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STORM WATER MANAGEMENT REPORT FOR PROPOSED ALTERATIONS TO CHASTAIN HORSE PARK ON ±15.50 ACRES OF PARK/RECREATIONAL LAND ON LAND LOTS #118 AND #138, 17th L.D., 4371 POWERS FERRY ROAD, ATLANTA, FULTON COUNTY, GEORGIA 30327

22 January 2020
Revised 26 July 2021
Revised 20 September 2021
Revised 10 March 2022
Revised 10 May 2023

Owner:

City of Atlanta
68 Mitchell Street SW, Suite1350
Atlanta GA 30303
Attention: Ms. Trisha Gross, Executive Director,
Chastain Horse Park
Tel: (206) 850-5686

Engineer:

J.J. van der Watt, P.E.

Professional Engineer's Certification
(To Be Included in the Hydrology Report)

Project Name:	Chastain Horse Park
Project Address:	4371 Powers Ferry Road, Atlanta, GA 30327
Hydrology Report Date:	10 March 2022

I, the undersigned, hereby attest to the accuracy of the information contained in the hydrology report prepared under my supervision after a thorough study of the site, and which, in my professional opinion, represents a true and accurate description of the storm water conditions for the site, both before and after the construction of the proposed development. The stormwater management system has been designed such that the discharge rates and volumes will provide the required runoff reduction, water quality, channel protection, overbank flooding protection, and extreme flooding protection as required by the City of Atlanta's Post-Development Stormwater Management Ordinance (Code Section 74, Article X).

Implementation of the Storm Water Management facilities for the proposed development, indicated in the report and in the plans, will not adversely impact upstream or downstream properties, adjacent properties, or existing drainage facilities.

Johan van der Watt P.E. #030867
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Signature

Revision Information

This fourth revision makes provision for the revision of the characteristics of some drainage areas resulting from the covering of the boarding arena with a roof and minor changes to the equipment barn.

General Information

The impact of the proposed alterations of the existing Chastain Horse Park facilities consisting of a new Boarding Barn, Therapeutic Horsemanship Center, Covered Arenas, Offices, Workshop, Equipment Barn, Residential Buildings and Hay/Shavings Storage Barns, and the relocation of a Covered Walker, as well as appurtenant infrastructure, on approximately 3.83 acres of land, being a portion of the approximately 15.50 acres of the entire horse park tract, located on Land Lots #118 and #138, 17th Land District, 4371 Powers Ferry Road, Atlanta, Georgia 30327 was analyzed by means of Hydraflow Hydrographs software. The Natural Resources Conservation Service (NRCS) Method was implemented for the sizing of the reconfigured detention pond and other runoff reduction best management practices, utilizing the Precipitation Data Curves for Atlanta to determine the peak storm water flow rates of the 1-, 2-, 5-, 10-, 25-, 50- and 100-year storms. A Type II Storm Distribution with a shape factor of 484 was used throughout. The Rational Method was implemented for the design flows of the pipe system, using the I-D-F Curves for Atlanta to determine the peak storm water flow rates of the 2-, 5-, 10-, 25-, 50- and 100-year storm events. The TR55 method was used throughout for the determination of the times of concentration, using a minimum time of concentration of 5 minutes.

There are three soil types present on the development site, namely Cecil Sandy Loam (CeC2) at 6 to 10% slopes, Rion Sandy Loam (ReD) at 10 to 15% slopes and Urban Land (Ub). Cecil and Rion are in the Hydrologic Soil Group B, while Urban Land is not rated, but with all the surrounding soils being in the Hydrologic Soil Group B, Urban Land is also considered as being in Group B for the purpose of this Hydrologic Analysis. The soil report is enclosed later in this report.

The proposed storm water management system has been analyzed and designed to comply with the requirements of, amongst others, Section 74-513. – Performance criteria for storm water management, which, amongst other, states that: "For redevelopment, the following performance criteria shall be applied to the area of the site impacted by the proposed work, provided that the impacted area does not exceed 35 percent of the previously developed area." The total area of the horse park tract is approximately 15.50 acres in extent, while the redevelopment area measures a total area of approximately 3.83 acres, which is ±25% of the entire tract. Whereas the proposed development area is less than 35% of the entire tract, the performance criteria for storm water management may be applied to only the redevelopment area impacted by the proposed improvements.

The following description of the existing and post-development conditions and summary of the hydrological analysis indicate that storm water flow rates from the development drainage area will be reduced by the proposed storm water management system for all storm frequencies, which confirms that the development will have no negative impact on any downstream properties.

Pre-development Conditions

The proposed redevelopment area is located on a fairly steep gradient sloping mostly from the northern corner of the tract to the southeastern corner. The entire tract is currently improved with several buildings, covered riding arenas, open riding arenas, barns, driveways, parking lots, a storm water management system and utilities infrastructure. A substantial portion of the tract is currently wooded, landscaped and grassed. The presence of existing roads and storm water drainage systems surrounding the horse park and the topographic characteristics of the tract prevents any offsite storm water from entering the site. The onsite drainage area is distinctly divided into three separate drainage areas by the topography and the existing onsite storm water drainage systems, as follows:

1. All the storm water from the large parking lot located on the northwestern portion of the tract, depicted as Area 1 on Sheet C15 of the drawings and measuring 1.91 acres, is conveyed by the curb and gutter in a southwestern direction off the property into the adjacent Powers Ferry right-of-way and is therefore currently not accommodated in the existing onsite storm water management system. This status quo will be maintained post-development, and this area is therefore excluded from the pre-development analysis of this hydrology study in its entirety.

2. The second identified onsite drainage area is depicted as Area 2 on Sheet C15 and measuring 6.43 acres, the storm water from which is collected in a piped system and conveyed into an existing onsite detention pond that discharges onto the surface of an existing service drive of the horse park property, and flows south farther downstream onto West Wieuca Road NW and into the storm water system of this street.

   The existing detention pond will be reconstructed as part of the proposed work and will cover a total area of approximately 0.40 acres of pervious area, of which 0.24 acres is included in the 6.43 acres of Area 2.

   The surface conditions of this drainage area consist of a total pervious area of 4.88 acres and a total impervious area of 1.55 acres, of which 0.09 acres will be demolished.

3. The remaining onsite drainage area is depicted as Area 3 on Sheet C15 and measures a total of 7.18 acres, the storm water from which currently mostly drains naturally as sheet flow in an eastern direction from the site onto the Elliott Galloway Way right-of-way and into the storm water system of this street. A portion of the storm water from the site is collected in piped systems, some conveyed offsite to an unknown destination east of the tract and other discharged on site and converted into sheet flow that also flows onto the Elliot Galloway Way right-of-way and into its storm water system.

   Keeping in mind that the performance criteria for storm water management may be applied to only the redevelopment area impacted by the proposed improvements, drainage Area 3, consisting of a total pervious area of 5.46 acres and a total impervious area of 1.72 acres, has been further subdivided into two drainage areas, i.e. Area 3A, the area outside of the redevelopment limits and Area 3B, the area inside of the redevelopment limits respectively. Area 3A consists of 3.19 acres of pervious surface area and 0.85 acres of impervious surface area, while Area 3B consists of 2.25 acres of pervious surface area and 0.87 acres of impervious

surface area. The entire 0.87 acres of impervious surface area of Area 3B will be demolished to provide room for the proposed redevelopment.

All the storm water from Area 2 and Area 3 is combined at the intersection of West Wieuca Road NW and Elliot Galloway Way from where it flows approximately 150 l.f. east to a low point in West Wieuca Road NW and then south across the Chastain Memorial Park Golf Course approximately 2,580 l.f. into Nancy Creek.

Post-development Conditions

The proposed development will cover approximately 3.83 acres (166,691 s.f.) and will consist of the demolition and removal or relocation of several barns, storage buildings, paved areas, fences, sidewalk, ramps, et cetera, a total impervious area of approximately 0.97 acres, and construction of a new Boarding Barn, Therapeutic Horsemanship Center, Covered Arenas, Offices, Workshop, Equipment Barn, Residential Buildings and Hay/Shavings Storage Barns, a total of approximately 1.35 acres (59,020 s.f.) of proposed impervious area. The proposed improvements will also include some gravel roadways and driveways, rubber paver walkways, several fenced sand paddocks, storm water pipelines and Best Management Practices, reconstructed detention pond and landscaped areas, all of which are pervious surfaces.

The three storm water drainage areas identified above will continue to exist with some adjustments, as follows:

1. The large parking lot located on the northwestern portion of the tract, depicted as Area 1 on Sheet C16 of the drawings and measuring 1.91 acres, will remain untouched and unchanged, and is therefore also excluded from the post-development part of this hydrology study in its entirety.

2. Onsite drainage Area 2, as depicted on Sheet C16, has been changed somewhat due to the reconfiguration of the boundary between drainage Area 2 and Area 3 as a result of the demolition of some existing facilities and the proposed construction of some new facilities, including the reconstruction of the detention pond. The post-development area of drainage Area 2 will measure 6.36 acres, the storm water from which will continue to be collected in the existing piped system and conveyed into the reconstructed onsite detention pond, which will continue discharging in the same manner as it currently does.

   The impervious surface area to be demolished from Area 2 is 0.09 acres, while the impervious area proposed to be added to Area 2 will consist of a portion of the Barn Manager Cottage and paved parking bays, a Picnic Pavilion and a parking bay for trucks and trailers, a combined total additional impervious area of 0.06 acres. The other proposed facilities in Area 2 consist of gravel driveways and segmental rubber pavements, sand paddocks and reconstruction of the detention pond, which are all pervious surfaces. The post-development surface conditions of this drainage area will therefore consist of a total pervious area of 4.82 acres and a total impervious area of 1.54 acres. The post-development pervious surface area in drainage Area 2 is 0.06 acres smaller than the pre-development pervious surface area, while the post-development impervious surface area is slightly smaller than the pre-development impervious surface area, and the flow

pattern and time of concentration of Area 2 are unchanged from pre-development to post-development conditions, which will result in a marginally reduced post-development total flow from Area 2 into the reconstructed detention pond, as depicted by the hydrographs later in this report.

The total redevelopment area in drainage Area 2 measures 0.62 acres, the surface areas of which are 0.56 acres of pervious and 0.06 acres of impervious surfaces respectively.

Although the permeable rubber pavement walkways proposed in drainage Area 2 are possible Best Management Practices for Runoff Reduction, the surface gradients of these proposed in Area 2 disqualify them from being utilized for this purpose and are therefore only considered as pervious surface areas in drainage Area 2, in favor of lower curve numbers than those of impervious surfaces.

3. The vast majority of the proposed redevelopment of the horse park facilities will be done on drainage Area 3 as depicted on Sheet C16. As a result of the reconfiguration of the boundary between drainage Area 2 and Area 3, as described above, the post-development area of drainage Area 3 will measure a total of 7.23 acres.

   Several existing barns, storage buildings and other small impervious areas will be demolished and removed and the covered walker will be relocated to a new location, the total area of which measures 0.88 acres of impervious drainage areas to be demolished and removed or relocated from Area 3. The impervious area proposed to be added to Area 3 will consist of a Boarding Barn, Therapeutic Horsemanship Center, Covered Arenas, Equipment Barn, Workshop, Temporary Living Apartment, Hay and Shavings Stores, Driveways and the Covered Walker to be relocated, and will have a combined total impervious area measuring 1.34 acres. As in the case of Area 2, the other proposed facilities in Area 3 also consist of segmental rubber pavements, sand paddocks and reconstruction of the detention pond, as well as gravel driveways, which are all pervious surfaces. The post-development surface conditions of drainage Area 3 will therefore consist of a total pervious area of 5.04 acres and a total impervious area of 2.19 acres.

   As stated earlier in this report, whereas the performance criteria for storm water management may be applied to only the redevelopment area impacted by the proposed improvements, drainage Area 3 has been further subdivided into drainage Area 3A and drainage Area 3B. In its post-development conditions, Area 3A will still consist of 3.19 acres of pervious surface area and 0.85 acres of impervious surface area, while Area 3B will consist of 1.85 acres of pervious surface area and 1.34 acres of impervious surface area.

   In spite of subdividing drainage Area 3 into drainage Area 3A and Area 3B and attempting to keep the storm water from Areas 3A and 3B apart, it was impossible to design the storm water drainage system in such a manner. The layout of the proposed storm water drainage system, consisting of roof gutters and downspouts, storm sewer pipes, catch basins, manholes, cleanouts, infiltration trenches, et cetera, was designed to accumulate as much as possible storm water from the development site and convey same into the infiltration trenches to comply with the Runoff Reduction requirements and the overflow from the infiltration trenches to the reconstructed detention pond to comply with the other storm water management requirements.

This practice resulted in a series of small drainage areas, draining to the individual storm water inlets, which are mostly located within the limits of the proposed development project area, but some that straddle the boundaries between the areas inside and outside of the limits of the redevelopment project area. Therefore, some storm water originating offsite of the redevelopment project area will also be accumulated and managed in the proposed storm water management system. These small drainage areas and the proposed storm water system are depicted on Sheets C16 and C5 respectively.

The storm water from a total drainage area of 3.37 acres located within the limits of drainage Area 3 will be accumulated in the storm water piped system and conveyed to the reconstructed detention pond, while the remaining 3.86 acres of drainage Area 3 will bypass the piped system and the detention pond, and will continue to drain as sheet flow in an eastern direction from the site onto the Elliott Galloway Way right-of-way and into the storm water system of this street. The small portion of the storm water from Area 3, located outside of the development area, that has to date been collected in piped systems and conveyed offsite to an unknown destination east of the tract, as well as the other storm water discharged on site and converted into sheet flow that flows onto the Elliot Galloway Way right of way and into its storm water system, will all continue to drain in this manner, as is currently the case.

