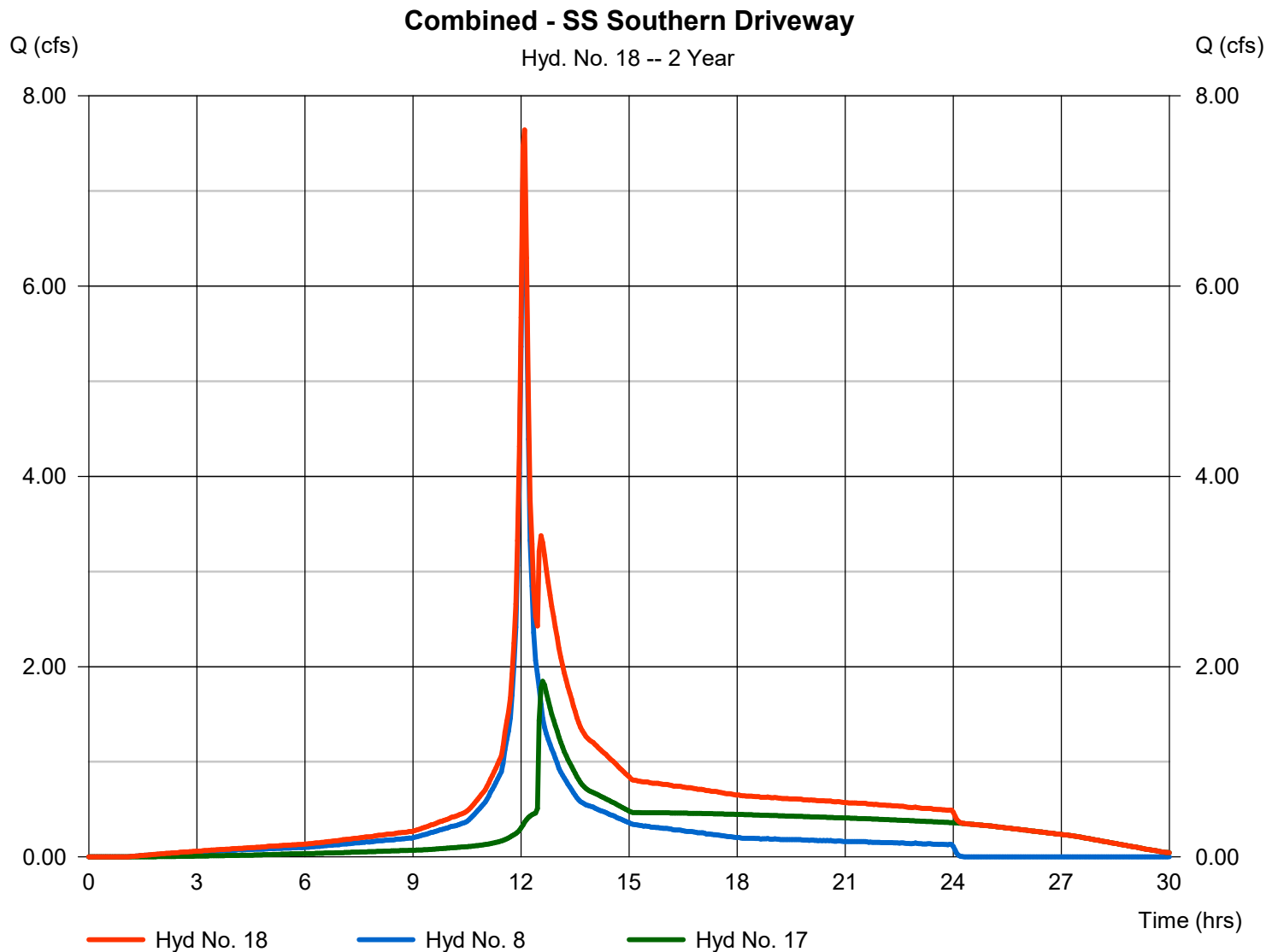
Monday, 05 / 9 / 2022

Hyd. No. 18

Combined - SS Southern Driveway

Hydrograph type = Combine
 Storm frequency = 2 yrs
 Time interval = 3 min
 Inflow hyds. = 8, 17

Peak discharge = 7.642 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 60,467 cuft
 Contrib. drain. area = 0.000 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

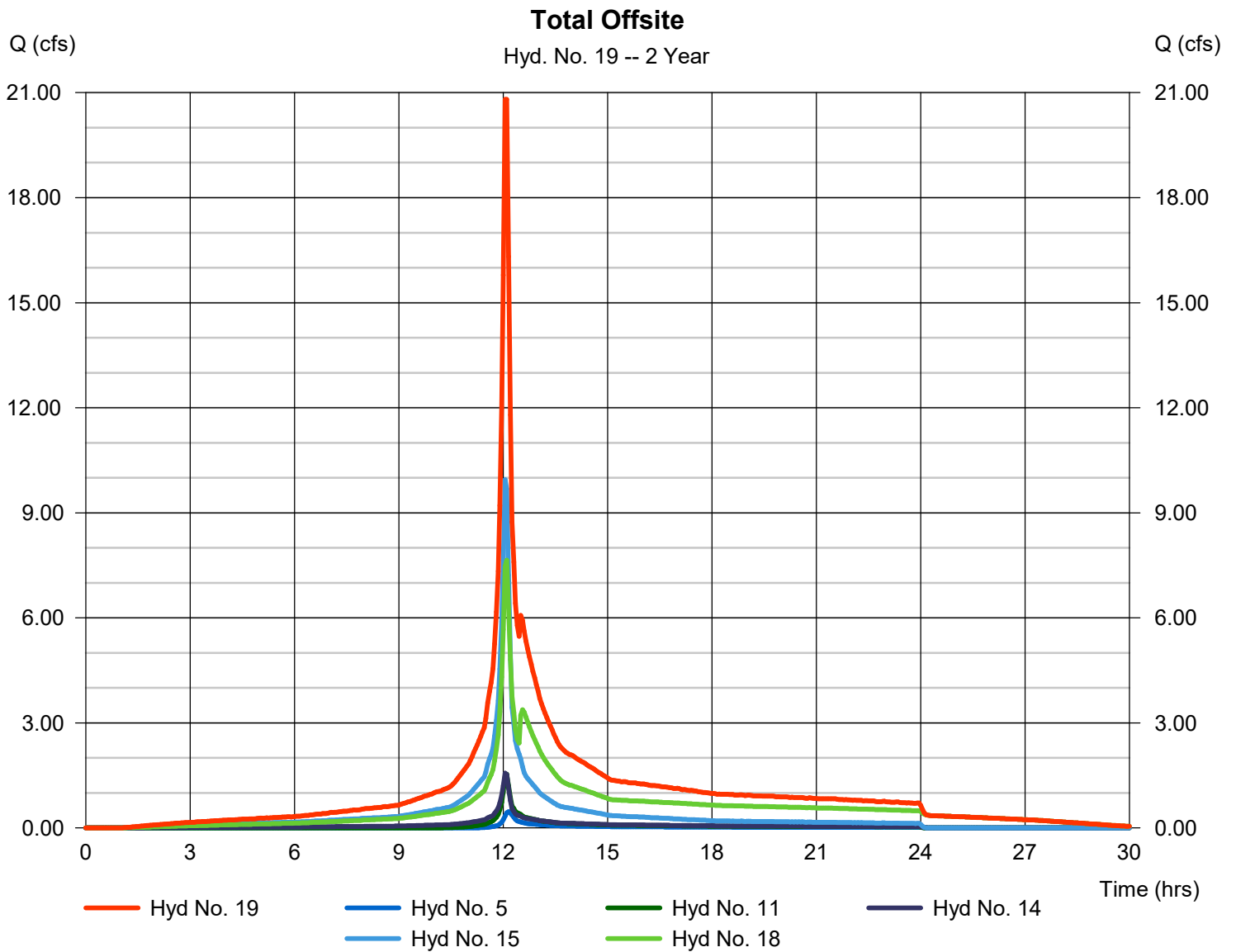
Monday, 05 / 9 / 2022

Hyd. No. 19

Total Offsite

Hydrograph type = Combine
 Storm frequency = 2 yrs
 Time interval = 3 min
 Inflow hyds. = 5, 11, 14, 15, 18

Peak discharge = 20.81 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 113,733 cuft
 Contrib. drain. area = 4.030 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

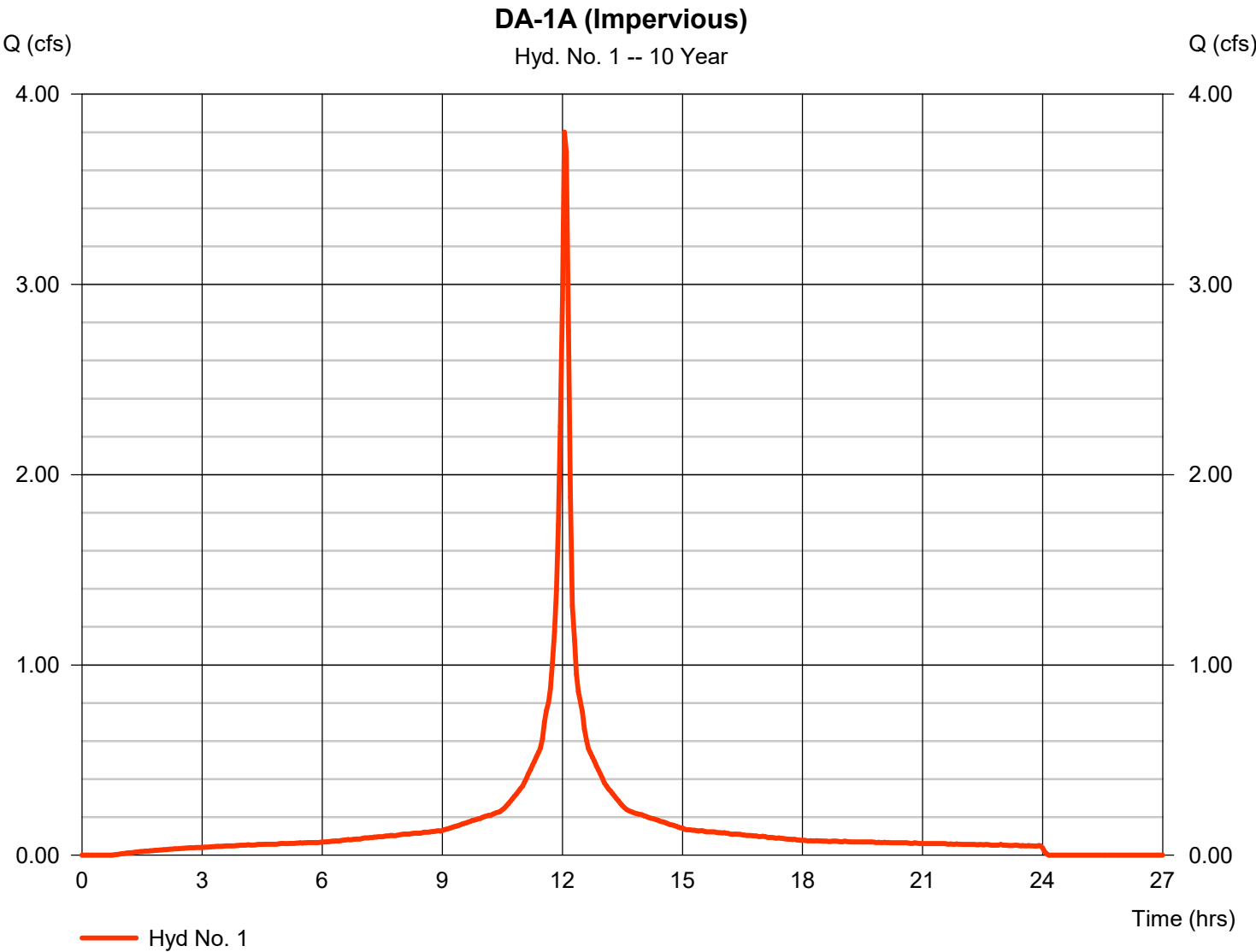
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	3.801	3	723	14,982	-----	-----	-----	DA-1A (Impervious)
2	SCS Runoff	10.69	3	729	43,596	-----	-----	-----	DA-1A (Pervious)
3	Combine	13.93	3	726	58,578	1, 2	-----	-----	DA-1A
4	SCS Runoff	0.440	3	729	1,788	-----	-----	-----	DA-1B
5	SCS Runoff	1.100	3	729	4,470	-----	-----	-----	DA-2
6	SCS Runoff	9.071	3	723	35,753	-----	-----	-----	DA-3 (Impervious)
7	SCS Runoff	3.903	3	729	16,078	-----	-----	-----	DA-3 (Pervious)
8	Combine	12.53	3	726	51,831	6, 7	-----	-----	DA-3
9	SCS Runoff	0.130	3	723	511	-----	-----	-----	DA-4 (Impervious)
10	SCS Runoff	3.016	3	726	10,256	-----	-----	-----	DA-4 (Pervious)
11	Combine	3.141	3	726	10,766	9, 10	-----	-----	DA-4
12	SCS Runoff	2.333	3	723	9,194	-----	-----	-----	DA-5 (Impervious)
13	SCS Runoff	0.815	3	732	5,868	-----	-----	-----	DA-5 (Pervious)
14	Combine	2.870	3	726	15,062	12, 13	-----	-----	DA-5
15	SCS Runoff	14.82	3	723	58,396	-----	-----	-----	DA-6
16	Combine	14.35	3	726	60,366	3, 4,	-----	-----	To Basin #1
17	Reservoir	14.12	3	729	60,359	16	419.40	11,772	Basin #1
18	Combine	24.77	3	726	112,190	8, 17	-----	-----	Combined - SS Southern Driveway
19	Combine	46.25	3	726	200,884	5, 11, 14, 15, 18	-----	-----	Total Offsite
Existing Conditions.gpw					Return Period: 10 Year			Monday, 05 / 9 / 2022	

Hydrograph Report

Hyd. No. 1

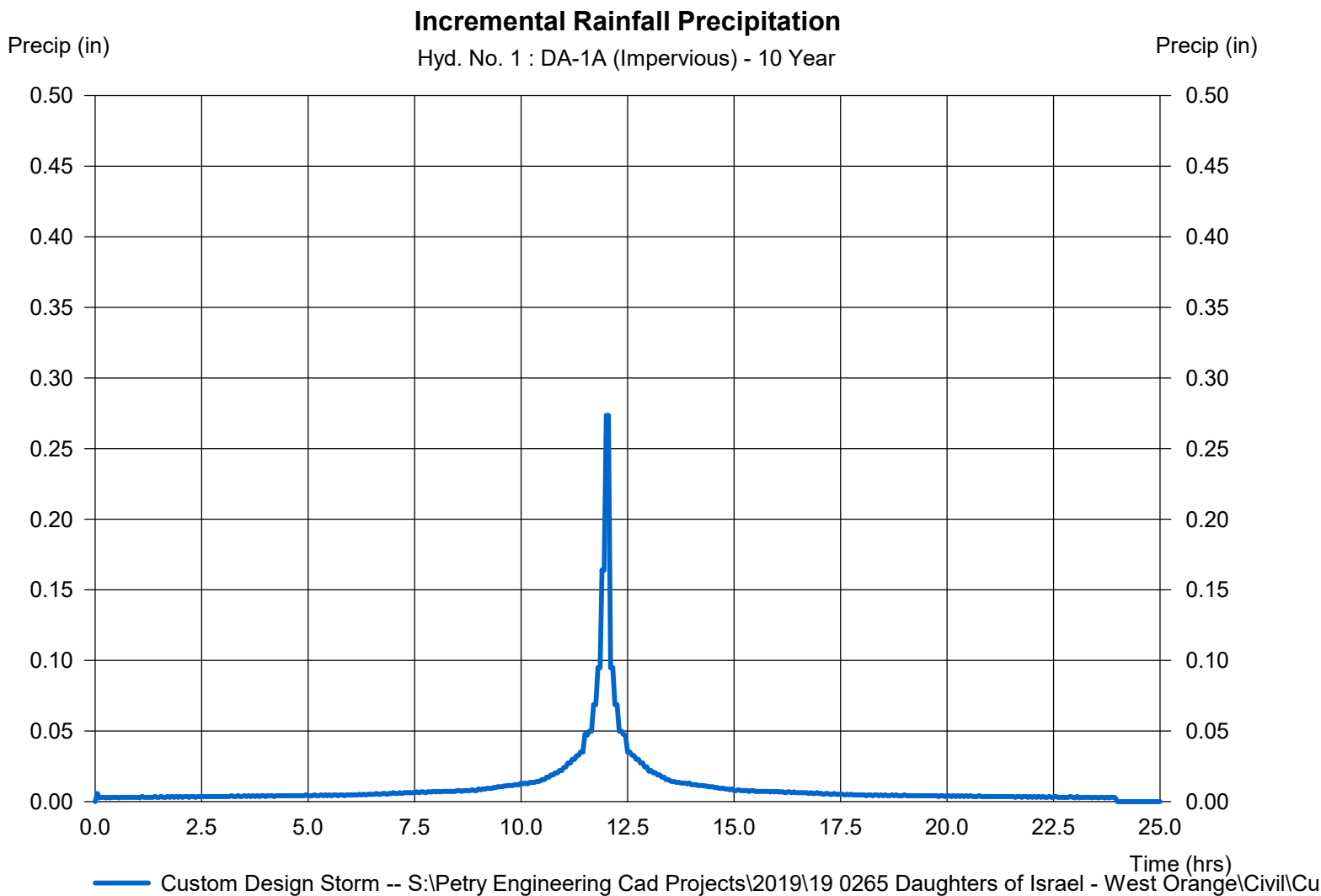
DA-1A (Impervious)

Hydrograph type	= SCS Runoff	Peak discharge	= 3.801 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.05 hrs
Time interval	= 3 min	Hyd. volume	= 14,982 cuft
Drainage area	= 0.880 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.24 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\191019 0265 Daughters of Israel - West Orange		



DA-1A (Impervious)

Storm Frequency = 10 yrs Time interval = 3 min
Total precip. = 5.2400 in Distribution = Custom
Storm duration = S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora



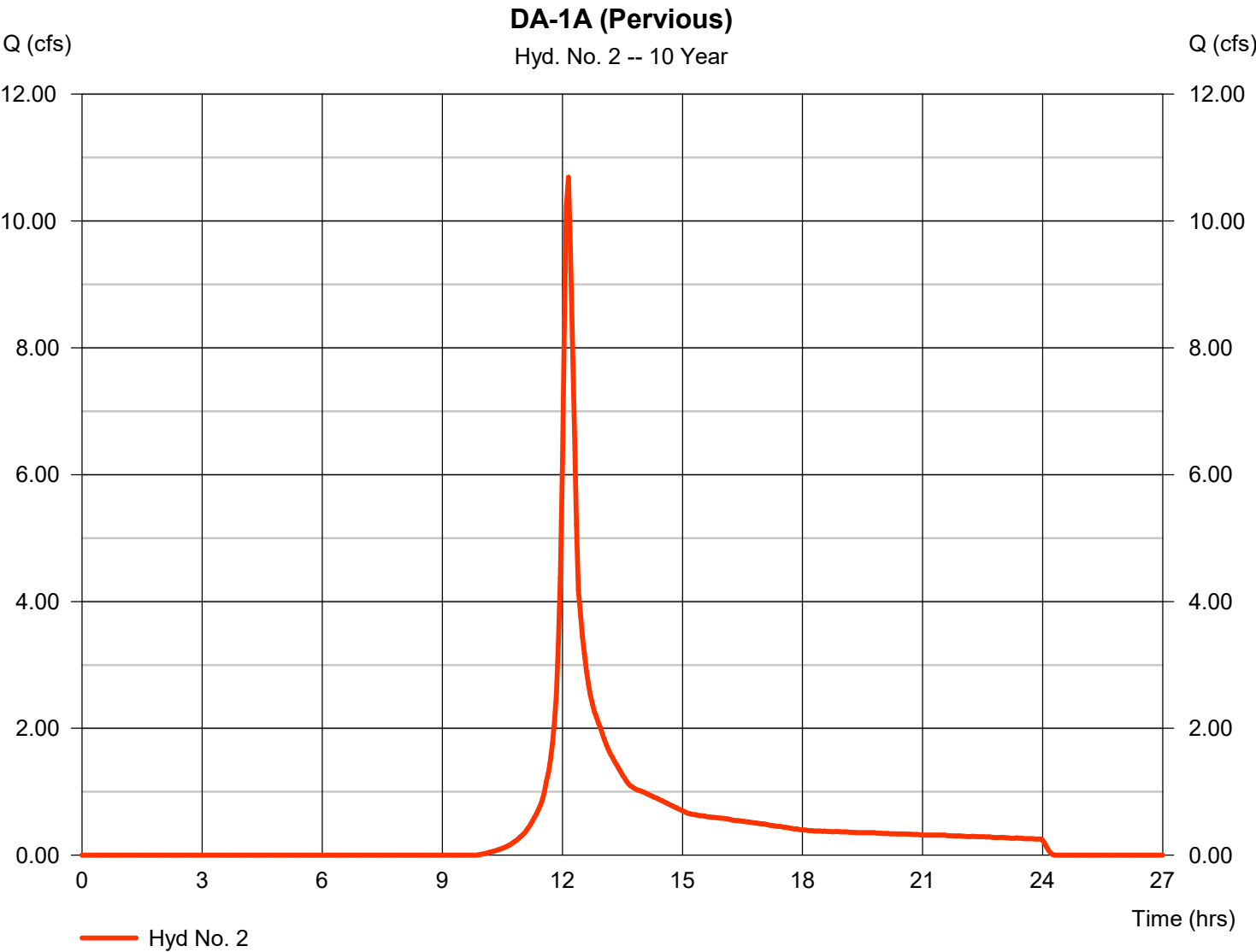
Hydrograph Report

Hyd. No. 2

DA-1A (Pervious)

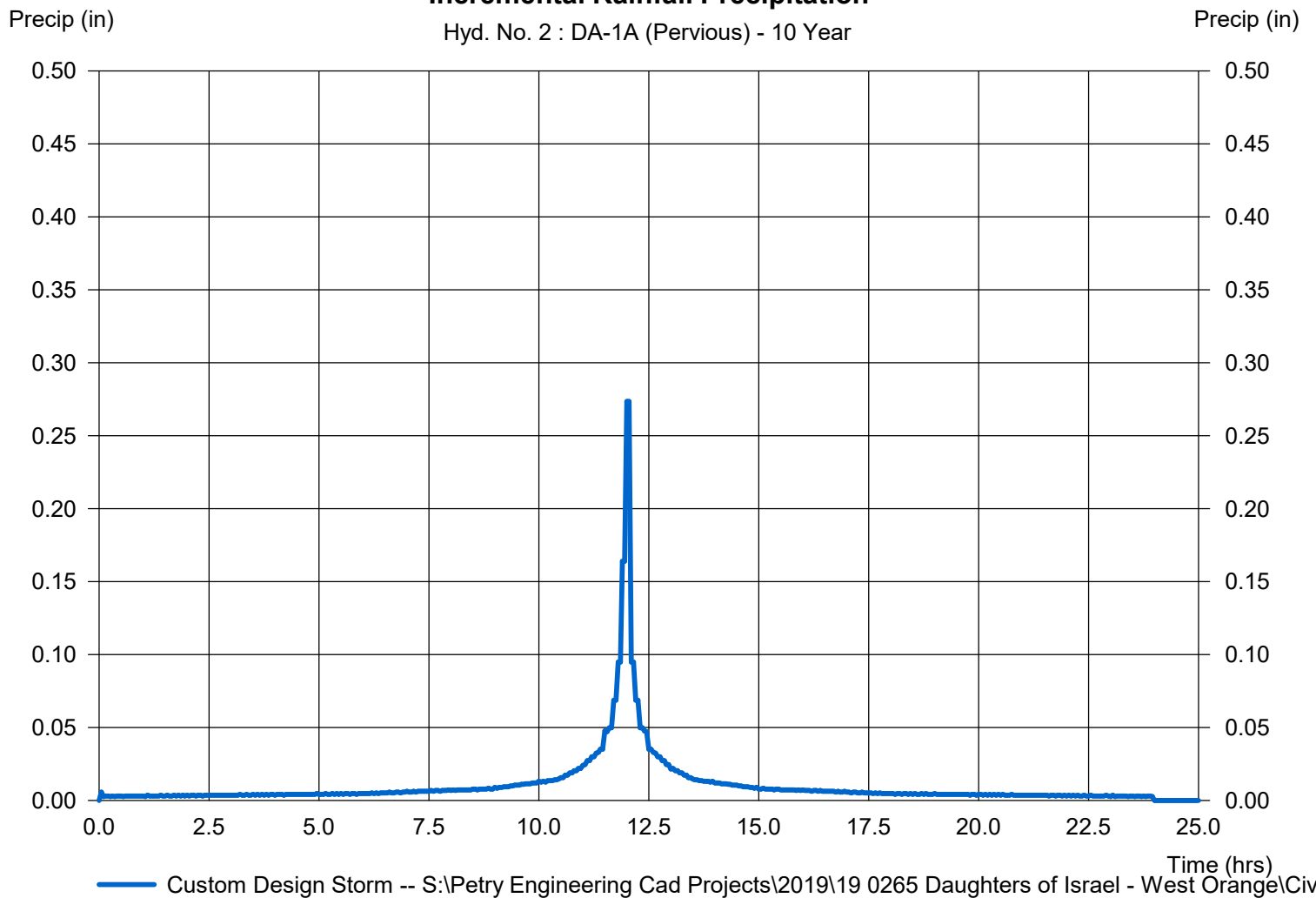
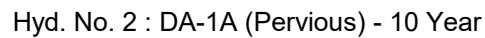
Hydrograph type	= SCS Runoff	Peak discharge	= 10.69 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.15 hrs
Time interval	= 3 min	Hyd. volume	= 43,596 cuft
Drainage area	= 6.090 ac	Curve number	= 67*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 14.30 min
Total precip.	= 5.24 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\2019\0265 Daughters of Israel - West Orange, NJ\DA-1A (Pervious) - 10 Year Storm		

* Composite (Area/CN) = [(0.500 x 30) + (4.740 x 70) + (0.280 x 77) + (0.010 x 80) + (0.560 x 74)] / 6.090



DA-1A (Pervious)

Storm Frequency = 10 yrs Time interval = 3 min
Total precip. = 5.2400 in Distribution = Custom
Storm duration = S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

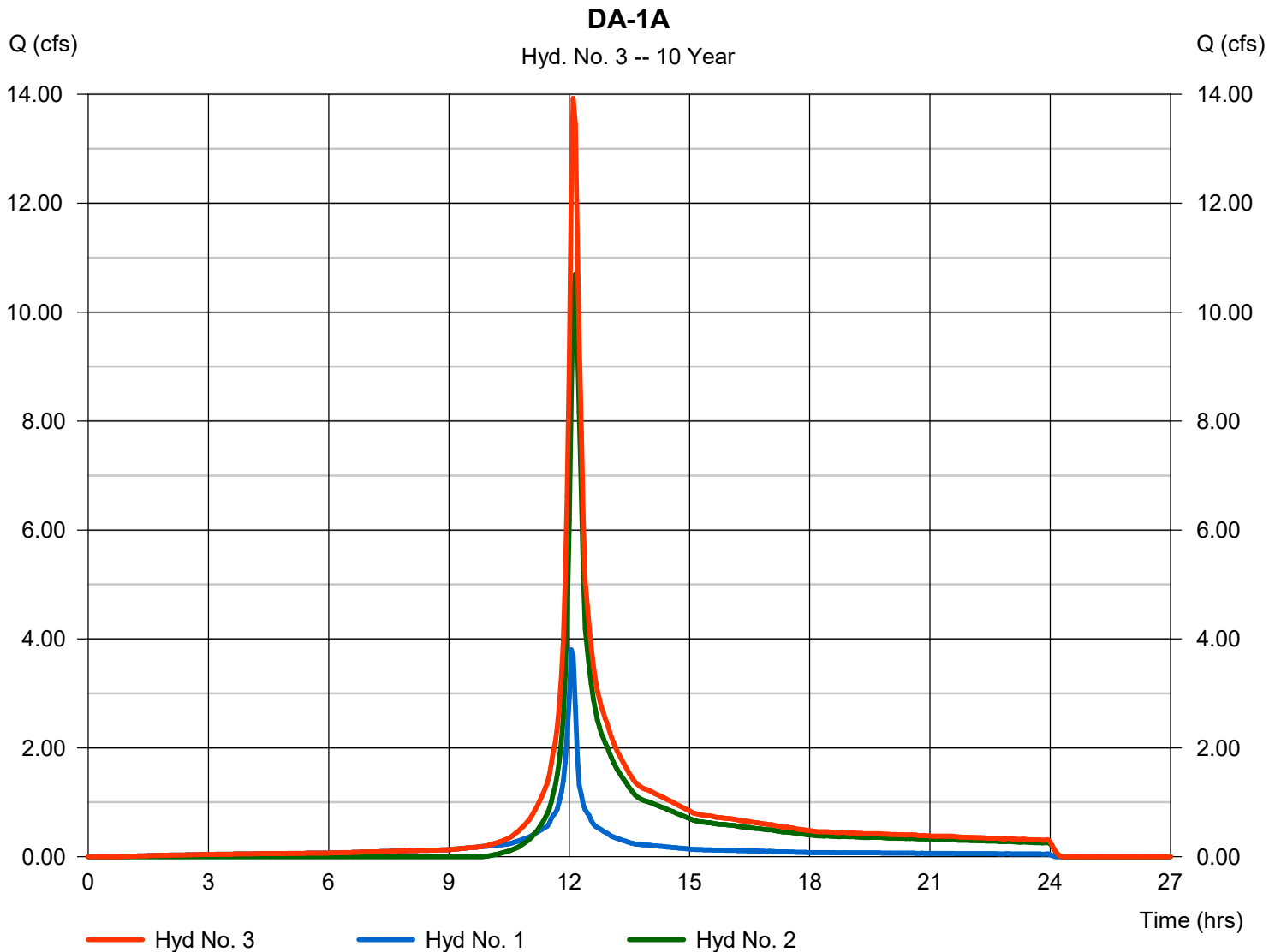
Monday, 05 / 9 / 2022

Hyd. No. 3

DA-1A

Hydrograph type = Combine
Storm frequency = 10 yrs
Time interval = 3 min
Inflow hyds. = 1, 2

Peak discharge = 13.93 cfs
Time to peak = 12.10 hrs
Hyd. volume = 58,578 cuft
Contrib. drain. area = 6.970 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

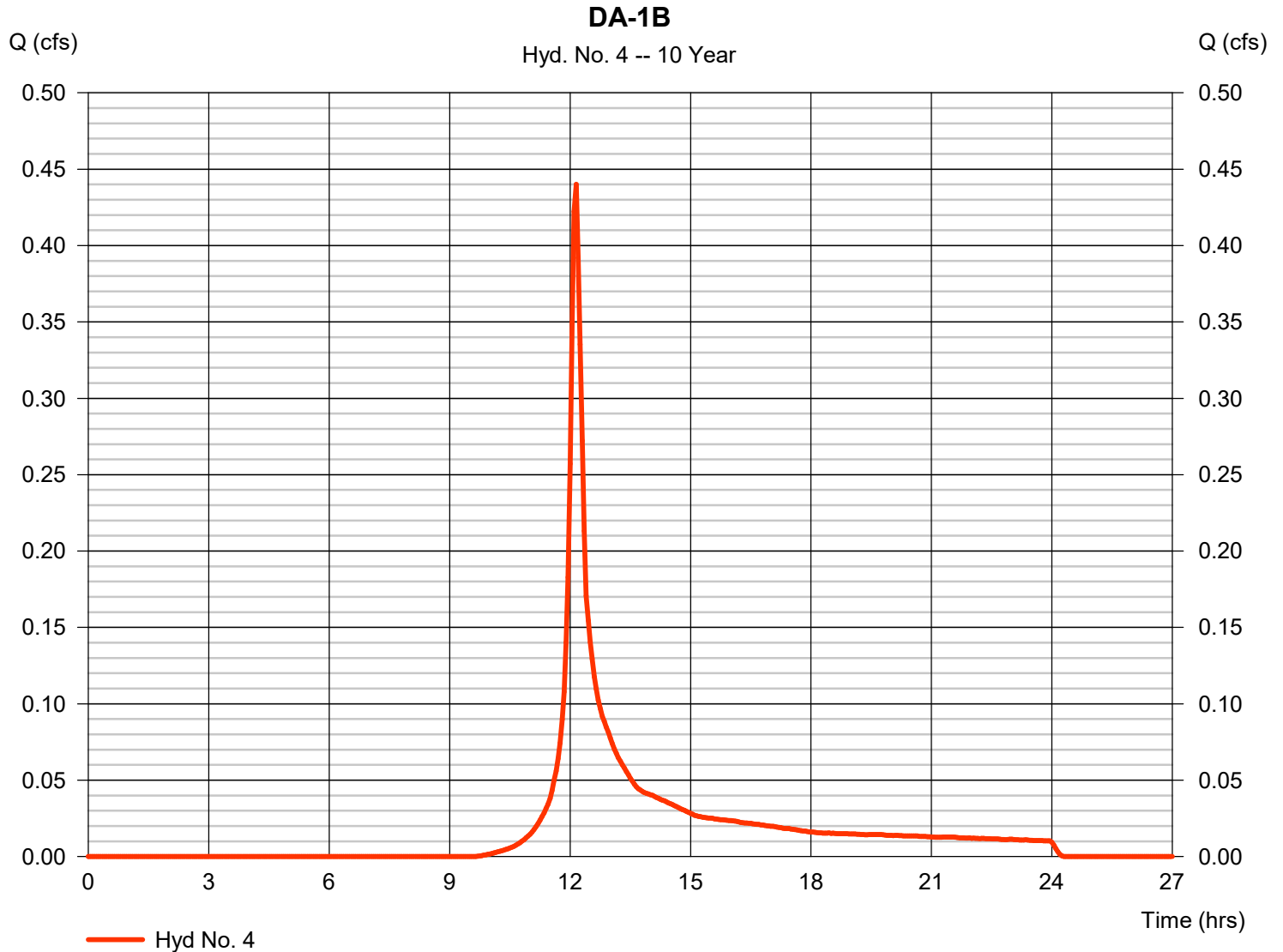
Monday, 05 / 9 / 2022

Hyd. No. 4

DA-1B

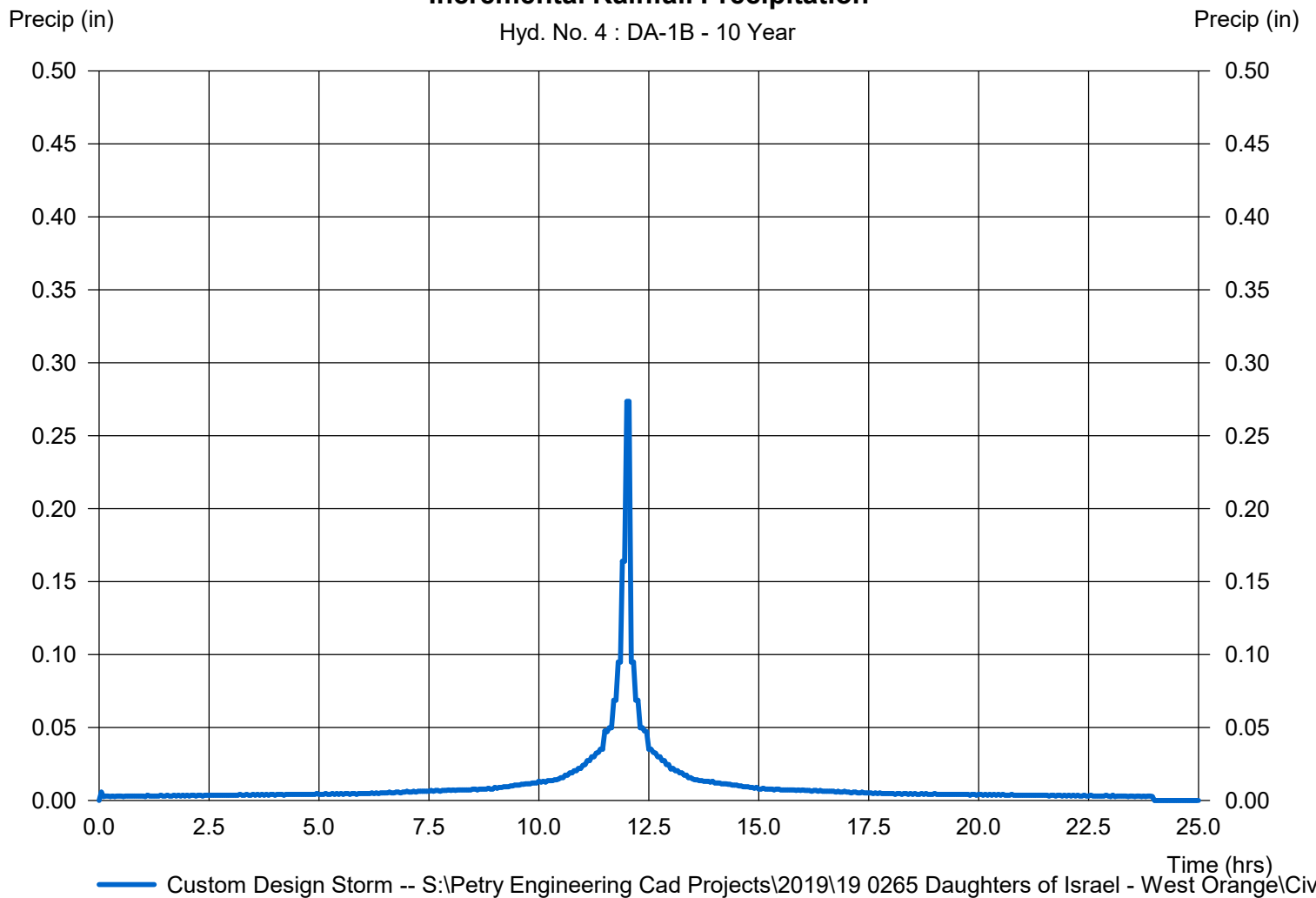
Hydrograph type	= SCS Runoff	Peak discharge	= 0.440 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.15 hrs
Time interval	= 3 min	Hyd. volume	= 1,788 cuft
Drainage area	= 0.240 ac	Curve number	= 68*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.80 min
Total precip.	= 5.24 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\2019-2020\0265 Daughters of Israel - West Orange		

* Composite (Area/CN) = $[(0.020 \times 30) + (0.170 \times 70) + (0.050 \times 77)] / 0.240$



DA-1B

Storm Frequency = 10 yrs Time interval = 3 min
Total precip. = 5.2400 in Distribution = Custom
Storm duration = S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora



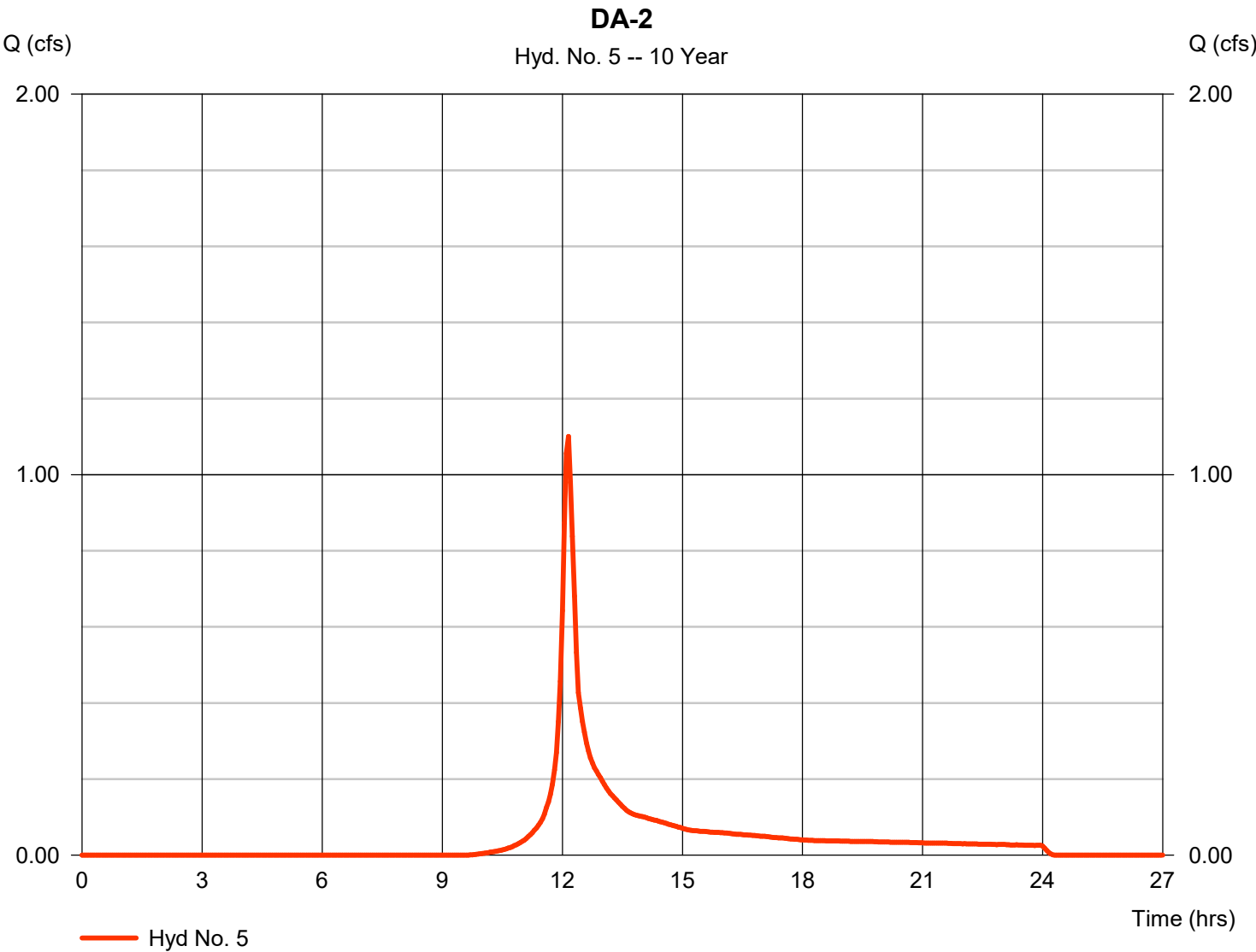
Hydrograph Report

Hyd. No. 5

DA-2

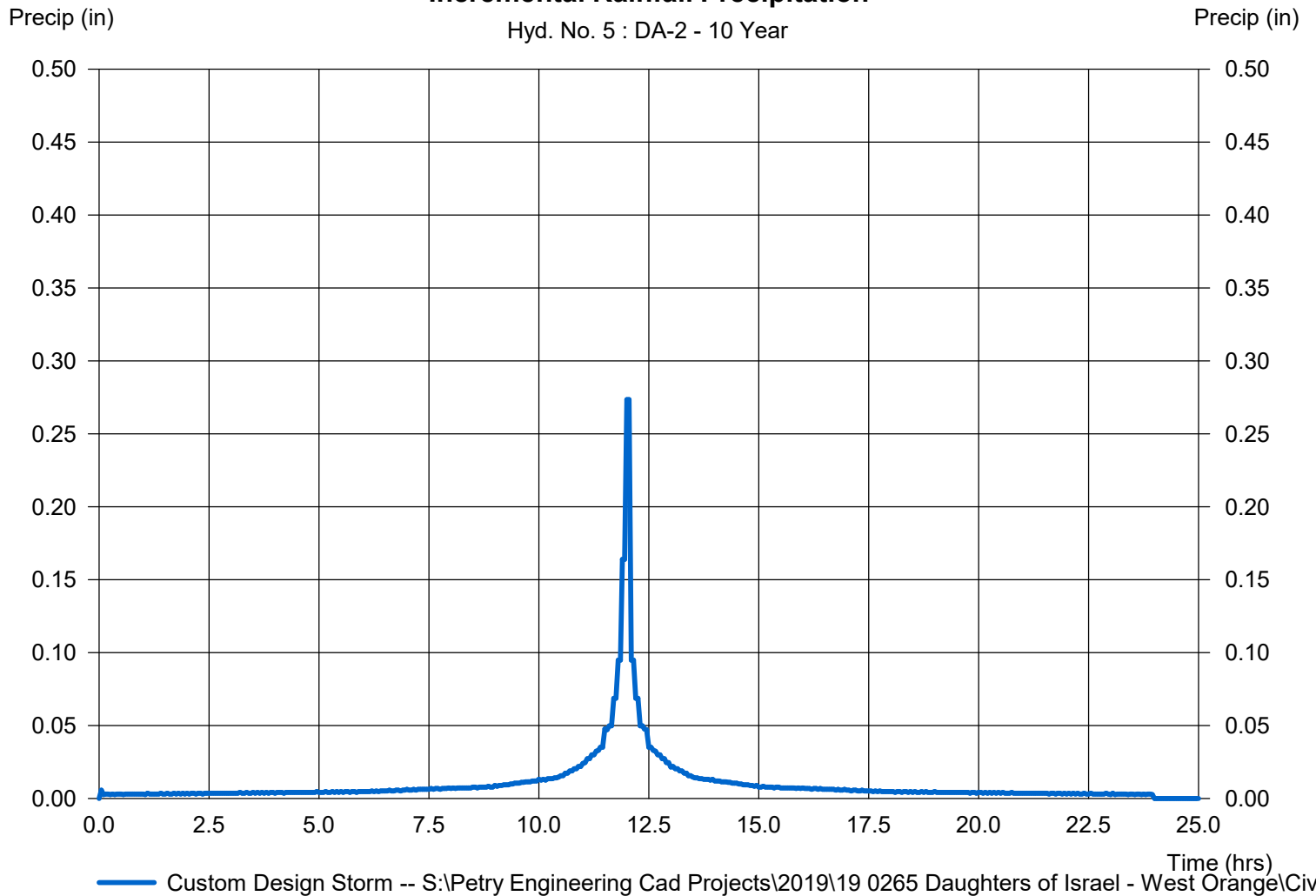
Hydrograph type	=	SCS Runoff	Peak discharge	=	1.100 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.15 hrs
Time interval	=	3 min	Hyd. volume	=	4,470 cuft
Drainage area	=	0.600 ac	Curve number	=	68*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.10 min
Total precip.	=	5.24 in	Distribution	=	Custom
Storm duration	=	S:\Petry Engineering Cad Projects\191019 0265 Daughters of Israel - West Orange			

* Composite (Area/CN) = [(0.100 x 77) + (0.140 x 70) + (0.250 x 80) + (0.110 x 30)] / 0.600



DA-2

Storm Frequency = 10 yrs Time interval = 3 min
Total precip. = 5.2400 in Distribution = Custom
Storm duration = S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora

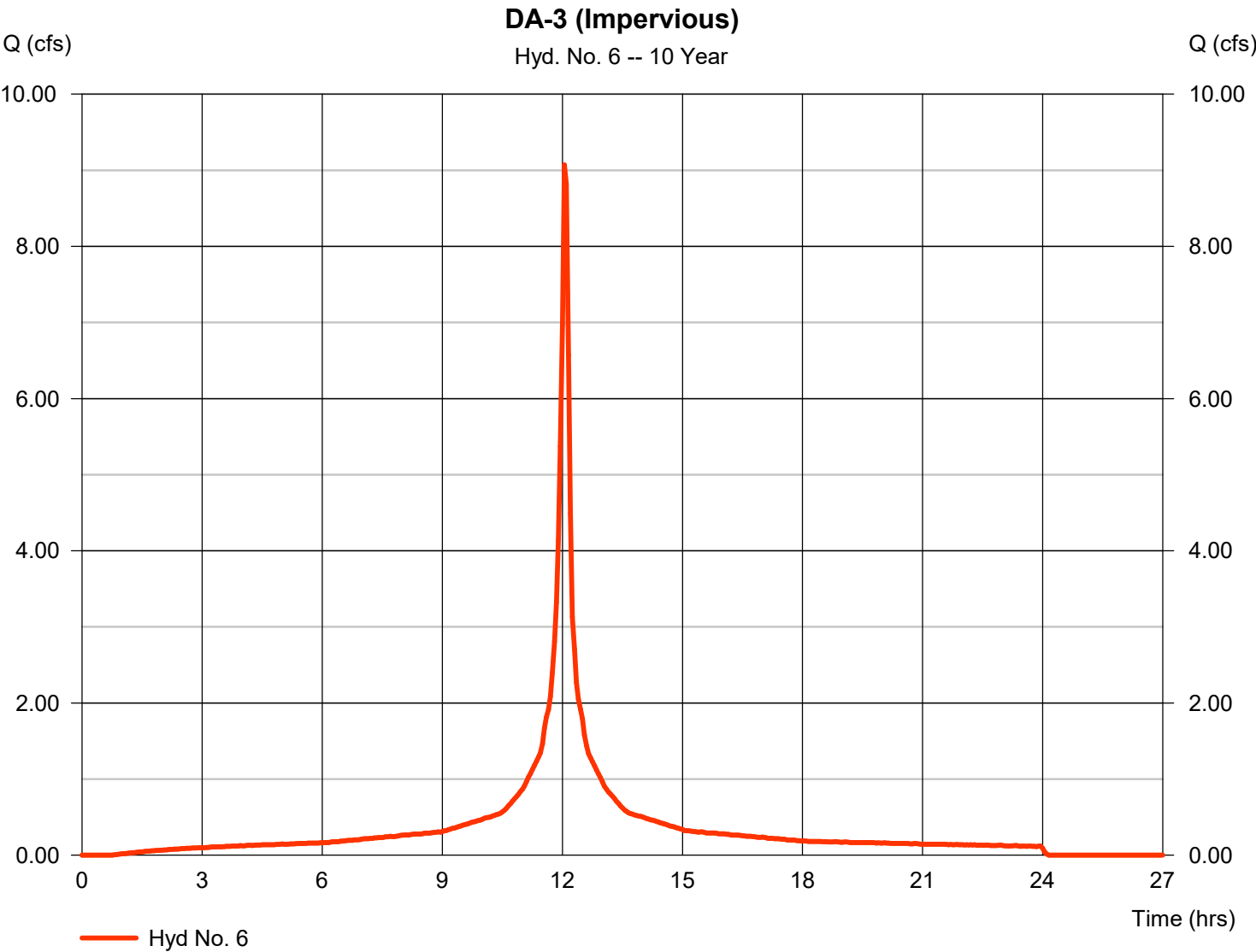


Hydrograph Report

Hyd. No. 6

DA-3 (Impervious)

Hydrograph type	=	SCS Runoff	Peak discharge	=	9.071 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.05 hrs
Time interval	=	3 min	Hyd. volume	=	35,753 cuft
Drainage area	=	2.100 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.24 in	Distribution	=	Custom
Storm duration	=	S:\Petry Engineering Cad Projects\191019 0265 Daughters of Israel - West Orange			

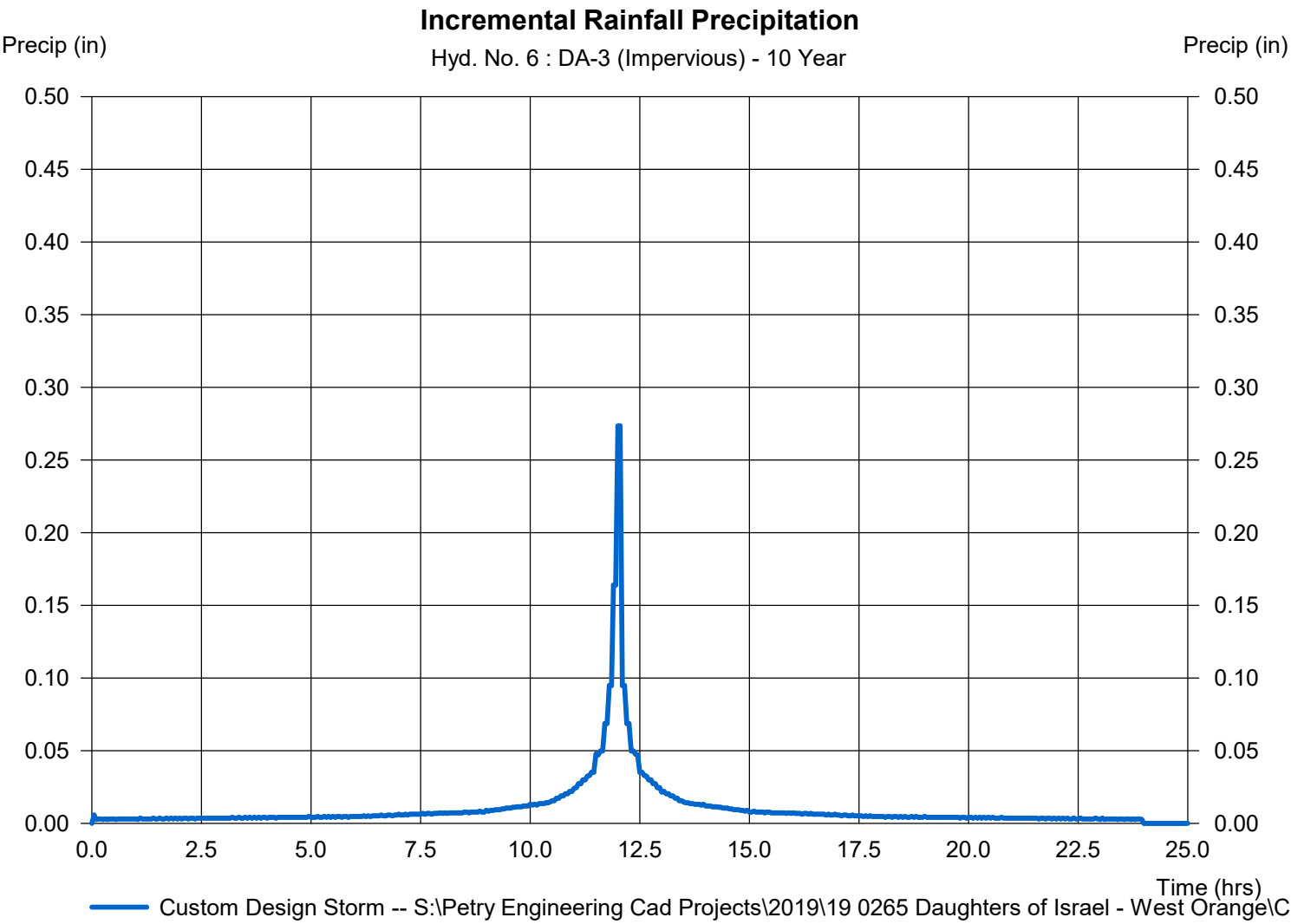


Precipitation Report

Hyd. No. 6

DA-3 (Impervious)

Storm Frequency	= 10 yrs	Time interval	= 3 min
Total precip.	= 5.2400 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Orange\Hydrographs\DA-3 (Impervious) - 10 Year		



Hydrograph Report

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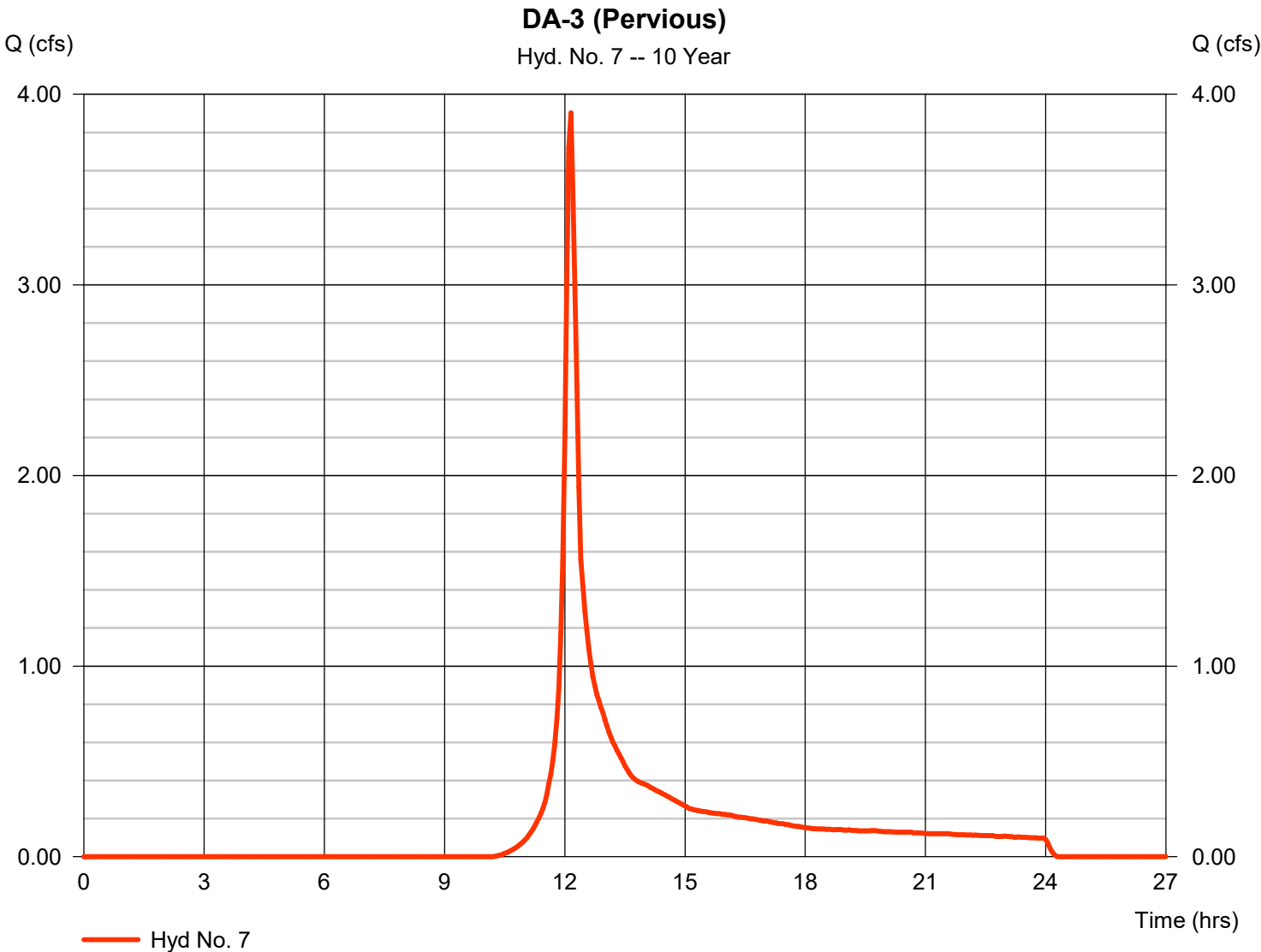
Monday, 05 / 9 / 2022

Hyd. No. 7

DA-3 (Pervious)

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.903 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.15 hrs
Time interval	=	3 min	Hyd. volume	=	16,078 cuft
Drainage area	=	2.440 ac	Curve number	=	65*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.50 min
Total precip.	=	5.24 in	Distribution	=	Custom
Storm duration	=	S:\Petry Engineering Cad Projects\2019\0265 Daughters of Israel - West Orange, NJ\0265 Daughters of Israel - West Orange, NJ.dwg			

* Composite (Area/CN) = [(0.890 x 80) + (0.210 x 74) + (0.550 x 30) + (0.760 x 70) + (0.030 x 77)] / 2.440



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

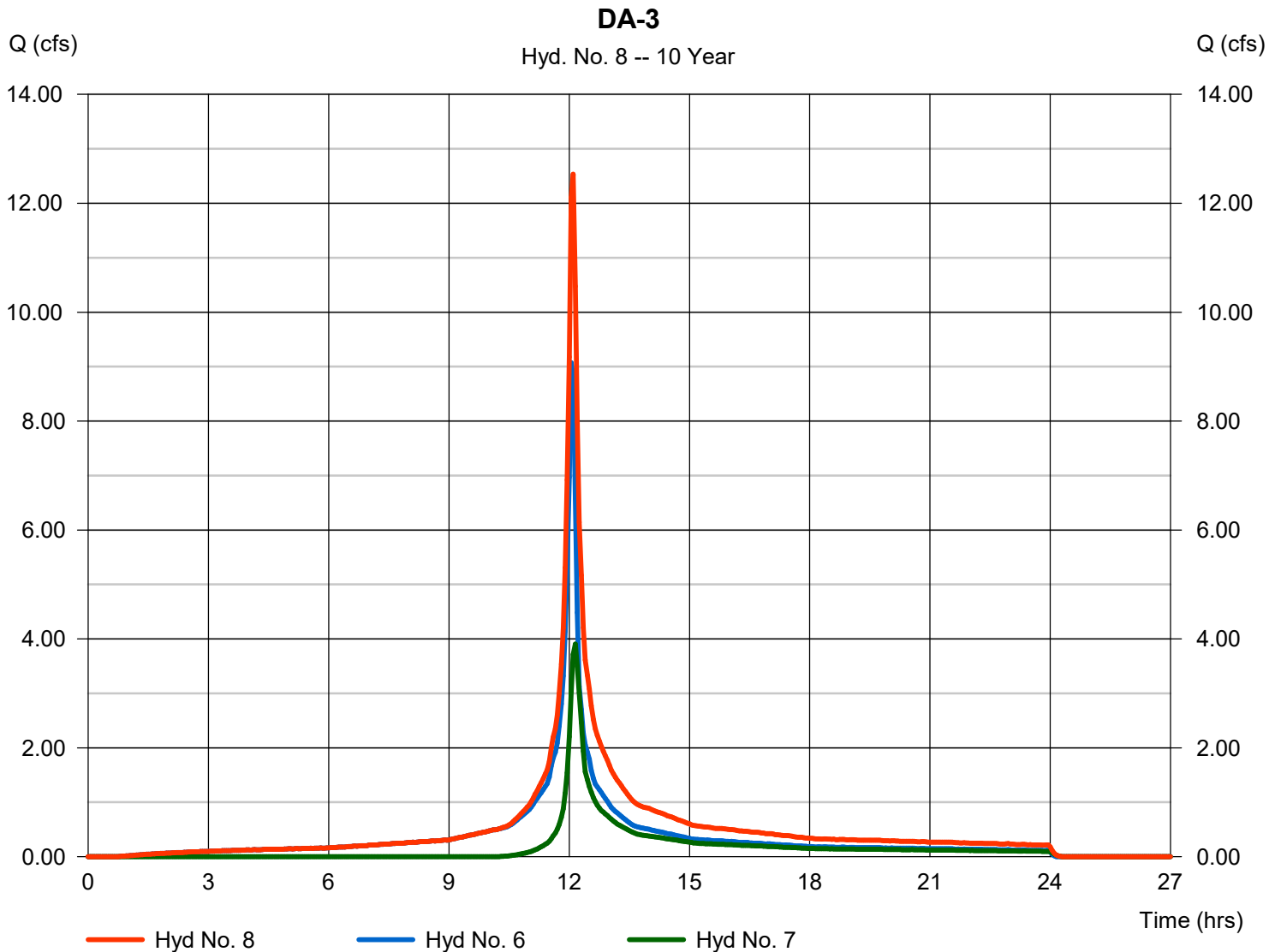
Monday, 05 / 9 / 2022

Hyd. No. 8

DA-3

Hydrograph type = Combine
Storm frequency = 10 yrs
Time interval = 3 min
Inflow hyds. = 6, 7

Peak discharge = 12.53 cfs
Time to peak = 12.10 hrs
Hyd. volume = 51,831 cuft
Contrib. drain. area = 4.540 ac

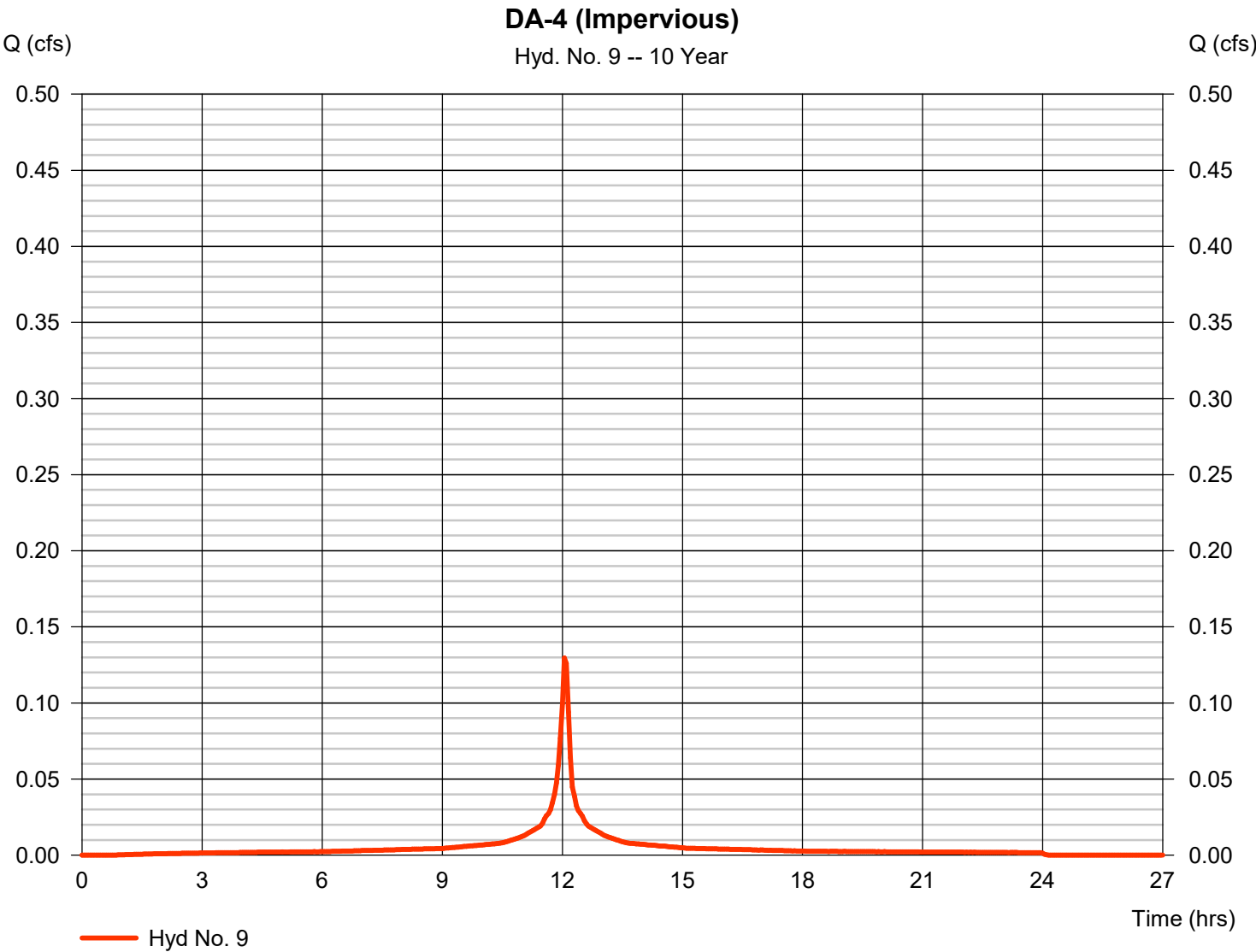


Hydrograph Report

Hyd. No. 9

DA-4 (Impervious)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.130 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.05 hrs
Time interval	=	3 min	Hyd. volume	=	511 cuft
Drainage area	=	0.030 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.24 in	Distribution	=	Custom
Storm duration	=	S:\Petry Engineering Cad Projects\19-01-0265 Daughters of Israel - West Orange			

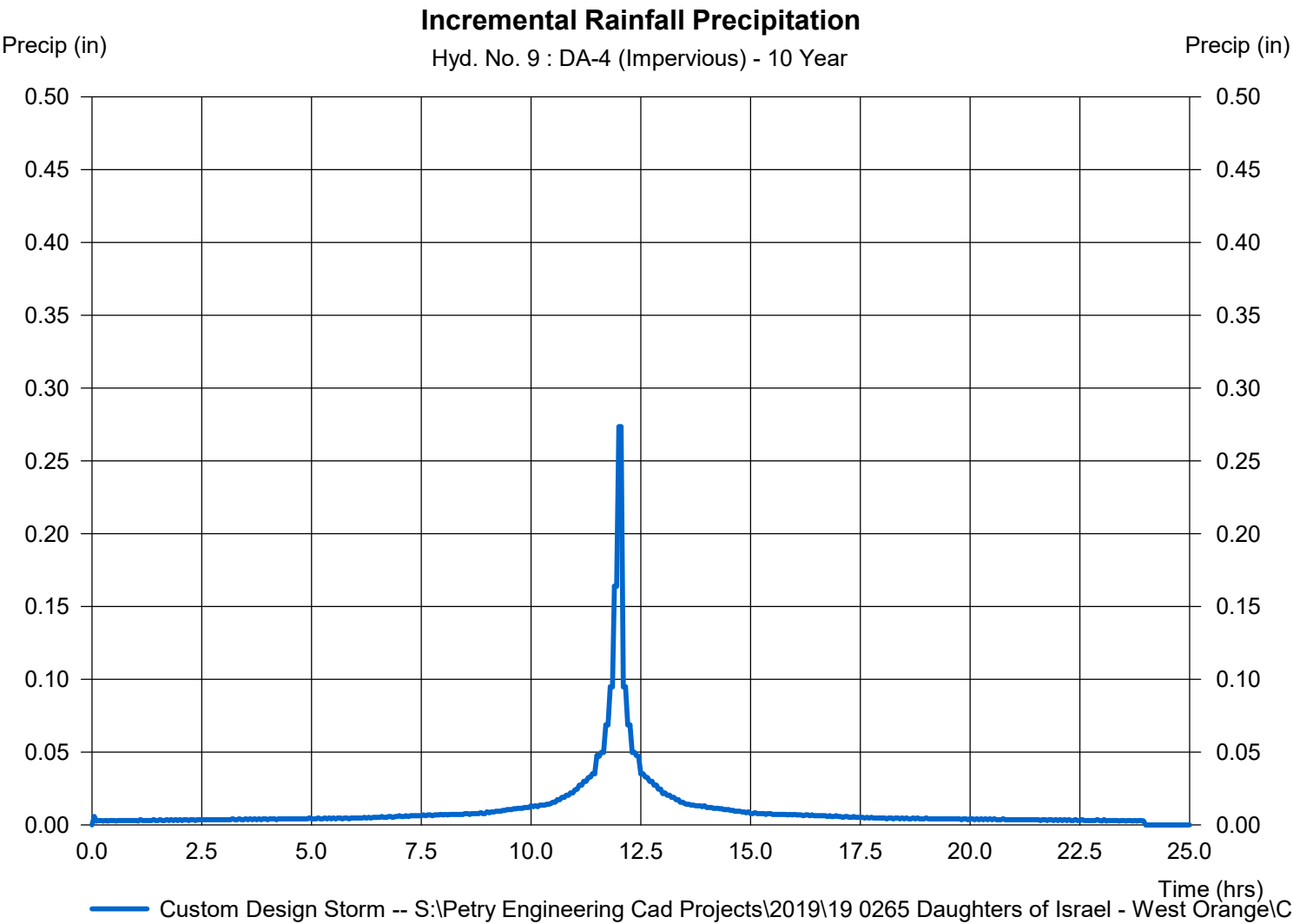


Precipitation Report

Hyd. No. 9

DA-4 (Impervious)

Storm Frequency	= 10 yrs	Time interval	= 3 min
Total precip.	= 5.2400 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora		



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

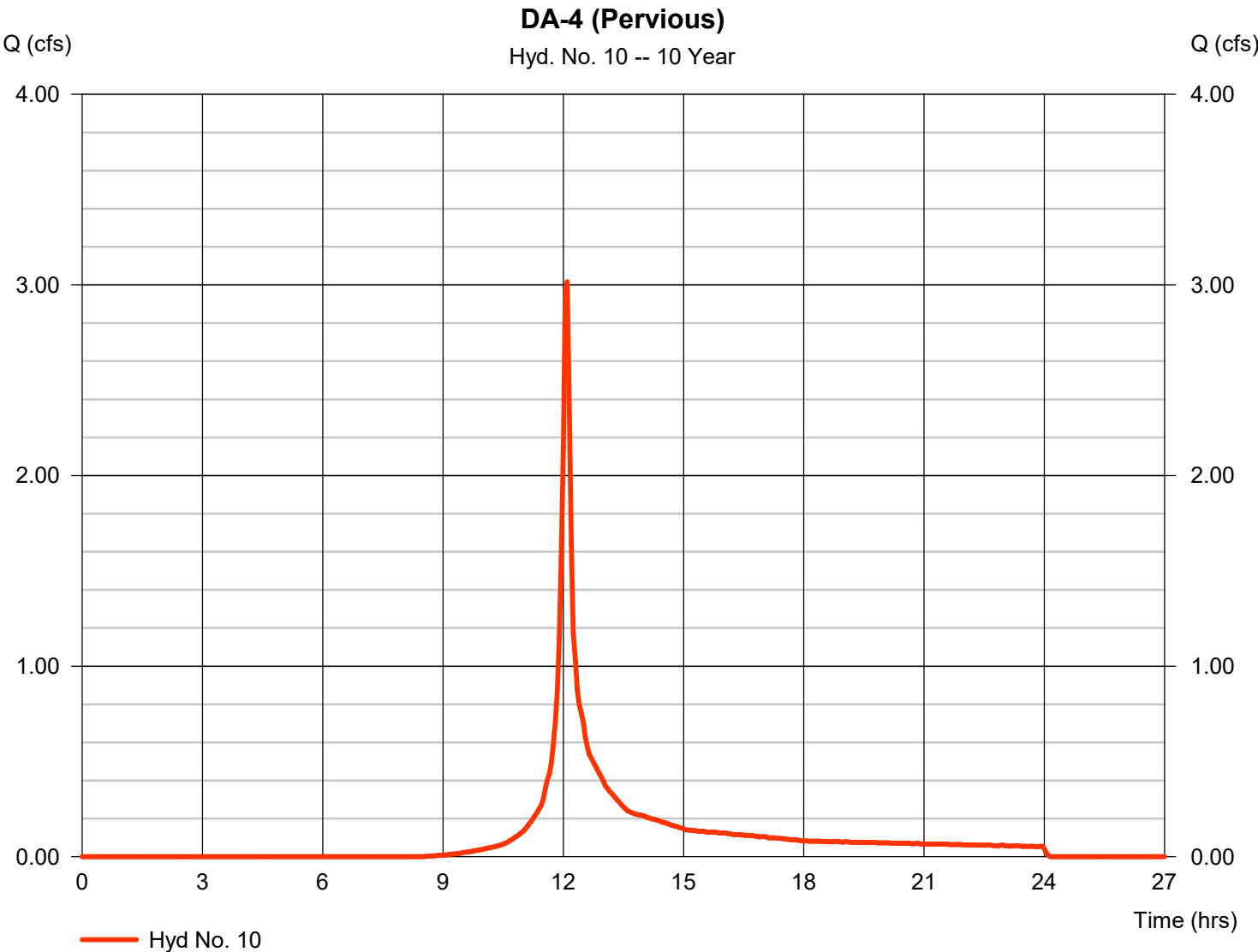
Monday, 05 / 9 / 2022

Hyd. No. 10

DA-4 (Pervious)

Hydrograph type	= SCS Runoff	Peak discharge	= 3.016 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 10,256 cuft
Drainage area	= 1.220 ac	Curve number	= 73*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.60 min
Total precip.	= 5.24 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\191010 0265 Daughters of Israel - West Orange NJ\191010 0265 Daughters of Israel - West Orange NJ.dwg		

* Composite (Area/CN) = [(1.060 x 80) + (0.160 x 30)] / 1.220



= S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora

— Custom Design Storm -- S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Orange\Civil\Cu

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

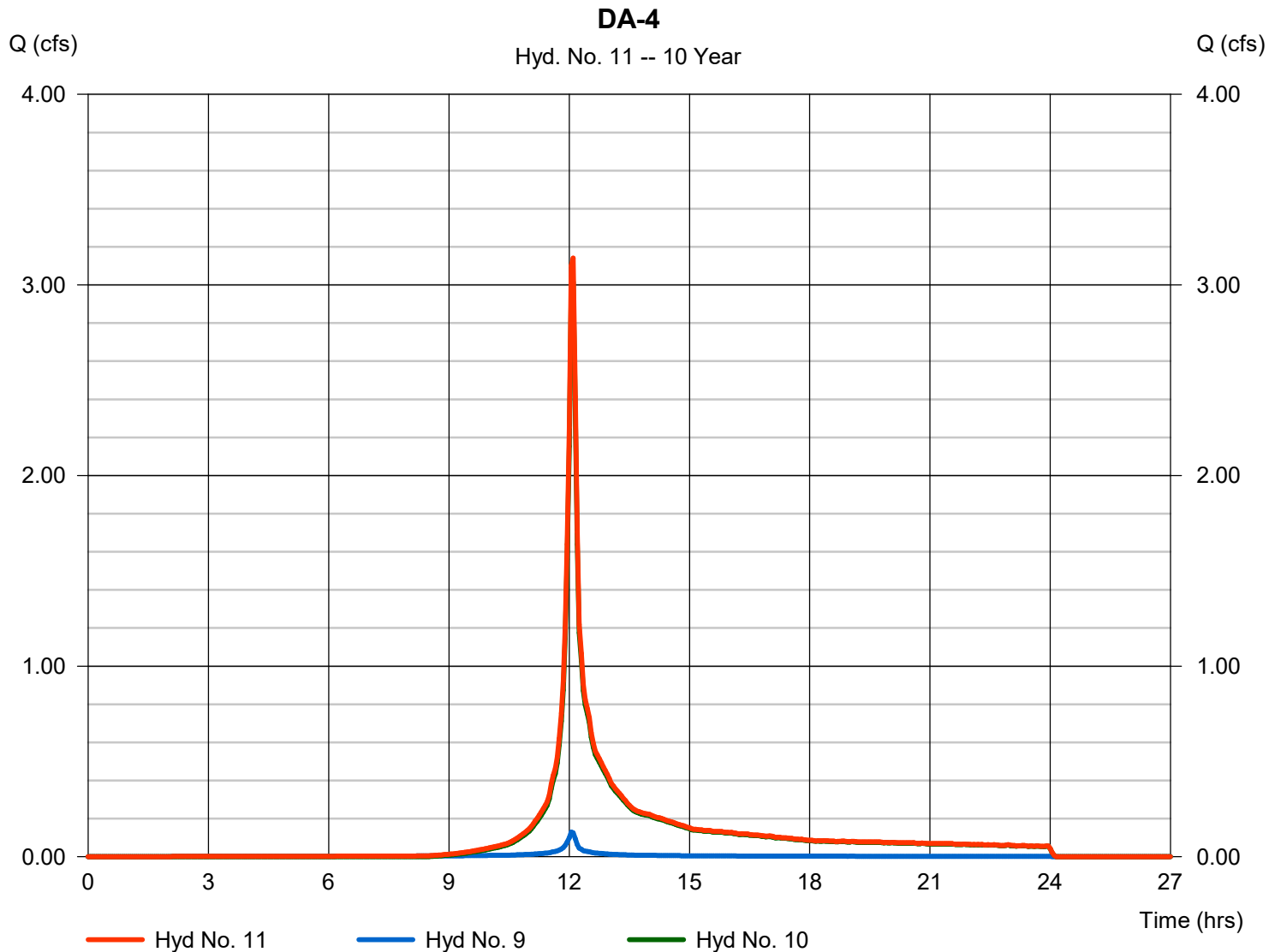
Monday, 05 / 9 / 2022

Hyd. No. 11

DA-4

Hydrograph type = Combine
 Storm frequency = 10 yrs
 Time interval = 3 min
 Inflow hyds. = 9, 10

Peak discharge = 3.141 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 10,766 cuft
 Contrib. drain. area = 1.250 ac

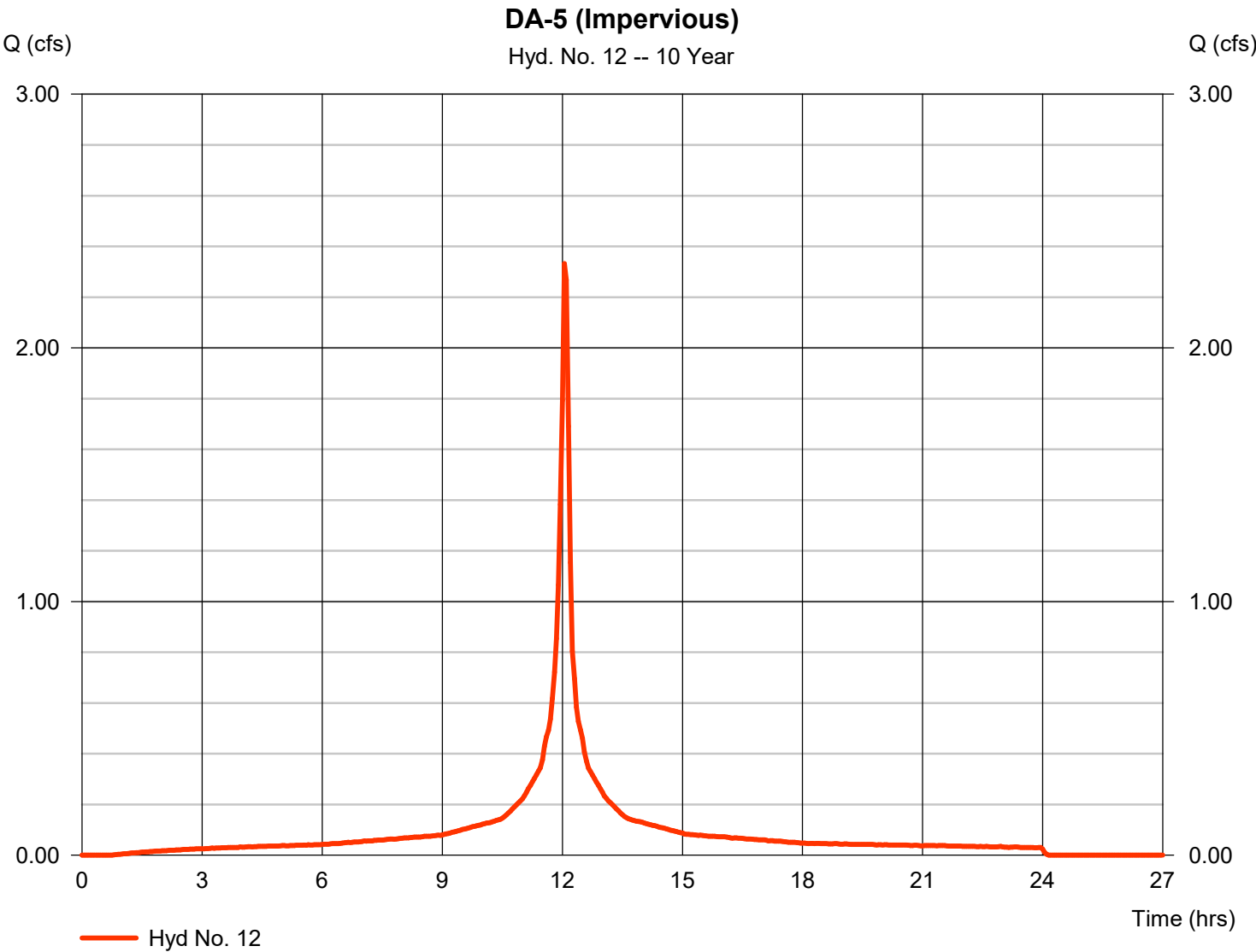


Hydrograph Report

Hyd. No. 12

DA-5 (Impervious)

Hydrograph type	= SCS Runoff	Peak discharge	= 2.333 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.05 hrs
Time interval	= 3 min	Hyd. volume	= 9,194 cuft
Drainage area	= 0.540 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.24 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\191010\0265 Daughters of Israel - West Orange		



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

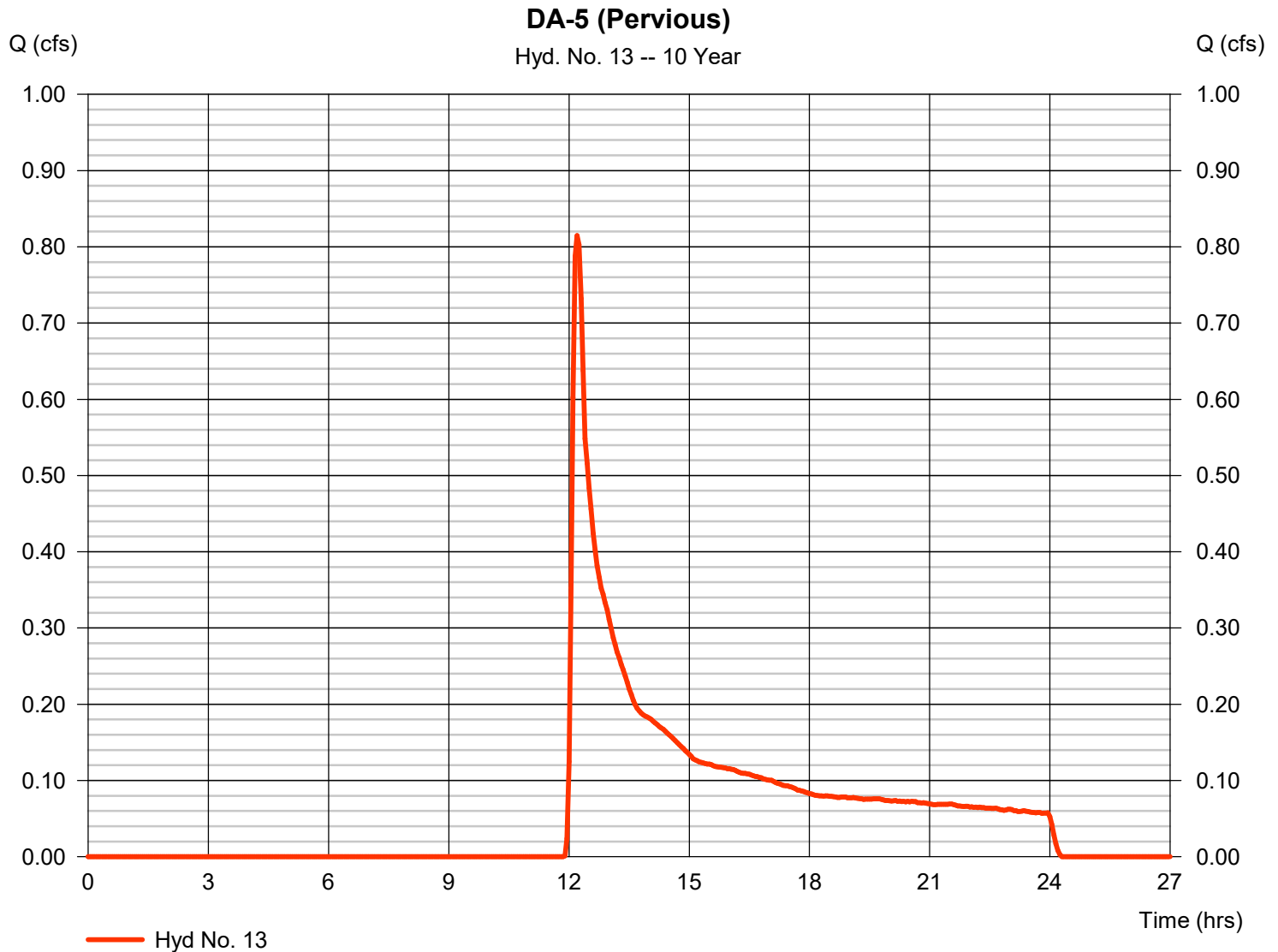
Monday, 05 / 9 / 2022

Hyd. No. 13

DA-5 (Pervious)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.815 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.20 hrs
Time interval	= 3 min	Hyd. volume	= 5,868 cuft
Drainage area	= 2.590 ac	Curve number	= 47*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.60 min
Total precip.	= 5.24 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\19-010-0265 Daughters of Israel - West Orange		

* Composite (Area/CN) = $[(0.760 \times 80) + (1.700 \times 30) + (0.130 \times 70)] / 2.590$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

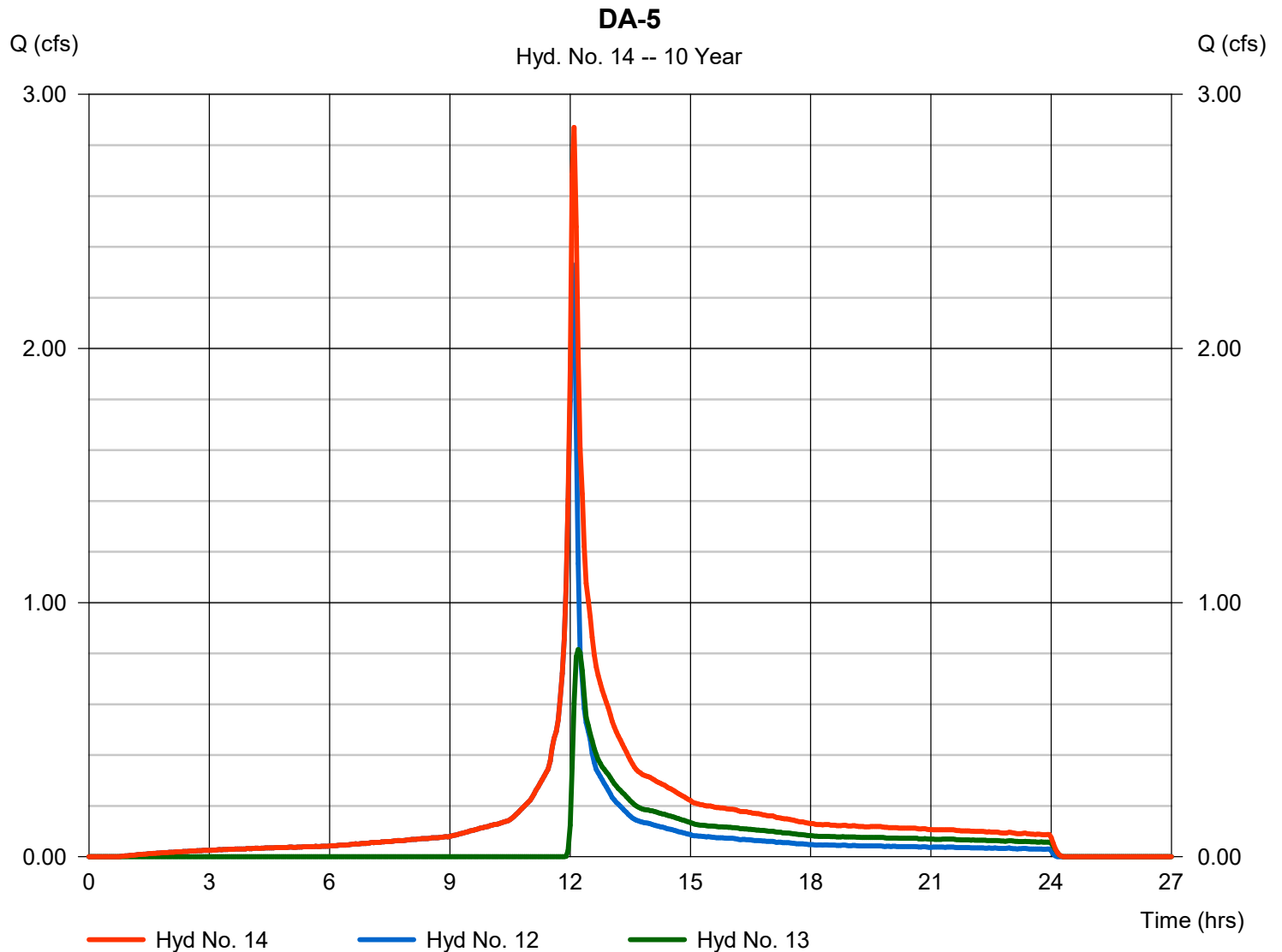
Monday, 05 / 9 / 2022

Hyd. No. 14

DA-5

Hydrograph type = Combine
 Storm frequency = 10 yrs
 Time interval = 3 min
 Inflow hyds. = 12, 13

Peak discharge = 2.870 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 15,062 cuft
 Contrib. drain. area = 3.130 ac

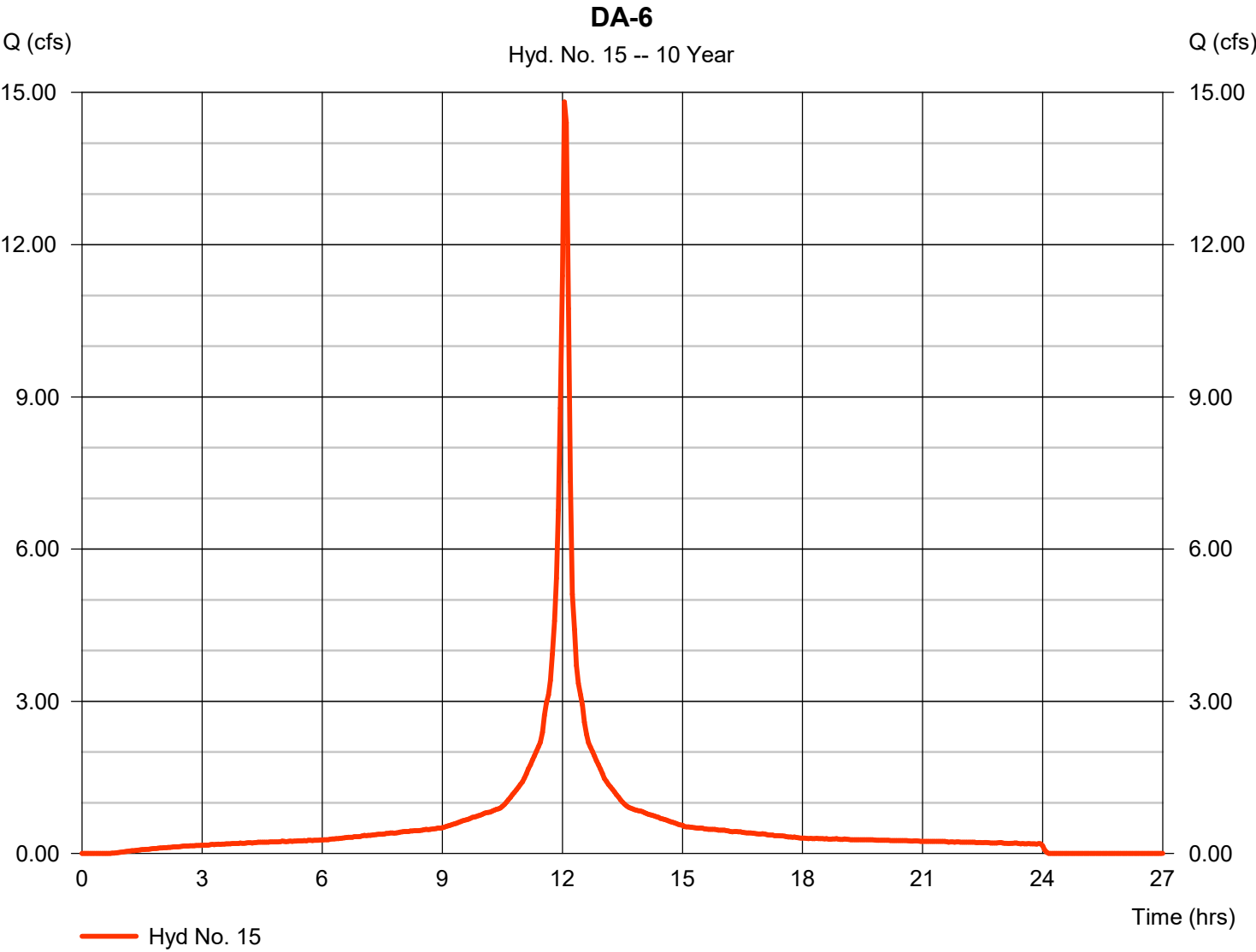


Hydrograph Report

Hyd. No. 15

DA-6

Hydrograph type	= SCS Runoff	Peak discharge	= 14.82 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.05 hrs
Time interval	= 3 min	Hyd. volume	= 58,396 cuft
Drainage area	= 3.430 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.24 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\19-010-0265 Daughters of Israel - West Orange		

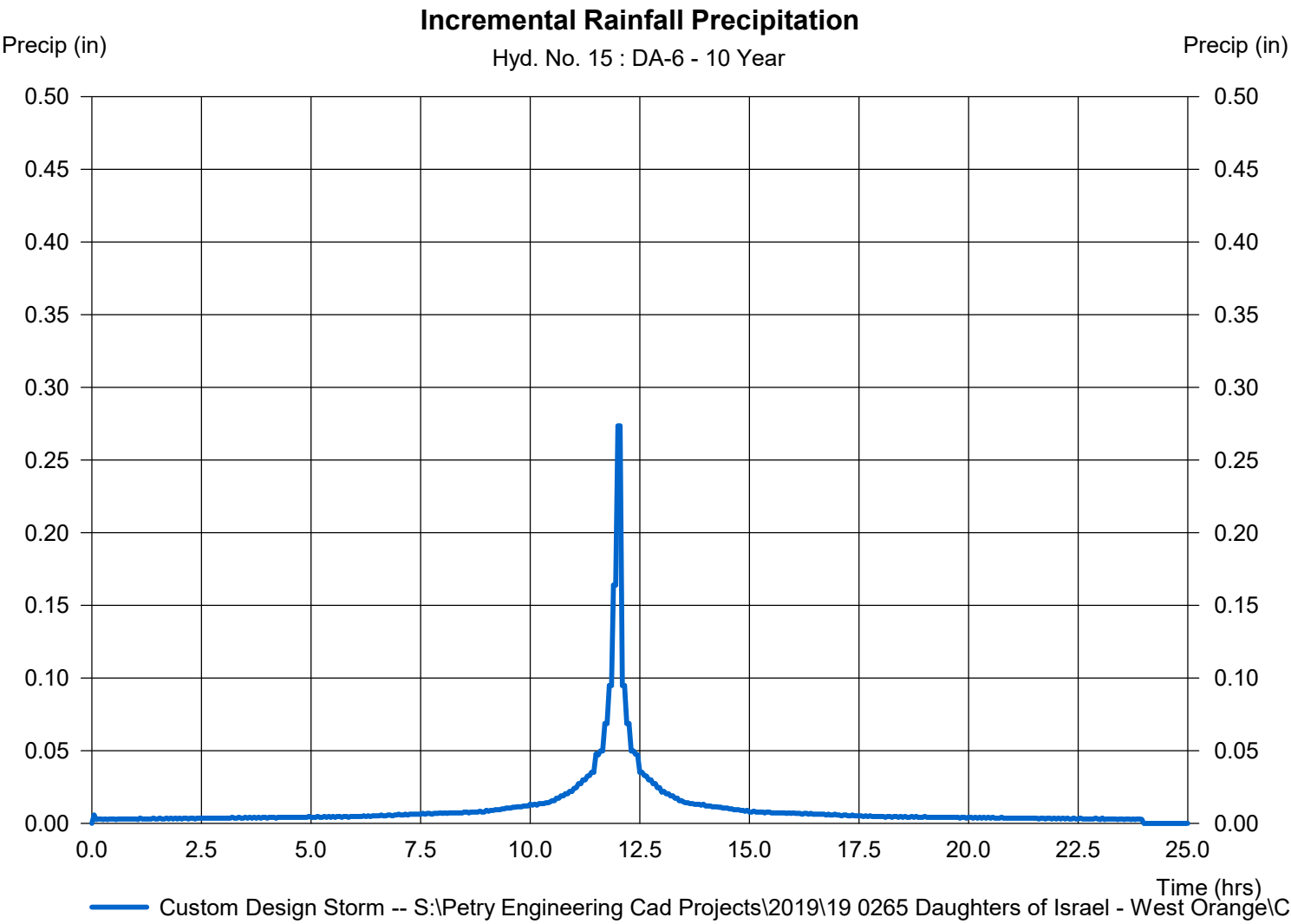


Precipitation Report

Hyd. No. 15

DA-6

Storm Frequency	= 10 yrs	Time interval	= 3 min
Total precip.	= 5.2400 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Orange\Civil\Hydro\15 DA-6		



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

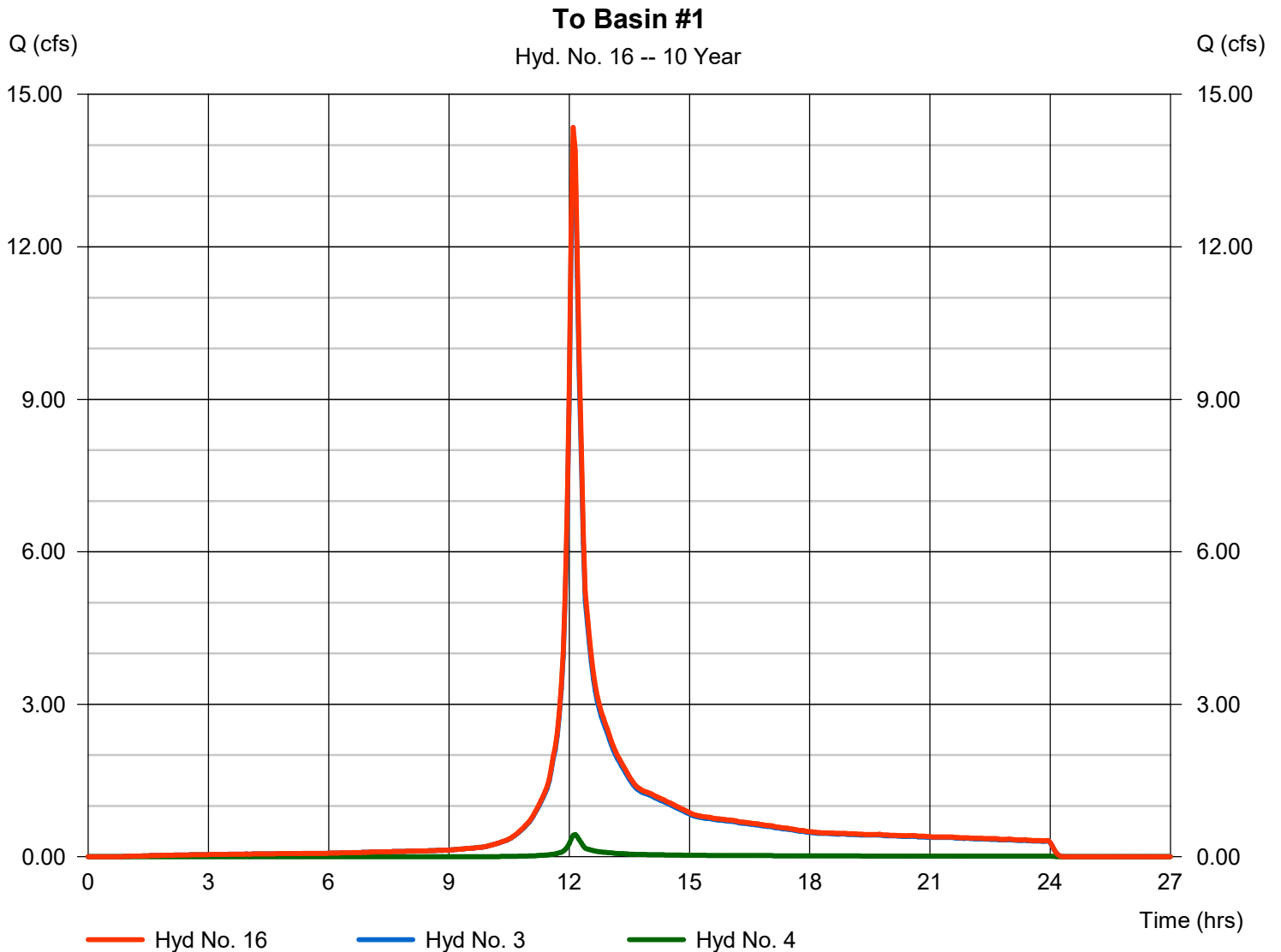
Monday, 05 / 9 / 2022

Hyd. No. 16

To Basin #1

Hydrograph type = Combine
 Storm frequency = 10 yrs
 Time interval = 3 min
 Inflow hyds. = 3, 4

Peak discharge = 14.35 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 60,366 cuft
 Contrib. drain. area = 0.240 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

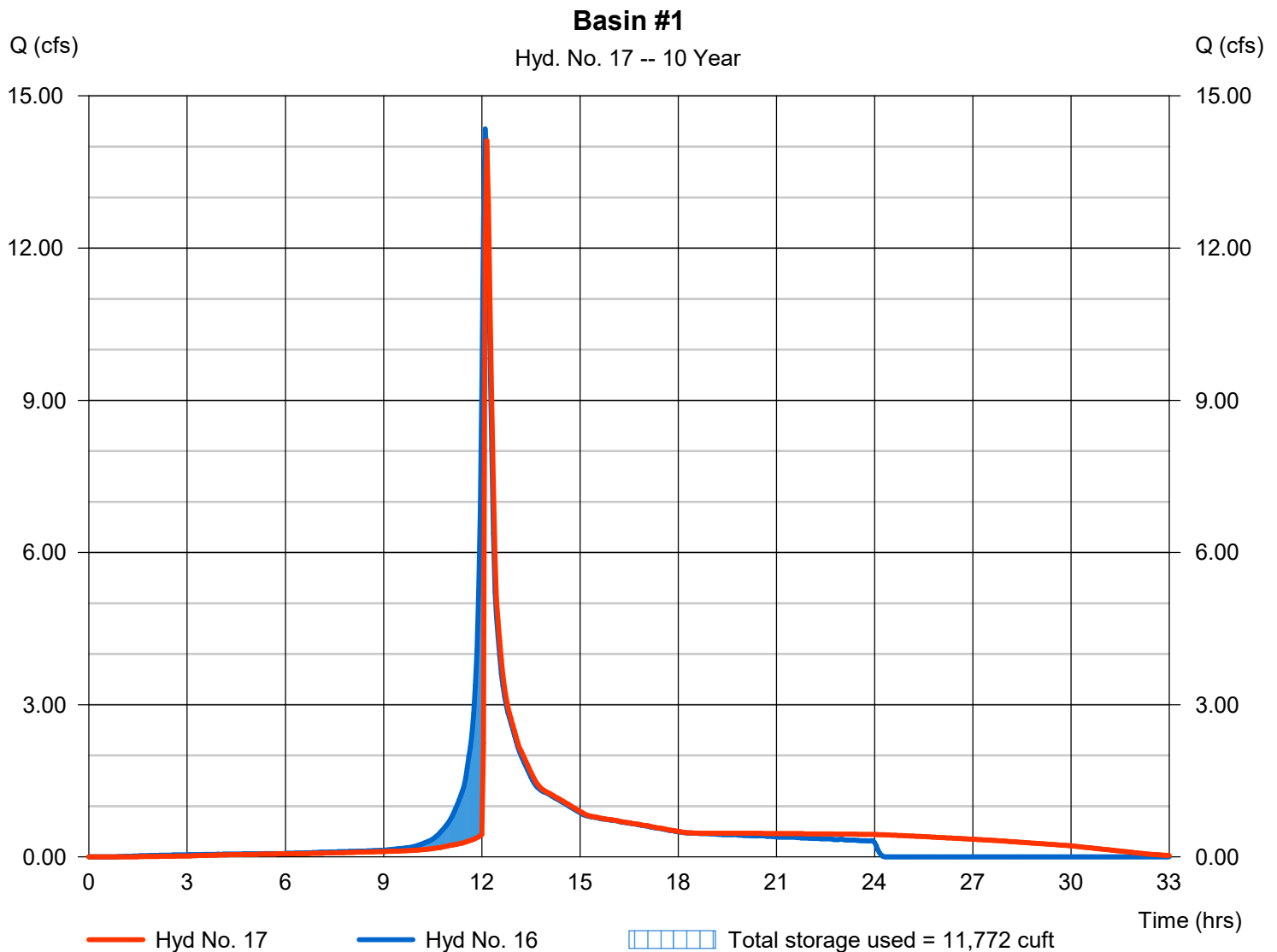
Monday, 05 / 9 / 2022

Hyd. No. 17

Basin #1

Hydrograph type	= Reservoir	Peak discharge	= 14.12 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.15 hrs
Time interval	= 3 min	Hyd. volume	= 60,359 cuft
Inflow hyd. No.	= 16 - To Basin #1	Max. Elevation	= 419.40 ft
Reservoir name	= Basin #1	Max. Storage	= 11,772 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

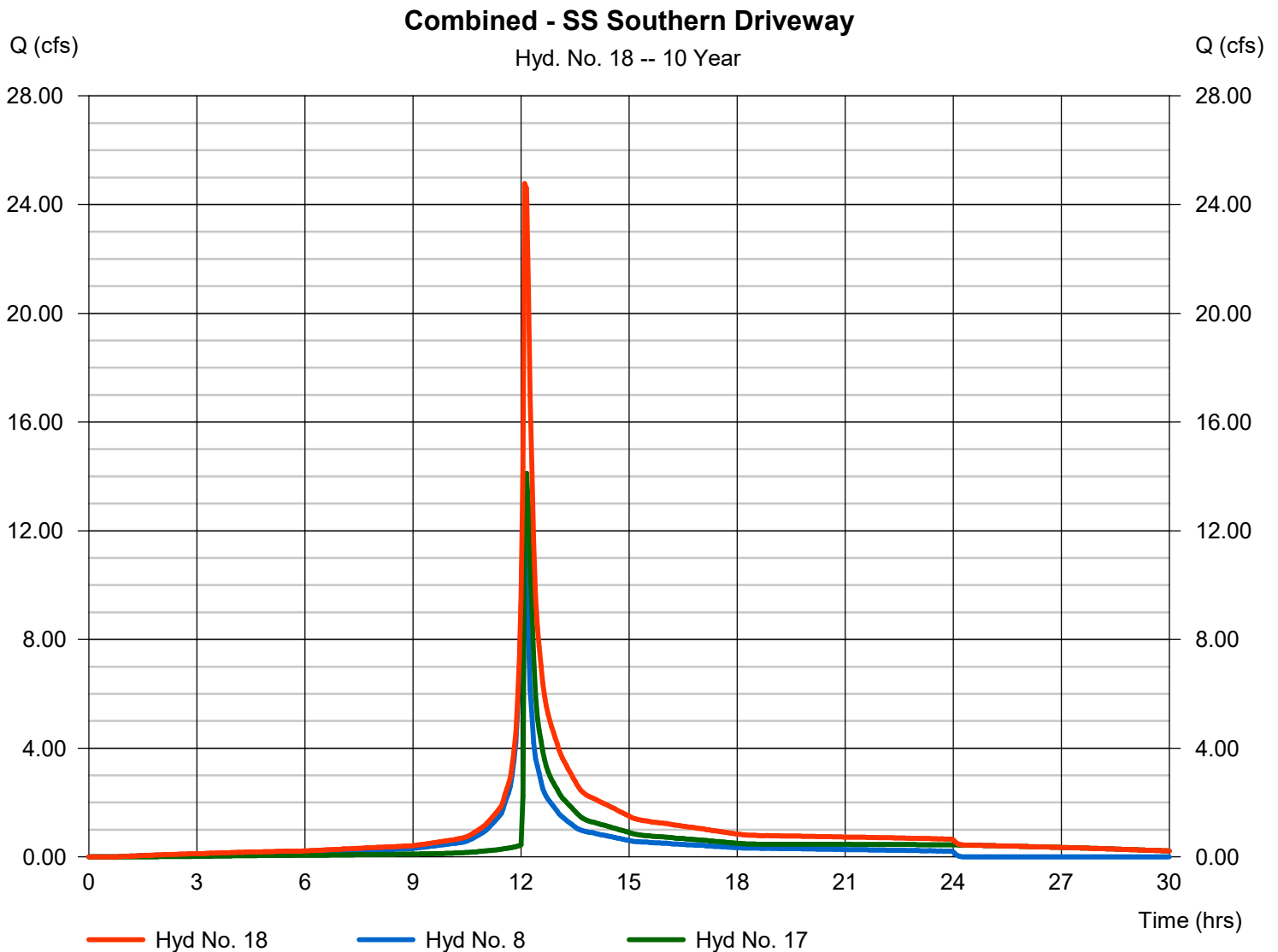
Monday, 05 / 9 / 2022

Hyd. No. 18

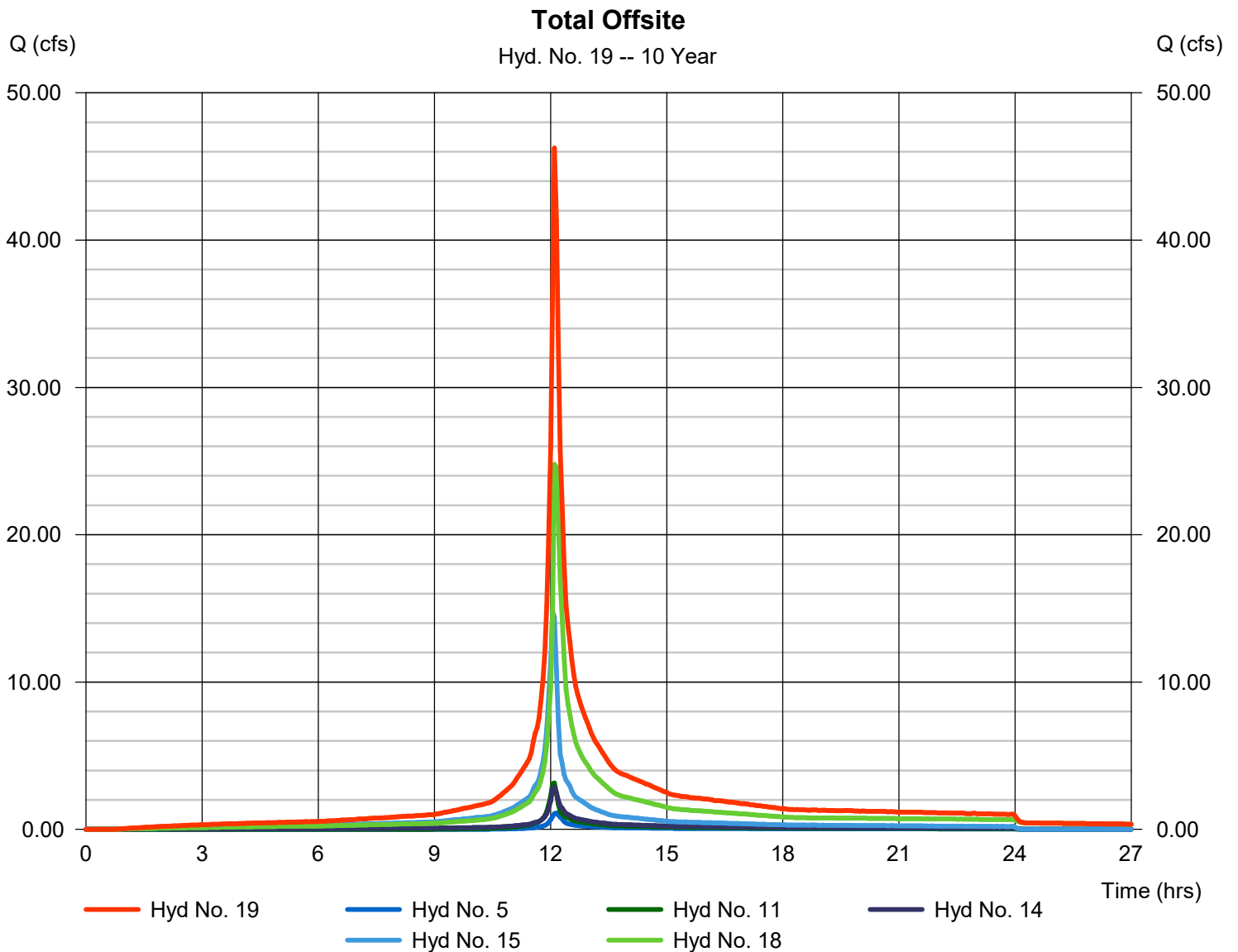
Combined - SS Southern Driveway

Hydrograph type = Combine
 Storm frequency = 10 yrs
 Time interval = 3 min
 Inflow hyds. = 8, 17

Peak discharge = 24.77 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 112,190 cuft
 Contrib. drain. area = 0.000 ac



Peak discharge = 46.25 cfs
Time to peak = 12.10 hrs
Hyd. volume = 200,884 cuft
Contrib. drain. area = 4.030 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	6.077	3	723	24,287	-----	-----	-----	DA-1A (Impervious)
2	SCS Runoff	24.27	3	729	97,566	-----	-----	-----	DA-1A (Pervious)
3	Combine	29.61	3	726	121,853	1, 2	-----	-----	DA-1A
4	SCS Runoff	0.981	3	729	3,947	-----	-----	-----	DA-1B
5	SCS Runoff	2.453	3	729	9,868	-----	-----	-----	DA-2
6	SCS Runoff	14.50	3	723	57,959	-----	-----	-----	DA-3 (Impervious)
7	SCS Runoff	9.213	3	729	37,015	-----	-----	-----	DA-3 (Pervious)
8	Combine	23.06	3	726	94,974	6, 7	-----	-----	DA-3
9	SCS Runoff	0.207	3	723	828	-----	-----	-----	DA-4 (Impervious)
10	SCS Runoff	6.173	3	723	21,263	-----	-----	-----	DA-4 (Pervious)
11	Combine	6.380	3	723	22,091	9, 10	-----	-----	DA-4
12	SCS Runoff	3.729	3	723	14,904	-----	-----	-----	DA-5 (Impervious)
13	SCS Runoff	4.593	3	729	20,104	-----	-----	-----	DA-5 (Pervious)
14	Combine	7.885	3	726	35,007	12, 13	-----	-----	DA-5
15	SCS Runoff	23.69	3	723	94,666	-----	-----	-----	DA-6
16	Combine	30.57	3	726	125,801	3, 4,	-----	-----	To Basin #1
17	Reservoir	30.22	3	729	125,793	16	419.68	12,951	Basin #1
18	Combine	52.45	3	726	220,767	8, 17	-----	-----	Combined - SS Southern Driveway
19	Combine	92.10	3	726	382,399	5, 11, 14, 15, 18	-----	-----	Total Offsite
Existing Conditions.gpw					Return Period: 100 Year			Monday, 05 / 9 / 2022	

Hydrograph Report

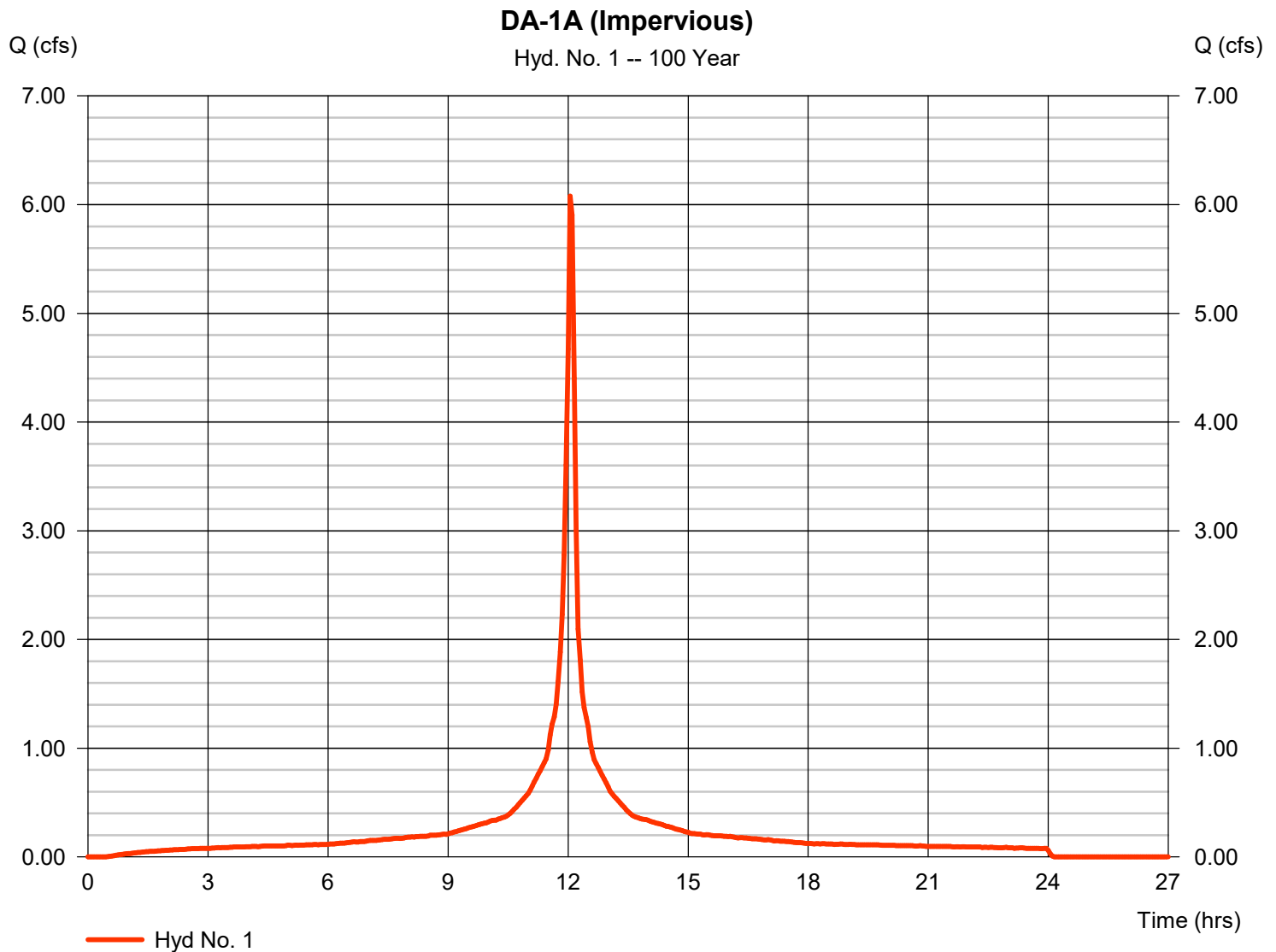
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Monday, 05 / 9 / 2022

Hyd. No. 1

DA-1A (Impervious)

Hydrograph type	= SCS Runoff	Peak discharge	= 6.077 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.05 hrs
Time interval	= 3 min	Hyd. volume	= 24,287 cuft
Drainage area	= 0.880 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 8.35 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\2019\0265 Daughters of Israel - West Orange		



DA-1A (Impervious)

= 100 yrs

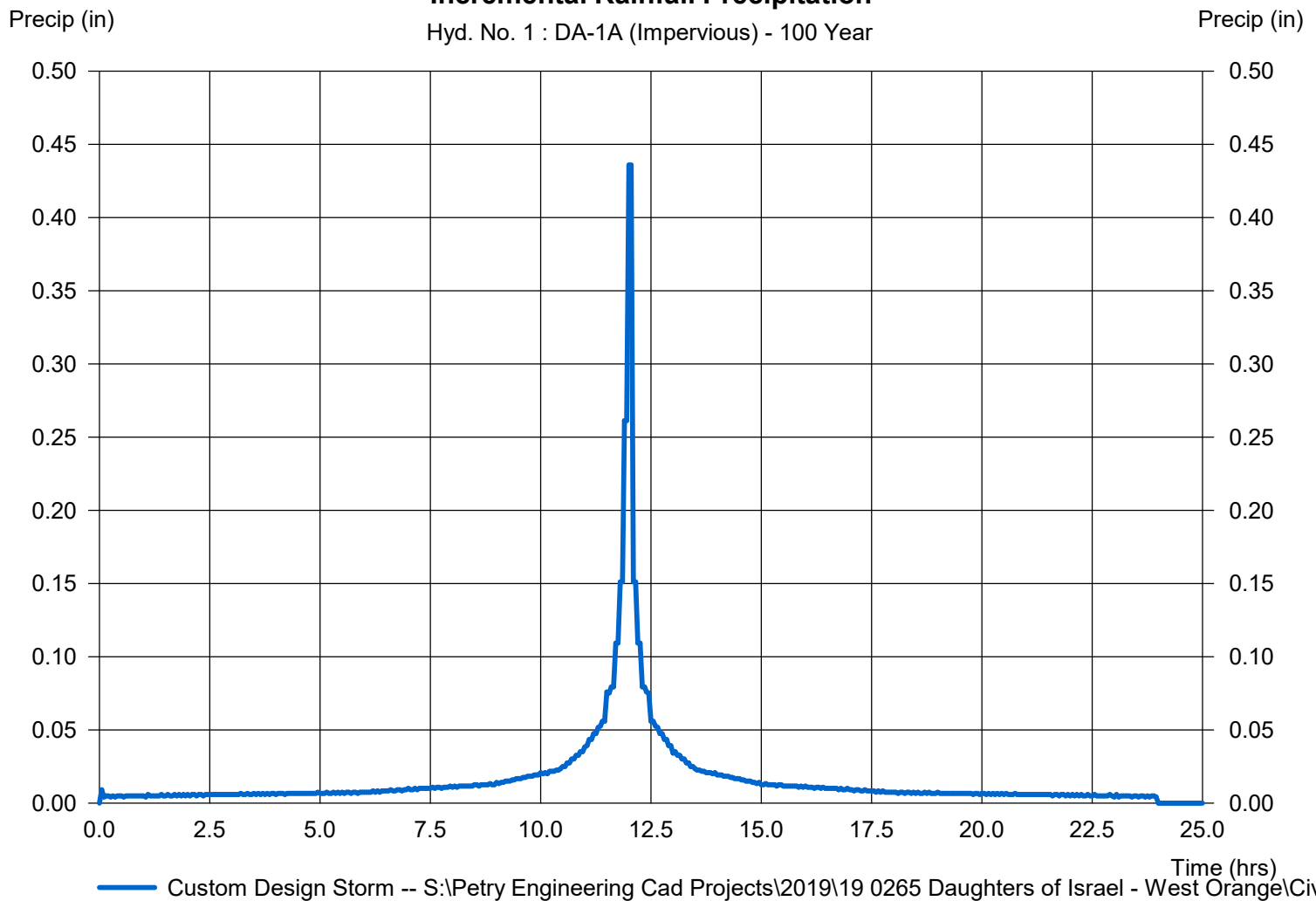
= 3 min

$$= 8.3500 \text{ in}$$

= Custom

= S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora

Hyd. No. 1 : DA-1A (Impervious) - 100 Year



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

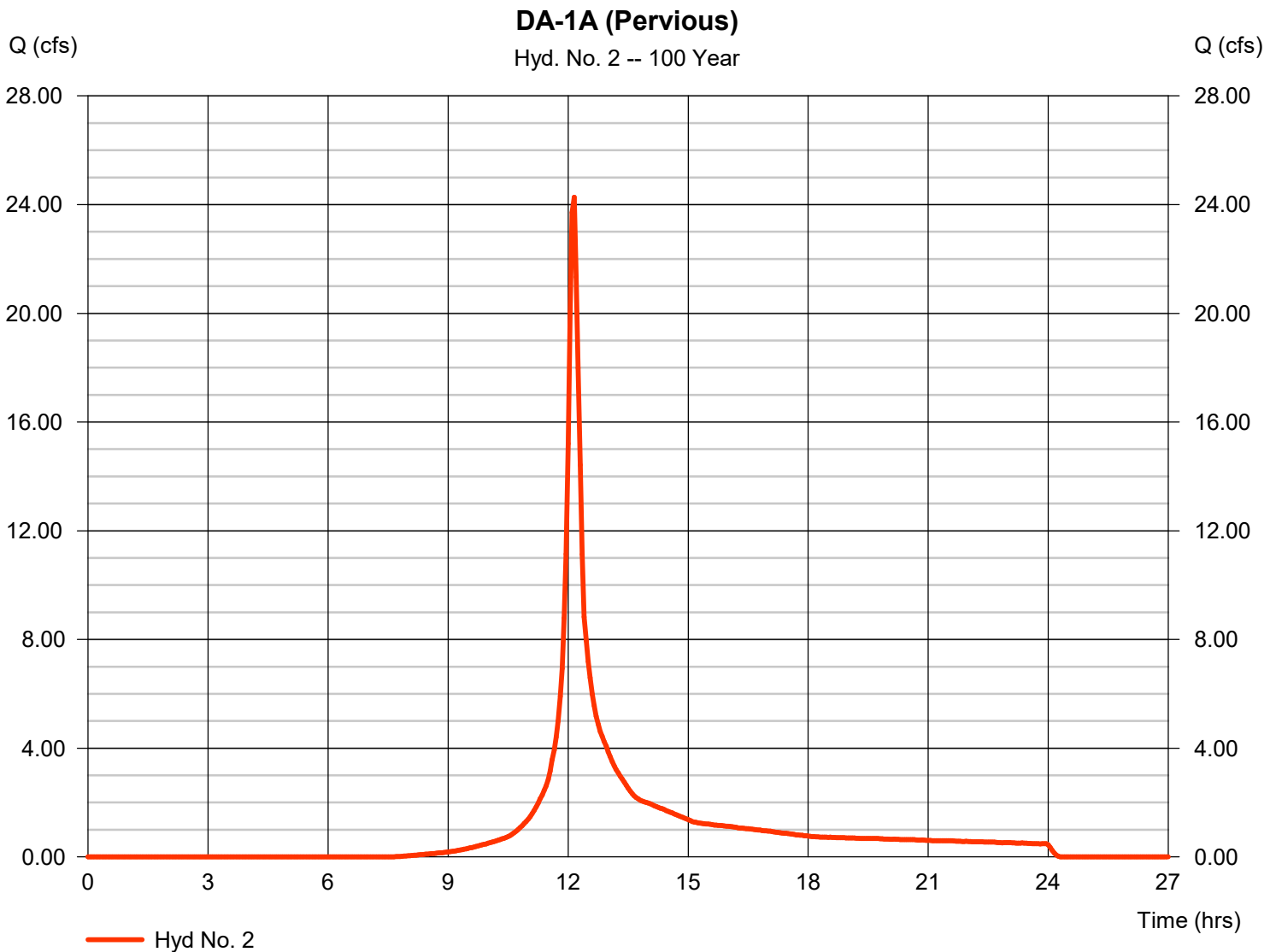
Monday, 05 / 9 / 2022

Hyd. No. 2

DA-1A (Pervious)

Hydrograph type	= SCS Runoff	Peak discharge	= 24.27 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.15 hrs
Time interval	= 3 min	Hyd. volume	= 97,566 cuft
Drainage area	= 6.090 ac	Curve number	= 67*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 14.30 min
Total precip.	= 8.35 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\191019 0265 Daughters of Israel - West Orange		

* Composite (Area/CN) = $[(0.500 \times 30) + (4.740 \times 70) + (0.280 \times 77) + (0.010 \times 80) + (0.560 \times 74)] / 6.090$

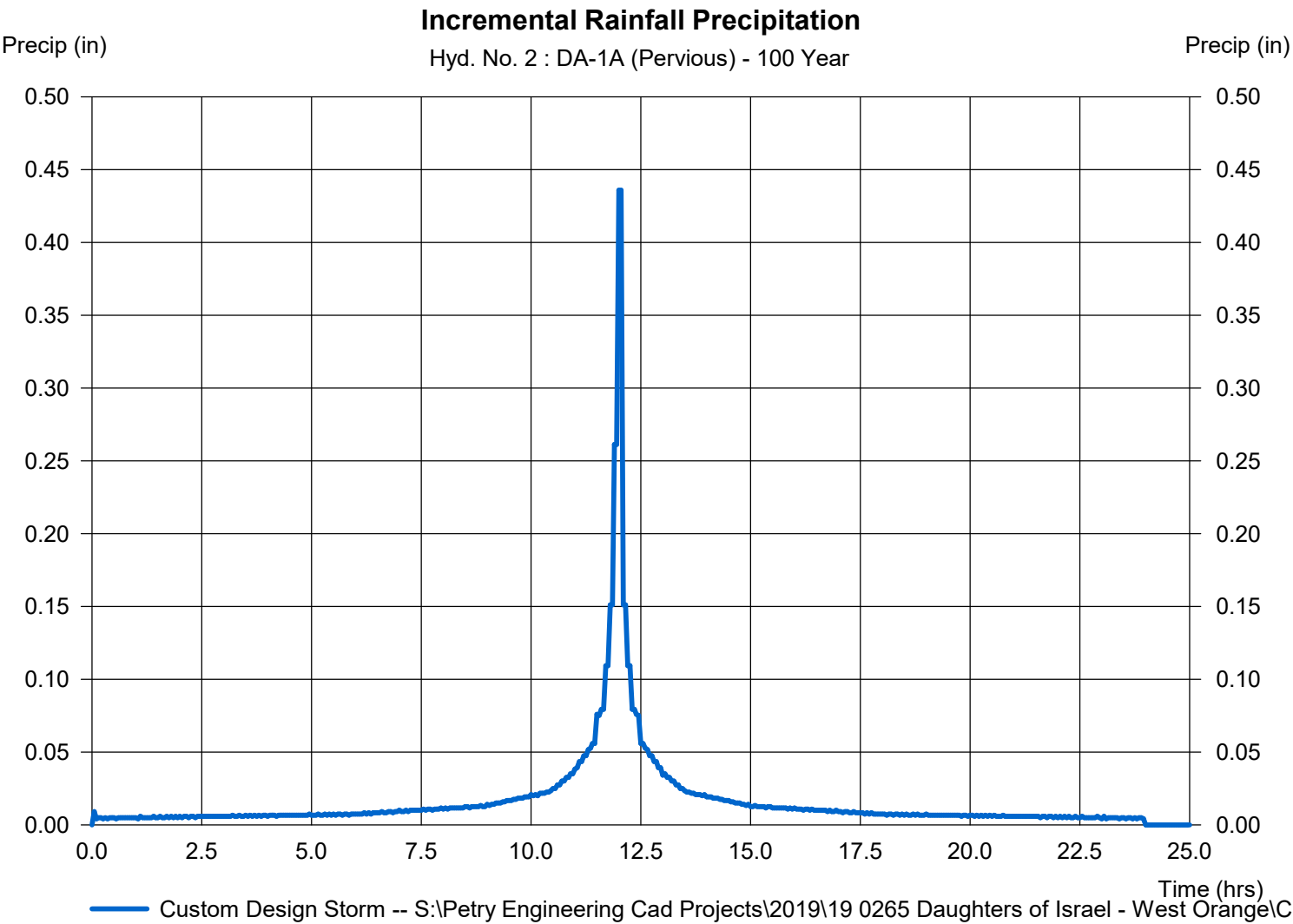


Precipitation Report

Hyd. No. 2

DA-1A (Pervious)

Storm Frequency	= 100 yrs	Time interval	= 3 min
Total precip.	= 8.3500 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Orange\Civil\Hydro\DA-1A (Pervious) - 100 Year		



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

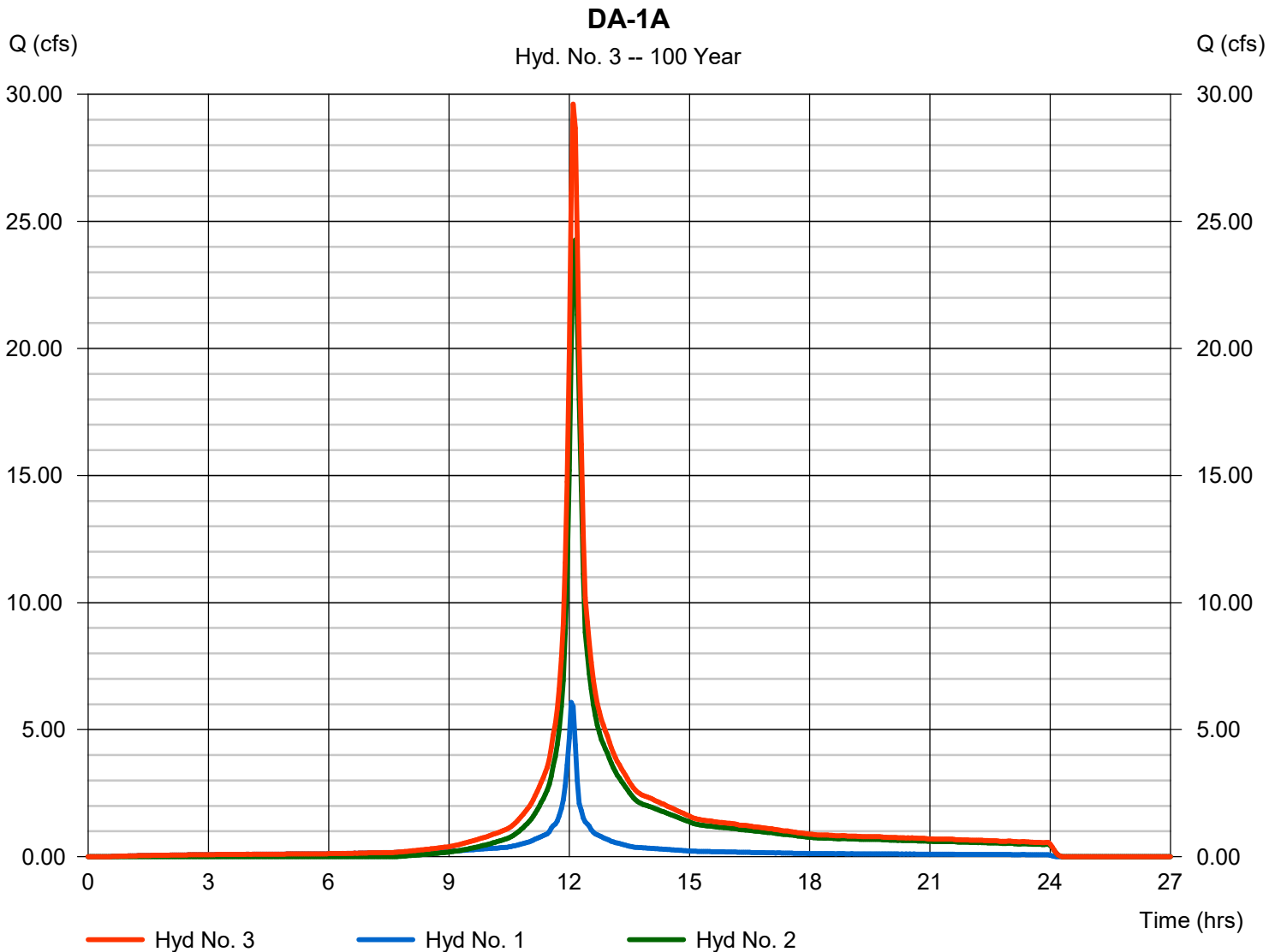
Monday, 05 / 9 / 2022

Hyd. No. 3

DA-1A

Hydrograph type = Combine
 Storm frequency = 100 yrs
 Time interval = 3 min
 Inflow hyds. = 1, 2

Peak discharge = 29.61 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 121,853 cuft
 Contrib. drain. area = 6.970 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

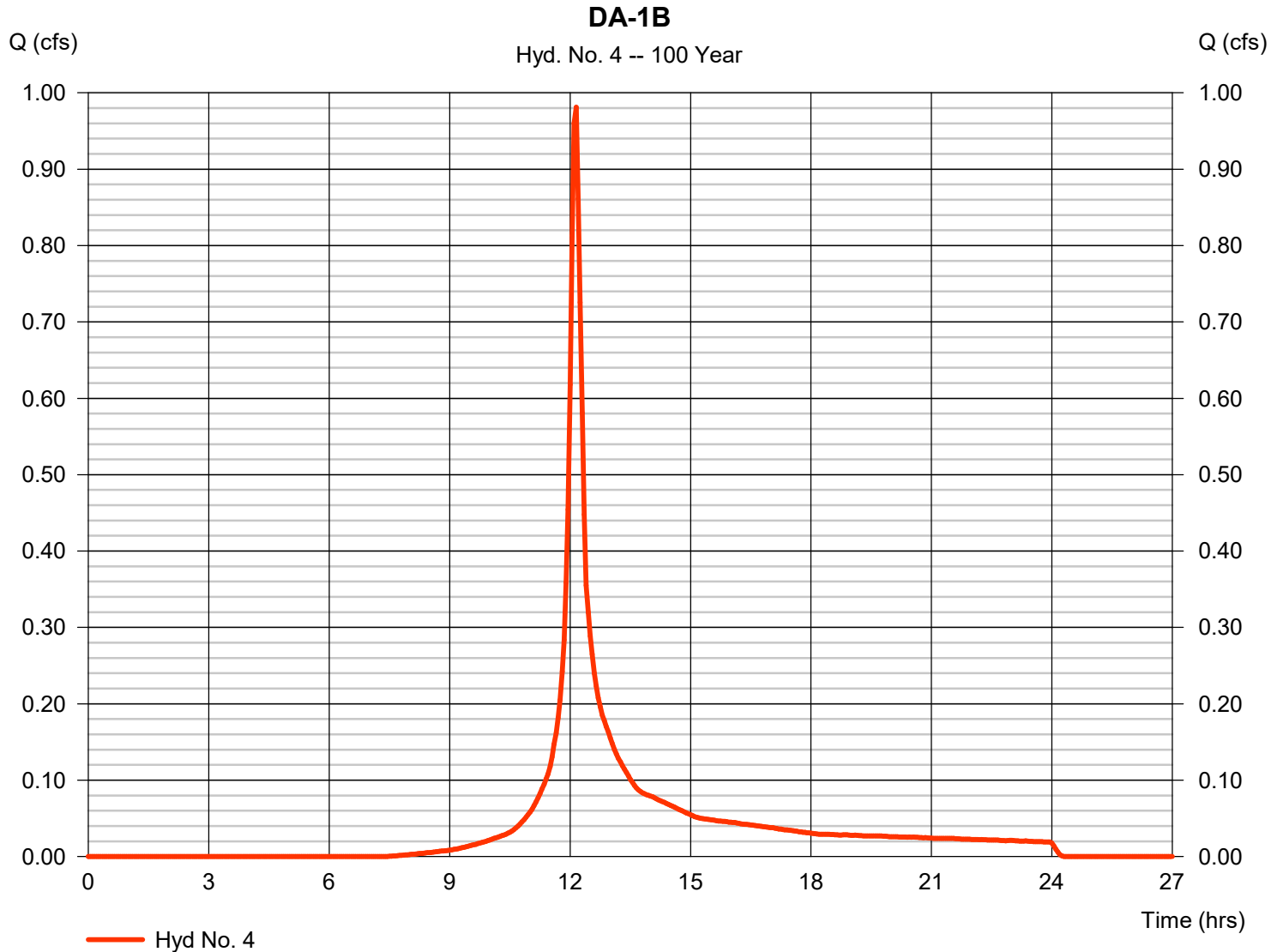
Monday, 05 / 9 / 2022

Hyd. No. 4

DA-1B

Hydrograph type	= SCS Runoff	Peak discharge	= 0.981 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.15 hrs
Time interval	= 3 min	Hyd. volume	= 3,947 cuft
Drainage area	= 0.240 ac	Curve number	= 68*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.80 min
Total precip.	= 8.35 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\19-010-0265 Daughters of Israel - West Orange		

* Composite (Area/CN) = $[(0.020 \times 30) + (0.170 \times 70) + (0.050 \times 77)] / 0.240$

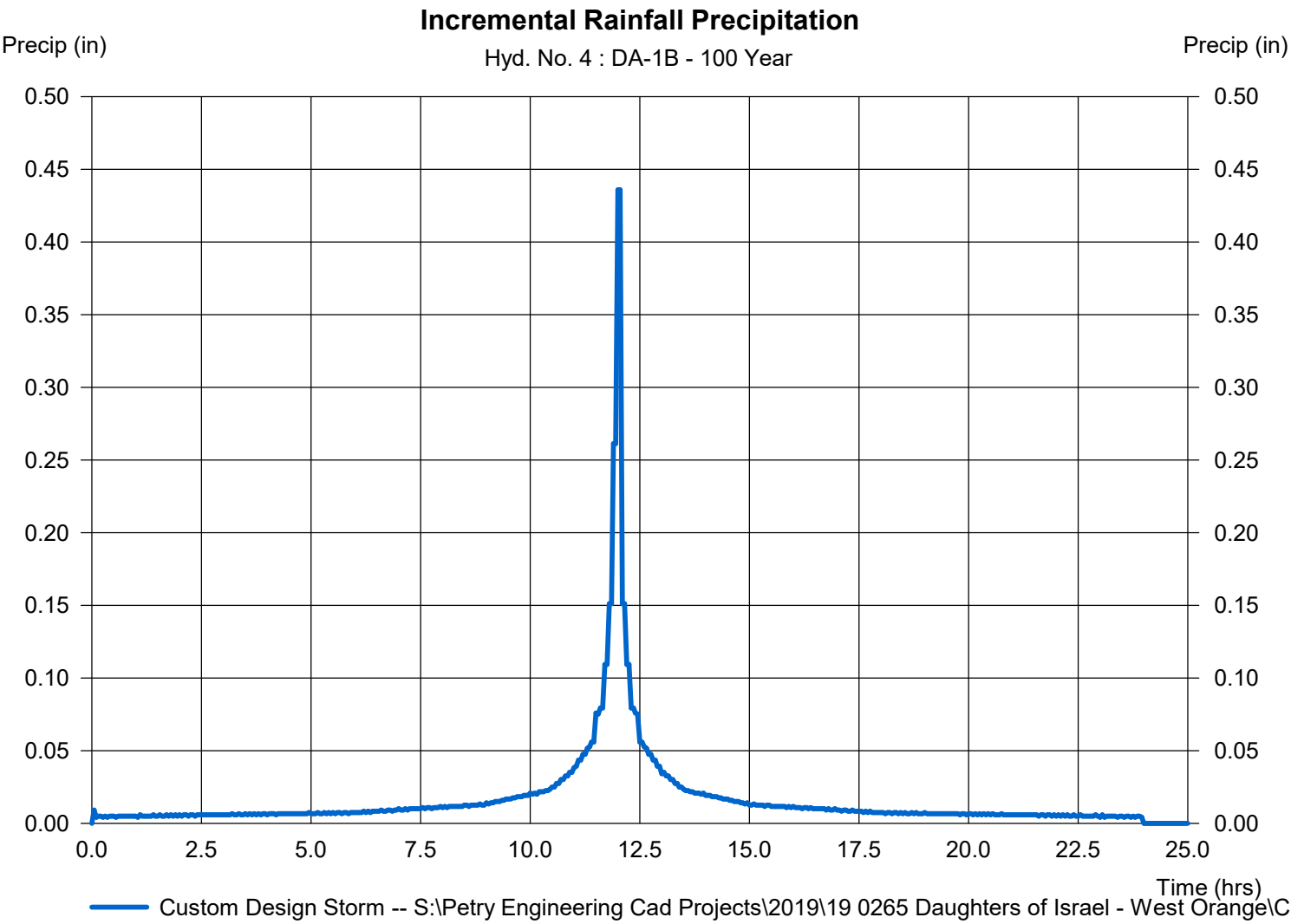


Precipitation Report

Hyd. No. 4

DA-1B

Storm Frequency	= 100 yrs	Time interval	= 3 min
Total precip.	= 8.3500 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora		



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

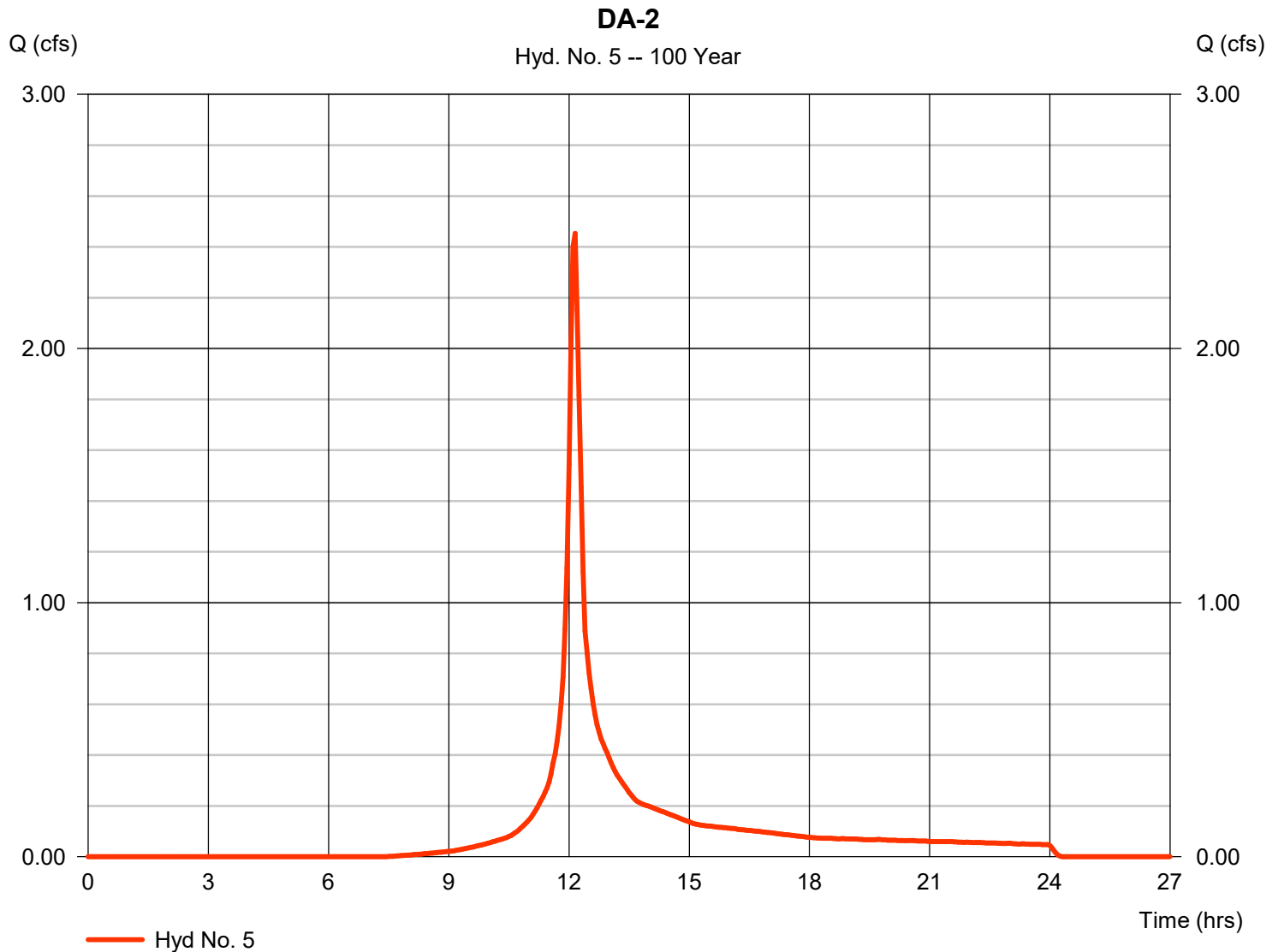
Monday, 05 / 9 / 2022

Hyd. No. 5

DA-2

Hydrograph type	= SCS Runoff	Peak discharge	= 2.453 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.15 hrs
Time interval	= 3 min	Hyd. volume	= 9,868 cuft
Drainage area	= 0.600 ac	Curve number	= 68*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.10 min
Total precip.	= 8.35 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\191010-0265 Daughters of Israel - West Orange		

* Composite (Area/CN) = $[(0.100 \times 77) + (0.140 \times 70) + (0.250 \times 80) + (0.110 \times 30)] / 0.600$



Precipitation Report

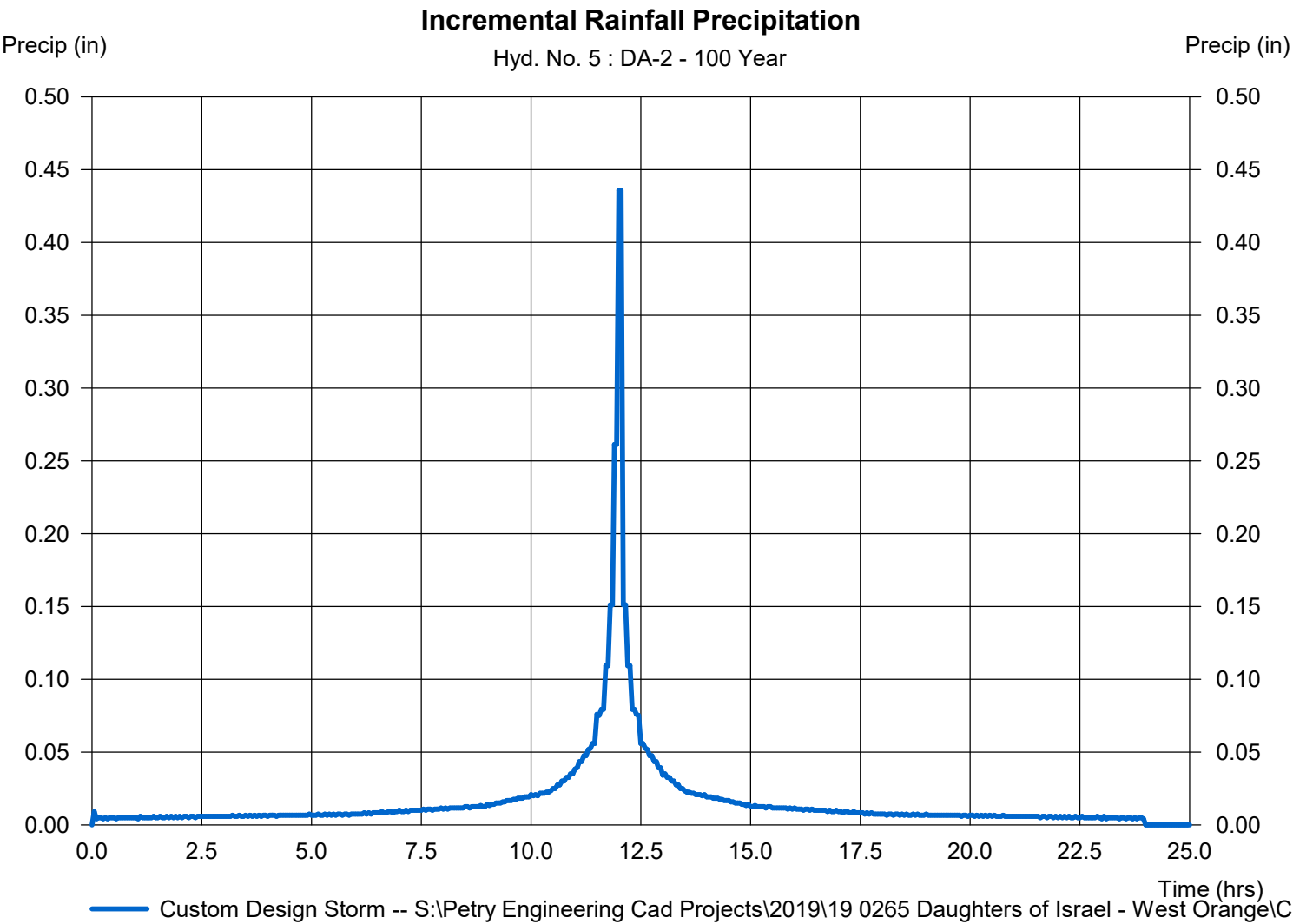
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Monday, 05 / 9 / 2022