As in the case of the pre-development conditions, all the storm water from Area 2 and Area 3 will continue to be combined at the intersection of West Wieuca Road NW and Elliot Galloway Way and will still flow approximately 150 l.f. east to a low point in West Wieuca Road NW and then south across the Chastain Memorial Park Golf Course approximately 2,580 l.f. into Nancy Creek, as is currently the case.

Storm Water Management

The storm water management system has been designed in accordance with the requirements of Sec. 74-513. – Performance criteria for storm water management of Chapter 74, Article X of the City of Atlanta Code of Ordinances and the Georgia Storm Water Management Manual in conjunction with the Coastal Storm Water Supplement.

Curve Numbers

The applicable Curve Numbers for the different surface conditions are as follows (Table 3.1.5-1 Runoff Curve Numbers of Georgia Storm Water Management Manual 2016 Edition):

Hydrological Soil Group	B
Open Spaces and Parks (good condition, grass cover > 75%)	61
Wood or Forest Land (thin stand, poor cover)	66
Residential District (½ to 1 Acre lot size)	69
Impervious Areas (Buildings, Paved Areas)	98

Manning's n-values for the different surface conditions are as follows (Table 3.1.5-2 of Georgia Storm Water Management Manual 2016 Edition):

- Smooth Surfaces n = 0.011
- Short Grass n = 0.15
- Woods (Light underbrush) n = 0.40

Storm water flow from the drainage areas of the development mentioned above will be accumulated and conveyed to the proposed reconstructed detention pond in the manner mentioned above. The proposed Best Management Practices and reconfigured detention pond will provide adequate storage capacity to comply with all the City of Atlanta Requirements regarding Storm Water Management.

Section 74-513 (a): Storm Water Runoff Reduction

It is the intention to reduce the runoff from the proposed redevelopment area of the site utilizing Infiltration Practices, as described below.

In terms of the Georgia Storm Water Management Manual 2016 Edition, Chapter 4. Storm Water Best Management Practices and Section 5.2 of the Coastal Storm Water Supplement, the total Runoff Reduction Target Volume for the entire proposed redevelopment area is

RR_v = P x R_v x A/12 in cu.ft.,
where P = Target Runoff Reduction Rainfall (inches),
R_v = (0.05 + 0.009 x I) (volumetric runoff coefficient),
I = Percentage of impervious area of the contributing drainage area (%),
and
A = Area of the Redevelopment Site (sq.ft.).

The values for the Best Management Practices listed above are as follows:

Target Runoff Reduction Rainfall, P	= 1.0 inch
Total Area of the Redevelopment Site, A	= 166,691 sq.ft.
Total Impervious Area of Redevelopment	= 59,020 sq.ft.
Percentage impervious area, I	= 35.4%
Volumetric runoff coefficient, R_v	= (0.05 + 0.009 x I) = (0.05 + 0.009 x 35.4) = 0.37
Runoff Reduction Target Volume, RR_v	= P x R_v x A/12
	= 1.0 x 0.37 x 166,691/12
	= 5,140 cu.ft.

The total Runoff Reduction Target Volume will be provided in three separate infiltration trenches located in strategic locations on the site, as shown on Sheet C5, enabling the collection and conveyance of as much as possible storm water into the infiltration trenches with overflows discharging into the piped system leading to the detention pond, the capacities of which are tabulated below. Due to the topographic and spatial limitations of the development site allowing very little space for the trenches, we propose covering the infiltration trenches with a geotextile layer, 18 inches of topsoil and grass sods over the stone in trench #1, and a geotextile layer and 24 inches of sand in trenches #2 and #3 in the area of the sand paddocks.

Infiltration Trench Storage Capacities

Trench #	Length (ft)	Width (ft)	Invert Elevation (ft)	Depth of Stone (ft)	Volume of Stone (cu.ft.)	Porosity of Stone (%)	RRv = Volume of Voids (cu.ft.)
1	45	20	885.0	5.00	4,500	40	1,800
2	45	36	911.5	3.33	5,395	40	2,158
3	30	30	909.0	3.33	2,997	40	1,199
Total Volume of Runoff Reduction Volume RRv provided							4,157

Section 74-513 (b): Water Quality Protection

In terms of this section of the ordinance, "it will be presumed that a storm water management system complies with this requirement if it satisfies the storm water runoff reduction criteria in Section 74-513(a)", which is the case and therefore no additional Water Quality Protection measures are proposed for the proposed redevelopment.

Section 74-513 (c): Stream Channel Protection

In terms of this section of the ordinance the Channel Protection Volume is equal to the runoff generated by the 1-year, 24-hour rainfall event, which has been determined by means of the NRCS Hydrograph Method using Hydraflow Hydrographs software, described above.

The Channel Protection Volume is 13,433 cu. ft. (see 1-year 24-hour Hydrograph #41 later in this report), which capacity will be provided in the reconstructed detention pond at a total water depth of 2.98' above the invert elevation of the pond outlet control structure, derived from the proposed pond geometry.

The Channel Protection Volume will be discharged from the pond over a period of 24 hours, which implies an average flow rate of Q = 13,433/(24 x 3,600) = 0.155 c.f.s. Using the orifice equation $Q = CA(2gh)^{0.5}$ with C = 0.60, an orifice diameter of 2.22 inches and an estimated average water depth h = (2.98 - 0.5 x 2.22/12)/2 = 1.444', the orifice area is calculated as A = 0.0269 s.f., which represents an orifice diameter of d = 2.22 inches, which is equal to the initially selected diameter.

Section 74-513 (d): Overbank Flooding Protection

In terms of this section of the ordinance, the Overbank Flooding Protection criterion specifies that the post-development discharge rates up to the 25-year, 24-hour storm peak discharge rate be reduced by the following formula:

Peak Discharge Rate Reduction PDRR (%) = Pre-development Impervious Cover PIC (%)/2.

The percentage PDRR for the redevelopment is calculated as follows:

Total Area of the Redevelopment Site, A	= 166,691 sq.ft.
Total Pre-development Impervious Cover	= 38,059 sq.ft.
PIC (%)	= 38,059/166,691x100
	= 22.83%
PDRR (%)	= 22.83%/2
	= 11.42%

The pre-development peak discharge flow rates from the redevelopment area are depicted by hydrograph #3 further back in this report and listed in the table below, together with the required quantitative Peak Discharge Rate Reductions that would have to be provided in the detention pond for the various return periods, as follows:

Required Peak Discharge Rate Reductions

Return Period (years)	Pre-development Peak Flow Rate (c.f.s.)	Required PDRR (%)	Required PDRR (c.f.s.)
1	5.08	11.42	0.58
2	6.45	11.42	0.74
5	8.94	11.42	1.02
10	11.24	11.42	1.28
25	14.80	11.42	1.69

It is shown in the table below that the actual Peak Discharge Rate Reduction rates provided by the reconstructed detention pond substantially exceed those required by this section of the ordinance.

Section 74-513 (e): Extreme Flooding Protection

In terms of this section of the ordinance, the Extreme Flooding Protection criterion specifies that extreme flood and public safety protection shall be provided by attenuating and safely conveying the 100-year, 24-hour return frequency storm event without any increase in peak discharge rate, such that flooding is not exacerbated.

Further to this requirement the reconfigured detention pond and outlet control structure have been designed such that the post-development 100-year, 24-hour storm peak discharge rate will be lower than the pre-development discharge rate, and will be able to safely pass through the storm water drainage system.

Reconstruction of Existing Detention Pond

Whereas it is practically impossible to manage the detention of the various drainage areas on either side of the onsite watershed and those inside and outside of the redevelopment area separately, the

design of the reconfigured detention pond was done to manage all the combined storm water from the entire site, irrespective of whether or not it is part of the redevelopment area.

The respective pre-development and post-development 1-, 2-, 5-, 10-, 25-, 50- and 100-year flow rates from the entire onsite drainage areas are summarized in the table below.

Flow Rates Summary Table.

Return Period (Years)	Pre-development Peak Flow from Entire Site (c.f.s.)	Post-development Peak Flow into Detention Pond (c.f.s.)	Post-development Peak Flow Bypassing Detention Pond (c.f.s.)	Detention Pond Storage Volume used (cu.ft.)	Post-development Peak Flow from Entire Site (c.f.s.)	Peak Discharge Rate Reduction from Entire Site (c.f.s.)	Post-development Peak Flow from Entire Site as Percentage of Pre-development Flow (%)
1	12.11	8.59	7.36	16,662	7.46	4.65	62
2	15.55	10.93	9.25	19,592	9.38	6.17	60
5	21.56	15.51	12.72	26,142	12.88	8.68	60
10	27.13	19.68	15.93	30,025	16.11	11.02	59
25	35.94	25.88	20.88	31,207	21.19	14.75	59
50	47.23	31.04	25.05	31,914	26.74	20.49	57
100	57.83	36.91	29.53	33,063	36.48	21.35	63

The calculations and table above show that the storm water management system and post-development flow rates from the entire site will comply with all the sizing and other criteria listed above.

Section 74-511 (c) (9): Post-development downstream analysis

In terms of this section of the ordinance, a downstream peak flow analysis which includes the assumptions, results and supporting calculations to show safe passage of post-development design flows downstream, has to be done in accordance with the Ten-Percent Rule as described in Clause 3.1.9.2. of the Georgia Storm Water Management Manual.

Determination of the total drainage area of the zone of influence:

Drainage area controlled by detention pond = 9.27 acres
Drainage area of zone of influence = 10 x 9.27 acres
= 92.7 acres

Four individual storm water drainage areas as depicted on Sheet C17 were delineated for the purpose of the downstream analysis, i.e. the respective drainage areas draining into the detention pond, draining to Point A (the first junction), draining to the 10% Point and draining to Point B (the second junction, with the 10% Point located between Points A and B.

The pre-development and post-development flow rates at Points A and B for the 25-year return period were analyzed and are listed in the table below, which shows that the post-development peak flows are lower than pre-development peak flows at both these junction points. This shows that there will also be no increase in flow at the 10% point, which is located between Points A and B,

which confirms that the proposed development will not have a detrimental effect on downstream areas.

Downstream Analysis Flow Rates Summary Table.

Peak Flow Rate (c.f.s.)		
Location	Point A	Point B
Pre-development	140.66	220.53
Post-development	120.34	208.30

Hydrological Calculations

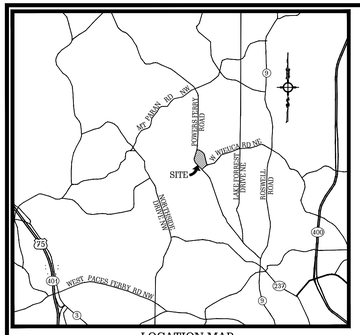
It is reiterated that all hydrological calculations were done using Hydraflow Hydrographs software, and are presented in the report following this page. The I-D-F curves for Atlanta were used for the analysis.

Hydraulic Calculations

The Runoff Coefficients used in the Rational Method for the determination of the pipe flows for the different surface conditions are as follows (Table 3.1.4-2 of Georgia Storm Water Management Manual 2016 Edition):

Surface Condition	Runoff Coefficient
Unimproved Areas (Forest)	0.15
Lawns (Sandy Soil, Average Slopes)	0.15
Impervious Areas	0.95

Manning's n-values for the different surface conditions are given earlier in this report.



LOCATION MAP
NOT TO SCALE

PROJECT NARRATIVE

1. THE PROPOSED DEVELOPMENT IS LOCATED IN THE CITY OF ATLANTA, FULTON COUNTY, GEORGIA 30327 AND IS SURROUNDED BY RESIDENTIAL AND RECREATIONAL LAND.

2. PROJECT AREA: ±15.497 ACRES; DISTURBED AREA: ±5.0 ACRES.

3. PROPERTY IS LOCATED IN LAND LOTS #118 AND #138, 17TH I.D., 4371 POWERS FERRY ROAD, ATLANTA, FULTON COUNTY, GA 30327. LATITUDE: 33.8742° N; LONGITUDE: 84.3958° W.