Hyd. No. 5

DA-2

Storm Frequency	= 100 yrs	Time interval	= 3 min
Total precip.	= 8.3500 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Orange\Civil\Hydro\DA-2		

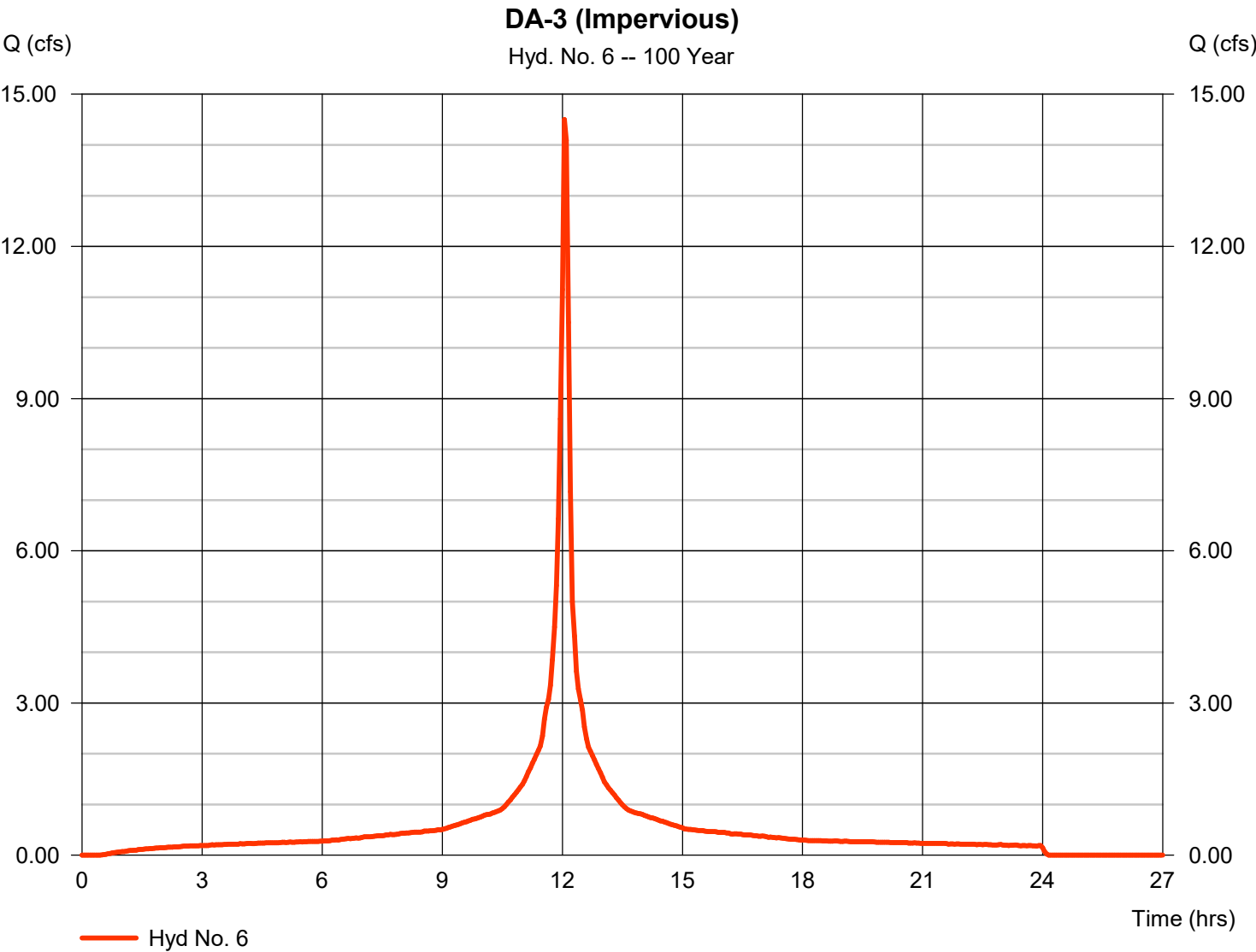


Hydrograph Report

Hyd. No. 6

DA-3 (Impervious)

Hydrograph type	= SCS Runoff	Peak discharge	= 14.50 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.05 hrs
Time interval	= 3 min	Hyd. volume	= 57,959 cuft
Drainage area	= 2.100 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 8.35 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\191019 0265 Daughters of Israel - West Orange		



Precipitation Report

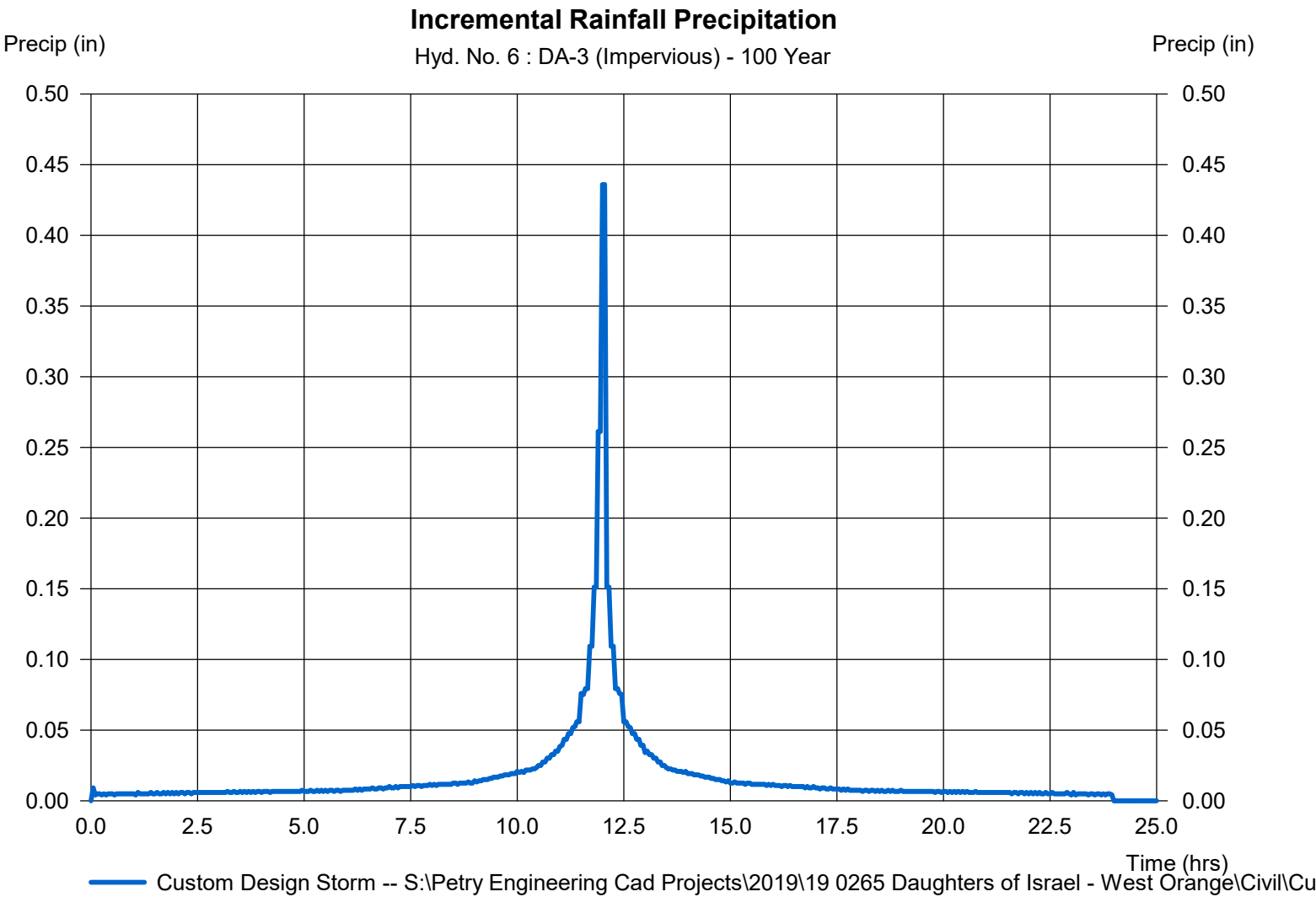
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Monday, 05 / 9 / 2022

Hyd. No. 6

DA-3 (Impervious)

Storm Frequency	= 100 yrs	Time interval	= 3 min
Total precip.	= 8.3500 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Orange\Civil\Hydro\DA-3 (Impervious) - 100 Year		



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

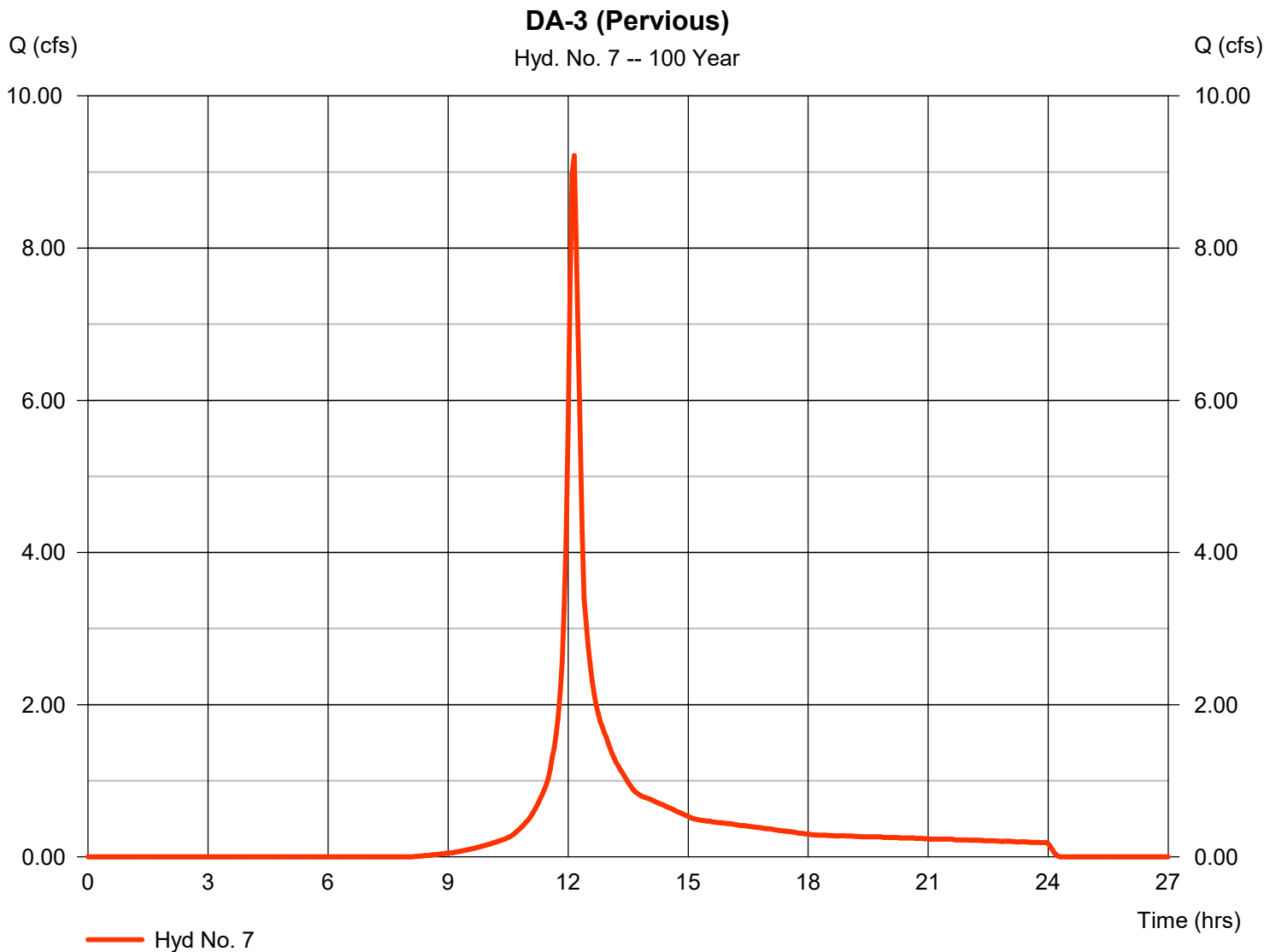
Monday, 05 / 9 / 2022

Hyd. No. 7

DA-3 (Pervious)

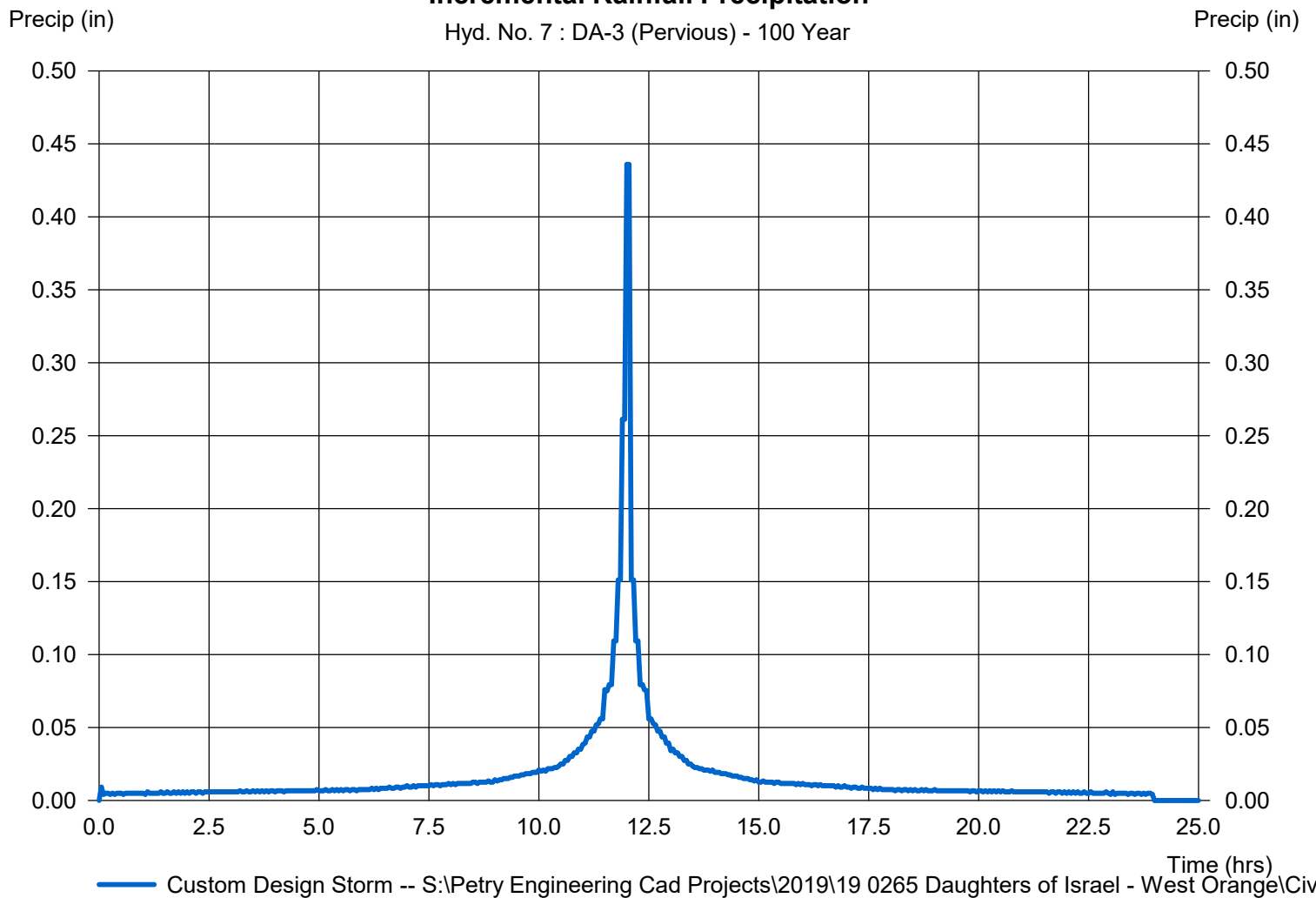
Hydrograph type	= SCS Runoff	Peak discharge	= 9.213 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.15 hrs
Time interval	= 3 min	Hyd. volume	= 37,015 cuft
Drainage area	= 2.440 ac	Curve number	= 65*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.50 min
Total precip.	= 8.35 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\191019 0265 Daugherty of Israel - West Orange		

* Composite (Area/CN) = $[(0.890 \times 80) + (0.210 \times 74) + (0.550 \times 30) + (0.760 \times 70) + (0.030 \times 77)] / 2.440$



DA-3 (Pervious)

Storm Frequency = 100 yrs Time interval = 3 min
Total precip. = 8.3500 in Distribution = Custom
Storm duration = S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora



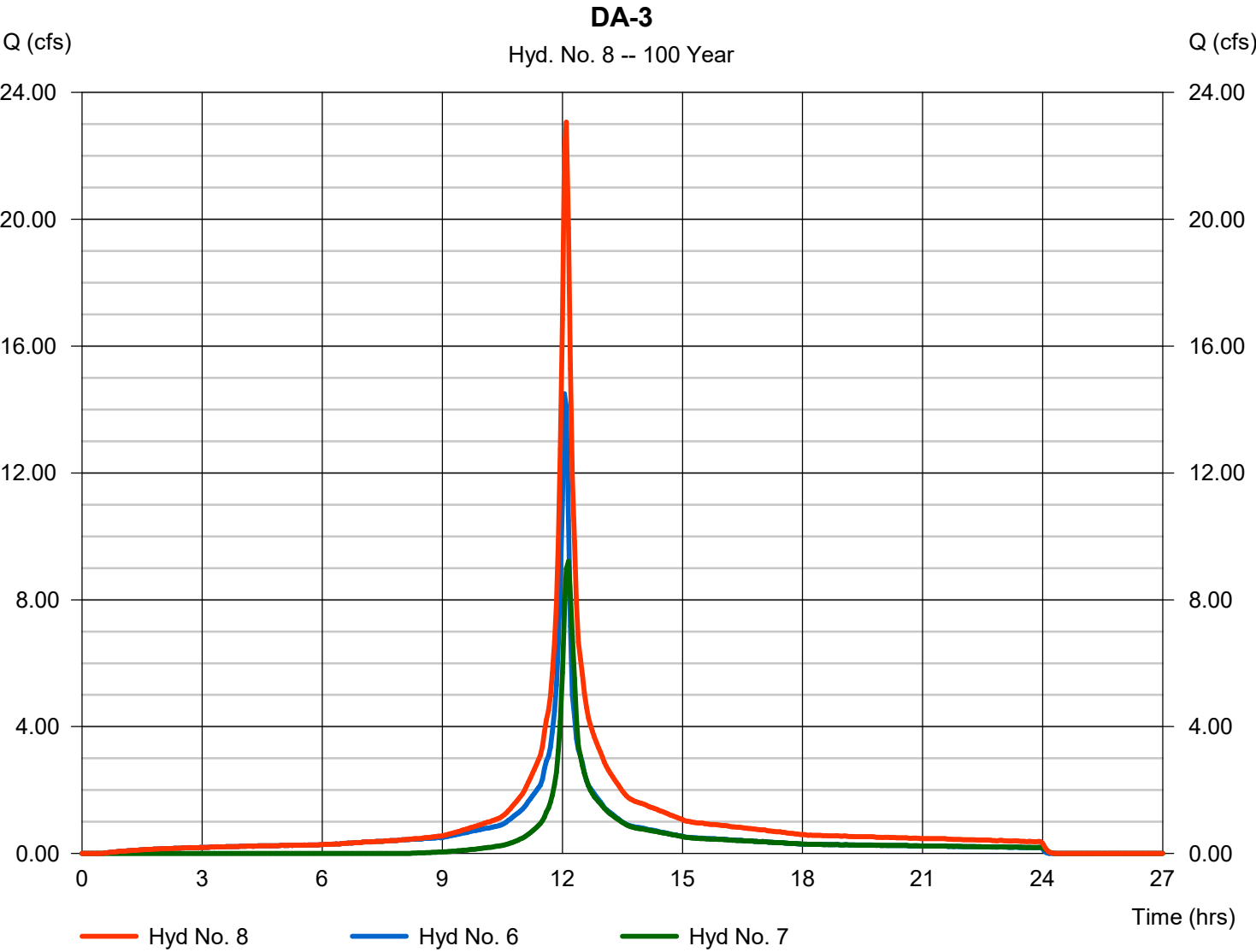
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Monday, 05 / 9 / 2022

Hyd. No. 8

DA-3			
Hydrograph type	= Combine	Peak discharge	= 23.06 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 94,974 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 4.540 ac



Hydrograph Report

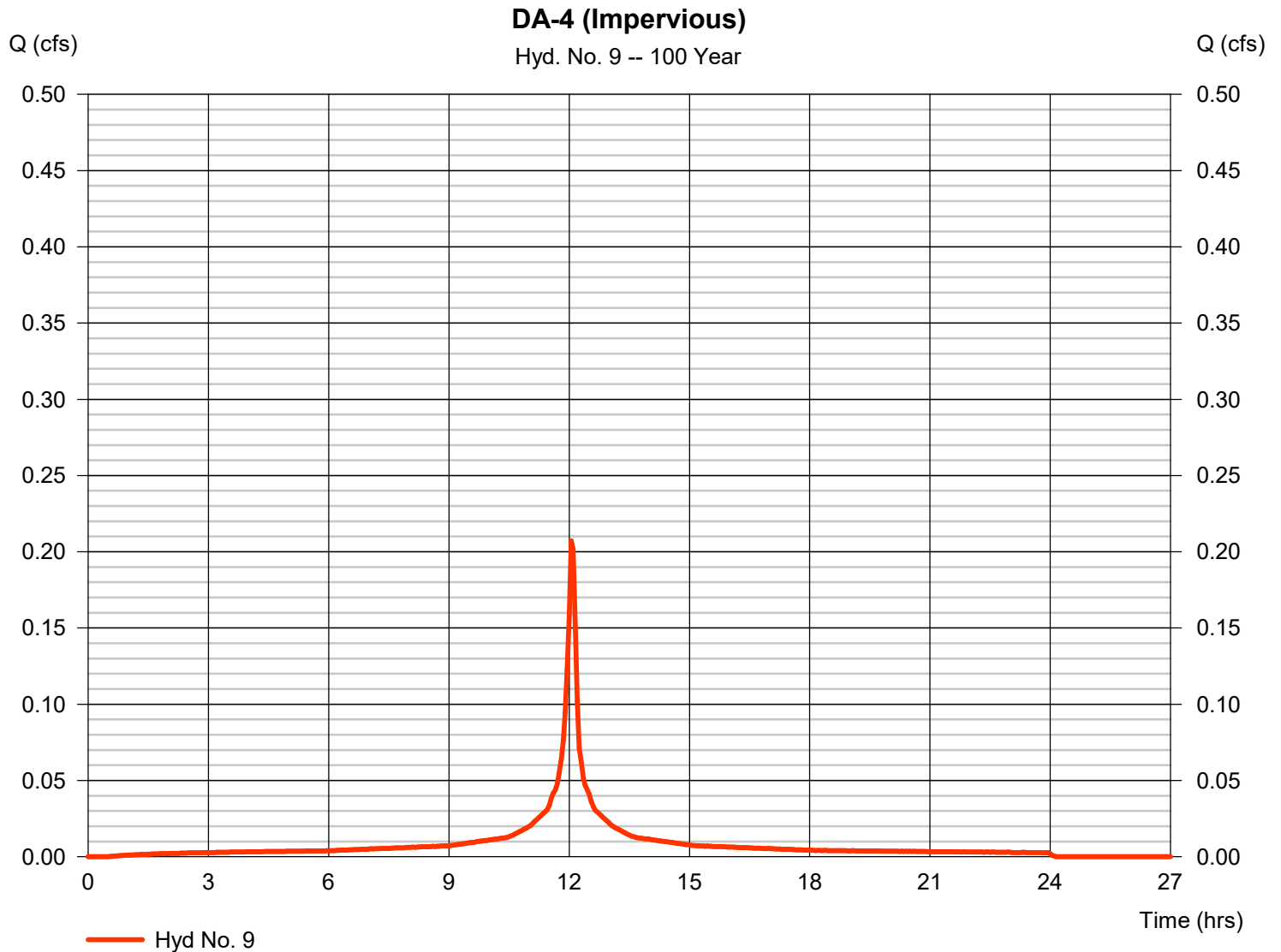
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Monday, 05 / 9 / 2022

Hyd. No. 9

DA-4 (Impervious)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.207 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.05 hrs
Time interval	= 3 min	Hyd. volume	= 828 cuft
Drainage area	= 0.030 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 8.35 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\2019\19-0265 Daughters of Israel - West Orange		

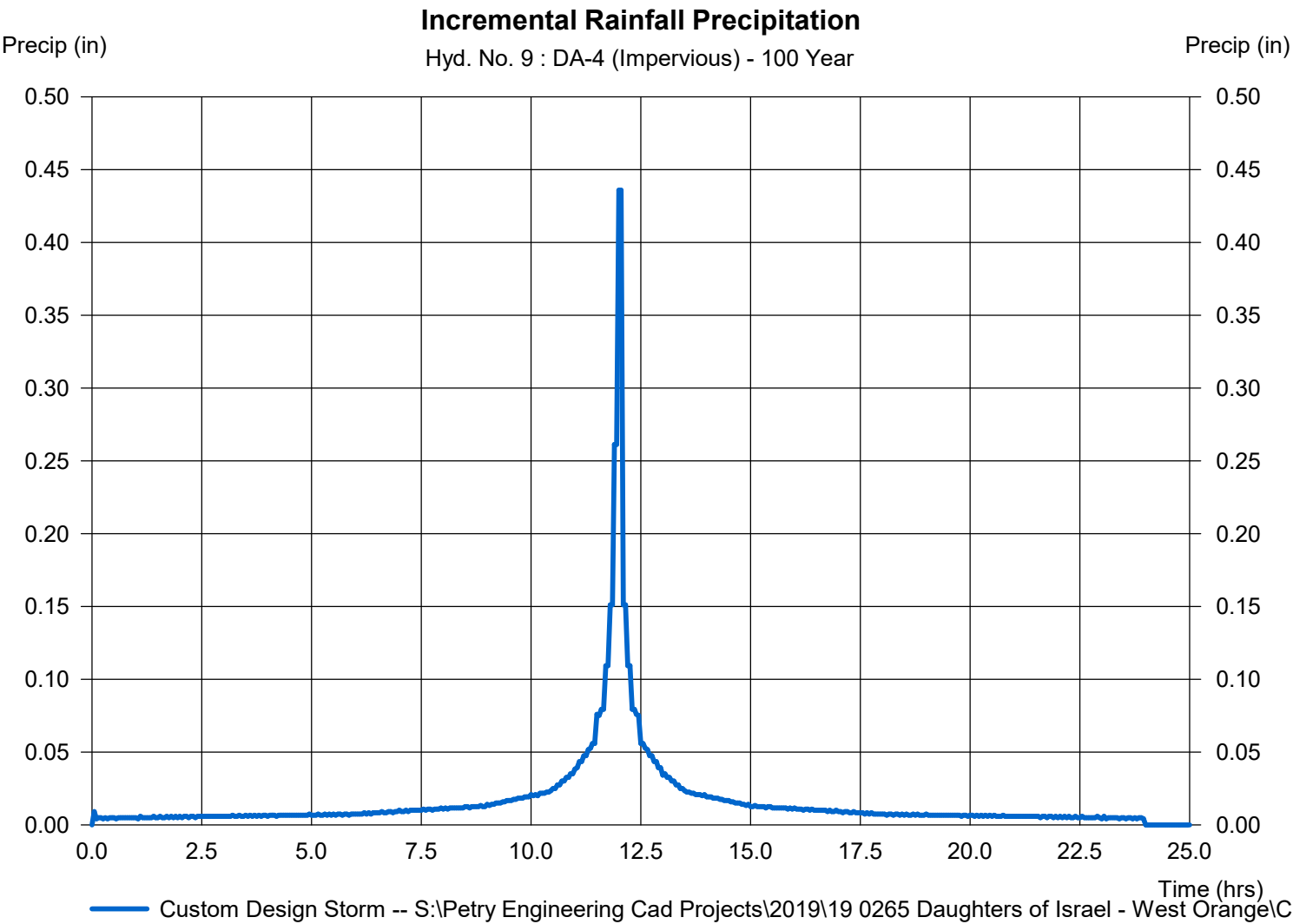


Precipitation Report

Hyd. No. 9

DA-4 (Impervious)

Storm Frequency	= 100 yrs	Time interval	= 3 min
Total precip.	= 8.3500 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Orange\Civil\Hydro\DA-4 (Impervious) - 100 Year		



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

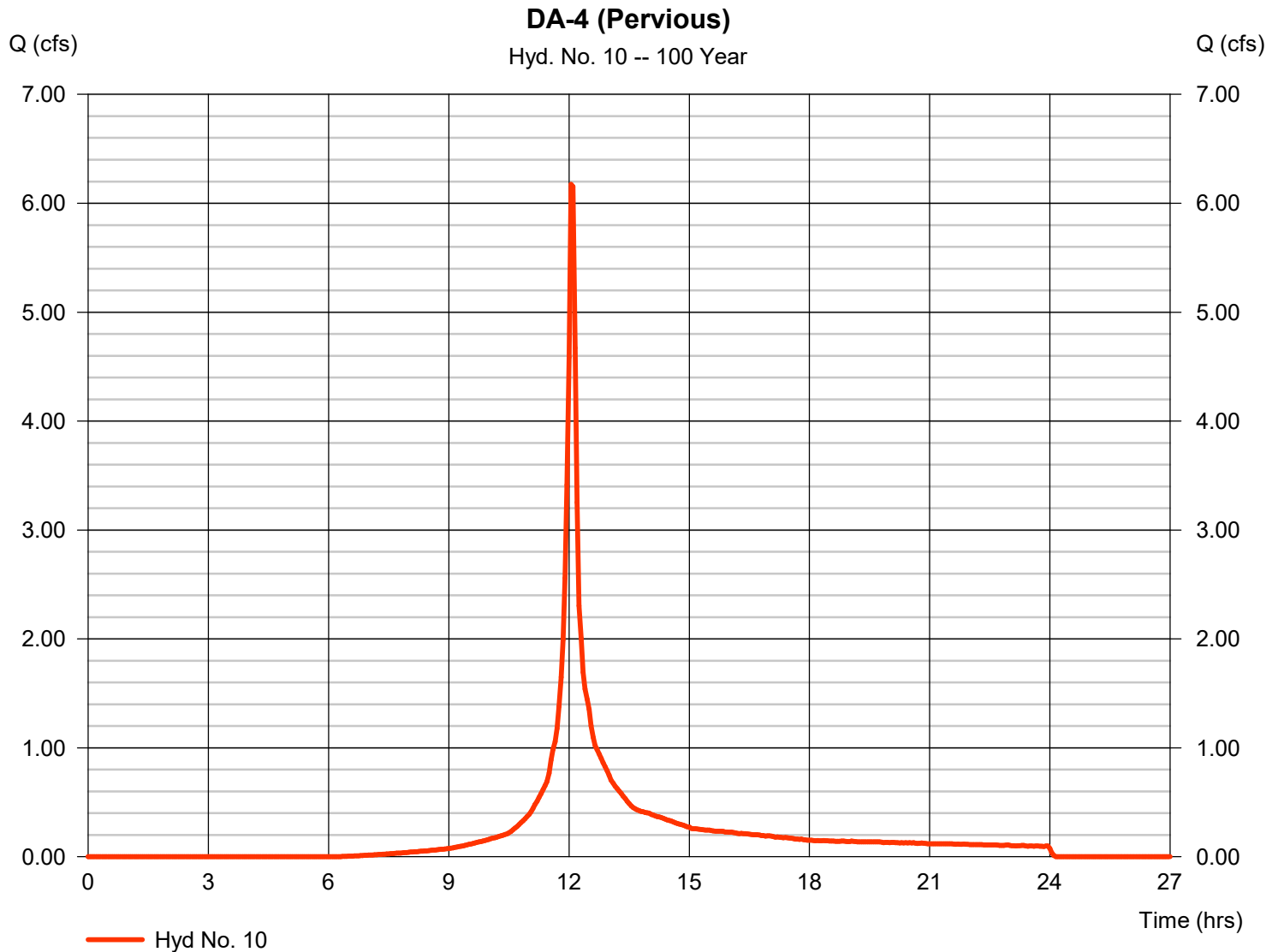
Monday, 05 / 9 / 2022

Hyd. No. 10

DA-4 (Pervious)

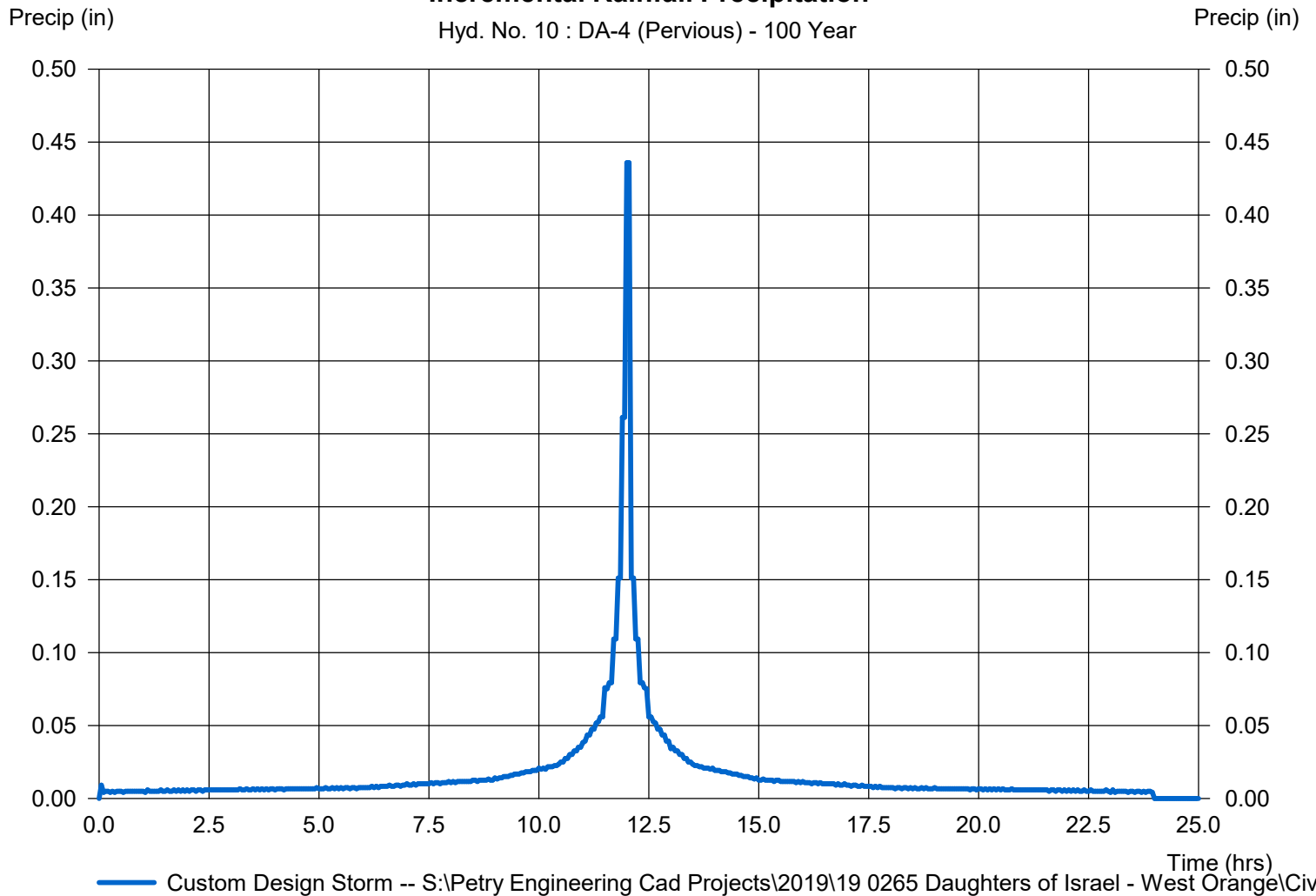
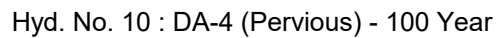
Hydrograph type	= SCS Runoff	Peak discharge	= 6.173 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.05 hrs
Time interval	= 3 min	Hyd. volume	= 21,263 cuft
Drainage area	= 1.220 ac	Curve number	= 73*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.60 min
Total precip.	= 8.35 in	Distribution	= Custom
Storm duration	= S:\Petty Engineering Cad Projects\19010265 Daughters of Israel - West Orange		

* Composite (Area/CN) = $[(1.060 \times 80) + (0.160 \times 30)] / 1.220$



DA-4 (Pervious)

Storm Frequency = 100 yrs Time interval = 3 min
Total precip. = 8.3500 in Distribution = Custom
Storm duration = S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

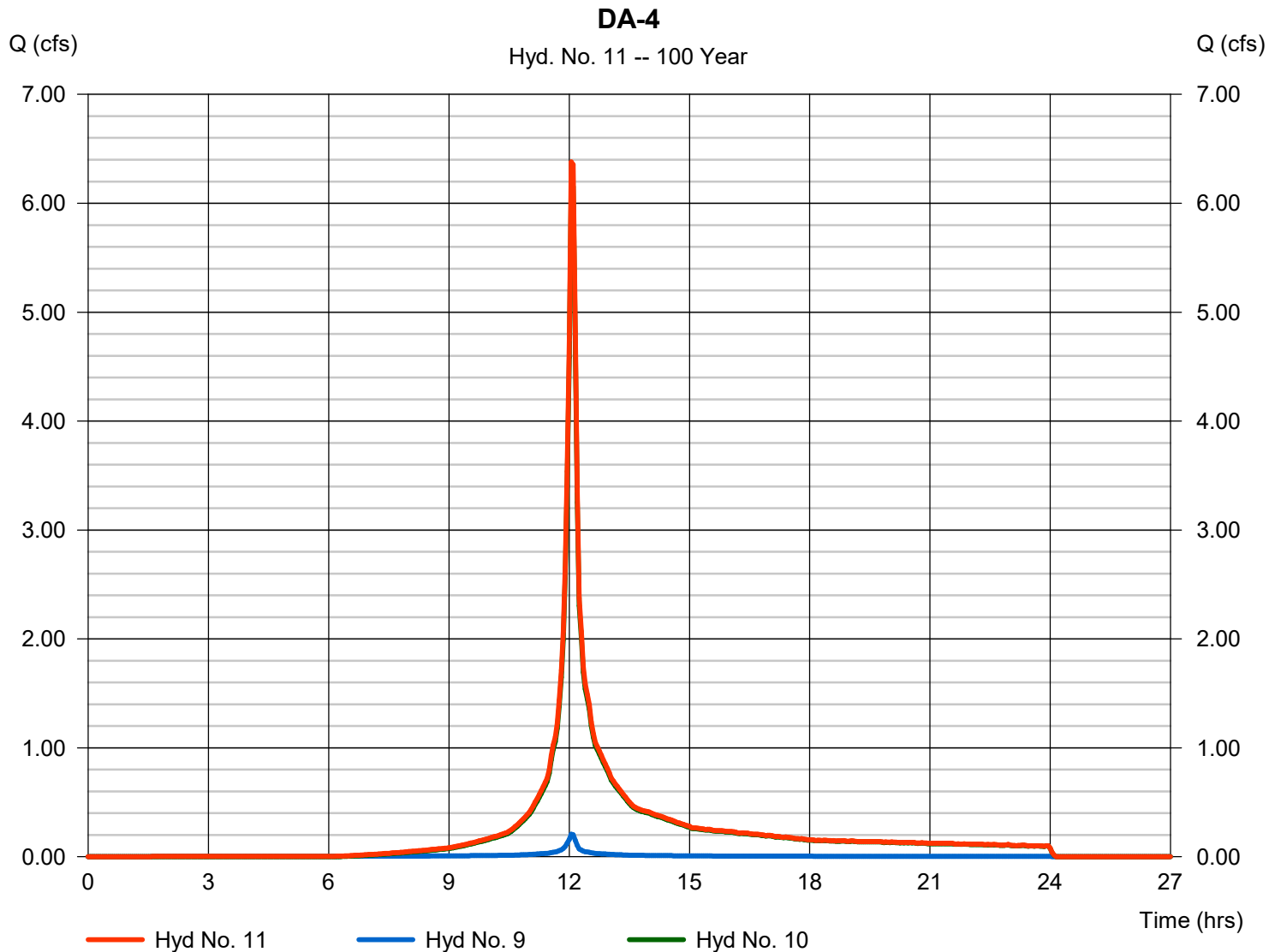
Monday, 05 / 9 / 2022

Hyd. No. 11

DA-4

Hydrograph type = Combine
 Storm frequency = 100 yrs
 Time interval = 3 min
 Inflow hyds. = 9, 10

Peak discharge = 6.380 cfs
 Time to peak = 12.05 hrs
 Hyd. volume = 22,091 cuft
 Contrib. drain. area = 1.250 ac

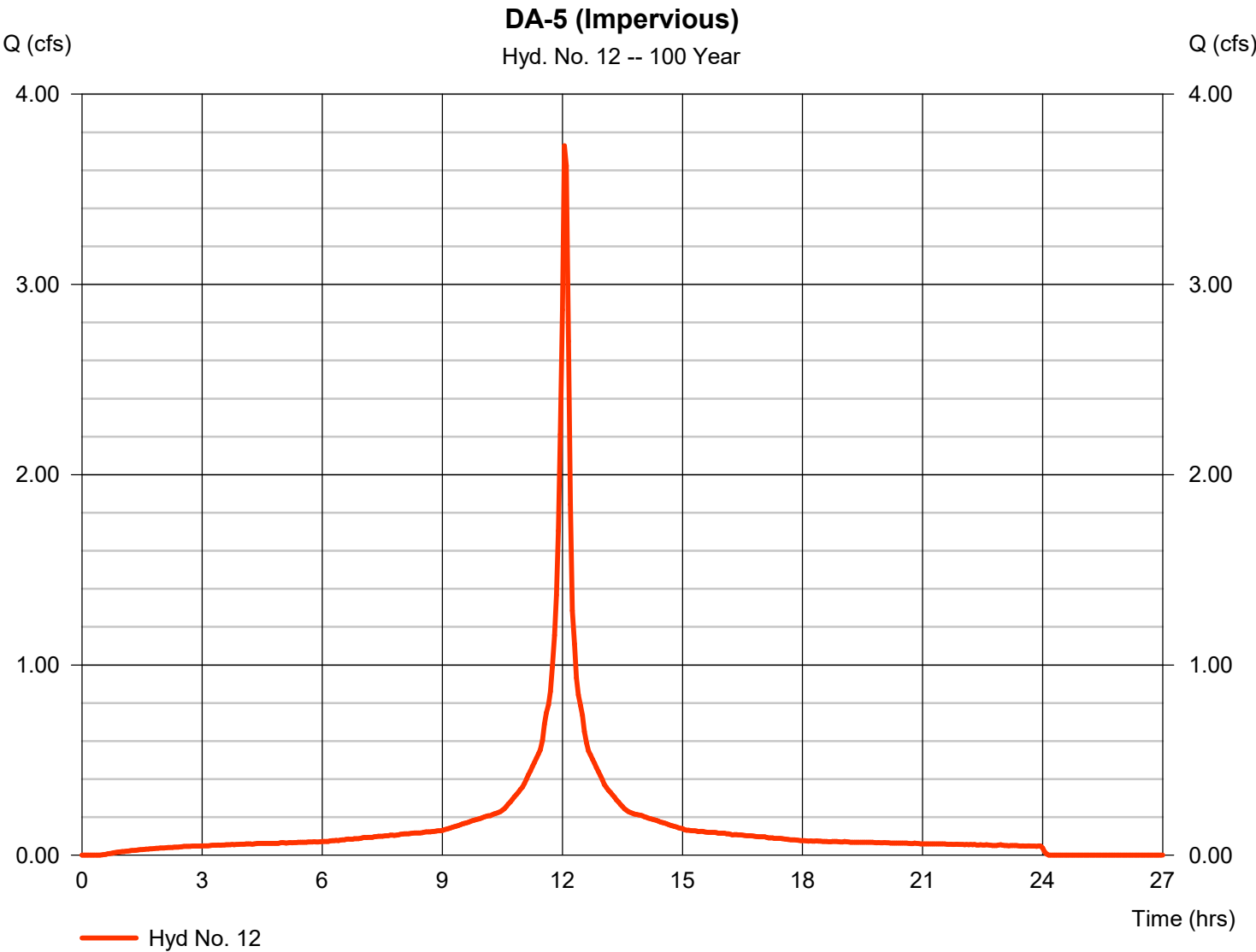


Hydrograph Report

Hyd. No. 12

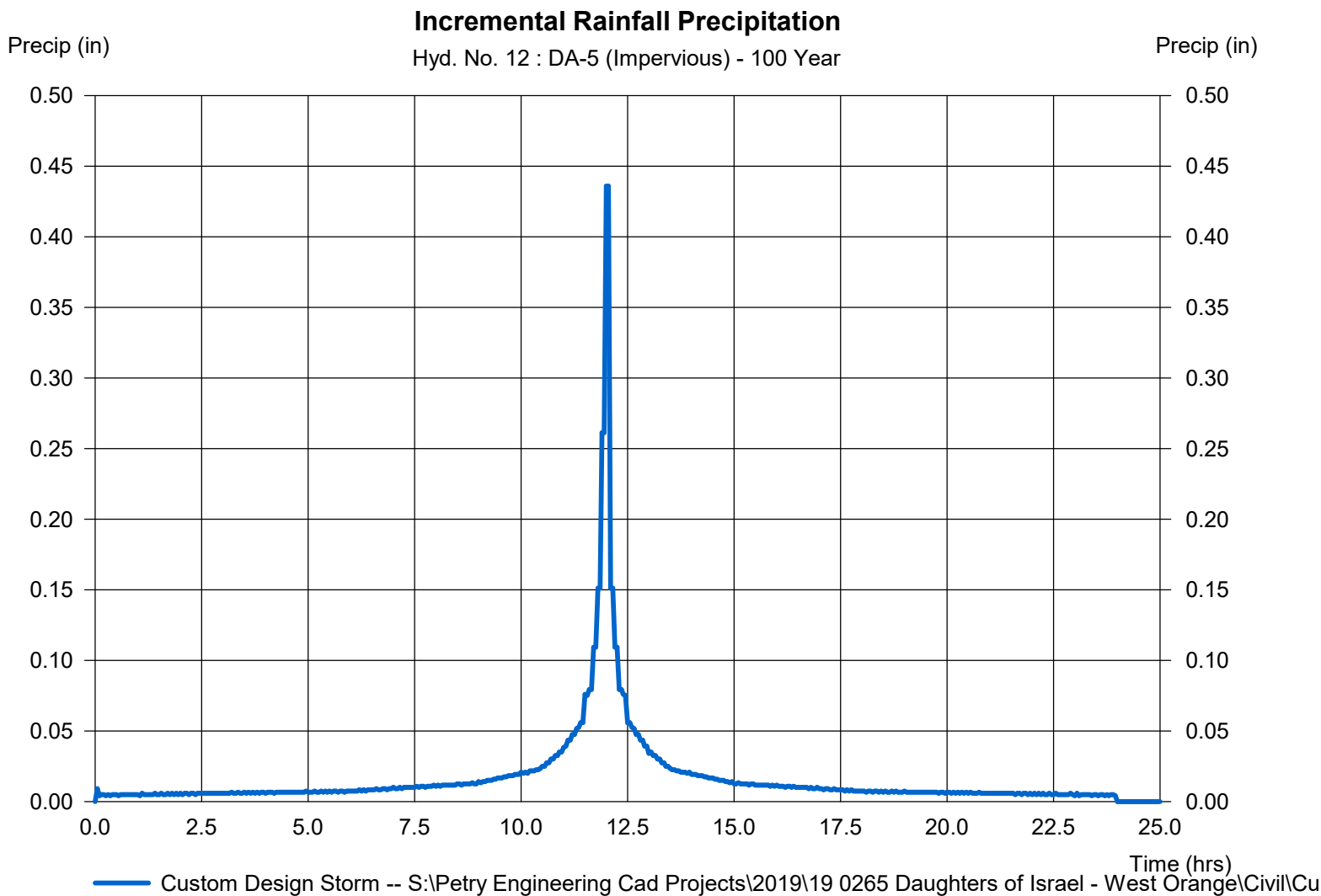
DA-5 (Impervious)

Hydrograph type	= SCS Runoff	Peak discharge	= 3.729 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.05 hrs
Time interval	= 3 min	Hyd. volume	= 14,904 cuft
Drainage area	= 0.540 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 8.35 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\19-010-0265 Daughters of Israel - West Orange		



DA-5 (Impervious)

Storm Frequency = 100 yrs Time interval = 3 min
Total precip. = 8.3500 in Distribution = Custom
Storm duration = S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

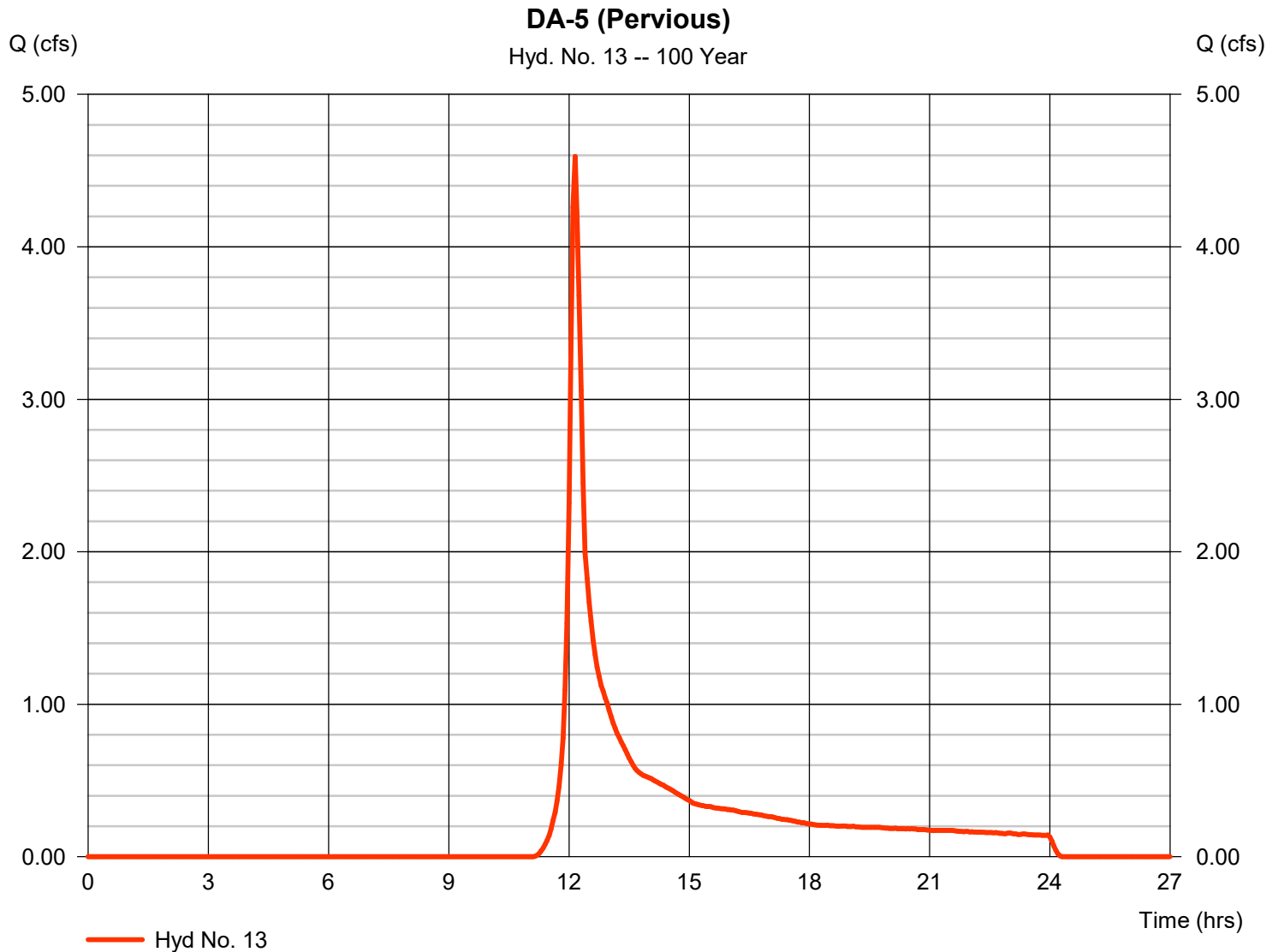
Monday, 05 / 9 / 2022

Hyd. No. 13

DA-5 (Pervious)

Hydrograph type	= SCS Runoff	Peak discharge	= 4.593 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.15 hrs
Time interval	= 3 min	Hyd. volume	= 20,104 cuft
Drainage area	= 2.590 ac	Curve number	= 47*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.60 min
Total precip.	= 8.35 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\13010265 Daughters of Israel - West Orange		

* Composite (Area/CN) = $[(0.760 \times 80) + (1.700 \times 30) + (0.130 \times 70)] / 2.590$

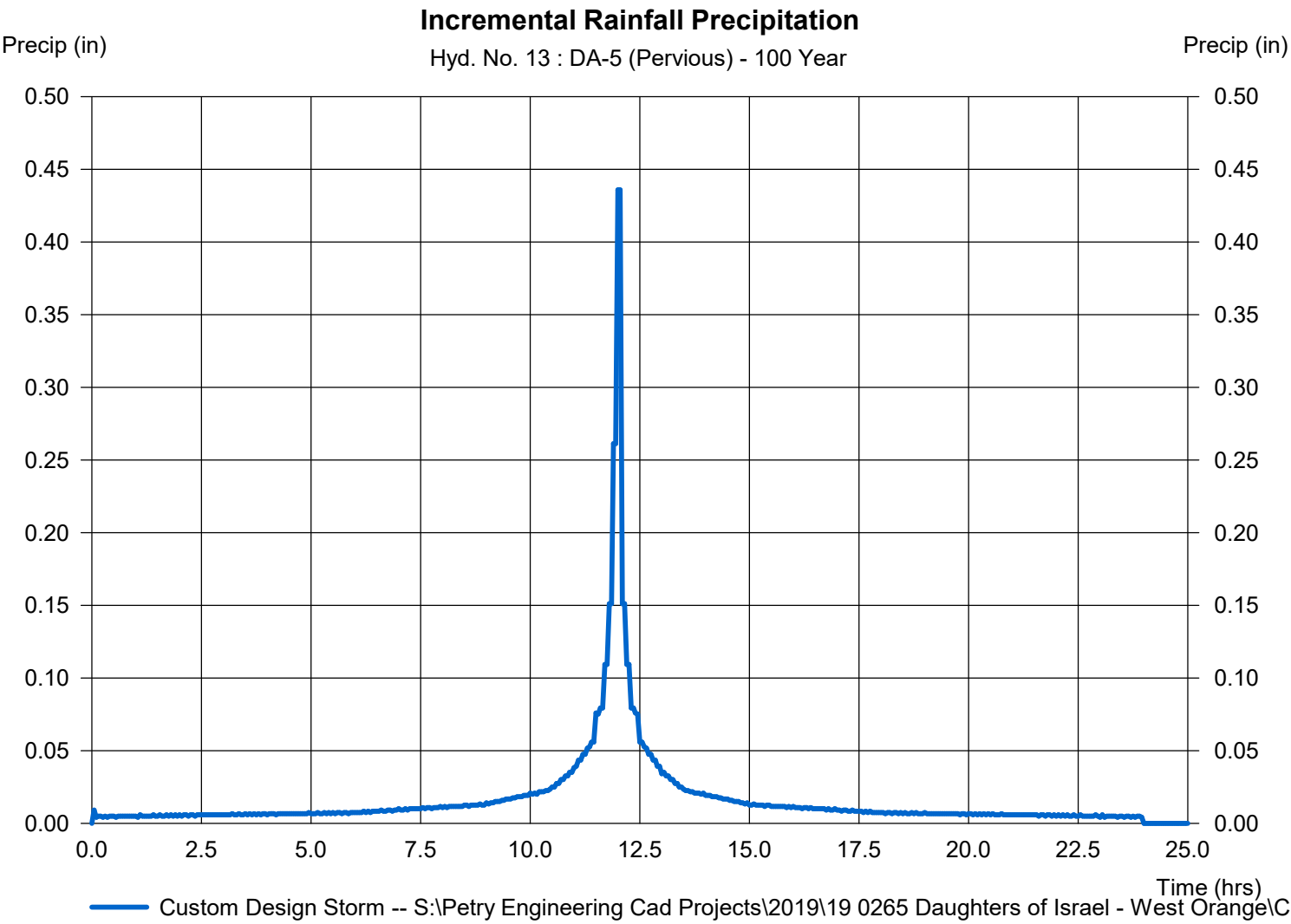


Precipitation Report

Hyd. No. 13

DA-5 (Pervious)

Storm Frequency	= 100 yrs	Time interval	= 3 min
Total precip.	= 8.3500 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora		



Hydrograph Report

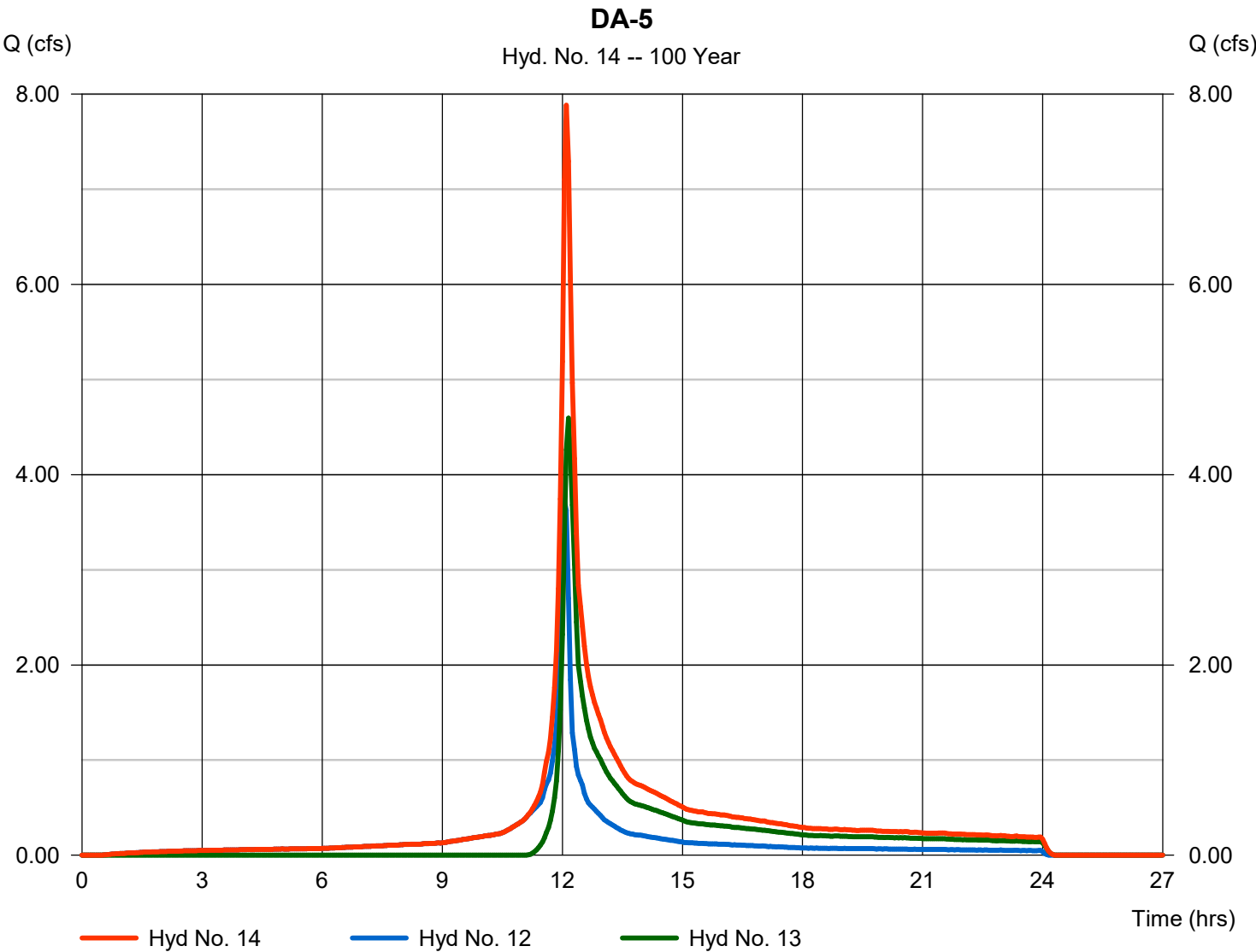
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Monday, 05 / 9 / 2022

Hyd. No. 14

DA-5

Hydrograph type	= Combine	Peak discharge	= 7.885 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 35,007 cuft
Inflow hyds.	= 12, 13	Contrib. drain. area	= 3.130 ac



Hydrograph Report

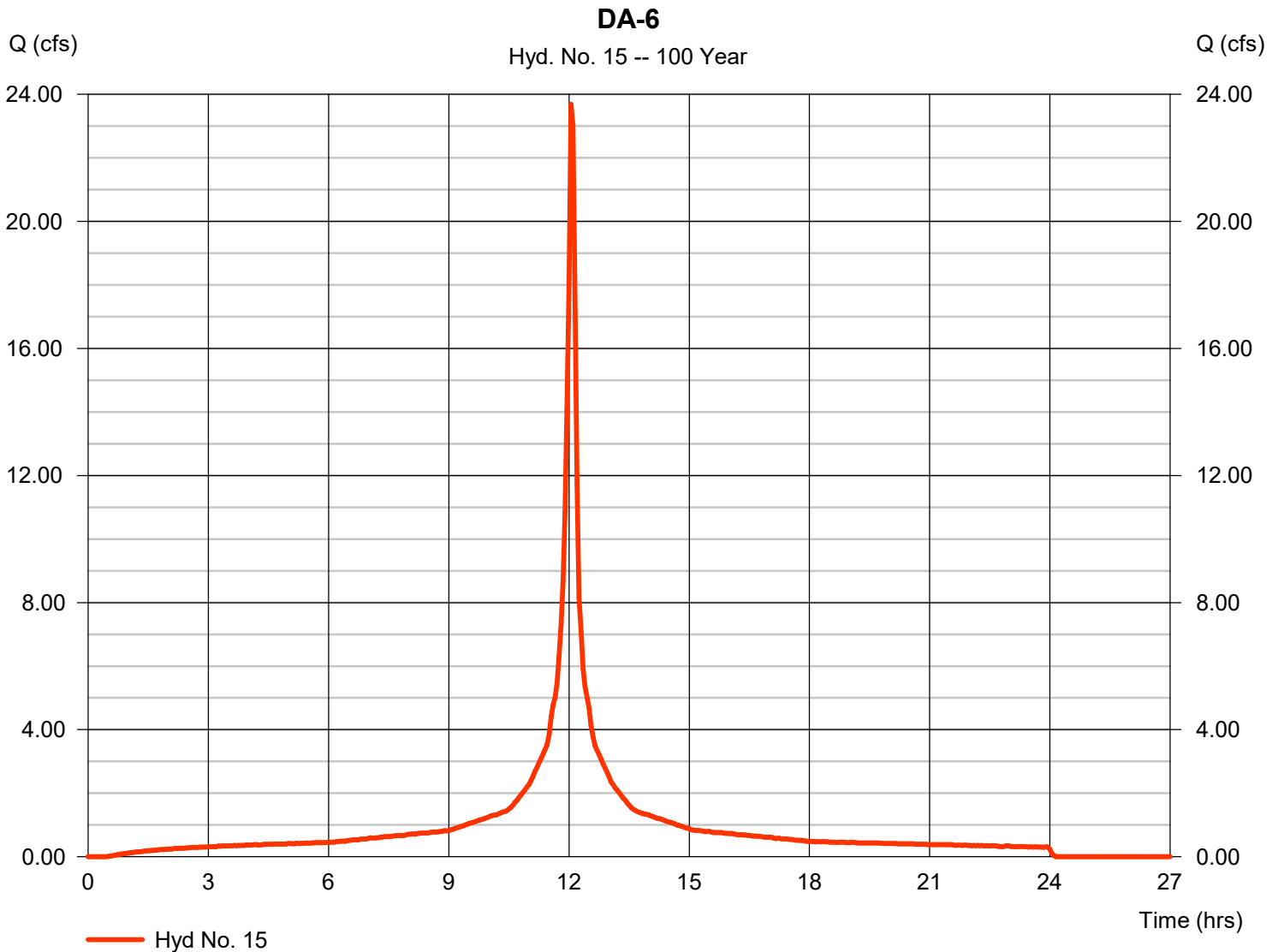
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Monday, 05 / 9 / 2022

Hyd. No. 15

DA-6

Hydrograph type	= SCS Runoff	Peak discharge	= 23.69 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.05 hrs
Time interval	= 3 min	Hyd. volume	= 94,666 cuft
Drainage area	= 3.430 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 8.35 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\19-01-0265 Daughters of Israel - West Orange		

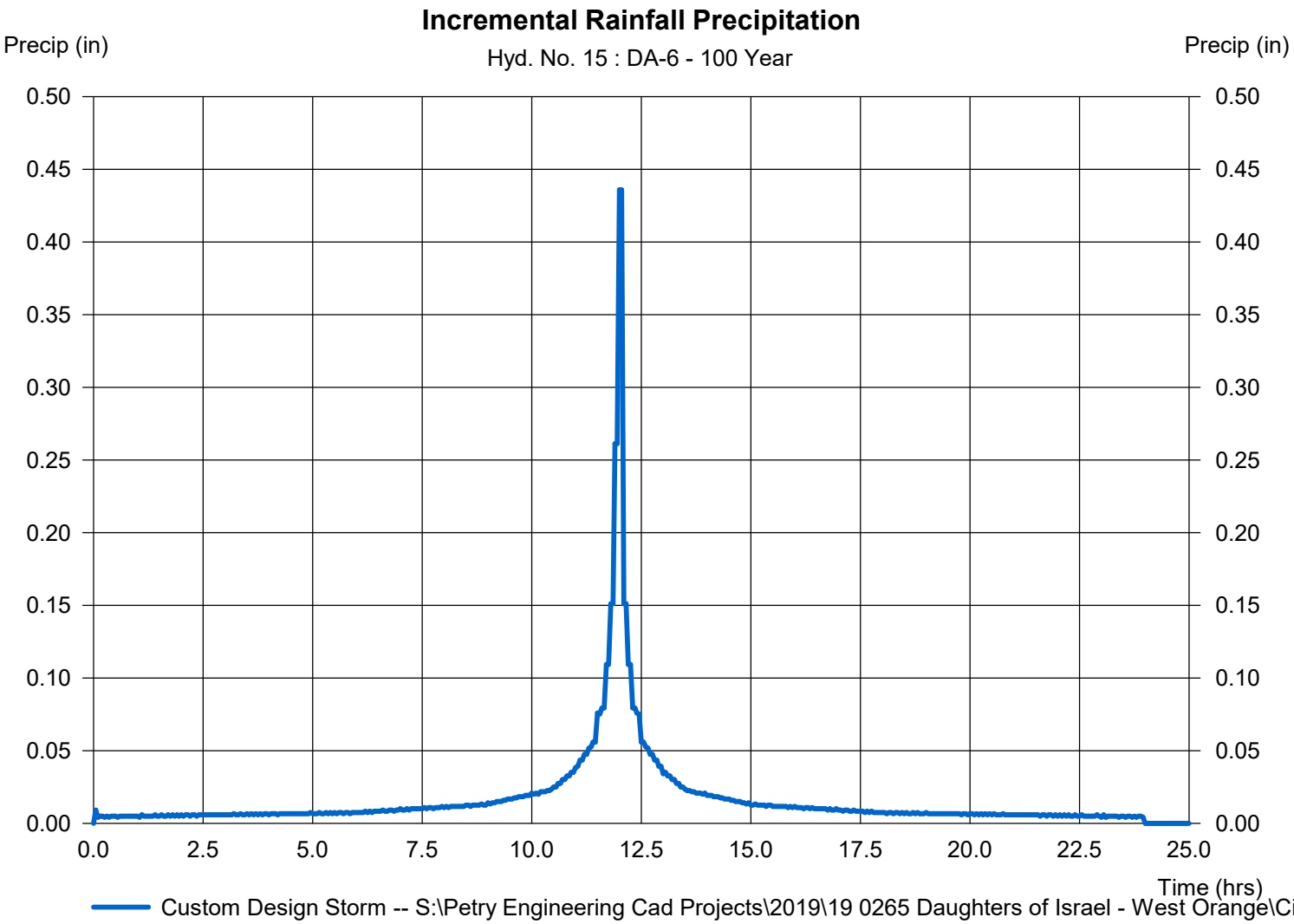


Precipitation Report

Hyd. No. 15

DA-6

Storm Frequency	= 100 yrs	Time interval	= 3 min
Total precip.	= 8.3500 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Orange\Civil\Hydro\15 DA-6 - 100 Year		



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

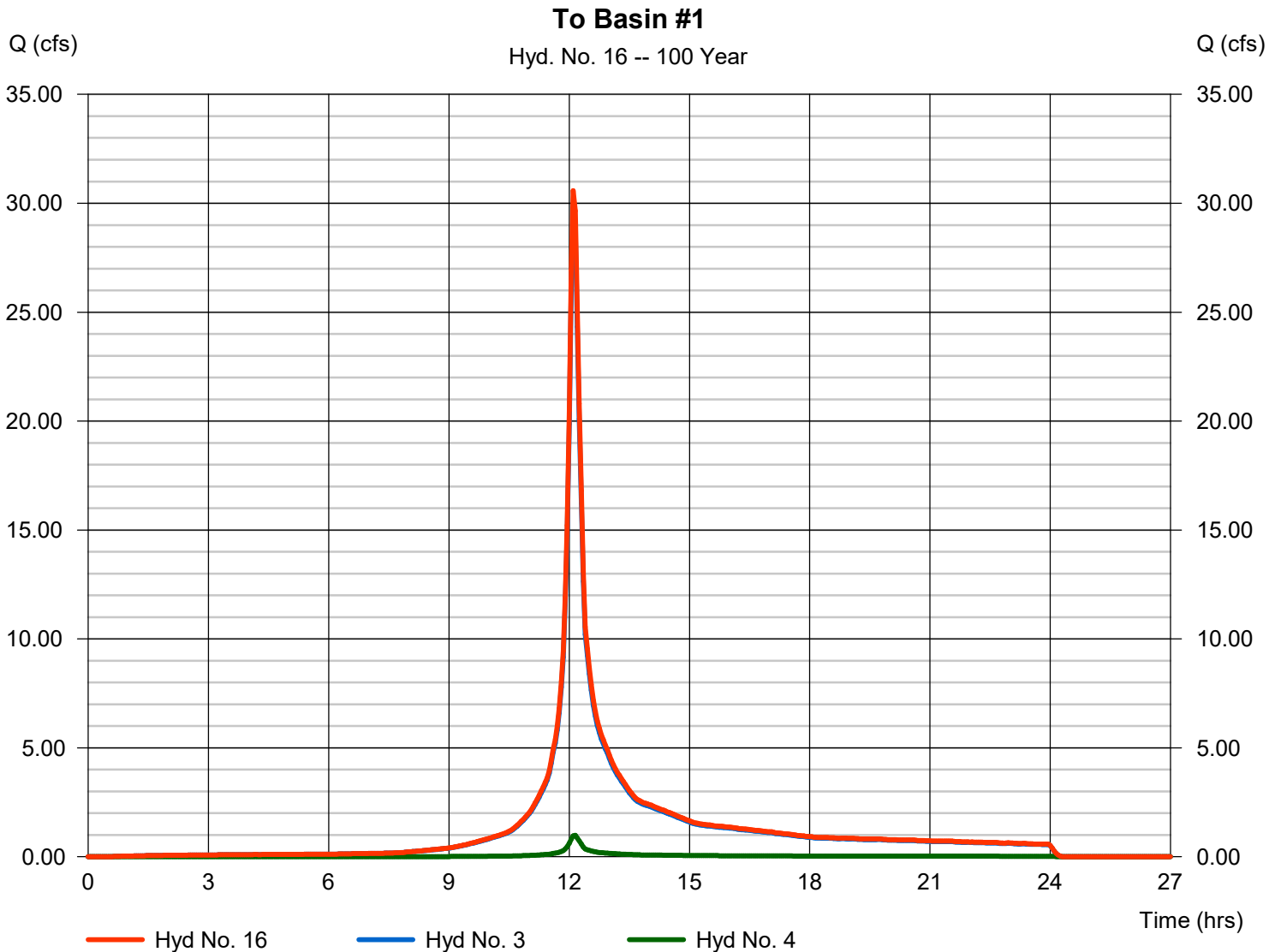
Monday, 05 / 9 / 2022

Hyd. No. 16

To Basin #1

Hydrograph type = Combine
 Storm frequency = 100 yrs
 Time interval = 3 min
 Inflow hyds. = 3, 4

Peak discharge = 30.57 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 125,801 cuft
 Contrib. drain. area = 0.240 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Monday, 05 / 9 / 2022

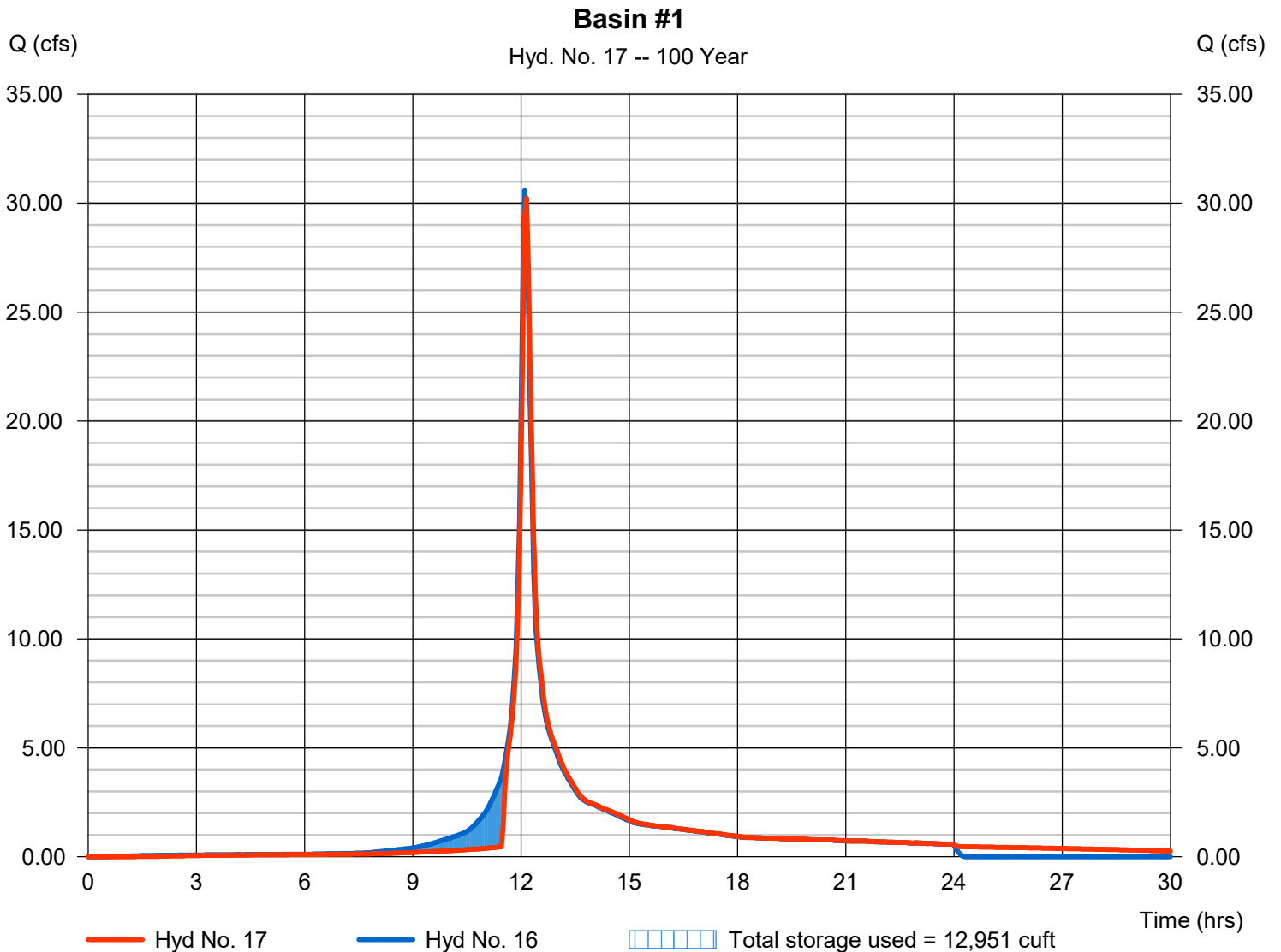
Hyd. No. 17

Basin #1

Hydrograph type = Reservoir
 Storm frequency = 100 yrs
 Time interval = 3 min
 Inflow hyd. No. = 16 - To Basin #1
 Reservoir name = Basin #1

Peak discharge = 30.22 cfs
 Time to peak = 12.15 hrs
 Hyd. volume = 125,793 cuft
 Max. Elevation = 419.68 ft
 Max. Storage = 12,951 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

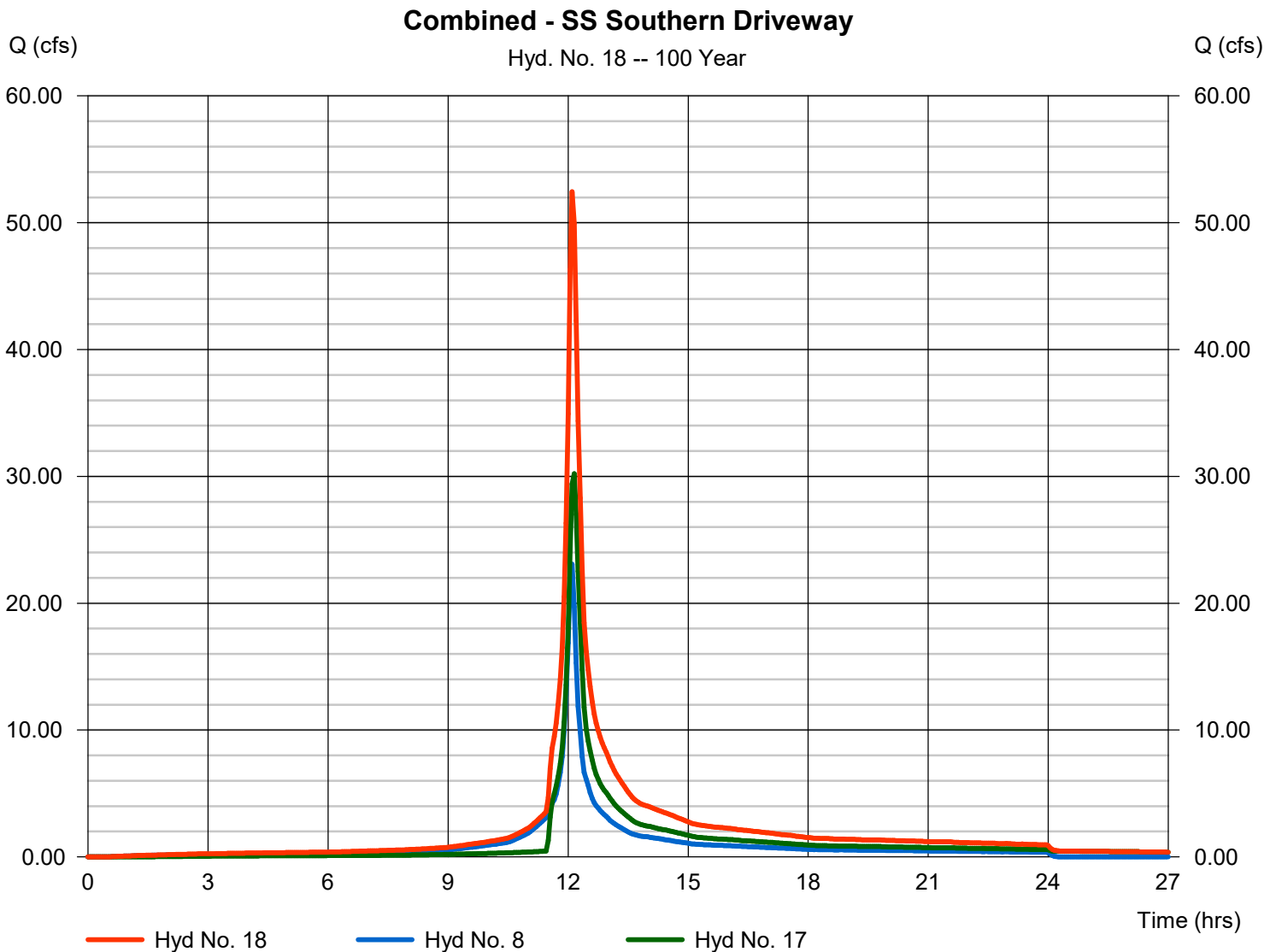
Monday, 05 / 9 / 2022

Hyd. No. 18

Combined - SS Southern Driveway

Hydrograph type = Combine
 Storm frequency = 100 yrs
 Time interval = 3 min
 Inflow hyds. = 8, 17

Peak discharge = 52.45 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 220,767 cuft
 Contrib. drain. area = 0.000 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

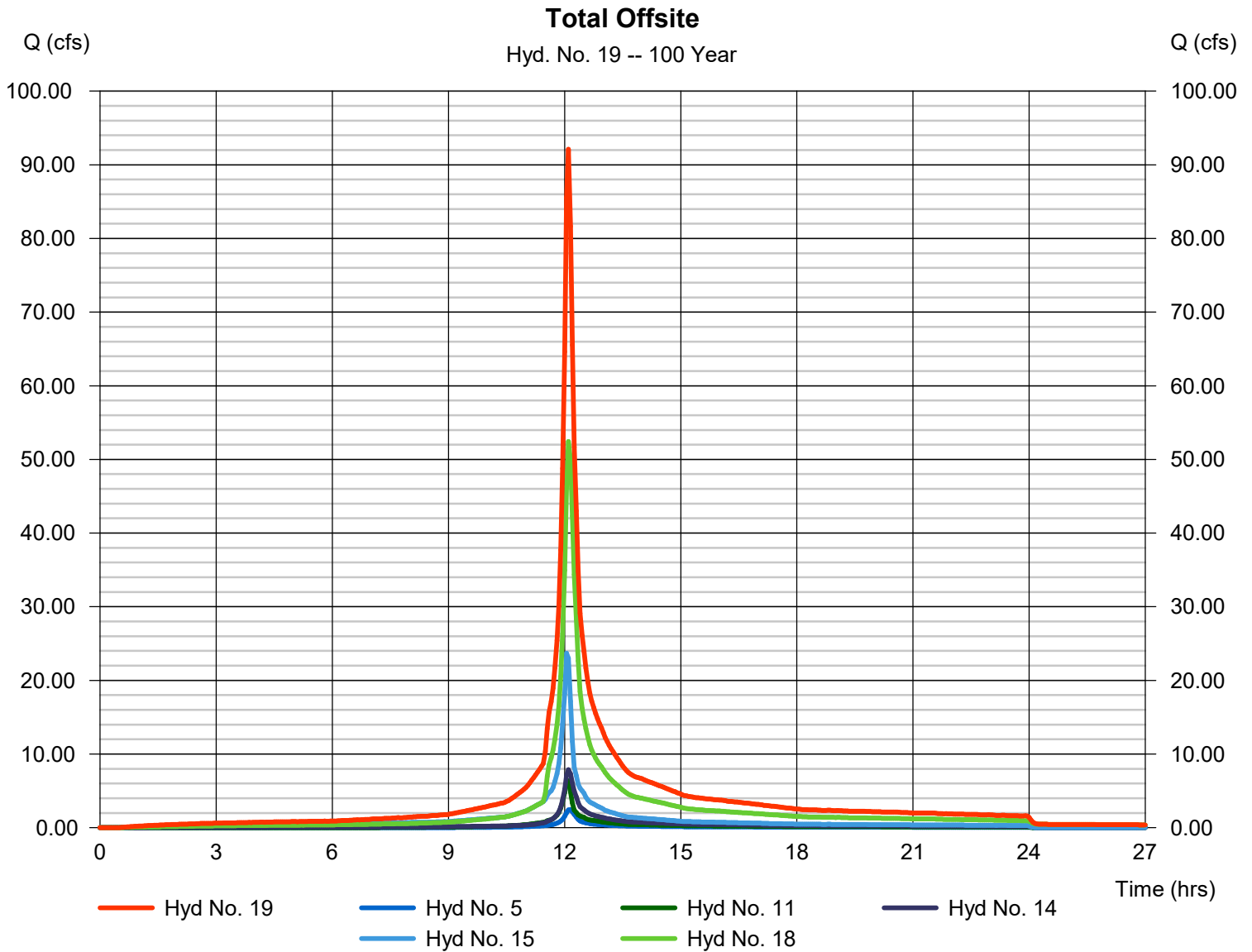
Monday, 05 / 9 / 2022

Hyd. No. 19

Total Offsite

Hydrograph type = Combine
 Storm frequency = 100 yrs
 Time interval = 3 min
 Inflow hyds. = 5, 11, 14, 15, 18

Peak discharge = 92.10 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 382,399 cuft
 Contrib. drain. area = 4.030 ac



Hydraflow Rainfall Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Monday, 05 / 9 / 2022

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	-----
2	69.8703	13.1000	0.8658	-----
3	0.0000	0.0000	0.0000	-----
5	79.2597	14.6000	0.8369	-----
10	88.2351	15.5000	0.8279	-----
25	102.6072	16.5000	0.8217	-----
50	114.8193	17.2000	0.8199	-----
100	127.1596	17.8000	0.8186	-----

File name: SampleFHA.idf

$$\text{Intensity} = B / (T_c + D)^E$$

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	5.69	4.61	3.89	3.38	2.99	2.69	2.44	2.24	2.07	1.93	1.81	1.70
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.57	5.43	4.65	4.08	3.65	3.30	3.02	2.79	2.59	2.42	2.27	2.15
10	7.24	6.04	5.21	4.59	4.12	3.74	3.43	3.17	2.95	2.77	2.60	2.46
25	8.25	6.95	6.03	5.34	4.80	4.38	4.02	3.73	3.48	3.26	3.07	2.91
50	9.04	7.65	6.66	5.92	5.34	4.87	4.49	4.16	3.88	3.65	3.44	3.25
100	9.83	8.36	7.30	6.50	5.87	5.36	4.94	4.59	4.29	4.03	3.80	3.60

T_c = time in minutes. Values may exceed 60.

Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Orange\Civil\Current\Stormwater\Rainfall.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	3.54	0.00	0.00	0.00	0.00	0.00	0.00
SCS 6-Hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	3.54	0.00	0.00	5.24	6.37	0.00	8.35

PROPOSED CONDITIONS HYDROGRAPHS



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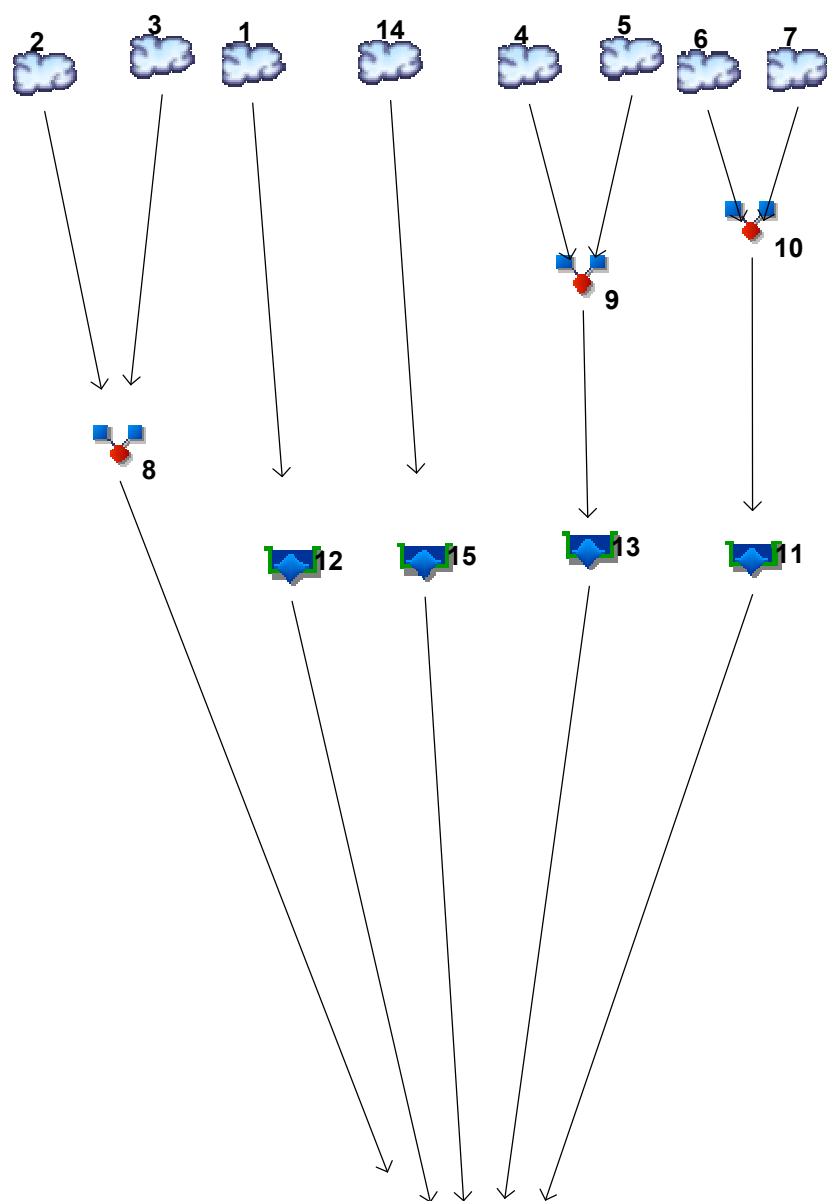
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Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4



Legend

Hyd.	Origin	Description
1	SCS Runoff	DA-1A (Roof)
2	SCS Runoff	DA-2 (Pervious)
3	SCS Runoff	DA-2 (Impervious)
4	SCS Runoff	DA-3 (Pervious)
5	SCS Runoff	DA-3 (Impervious)
6	SCS Runoff	DA-4 (Pervious)
7	SCS Runoff	DA-4 (Impervious)
8	Combine	DA-2
9	Combine	DA-3
10	Combine	DA-4
11	Reservoir	Basin #3
12	Reservoir	Basin #1A
13	Reservoir	Basin #2
14	SCS Runoff	DA-1B (Roof)
15	Reservoir	Basin #1B
16	Combine	<no description>

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	-----	-----	3.307	-----	-----	4.924	-----	-----	7.872	DA-1A (Roof)
2	SCS Runoff	-----	-----	3.193	-----	-----	6.860	-----	-----	14.32	DA-2 (Pervious)
3	SCS Runoff	-----	-----	3.539	-----	-----	5.270	-----	-----	8.425	DA-2 (Impervious)
4	SCS Runoff	-----	-----	5.566	-----	-----	11.96	-----	-----	24.96	DA-3 (Pervious)
5	SCS Runoff	-----	-----	4.004	-----	-----	5.961	-----	-----	9.530	DA-3 (Impervious)
6	SCS Runoff	-----	-----	0.590	-----	-----	3.789	-----	-----	12.44	DA-4 (Pervious)
7	SCS Runoff	-----	-----	3.133	-----	-----	4.665	-----	-----	7.458	DA-4 (Impervious)
8	Combine	2, 3,	-----	6.468	-----	-----	11.77	-----	-----	22.27	DA-2
9	Combine	4, 5,	-----	9.166	-----	-----	17.38	-----	-----	33.81	DA-3
10	Combine	6, 7,	-----	3.362	-----	-----	7.935	-----	-----	19.09	DA-4
11	Reservoir	10	-----	1.879	-----	-----	5.658	-----	-----	14.52	Basin #3
12	Reservoir	1	-----	1.341	-----	-----	3.748	-----	-----	7.857	Basin #1A
13	Reservoir	9	-----	4.549	-----	-----	14.88	-----	-----	29.43	Basin #2
14	SCS Runoff	-----	-----	5.077	-----	-----	7.559	-----	-----	12.08	DA-1B (Roof)
15	Reservoir	14	-----	2.831	-----	-----	5.733	-----	-----	12.64	Basin #1B
16	Combine	8, 11, 12, 13, 15	-----	15.38	-----	-----	40.20	-----	-----	82.37	<no description>
Proj. file: Proposed Conditions.gpw										Monday, 05 / 9 / 2022	

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

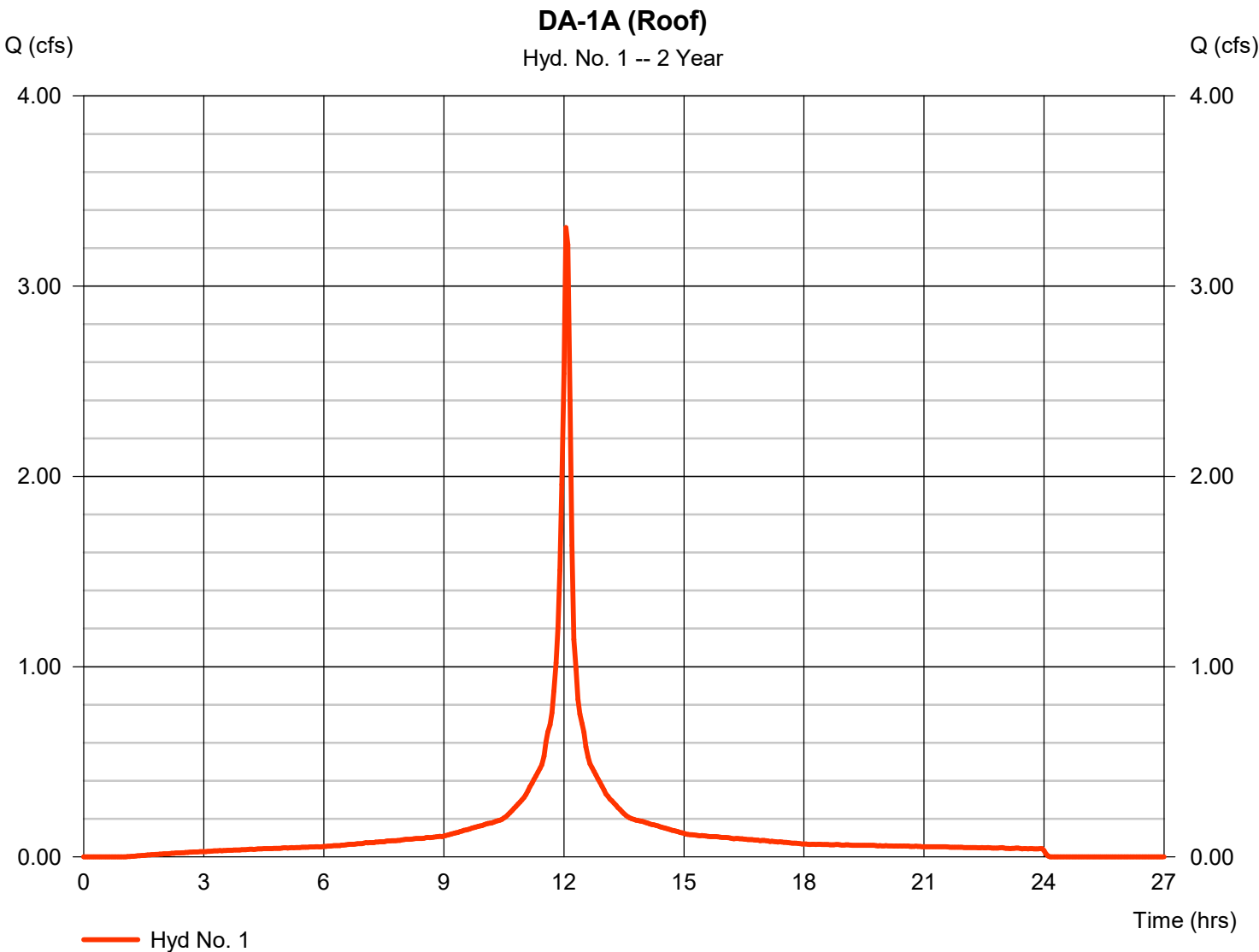
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	3.307	3	723	12,827	-----	-----	-----	DA-1A (Roof)
2	SCS Runoff	3.193	3	729	13,284	-----	-----	-----	DA-2 (Pervious)
3	SCS Runoff	3.539	3	723	13,727	-----	-----	-----	DA-2 (Impervious)
4	SCS Runoff	5.566	3	729	23,153	-----	-----	-----	DA-3 (Pervious)
5	SCS Runoff	4.004	3	723	15,528	-----	-----	-----	DA-3 (Impervious)
6	SCS Runoff	0.590	3	735	5,721	-----	-----	-----	DA-4 (Pervious)
7	SCS Runoff	3.133	3	723	12,152	-----	-----	-----	DA-4 (Impervious)
8	Combine	6.468	3	726	27,011	2, 3,	-----	-----	DA-2
9	Combine	9.166	3	726	38,680	4, 5,	-----	-----	DA-3
10	Combine	3.362	3	726	17,873	6, 7,	-----	-----	DA-4
11	Reservoir	1.879	3	735	17,872	10	417.14	2,557	Basin #3
12	Reservoir	1.341	3	735	12,826	1	420.52	2,137	Basin #1A
13	Reservoir	4.549	3	738	38,679	9	416.01	6,779	Basin #2
14	SCS Runoff	5.077	3	723	19,691	-----	-----	-----	DA-1B (Roof)
15	Reservoir	2.831	3	732	19,690	14	411.12	2,408	Basin #1B
16	Combine	15.38	3	729	116,078	8, 11, 12, 13, 15	-----	-----	<no description>
Proposed Conditions.gpw					Return Period: 2 Year			Monday, 05 / 9 / 2022	

Hydrograph Report

Hyd. No. 1

DA-1A (Roof)

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.307 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.05 hrs
Time interval	=	3 min	Hyd. volume	=	12,827 cuft
Drainage area	=	1.140 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.54 in	Distribution	=	Custom
Storm duration	=	S:\Petry Engineering Cad Projects\191019 0265 Daughters of Israel - West Orange			



Precipitation Report

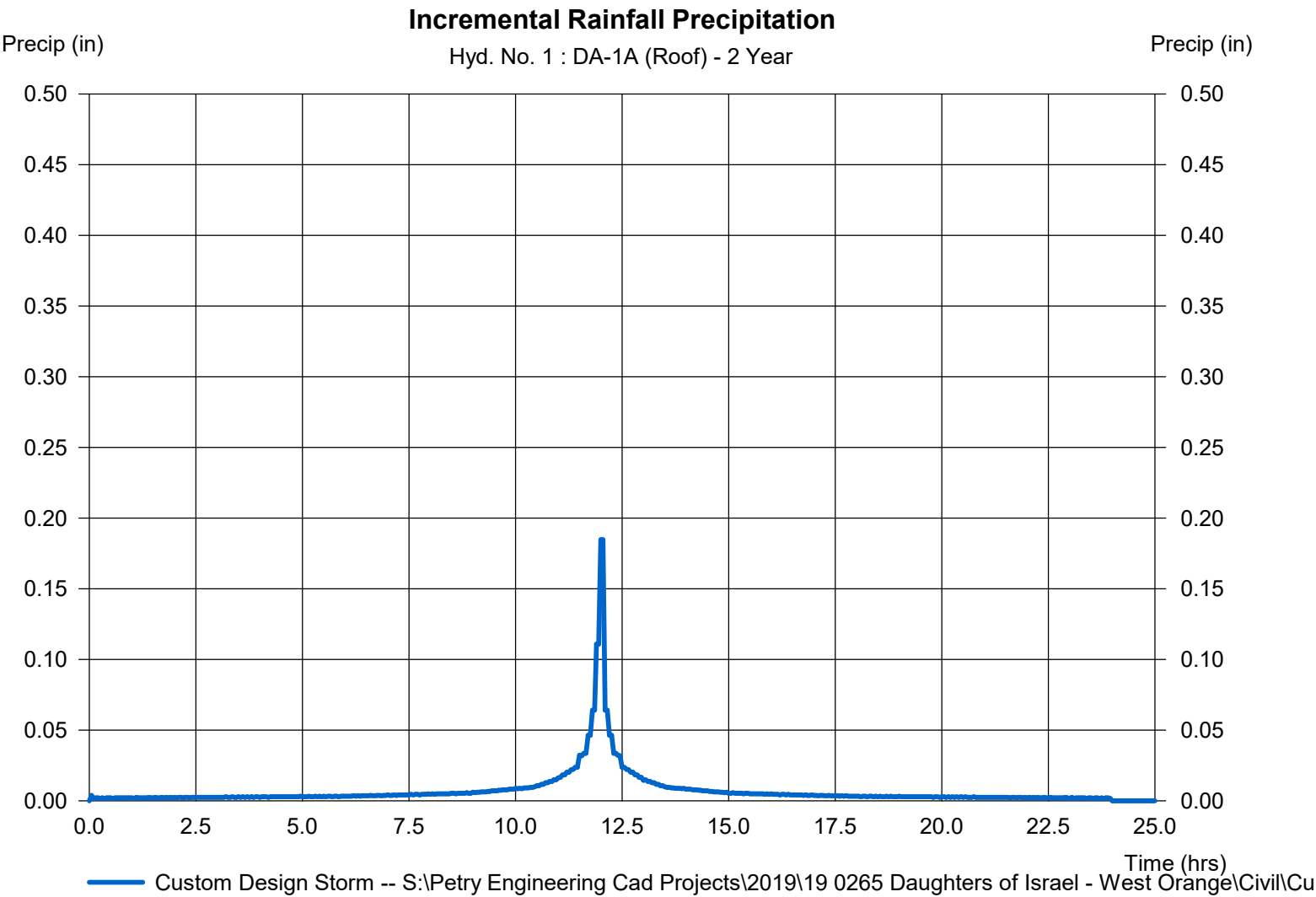
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Monday, 05 / 9 / 2022

Hyd. No. 1

DA-1A (Roof)

Storm Frequency	= 2 yrs	Time interval	= 3 min
Total precip.	= 3.5400 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora		



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

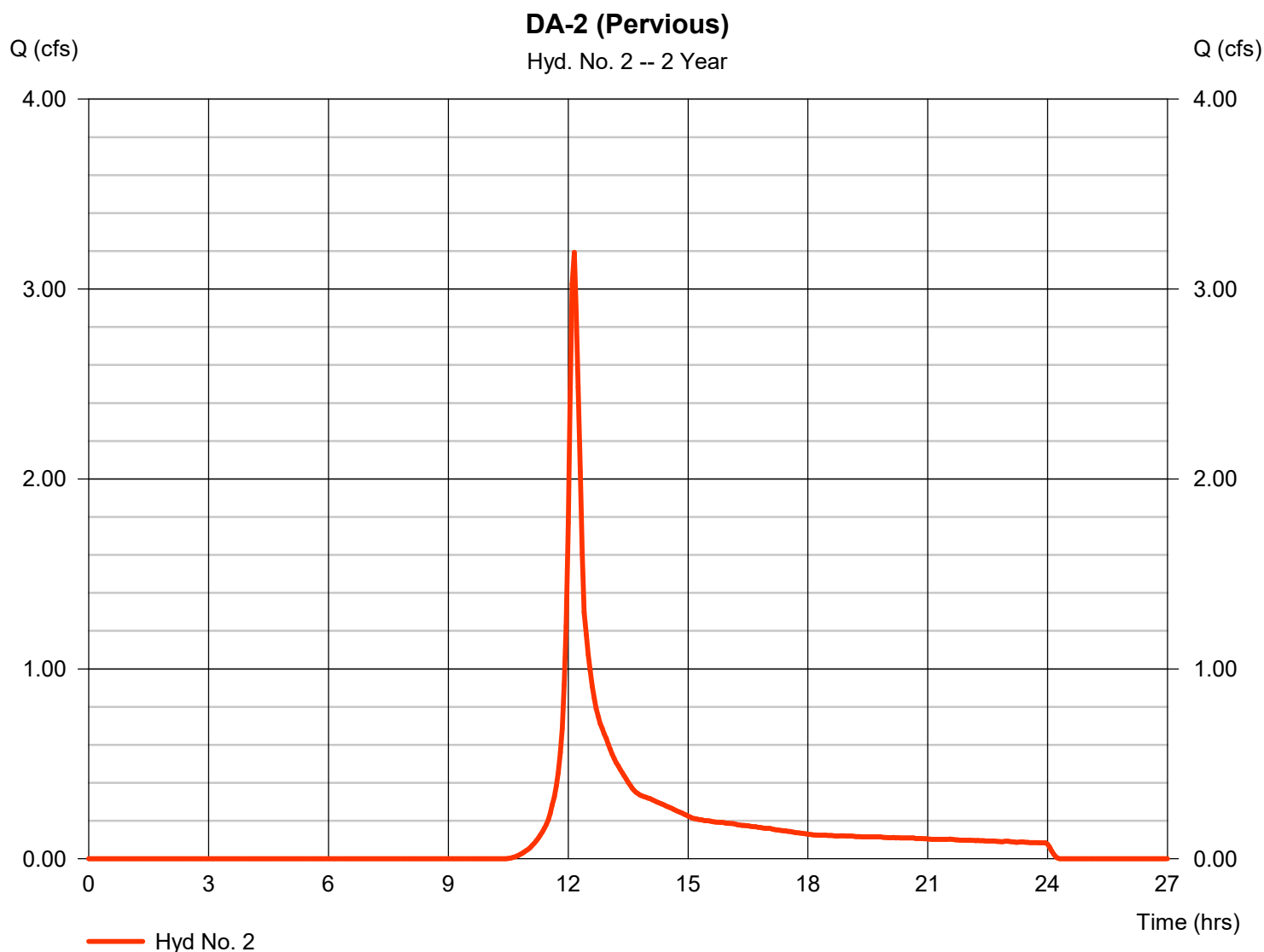
Monday, 05 / 9 / 2022

Hyd. No. 2

DA-2 (Pervious)

Hydrograph type	= SCS Runoff	Peak discharge	= 3.193 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.15 hrs
Time interval	= 3 min	Hyd. volume	= 13,284 cuft
Drainage area	= 3.190 ac	Curve number	= 72*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.10 min
Total precip.	= 3.54 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\191019 0265 Daughters of Israel - West Orange		

* Composite (Area/CN) = $[(0.450 \times 30) + (0.100 \times 77) + (0.150 \times 70) + (2.490 \times 80)] / 3.190$



Precipitation Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Monday, 05 / 9 / 2022

Hyd. No. 2

DA-2 (Pervious)

Storm Frequency

= 2 yrs

Time interval

= 3 min

Total precip.

= 3.5400 in

Distribution

= Custom

Storm duration

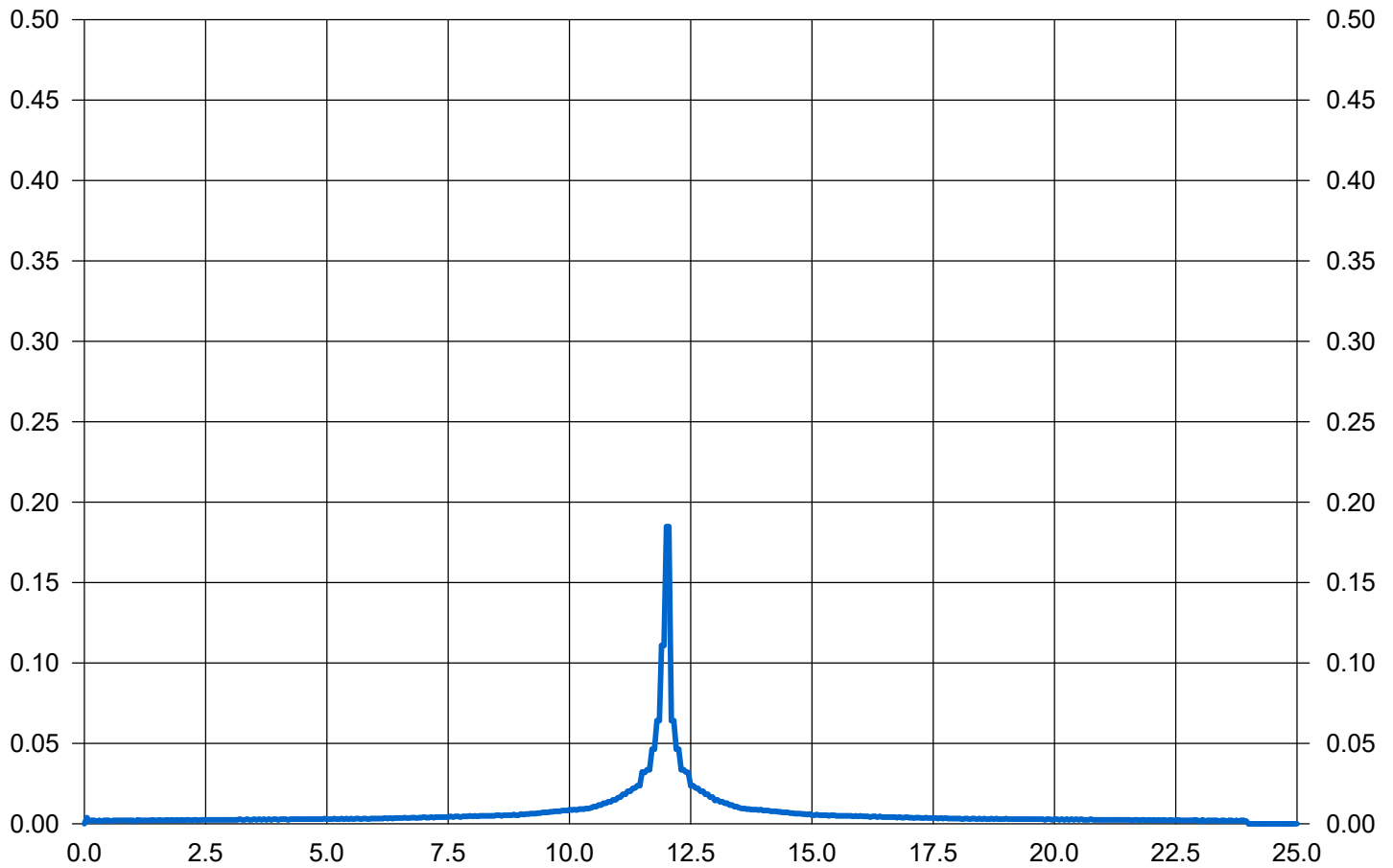
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Incremental Rainfall Precipitation

Hyd. No. 2 : DA-2 (Pervious) - 2 Year

Precip (in)

Precip (in)



— Custom Design Storm -- S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Orange\Civil\Cu

Hydrograph Report

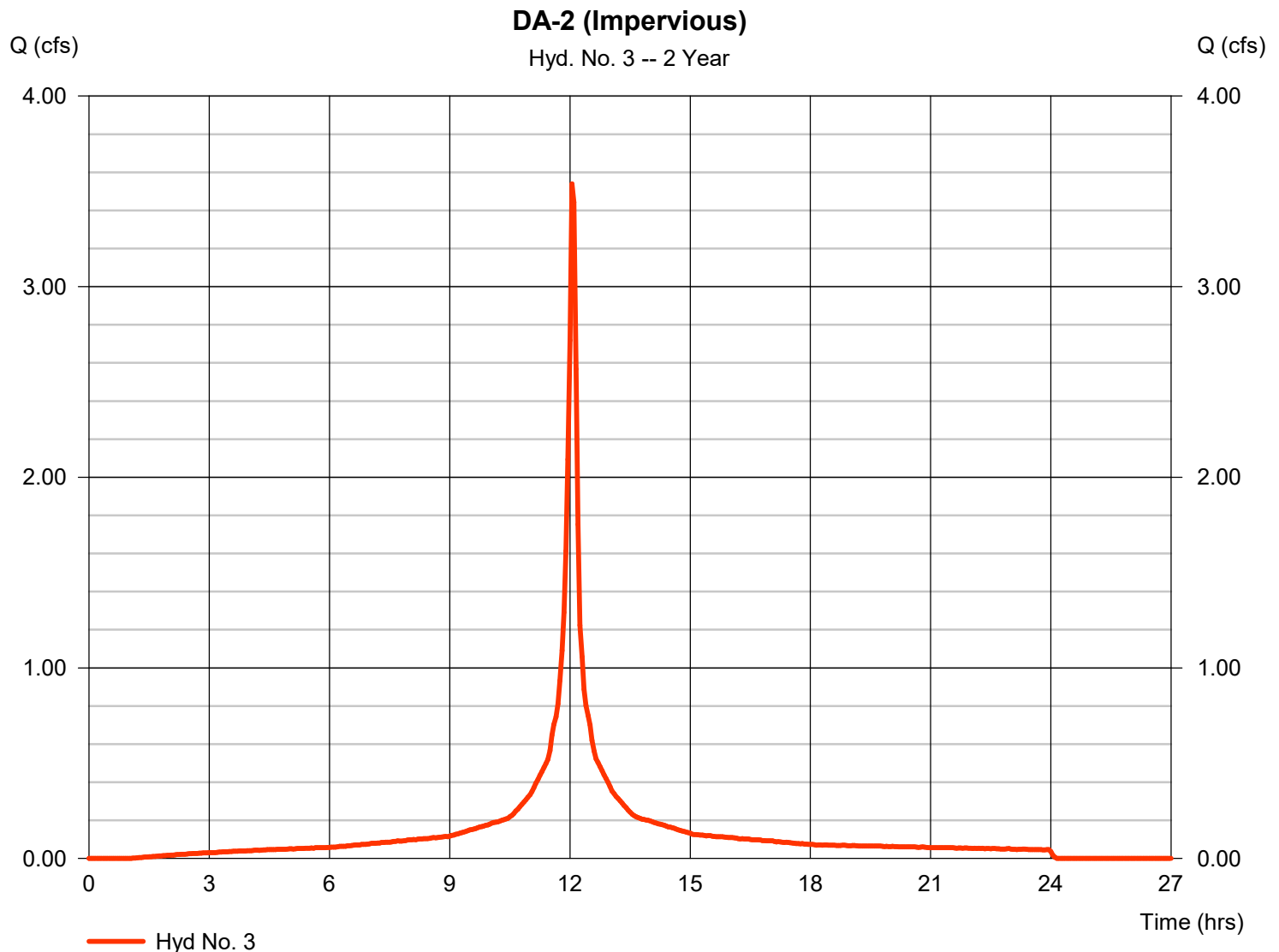
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Monday, 05 / 9 / 2022

Hyd. No. 3

DA-2 (Impervious)

Hydrograph type	= SCS Runoff	Peak discharge	= 3.539 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.05 hrs
Time interval	= 3 min	Hyd. volume	= 13,727 cuft
Drainage area	= 1.220 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.54 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\1910-0265 Daughters of Israel - West Orange		

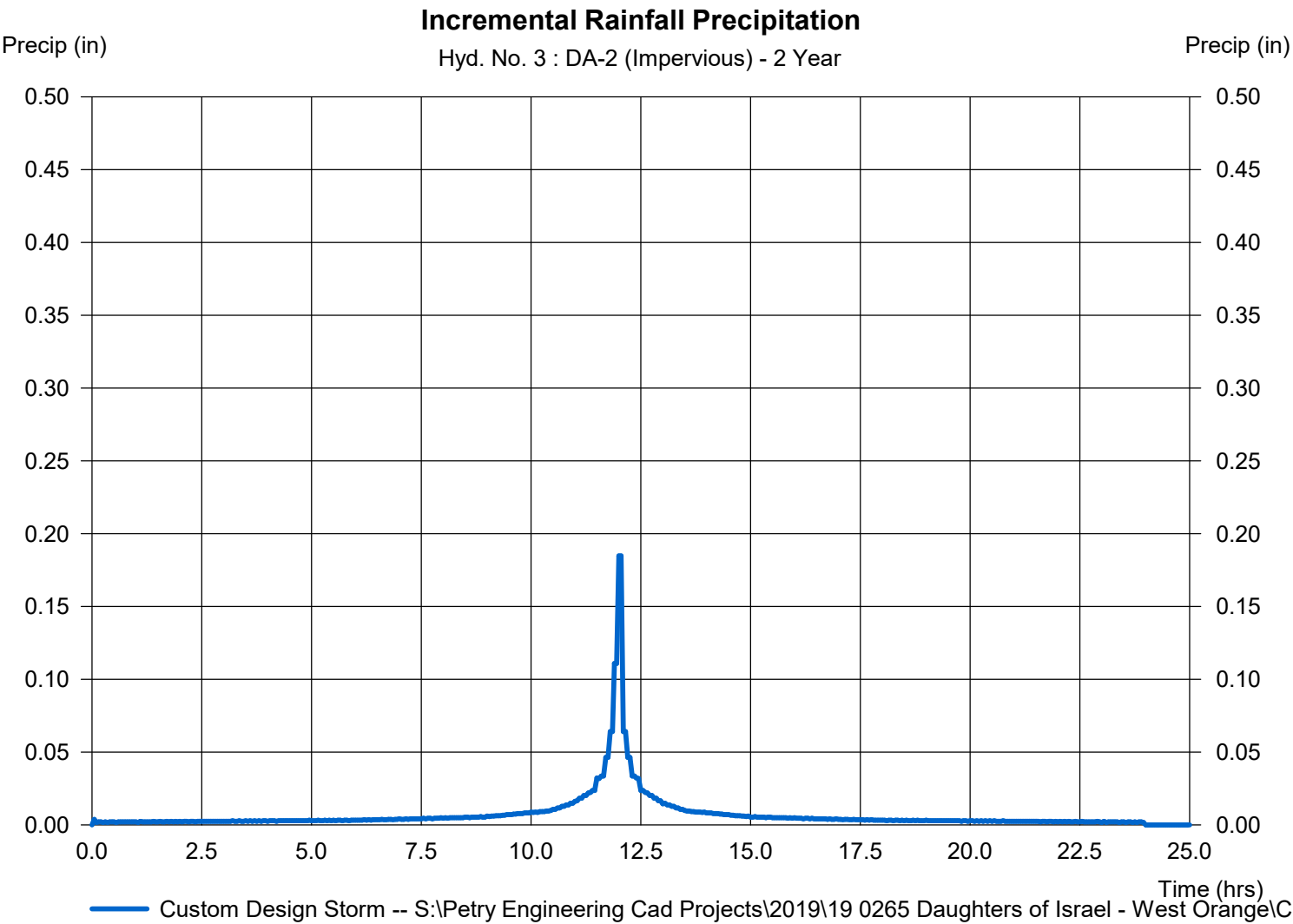


Precipitation Report

Hyd. No. 3

DA-2 (Impervious)

Storm Frequency	= 2 yrs	Time interval	= 3 min
Total precip.	= 3.5400 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Orange\19 0265 Daughters of Israel - West Orange.dwg		



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

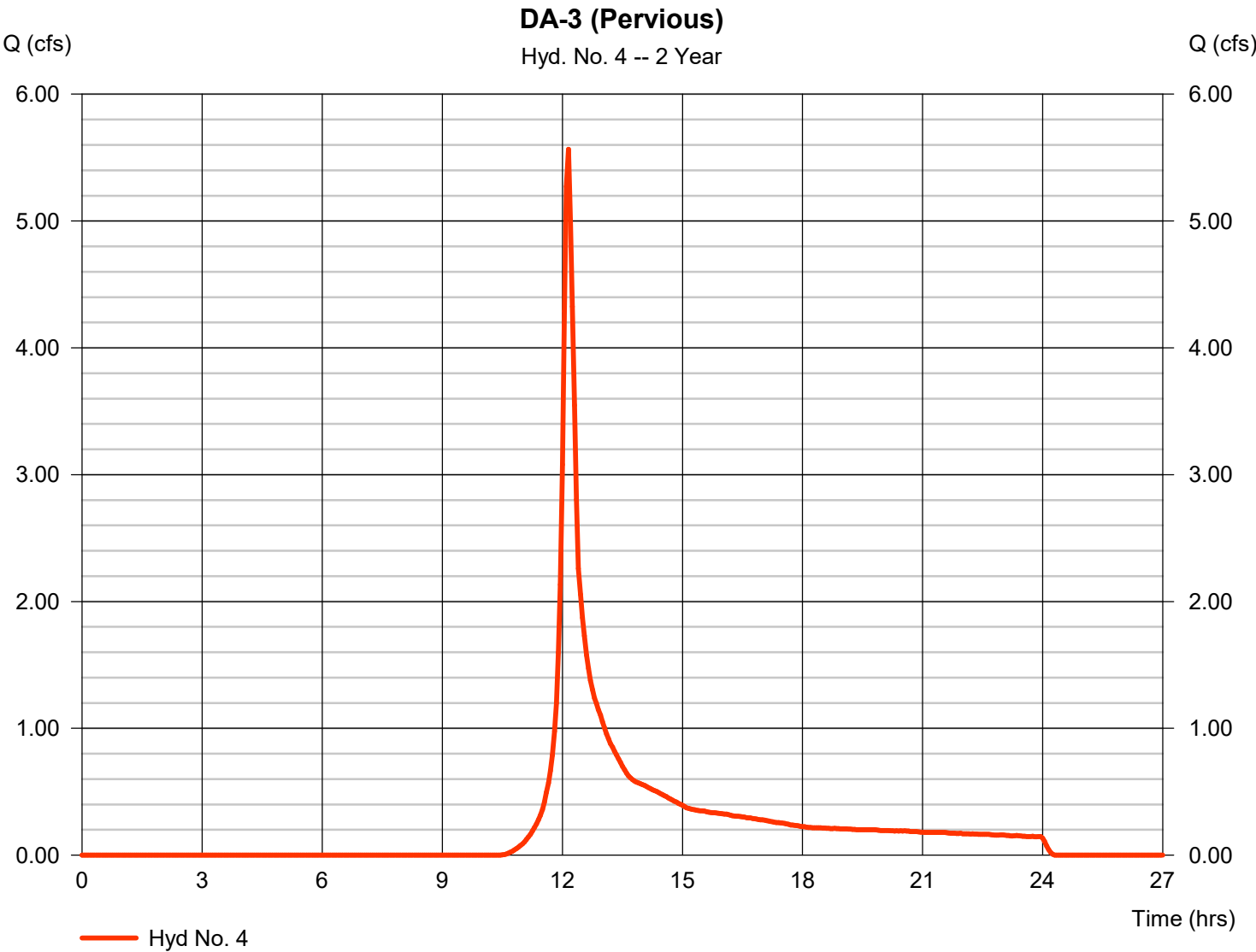
Monday, 05 / 9 / 2022

Hyd. No. 4

DA-3 (Pervious)

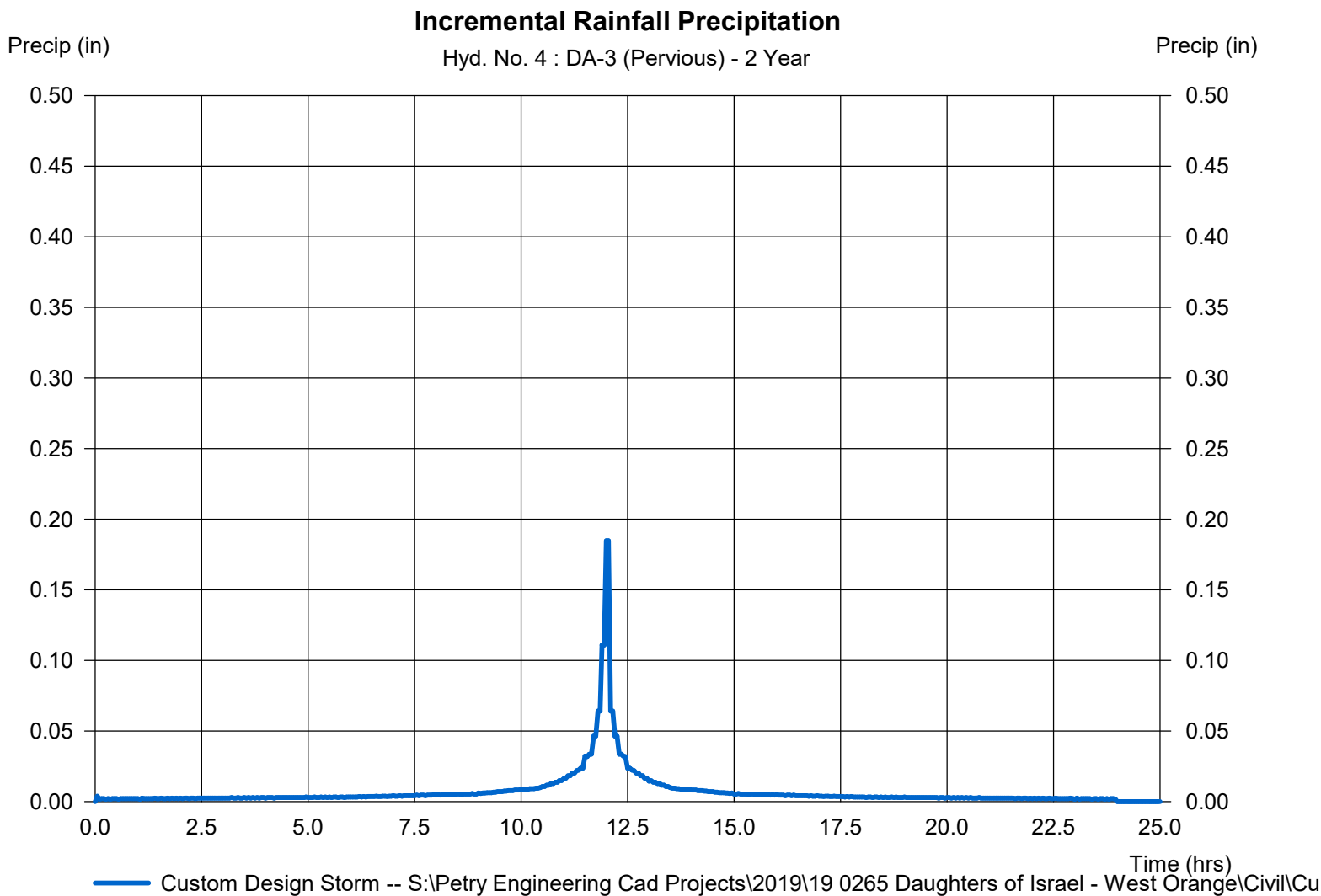
Hydrograph type	=	SCS Runoff	Peak discharge	=	5.566 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.15 hrs
Time interval	=	3 min	Hyd. volume	=	23,153 cuft
Drainage area	=	5.560 ac	Curve number	=	72*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	14.50 min
Total precip.	=	3.54 in	Distribution	=	Custom
Storm duration	=	S:\Petry Engineering Cad Projects\191019 0265 Daughters of Israel - West Orange			

* Composite (Area/CN) = [(0.010 x 30) + (4.210 x 70) + (0.340 x 77) + (0.400 x 74) + (0.600 x 80)] / 5.560



DA-3 (Pervious)

Storm Frequency = 2 yrs Time interval = 3 min
Total precip. = 3.5400 in Distribution = Custom
Storm duration = S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora

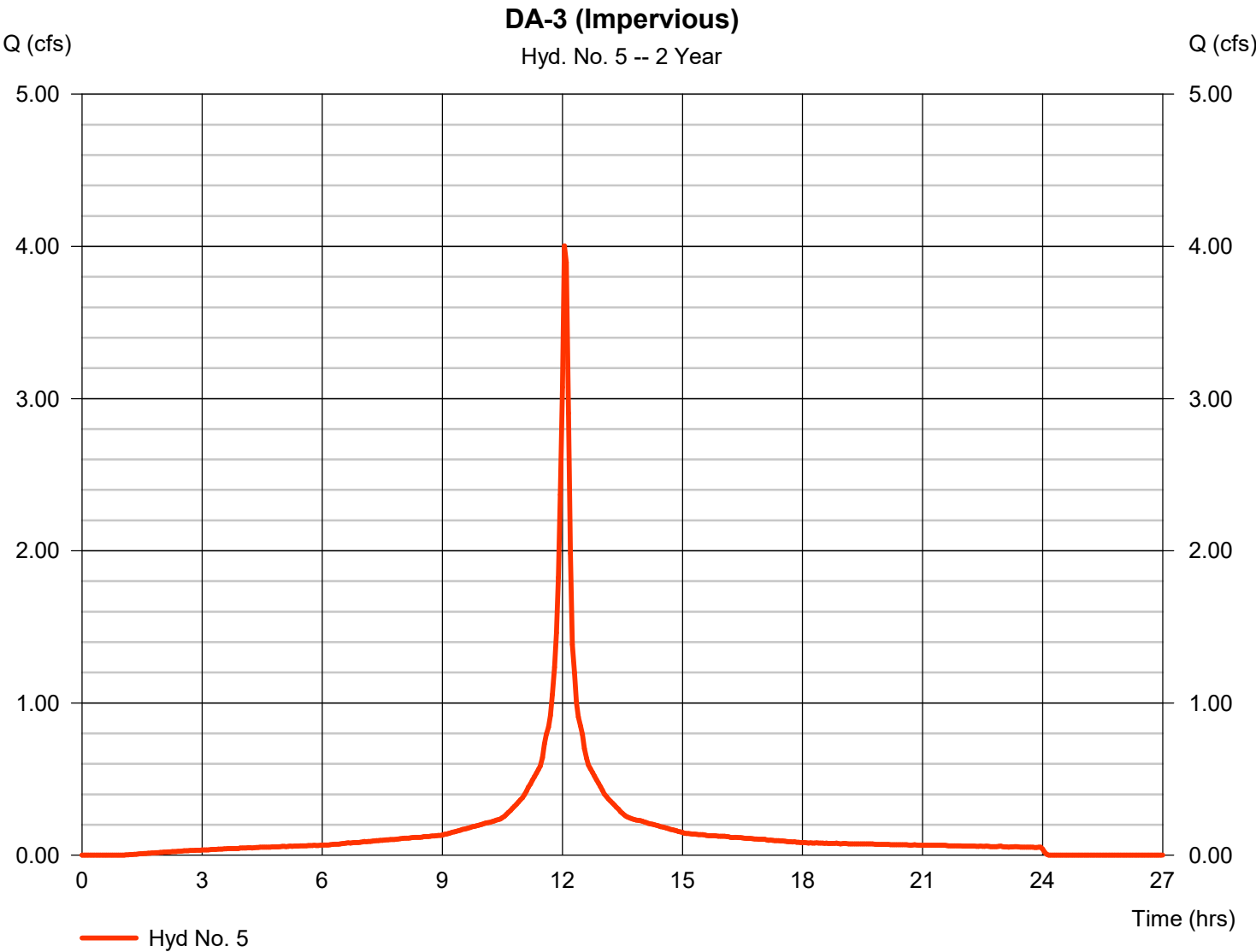


Hydrograph Report

Hyd. No. 5

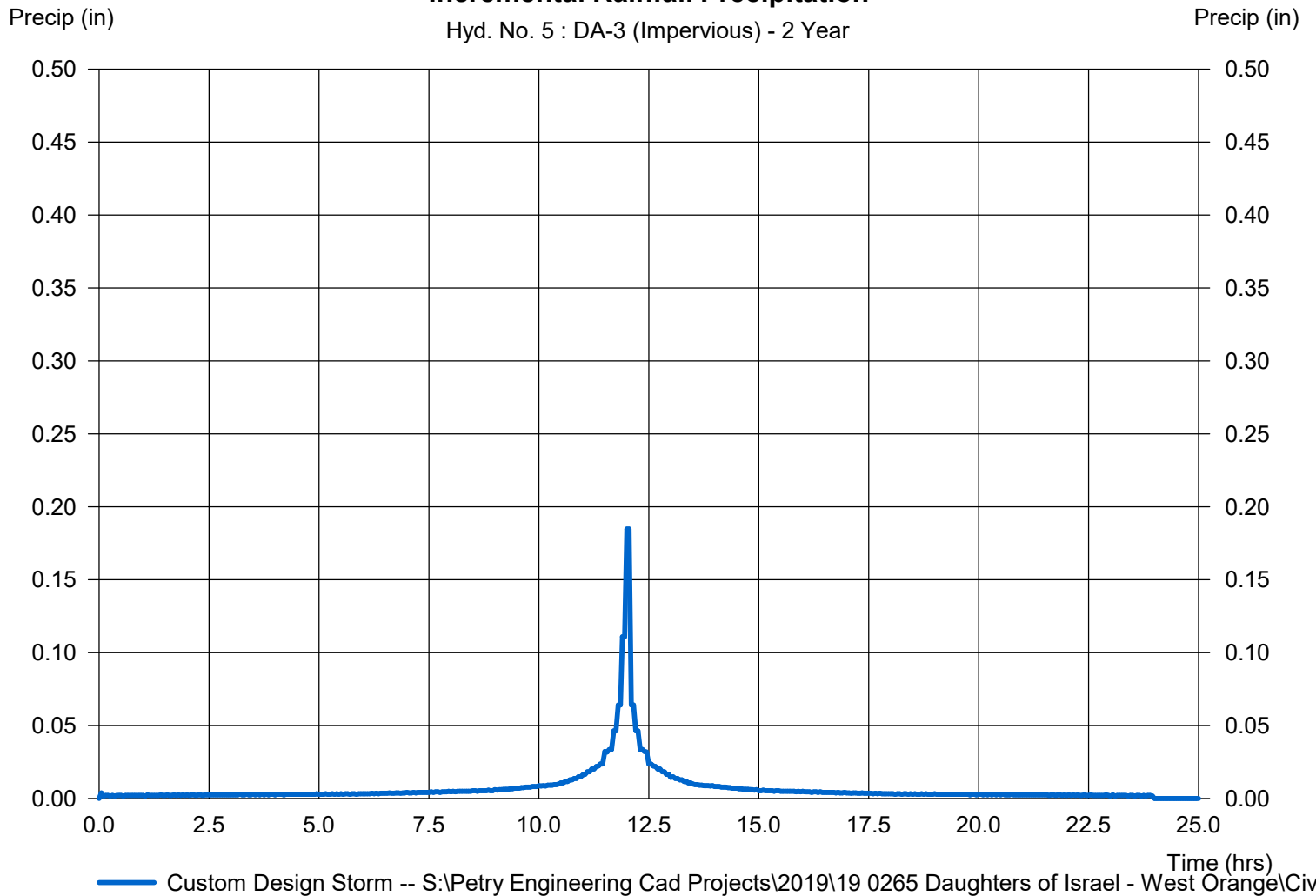
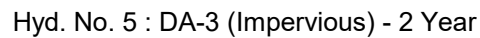
DA-3 (Impervious)

Hydrograph type	= SCS Runoff	Peak discharge	= 4.004 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.05 hrs
Time interval	= 3 min	Hyd. volume	= 15,528 cuft
Drainage area	= 1.380 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.54 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\2019\0265 Daughters of Israel - West Orange, NJ\DA-3 (Impervious) - 2 Year Storm		



DA-3 (Impervious)

Storm Frequency = 2 yrs Time interval = 3 min
Total precip. = 3.5400 in Distribution = Custom
Storm duration = S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

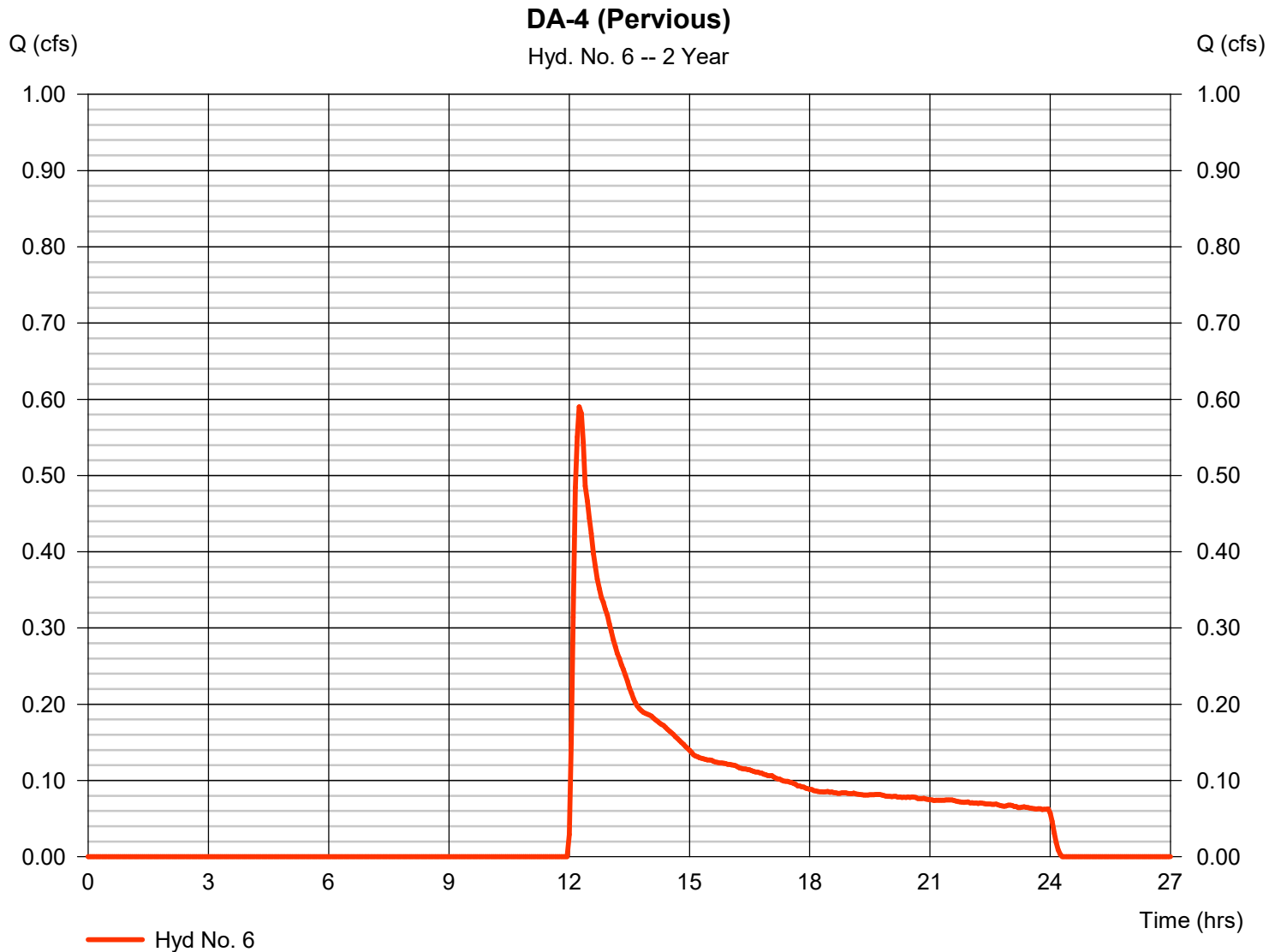
Monday, 05 / 9 / 2022

Hyd. No. 6

DA-4 (Pervious)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.590 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.25 hrs
Time interval	= 3 min	Hyd. volume	= 5,721 cuft
Drainage area	= 4.840 ac	Curve number	= 54*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 14.30 min
Total precip.	= 3.54 in	Distribution	= Custom
Storm duration	= S:\Petty Engineering Cad Projects\191019 0265 Daughters of Israel - West Orange		

* Composite (Area/CN) = $[(2.140 \times 30) + (1.440 \times 70) + (0.360 \times 74) + (0.900 \times 80)] / 4.840$



Precipitation Report

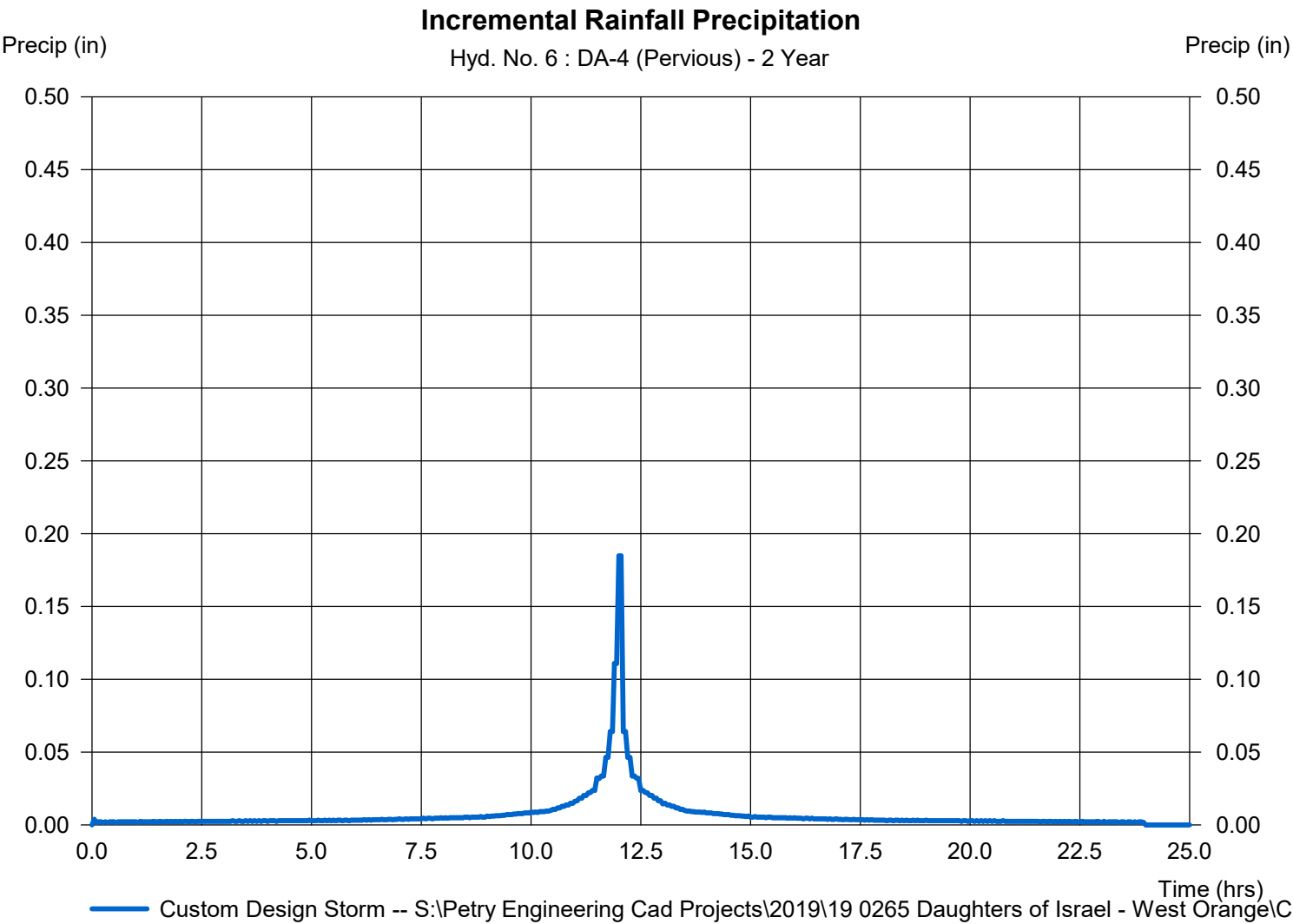
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Monday, 05 / 9 / 2022

Hyd. No. 6

DA-4 (Pervious)

Storm Frequency	= 2 yrs	Time interval	= 3 min
Total precip.	= 3.5400 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora		



Hydrograph Report

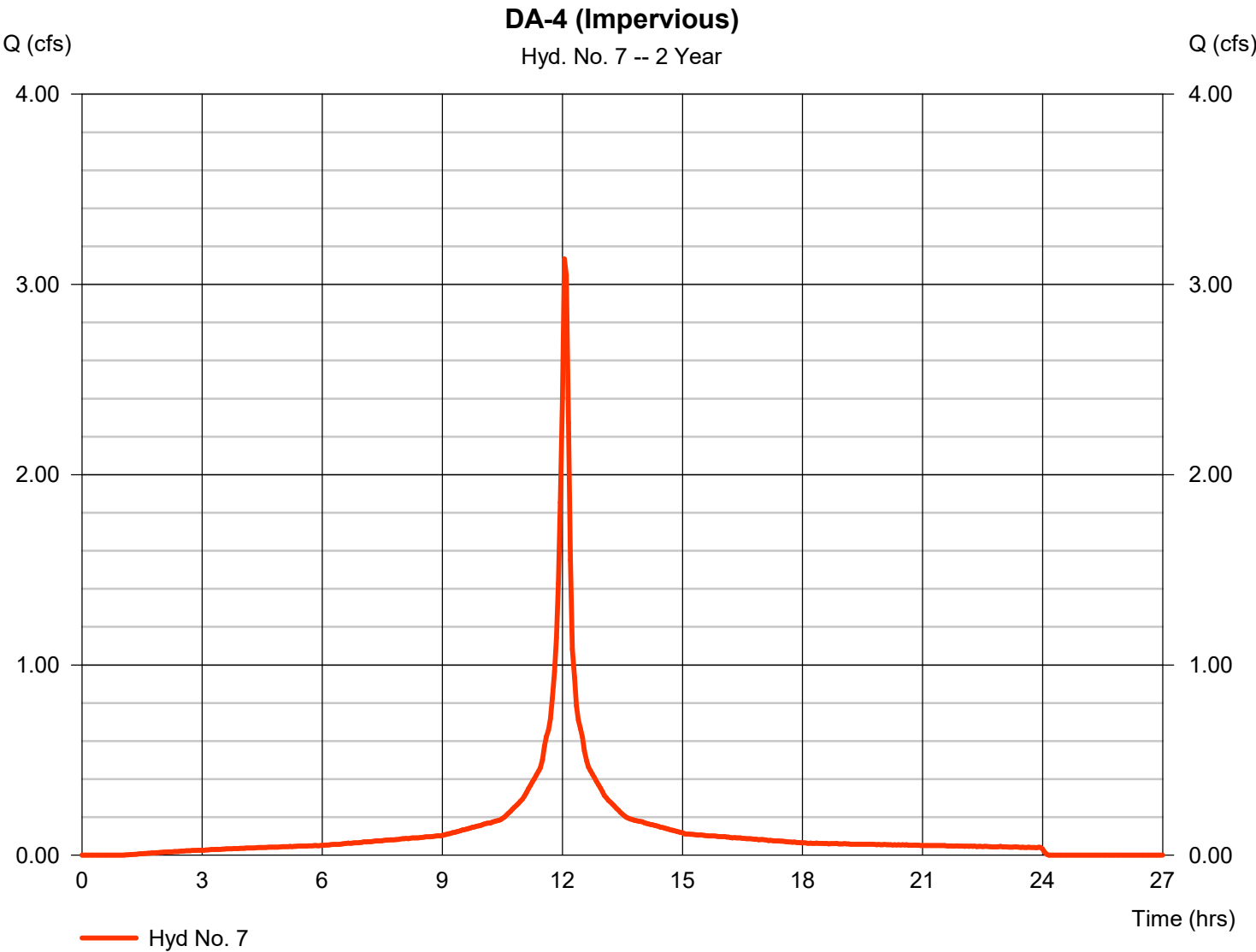
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Monday, 05 / 9 / 2022

Hyd. No. 7

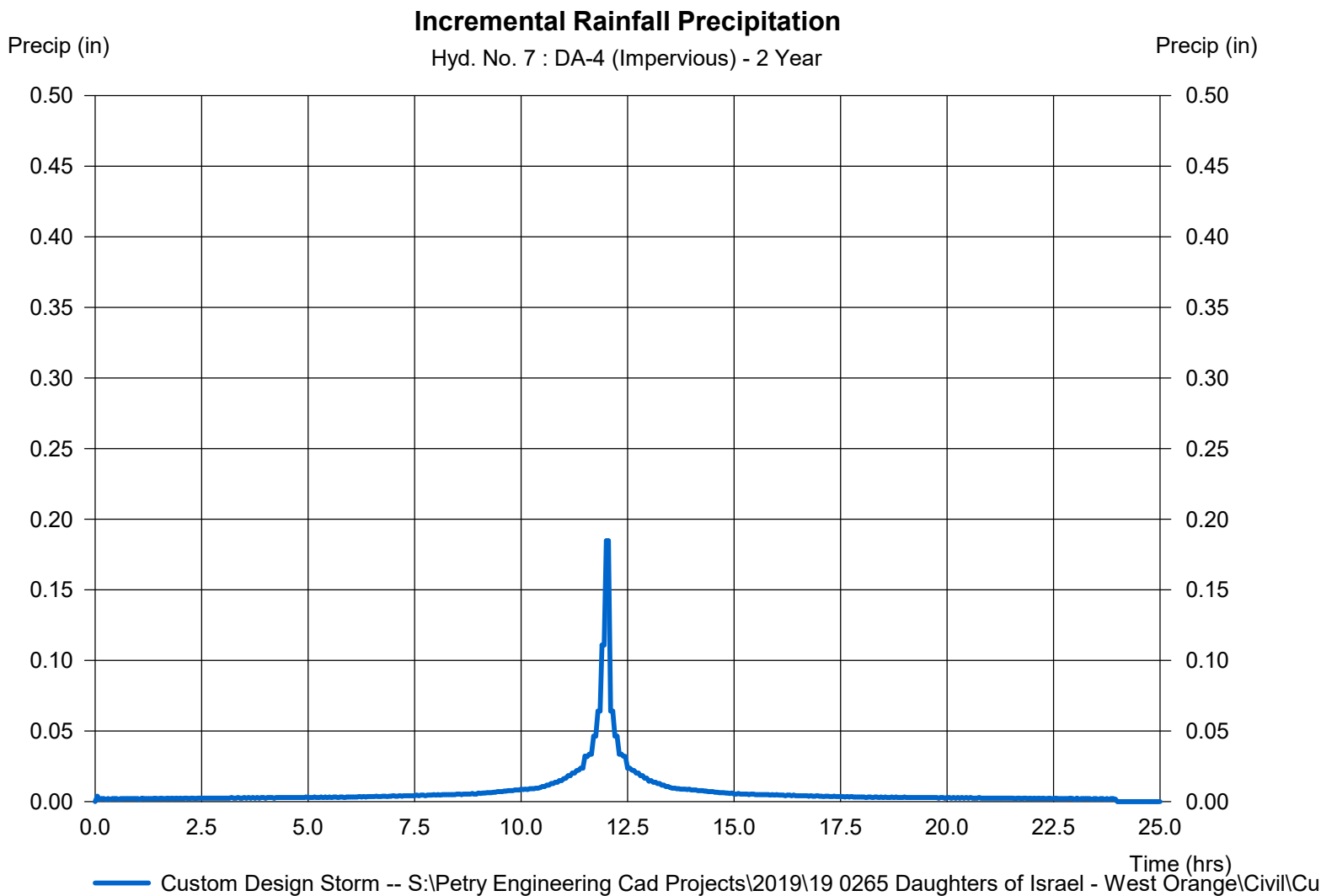
DA-4 (Impervious)

Hydrograph type	= SCS Runoff	Peak discharge	= 3.133 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.05 hrs
Time interval	= 3 min	Hyd. volume	= 12,152 cuft
Drainage area	= 1.080 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.54 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\19-010-0265 Daughters of Israel - West Orange		



DA-4 (Impervious)

Storm Frequency = 2 yrs Time interval = 3 min
Total precip. = 3.5400 in Distribution = Custom
Storm duration = S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora



Hydrograph Report

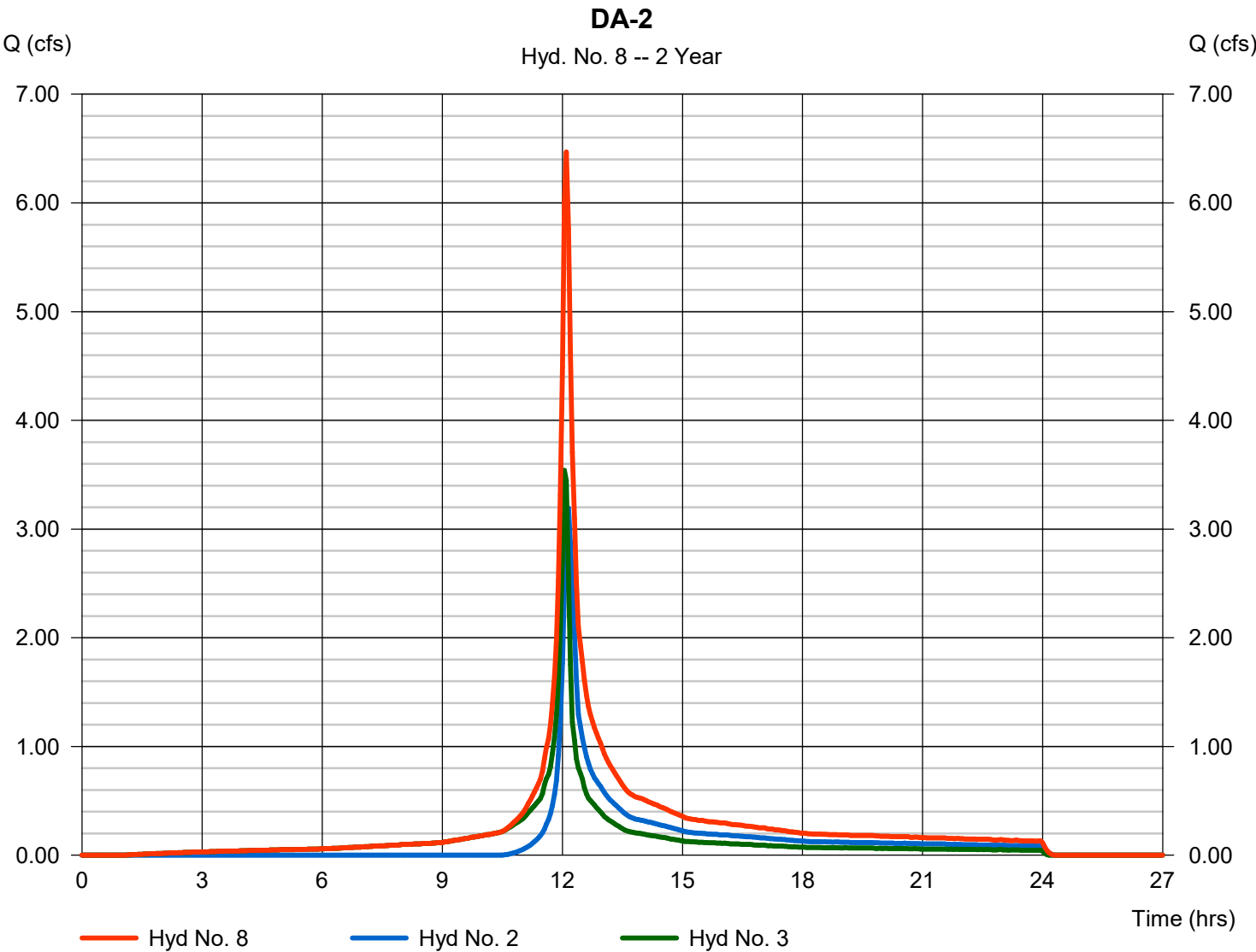
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Monday, 05 / 9 / 2022