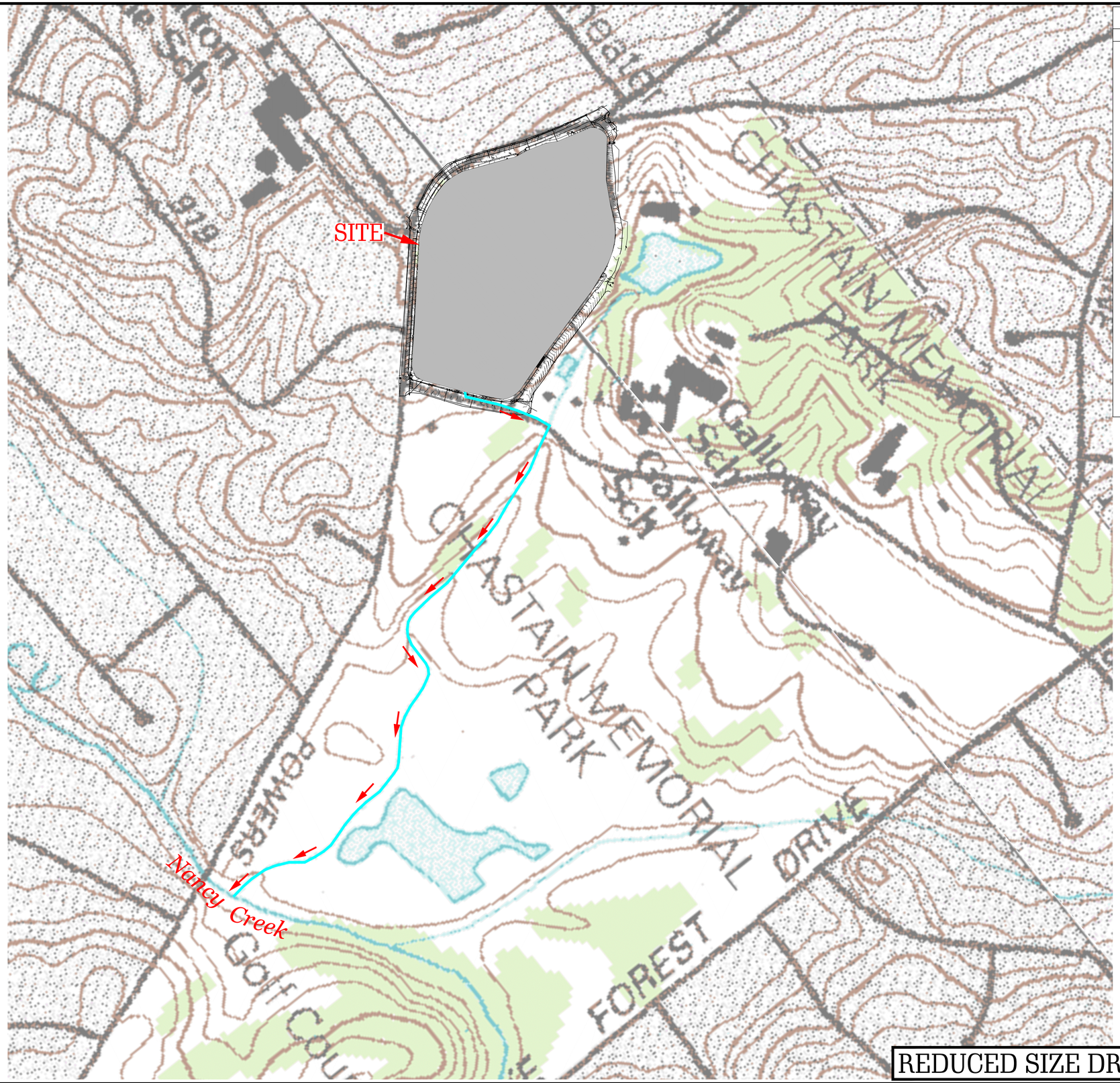
4. CURRENT PROPERTY USE: HORSE PARK

5. CURRENT ZONING: R-3 RESIDENTIAL - SINGLE FAMILY

6. BUILDING SETBACK LINES:
   FRONT = 50' FROM PROPERTY LINE,
   REAR = 20' FROM PROPERTY LINE,
   SIDE = 10' FROM PROPERTY LINE.

7. PROJECT OWNER/24 HOUR CONTACT:
   OWNER:
   THE BOARD OF DIRECTORS
   CHASTAIN HORSE PARK
   4371 POWERS FERRY ROAD
   ATLANTA, GA 30327
   24 HOUR CONTACT:
   STEIN EQUESTRIAN LLC
   ATTN: MR. JOHN STEIN
   TEL : (770) 262-8723

GRAPHIC SCALE
0 200 400
SCALE: 1" = 200'



LEGEND

EXISTING		PROPOSED	
C.M.S.	- CONCRETE MONUMENT SET		
P.I.P.	- IRON PIN PLACED		
C.M.F.	- CONCRETE MONUMENT FOUND		
I.P.F.	- IRON PIN FOUND		
G.P.F.	- GALVANIZED PIPE FOUND		
—W—	- EXISTING WATER MAIN	—W—	- PROPOSED WATER MAIN
	- EXISTING FIRE HYDRANT		- PROPOSED FIRE HYDRANT
W	- EXISTING WATER VALVE	W	- PROPOSED WATER VALVE
	- EXISTING WATER METER		- PROPOSED WATER METER
— SS —	- EXISTING SANITARY SEWER	— SS —	- PROPOSED SANITARY SEWER
S	- EXISTING SANITARY SEWER MANHOLE	S	- PROPOSED SANITARY SEWER MANHOLE
	- EXISTING CONCRETE PIPE		- PROPOSED CONCRETE PIPE
ST	- EXISTING STORM SEWER MANHOLE	ST	- PROPOSED STORM SEWER MANHOLE
	- EXISTING POWER POLE (P.P.)		- PROPOSED POWER POLE (P.P.)
—OHP—	- EXISTING OVER HEAD POWER	—OHP—	- PROPOSED OVER HEAD POWER
—UGP—	- EXISTING UNDERGROUND POWER	—UGP—	- PROPOSED UNDERGROUND POWER
—UGT—	- EXISTING TELEPHONE LINE BURIED UNDER GROUND	—UGT—	- PROPOSED TELEPHONE LINE BURIED UNDER GROUND
—CTV—	- EXISTING CABLE	—CTV—	- PROPOSED CABLE
—100—	- EXISTING CONTOUR	—101—	- PROPOSED CONTOUR
	- EXISTING TREE		- PROPOSED TREE
	- SOILS LINES		
	- 100-YR FLOODPLAIN BOUNDARY		
	- EXISTING ITEMS TO BE DEMOLISHED		
	- EXISTING FLARED END SECTION		- PROPOSED FLARED END SECTION
R/W	- EXISTING RIGHT OF WAY	R/W	- PROPOSED RIGHT OF WAY
	- EXISTING LOT BOUNDARY CORNER		- PROPOSED LOT BOUNDARY CORNER
—o—o—	- EXISTING FENCE	—o—o—	- PROPOSED FENCE
C/L	- EXISTING CENTERLINE	C/L	- CENTERLINE
		—X—	- SILT FENCE
			- RIP-RAP

VDWE
VAN DER WATT ENGINEERING, LLC
CONSULTING CIVIL ENGINEERS
84 BENT OAK CIRCLE,
THOMASVILLE, GA 31757-9502
TEL: (229) 551-0363
FAX: (229) 227-6593
E-MAIL: JJ@VDWENGINEERS.COM
CERT. OF AUTH. GA # PEF004845

PROJECT:
PROPOSED ALTERATIONS
TO CHASTAIN PARK
EQUESTRIAN PARK
4371 POWERS FERRY ROAD
ATLANTA, GA 30327

CLIENT:
CHASTAIN PARK
ATLANTA, GA

DRAWING TITLE:
RECEIVING
WATERS

PROJ. No.:	19-003	DRAWN BY:	jj
DWG NAME:	PRE AND POST DEVELOPMENT AREAS.dwg	CHECKED BY:	jj
SCALE:	NO SCALE	DATE:	26 JUL 2021

REVISIONS

NO.	DATE	INITIALS	DESCRIPTION

RELEASED FOR CONSTRUCTION

SHEET NO.
C18

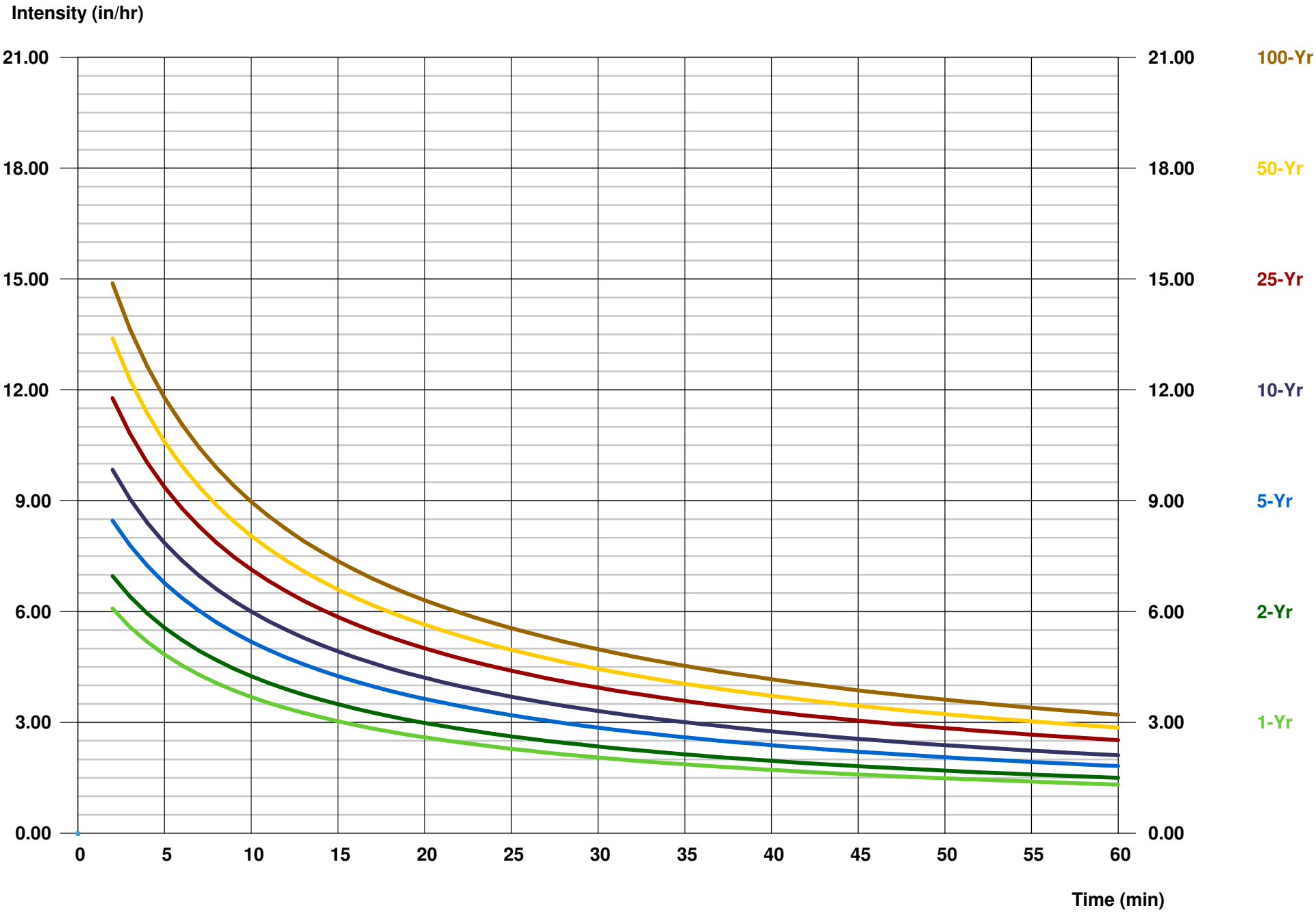
GEORGIA REGISTERED No. 030867 PROFESSIONAL ENGINEER JOHAN VAN DER WATT

GEORGIA 811 Utilities Protection Center, Inc.
Know what's below. Call before you dig.