Hyd. No. 8

DA-2

Hydrograph type	= Combine	Peak discharge	= 6.468 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 27,011 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 4.410 ac



Hydrograph Report

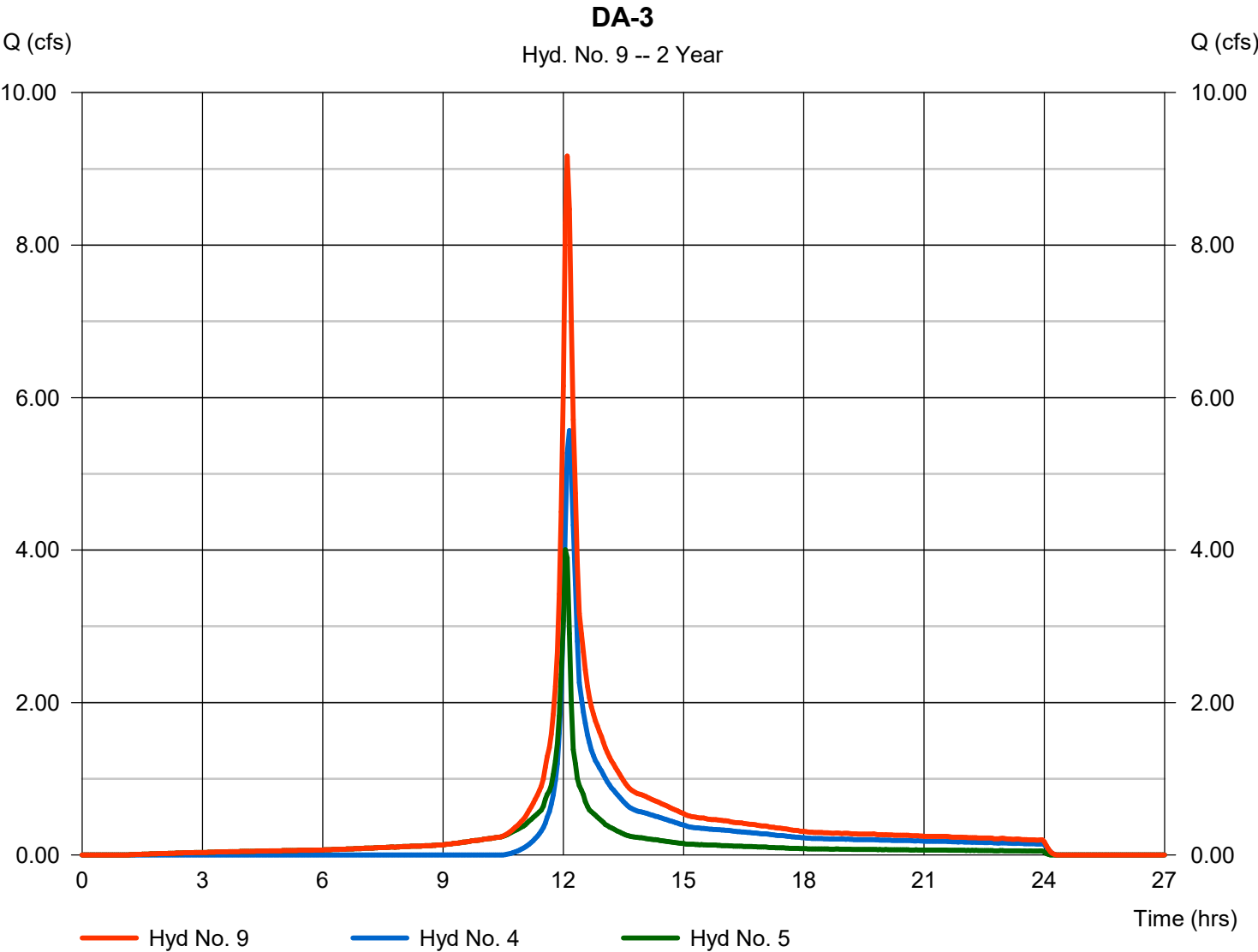
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Monday, 05 / 9 / 2022

Hyd. No. 9

DA-3

Hydrograph type	= Combine	Peak discharge	= 9.166 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 38,680 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 6.940 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

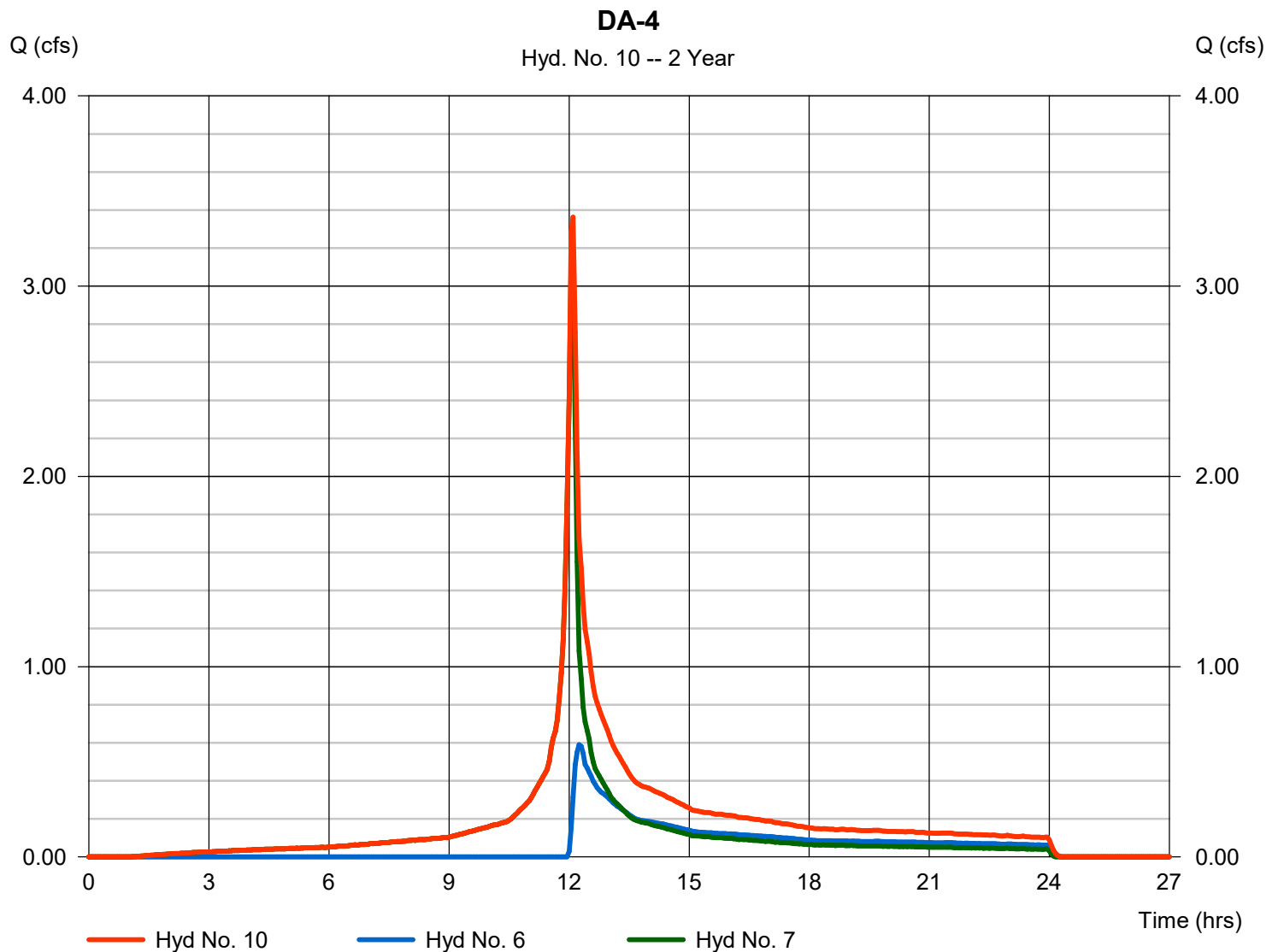
Monday, 05 / 9 / 2022

Hyd. No. 10

DA-4

Hydrograph type = Combine
 Storm frequency = 2 yrs
 Time interval = 3 min
 Inflow hyds. = 6, 7

Peak discharge = 3.362 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 17,873 cuft
 Contrib. drain. area = 5.920 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

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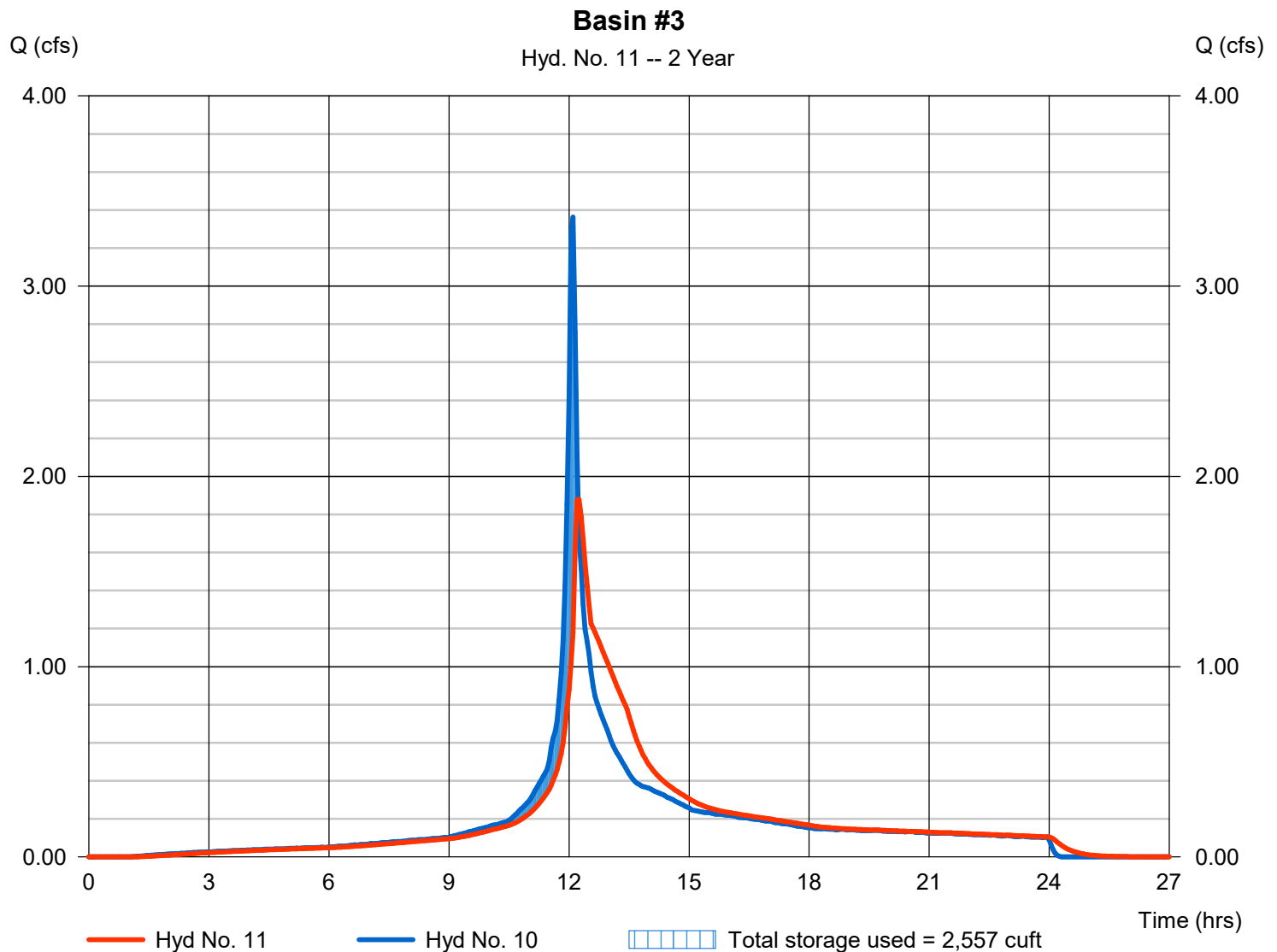
Hyd. No. 11

Basin #3

Hydrograph type = Reservoir
 Storm frequency = 2 yrs
 Time interval = 3 min
 Inflow hyd. No. = 10 - DA-4
 Reservoir name = Basin #3

Peak discharge = 1.879 cfs
 Time to peak = 12.25 hrs
 Hyd. volume = 17,872 cuft
 Max. Elevation = 417.14 ft
 Max. Storage = 2,557 cuft

Storage Indication method used.



Pond No. 2 - Basin #3

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Beginning Elevation = 416.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	416.00	910	0	0
5.00	421.00	3,570	11,200	11,200

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.00	6.00	6.00	0.00
Span (in)	= 10.00	10.00	10.00	0.00
No. Barrels	= 1	2	2	0
Invert El. (ft)	= 416.00	417.00	418.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 4.00	0.00	0.00	0.00
Crest El. (ft)	= 420.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Civ A cfs	Civ B cfs	Civ C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	416.00	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
5.00	11,200	421.00	2.94 ic	7.77 ic	6.65 ic	---	13.32	---	---	---	---	---	30.68

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

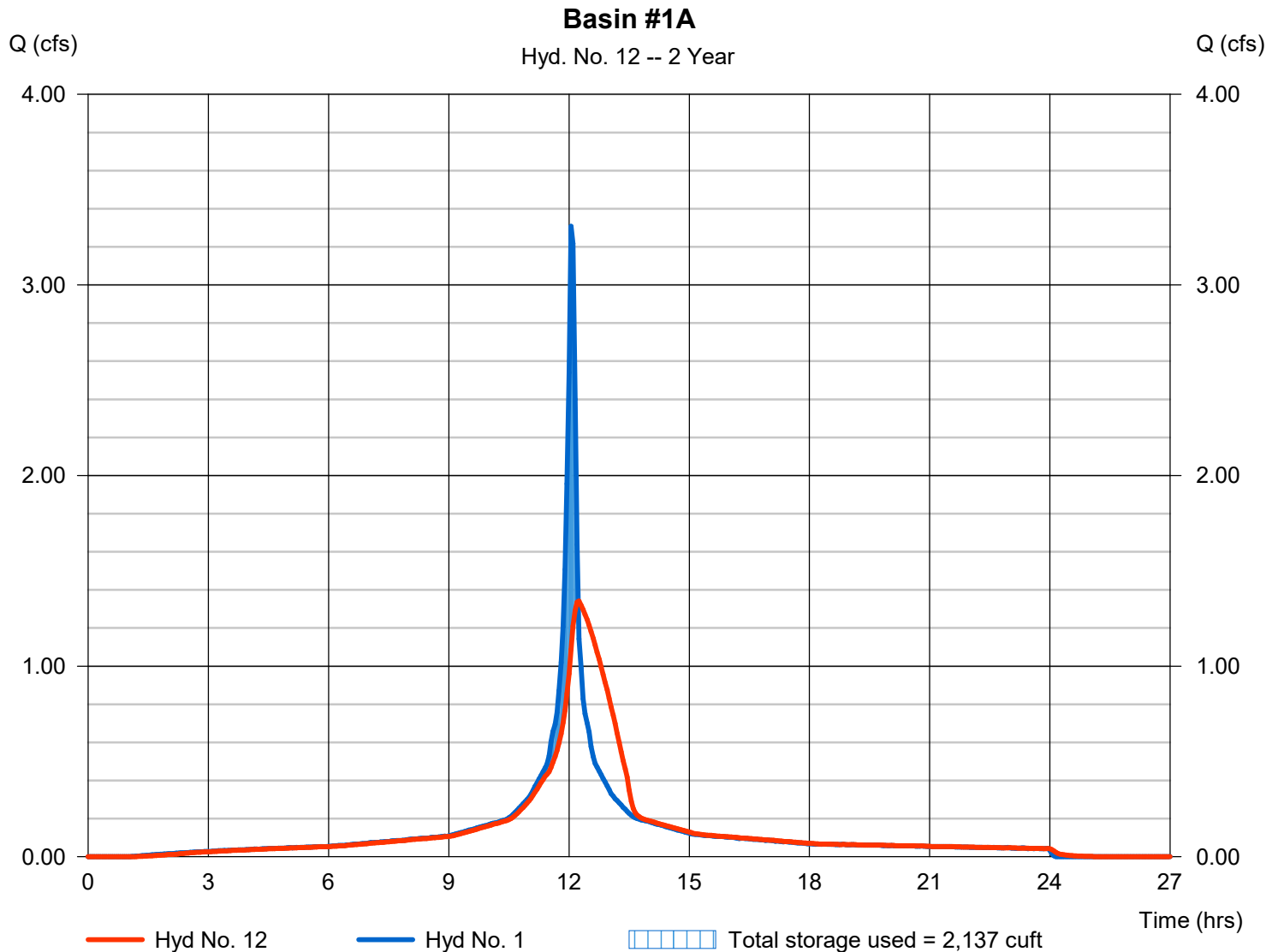
Monday, 05 / 9 / 2022

Hyd. No. 12

Basin #1A

Hydrograph type	= Reservoir	Peak discharge	= 1.341 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.25 hrs
Time interval	= 3 min	Hyd. volume	= 12,826 cuft
Inflow hyd. No.	= 1 - DA-1A (Roof)	Max. Elevation	= 420.52 ft
Reservoir name	= Basin #1A	Max. Storage	= 2,137 cuft

Storage Indication method used.



Pond No. 4 - Basin #1A

Pond Data

UG Chambers -Invert elev. = 418.00 ft, Rise x Span = 4.00 x 4.00 ft, Barrel Len = 75.00 ft, No. Barrels = 3, Slope = 0.00%, Headers = Yes

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	418.00	n/a	0	0
0.40	418.40	n/a	168	168
0.80	418.80	n/a	292	460
1.20	419.20	n/a	355	815
1.60	419.60	n/a	391	1,207
2.00	420.00	n/a	409	1,615
2.40	420.40	n/a	409	2,024
2.80	420.80	n/a	391	2,415
3.20	421.20	n/a	355	2,770
3.60	421.60	n/a	292	3,062
4.00	422.00	n/a	168	3,230

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.00	8.00	0.00	0.00
Span (in)	= 6.50	12.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 418.00	420.50	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 4.00	0.00	0.00	0.00
Crest El. (ft)	= 421.30	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	418.00	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.40	168	418.40	0.42 ic	0.00	---	---	0.00	---	---	---	---	---	0.420
0.80	460	418.80	0.69 ic	0.00	---	---	0.00	---	---	---	---	---	0.692
1.20	815	419.20	0.88 ic	0.00	---	---	0.00	---	---	---	---	---	0.884
1.60	1,207	419.60	1.04 ic	0.00	---	---	0.00	---	---	---	---	---	1.041
2.00	1,615	420.00	1.18 ic	0.00	---	---	0.00	---	---	---	---	---	1.177
2.40	2,024	420.40	1.30 ic	0.00	---	---	0.00	---	---	---	---	---	1.299
2.80	2,415	420.80	1.41 ic	0.56 ic	---	---	0.00	---	---	---	---	---	1.970
3.20	2,770	421.20	1.51 ic	1.94 ic	---	---	0.00	---	---	---	---	---	3.458
3.60	3,062	421.60	1.61 ic	2.81 ic	---	---	2.19	---	---	---	---	---	6.610
4.00	3,230	422.00	1.70 ic	3.47 ic	---	---	7.80	---	---	---	---	---	12.97

Hydrograph Report

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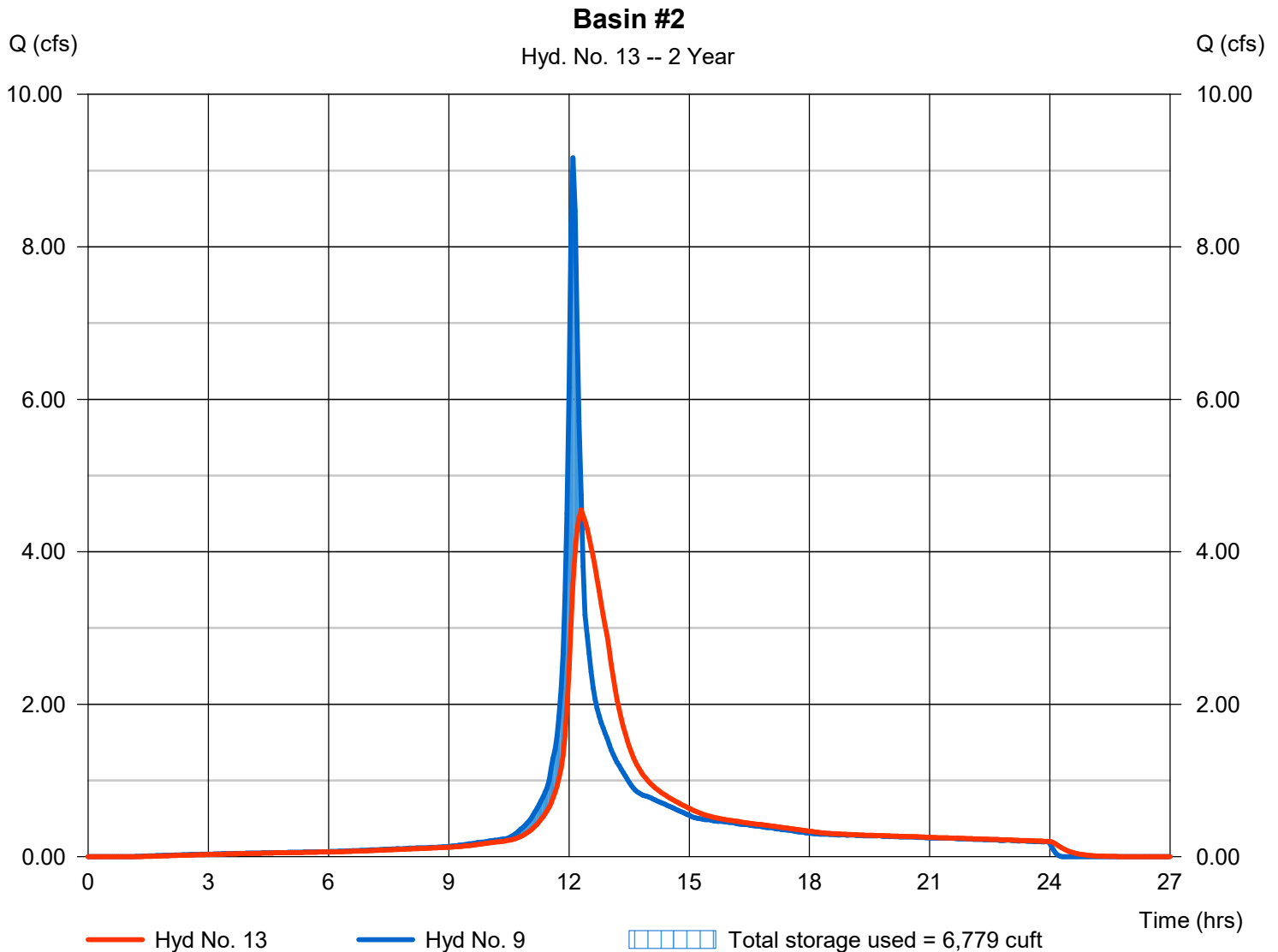
Hyd. No. 13

Basin #2

Hydrograph type = Reservoir
 Storm frequency = 2 yrs
 Time interval = 3 min
 Inflow hyd. No. = 9 - DA-3
 Reservoir name = Basin #2

Peak discharge = 4.549 cfs
 Time to peak = 12.30 hrs
 Hyd. volume = 38,679 cuft
 Max. Elevation = 416.01 ft
 Max. Storage = 6,779 cuft

Storage Indication method used.



Pond No. 1 - Basin #2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 414.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	414.00	3,360	0	0
5.00	419.00	3,400	16,898	16,898

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 8.00	13.00	0.00	0.00
Span (in)	= 13.00	22.00	0.00	0.00
No. Barrels	= 1	2	0	0
Invert El. (ft)	= 414.00	416.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 10.00	0.00	0.00	0.00
Crest El. (ft)	= 418.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No
Exfil.(in/hr)	= 0.000 (by Contour)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Civ A cfs	Civ B cfs	Civ C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	414.00	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
5.00	16,898	419.00	7.51 ic	29.99 ic	---	---	33.30	---	---	---	---	---	70.80

Hydrograph Report

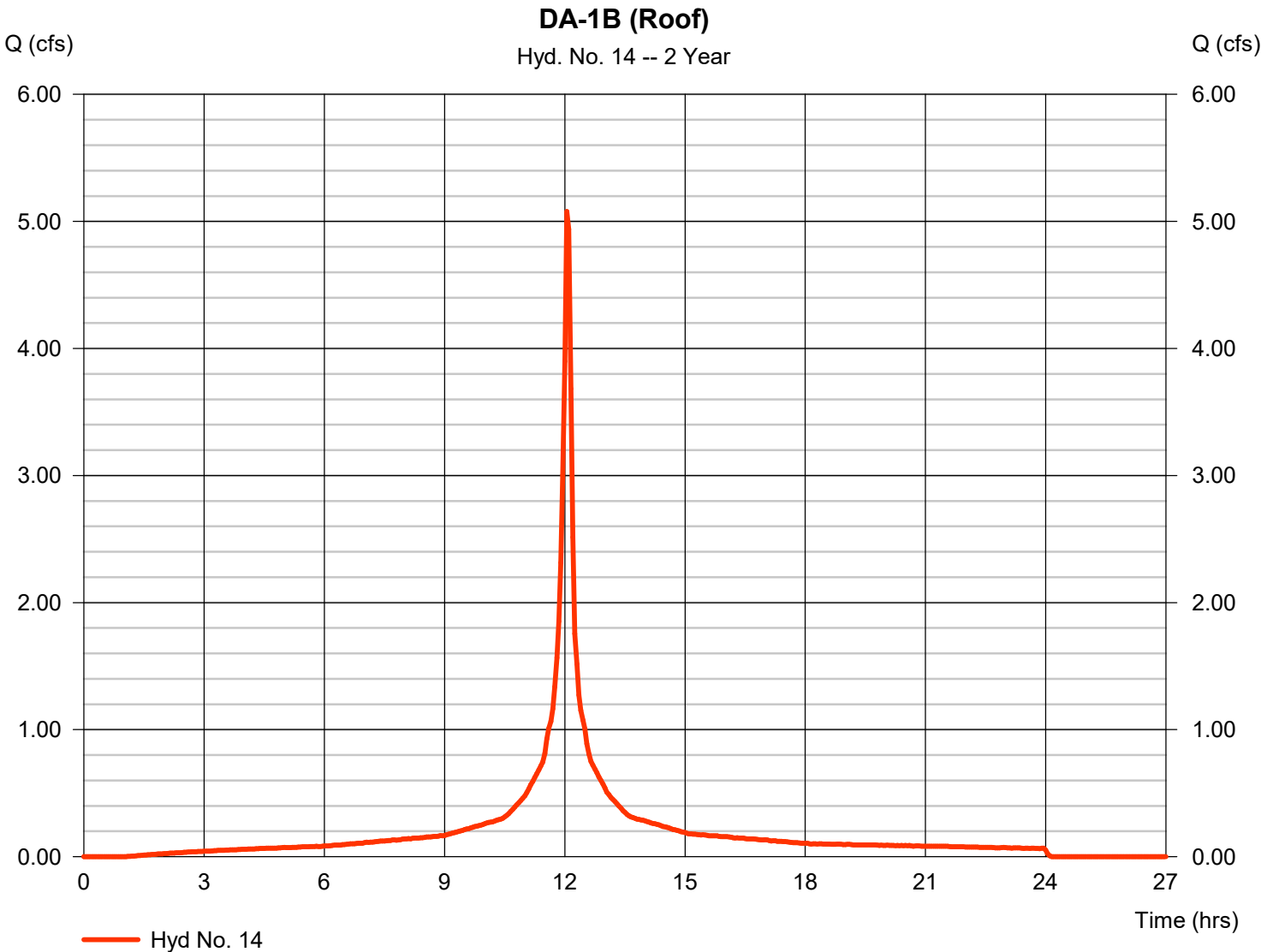
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Monday, 05 / 9 / 2022

Hyd. No. 14

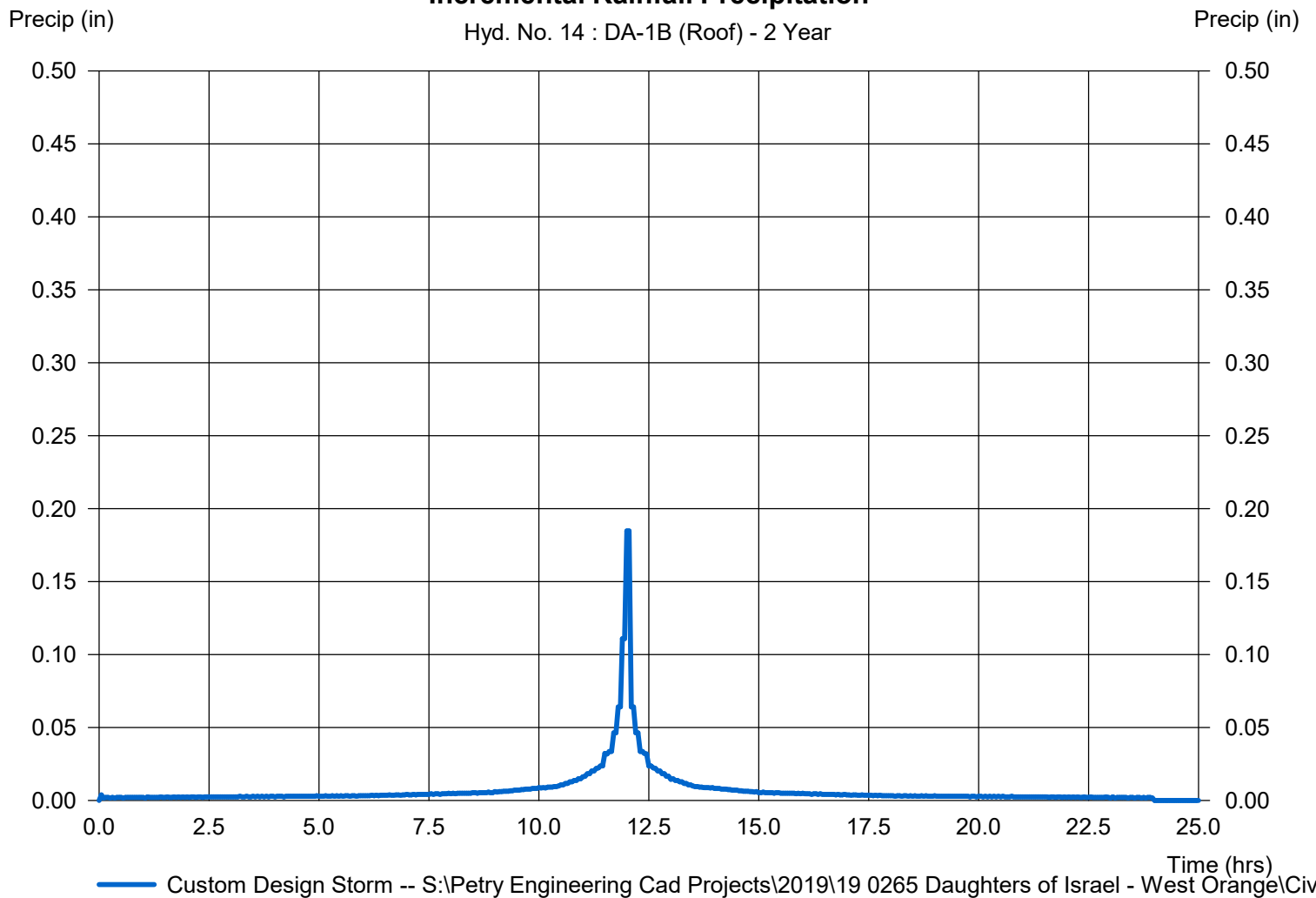
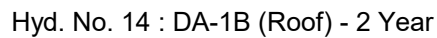
DA-1B (Roof)

Hydrograph type	= SCS Runoff	Peak discharge	= 5.077 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.05 hrs
Time interval	= 3 min	Hyd. volume	= 19,691 cuft
Drainage area	= 1.750 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.54 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\19-010-0265 Daughters of Israel - West Orange, NJ\19-010-0265.dwg		



DA-1B (Roof)

Storm Frequency = 2 yrs Time interval = 3 min
 Total precip. = 3.5400 in Distribution = Custom
 Storm duration = S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

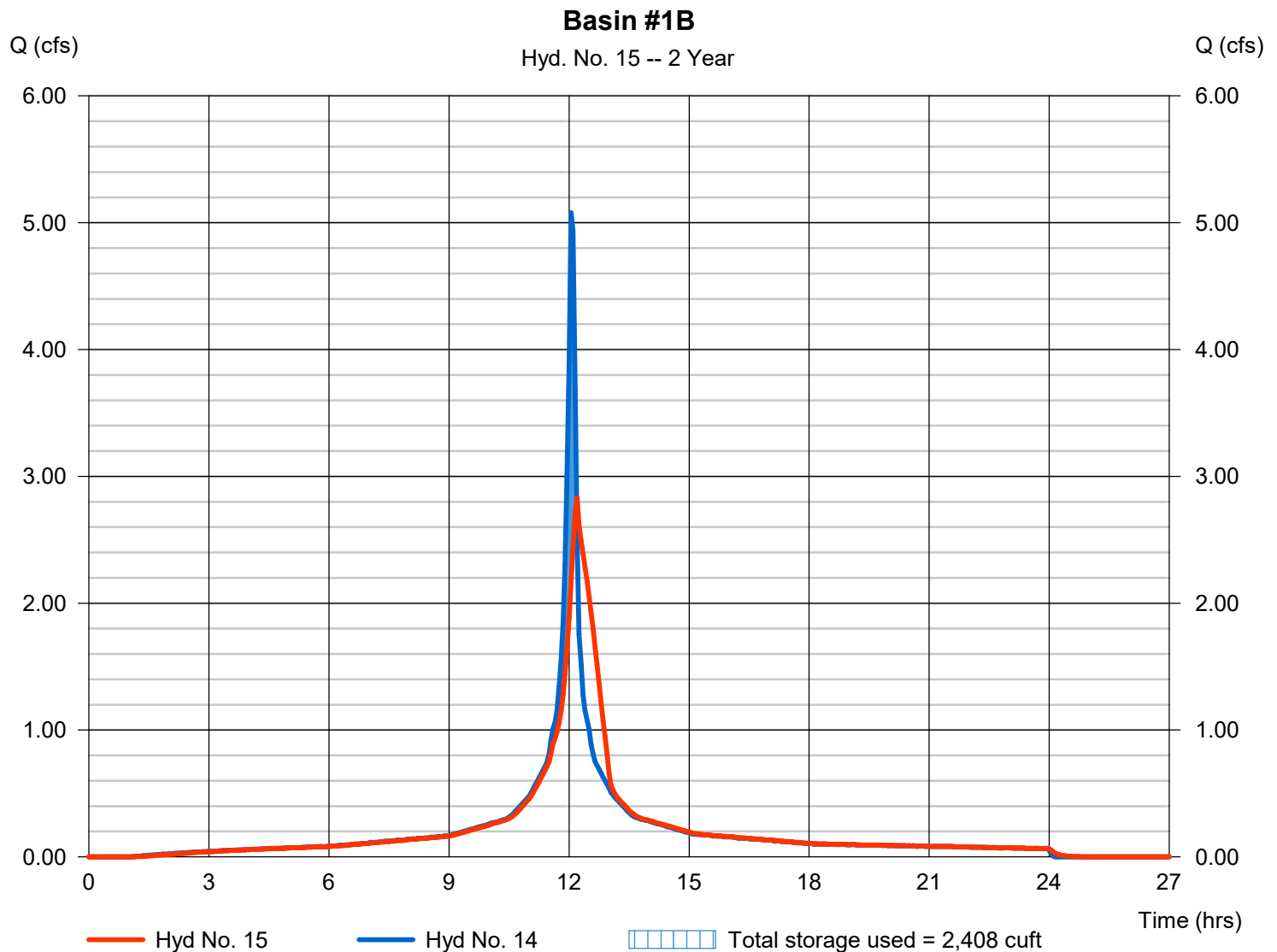
Monday, 05 / 9 / 2022

Hyd. No. 15

Basin #1B

Hydrograph type	= Reservoir	Peak discharge	= 2.831 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.20 hrs
Time interval	= 3 min	Hyd. volume	= 19,690 cuft
Inflow hyd. No.	= 14 - DA-1B (Roof)	Max. Elevation	= 411.12 ft
Reservoir name	= Basin #1B	Max. Storage	= 2,408 cuft

Storage Indication method used.



Pond No. 3 - Basin #1B

Pond Data

UG Chambers -Invert elev. = 409.00 ft, Rise x Span = 4.00 x 4.00 ft, Barrel Len = 60.00 ft, No. Barrels = 5, Slope = 0.00%, Headers = Yes

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	409.00	n/a	0	0
0.40	409.40	n/a	233	233
0.80	409.80	n/a	405	637
1.20	410.20	n/a	492	1,130
1.60	410.60	n/a	542	1,671
2.00	411.00	n/a	566	2,238
2.40	411.40	n/a	566	2,804
2.80	411.80	n/a	542	3,346
3.20	412.20	n/a	492	3,838
3.60	412.60	n/a	404	4,242
4.00	413.00	n/a	233	4,474

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.00	6.00	0.00	0.00
Span (in)	= 7.00	18.00	0.00	0.00
No. Barrels	= 2	1	0	0
Invert El. (ft)	= 409.00	411.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 4.00	0.00	0.00	0.00
Crest El. (ft)	= 412.25	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

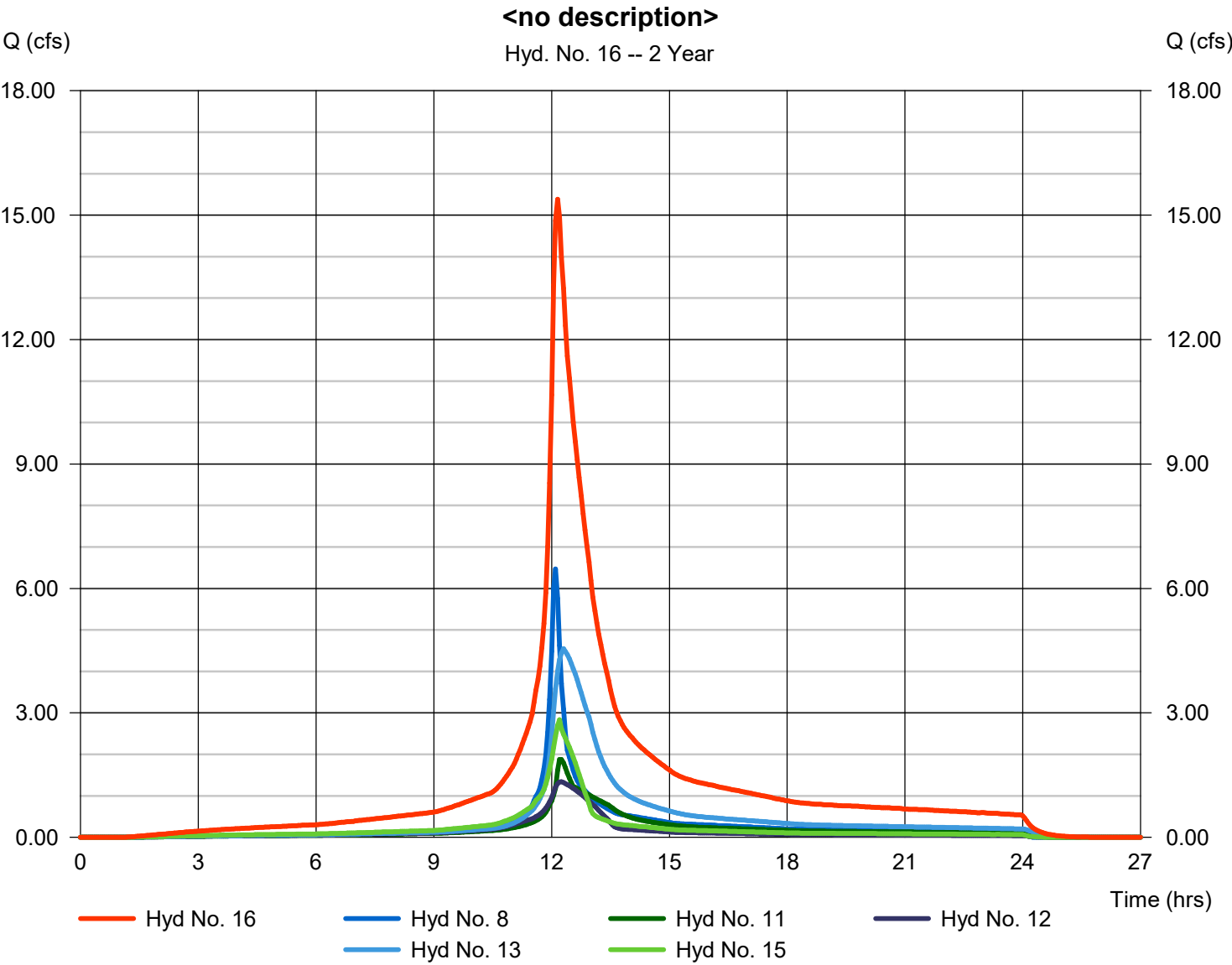
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	409.00	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.40	233	409.40	0.90 ic	0.00	---	---	0.00	---	---	---	---	---	0.904
0.80	637	409.80	1.49 ic	0.00	---	---	0.00	---	---	---	---	---	1.490
1.20	1,130	410.20	1.90 ic	0.00	---	---	0.00	---	---	---	---	---	1.903
1.60	1,671	410.60	2.24 ic	0.00	---	---	0.00	---	---	---	---	---	2.242
2.00	2,238	411.00	2.54 ic	0.00	---	---	0.00	---	---	---	---	---	2.535
2.40	2,804	411.40	2.80 ic	1.29 ic	---	---	0.00	---	---	---	---	---	4.090
2.80	3,346	411.80	3.04 ic	2.68 ic	---	---	0.00	---	---	---	---	---	5.717
3.20	3,838	412.20	3.26 ic	3.52 ic	---	---	0.00	---	---	---	---	---	6.781
3.60	4,242	412.60	3.47 ic	4.20 ic	---	---	2.76	---	---	---	---	---	10.42
4.00	4,474	413.00	3.67 ic	4.78 ic	---	---	8.65	---	---	---	---	---	17.09

Hydrograph Report

Hyd. No. 16

<no description>

Hydrograph type	= Combine	Peak discharge	= 15.38 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.15 hrs
Time interval	= 3 min	Hyd. volume	= 116,078 cuft
Inflow hyds.	= 8, 11, 12, 13, 15	Contrib. drain. area	= 0.000 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	4.924	3	723	19,409	-----	-----	-----	DA-1A (Roof)
2	SCS Runoff	6.860	3	729	27,609	-----	-----	-----	DA-2 (Pervious)
3	SCS Runoff	5.270	3	723	20,771	-----	-----	-----	DA-2 (Impervious)
4	SCS Runoff	11.96	3	729	48,122	-----	-----	-----	DA-3 (Pervious)
5	SCS Runoff	5.961	3	723	23,495	-----	-----	-----	DA-3 (Impervious)
6	SCS Runoff	3.789	3	729	18,226	-----	-----	-----	DA-4 (Pervious)
7	SCS Runoff	4.665	3	723	18,387	-----	-----	-----	DA-4 (Impervious)
8	Combine	11.77	3	726	48,380	2, 3,	-----	-----	DA-2
9	Combine	17.38	3	726	71,616	4, 5,	-----	-----	DA-3
10	Combine	7.935	3	726	36,613	6, 7,	-----	-----	DA-4
11	Reservoir	5.658	3	732	36,612	10	418.06	4,608	Basin #3
12	Reservoir	3.748	3	729	19,408	1	421.30	2,843	Basin #1A
13	Reservoir	14.88	3	732	71,615	9	416.81	9,497	Basin #2
14	SCS Runoff	7.559	3	723	29,794	-----	-----	-----	DA-1B (Roof)
15	Reservoir	5.733	3	729	29,793	14	411.81	3,352	Basin #1B
16	Combine	40.20	3	729	205,807	8, 11, 12, 13, 15	-----	-----	<no description>
Proposed Conditions.gpw					Return Period: 10 Year			Monday, 05 / 9 / 2022	

Hydrograph Report

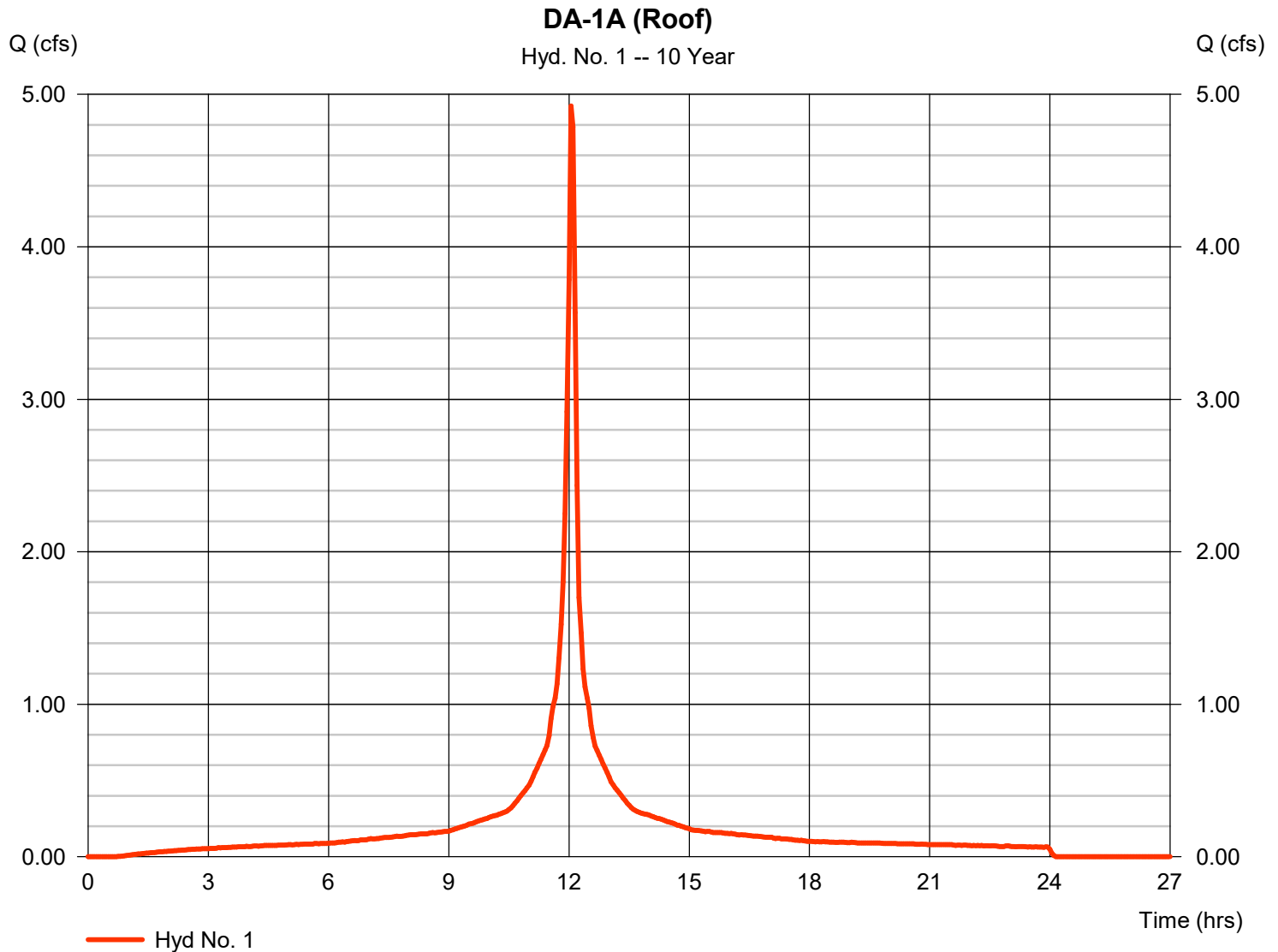
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Monday, 05 / 9 / 2022

Hyd. No. 1

DA-1A (Roof)

Hydrograph type	= SCS Runoff	Peak discharge	= 4.924 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.05 hrs
Time interval	= 3 min	Hyd. volume	= 19,409 cuft
Drainage area	= 1.140 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.24 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\19-010-0265 Daughters of Israel - West Orange		

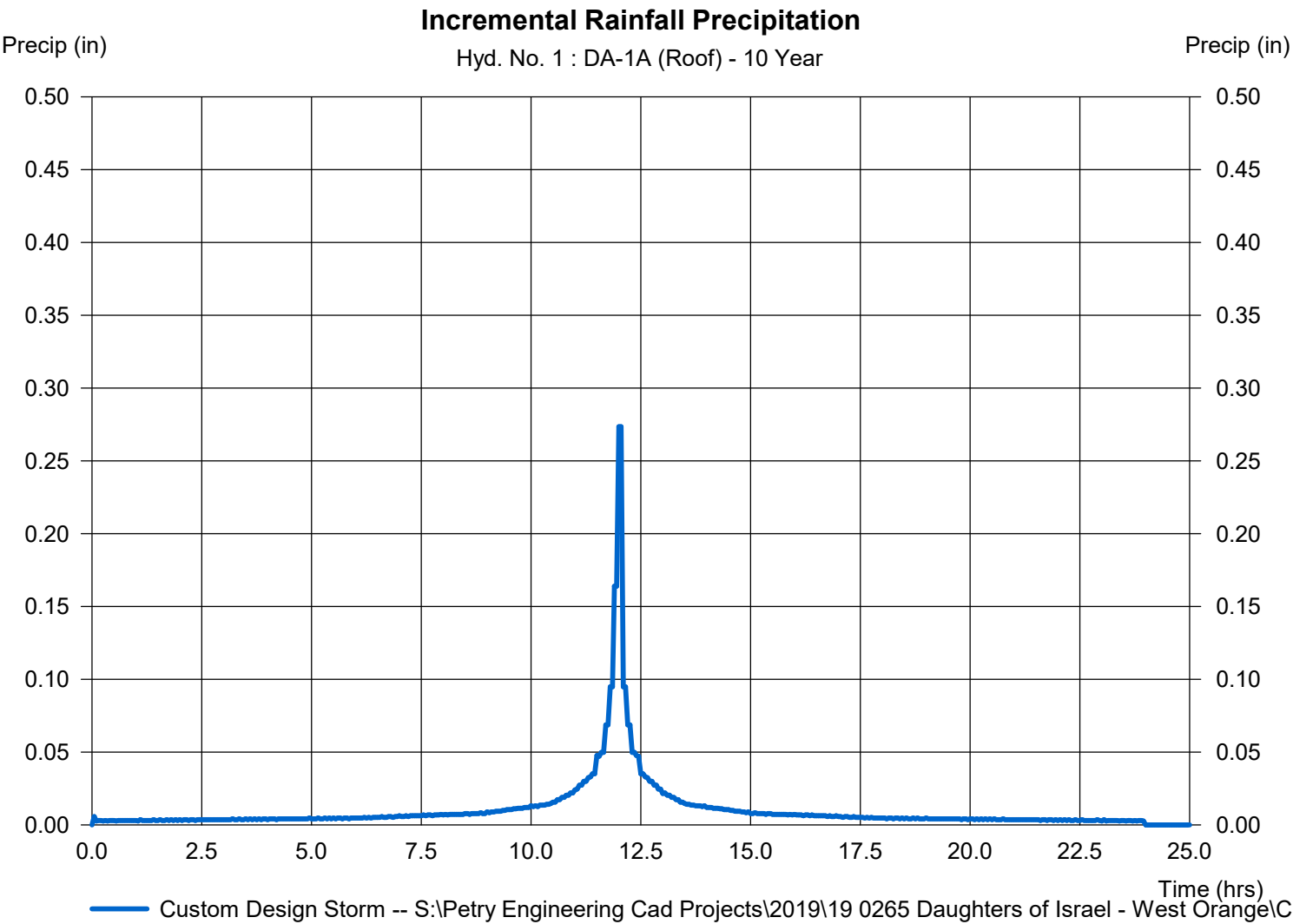


Precipitation Report

Hyd. No. 1

DA-1A (Roof)

Storm Frequency	= 10 yrs	Time interval	= 3 min
Total precip.	= 5.2400 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora		



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

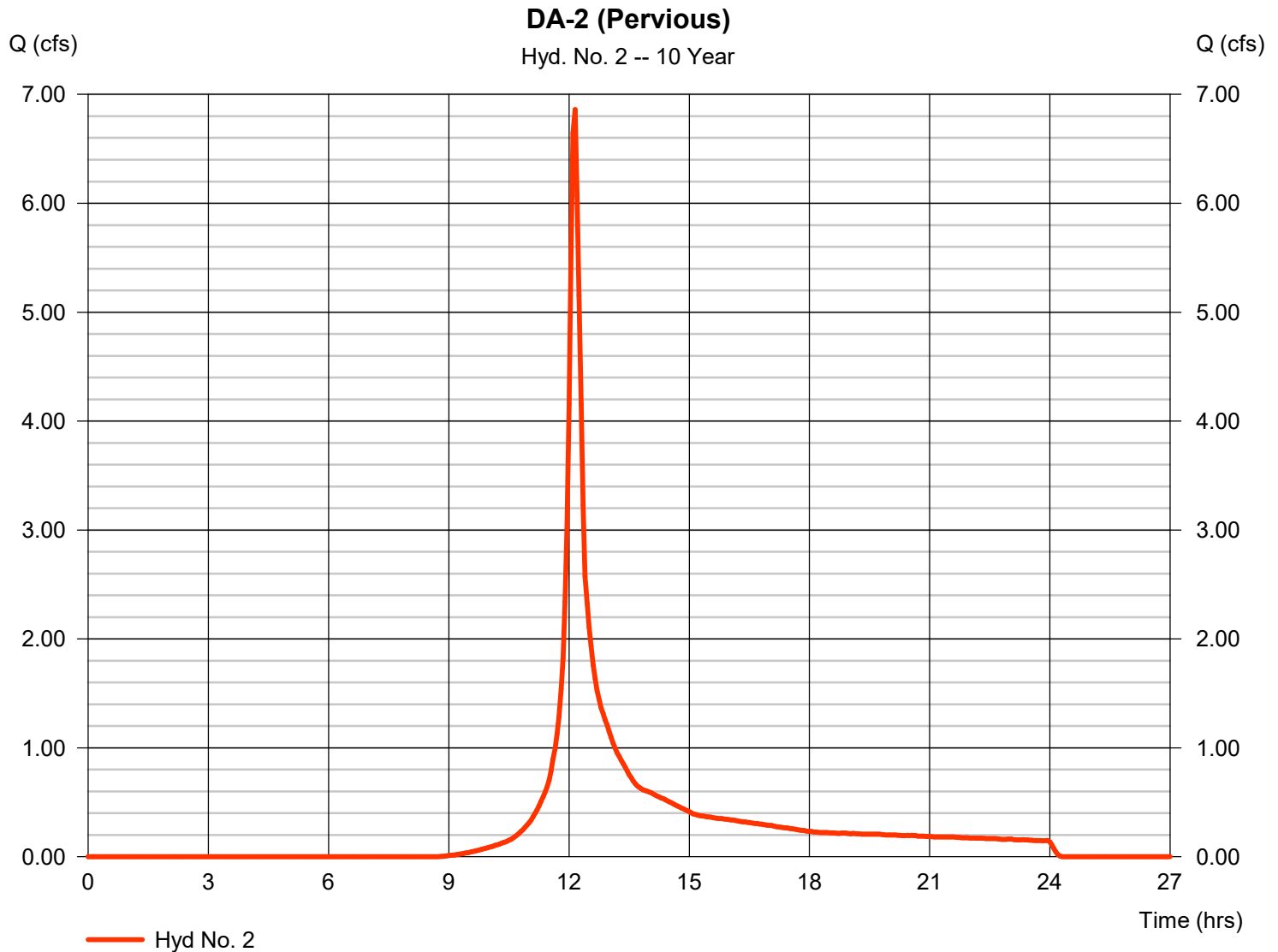
Monday, 05 / 9 / 2022

Hyd. No. 2

DA-2 (Pervious)

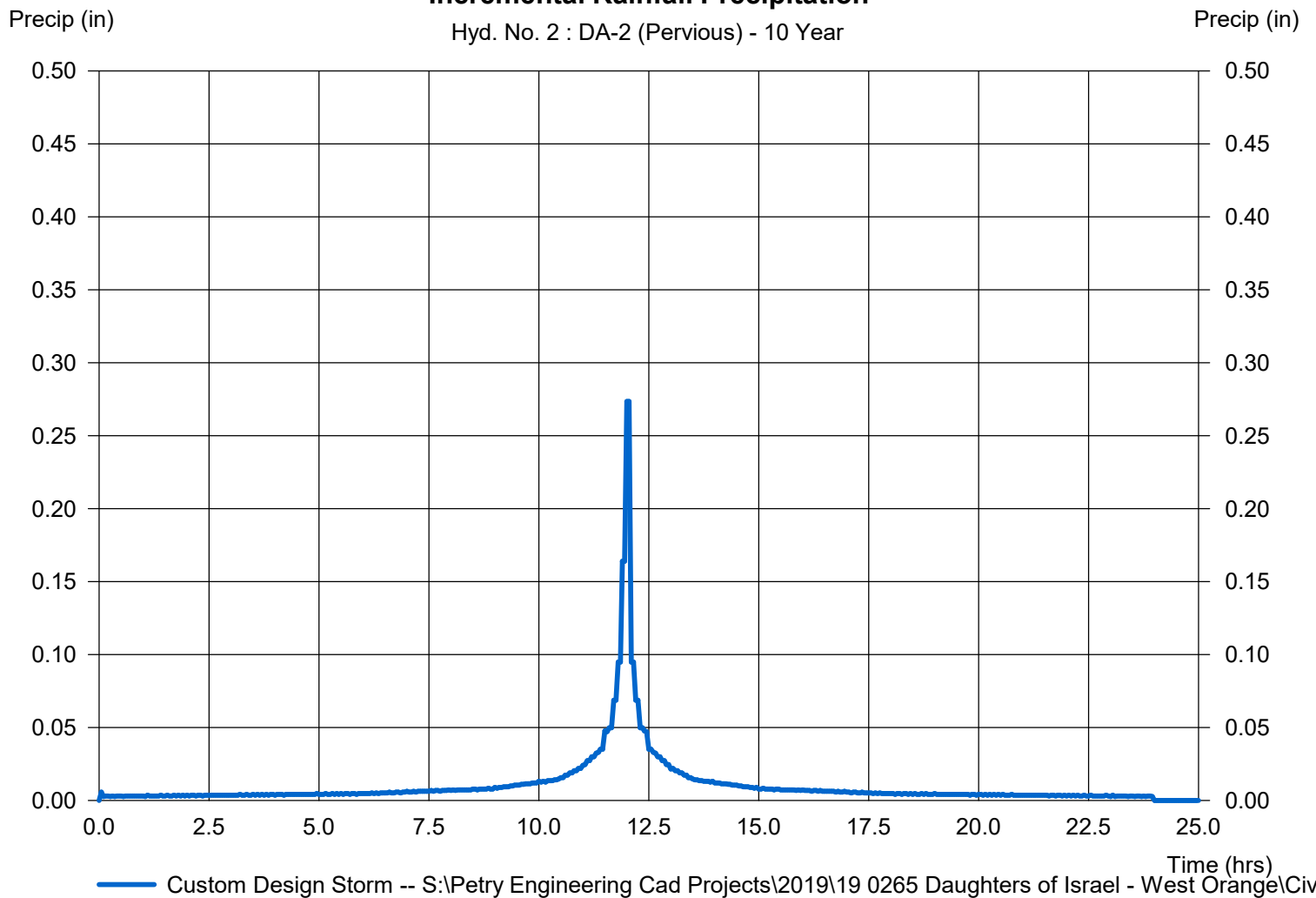
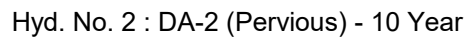
Hydrograph type	= SCS Runoff	Peak discharge	= 6.860 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.15 hrs
Time interval	= 3 min	Hyd. volume	= 27,609 cuft
Drainage area	= 3.190 ac	Curve number	= 72*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.10 min
Total precip.	= 5.24 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\2019\0265 Daughters of Israel - West Orange		

* Composite (Area/CN) = $[(0.450 \times 30) + (0.100 \times 77) + (0.150 \times 70) + (2.490 \times 80)] / 3.190$



DA-2 (Pervious)

Storm Frequency = 10 yrs Time interval = 3 min
Total precip. = 5.2400 in Distribution = Custom
Storm duration = S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora

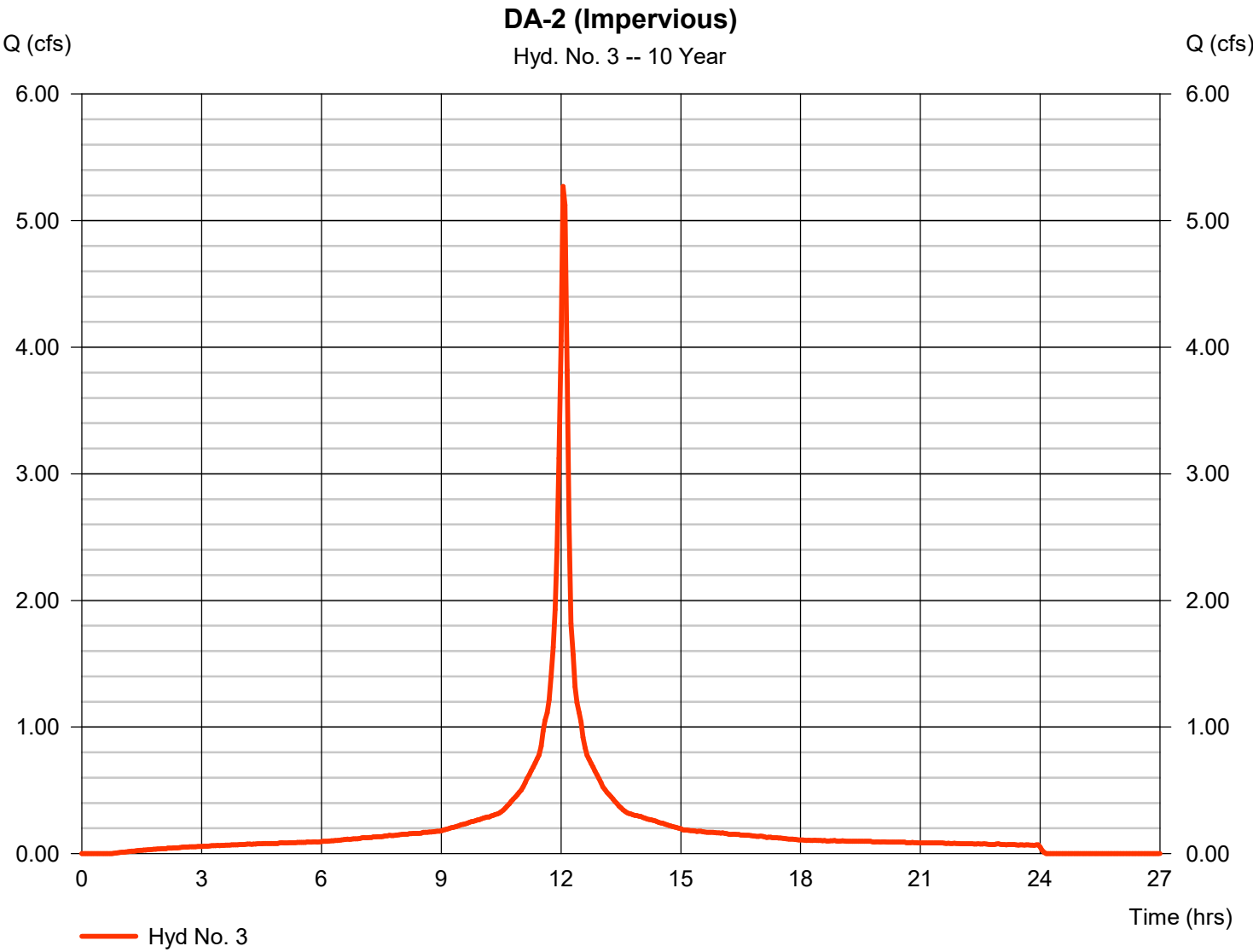


Hydrograph Report

Hyd. No. 3

DA-2 (Impervious)

Hydrograph type	= SCS Runoff	Peak discharge	= 5.270 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.05 hrs
Time interval	= 3 min	Hyd. volume	= 20,771 cuft
Drainage area	= 1.220 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.24 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\191019 0265 Daughters of Israel - West Orange		

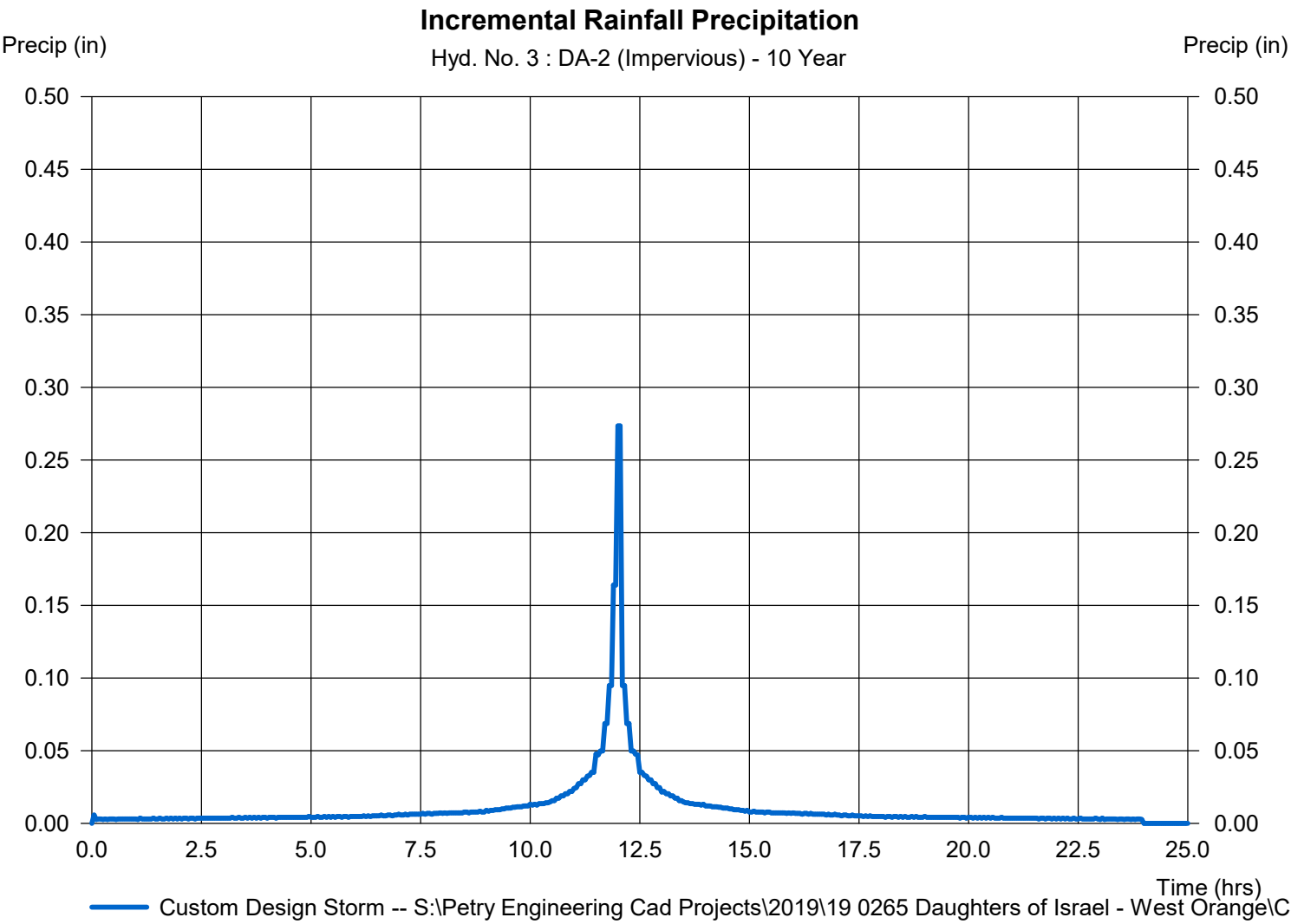


Precipitation Report

Hyd. No. 3

DA-2 (Impervious)

Storm Frequency	= 10 yrs	Time interval	= 3 min
Total precip.	= 5.2400 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Orange\Civil\Hydro\DA-2 (Impervious) - 10 Year		



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

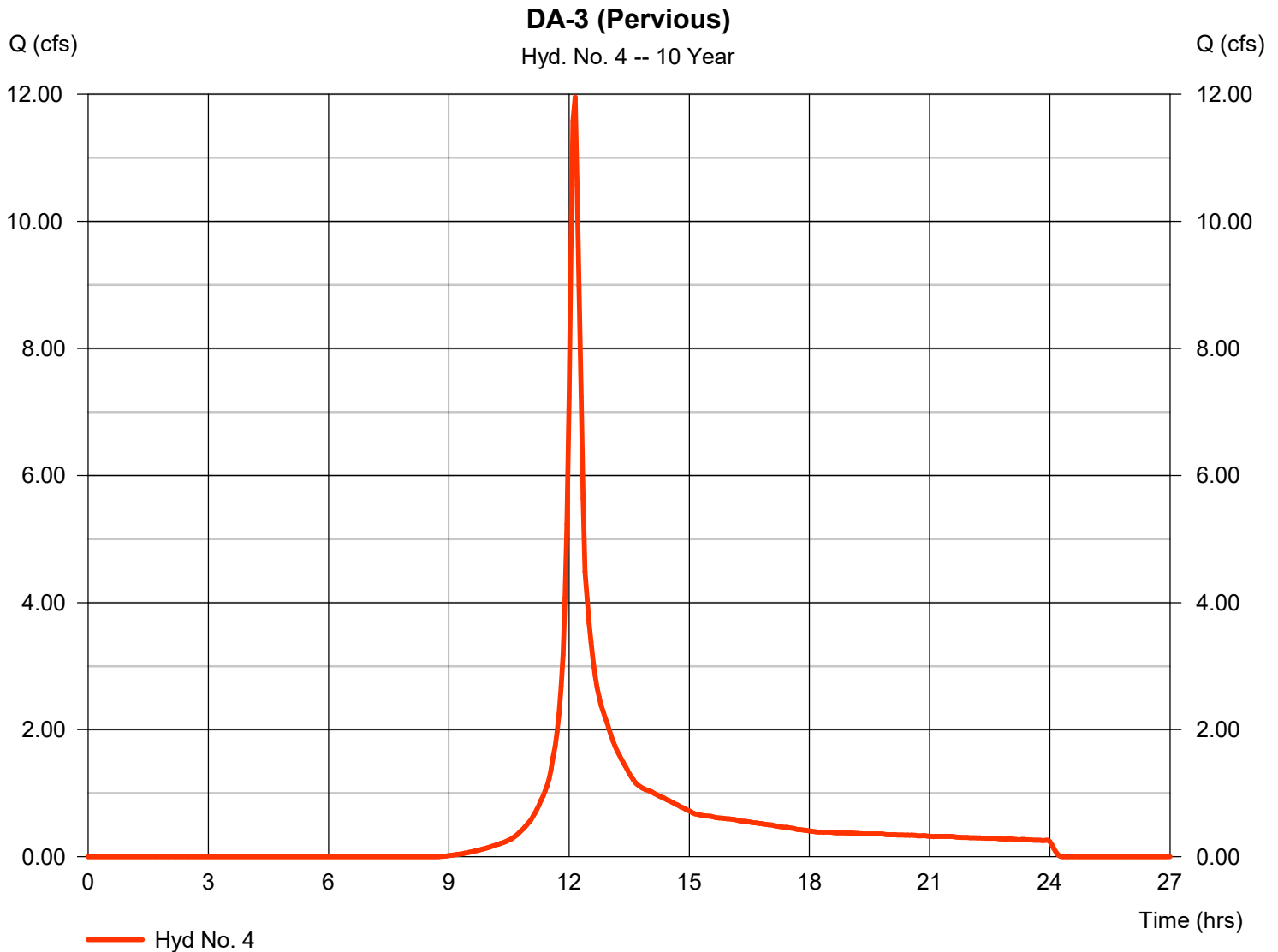
Monday, 05 / 9 / 2022

Hyd. No. 4

DA-3 (Pervious)

Hydrograph type	= SCS Runoff	Peak discharge	= 11.96 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.15 hrs
Time interval	= 3 min	Hyd. volume	= 48,122 cuft
Drainage area	= 5.560 ac	Curve number	= 72*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 14.50 min
Total precip.	= 5.24 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\191019 0265 Daughters of Israel - West Orange		

* Composite (Area/CN) = $[(0.010 \times 30) + (4.210 \times 70) + (0.340 \times 77) + (0.400 \times 74) + (0.600 \times 80)] / 5.560$

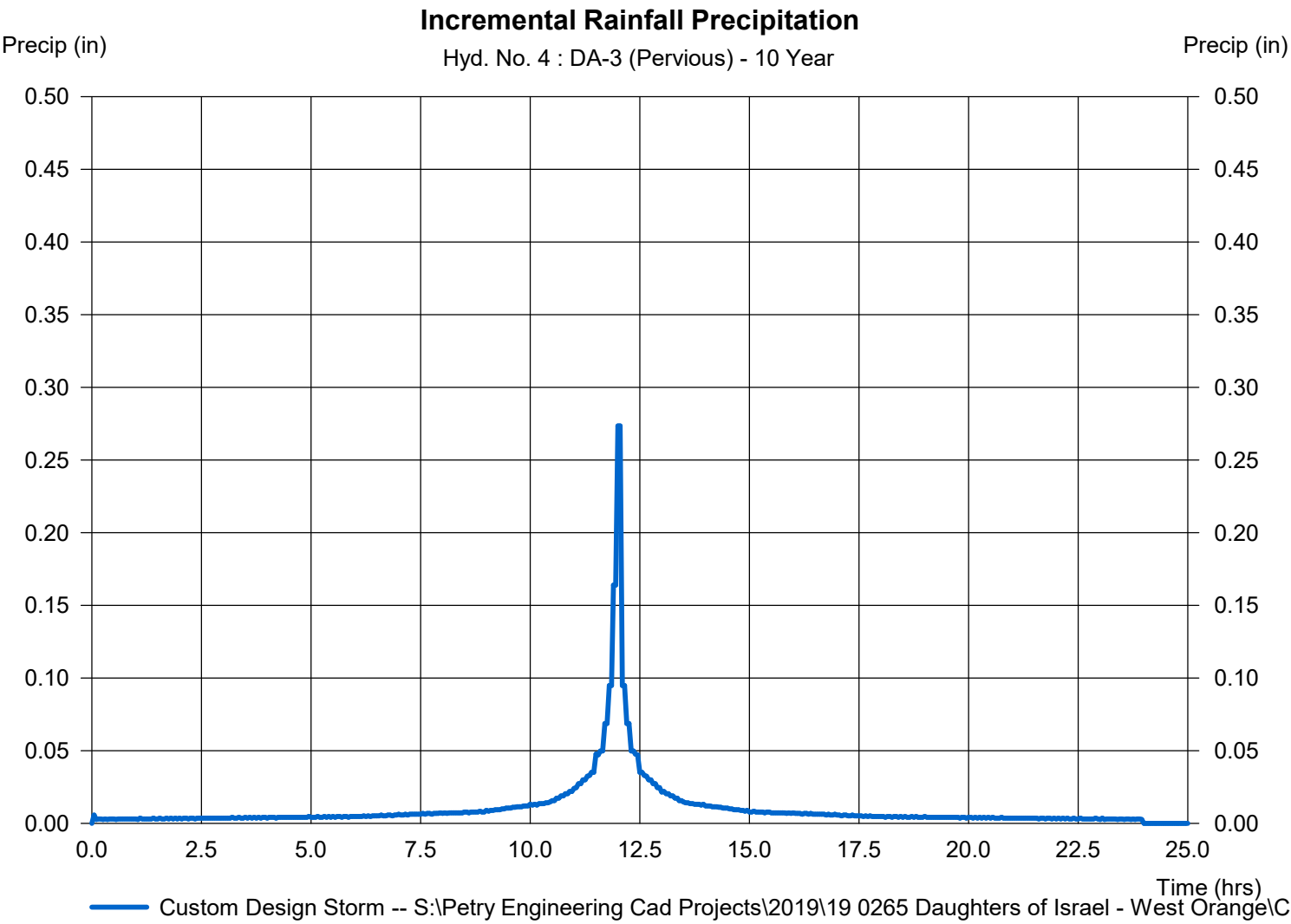


Precipitation Report

Hyd. No. 4

DA-3 (Pervious)