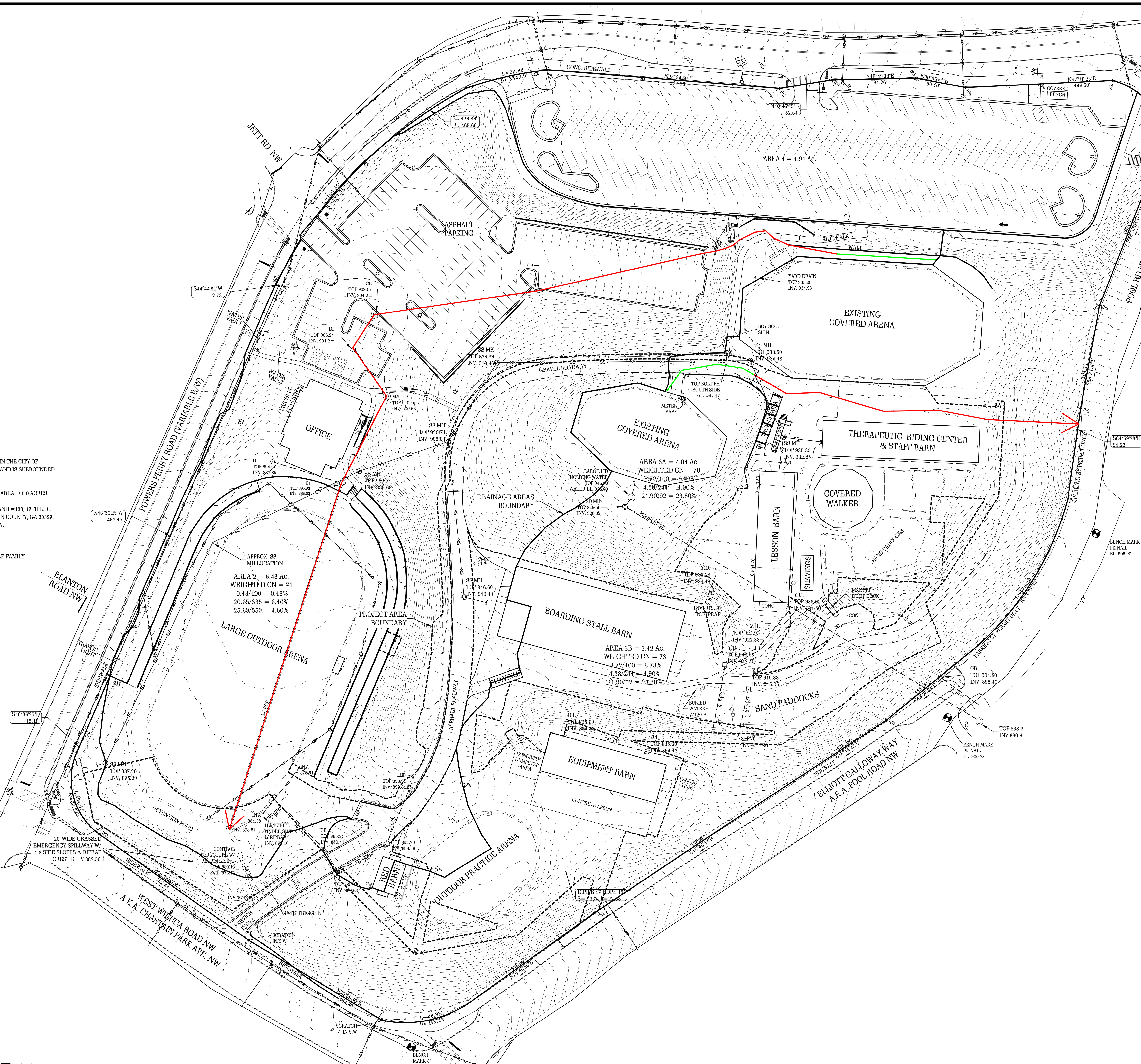
REDUCED SIZE DRAWING

Hydraflow IDF Curves

IDF file: Atlanta CHP.idf



PRE-DEVELOPED

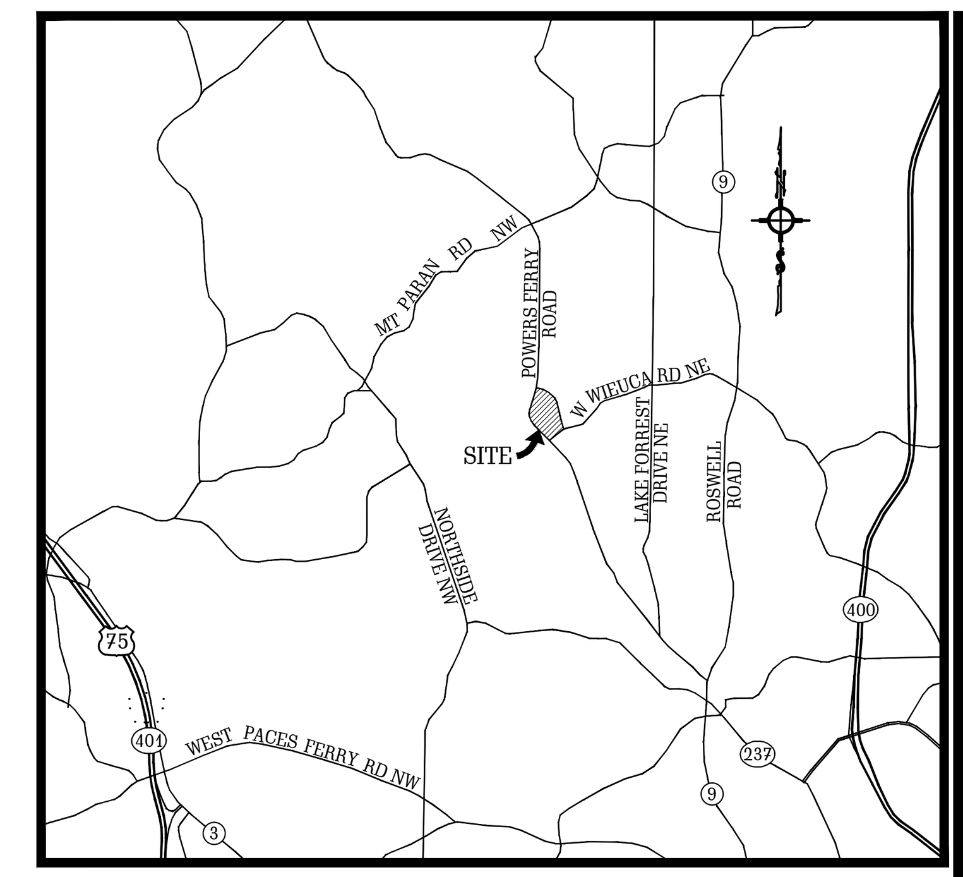


PROJECT NARRATIVE

1. THE PROPOSED DEVELOPMENT IS LOCATED IN THE CITY OF ATLANTA, FULTON COUNTY, GEORGIA 30327 AND IS SURROUNDED BY RESIDENTIAL AND RECREATIONAL LAND.
2. PROJECT AREA: ±15.497 ACRES; DISTURBED AREA: ±5.0 ACRES.
3. PROPERTY IS LOCATED IN LAND LOTS #118 AND #138, 17TH L.D., 4371 POWERS FERRY ROAD, ATLANTA, FULTON COUNTY, GA 30327. LATITUDE: 33.8742° N; LONGITUDE: 84.3958° W.
4. CURRENT PROPERTY USE: HORSE PARK
5. CURRENT ZONING: R-3 RESIDENTIAL - SINGLE FAMILY
6. BUILDING SETBACK LINES:
   FRONT = 50' FROM PROPERTY LINE,
   REAR = 20' FROM PROPERTY LINE,
   SIDE = 10' FROM PROPERTY LINE.
7. PROJECT OWNER/24 HOUR CONTACT:
   OWNER:
   THE BOARD OF DIRECTORS
   CHASTAIN HORSE PARK
   4371 POWERS FERRY ROAD
   ATLANTA, GA 30327
   24 HOUR CONTACT:
   STEIN EQUESTRIAN LLC
   ATTN: MR. JOHN STEIN
   TEL : (770) 262-8723

LEGEND

EXISTING		PROPOSED	
C.M.S.	- CONCRETE MONUMENT SET		
P.I.P.	- IRON PIN PLACED		
C.M.F.	- CONCRETE MONUMENT FOUND		
I.P.F.	- IRON PIN FOUND		
G.P.F.	- GALVANIZED PIPE FOUND		
—W—	- EXISTING WATER MAIN	—W—	- PROPOSED WATER MAIN
	- EXISTING FIRE HYDRANT		- PROPOSED FIRE HYDRANT
WV	- EXISTING WATER VALVE	WV	- PROPOSED WATER VALVE
	- EXISTING WATER METER		- PROPOSED WATER METER
— SS —	- EXISTING SANITARY SEWER	— SS —	- PROPOSED SANITARY SEWER
(S)	- EXISTING SANITARY SEWER MANHOLE	(S)	- PROPOSED SANITARY SEWER MANHOLE
	- EXISTING CONCRETE PIPE		- PROPOSED CONCRETE PIPE
(ST)	- EXISTING STORM SEWER MANHOLE	(ST)	- PROPOSED STORM SEWER MANHOLE
	- EXISTING POWER POLE (P.P.)		- PROPOSED POWER POLE (P.P.)
—OHP—	- EXISTING OVER HEAD POWER	—OHP—	- PROPOSED OVER HEAD POWER
—UGP—	- EXISTING UNDERGROUND POWER	—UGP—	- PROPOSED UNDERGROUND POWER
—UGT—	- EXISTING TELEPHONE LINE BURIED UNDER GROUND	—UGT—	- PROPOSED TELEPHONE LINE BURIED UNDER GROUND
—CTV—	- EXISTING CABLE	—CTV—	- PROPOSED CABLE
– –100– –	- EXISTING CONTOUR	—101—	- PROPOSED CONTOUR
	- EXISTING TREE		- PROPOSED TREE
	- SOILS LINES		
	- 100-YR FLOODPLAIN BOUNDARY		
	- EXISTING ITEMS TO BE DEMOLISHED		
	- EXISTING FLARED END SECTION		- PROPOSED FLARED END SECTION
R/W	- EXISTING RIGHT OF WAY	R/W	- PROPOSED RIGHT OF WAY
○	- EXISTING LOT BOUNDARY CORNER	○	- PROPOSED LOT BOUNDARY CORNER
	- EXISTING FENCE		- PROPOSED FENCE
C/L	- EXISTING CENTERLINE	C/L	- CENTERLINE
		—X—	- SILT FENCE
			- RIP-RAP



LOCATION MAP
NOT TO SCALE

VDWE
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PROJECT:
PROPOSED ALTERATIONS TO CHASTAIN PARK EQUESTRIAN PARK
4371 POWERS FERRY ROAD
ATLANTA, GA 30327

CLIENT:
CHASTAIN PARK
ATLANTA, GA

DRAWING TITLE:
PRE-DEVELOPMENT DRAINAGE AREAS

PROJ. No.:	19-003	DRAWN BY:	jj
DWG NAME:	PRE AND POST DEVELOPMENT AREAS.dwg	CHECKED BY:	jj
SCALE:	NO SCALE	DATE:	26 JUL 2021

REVISIONS

NO.	DATE	INITIALS	DESCRIPTION

RELEASED FOR CONSTRUCTION

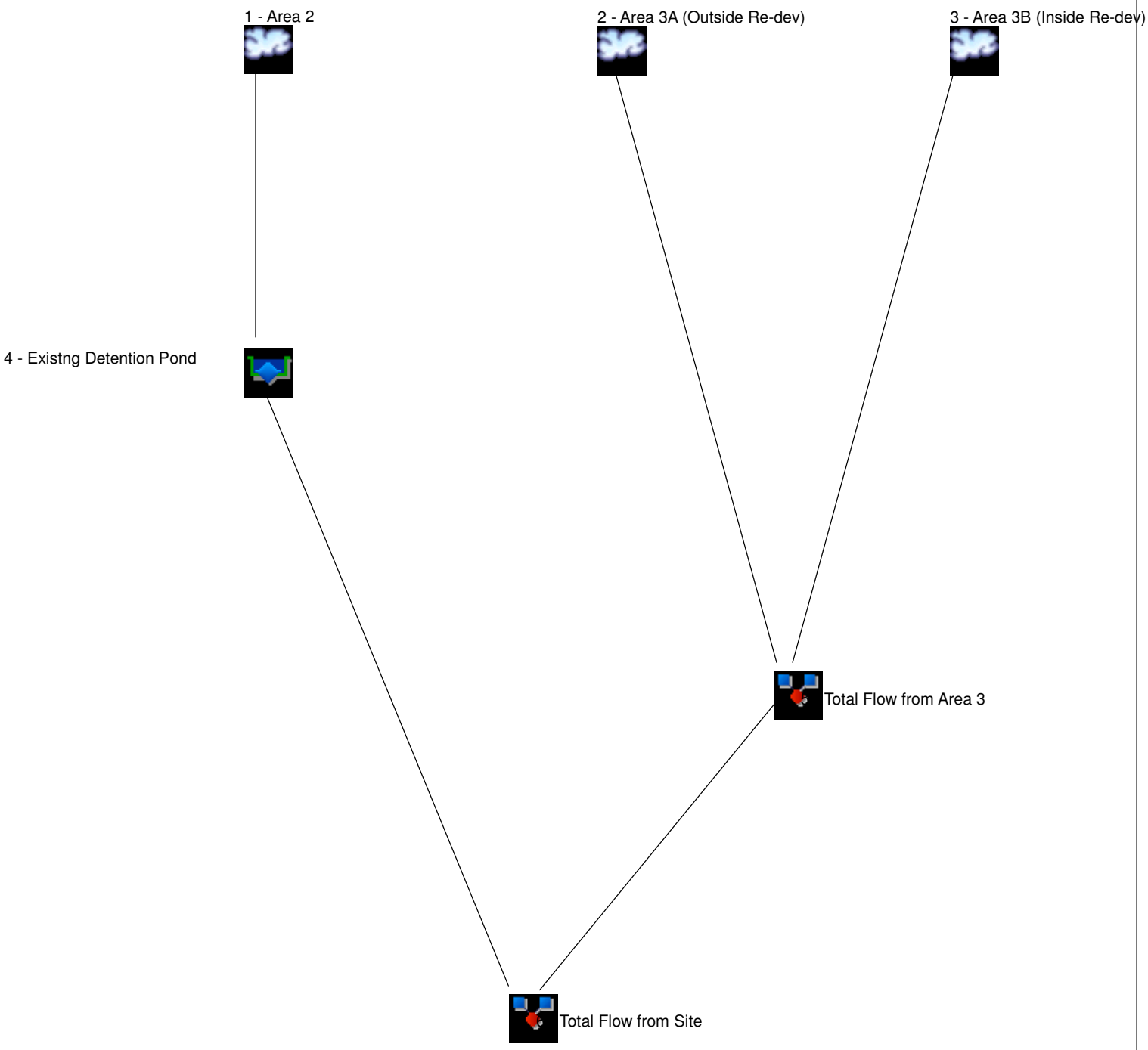
SHEET NO.
C15

GEORGIA REGISTERED No. 030867 PROFESSIONAL ENGINEER JOHAN VAN DER WATT

REDUCED SIZE DRAWING

Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066



Legend

Hyd.	Origin	Description
1	SCS Runoff	Area 2
2	SCS Runoff	Area 3A (Outside Re-dev)
3	SCS Runoff	Area 3B (Inside Re-dev)
4	Reservoir	Existng Detention Pond
5	Combine	Total Flow from Area 3
6	Combine	Total Flow from Site

Hydrograph Return Period Recap

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	------	4.590	6.042	-------	8.739	11.28	15.17	18.43	21.98	Area 2
2	SCS Runoff	------	5.453	7.101	-------	10.14	12.99	17.34	21.08	25.11	Area 3A (Outside Re-dev)
3	SCS Runoff	------	5.081	6.445	-------	8.933	11.23	14.80	17.76	20.95	Area 3B (Inside Re-dev)
4	Reservoir	1	3.411	5.553	-------	8.638	11.20	15.13	18.42	21.96	Existng Detention Pond
5	Combine	2, 3,	10.53	13.55	-------	19.08	24.23	32.14	38.84	46.06	Total Flow from Area 3
6	Combine	4, 5	12.11	15.55	-------	21.56	27.13	35.94	47.23	57.83	Total Flow from Site

Hydrograph Report

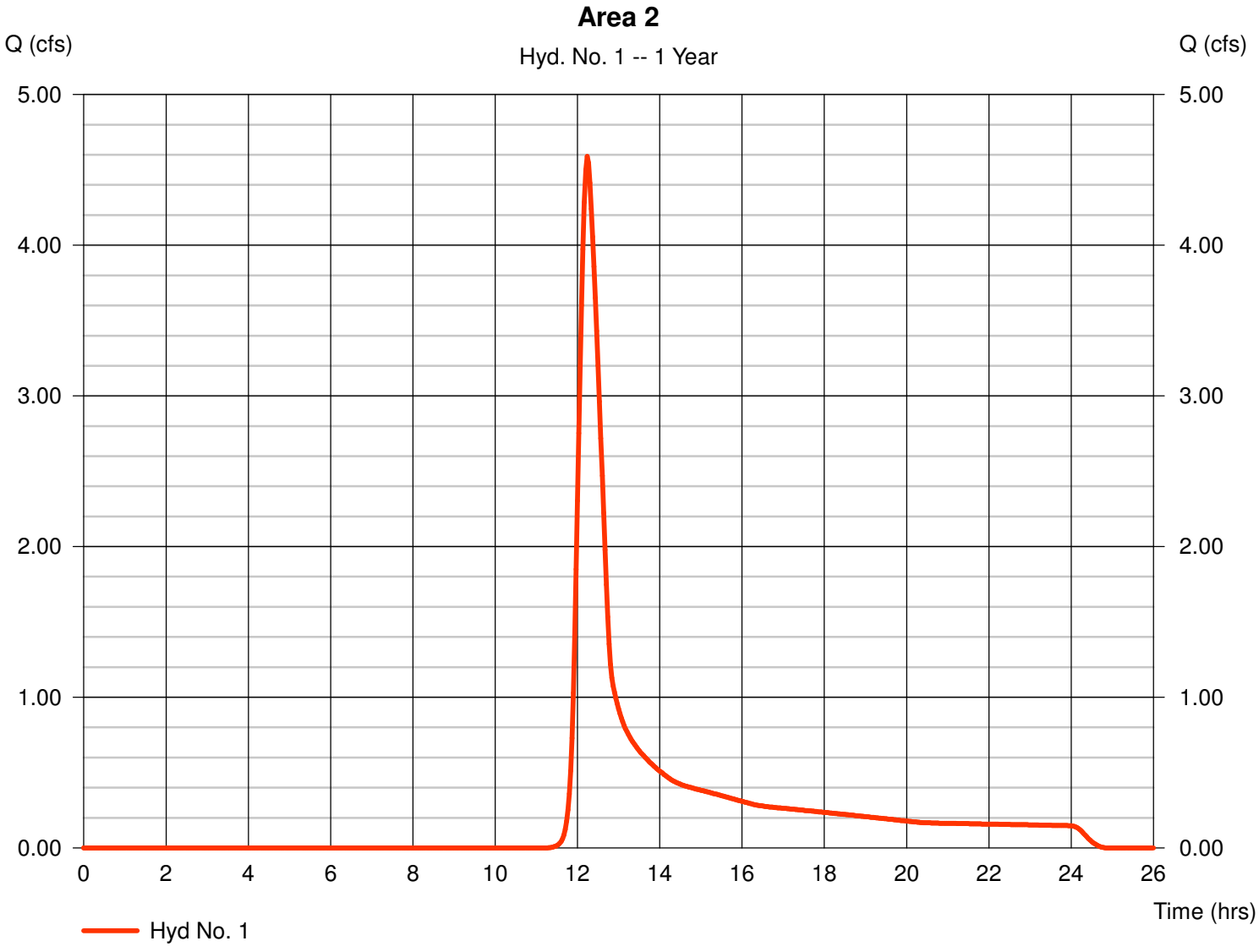
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 1

Area 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.590 cfs
Storm frequency	=	1 yrs	Time to peak	=	12.23 hrs
Time interval	=	2 min	Hyd. volume	=	22,042 cuft
Drainage area	=	6.430 ac	Curve number	=	71*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	31.00 min
Total precip.	=	3.29 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(3.230 x 61) + (1.650 x 66) + (1.550 x 98)] / 6.430



TR55 Tc Worksheet

Hyd. No. 1

Area 2

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.150		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.69		0.00		0.00		
Land slope (%)	=	0.13		0.00		0.00		
Travel Time (min)	**=**	**27.23**	**+**	**0.00**	**+**	**0.00**	**=**	**27.23**
Shallow Concentrated Flow								
Flow length (ft)	=	142.00		335.00		559.00		
Watercourse slope (%)	=	8.12		6.16		4.60		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (ft/s)	=	4.60		5.05		4.36		
Travel Time (min)	**=**	**0.51**	**+**	**1.11**	**+**	**2.14**	**=**	**3.76**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 31.00 min

Hydrograph Report

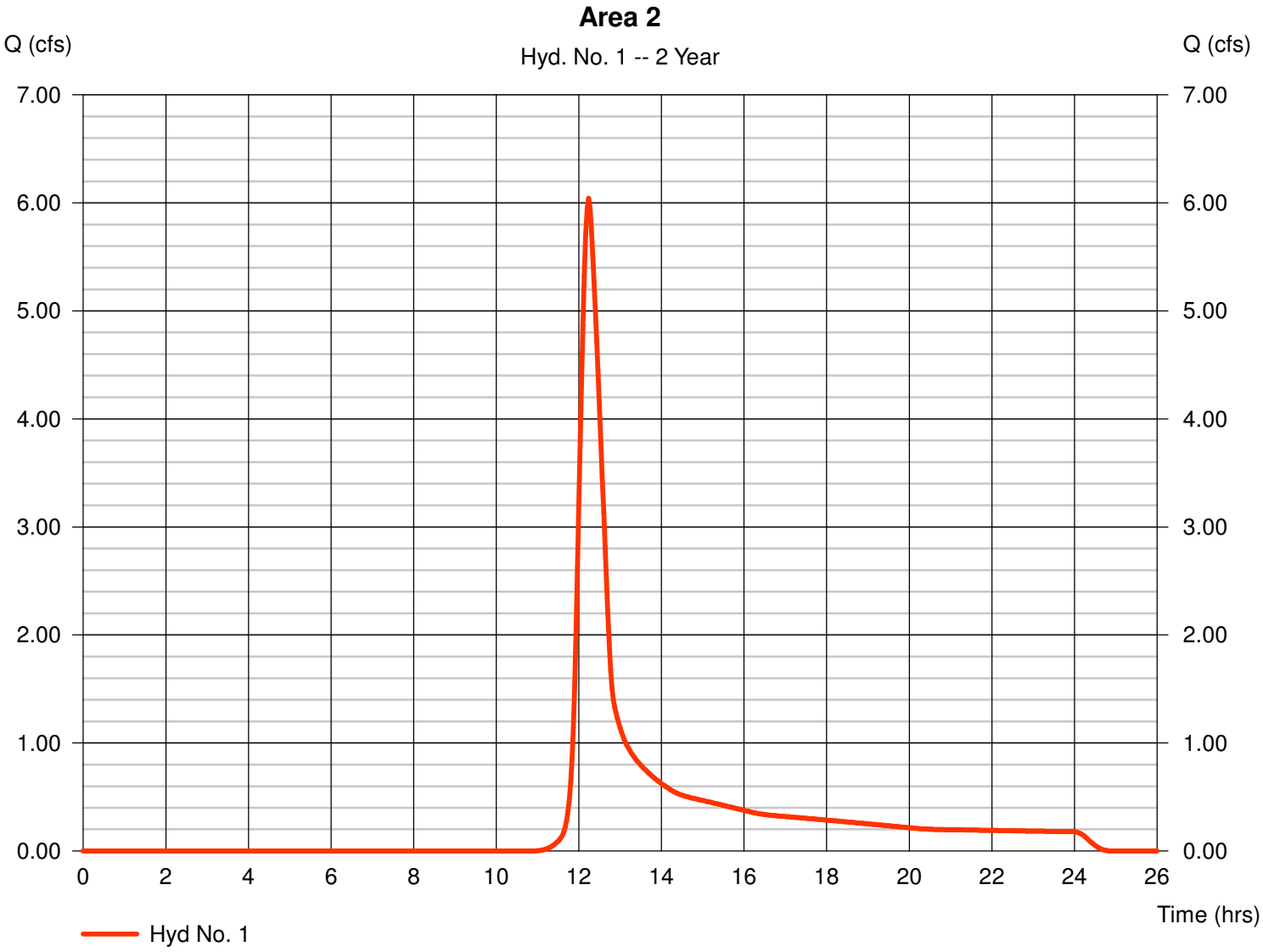
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 1

Area 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	6.042 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.23 hrs
Time interval	=	2 min	Hyd. volume	=	28,038 cuft
Drainage area	=	6.430 ac	Curve number	=	71*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	31.00 min
Total precip.	=	3.69 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(3.230 x 61) + (1.650 x 66) + (1.550 x 98)] / 6.430



Hydrograph Report

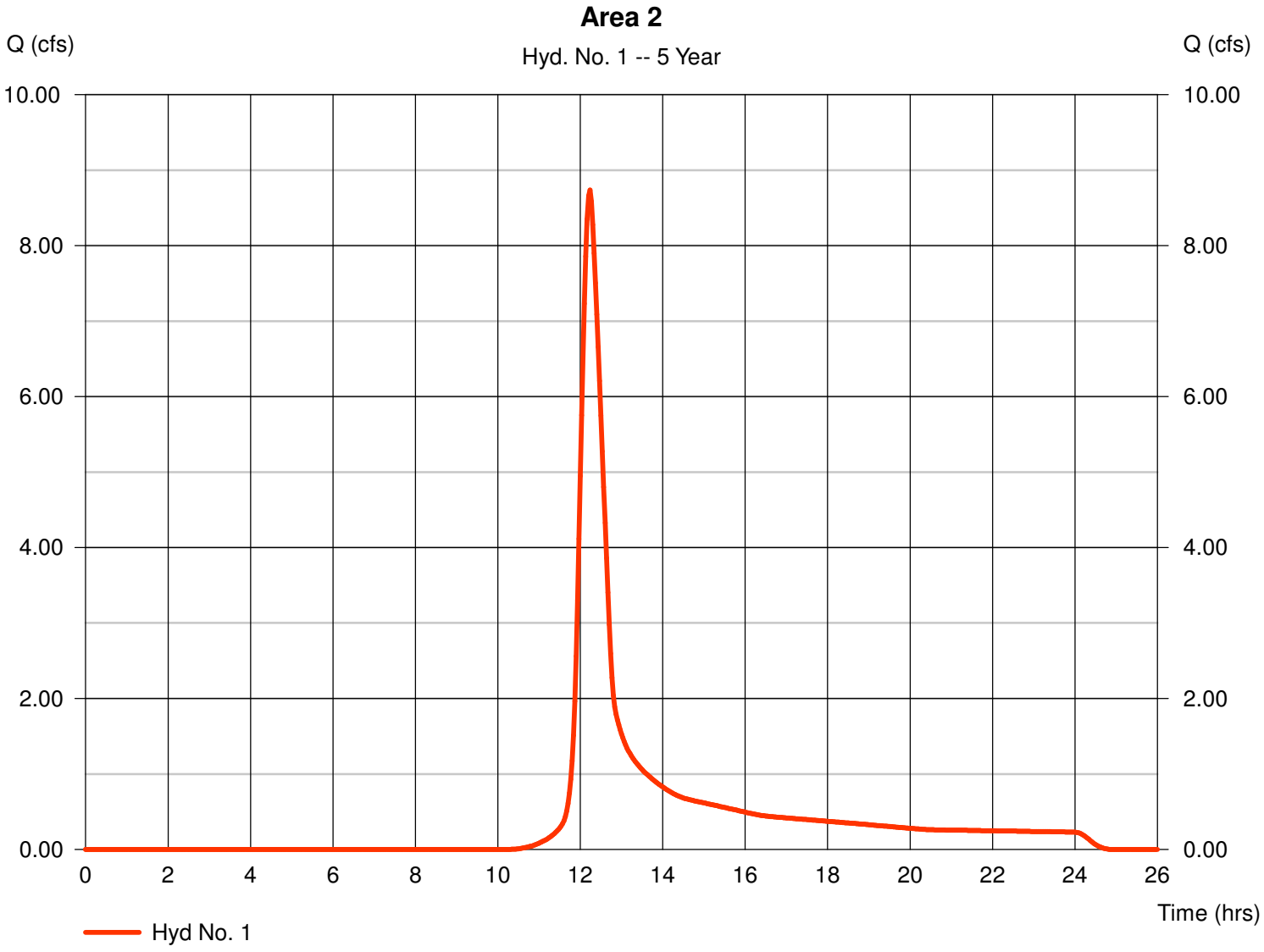
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 1

Area 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	8.739 cfs
Storm frequency	=	5 yrs	Time to peak	=	12.23 hrs
Time interval	=	2 min	Hyd. volume	=	39,232 cuft
Drainage area	=	6.430 ac	Curve number	=	71*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	31.00 min
Total precip.	=	4.38 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(3.230 x 61) + (1.650 x 66) + (1.550 x 98)] / 6.430