Storm Frequency	= 10 yrs	Time interval	= 3 min
Total precip.	= 5.2400 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Orange\Hydrographs\DA-3 (Pervious) - 10 Year		



Hydrograph Report

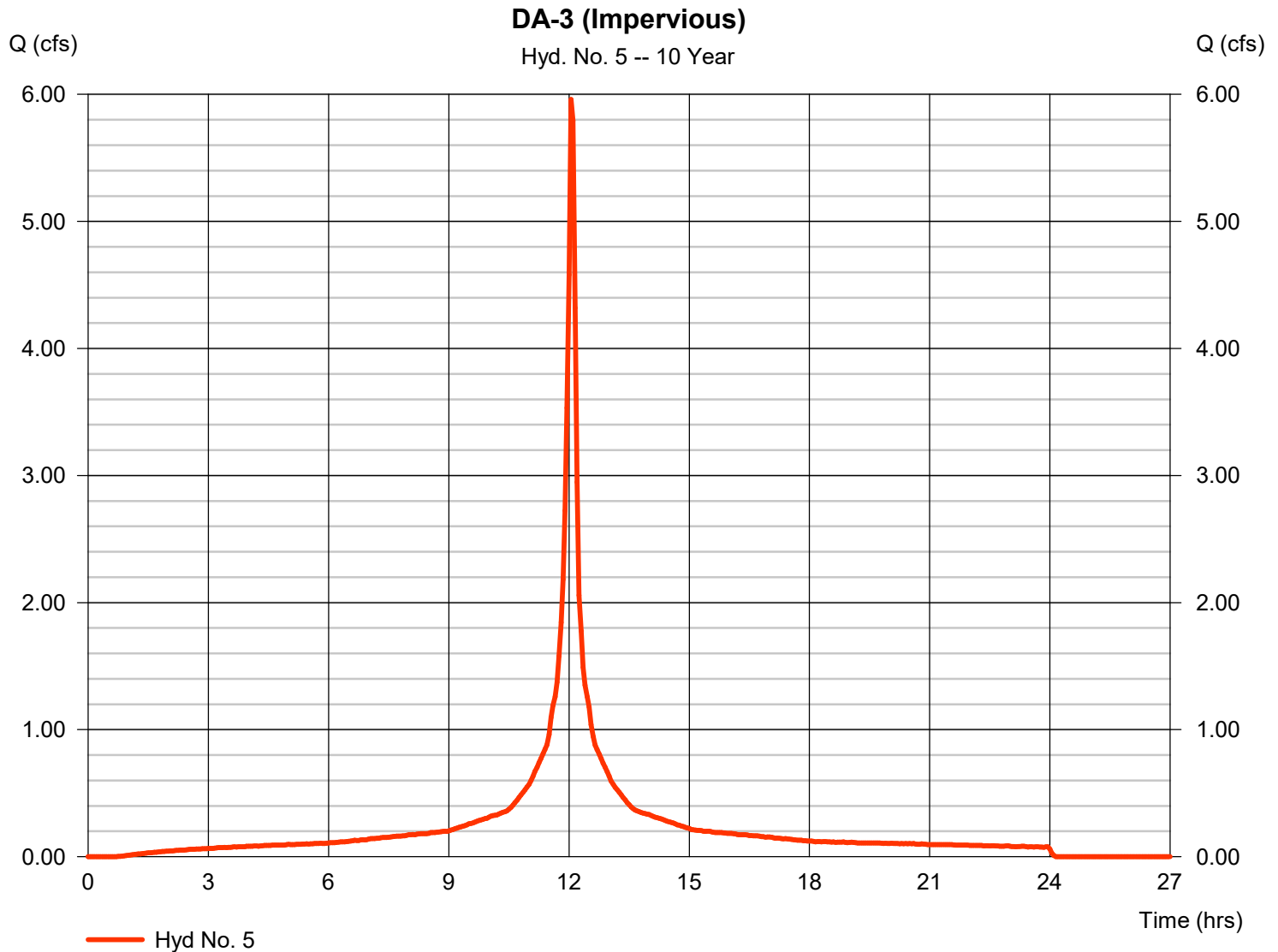
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Monday, 05 / 9 / 2022

Hyd. No. 5

DA-3 (Impervious)

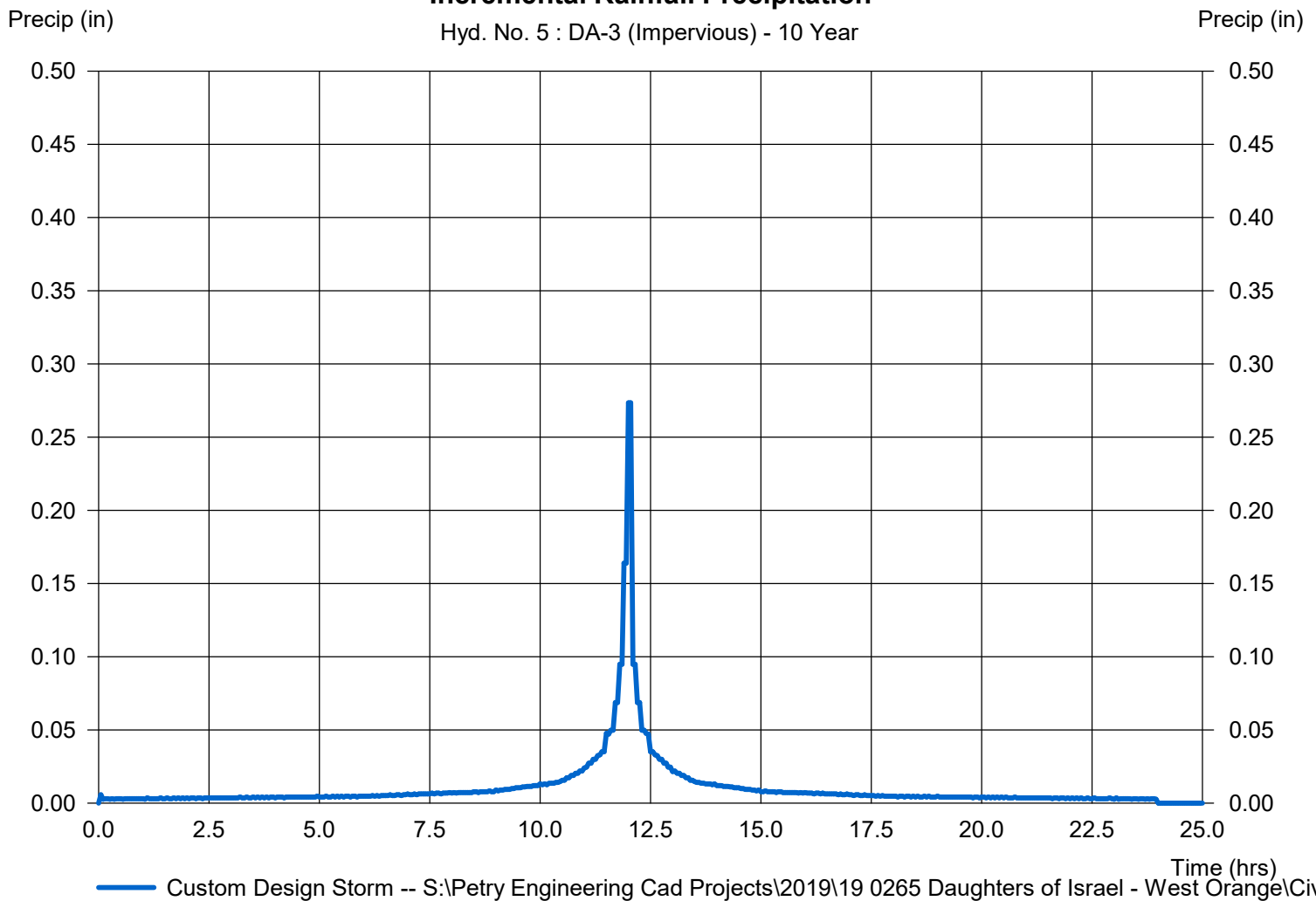
Hydrograph type	= SCS Runoff	Peak discharge	= 5.961 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.05 hrs
Time interval	= 3 min	Hyd. volume	= 23,495 cuft
Drainage area	= 1.380 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.24 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\191019 0265 Daughters of Israel - West Orange		



DA-3 (Impervious)

Storm Frequency = 10 yrs Time interval = 3 min
Total precip. = 5.2400 in Distribution = Custom
Storm duration = S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora

Hyd. No. 5 : DA-3 (Impervious) - 10 Year



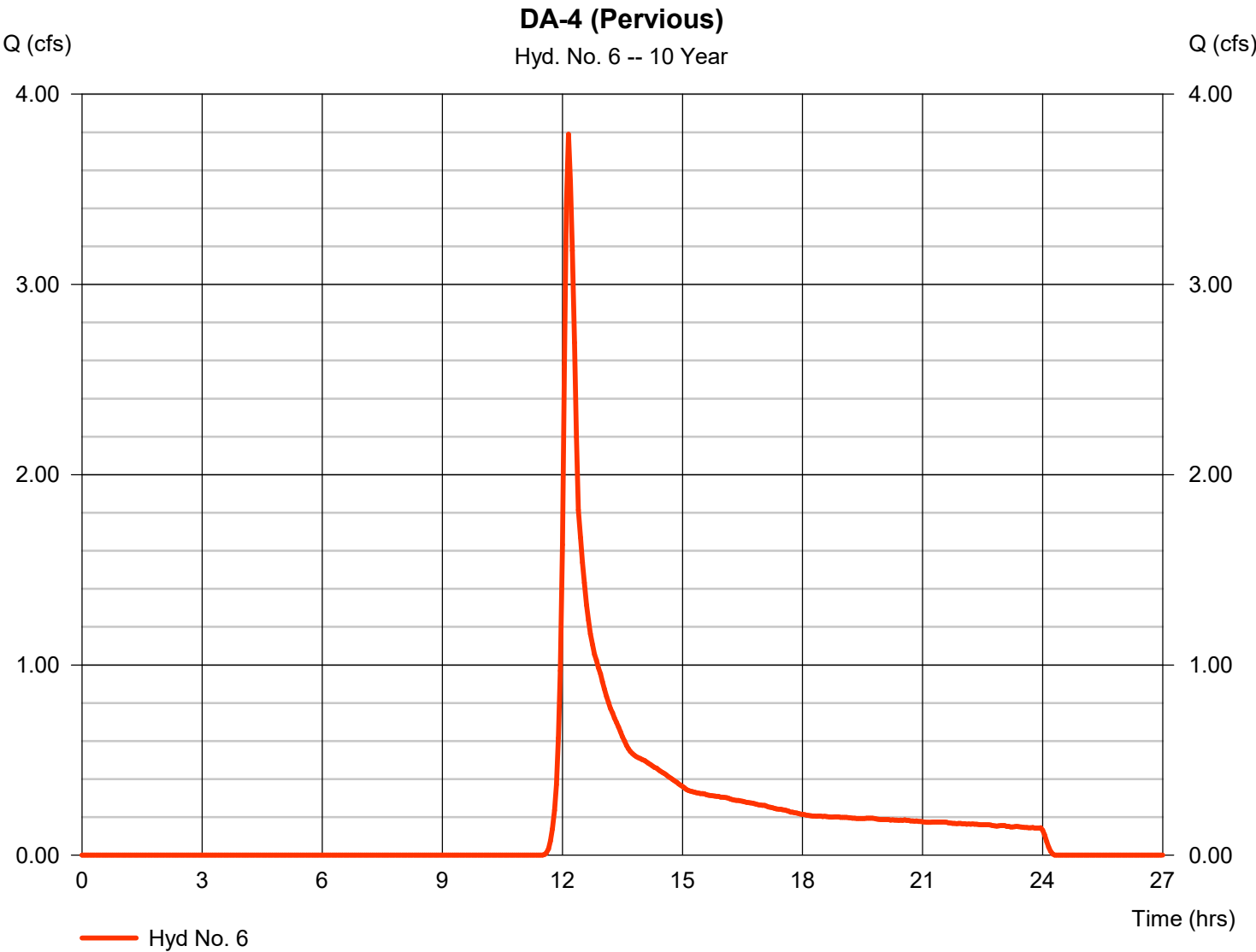
Hydrograph Report

Hyd. No. 6

DA-4 (Pervious)

Hydrograph type	= SCS Runoff	Peak discharge	= 3.789 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.15 hrs
Time interval	= 3 min	Hyd. volume	= 18,226 cuft
Drainage area	= 4.840 ac	Curve number	= 54*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 14.30 min
Total precip.	= 5.24 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\191019 0265 Daughters of Israel - West Orange NJ\191019 0265 Daughters of Israel - West Orange NJ.dwg		

* Composite (Area/CN) = [(2.140 x 30) + (1.440 x 70) + (0.360 x 74) + (0.900 x 80)] / 4.840

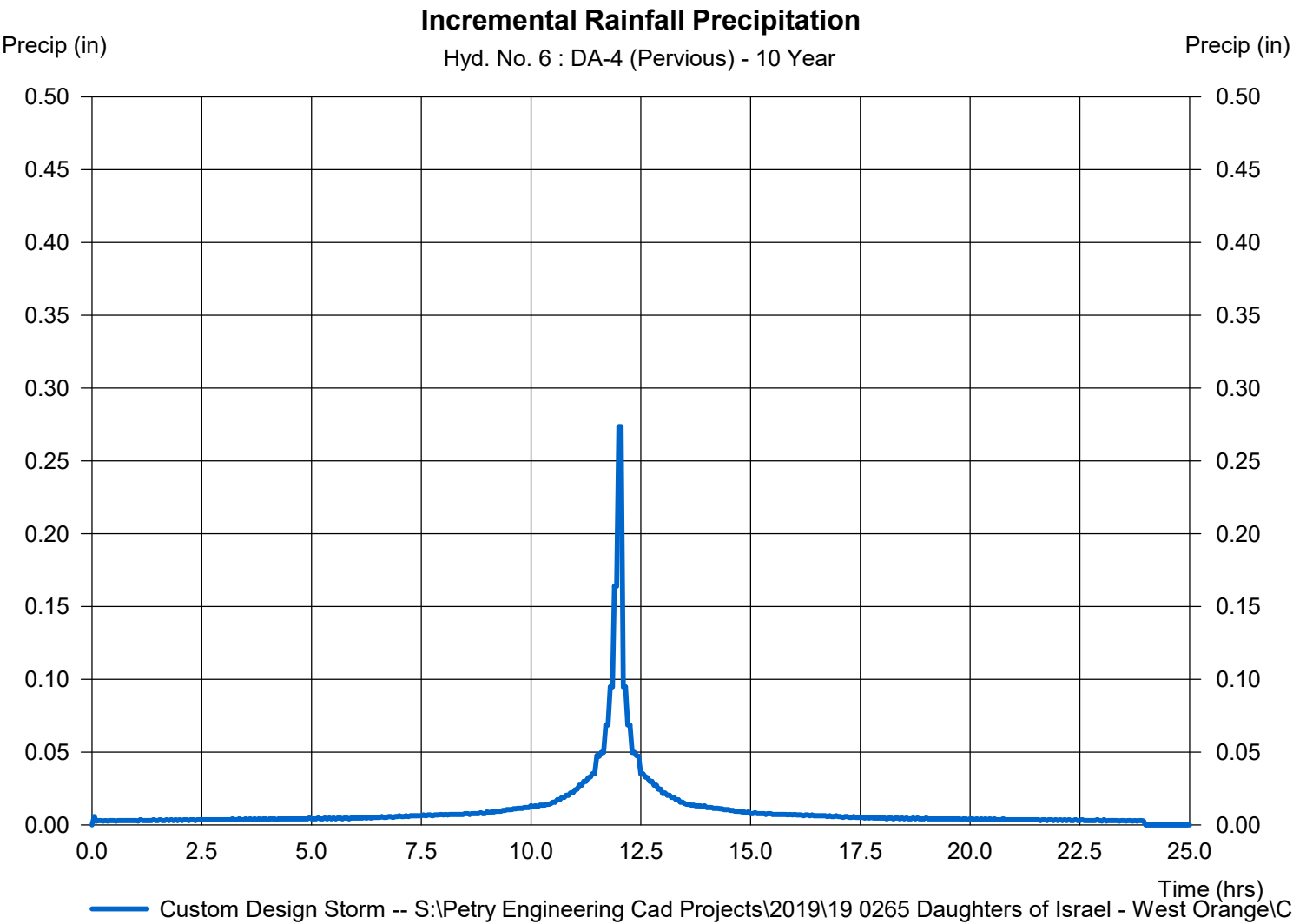


Precipitation Report

Hyd. No. 6

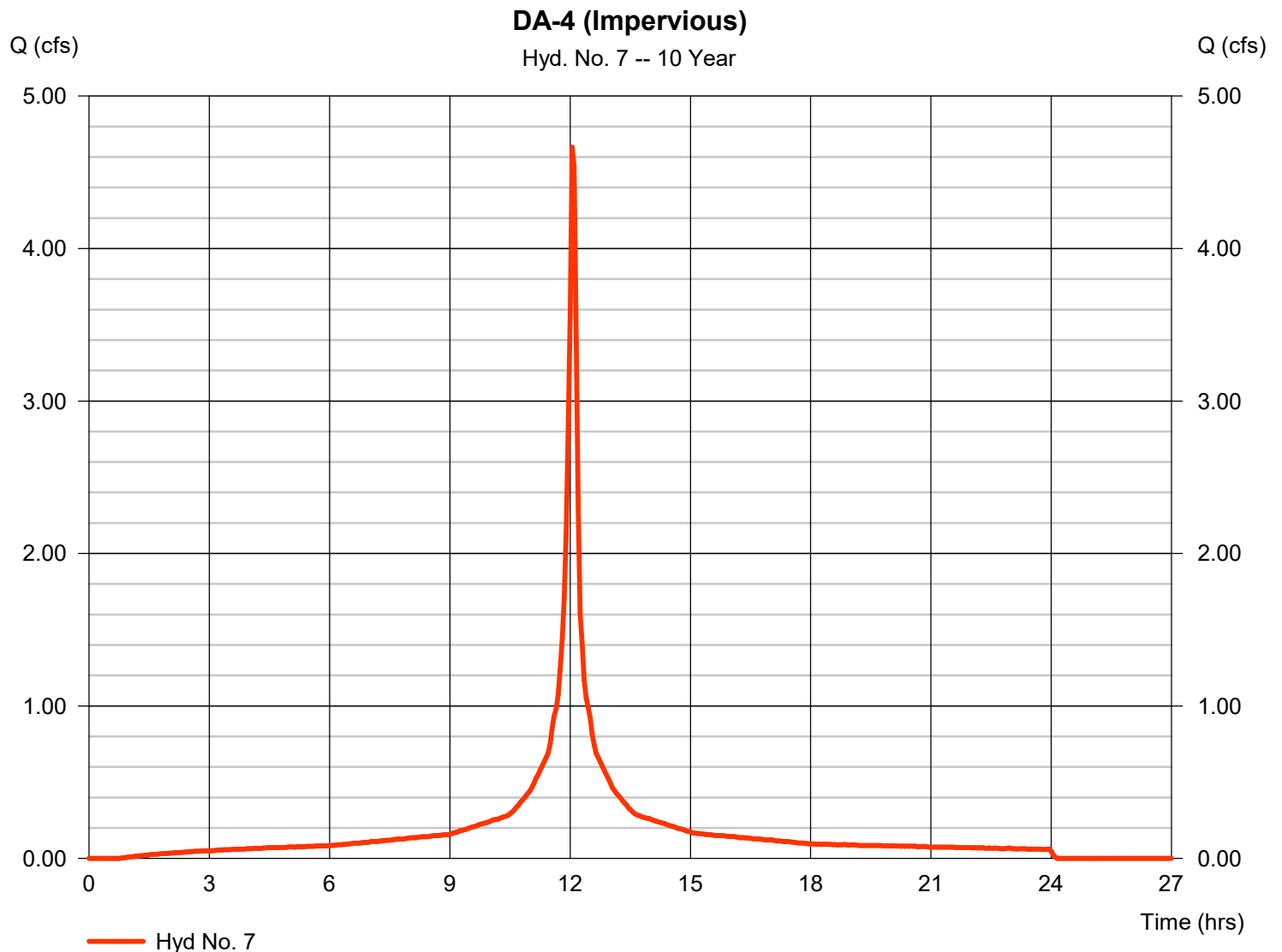
DA-4 (Pervious)

Storm Frequency	= 10 yrs	Time interval	= 3 min
Total precip.	= 5.2400 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Orange\Hydrographs\DA-4 (Pervious) - 10 Year		



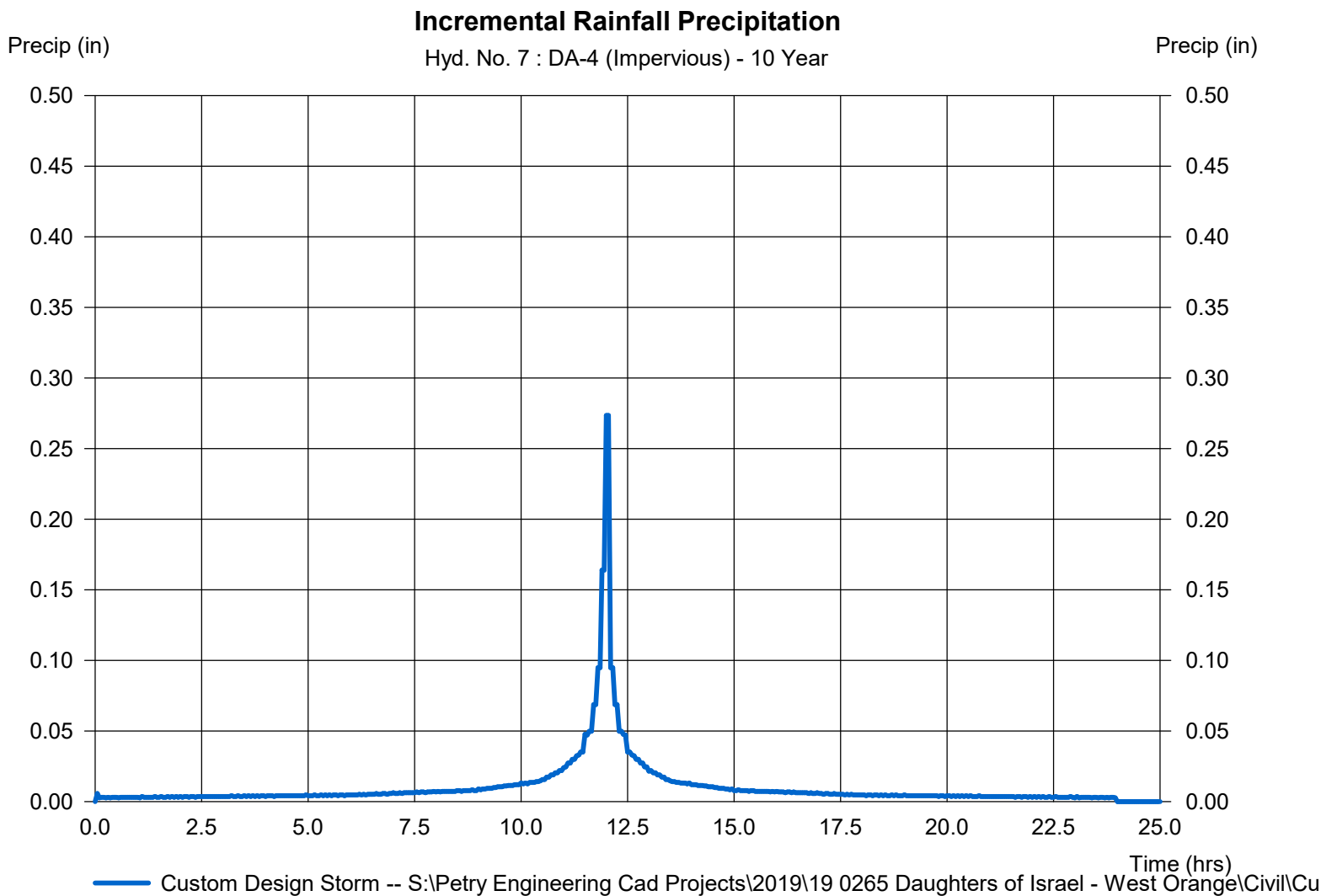
DA-4 (Impervious)

Hydrograph type	= SCS Runoff	Peak discharge	= 4.665 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.05 hrs
Time interval	= 3 min	Hyd. volume	= 18,387 cuft
Drainage area	= 1.080 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.24 in	Distribution	= Custom
Storm duration	= 5.00 hrs		



DA-4 (Impervious)

Storm Frequency = 10 yrs Time interval = 3 min
Total precip. = 5.2400 in Distribution = Custom
Storm duration = S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

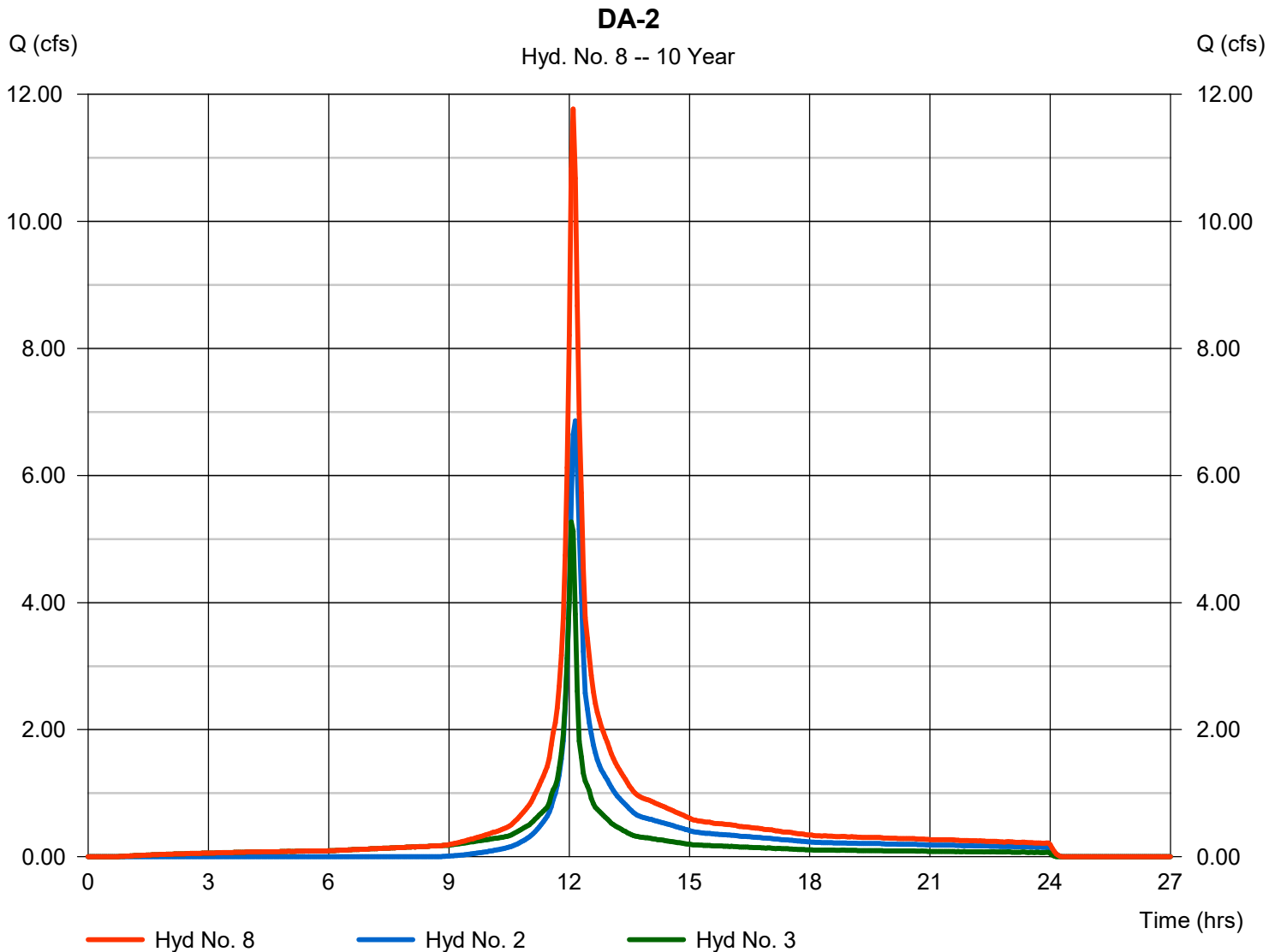
Monday, 05 / 9 / 2022

Hyd. No. 8

DA-2

Hydrograph type = Combine
 Storm frequency = 10 yrs
 Time interval = 3 min
 Inflow hyds. = 2, 3

Peak discharge = 11.77 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 48,380 cuft
 Contrib. drain. area = 4.410 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

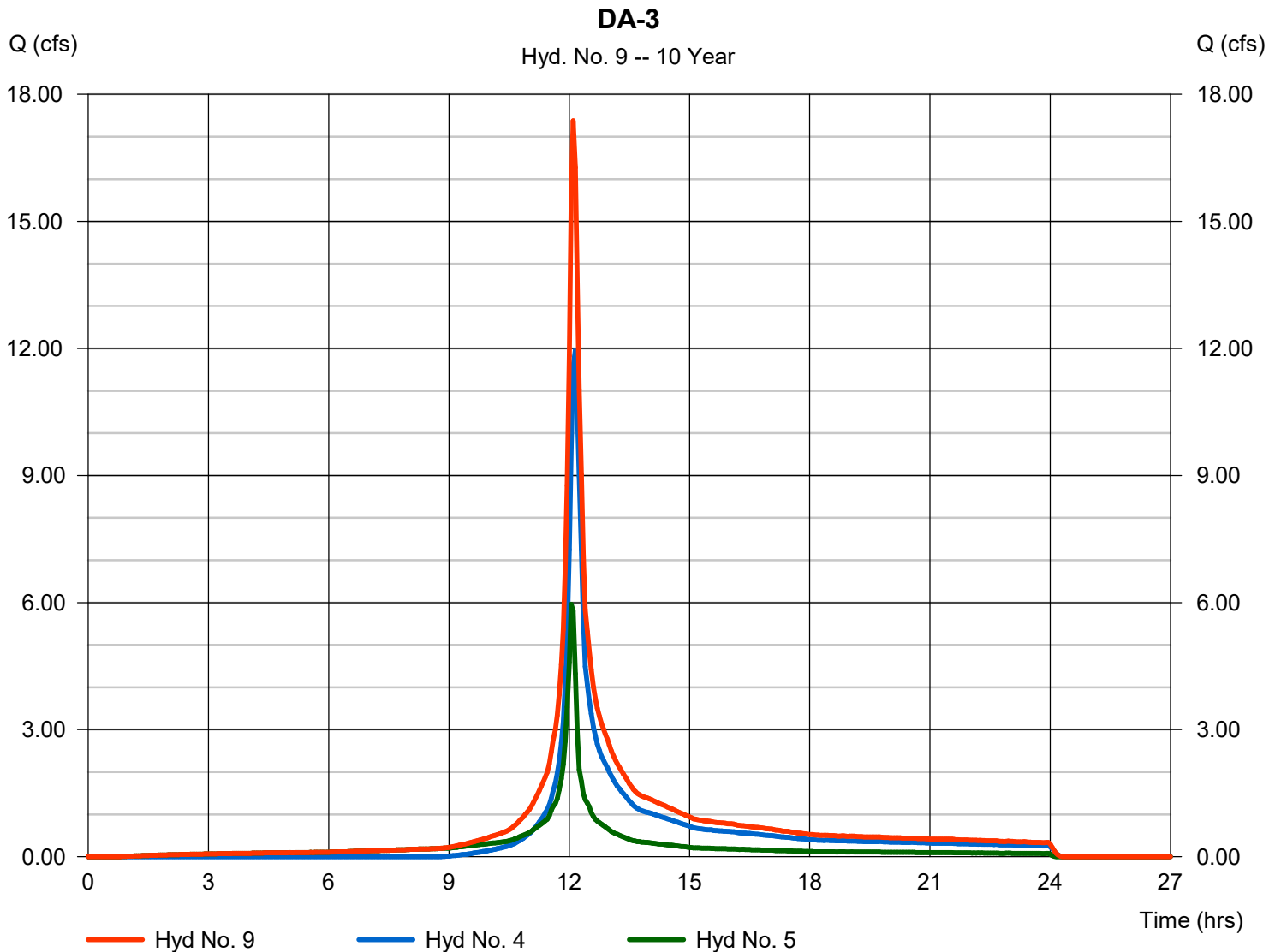
Monday, 05 / 9 / 2022

Hyd. No. 9

DA-3

Hydrograph type = Combine
Storm frequency = 10 yrs
Time interval = 3 min
Inflow hyds. = 4, 5

Peak discharge = 17.38 cfs
Time to peak = 12.10 hrs
Hyd. volume = 71,616 cuft
Contrib. drain. area = 6.940 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

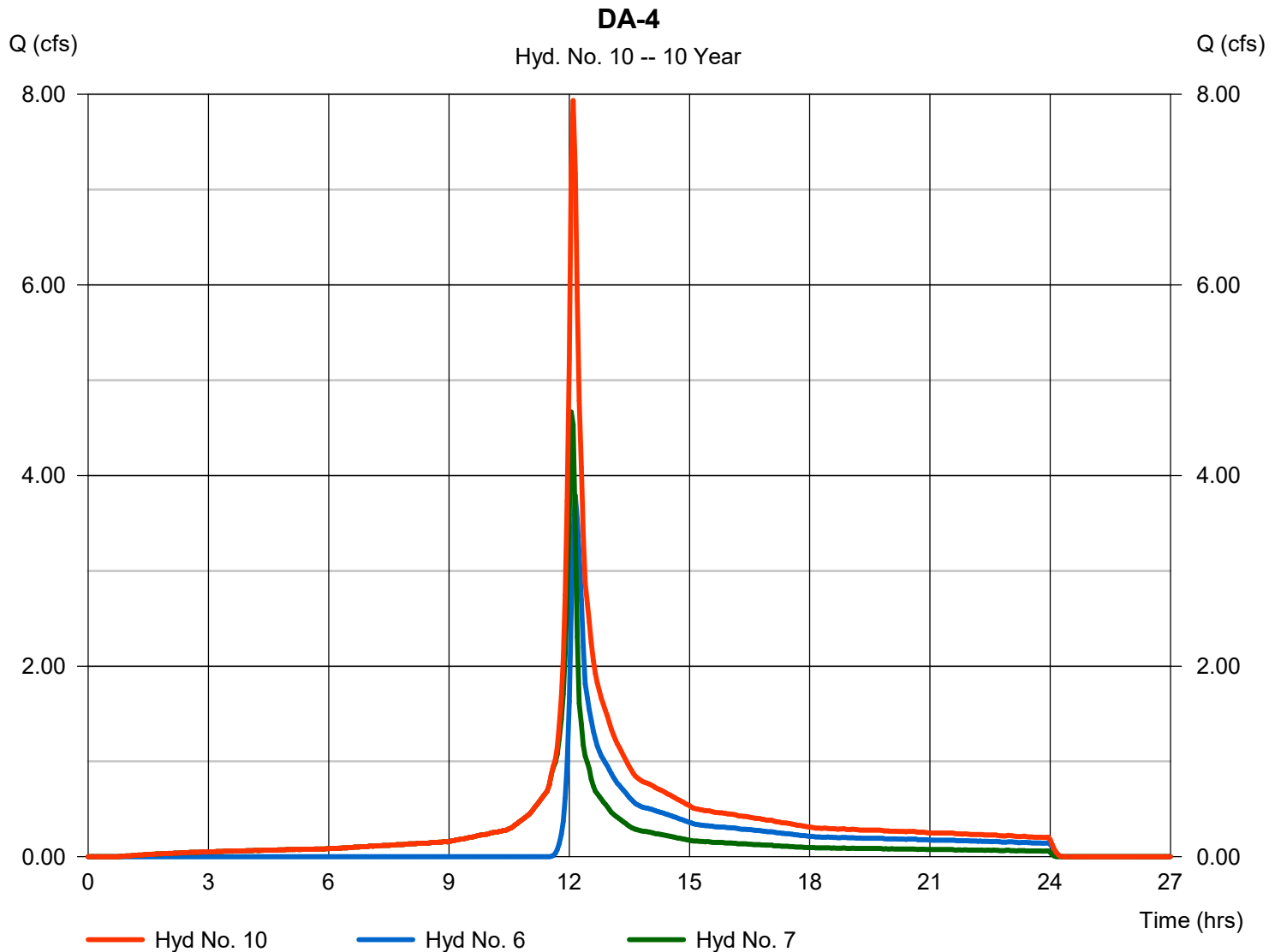
Monday, 05 / 9 / 2022

Hyd. No. 10

DA-4

Hydrograph type = Combine
 Storm frequency = 10 yrs
 Time interval = 3 min
 Inflow hyds. = 6, 7

Peak discharge = 7.935 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 36,613 cuft
 Contrib. drain. area = 5.920 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

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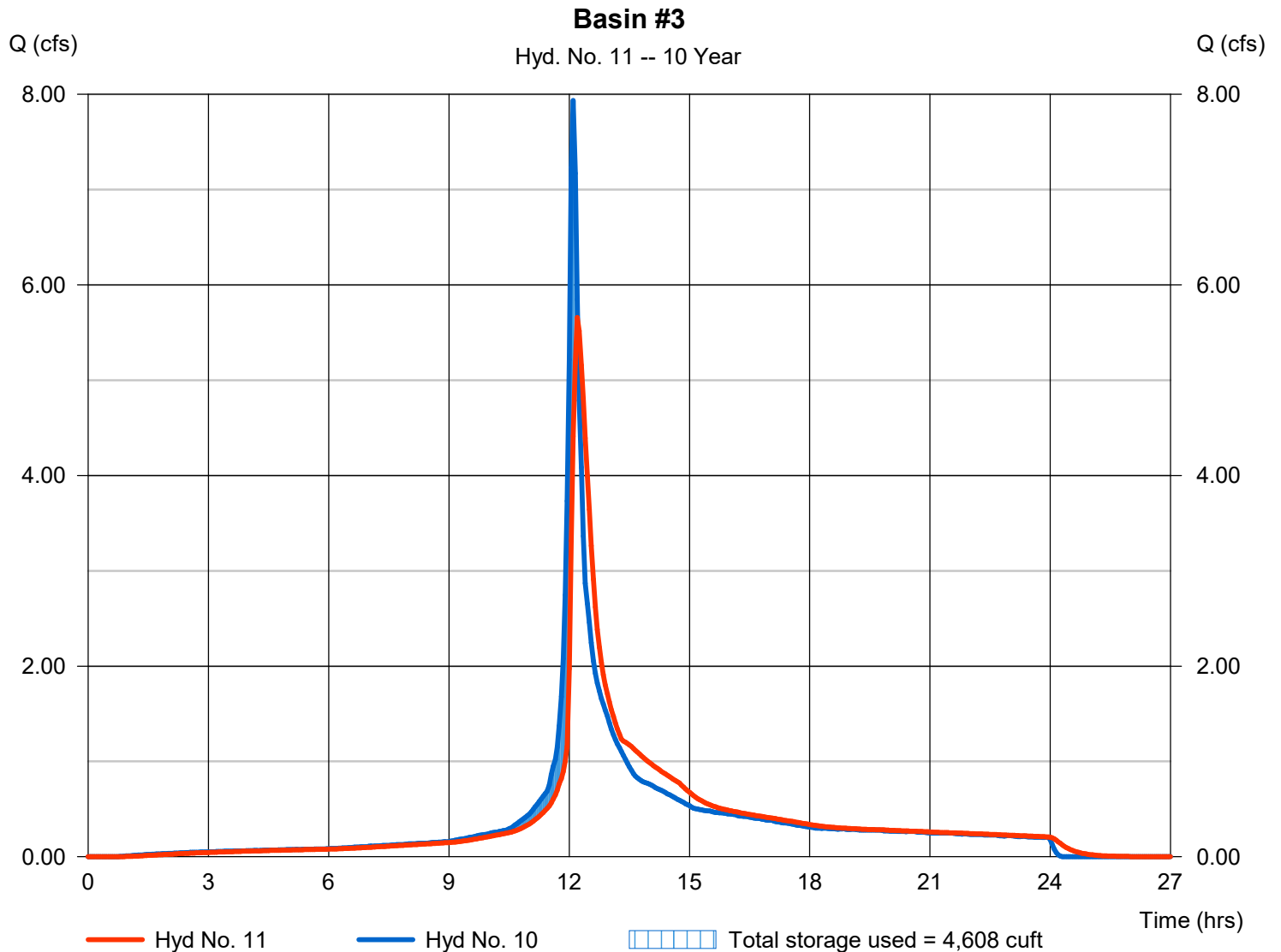
Hyd. No. 11

Basin #3

Hydrograph type = Reservoir
 Storm frequency = 10 yrs
 Time interval = 3 min
 Inflow hyd. No. = 10 - DA-4
 Reservoir name = Basin #3

Peak discharge = 5.658 cfs
 Time to peak = 12.20 hrs
 Hyd. volume = 36,612 cuft
 Max. Elevation = 418.06 ft
 Max. Storage = 4,608 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

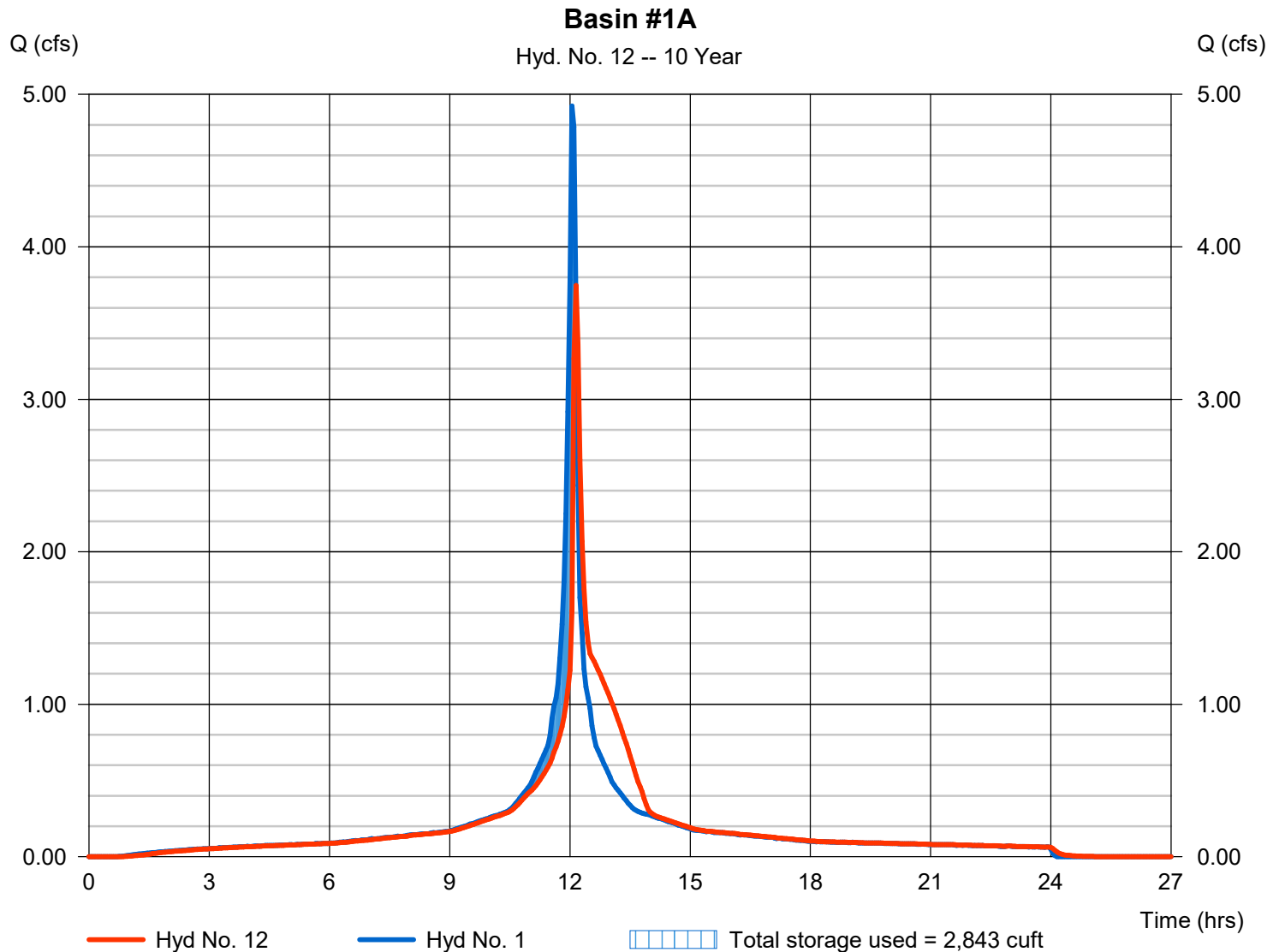
Monday, 05 / 9 / 2022

Hyd. No. 12

Basin #1A

Hydrograph type	= Reservoir	Peak discharge	= 3.748 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.15 hrs
Time interval	= 3 min	Hyd. volume	= 19,408 cuft
Inflow hyd. No.	= 1 - DA-1A (Roof)	Max. Elevation	= 421.30 ft
Reservoir name	= Basin #1A	Max. Storage	= 2,843 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Monday, 05 / 9 / 2022

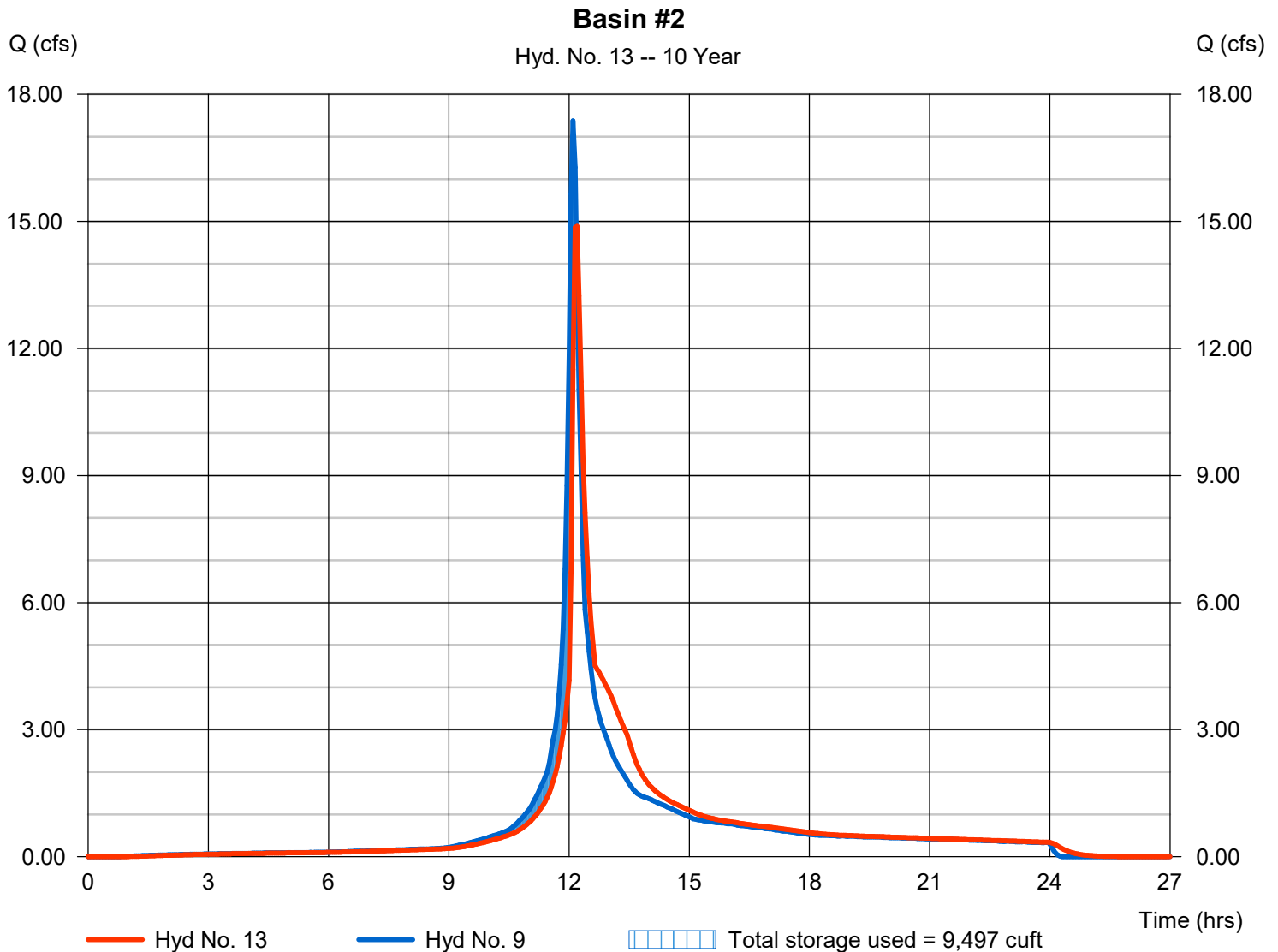
Hyd. No. 13

Basin #2

Hydrograph type = Reservoir
 Storm frequency = 10 yrs
 Time interval = 3 min
 Inflow hyd. No. = 9 - DA-3
 Reservoir name = Basin #2

Peak discharge = 14.88 cfs
 Time to peak = 12.20 hrs
 Hyd. volume = 71,615 cuft
 Max. Elevation = 416.81 ft
 Max. Storage = 9,497 cuft

Storage Indication method used.

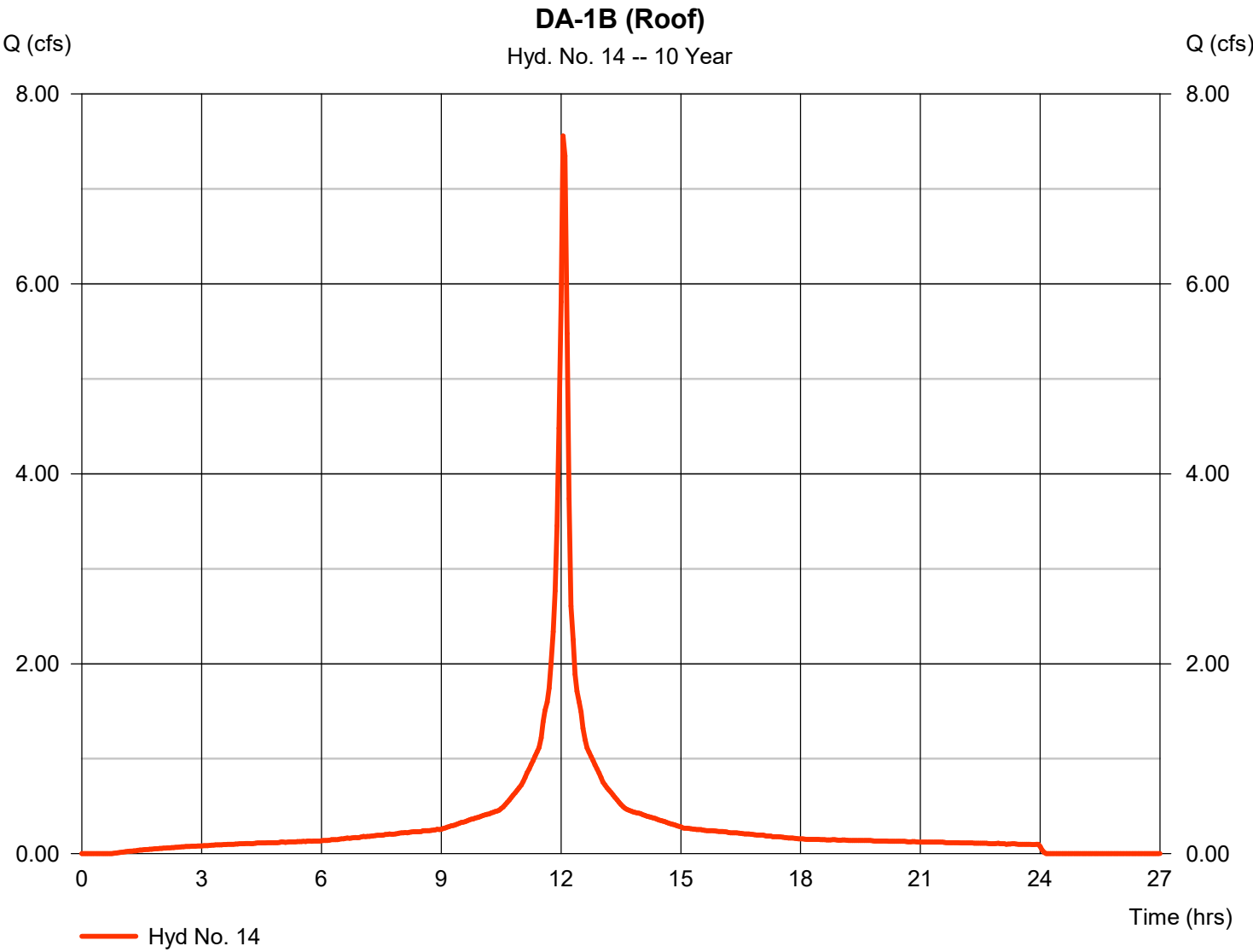


Hydrograph Report

Hyd. No. 14

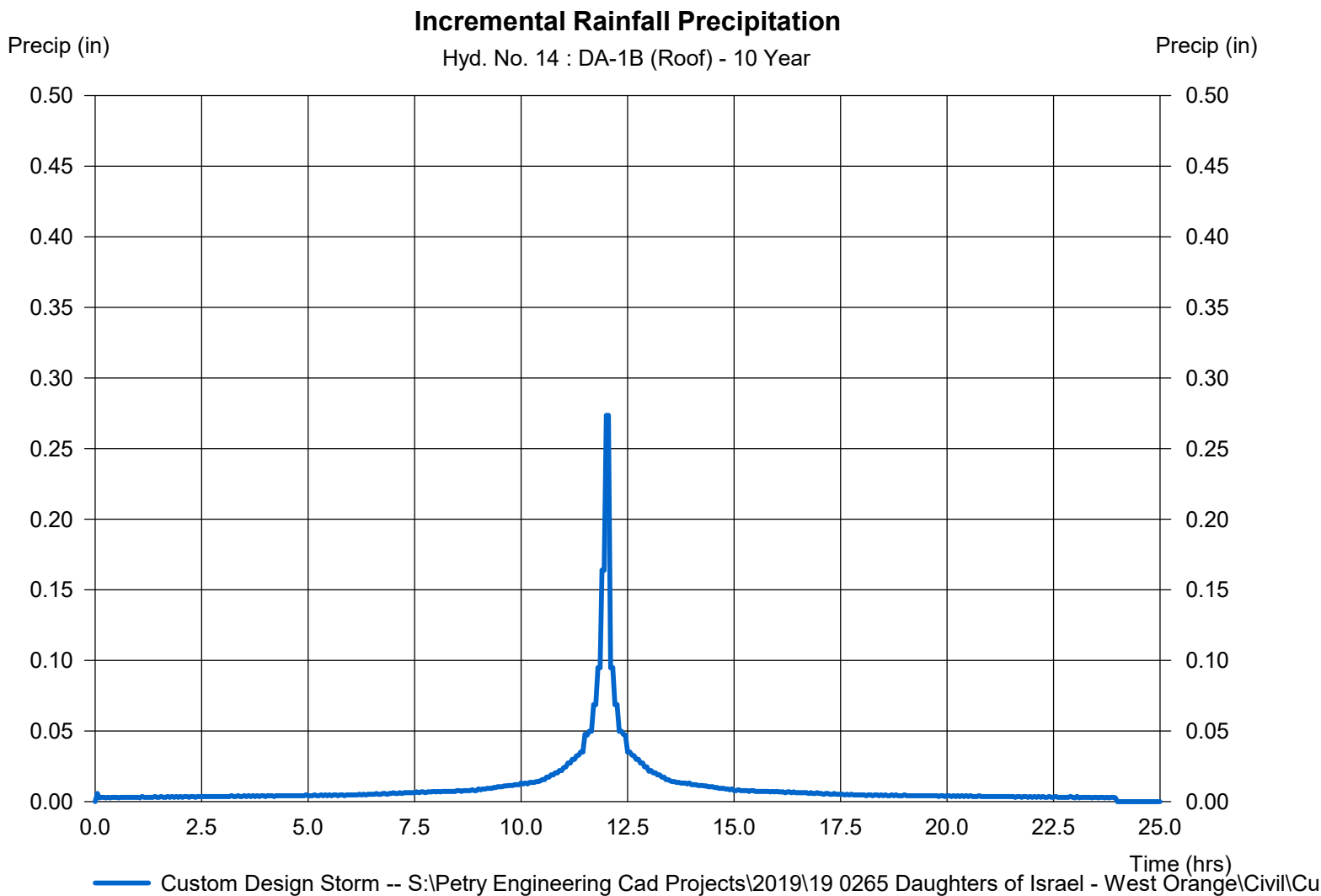
DA-1B (Roof)

Hydrograph type	= SCS Runoff	Peak discharge	= 7.559 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.05 hrs
Time interval	= 3 min	Hyd. volume	= 29,794 cuft
Drainage area	= 1.750 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.24 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\2019\0265 Daughters of Israel - West Orange, NJ\0265 Daughters of Israel - West Orange, NJ.dwg		



DA-1B (Roof)

Storm Frequency = 10 yrs Time interval = 3 min
Total precip. = 5.2400 in Distribution = Custom
Storm duration = S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

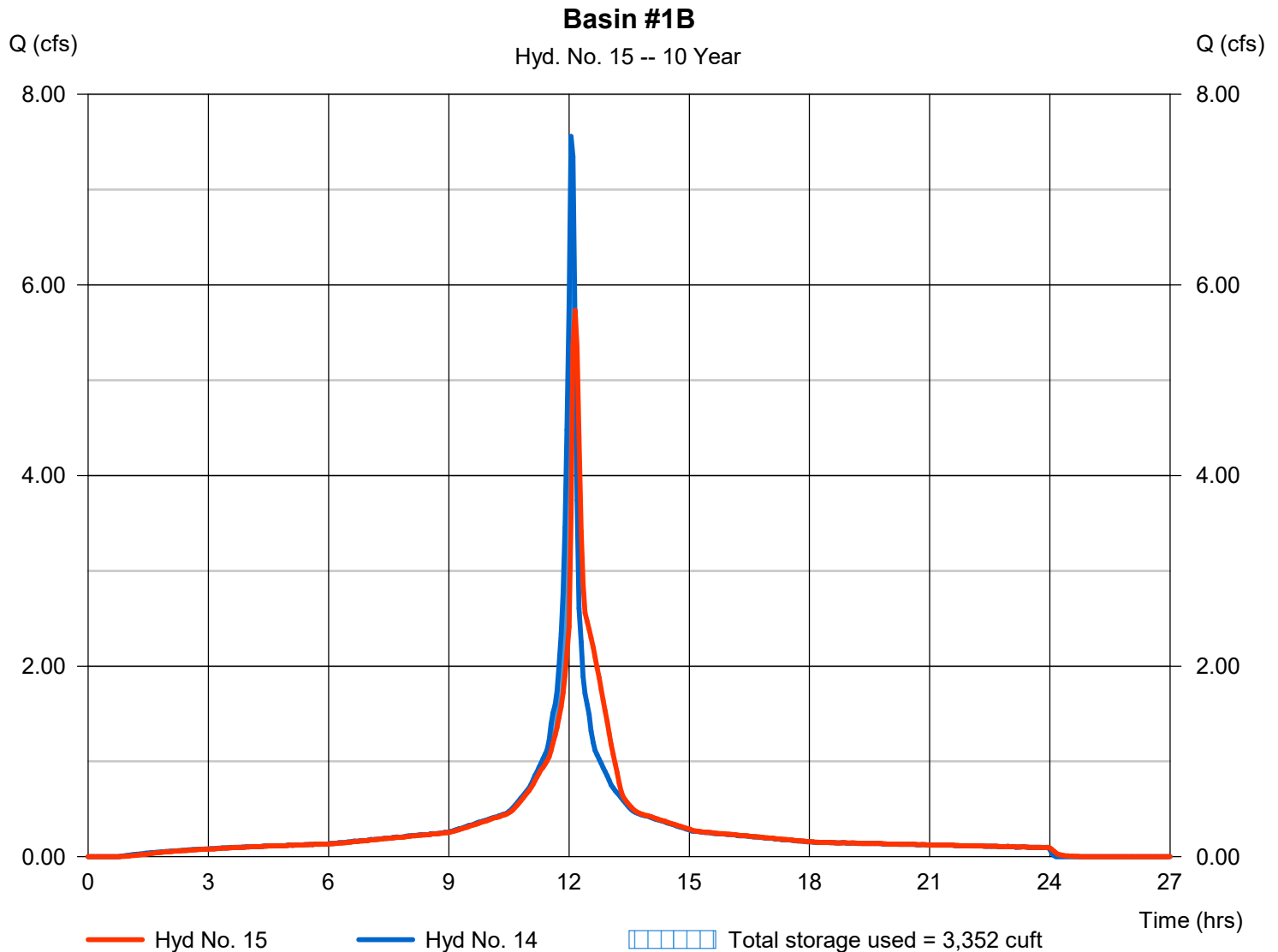
Monday, 05 / 9 / 2022

Hyd. No. 15

Basin #1B

Hydrograph type	= Reservoir	Peak discharge	= 5.733 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.15 hrs
Time interval	= 3 min	Hyd. volume	= 29,793 cuft
Inflow hyd. No.	= 14 - DA-1B (Roof)	Max. Elevation	= 411.81 ft
Reservoir name	= Basin #1B	Max. Storage	= 3,352 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

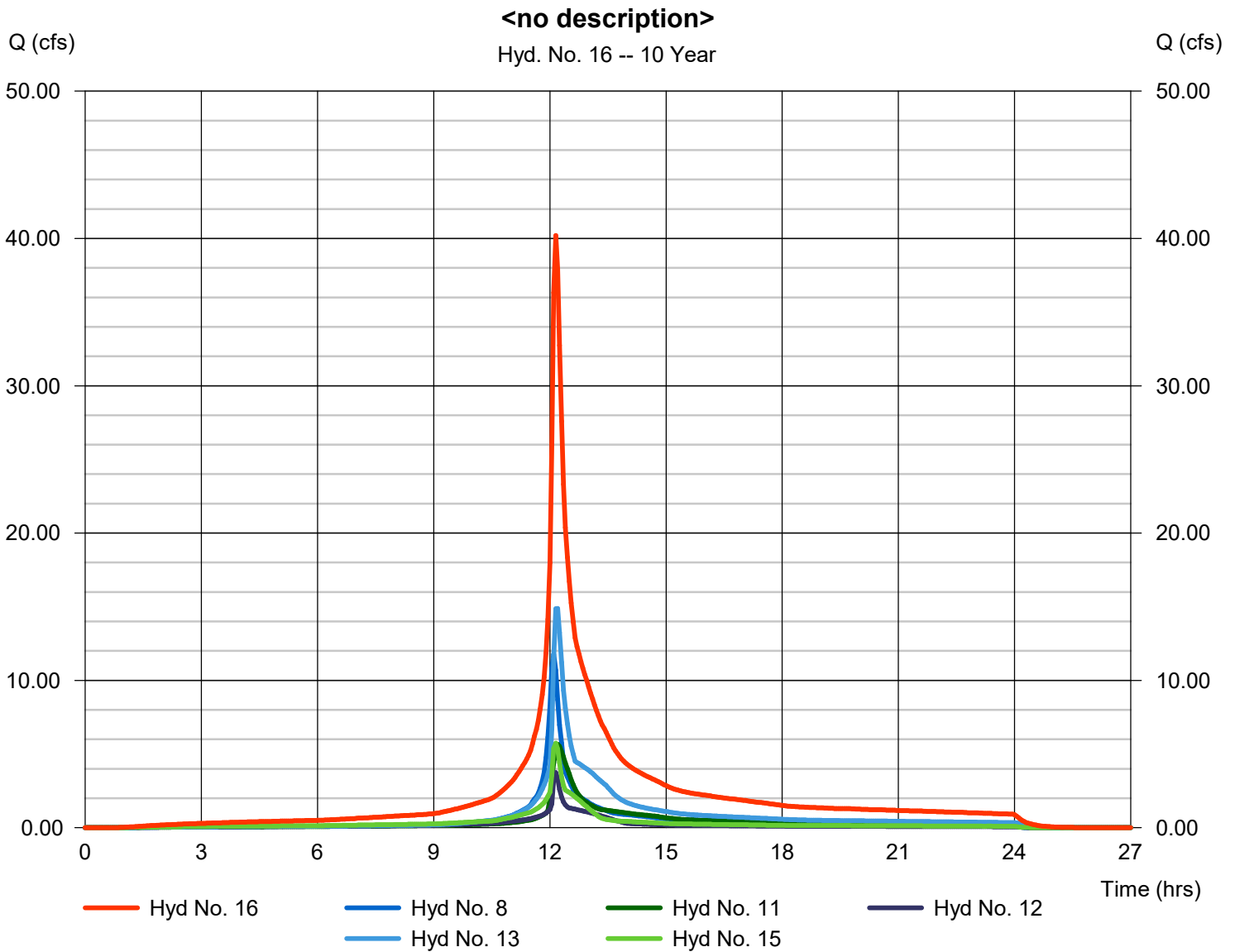
Monday, 05 / 9 / 2022

Hyd. No. 16

<no description>

Hydrograph type = Combine
 Storm frequency = 10 yrs
 Time interval = 3 min
 Inflow hyds. = 8, 11, 12, 13, 15

Peak discharge = 40.20 cfs
 Time to peak = 12.15 hrs
 Hyd. volume = 205,807 cuft
 Contrib. drain. area = 0.000 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

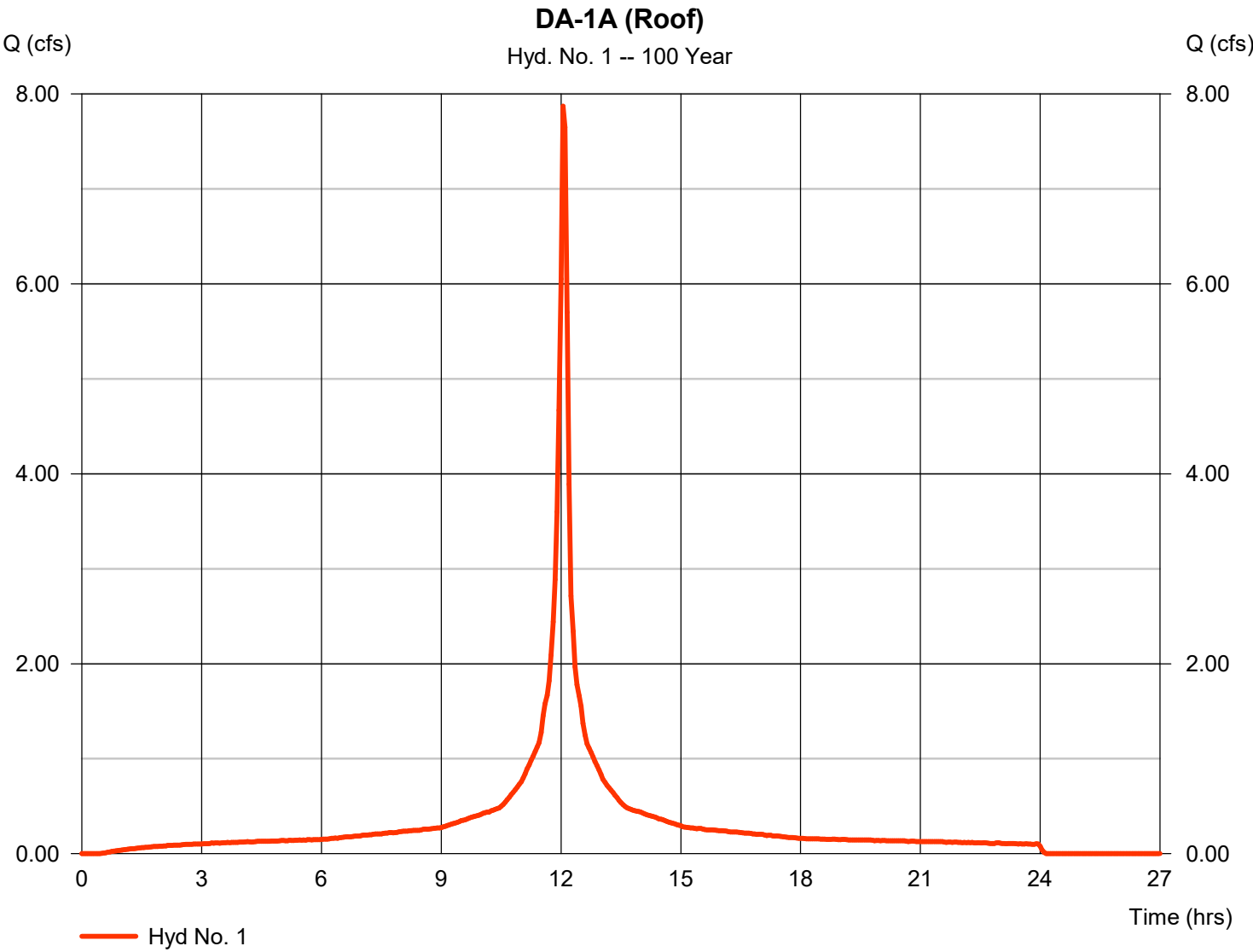
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	7.872	3	723	31,463	-----	-----	-----	DA-1A (Roof)
2	SCS Runoff	14.32	3	729	57,932	-----	-----	-----	DA-2 (Pervious)
3	SCS Runoff	8.425	3	723	33,671	-----	-----	-----	DA-2 (Impervious)
4	SCS Runoff	24.96	3	729	100,972	-----	-----	-----	DA-3 (Pervious)
5	SCS Runoff	9.530	3	723	38,087	-----	-----	-----	DA-3 (Impervious)
6	SCS Runoff	12.44	3	729	51,177	-----	-----	-----	DA-4 (Pervious)
7	SCS Runoff	7.458	3	723	29,807	-----	-----	-----	DA-4 (Impervious)
8	Combine	22.27	3	726	91,603	2, 3,	-----	-----	DA-2
9	Combine	33.81	3	726	139,059	4, 5,	-----	-----	DA-3
10	Combine	19.09	3	726	80,984	6, 7,	-----	-----	DA-4
11	Reservoir	14.52	3	732	80,983	10	419.98	8,915	Basin #3
12	Reservoir	7.857	3	726	31,462	1	421.69	3,100	Basin #1A
13	Reservoir	29.43	3	729	139,058	9	417.97	13,405	Basin #2
14	SCS Runoff	12.08	3	723	48,299	-----	-----	-----	DA-1B (Roof)
15	Reservoir	12.64	3	726	48,298	14	412.75	4,328	Basin #1B
16	Combine	82.37	3	726	391,403	8, 11, 12, 13, 15	-----	-----	<no description>
Proposed Conditions.gpw					Return Period: 100 Year			Monday, 05 / 9 / 2022	

Hydrograph Report

Hyd. No. 1

DA-1A (Roof)

Hydrograph type	= SCS Runoff	Peak discharge	= 7.872 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.05 hrs
Time interval	= 3 min	Hyd. volume	= 31,463 cuft
Drainage area	= 1.140 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 8.35 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\19-010-0265 Daughters of Israel - West Orange, NJ\19-010-0265 Daughters of Israel - West Orange, NJ.dwg		

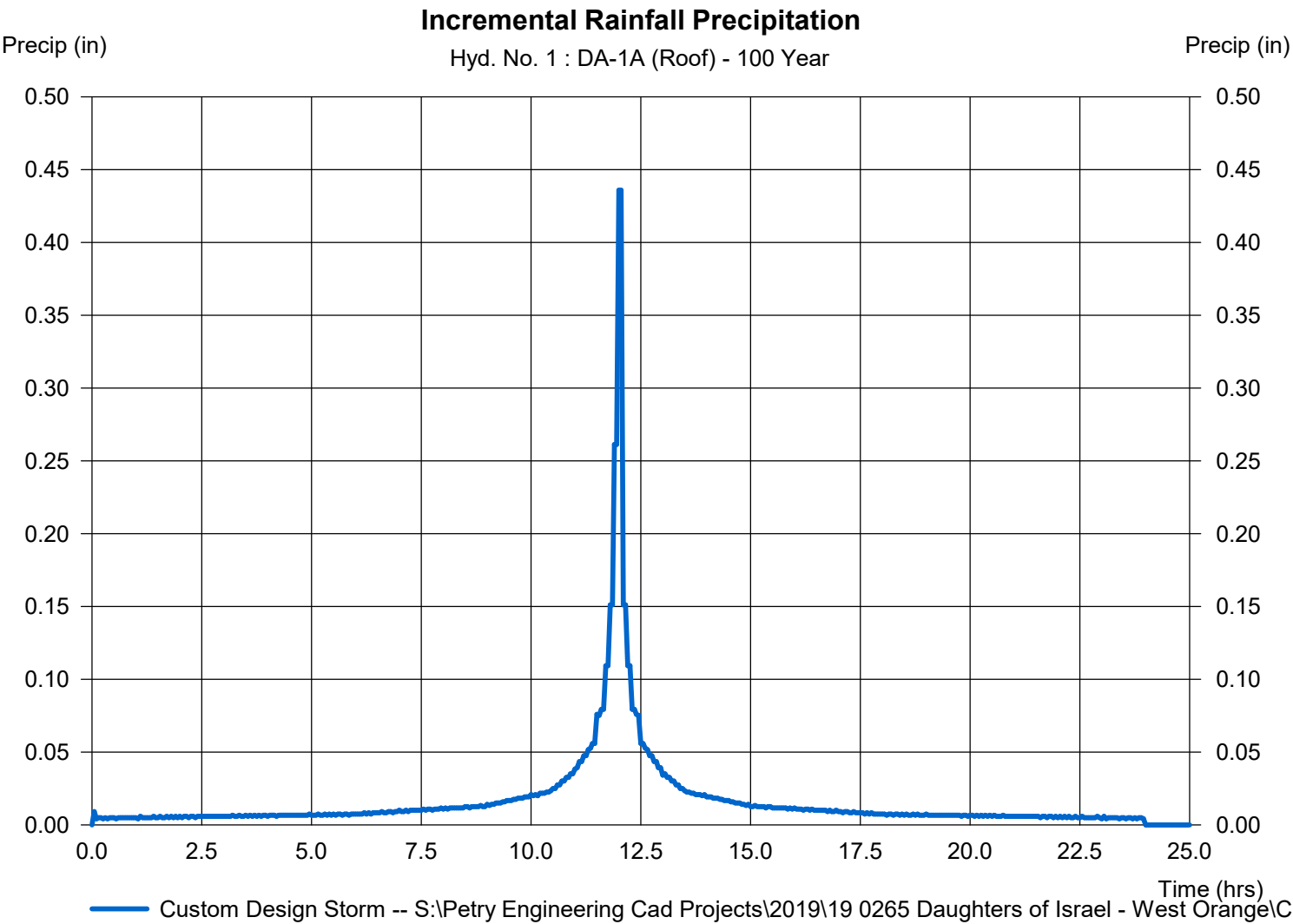


Precipitation Report

Hyd. No. 1

DA-1A (Roof)

Storm Frequency	= 100 yrs	Time interval	= 3 min
Total precip.	= 8.3500 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora		