Hydrograph Report

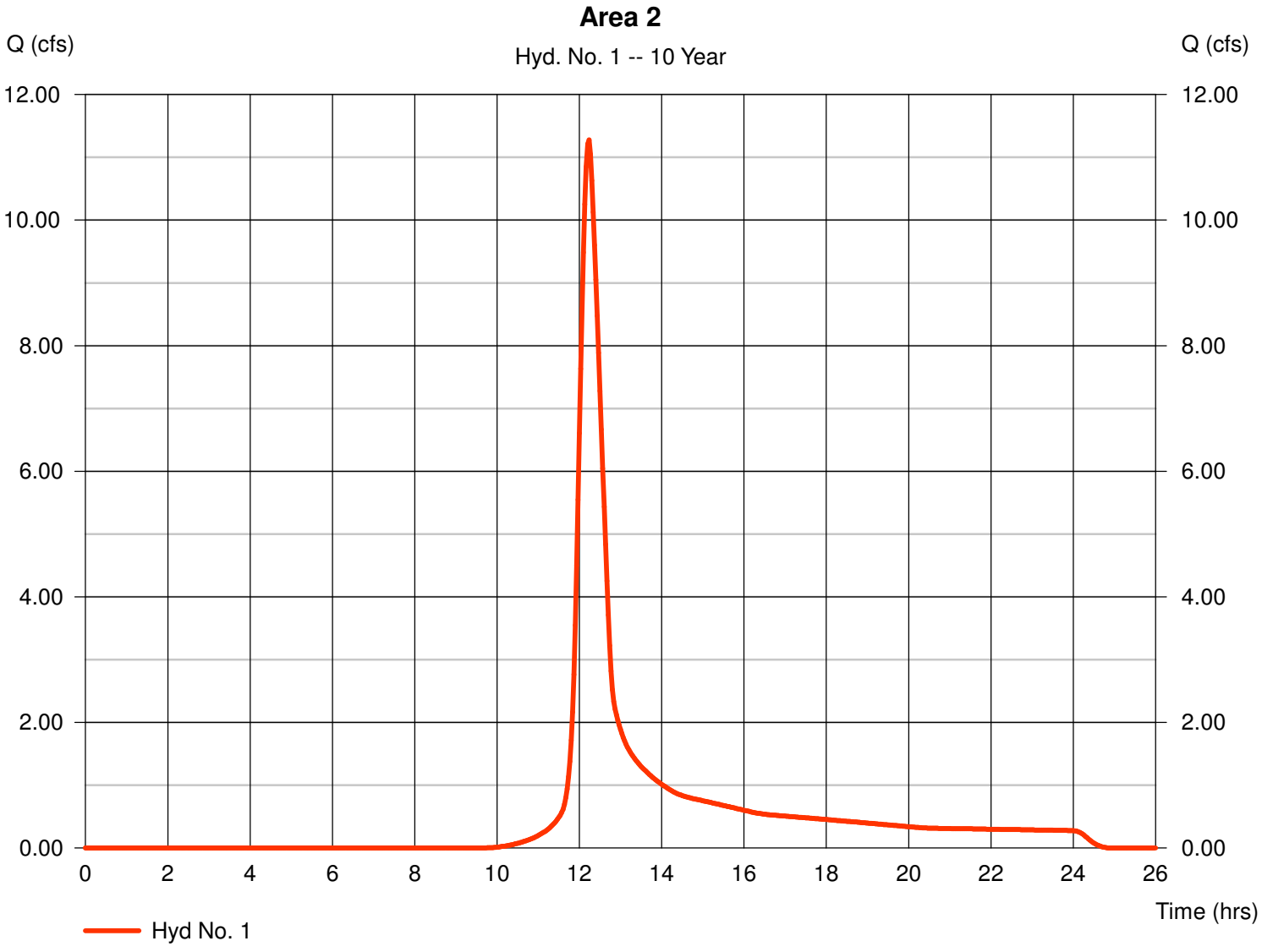
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 1

Area 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	11.28 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.23 hrs
Time interval	=	2 min	Hyd. volume	=	49,840 cuft
Drainage area	=	6.430 ac	Curve number	=	71*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	31.00 min
Total precip.	=	4.99 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(3.230 x 61) + (1.650 x 66) + (1.550 x 98)] / 6.430



Hydrograph Report

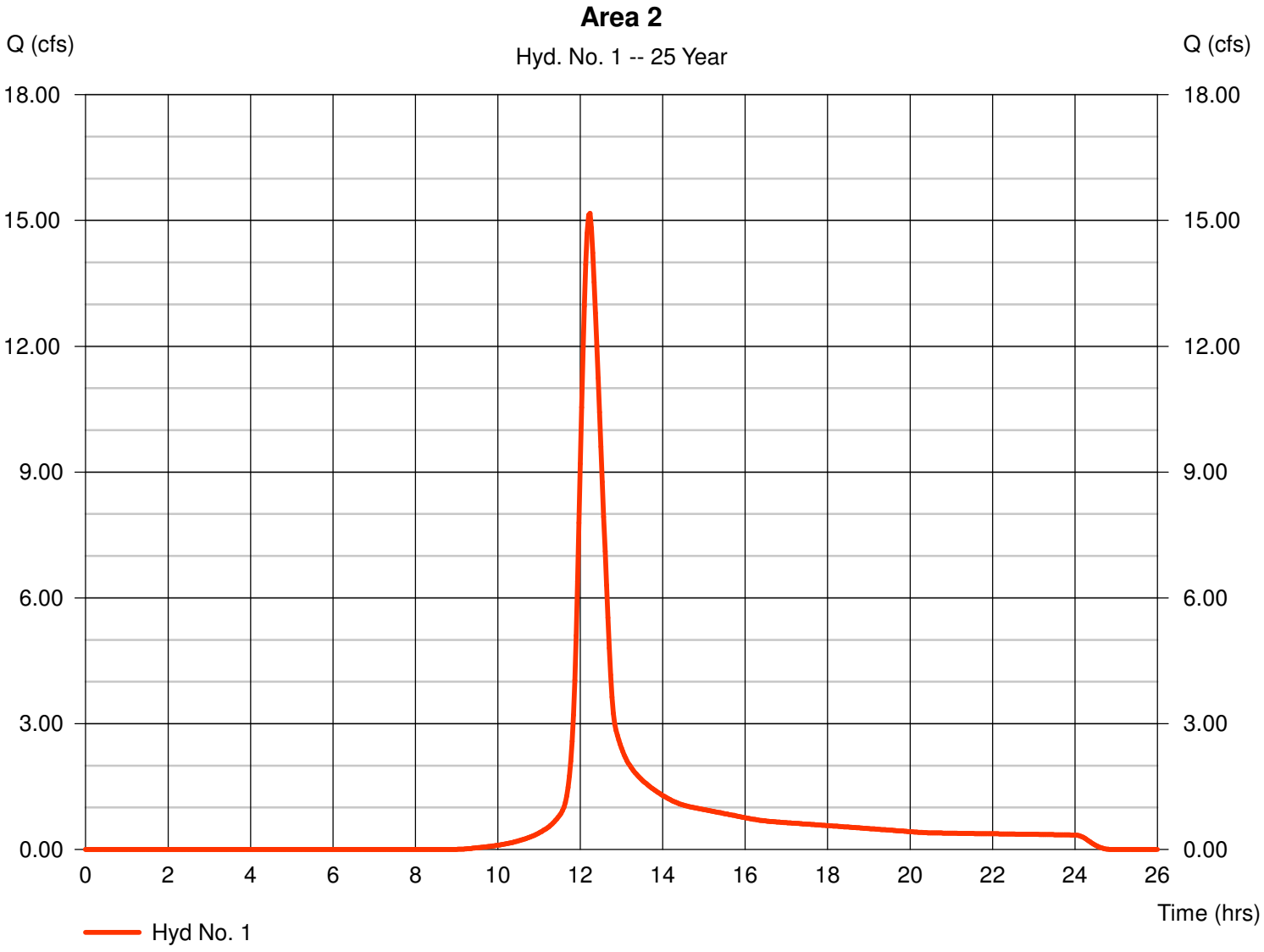
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 1

Area 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	15.17 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.23 hrs
Time interval	=	2 min	Hyd. volume	=	66,227 cuft
Drainage area	=	6.430 ac	Curve number	=	71*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	31.00 min
Total precip.	=	5.88 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(3.230 x 61) + (1.650 x 66) + (1.550 x 98)] / 6.430



Hydrograph Report

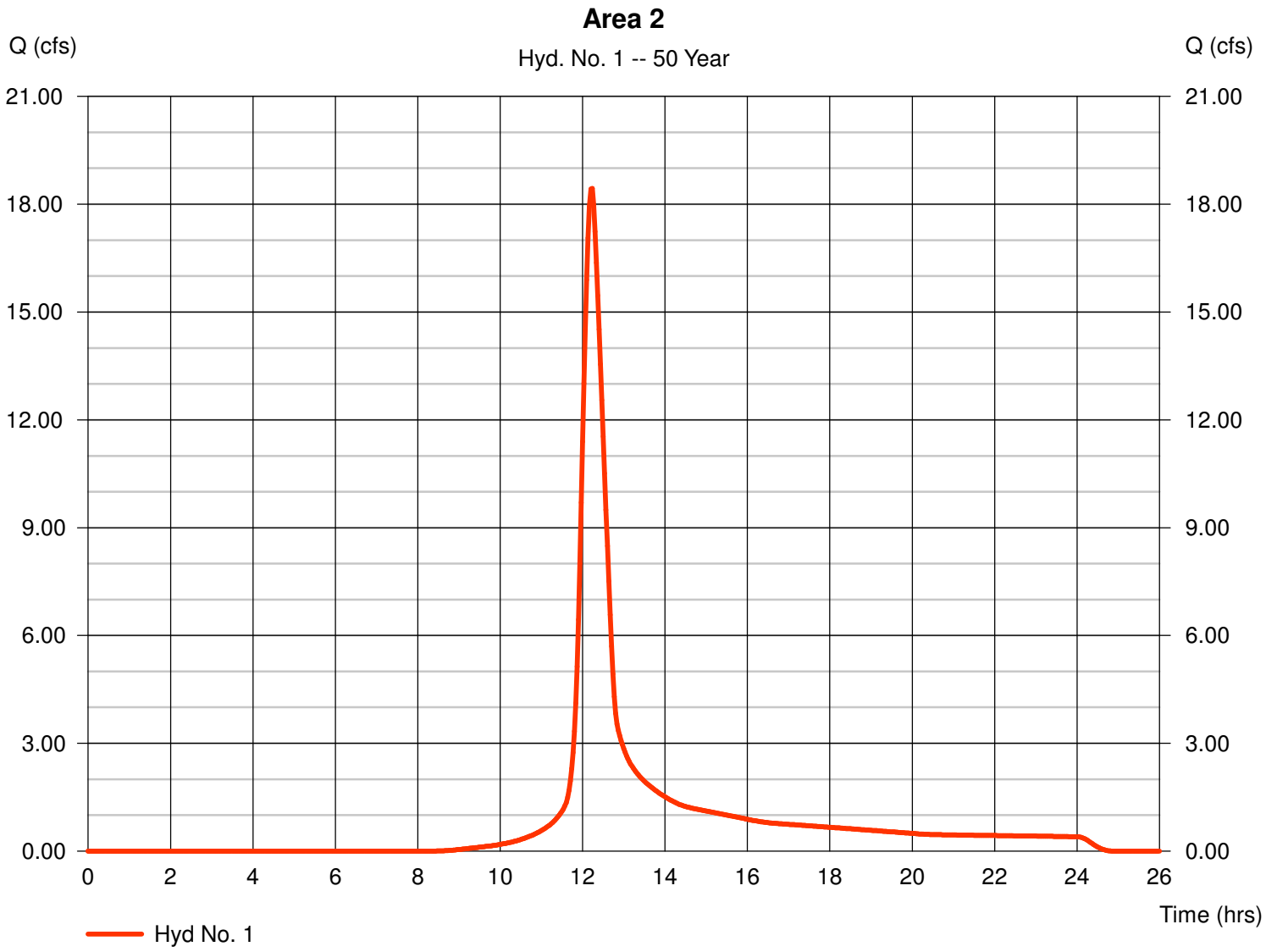
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 1

Area 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	18.43 cfs
Storm frequency	=	50 yrs	Time to peak	=	12.23 hrs
Time interval	=	2 min	Hyd. volume	=	80,098 cuft
Drainage area	=	6.430 ac	Curve number	=	71*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	31.00 min
Total precip.	=	6.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(3.230 x 61) + (1.650 x 66) + (1.550 x 98)] / 6.430



Hydrograph Report

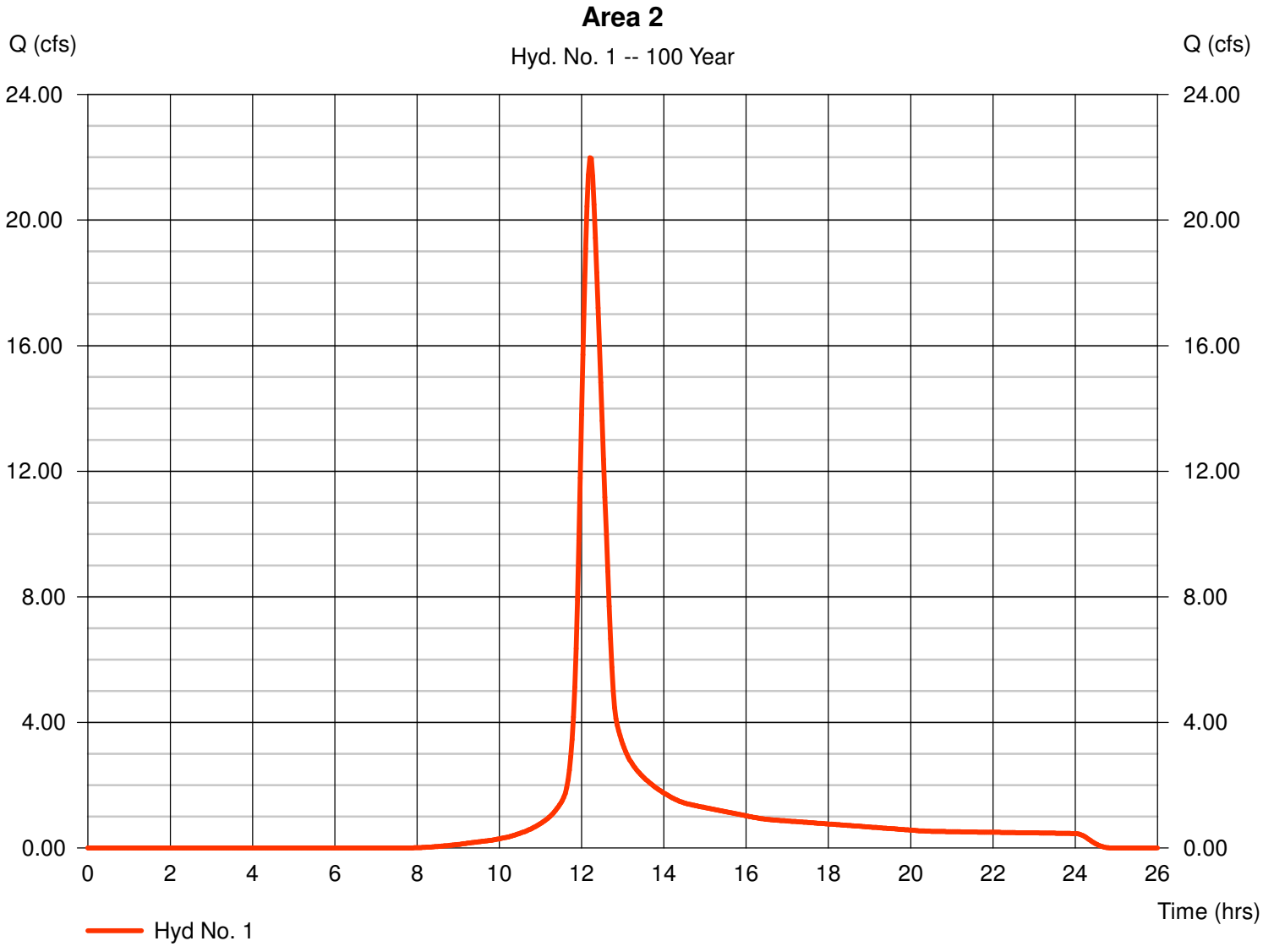
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 1

Area 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	21.98 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.20 hrs
Time interval	=	2 min	Hyd. volume	=	95,202 cuft
Drainage area	=	6.430 ac	Curve number	=	71*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	31.00 min
Total precip.	=	7.36 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(3.230 x 61) + (1.650 x 66) + (1.550 x 98)] / 6.430



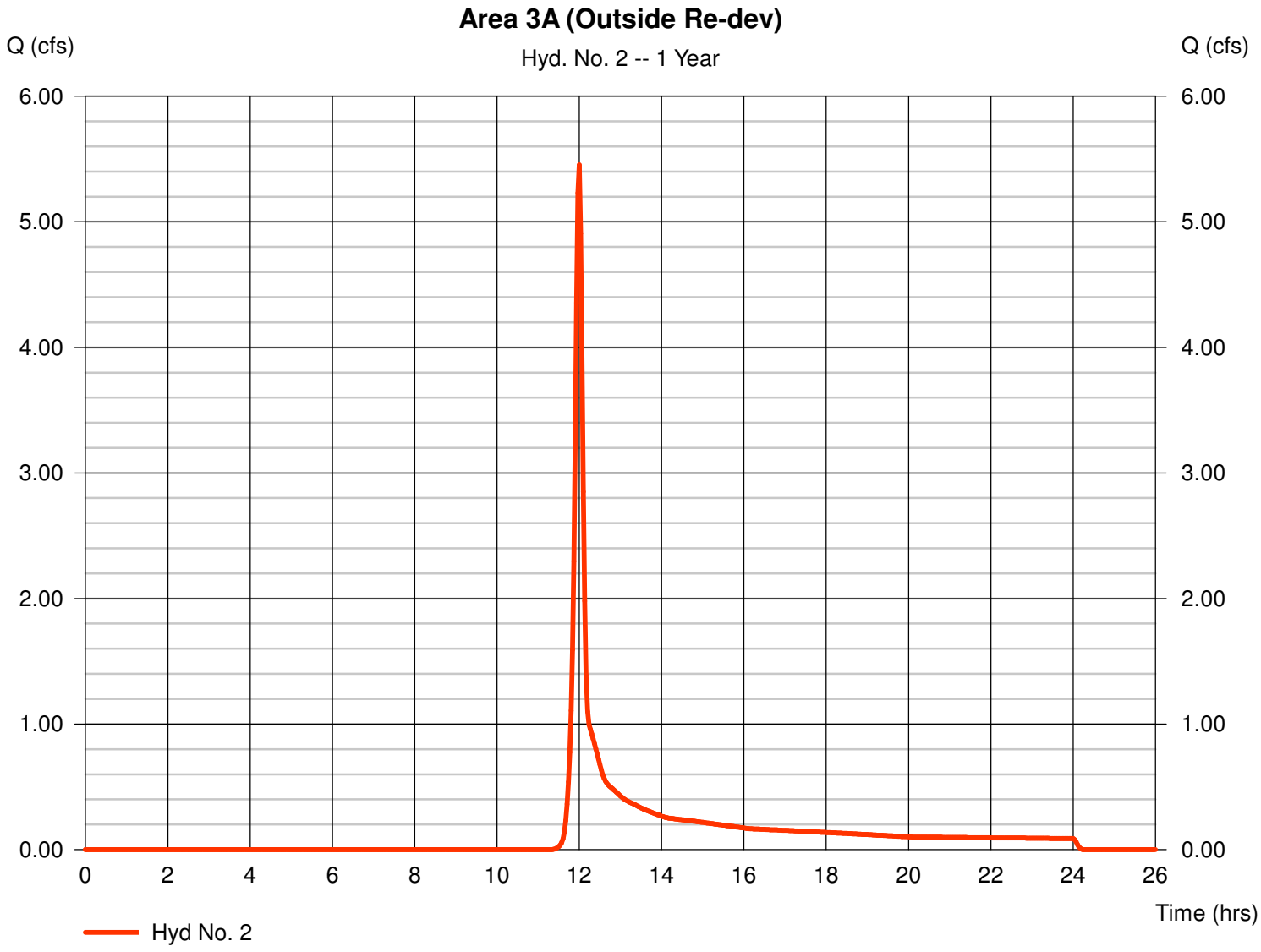
Hydrograph Report

Hyd. No. 2

Area 3A (Outside Re-dev)

Hydrograph type	= SCS Runoff	Peak discharge	= 5.453 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 12,919 cuft
Drainage area	= 4.040 ac	Curve number	= 70*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.10 min
Total precip.	= 3.29 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(2.110 x 61) + (1.080 x 66) + (0.850 x 98)] / 4.040



TR55 Tc Worksheet

Hyd. No. 2

Area 3A (Outside Re-dev)

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.150		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.69		0.00		0.00		
Land slope (%)	=	8.73		0.00		0.00		
Travel Time (min)	**=**	**5.06**	**+**	**0.00**	**+**	**0.00**	**=**	**5.06**
Shallow Concentrated Flow								
Flow length (ft)	=	241.00		92.00		0.00		
Watercourse slope (%)	=	1.90		23.80		0.00		
Surface description	=	Unpaved		Unpaved		Paved		
Average velocity (ft/s)	=	2.22		7.87		0.00		
Travel Time (min)	**=**	**1.81**	**+**	**0.19**	**+**	**0.00**	**=**	**2.00**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 7.10 min

Hydrograph Report

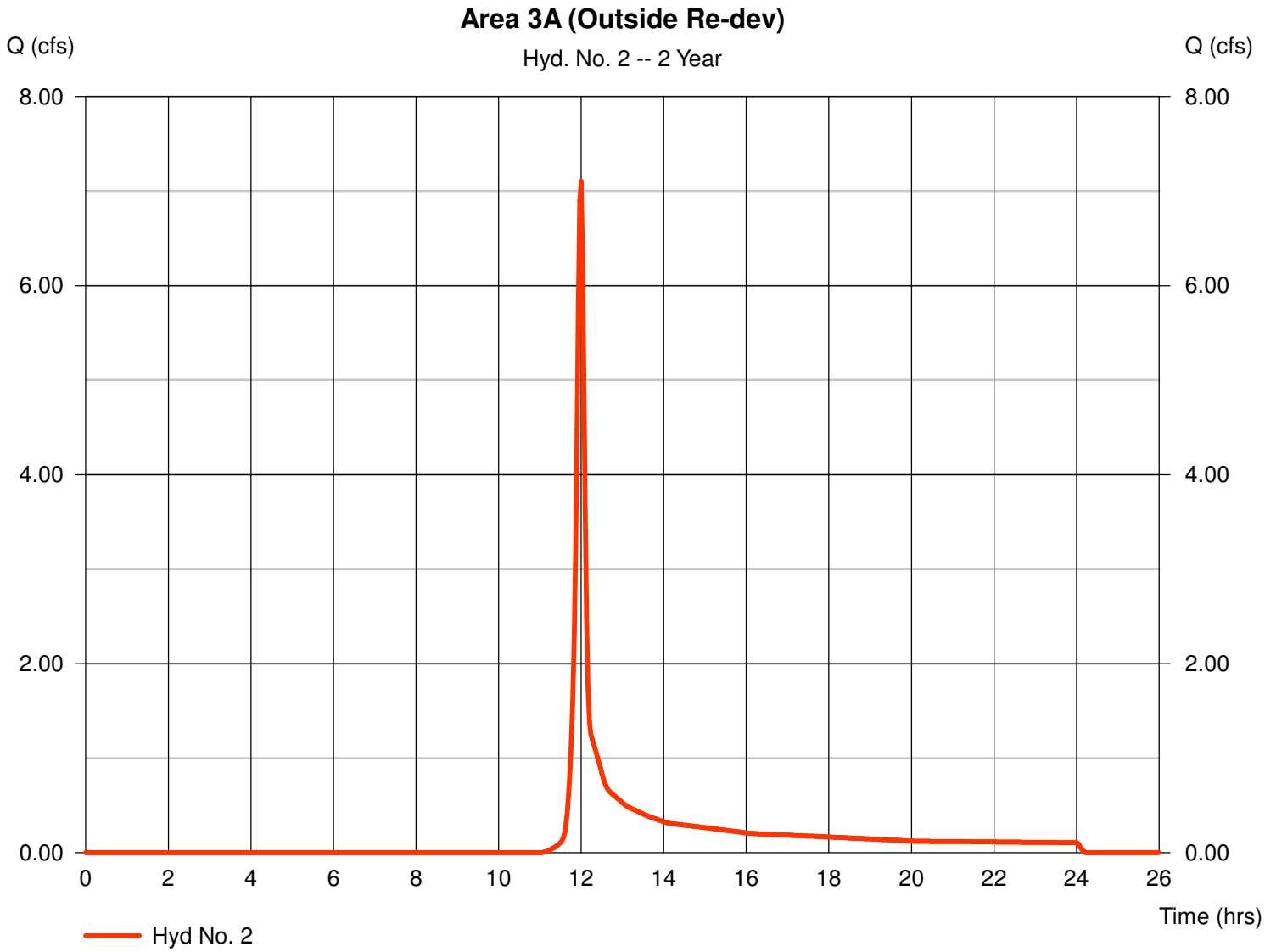
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 2

Area 3A (Outside Re-dev)

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.101 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	16,533 cuft
Drainage area	=	4.040 ac	Curve number	=	70*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	7.10 min
Total precip.	=	3.69 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(2.110 x 61) + (1.080 x 66) + (0.850 x 98)] / 4.040



Hydrograph Report

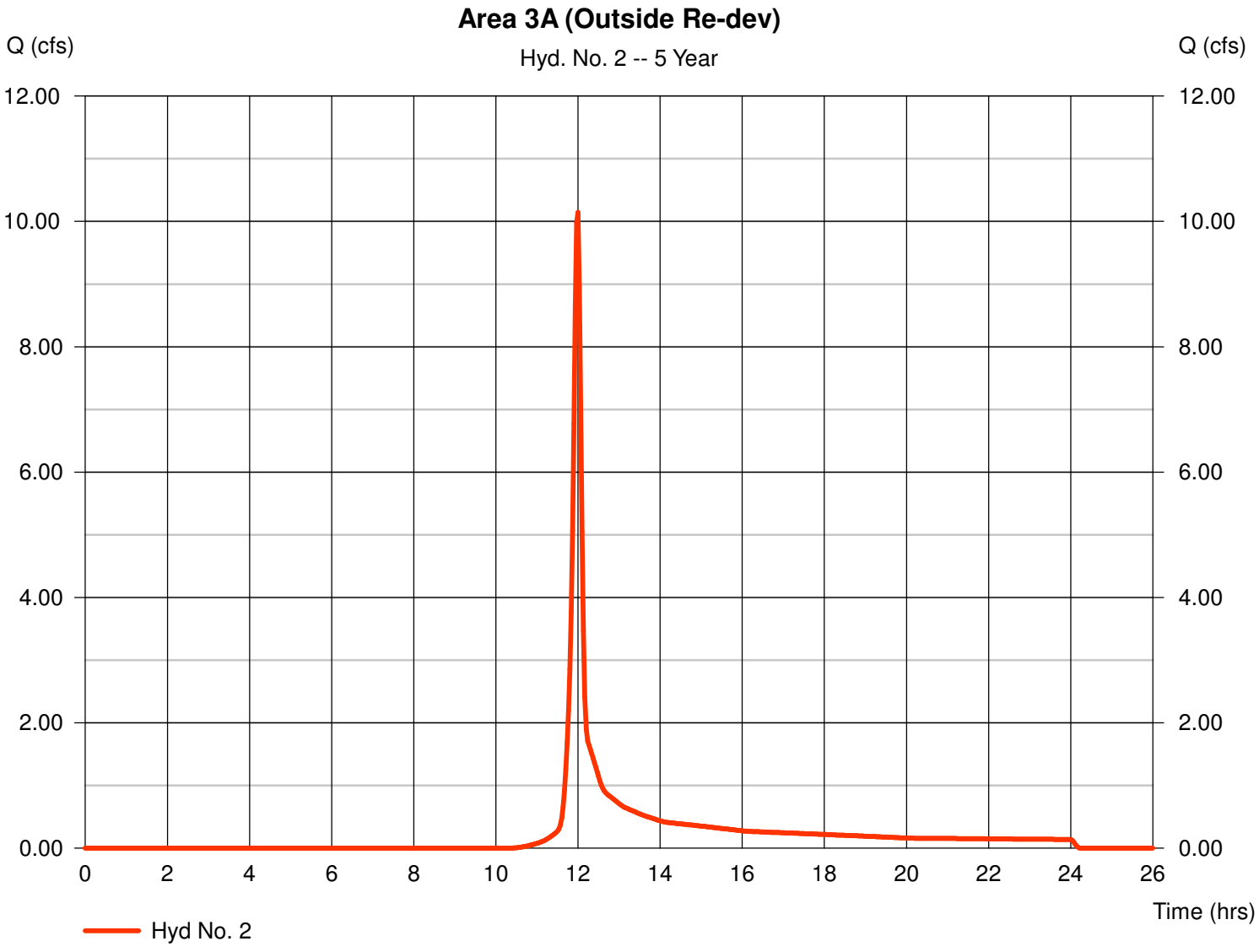
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 2