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

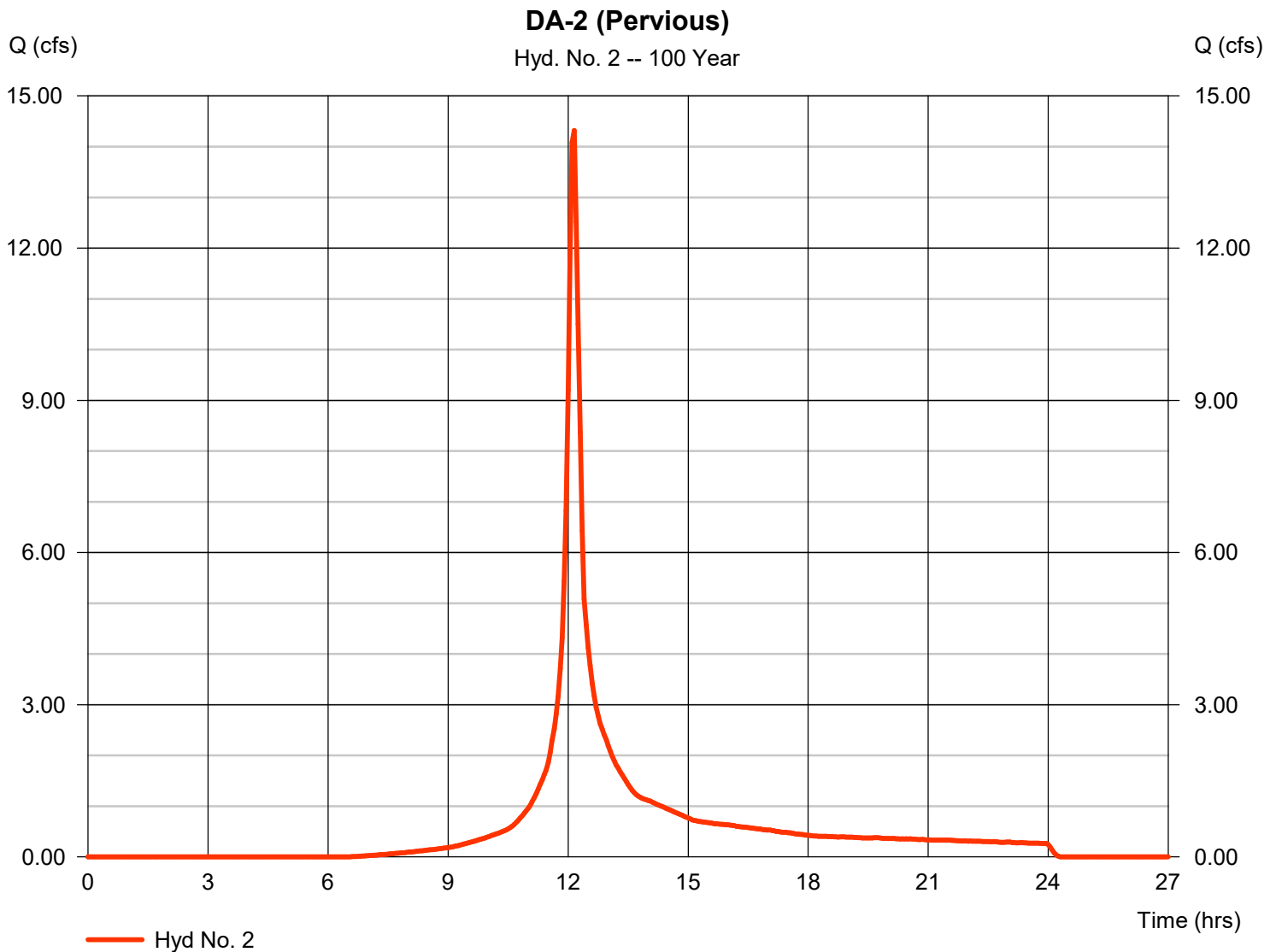
Monday, 05 / 9 / 2022

Hyd. No. 2

DA-2 (Pervious)

Hydrograph type	= SCS Runoff	Peak discharge	= 14.32 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.15 hrs
Time interval	= 3 min	Hyd. volume	= 57,932 cuft
Drainage area	= 3.190 ac	Curve number	= 72*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.10 min
Total precip.	= 8.35 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\191010-0265 Daughters of Israel - West Orange		

* Composite (Area/CN) = $[(0.450 \times 30) + (0.100 \times 77) + (0.150 \times 70) + (2.490 \times 80)] / 3.190$



Hydrograph Report

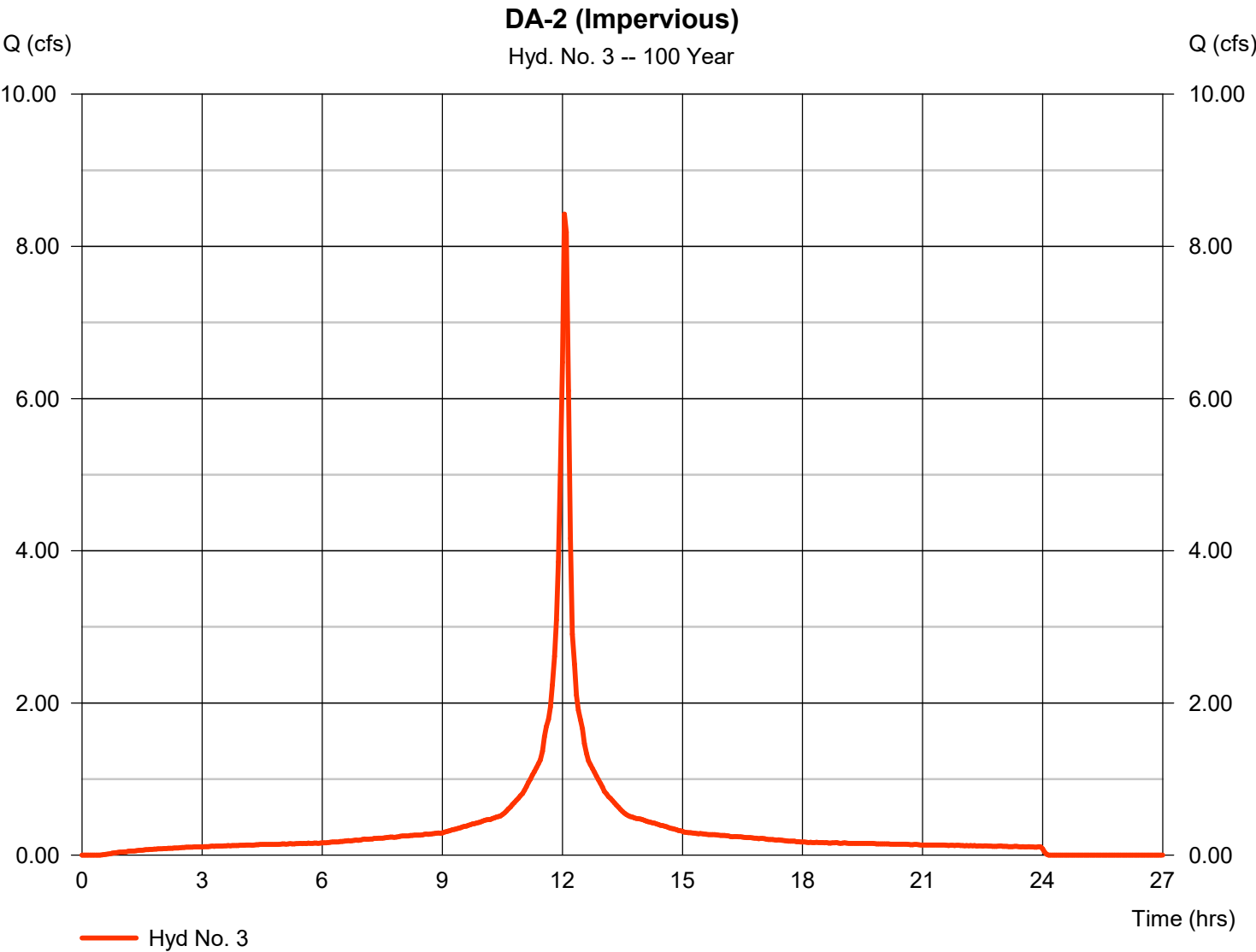
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Monday, 05 / 9 / 2022

Hyd. No. 3

DA-2 (Impervious)

Hydrograph type	= SCS Runoff	Peak discharge	= 8.425 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.05 hrs
Time interval	= 3 min	Hyd. volume	= 33,671 cuft
Drainage area	= 1.220 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 8.35 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\191019 0265 Daughters of Israel - West Orange		



= S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora

Custom Design Storm -- S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Orange\Civil\Cu

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

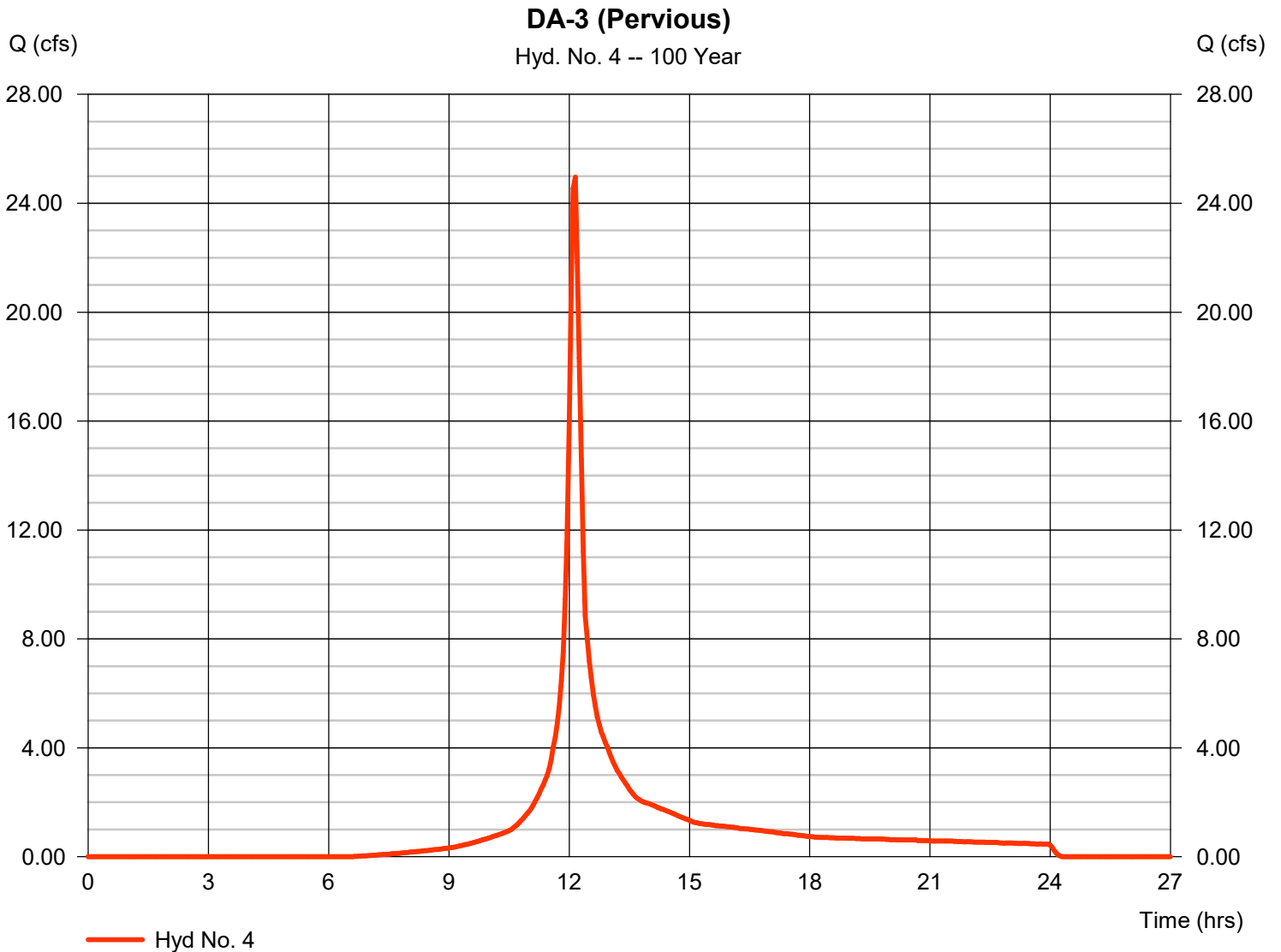
Monday, 05 / 9 / 2022

Hyd. No. 4

DA-3 (Pervious)

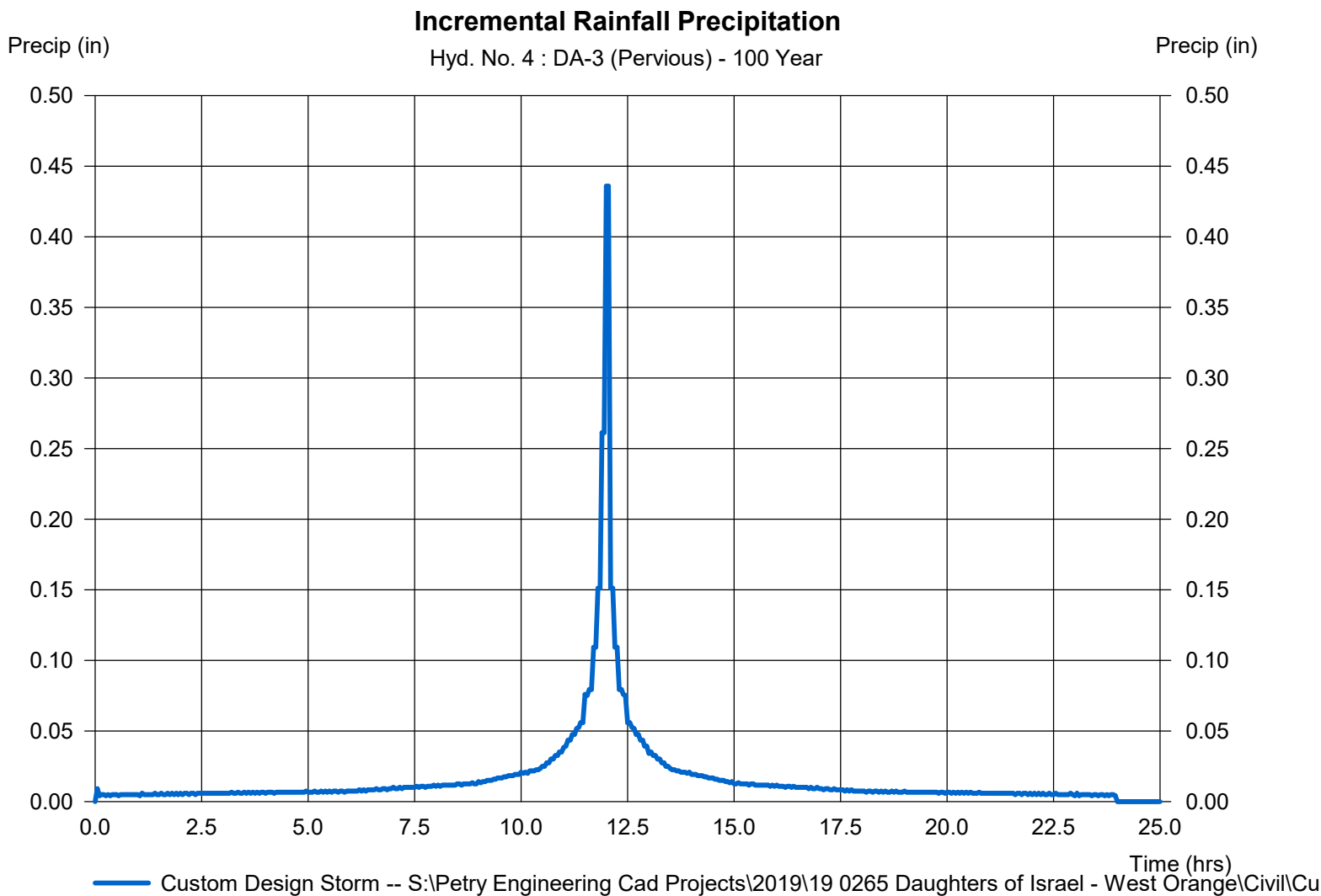
Hydrograph type	= SCS Runoff	Peak discharge	= 24.96 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.15 hrs
Time interval	= 3 min	Hyd. volume	= 100,972 cuft
Drainage area	= 5.560 ac	Curve number	= 72*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 14.50 min
Total precip.	= 8.35 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\191019 0265 Daughters of Israel - West Orange		

* Composite (Area/CN) = $[(0.010 \times 30) + (4.210 \times 70) + (0.340 \times 77) + (0.400 \times 74) + (0.600 \times 80)] / 5.560$



DA-3 (Pervious)

Storm Frequency = 100 yrs Time interval = 3 min
Total precip. = 8.3500 in Distribution = Custom
Storm duration = S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora

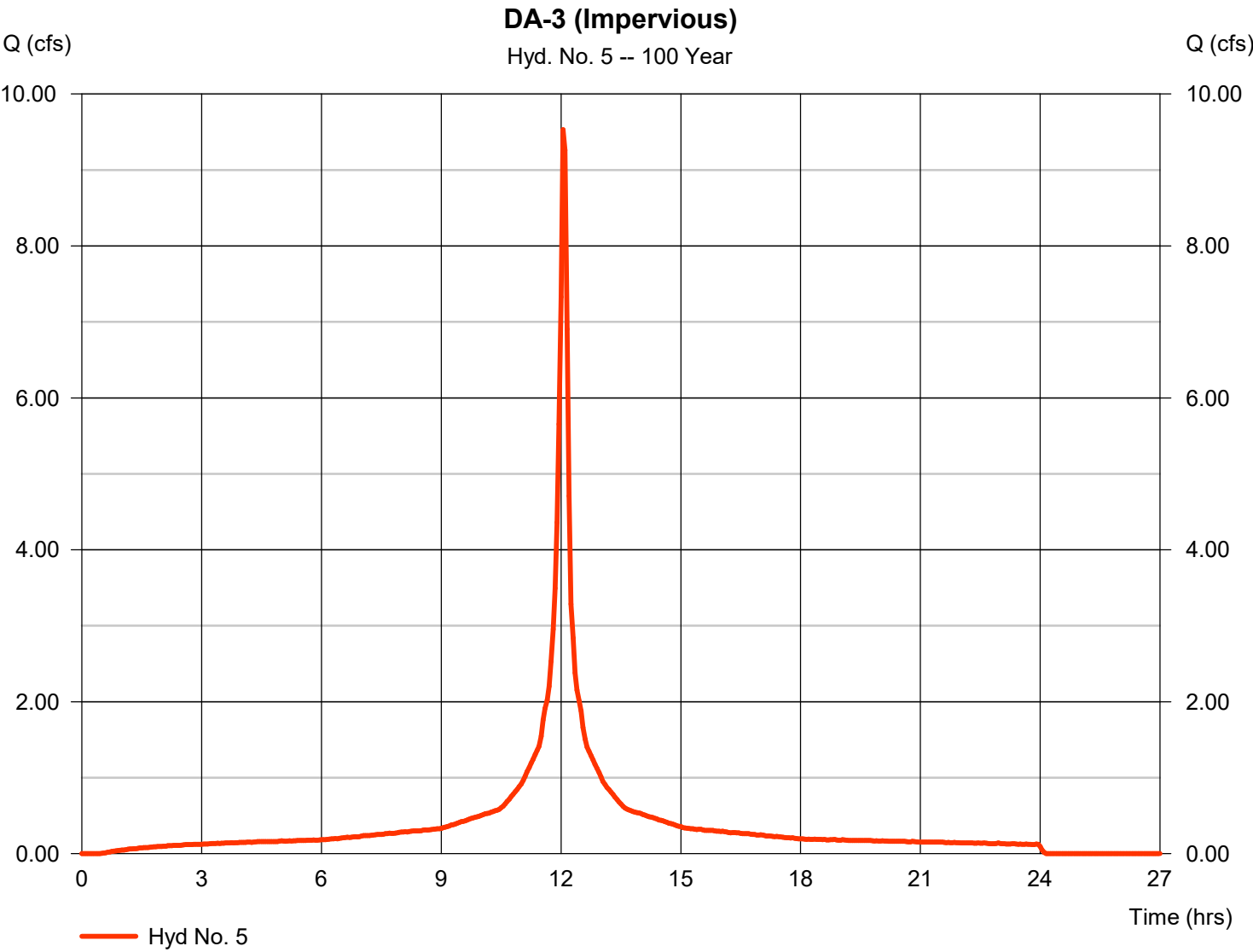


Hydrograph Report

Hyd. No. 5

DA-3 (Impervious)

Hydrograph type	=	SCS Runoff	Peak discharge	=	9.530 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.05 hrs
Time interval	=	3 min	Hyd. volume	=	38,087 cuft
Drainage area	=	1.380 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.35 in	Distribution	=	Custom
Storm duration	=	S:\Petry Engineering Cad Projects\191019 0265 Daughters of Israel - West Orange			

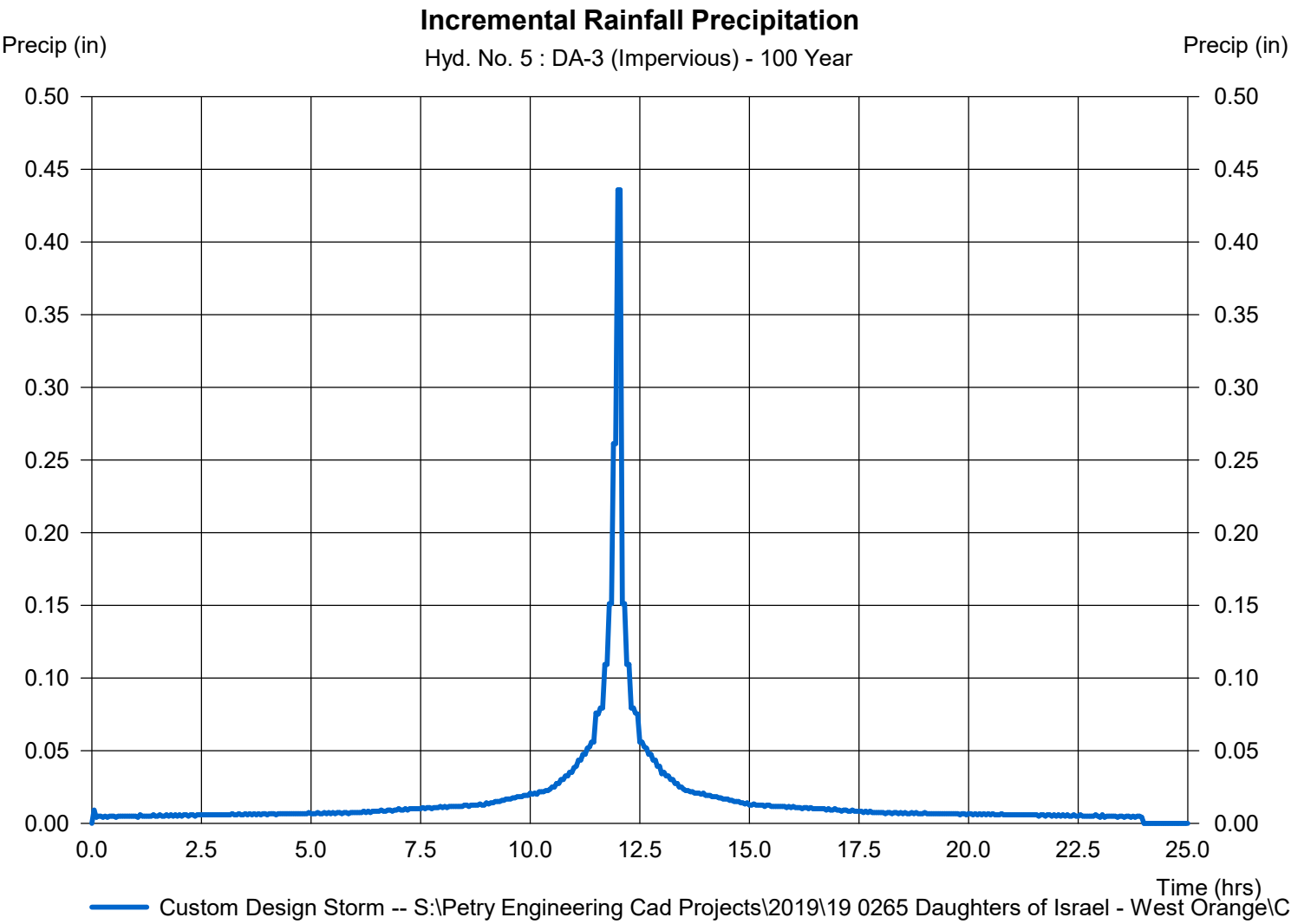


Precipitation Report

Hyd. No. 5

DA-3 (Impervious)

Storm Frequency	= 100 yrs	Time interval	= 3 min
Total precip.	= 8.3500 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora		



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

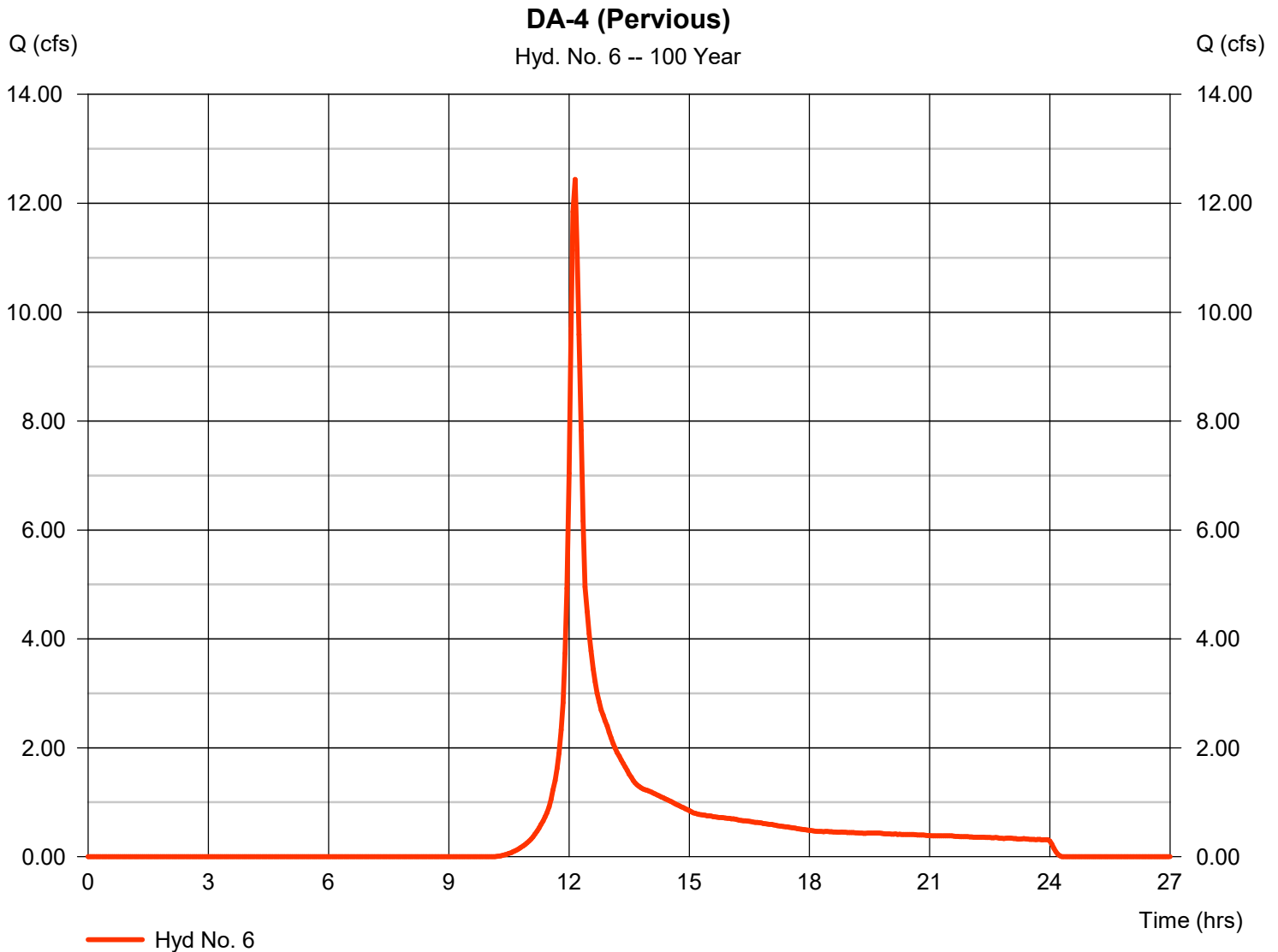
Monday, 05 / 9 / 2022

Hyd. No. 6

DA-4 (Pervious)

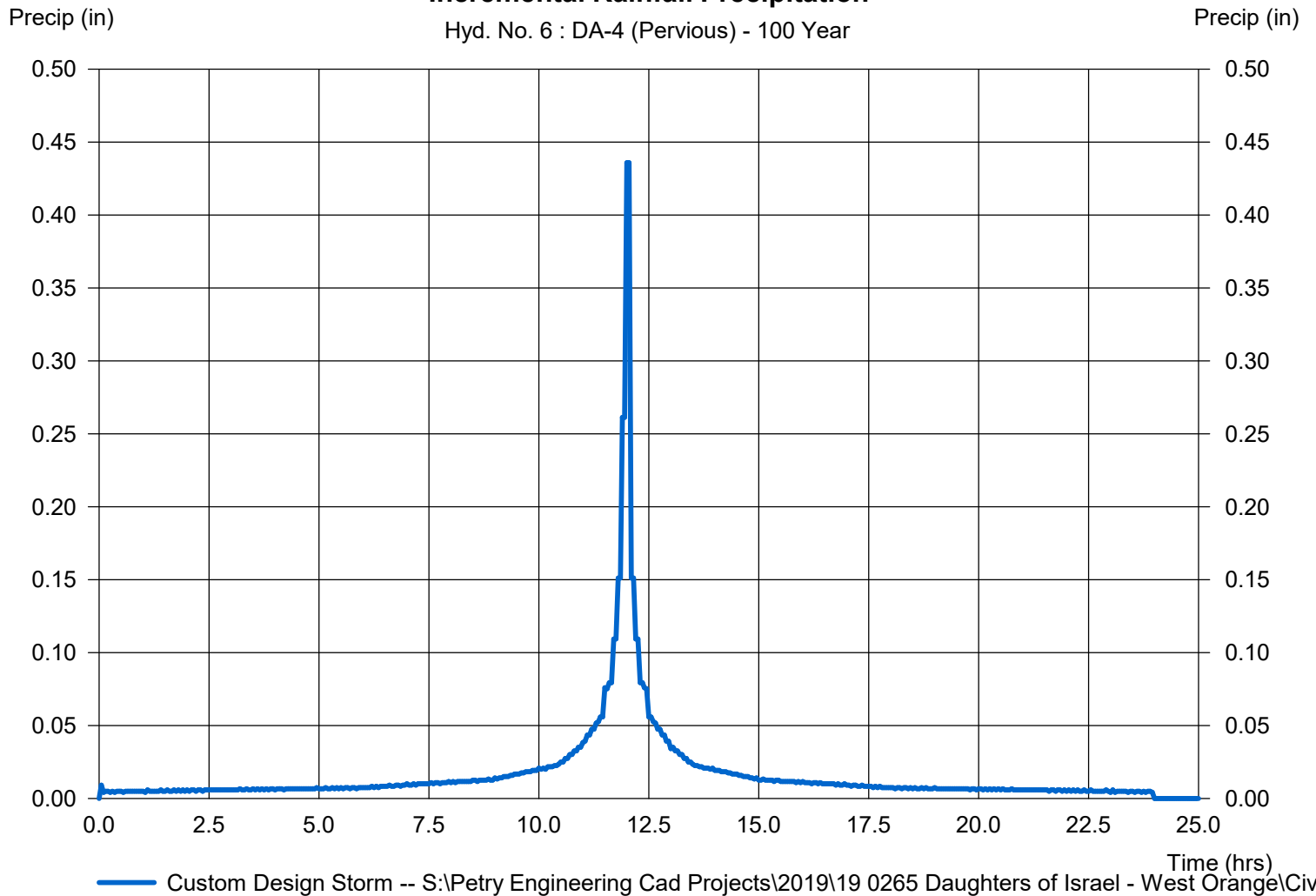
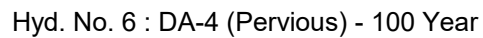
Hydrograph type	= SCS Runoff	Peak discharge	= 12.44 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.15 hrs
Time interval	= 3 min	Hyd. volume	= 51,177 cuft
Drainage area	= 4.840 ac	Curve number	= 54*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 14.30 min
Total precip.	= 8.35 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\191019 0265 Daughters of Israel - West Orange		

* Composite (Area/CN) = $[(2.140 \times 30) + (1.440 \times 70) + (0.360 \times 74) + (0.900 \times 80)] / 4.840$



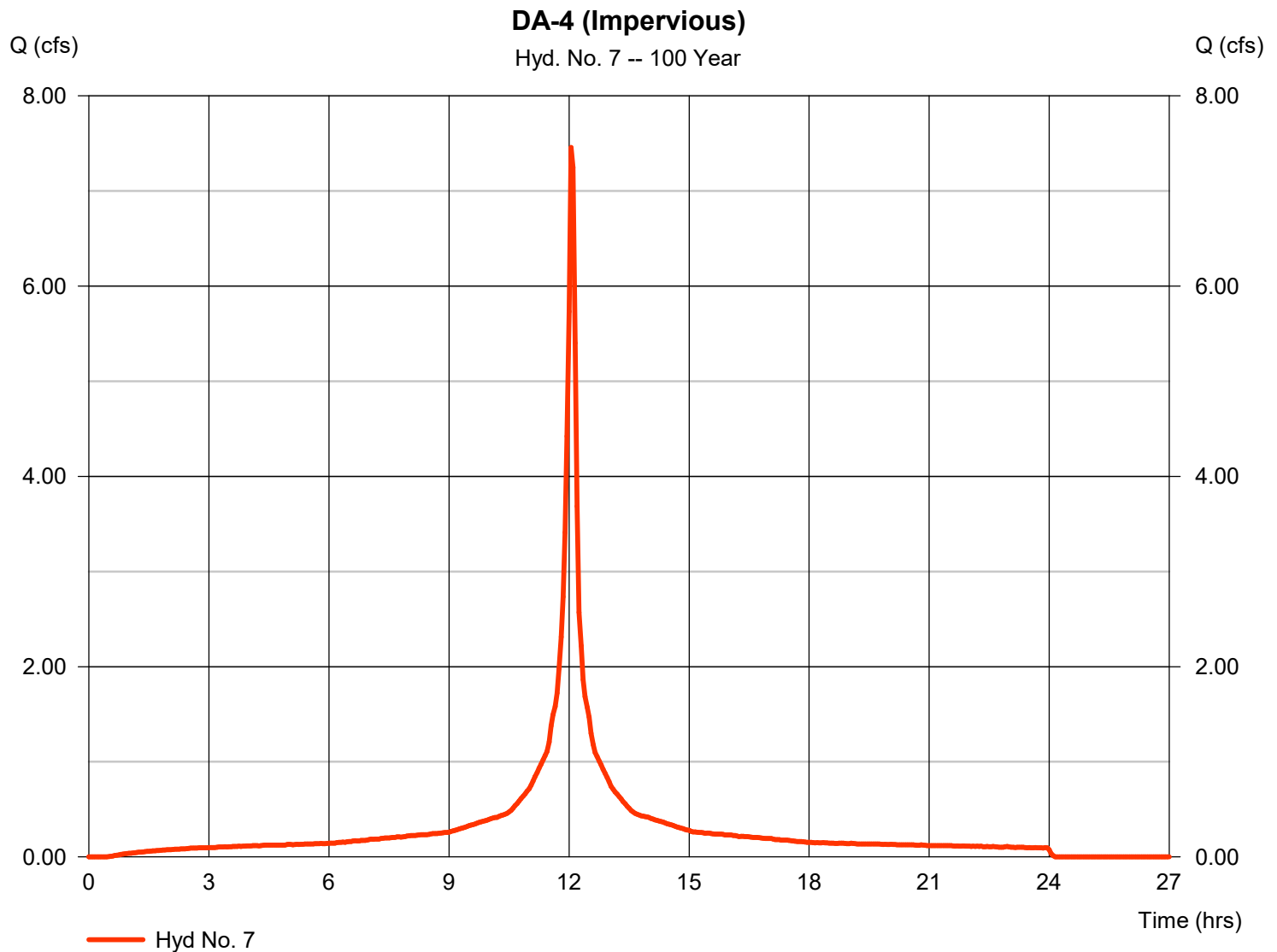
DA-4 (Pervious)

Storm Frequency = 100 yrs Time interval = 3 min
 Total precip. = 8.3500 in Distribution = Custom
 Storm duration = S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora



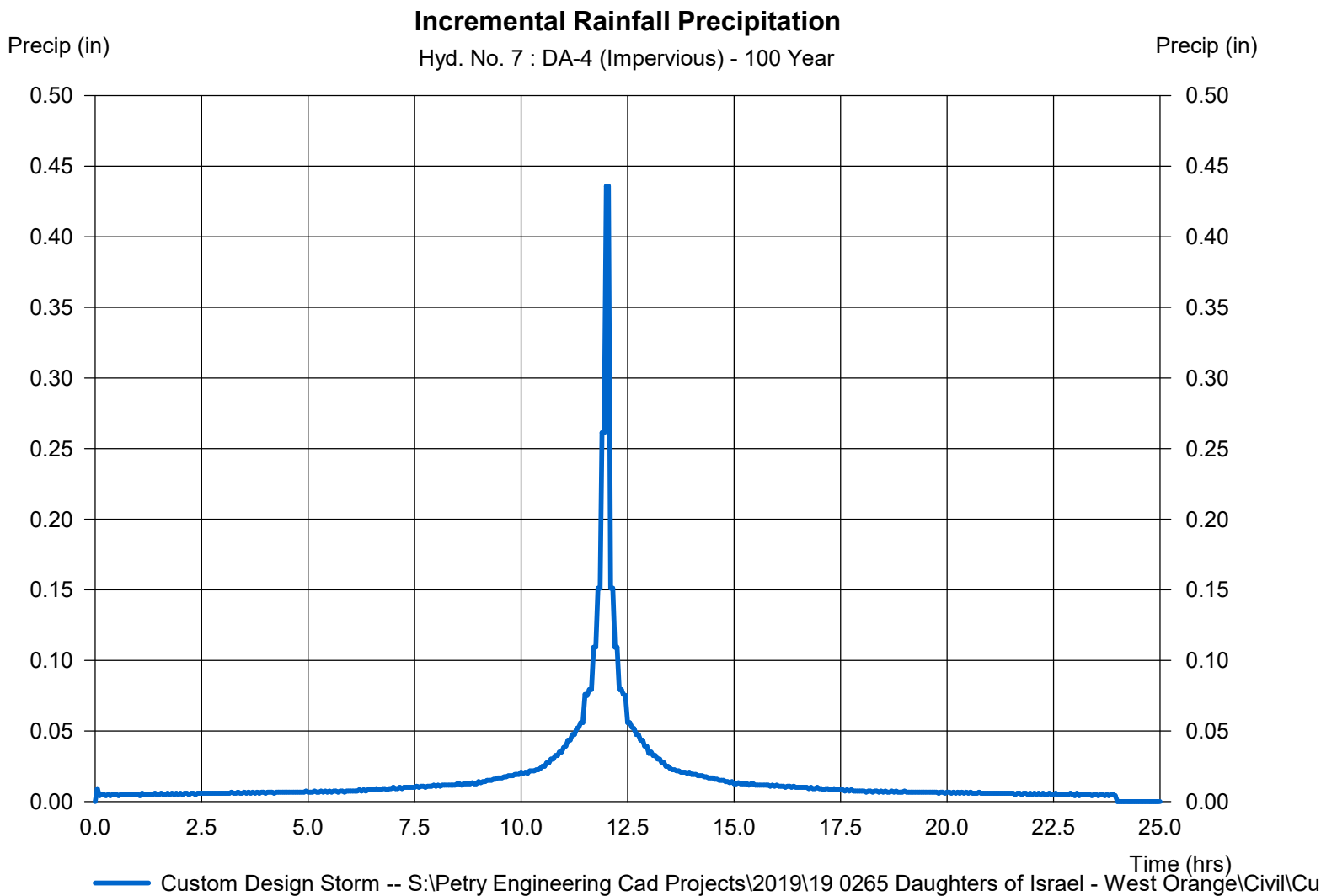
DA-4 (Impervious)

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.458 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.05 hrs
Time interval	=	3 min	Hyd. volume	=	29,807 cuft
Drainage area	=	1.080 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.35 in	Distribution	=	Custom
Storm duration	=	5.00 hrs			



DA-4 (Impervious)

Storm Frequency = 100 yrs Time interval = 3 min
Total precip. = 8.3500 in Distribution = Custom
Storm duration = S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

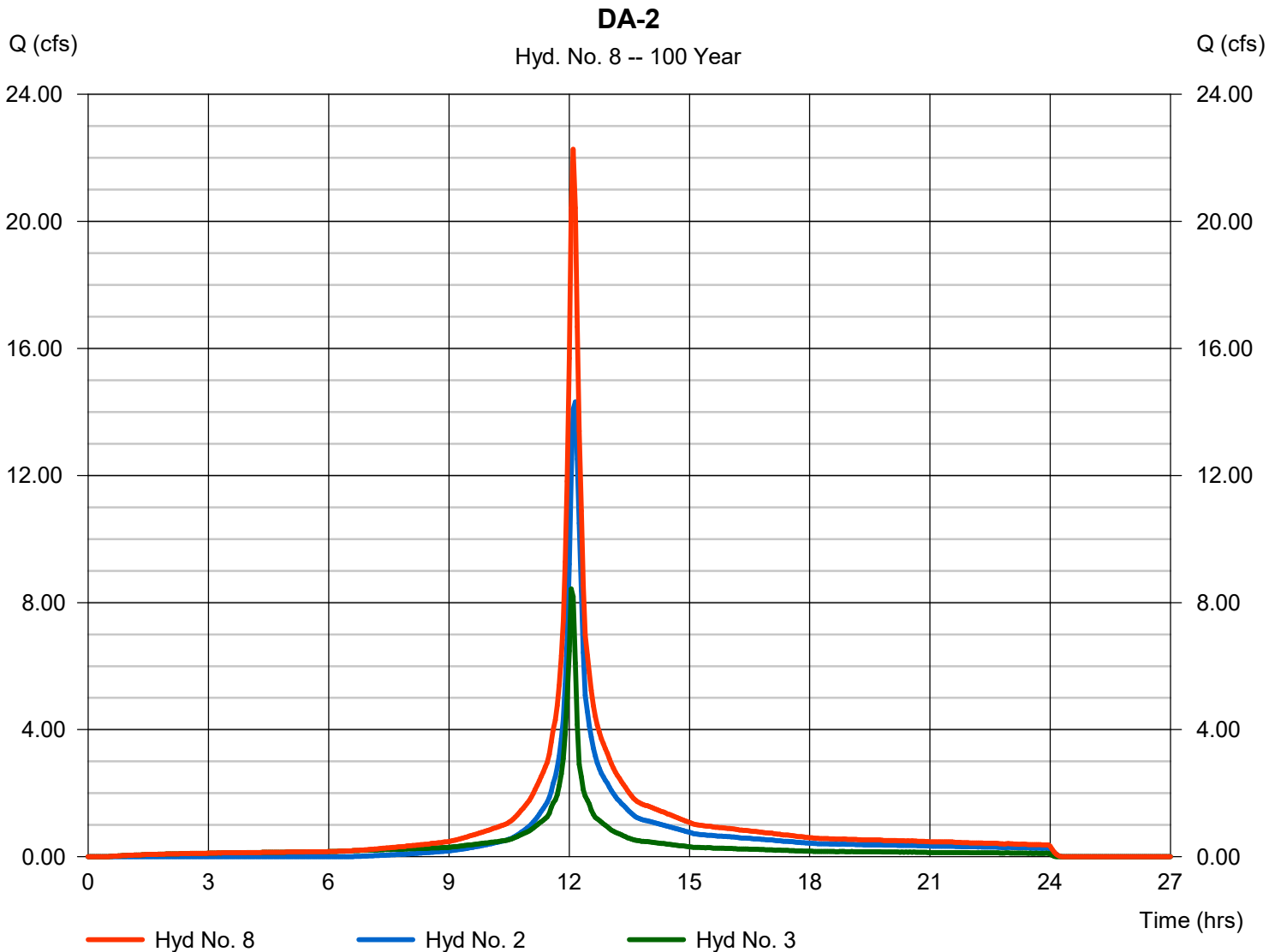
Monday, 05 / 9 / 2022

Hyd. No. 8

DA-2

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 3 min
Inflow hyds. = 2, 3

Peak discharge = 22.27 cfs
Time to peak = 12.10 hrs
Hyd. volume = 91,603 cuft
Contrib. drain. area = 4.410 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

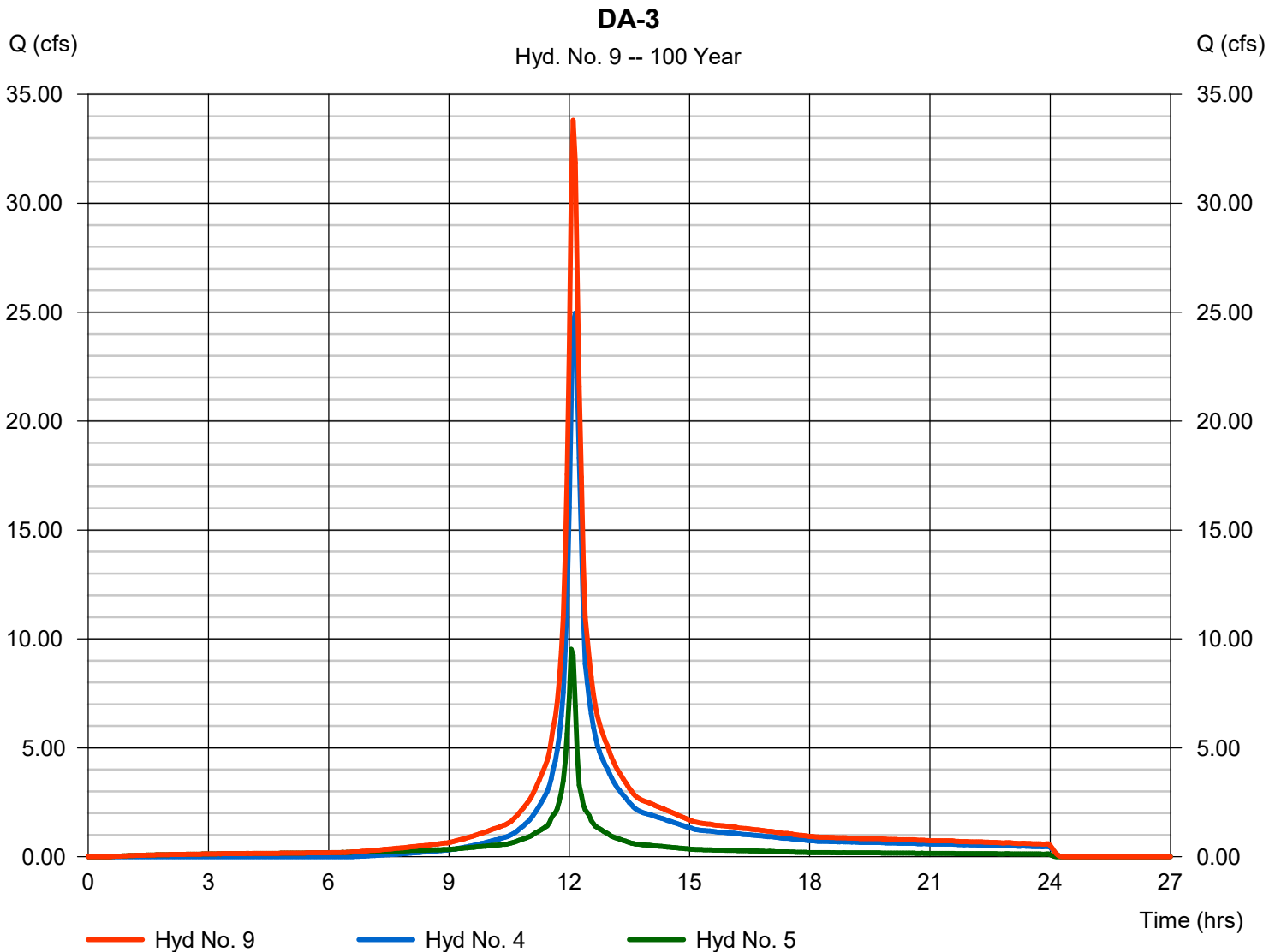
Monday, 05 / 9 / 2022

Hyd. No. 9

DA-3

Hydrograph type = Combine
 Storm frequency = 100 yrs
 Time interval = 3 min
 Inflow hyds. = 4, 5

Peak discharge = 33.81 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 139,059 cuft
 Contrib. drain. area = 6.940 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

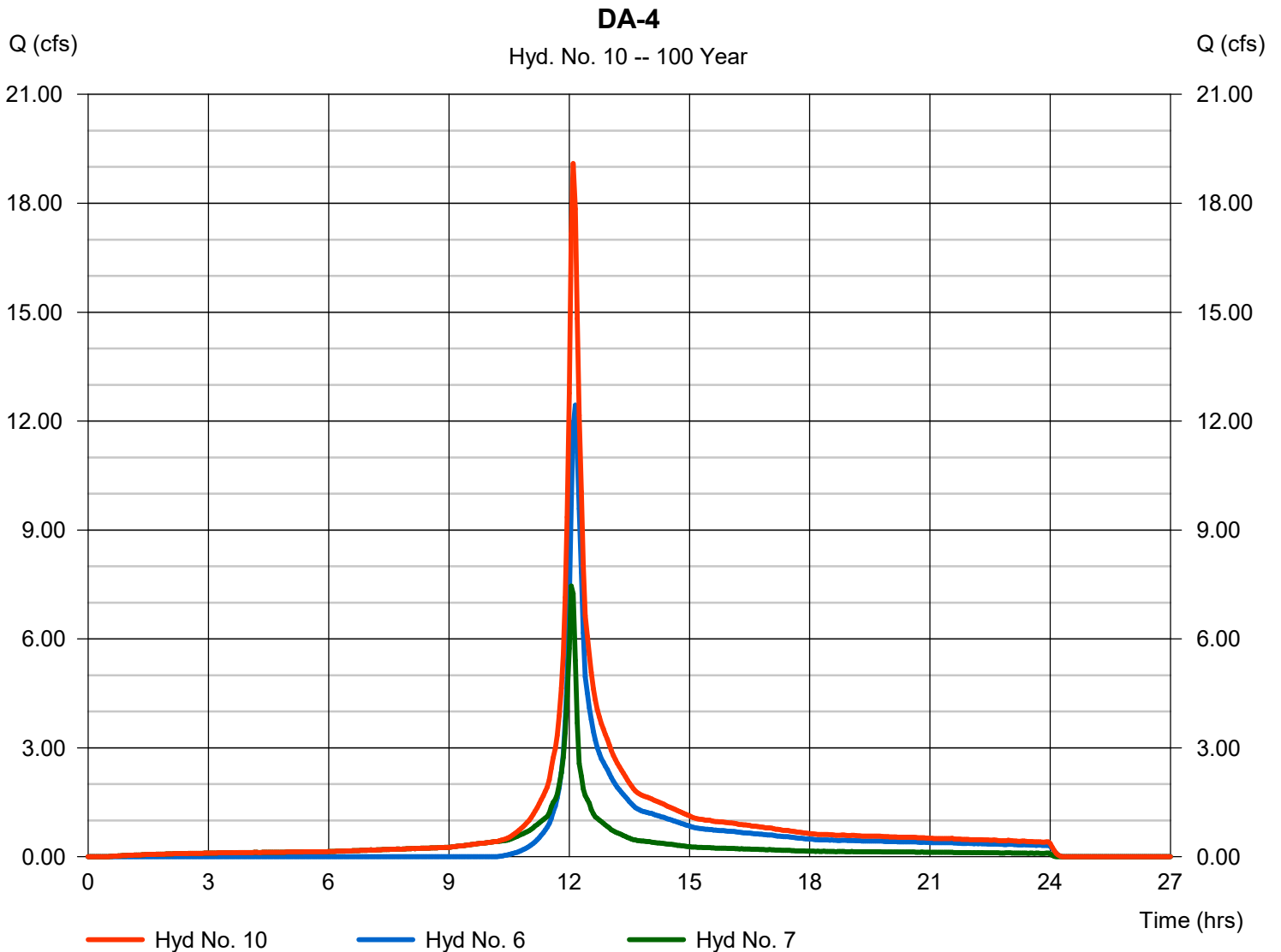
Monday, 05 / 9 / 2022

Hyd. No. 10

DA-4

Hydrograph type = Combine
 Storm frequency = 100 yrs
 Time interval = 3 min
 Inflow hyds. = 6, 7

Peak discharge = 19.09 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 80,984 cuft
 Contrib. drain. area = 5.920 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Monday, 05 / 9 / 2022

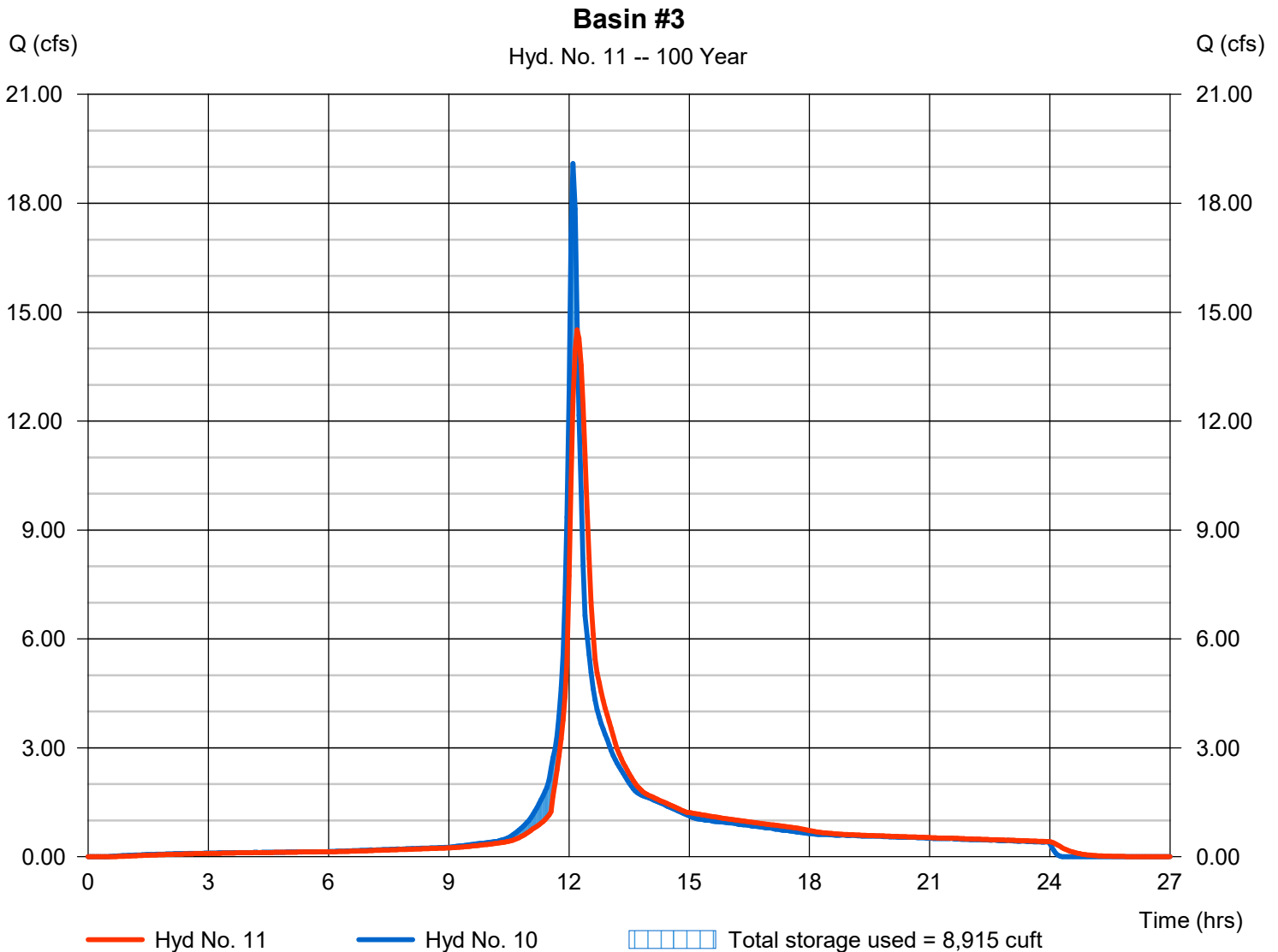
Hyd. No. 11

Basin #3

Hydrograph type = Reservoir
 Storm frequency = 100 yrs
 Time interval = 3 min
 Inflow hyd. No. = 10 - DA-4
 Reservoir name = Basin #3

Peak discharge = 14.52 cfs
 Time to peak = 12.20 hrs
 Hyd. volume = 80,983 cuft
 Max. Elevation = 419.98 ft
 Max. Storage = 8,915 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

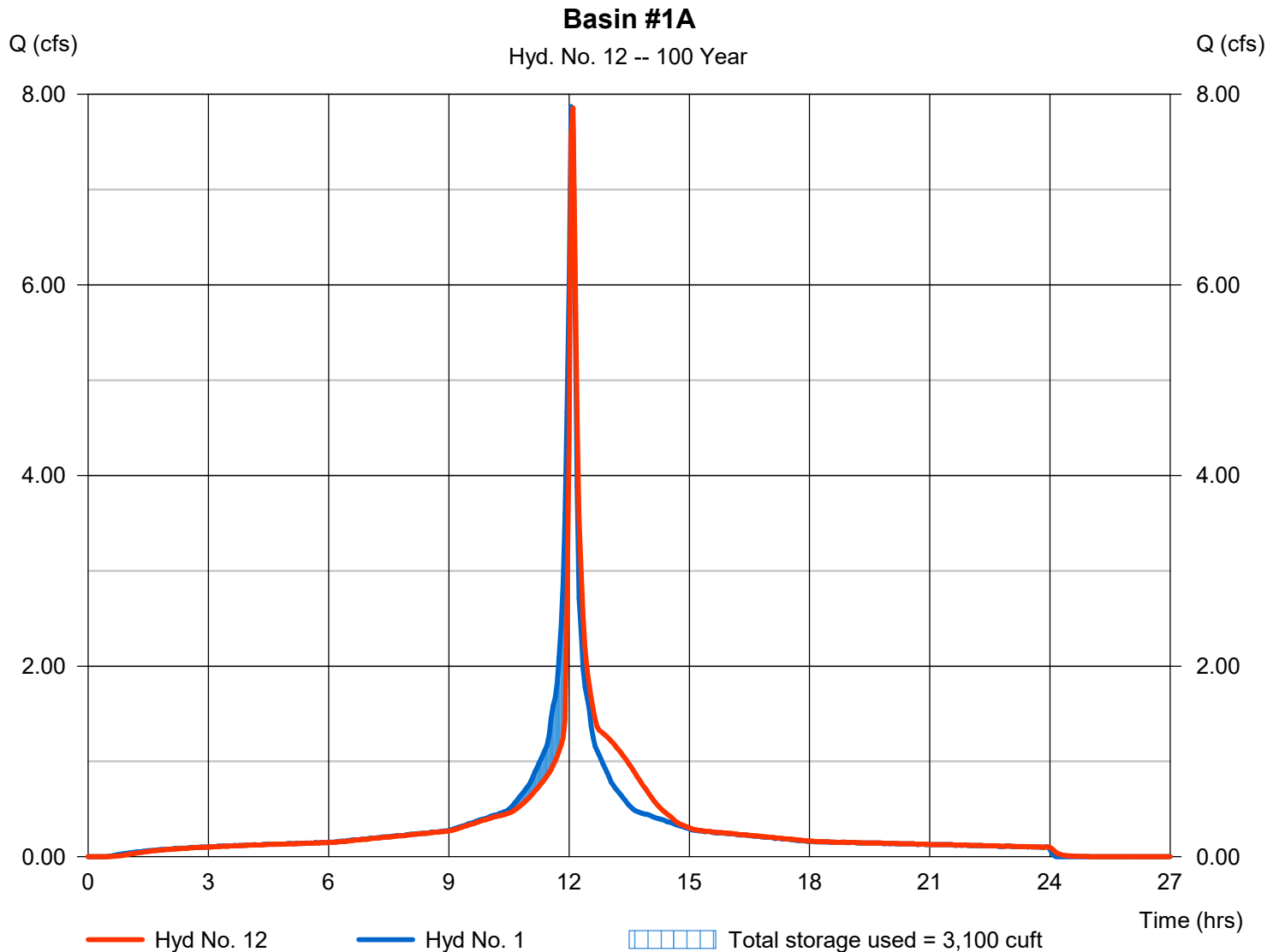
Monday, 05 / 9 / 2022

Hyd. No. 12

Basin #1A

Hydrograph type	= Reservoir	Peak discharge	= 7.857 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 31,462 cuft
Inflow hyd. No.	= 1 - DA-1A (Roof)	Max. Elevation	= 421.69 ft
Reservoir name	= Basin #1A	Max. Storage	= 3,100 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Monday, 05 / 9 / 2022

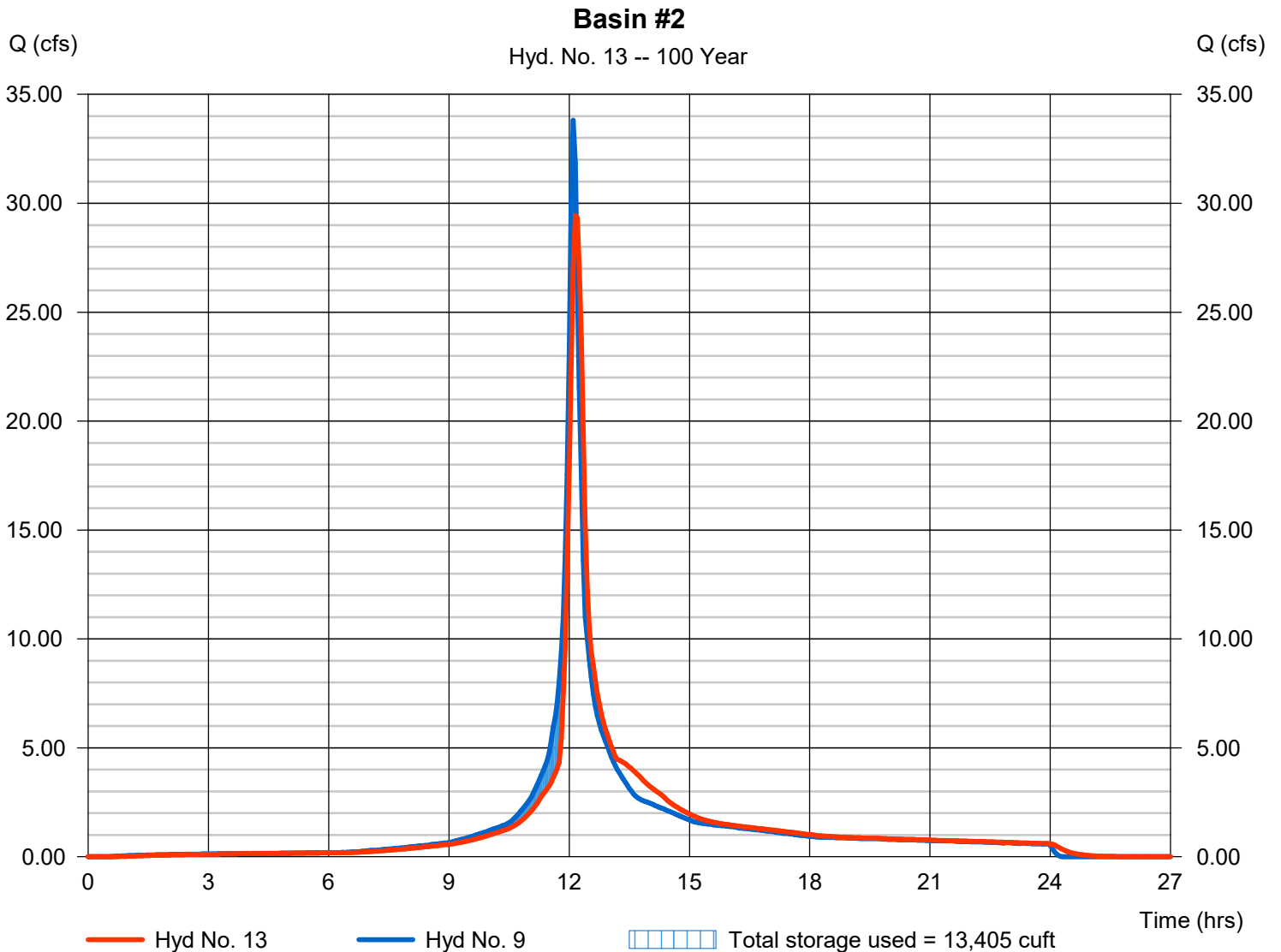
Hyd. No. 13

Basin #2

Hydrograph type = Reservoir
 Storm frequency = 100 yrs
 Time interval = 3 min
 Inflow hyd. No. = 9 - DA-3
 Reservoir name = Basin #2

Peak discharge = 29.43 cfs
 Time to peak = 12.15 hrs
 Hyd. volume = 139,058 cuft
 Max. Elevation = 417.97 ft
 Max. Storage = 13,405 cuft

Storage Indication method used.



Hydrograph Report

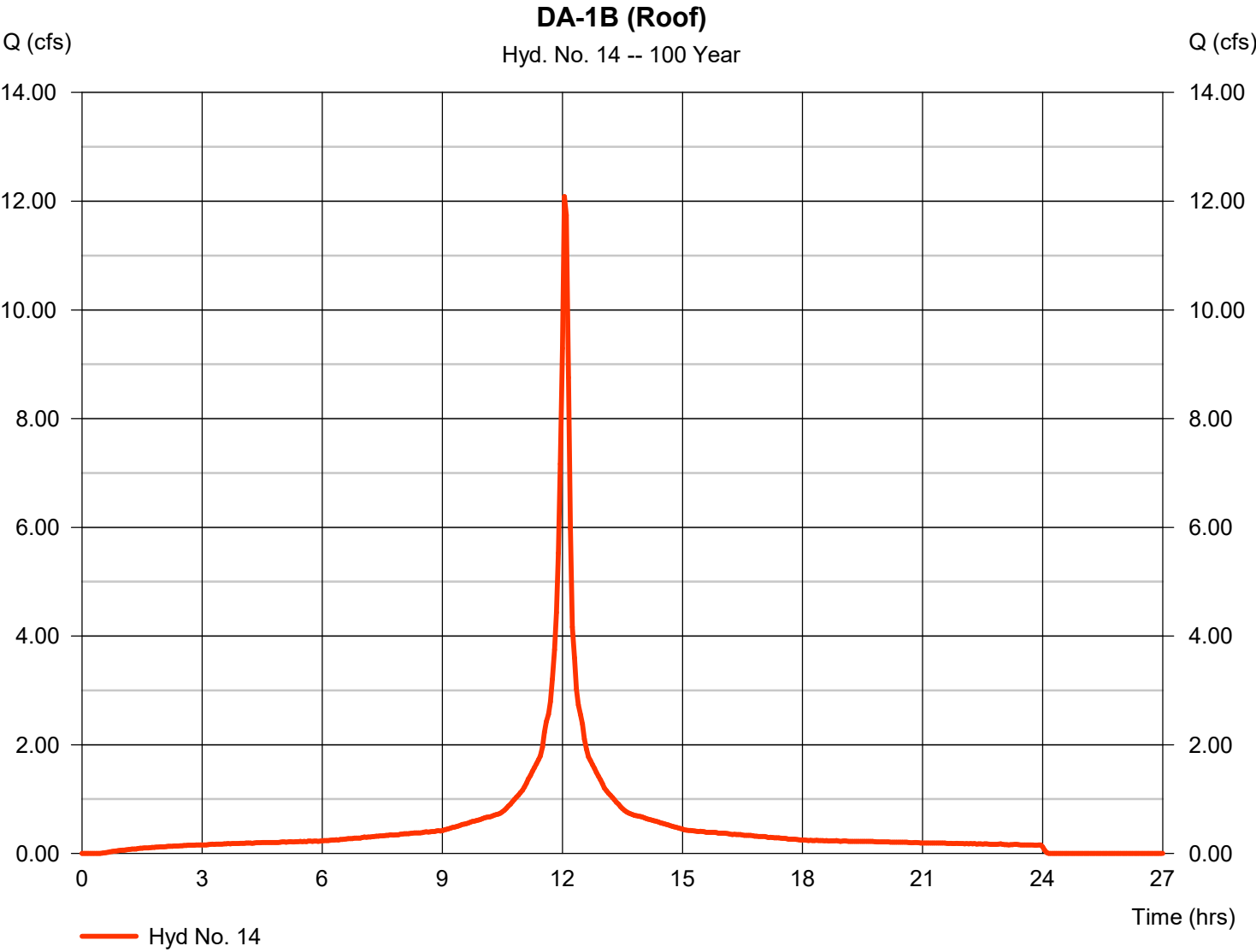
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Monday, 05 / 9 / 2022

Hyd. No. 14

DA-1B (Roof)

Hydrograph type	= SCS Runoff	Peak discharge	= 12.08 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.05 hrs
Time interval	= 3 min	Hyd. volume	= 48,299 cuft
Drainage area	= 1.750 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 8.35 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\19-010-0265 Daughters of Israel - West Orange, NJ\19-010-0265 Daughters of Israel - West Orange, NJ.dwg		

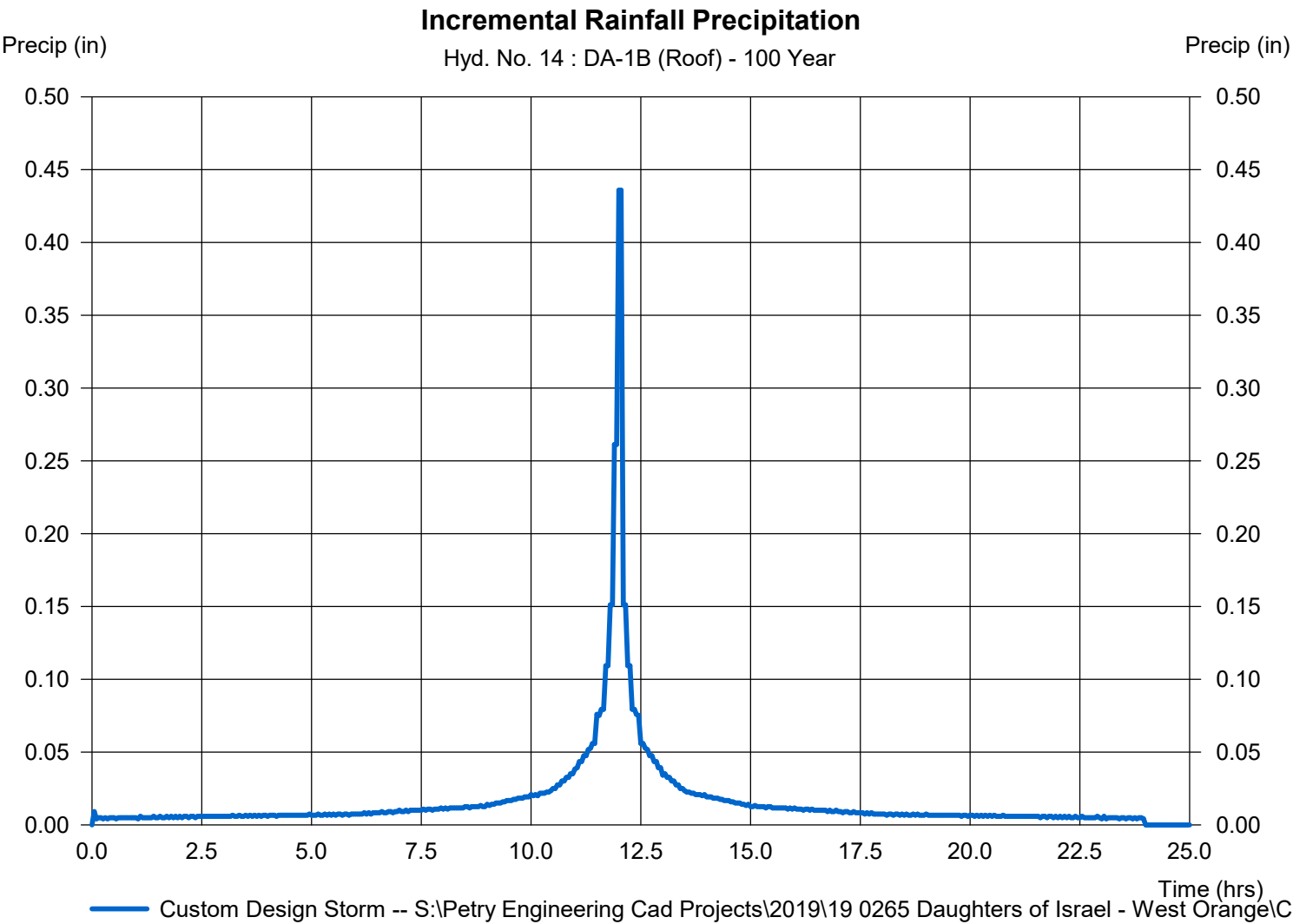


Precipitation Report

Hyd. No. 14

DA-1B (Roof)

Storm Frequency	= 100 yrs	Time interval	= 3 min
Total precip.	= 8.3500 in	Distribution	= Custom
Storm duration	= S:\Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Ora		



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

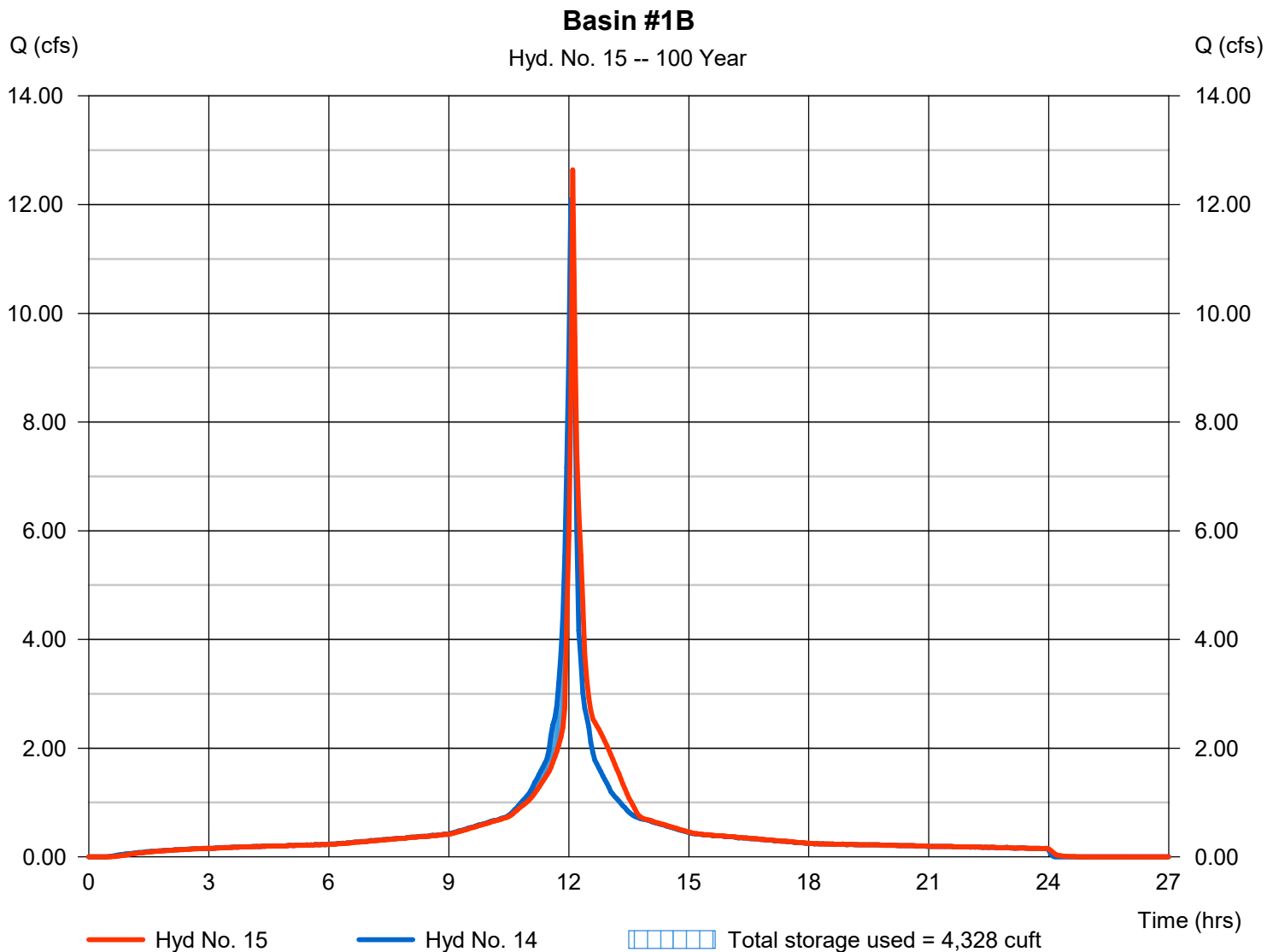
Monday, 05 / 9 / 2022

Hyd. No. 15

Basin #1B

Hydrograph type	= Reservoir	Peak discharge	= 12.64 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 48,298 cuft
Inflow hyd. No.	= 14 - DA-1B (Roof)	Max. Elevation	= 412.75 ft
Reservoir name	= Basin #1B	Max. Storage	= 4,328 cuft

Storage Indication method used.



Hydrograph Report

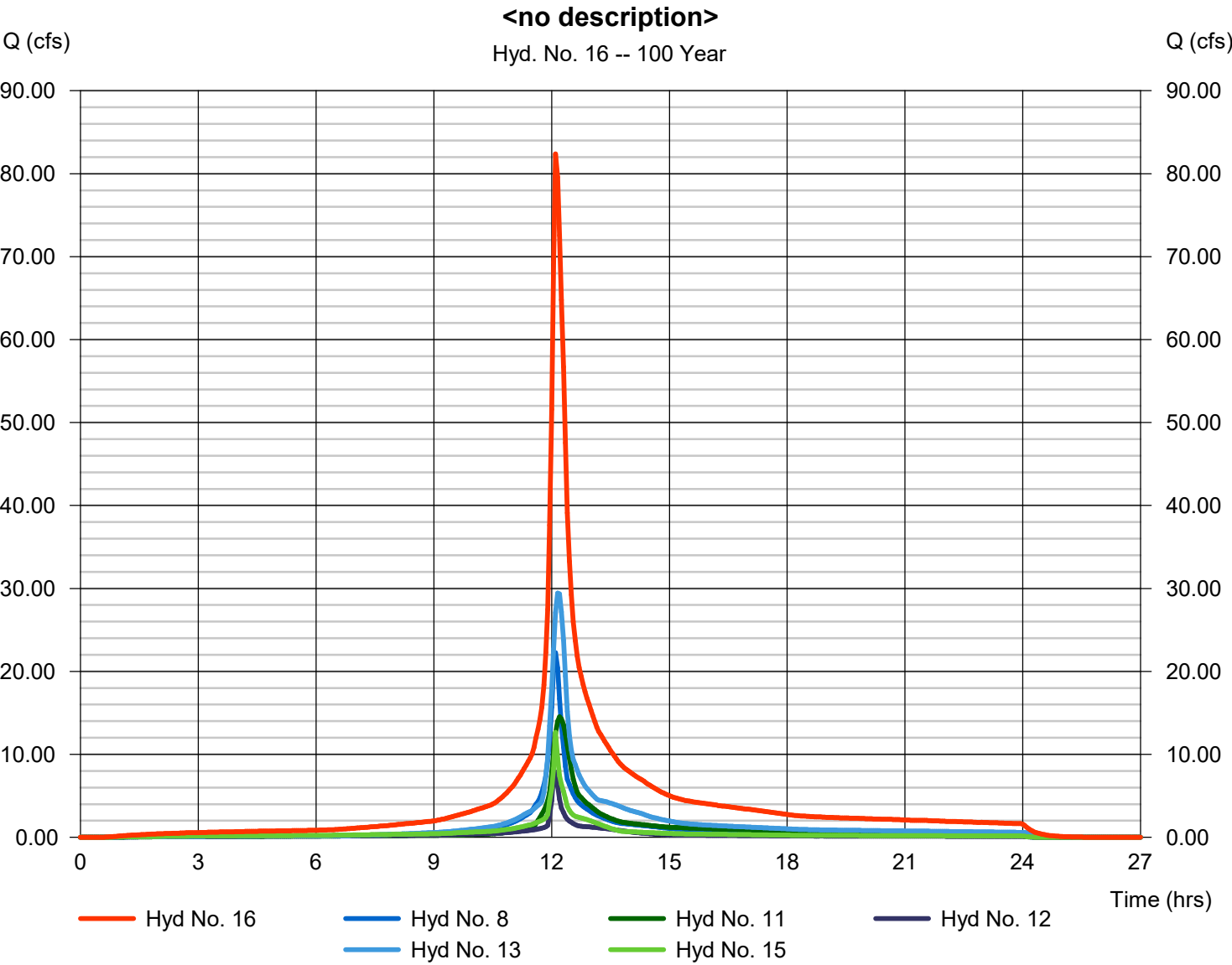
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Monday, 05 / 9 / 2022

Hyd. No. 16

<no description>

Hydrograph type	= Combine	Peak discharge	= 82.37 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 391,403 cuft
Inflow hyds.	= 8, 11, 12, 13, 15	Contrib. drain. area	= 0.000 ac



Hydraflow Rainfall Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Monday, 05 / 9 / 2022

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	-----
2	69.8703	13.1000	0.8658	-----
3	0.0000	0.0000	0.0000	-----
5	79.2597	14.6000	0.8369	-----
10	88.2351	15.5000	0.8279	-----
25	102.6072	16.5000	0.8217	-----
50	114.8193	17.2000	0.8199	-----
100	127.1596	17.8000	0.8186	-----

File name: SampleFHA.idf

$$\text{Intensity} = B / (T_c + D)^E$$

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	5.69	4.61	3.89	3.38	2.99	2.69	2.44	2.24	2.07	1.93	1.81	1.70
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.57	5.43	4.65	4.08	3.65	3.30	3.02	2.79	2.59	2.42	2.27	2.15
10	7.24	6.04	5.21	4.59	4.12	3.74	3.43	3.17	2.95	2.77	2.60	2.46
25	8.25	6.95	6.03	5.34	4.80	4.38	4.02	3.73	3.48	3.26	3.07	2.91
50	9.04	7.65	6.66	5.92	5.34	4.87	4.49	4.16	3.88	3.65	3.44	3.25
100	9.83	8.36	7.30	6.50	5.87	5.36	4.94	4.59	4.29	4.03	3.80	3.60

T_c = time in minutes. Values may exceed 60.

Petry Engineering Cad Projects\2019\19 0265 Daughters of Israel - West Orange\Civil\Current\Stormwater\Rainfall.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	3.54	0.00	0.00	0.00	0.00	0.00	0.00
SCS 6-Hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	3.54	0.00	0.00	5.24	6.37	0.00	8.35

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

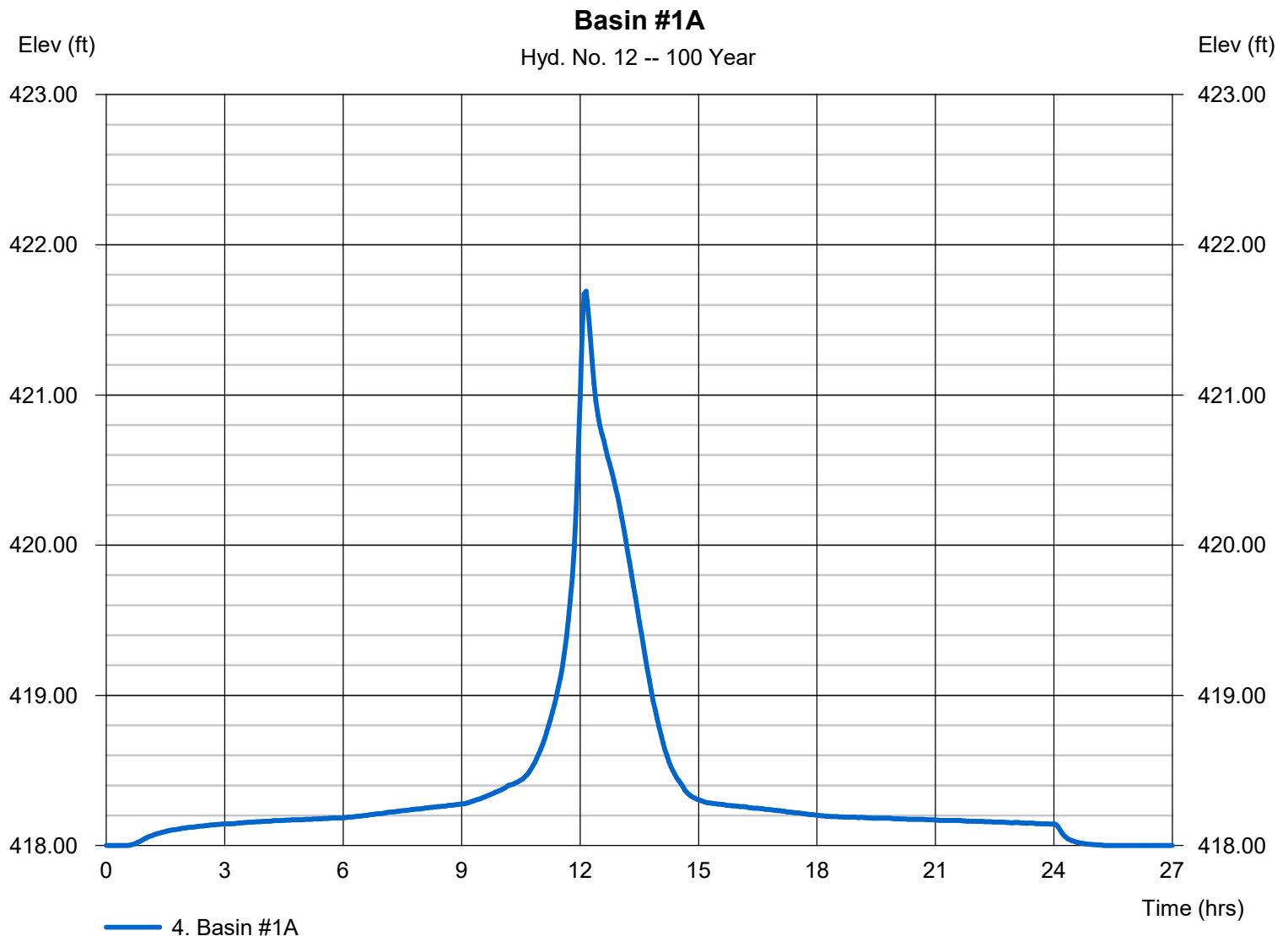
Monday, 05 / 9 / 2022

Hyd. No. 12

Basin #1A

Hydrograph type	= Reservoir	Peak discharge	= 7.857 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 31,462 cuft
Inflow hyd. No.	= 1 - DA-1A (Roof)	Max. Elevation	= 421.69 ft
Reservoir name	= Basin #1A	Max. Storage	= 3,100 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

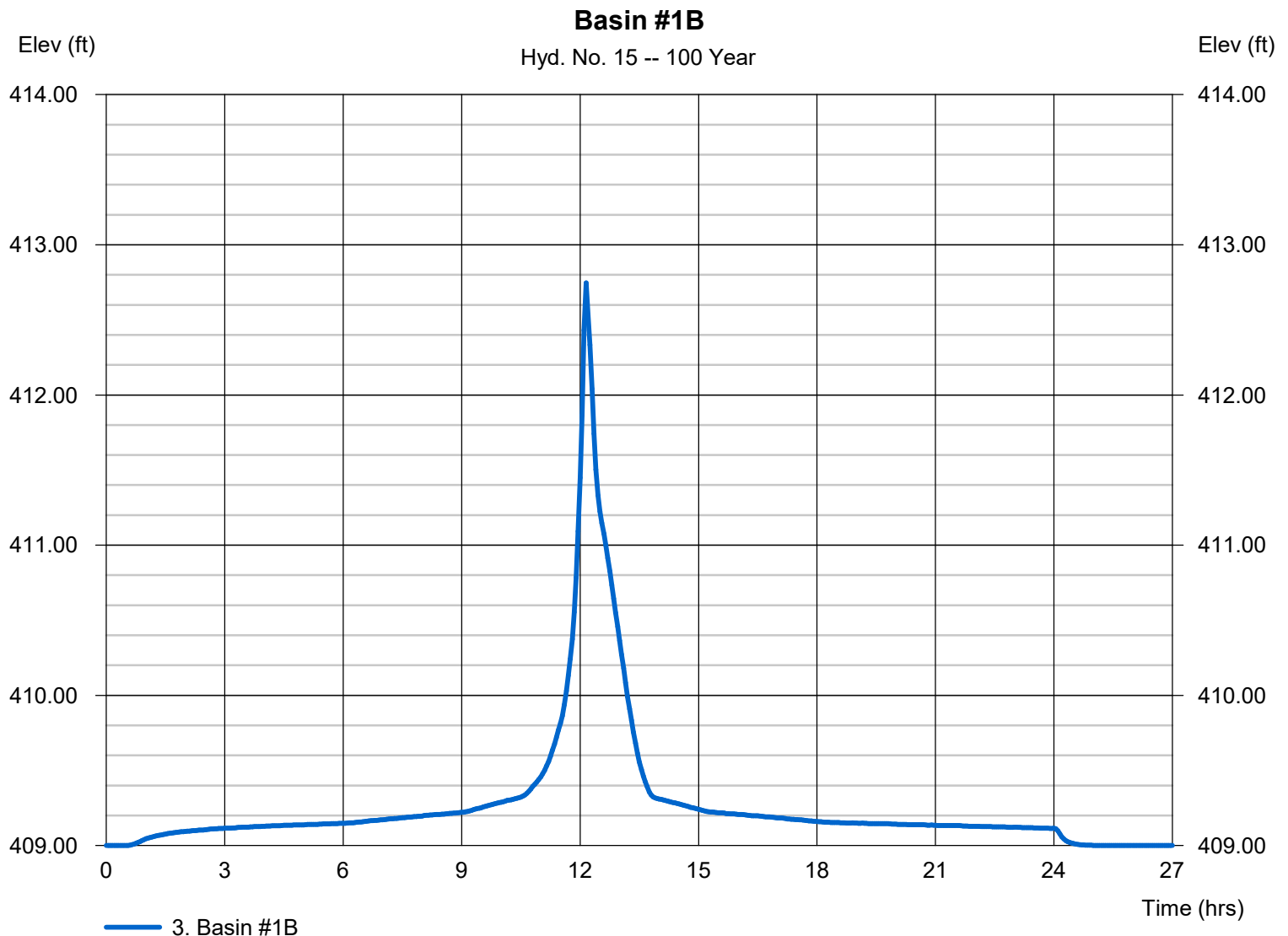
Monday, 05 / 9 / 2022

Hyd. No. 15

Basin #1B

Hydrograph type	= Reservoir	Peak discharge	= 12.64 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 48,298 cuft
Inflow hyd. No.	= 14 - DA-1B (Roof)	Max. Elevation	= 412.75 ft
Reservoir name	= Basin #1B	Max. Storage	= 4,328 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Monday, 05 / 9 / 2022

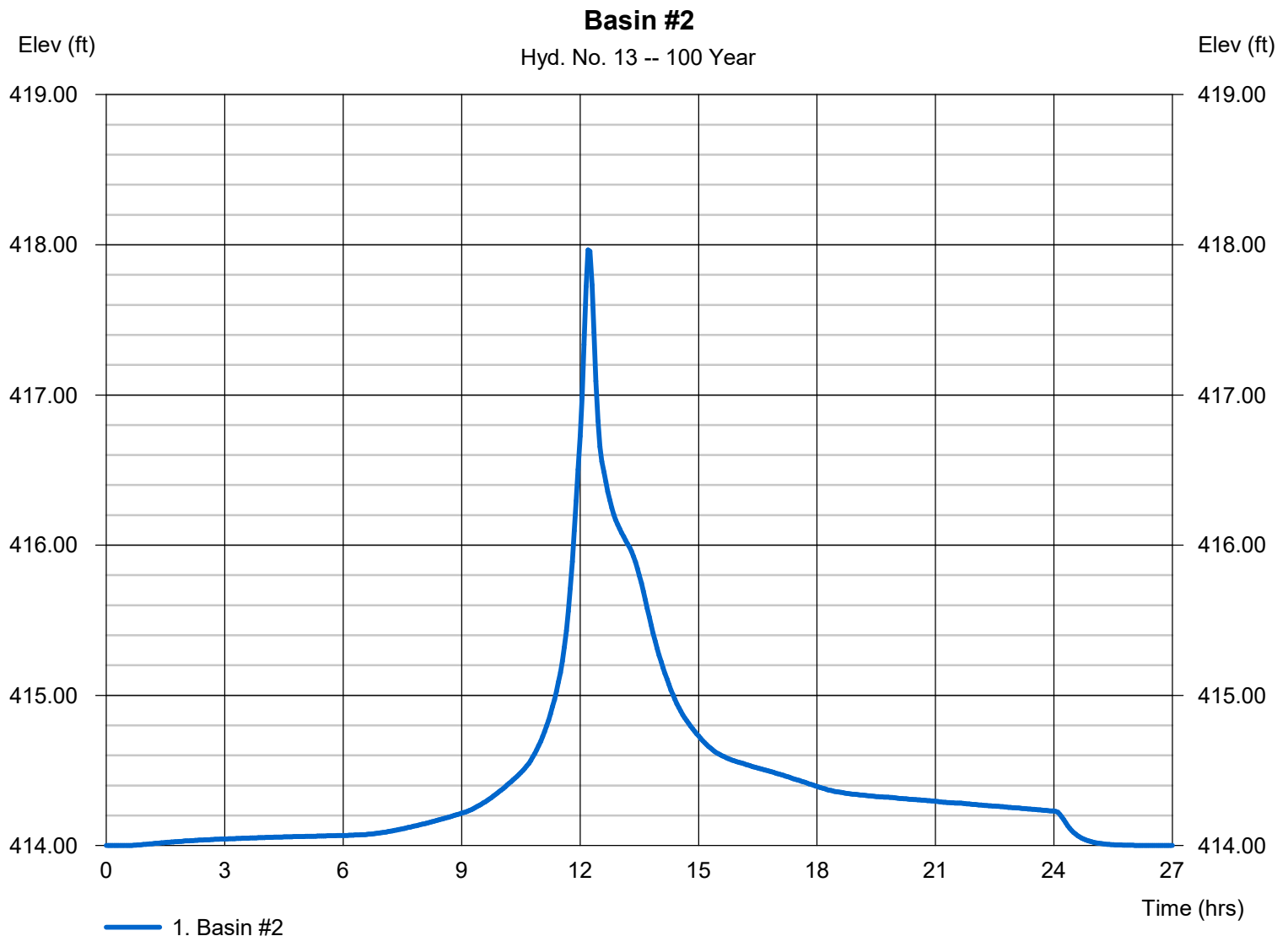
Hyd. No. 13

Basin #2

Hydrograph type = Reservoir
Storm frequency = 100 yrs
Time interval = 3 min
Inflow hyd. No. = 9 - DA-3
Reservoir name = Basin #2

Peak discharge = 29.43 cfs
Time to peak = 12.15 hrs
Hyd. volume = 139,058 cuft
Max. Elevation = 417.97 ft
Max. Storage = 13,405 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Monday, 05 / 9 / 2022

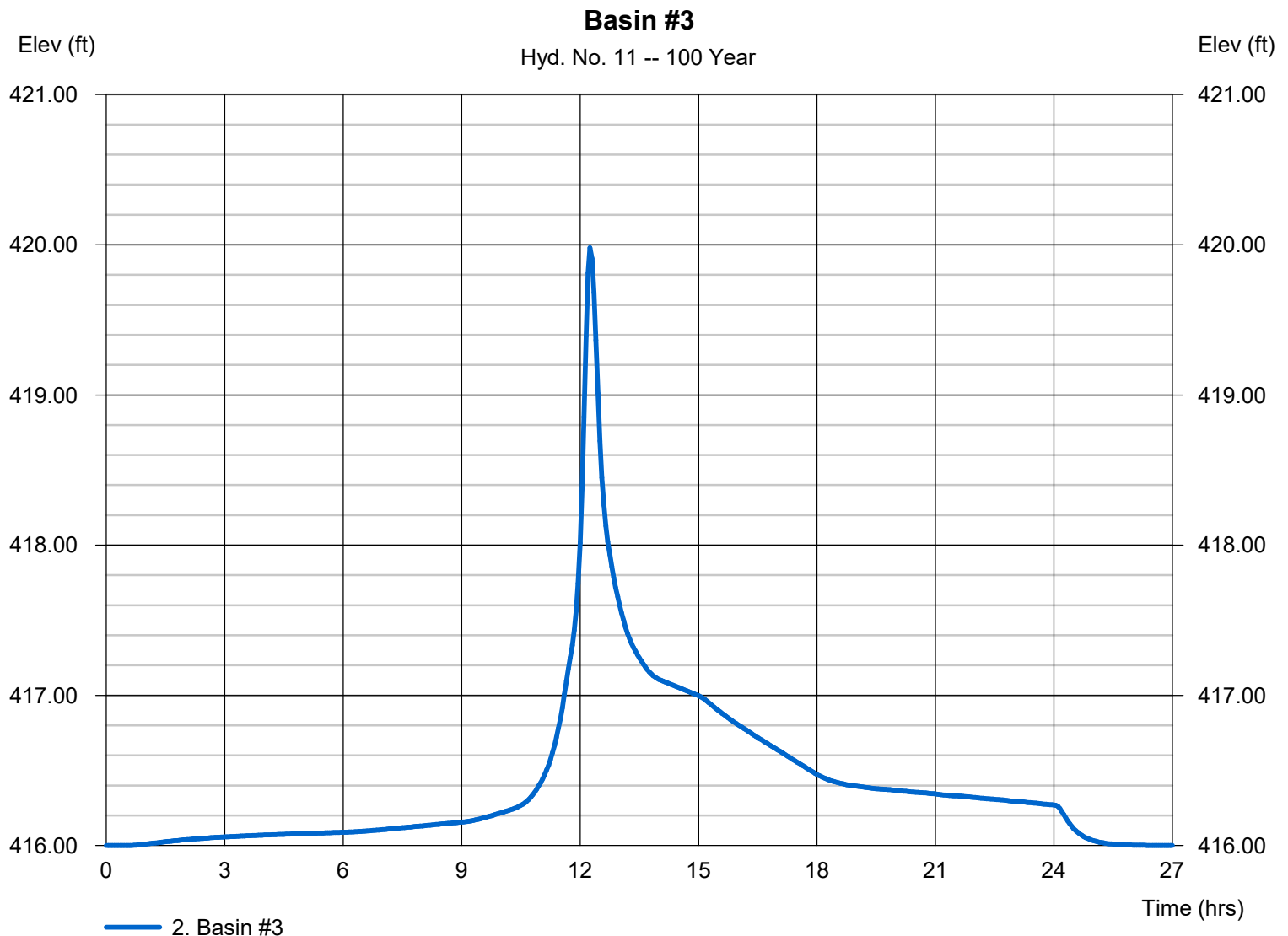
Hyd. No. 11

Basin #3

Hydrograph type = Reservoir
Storm frequency = 100 yrs
Time interval = 3 min
Inflow hyd. No. = 10 - DA-4
Reservoir name = Basin #3

Peak discharge = 14.52 cfs
Time to peak = 12.20 hrs
Hyd. volume = 80,983 cuft
Max. Elevation = 419.98 ft
Max. Storage = 8,915 cuft

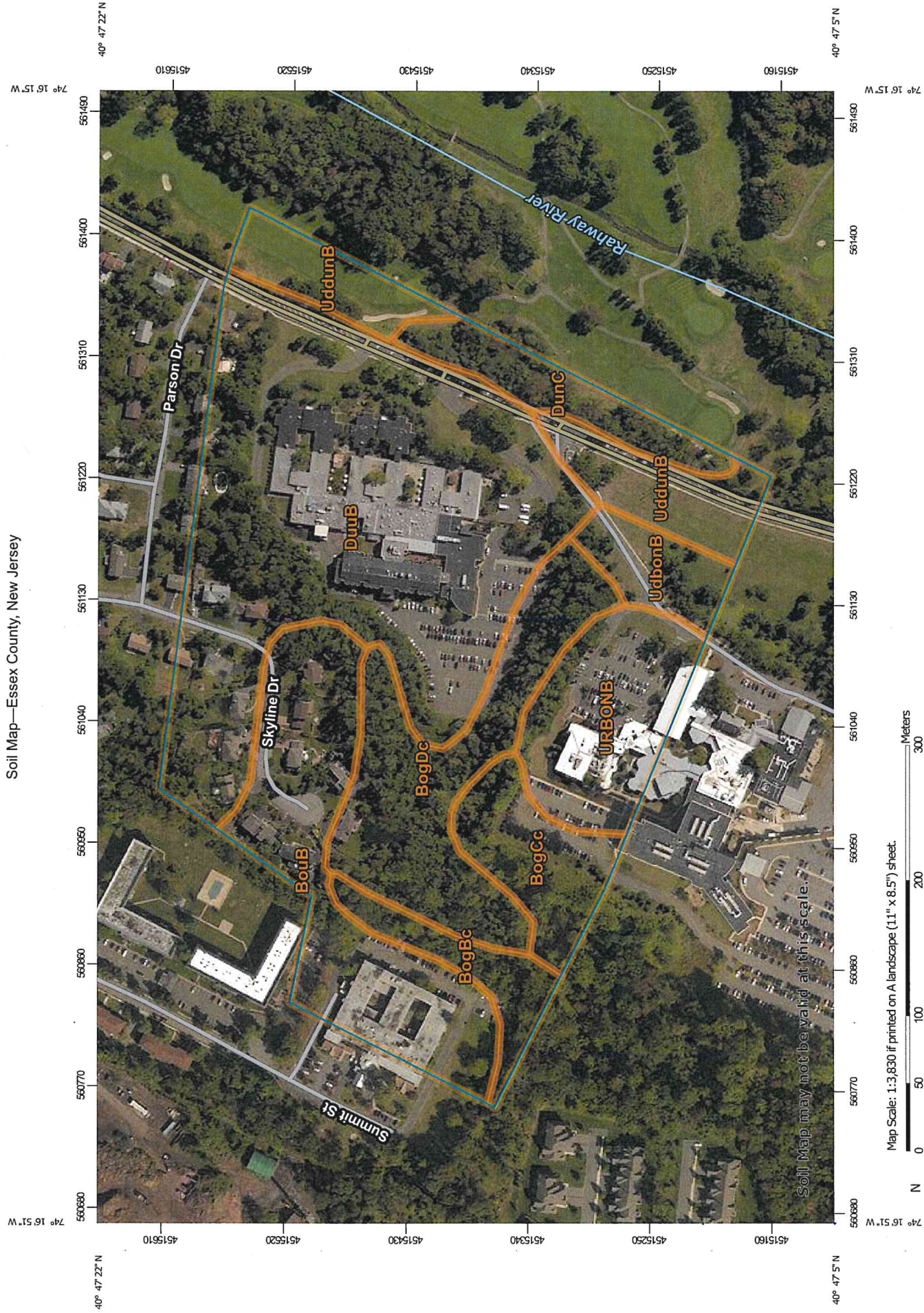
Storage Indication method used.



APPENDIX



Soil Map—Essex County, New Jersey



MAP LEGEND

- Area of Interest (AOI)**

Area of Interest (AOI)
- Soils**

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points
- Special Point Features**

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot
- Water Features**

Streams and Canals
- Transportation**

Rails

Interstate Highways

US Routes

Major Roads

Local Roads
- Background**

Aerial Photography
- Other**

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Essex County, New Jersey
Survey Area Data: Version 15, Sep 16, 2019

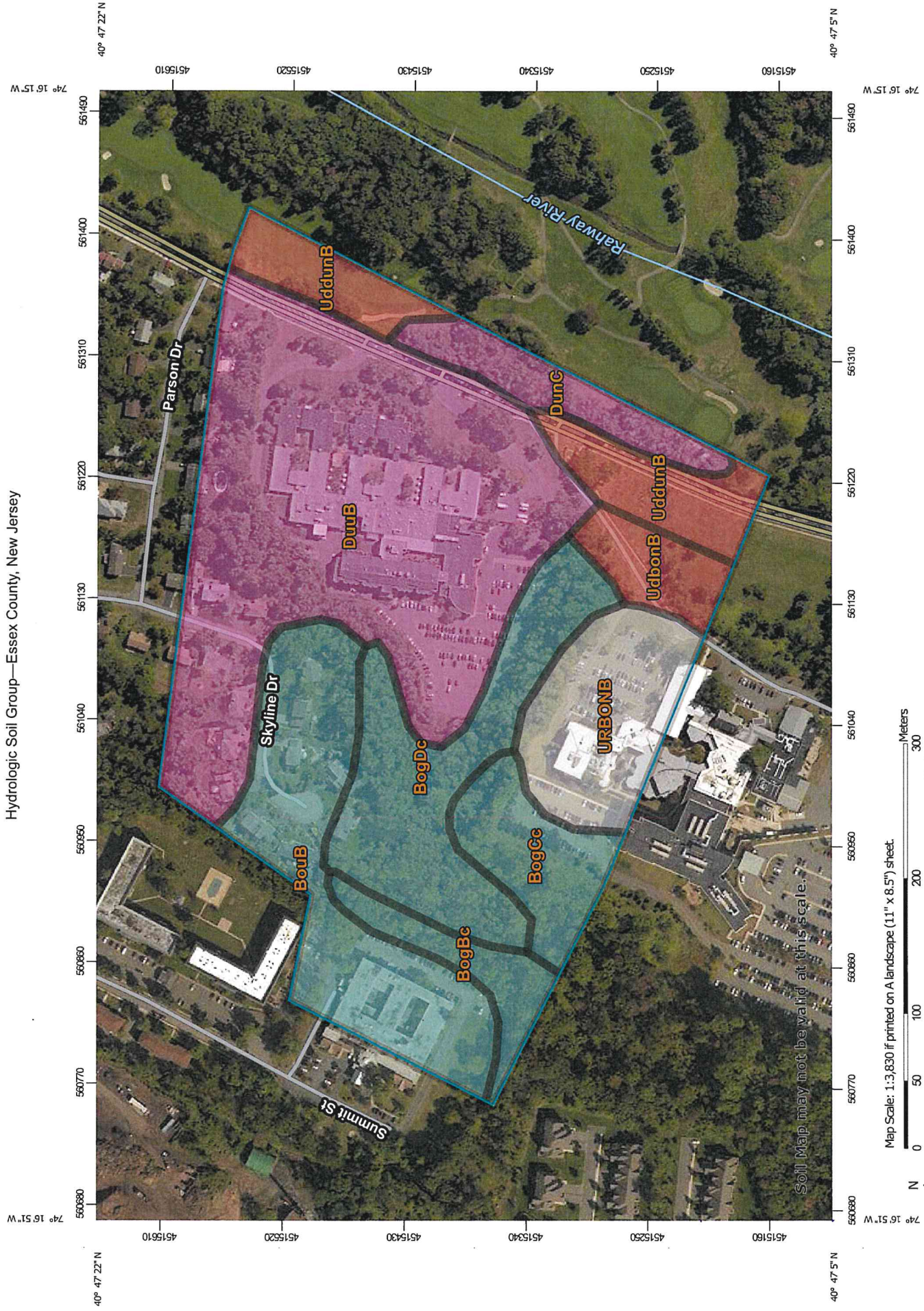
Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 25, 2014—Sep 27, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

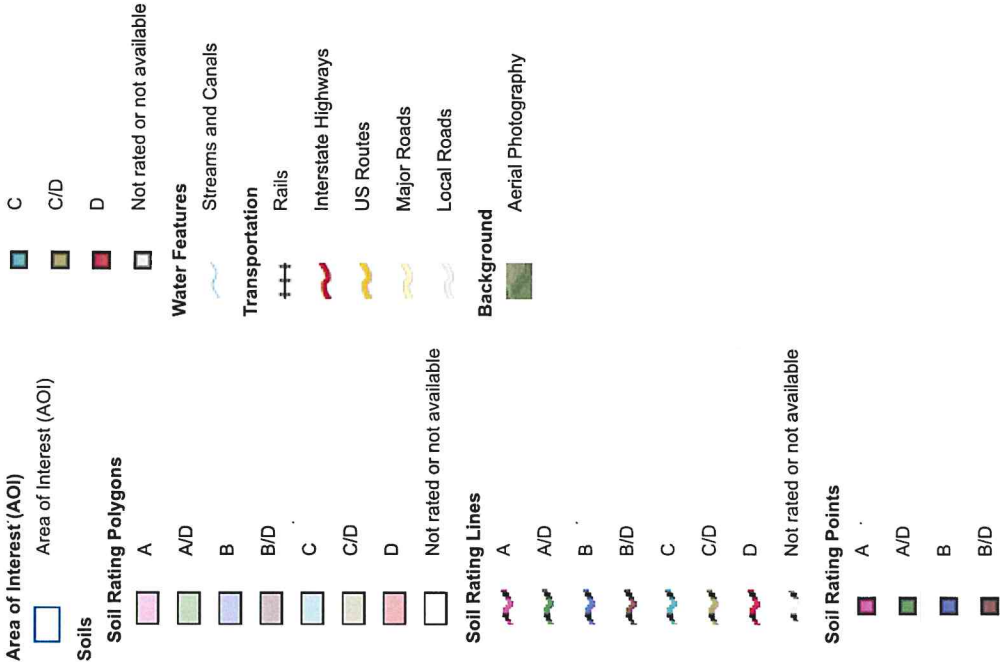
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BogBc	Boonton loam, 0 to 8 percent slopes, extremely stony	1.6	3.5%
BogCc	Boonton loam, 8 to 15 percent slopes, extremely stony	2.5	5.5%
BogDc	Boonton loam, 15 to 35 percent slopes, extremely stony	5.7	12.8%
BouB	Boonton - Urban land, Boonton substratum complex, 0 to 8 percent slopes	6.4	14.4%
DunC	Dunellen sandy loam, 8 to 15 percent slopes	2.0	4.4%
DuuB	Dunellen - Urban land, Dunellen substratum complex, 0 to 8 percent slopes	17.5	39.3%
UdbonB	Udorthents, Boonton substratum, 0 to 8 percent slopes	1.5	3.3%
UddunB	Udorthents, Dunellen substratum, 0 to 8 percent slopes	3.6	8.1%
URBONB	Urban land, Boonton substratum, 0 to 8 percent slopes	3.8	8.6%
Totals for Area of Interest		44.5	100.0%



Map Scale: 1:3,830 if printed on A landscape (11" x 8.5") sheet.

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND



MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Essex County, New Jersey
Survey Area Data: Version 15, Sep 16, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 25, 2014—Sep 27, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BogBc	Boonton loam, 0 to 8 percent slopes, extremely stony	C	1.6	3.5%
BogCc	Boonton loam, 8 to 15 percent slopes, extremely stony	C	2.5	5.5%
BogDc	Boonton loam, 15 to 35 percent slopes, extremely stony	C	5.7	12.8%
BouB	Boonton - Urban land, Boonton substratum complex, 0 to 8 percent slopes	C	6.4	14.4%
DunC	Dunellen sandy loam, 8 to 15 percent slopes	A	2.0	4.4%
DuuB	Dunellen - Urban land, Dunellen substratum complex, 0 to 8 percent slopes	A	17.5	39.3%
UdbonB	Udorthents, Boonton substratum, 0 to 8 percent slopes	D	1.5	3.3%
UddunB	Udorthents, Dunellen substratum, 0 to 8 percent slopes	D	3.6	8.1%
URBONB	Urban land, Boonton substratum, 0 to 8 percent slopes		3.8	8.6%
Totals for Area of Interest			44.5	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

NEW JERSEY 24 HOUR RAINFALL FREQUENCY DATA

Rainfall amounts in Inches

County	1 year	2 year	5 year	10 year	25 year	50 year	100 year
Atlantic	2.72	3.31	4.30	5.16	6.46	7.61	8.90
Bergen	2.75	3.34	4.27	5.07	6.28	7.32	8.47
Burlington	2.77	3.36	4.34	5.18	6.45	7.56	8.81
Camden	2.73	3.31	4.25	5.06	6.28	7.34	8.52
Cape May	2.67	3.25	4.22	5.07	6.34	7.47	8.73
Cumberland	2.69	3.27	4.25	5.09	6.37	7.49	8.76
Essex	2.85	3.44	4.40	5.22	6.44	7.49	8.66
Gloucester	2.71	3.29	4.24	5.05	6.29	7.36	8.55
Hudson	2.73	3.31	4.23	5.02	6.19	7.20	8.31
Hunterdon	2.80	3.38	4.26	5.00	6.09	7.02	8.03
Mercer	2.74	3.31	4.23	5.01	6.19	7.20	8.33
Middlesex	2.76	3.35	4.30	5.12	6.36	7.43	8.63
Monmouth	2.79	3.38	4.38	5.23	6.53	7.66	8.94
Morris	2.94	3.54	4.47	5.24	6.37	7.32	8.35
Ocean	2.81	3.42	4.45	5.33	6.68	7.87	9.20
Passaic	2.87	3.47	4.42	5.23	6.43	7.47	8.62
Salem	2.69	3.26	4.20	5.00	6.22	7.28	8.45
Somerset	2.76	3.34	4.25	5.01	6.15	7.13	8.21
Sussex	2.68	3.22	4.02	4.70	5.72	6.60	7.58
Union	2.80	3.39	4.35	5.17	6.42	7.49	8.69
Warren	2.78	3.34	4.18	4.89	5.93	6.83	7.82

Notes: The average point rainfall amounts listed above were developed from data contained in NOAA Atlas 14 Volume 2.

Point rainfall estimates for specific locations may be obtained from the Precipitation Frequency Data Server located at <http://www.nws.noaa.gov/ohd/hdsc/>

For most hydrologic design procedures, the rainfall amounts listed above may be rounded to the nearest tenth of an inch.

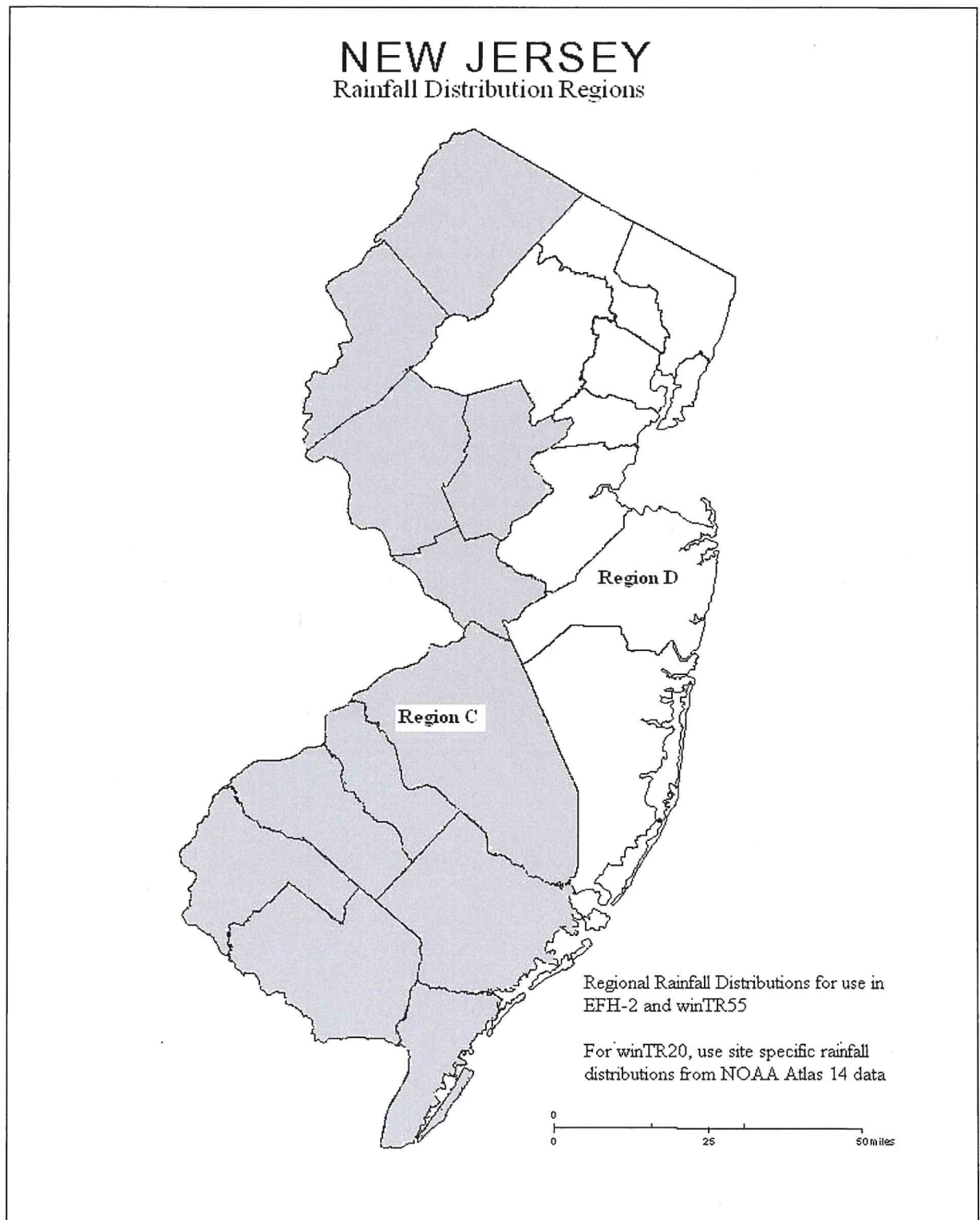


Table 2-2a Runoff curve numbers for urban areas ^{1/}

Cover description		Curve numbers for hydrologic soil group			
Cover type and hydrologic condition	Average percent impervious area ^{2/}	A	B	C	D
<i>Fully developed urban areas (vegetation established)</i>					
Open space (lawns, parks, golf courses, cemeteries, etc.) ^{3/} :					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) ^{4/}		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
<i>Developing urban areas</i>					
Newly graded areas (pervious areas only, no vegetation) ^{5/}		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

¹ Average runoff condition, and $I_a = 0.2S$.² The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.³ CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.⁴ Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.⁵ Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table 2-2b Runoff curve numbers for cultivated agricultural lands ^{1/}

Cover description			Curve numbers for hydrologic soil group			
Cover type	Treatment ^{2/}	Hydrologic condition ^{3/}	A	B	C	D
Fallow	Bare soil	—	77	86	91	94
	Crop residue cover (CR)	Poor	76	85	90	93
		Good	74	83	88	90
Row crops	Straight row (SR)	Poor	72	81	88	91
		Good	67	78	85	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured (C)	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & terraced (C&T)	Poor	66	74	80	82
		Good	62	71	78	81
Small grain	SR	Poor	65	76	84	88
		Good	63	75	83	87
	SR + CR	Poor	64	75	83	86
		Good	60	72	80	84
	C	Poor	63	74	82	85
		Good	61	73	81	84
	C + CR	Poor	62	73	81	84
		Good	60	72	80	83
	C&T	Poor	61	72	79	82
		Good	59	70	78	81
Close-seeded or broadcast legumes or rotation meadow	SR	Poor	66	77	85	89
		Good	58	72	81	85
	C	Poor	64	75	83	85
		Good	55	69	78	83
	C&T	Poor	63	73	80	83
		Good	51	67	76	80

¹ Average runoff condition, and $I_a=0.2S$ ² Crop residue cover applies only if residue is on at least 5% of the surface throughout the year.³ Hydraulic condition is based on combination factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes, (d) percent of residue cover on the land surface (good $\geq 20\%$), and (e) degree of surface roughness.

Poor: Factors impair infiltration and tend to increase runoff.

Good: Factors encourage average and better than average infiltration and tend to decrease runoff.

Table 2-2c Runoff curve numbers for other agricultural lands ^{1/}

Cover type	Cover description	Hydrologic condition	Curve numbers for hydrologic soil group			
			A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. ^{2/}		Poor	68	79	86	89
		Fair	49	69	79	84
		Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.		—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. ^{3/}		Poor	48	67	77	83
		Fair	35	56	70	77
		Good	30 ^{4/}	48	65	73
Woods—grass combination (orchard or tree farm). ^{5/}		Poor	57	73	82	86
		Fair	43	65	76	82
		Good	32	58	72	79
Woods. ^{6/}		Poor	45	66	77	83
		Fair	36	60	73	79
		Good	30 ^{4/}	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.		—	59	74	82	86

¹ Average runoff condition, and $I_a = 0.2S$.² *Poor*: <50% ground cover or heavily grazed with no mulch.*Fair*: 50 to 75% ground cover and not heavily grazed.*Good*: > 75% ground cover and lightly or only occasionally grazed.³ *Poor*: <50% ground cover.*Fair*: 50 to 75% ground cover.*Good*: >75% ground cover.⁴ Actual curve number is less than 30; use CN = 30 for runoff computations.⁵ CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.⁶ *Poor*: Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.*Fair*: Woods are grazed but not burned, and some forest litter covers the soil.*Good*: Woods are protected from grazing, and litter and brush adequately cover the soil.

Table 2-2d Runoff curve numbers for arid and semiarid rangelands ^{1/}

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition ^{2/}	A ^{3/}	B	C	D
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper—pinyon, juniper, or both; grass understory.	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory.	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

¹ Average runoff condition, and $I_w = 0.2S$. For range in humid regions, use table 2-2c.² Poor: <30% ground cover (litter, grass, and brush overstory).

Fair: 30 to 70% ground cover.

Good: > 70% ground cover.

³ Curve numbers for group A have been developed only for desert shrub.

STORM SEWER COMPUTATIONS
RATIONAL METHOD - (Q=CIA)
25 YR. STORM

Project: Daughters of Israel
Date: 05/13/22
By: JAF

PIPE SEGMENT														
FROM	TO	A-Incremental	C-Runoff Coef.	AxC-Incremental	Tc (MIN.)	I-Rainfall Int. (in./hr)	Qp-Peak Runoff (cfs)	Qp-Peak Runoff Cumulative (cfs)	Pipe/Box Length (FT.)	Slope (%)	Pipe/Box Size (IN.)	Capacity (FULL) (cfs)	Velocity (Design) (fps)	Pipe Travel Time(min)
Type "B" #6-4	Type "B" #6-3	0.64	0.75	0.48	6.0	5.60	2.69	2.69		2.0%	15" HDPE	9.92	8.09	0.00
Type "B" #6-3	Type "B" #6-2	0.34	0.75	0.26	6.0	5.60	1.43	4.12		2.0%	15" HDPE	9.92	8.09	0.00
Type "B" #6-2	Type "B" #6-1	5.37	0.75	4.03	6.0	5.60	22.55	26.67		2.0%	24" HDPE	34.75	11.06	0.00
Type "B" #7-2	Type "B" #7-1	0.18	0.99	0.18	6.0	5.60	1.00	1.00		1.0%	15" HDPE	7.02	5.72	0.00
Type "B" #7-1	Type "B" #6-1	0.03	0.99	0.03	6.0	5.60	0.17	1.16		1.0%	15" HDPE	7.02	5.72	0.00
Type "B" #6-1	Basin #2	0.15	0.99	0.15	6.0	5.60	0.83	28.67		1.5%	24" HDPE	30.10	9.58	0.00
Phase 1 Roof														
Leaders	Subsurface Basin #1A	1.14	0.99	1.13	6.0	5.60	6.32	6.32		2.0%	15" HDPE	9.92	8.09	0.00
2'x2' #10-3	Subsurface Basin #1A	0.07	0.99	0.07	6.0	5.60	0.39	0.39		1.0%	12" PVC	4.22	5.38	0.00
Subsurface Basin														
#1A	MH #5-6							5.79		2.0%	18" HDPE	16.14	9.13	0.00
Basin #2	MH #5-6							20.88		3.5%	24" HDPE	45.97	14.63	0.00
MH #5-6	Type "B" #5-5							26.67		3.5%	24" HDPE	45.97	14.63	0.00
Type "B" #5-5A	Type "B" #5-5	0.04	0.99	0.04	6.0	5.60	0.22	0.22		1.0%	15" HDPE	7.02	5.72	0.00
Type "B" #5-5	Type "B" #5-4	0.05	0.99	0.05	6.0	5.60	0.28	27.17		3.5%	24" HDPE	45.97	14.63	0.00
Type "B" #5-4A	Type "B" #5-4	0.3	0.99	0.30	6.0	5.60	1.66	1.66		1.0%	15" HDPE	7.02	5.72	0.00
Type "B" #5-4	Type "B" #5-2	0.03	0.99	0.03	6.0	5.60	0.17	29.00		3.5%	24" HDPE	45.97	14.63	0.00
Type "B" #5-2A	Type "B" #5-2	0.37	0.99	0.37	6.0	5.60	2.05	2.05		1.0%	15" HDPE	7.02	5.72	0.00
Type "B" #5-2	MH #1-1	0.06	0.99	0.06	6.0	5.60	0.33	31.38		3.5%	24" HDPE	45.97	14.63	0.00

Phase 2 Roof

Leaders	Subsurface Basin #1B	1.75	0.99	1.73	6.0	5.60	9.70	9.70	2.0%	15" HDPE	9.92	8.09	0.00
Subsurface Basin #1B	MH #1-1							7.24	5.0%	15" HDPE	15.69	12.79	0.00
Type "B" #4-7	Type "B" #4-6	0.21	0.99	0.21	6.0	5.60	1.16	1.16	1.2%	15" HDPE	7.69	6.26	0.00
Type "B" #4-6	Type "B" #4-5	1.35	0.75	1.01	6.0	5.60	5.67	6.83	1.2%	15" HDPE	7.69	6.26	0.00
Type "B" #4-5	Type "B" #4-4	0.91	0.75	0.68	6.0	5.60	3.82	10.66	1.2%	18" HDPE	12.50	7.07	0.00
Type "B" #4-4	Type "B" #4-3	0.75	0.75	0.56	6.0	5.60	3.15	13.81	1.2%	24" HDPE	26.92	8.57	0.00
Type "B" #4-3	Type "B" #4-2	0.26	0.99	0.26	6.0	5.60	1.44	15.25	1.2%	24" HDPE	26.92	8.57	0.00
Type "B" #4-2	MH#4-1	0.47	0.75	0.35	6.0	5.60	1.97	17.22	1.2%	24" HDPE	26.92	8.57	0.00
Type "B" #4-1A	MH#4-1	0.6	0.75	0.45	6.0	5.60	2.52	2.52	1.0%	15" HDPE	7.02	5.72	0.00
Type "B" #3-2	Type "B" #3-1	0.59	0.75	0.44	6.0	5.60	2.48	2.48	1.0%	15" HDPE	7.02	5.72	0.00
Type "B" #3-1	MH#4-1	0.11	0.99	0.11	6.0	5.60	0.61	3.09	1.0%	15" HDPE	7.02	5.72	0.00
MH #4-1	Basin #3							22.83	1.0%	24" HDPE	24.57	7.82	0.00
2'x2' #11-2	2'x2' #11-1	0.08	0.99	0.08	6.0	5.60	0.44	0.44	2.0%	12" PVC	5.97	7.60	0.00
2'x2' #11-1	Basin #3	0.24	0.99	0.24	6.0	5.60	1.33	1.77	3.0%	12" PVC	7.31	9.31	0.00
Phase 3 Roof													
Leaders	Basin #3	0.14	0.99	0.14	6.0	5.60	0.78	0.78	2.0%	12" HDPE	5.47	6.97	0.00
Basin #3	Type "B" #1-8							9.30	2.0%	15" HDPE	9.92	8.09	0.00
Type "B" #1-8A	Type "B" #1-8	0.24	0.75	0.18	6.0	5.60	1.01	1.01	1.0%	15" HDPE	7.02	5.72	0.00
Type "B" #1-8	Type "B" #1-7	0.11	0.99	0.11	6.0	5.60	0.61	10.92	2.5%	15" HDPE	11.09	9.04	0.00
Type "B" #1-7A	Type "B" #1-7	0.15	0.75	0.11	6.0	5.60	0.63	0.63	1.0%	15" HDPE	7.02	5.72	0.00
Type "B" #1-7	Type "B" #1-6	0.05	0.99	0.05	6.0	5.60	0.28	11.83	2.5%	18" HDPE	18.04	10.21	0.00
Type "B" #1-6A	Type "B" #1-6	0.08	0.99	0.08	6.0	5.60	0.44	0.44	1.0%	15" HDPE	7.02	5.72	0.00
Type "B" #2-2	Type "B" #1-6	0.58	0.99	0.57	6.0	5.60	3.22	3.22	2.5%	15" HDPE	11.09	9.04	0.00
Type "B" #1-6	Type "B" #1-4	0.06	0.99	0.06	6.0	5.60	0.33	15.82	2.5%	18" HDPE	18.04	10.21	0.00
Type "B" #1-4A	Type "B" #1-4	0.22	0.99	0.22	6.0	5.60	1.22	1.22	1.0%	15" HDPE	7.02	5.72	0.00
Type "B" #1-4	Type "B" #1-3	0.04	0.99	0.04	6.0	5.60	0.22	17.26	2.5%	18" HDPE	18.04	10.21	0.00
Type "B" #1-3	Type "B" #1-2	0.02	0.99	0.02	6.0	5.60	0.11	17.37	2.5%	18" HDPE	18.04	10.21	0.00
Type "B" #1-2	MH #1-1	0.17	0.99	0.17	6.0	5.60	0.94	18.31	2.5%	24" HDPE	38.85	12.37	0.00
MH #1-1	EX. MH in Pleasant Valley Way							56.93	3.0%	30" RCP	61.74	12.58	0.00



Time of Concentration Calculations

Project #: 20-0265

Project: Daughters of Israel

County: Essex

Pre-Development ☒

Post-Development ☐

Drainage Area: DA-1

TOC Line 1

Sheet Flow

	Segment 1	Segment 2	Segment 3	
Surface Description (Table 3-1)	Grass, Dense Grasses	Woods, Light Underbrush	Woods, Light Underbrush	
Manning's Roughness Coeff., n (Table 3-1)	0.24	0.4	0.4	
Flow Length, L (total $\leq$ 100 ft)	23	51	26	
Two-Year 24-Hour Rainfall, P_2	3.44	3.44	3.44	
Land Slope, s (ft/ft)	0.04	0.08	0.46	
T_t	3.22	6.94	2.01	12.17

Shallow Concentrated Flow

	Segment 1	Segment 2	Segment 3	
Surface Description	Unpaved	Unpaved	paved	
Flow Length, L	345	185	157	
Watercourse Slope, s	0.31	0.06	0.04	
Average Velocity	8.9	3.9	4.1	
T_t	0.65	0.79	0.64	2.08

Channel Flow

	Segment 1	Segment 2	Segment 3	
Cross Sectional Flow Area, a				
Wetted Perimeter, P_w				
Hydraulic Radius, r	-	-	-	
Channel Slope, s				
Manning's Roughness Description				
Manning's Roughness	-	-	-	
Velocity	-	-	-	
Flow Length				
T_t	-	-	-	0.00
				14.25



Time of Concentration Calculations

Project #: 20-0265

Project: Daughters of Israel

County: Essex

Pre-Development ☒

Post-Development ☐

Drainage Area: DA-1B

Sheet Flow

	Segment 1	Segment 2	Segment 3	
Surface Description (Table 3-1)	Woods, Light Underbrush			
Manning's Roughness Coeff., n (Table 3-1)	0.4	-	-	
Flow Length, L (total $\leq$ 100 ft)	100			
Two-Year 24-Hour Rainfall, P_2	3.44	3.44	3.44	
Land Slope, s (ft/ft)	0.14			
T_t	9.51	-	-	9.51

Shallow Concentrated Flow

	Segment 1	Segment 2	Segment 3	
Surface Description	Unpaved	Unpaved	Unpaved	
Flow Length, L	51	23	36	
Watercourse Slope, s	0.09	0.26	0.72	
Average Velocity	4.8	8.2	13.6	
T_t	0.18	0.05	0.04	0.27

Channel Flow

	Segment 1	Segment 2	Segment 3	
Cross Sectional Flow Area, a				
Wetted Perimeter, P_w				
Hydraulic Radius, r	-	-	-	
Channel Slope, s				
Manning's Roughness Description				
Manning's Roughness	-	-	-	
Velocity	-	-	-	
Flow Length				
T_t	-	-	-	0.00
				9.78



Time of Concentration Calculations

Project #: 20-0265

Project: Daughters of Israel

County: Essex

Pre-Development ☒

Post-Development ☐

Drainage Area: DA-2

Sheet Flow

	Segment 1	Segment 2	Segment 3	
Surface Description (Table 3-1)	Woods, Light Underbrush			
Manning's Roughness Coeff., n (Table 3-1)	0.4	-	-	
Flow Length, L (total $\leq$ 100 ft)	100			
Two-Year 24-Hour Rainfall, P_2	3.44	3.44	3.44	
Land Slope, s (ft/ft)	0.13			
T_t	9.80	-	-	9.80

Shallow Concentrated Flow

	Segment 1	Segment 2	Segment 3	
Surface Description	Unpaved	Unpaved		
Flow Length, L	66	63		
Watercourse Slope, s	0.11	0.22		
Average Velocity	5.3	7.5	-	
T_t	0.21	0.14	-	0.35

Channel Flow

	Segment 1	Segment 2	Segment 3	
Cross Sectional Flow Area, a				
Wetted Perimeter, P_w				
Hydraulic Radius, r	-	-	-	
Channel Slope, s				
Manning's Roughness Description				
Manning's Roughness	-	-	-	
Velocity	-	-	-	
Flow Length				
T_t	-	-	-	0.00
				10.14



Time of Concentration Calculations

Project #: 20-0265

Project: Daughters of Israel

County: Essex

Pre-Development ☒

Post-Development ☐

Drainage Area: DA-3

Sheet Flow

	Segment 1	Segment 2	Segment 3	
Surface Description (Table 3-1)	Grass, Dense Grasses	Woods, Light Underbrush		
Manning's Roughness Coeff., n (Table 3-1)	0.24	0.4	-	
Flow Length, L (total $\leq$ 100 ft)	45	55		
Two-Year 24-Hour Rainfall, P_2	3.44	3.44	3.44	
Land Slope, s (ft/ft)	0.11	0.16		
T_t	3.67	5.59	-	9.26

Shallow Concentrated Flow

	Segment 1	Segment 2	Segment 3	
Surface Description	Unpaved	Unpaved	paved	
Flow Length, L	140	115	64	
Watercourse Slope, s	0.04	0.52	0.03	
Average Velocity	3.2	11.5	3.5	
T_t	0.73	0.17	0.30	1.20

Channel Flow

	Segment 1	Segment 2	Segment 3	
Cross Sectional Flow Area, a				
Wetted Perimeter, P_w				
Hydraulic Radius, r	-	-	-	
Channel Slope, s				
Manning's Roughness Description				
Manning's Roughness	-	-	-	
Velocity	-	-	-	
Flow Length				
T_t	-	-	-	0.00
				10.47



Time of Concentration Calculations

Project #: 20-0265

Project: Daughters of Israel

County: Essex

Pre-Development ☒

Post-Development ☐

Drainage Area: DA-4

TOC Line 2

Sheet Flow

	Segment 1	Segment 2	Segment 3	
Surface Description (Table 3-1)	Woods, Light Underbrush			
Manning's Roughness Coeff., n (Table 3-1)	0.4	-	-	
Flow Length, L (total ≤ 100 ft)	100			
Two-Year 24-Hour Rainfall, P_2	3.44	3.44	3.44	
Land Slope, s (ft/ft)	0.15			
T_t	9.25	-	-	9.25

Shallow Concentrated Flow

	Segment 1	Segment 2	Segment 3	
Surface Description	Unpaved			
Flow Length, L	138			
Watercourse Slope, s	0.18			
Average Velocity	6.8	-	-	
T_t	0.34	-	-	0.34

Channel Flow

	Segment 1	Segment 2	Segment 3	
Cross Sectional Flow Area, a				
Wetted Perimeter, P_w				
Hydraulic Radius, r	-	-	-	
Channel Slope, s				
Manning's Roughness Description				
Manning's Roughness	-	-	-	
Velocity	-	-	-	
Flow Length				
T_t	-	-	-	0.00
				9.59



Time of Concentration Calculations

Project #: 20-0265

Project: Daughters of Israel

County: Essex

Pre-Development ☒

Post-Development ☐

Drainage Area: DA-5

TOC Line 1

Sheet Flow

	Segment 1	Segment 2	Segment 3	
Surface Description (Table 3-1)	Woods, Light Underbrush	Woods, Light Underbrush		
Manning's Roughness Coeff., n (Table 3-1)	0.4	0.4	-	
Flow Length, L (total $\leq$ 100 ft)	48	52		
Two-Year 24-Hour Rainfall, P ₂	3.44	3.44	3.44	
Land Slope, s (ft/ft)	0.08	0.19		
T _t	6.61	4.99	-	11.60

Shallow Concentrated Flow

	Segment 1	Segment 2	Segment 3	
Surface Description	Unpaved	Unpaved	paved	
Flow Length, L	135	271	77	
Watercourse Slope, s	0.04	0.17	0.01	
Average Velocity	3.2	6.6	2.0	
T _t	0.71	0.69	0.64	2.03

Channel Flow

	Segment 1	Segment 2	Segment 3	
Cross Sectional Flow Area, a				
Wetted Perimeter, P _w				
Hydraulic Radius, r	-	-	-	
Channel Slope, s				
Manning's Roughness Description				
Manning's Roughness	-	-	-	
Velocity	-	-	-	
Flow Length				
T _t	-	-	-	0.00
				13.63



Time of Concentration Calculations

Project #: 20-0265

Project: Daughters of Israel

County: Essex

Pre-Development ☐

Post-Development ☒

Drainage Area: DA-2

Sheet Flow

	Segment 1	Segment 2	Segment 3	
Surface Description (Table 3-1)	Woods, Light Underbrush			
Manning's Roughness Coeff., n (Table 3-1)	0.4	-	-	
Flow Length, L (total ≤ 100 ft)	100			
Two-Year 24-Hour Rainfall, P_2	3.44	3.44	3.44	
Land Slope, s (ft/ft)	0.13			
T_t	9.80	-	-	9.80

Shallow Concentrated Flow

	Segment 1	Segment 2	Segment 3	
Surface Description	Unpaved	Unpaved		
Flow Length, L	66	63		
Watercourse Slope, s	0.11	0.22		
Average Velocity	5.3	7.5	-	
T_t	0.21	0.14	-	0.35

Channel Flow

	Segment 1	Segment 2	Segment 3	
Cross Sectional Flow Area, a				
Wetted Perimeter, P_w				
Hydraulic Radius, r	-	-	-	
Channel Slope, s				
Manning's Roughness Description				
Manning's Roughness	-	-	-	
Velocity	-	-	-	
Flow Length				
T_t	-	-	-	0.00
				10.14



Time of Concentration Calculations

Project #: 20-0265

Project: Daughters of Israel

County: Essex

Pre-Development ☐

Post-Development ☒

Drainage Area: DA-3

Sheet Flow

	Segment 1	Segment 2	Segment 3	
Surface Description (Table 3-1)	Grass, Dense Grasses	Woods, Light Underbrush	Woods, Light Underbrush	
Manning's Roughness Coeff., n (Table 3-1)	0.24	0.4	0.4	
Flow Length, L (total $\leq$ 100 ft)	23	51	26	
Two-Year 24-Hour Rainfall, P_2	3.44	3.44	3.44	
Land Slope, s (ft/ft)	0.04	0.08	0.46	
T_t	3.22	6.94	2.01	12.17

Shallow Concentrated Flow

	Segment 1	Segment 2	Segment 3	
Surface Description	Unpaved	Unpaved	paved	
Flow Length, L	345	185	207	
Watercourse Slope, s	0.31	0.06	0.04	
Average Velocity	8.9	3.9	4.1	
T_t	0.65	0.79	0.85	2.28

Channel Flow

	Segment 1	Segment 2	Segment 3	
Cross Sectional Flow Area, a				
Wetted Perimeter, P_w				
Hydraulic Radius, r	-	-	-	
Channel Slope, s				
Manning's Roughness Description				
Manning's Roughness	-	-	-	
Velocity	-	-	-	
Flow Length				
T_t	-	-	-	0.00
				14.46



Time of Concentration Calculations

Project #: 20-0265

Project: Daughters of Israel

County: Essex

Pre-Development ☐

Post-Development ☒

Drainage Area: DA-4

Sheet Flow

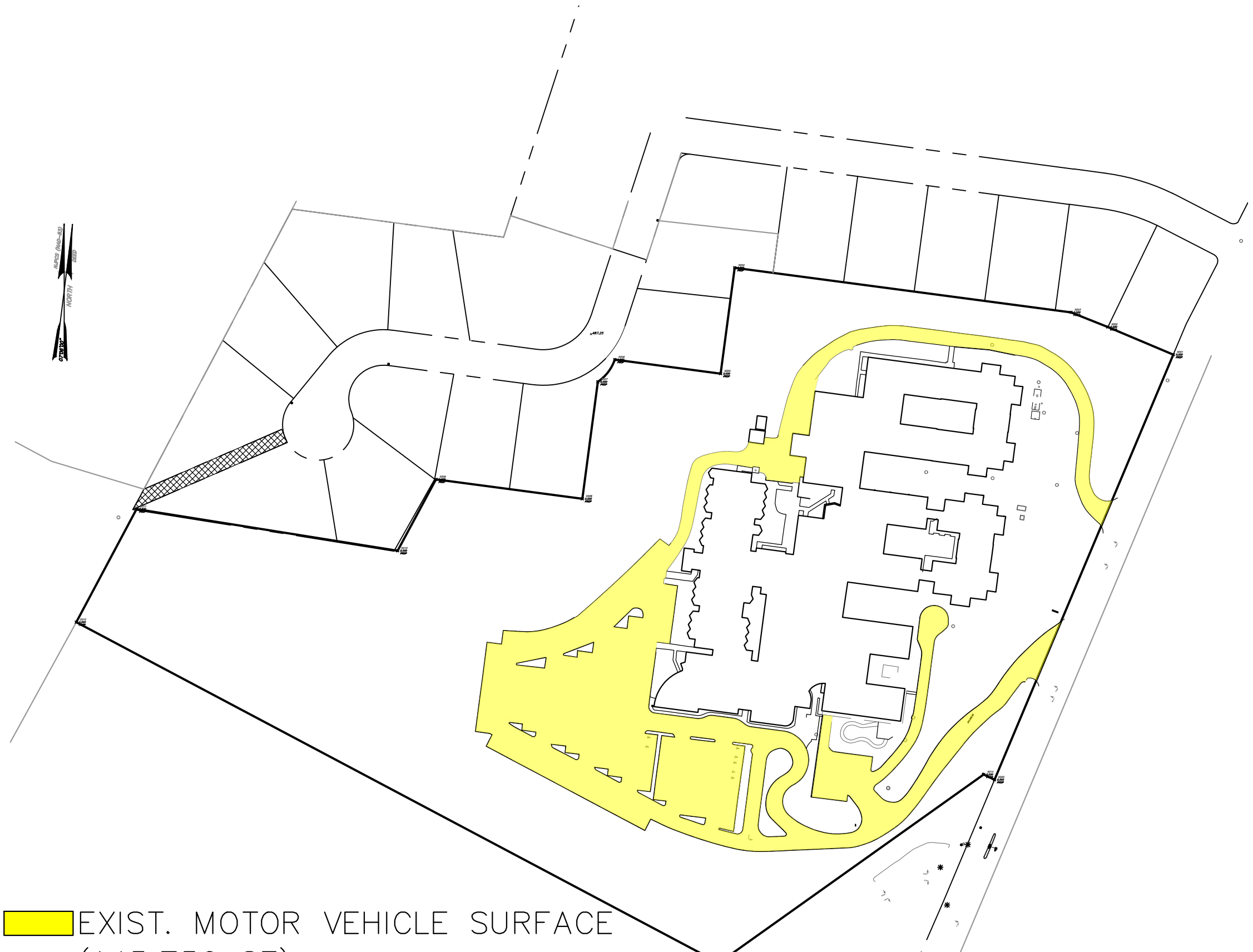
	Segment 1	Segment 2	Segment 3	
Surface Description (Table 3-1)	Woods, Light Underbrush	Woods, Light Underbrush		
Manning's Roughness Coeff., n (Table 3-1)	0.4	0.4	-	
Flow Length, L (total $\leq$ 100 ft)	48	52		
Two-Year 24-Hour Rainfall, P_2	3.44	3.44	3.44	
Land Slope, s (ft/ft)	0.08	0.19		
T_t	6.61	4.99	-	11.60

Shallow Concentrated Flow

	Segment 1	Segment 2	Segment 3	
Surface Description	Unpaved	Unpaved	paved	
Flow Length, L	52	117	270	
Watercourse Slope, s	0.06	0.24	0.01	
Average Velocity	3.9	7.8	2.0	
T_t	0.22	0.25	2.23	2.70

Channel Flow

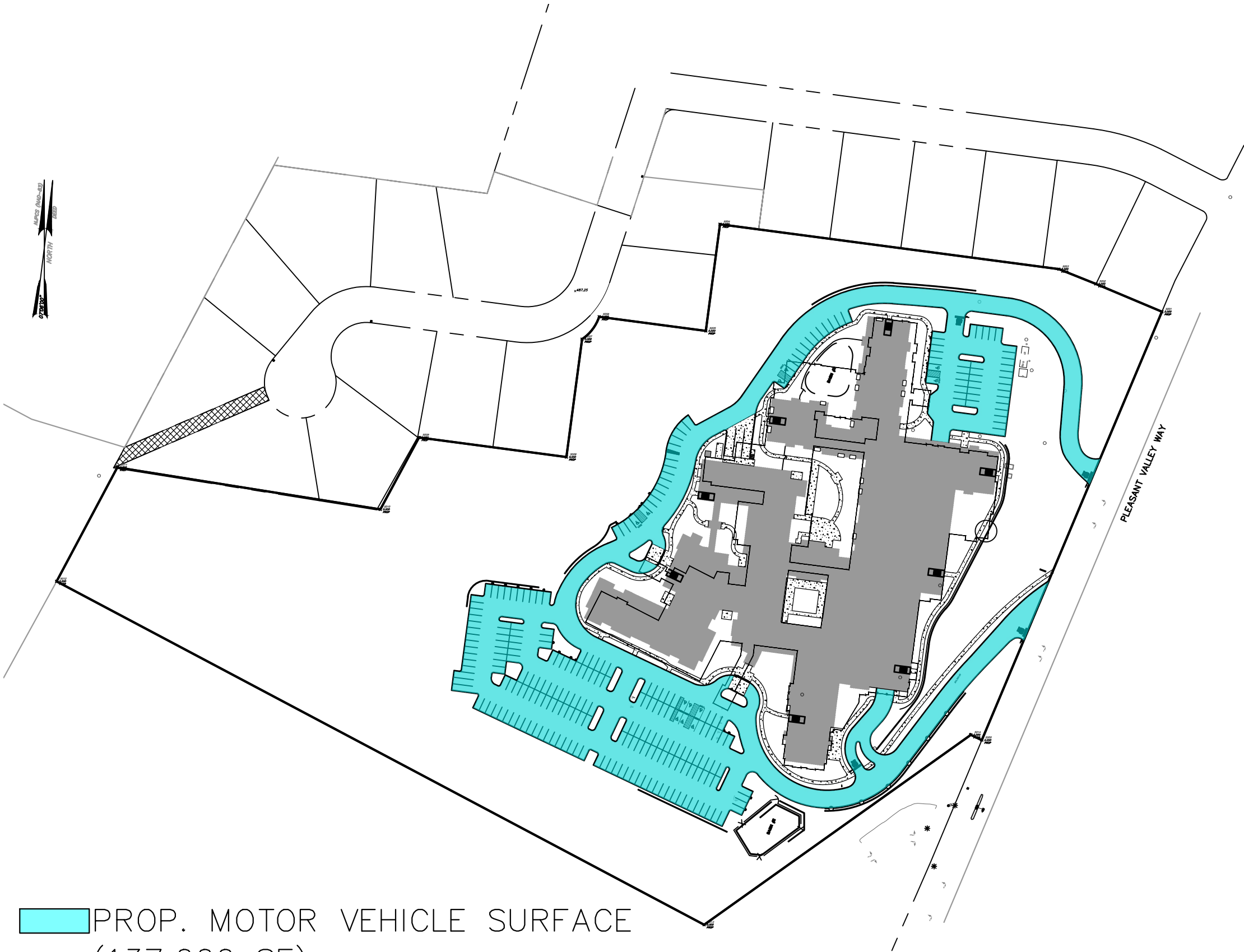
	Segment 1	Segment 2	Segment 3	
Cross Sectional Flow Area, a				
Wetted Perimeter, P_w				
Hydraulic Radius, r	-	-	-	
Channel Slope, s				
Manning's Roughness Description				
Manning's Roughness	-	-	-	
Velocity	-	-	-	
Flow Length				
T_t	-	-	-	0.00
				14.30



 EXIST. MOTOR VEHICLE SURFACE
(145,750 SF)

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PREPARED FOR DAUGHTERS OF ISRAEL 1155 PLEASANT VALLEY WAY BLOCK 171 LOT 12 TOWNSHIP OF WEST ORANGE ESSEX COUNTY, NEW JERSEY			
EXISTING CONDITIONS			
 DIVISION OF CONSUMER AFFAIRS LICENSE NUMBER JH403819800 100 PASADENA AVENUE • FAIRFIELD, NJ 07004 • NEW JERSEY • 07004 TEL. (973) 227-7004 FAX (973) 227-7074		Designer: J.M.P.	
		Draftsman: P.P.P.	
		Checked By: J.M.P.	
		Project No.: 19-265	
		Scale: 1" = 150'	
		Sheet: MV-1	



PROP. MOTOR VEHICLE SURFACE
(137,000 SF)

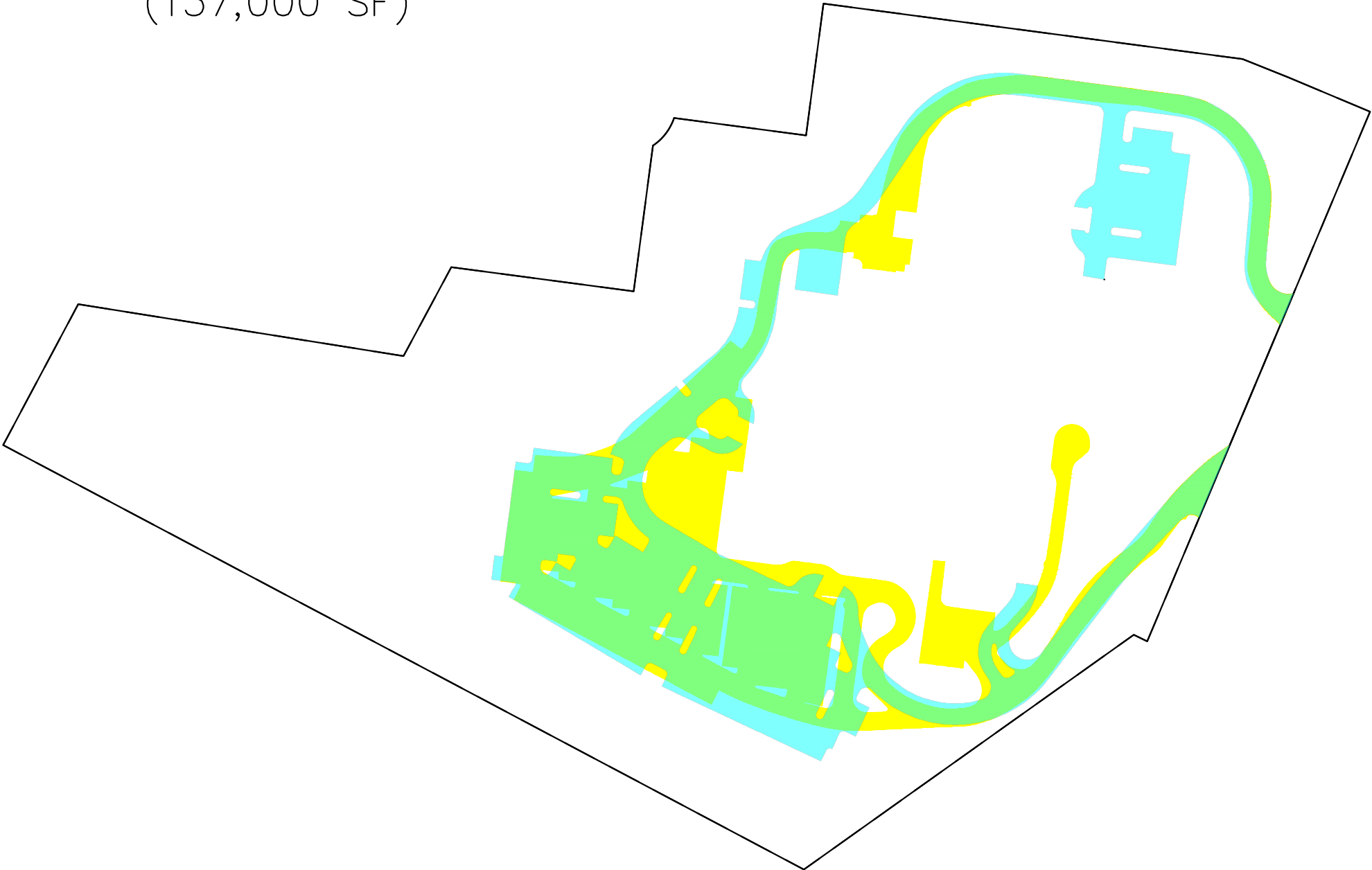
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			Draftsman: PPP
			Checked By: JMP
			Project No.: 19-265
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FIGURE:

EXIST. MOTOR VEHICLE SURFACE
(145,750 SF)

PROP. MOTOR VEHICLE SURFACE
(137,000 SF)



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			Draftsman: PPP
			Checked By: JMP
			Project No.: 19-265
			Scale: 1" = 150'
			Sheet: MV-3