Area 3A (Outside Re-dev)

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.14 cfs
Storm frequency	=	5 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	23,308 cuft
Drainage area	=	4.040 ac	Curve number	=	70*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	7.10 min
Total precip.	=	4.38 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(2.110 x 61) + (1.080 x 66) + (0.850 x 98)] / 4.040



Hydrograph Report

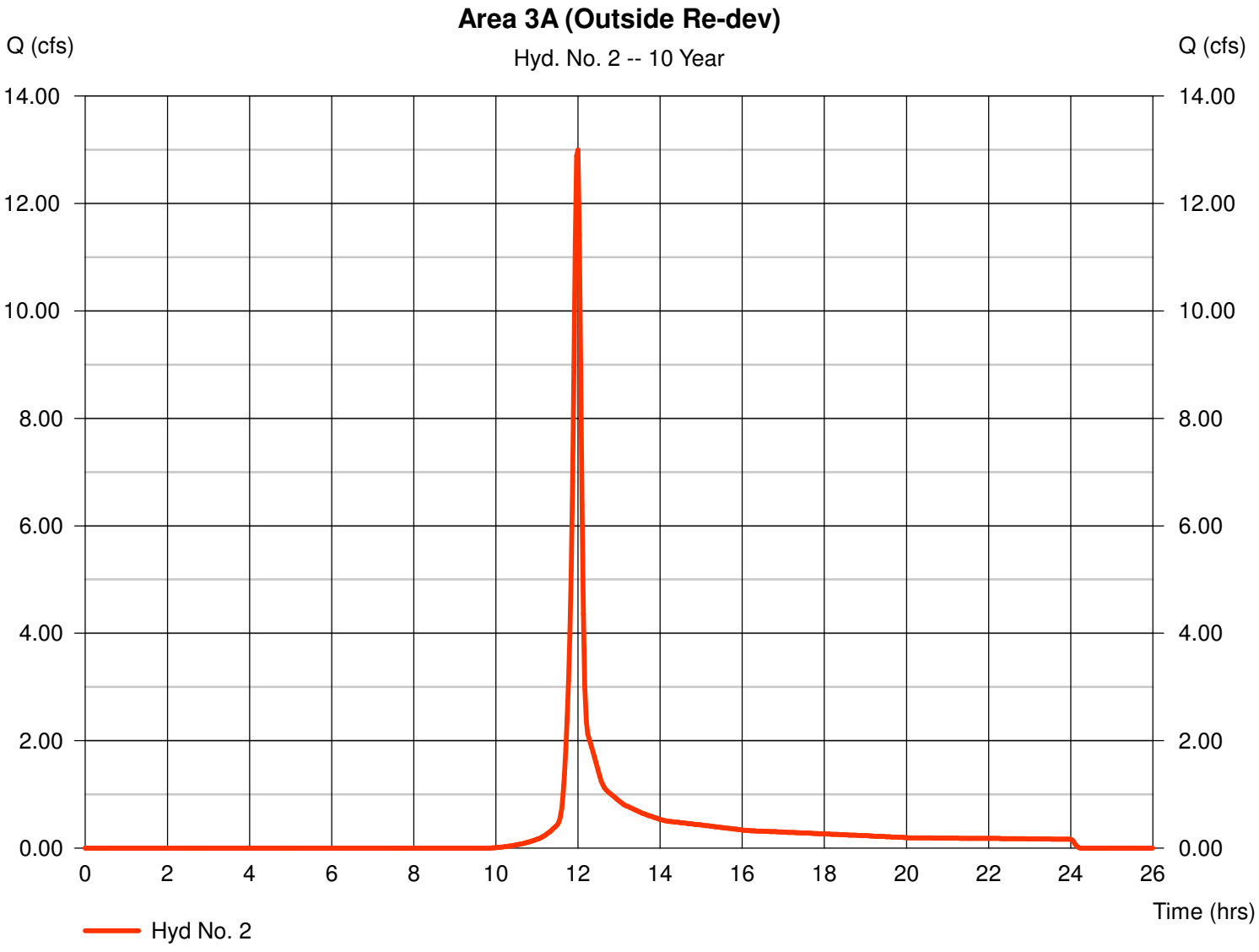
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 2

Area 3A (Outside Re-dev)

Hydrograph type	=	SCS Runoff	Peak discharge	=	12.99 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	29,754 cuft
Drainage area	=	4.040 ac	Curve number	=	70*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	7.10 min
Total precip.	=	4.99 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(2.110 x 61) + (1.080 x 66) + (0.850 x 98)] / 4.040



Hydrograph Report

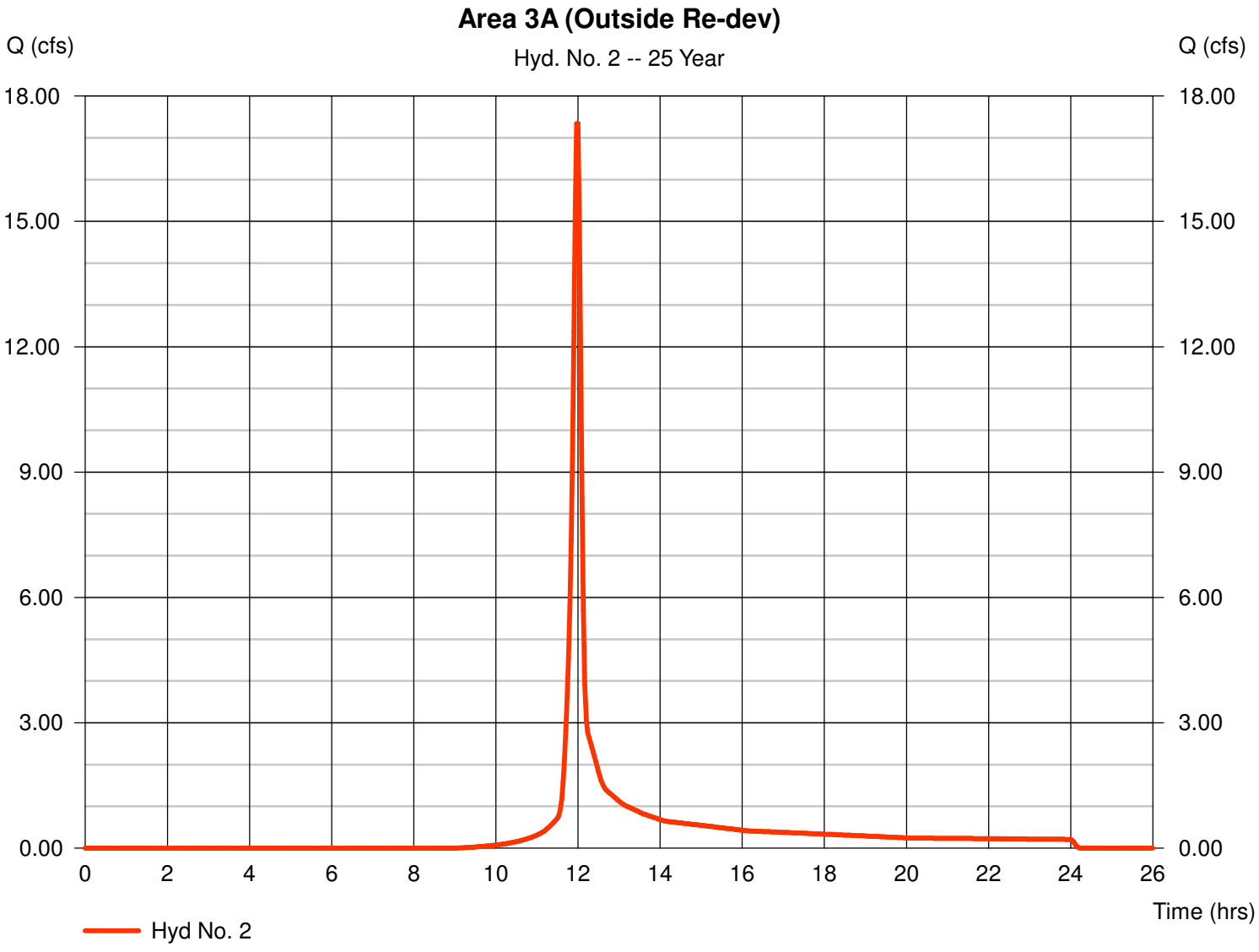
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 2

Area 3A (Outside Re-dev)

Hydrograph type	=	SCS Runoff	Peak discharge	=	17.34 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	39,747 cuft
Drainage area	=	4.040 ac	Curve number	=	70*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	7.10 min
Total precip.	=	5.88 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(2.110 x 61) + (1.080 x 66) + (0.850 x 98)] / 4.040



Hydrograph Report

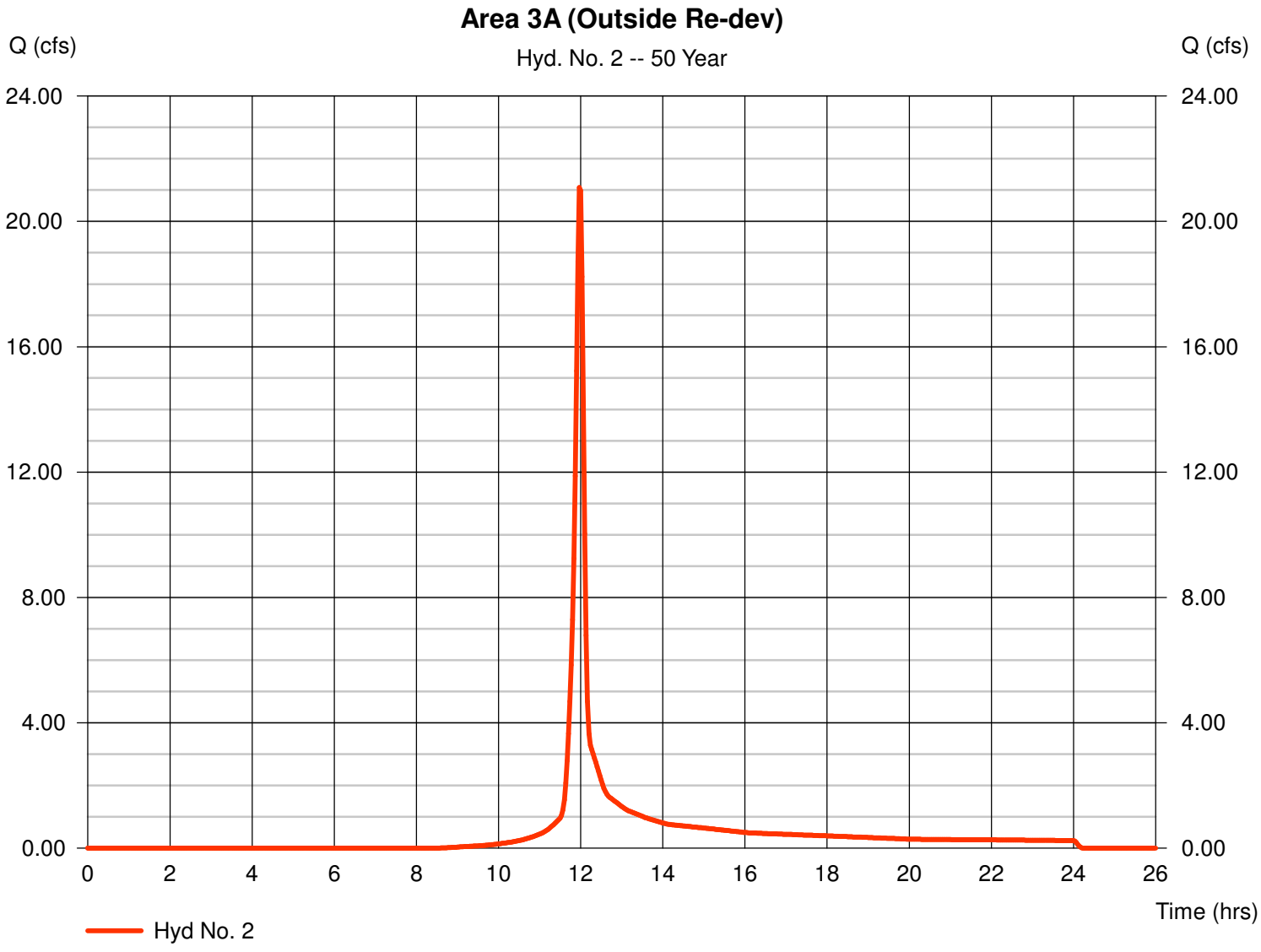
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 2

Area 3A (Outside Re-dev)

Hydrograph type	=	SCS Runoff	Peak discharge	=	21.08 cfs
Storm frequency	=	50 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	48,229 cuft
Drainage area	=	4.040 ac	Curve number	=	70*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	7.10 min
Total precip.	=	6.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(2.110 x 61) + (1.080 x 66) + (0.850 x 98)] / 4.040



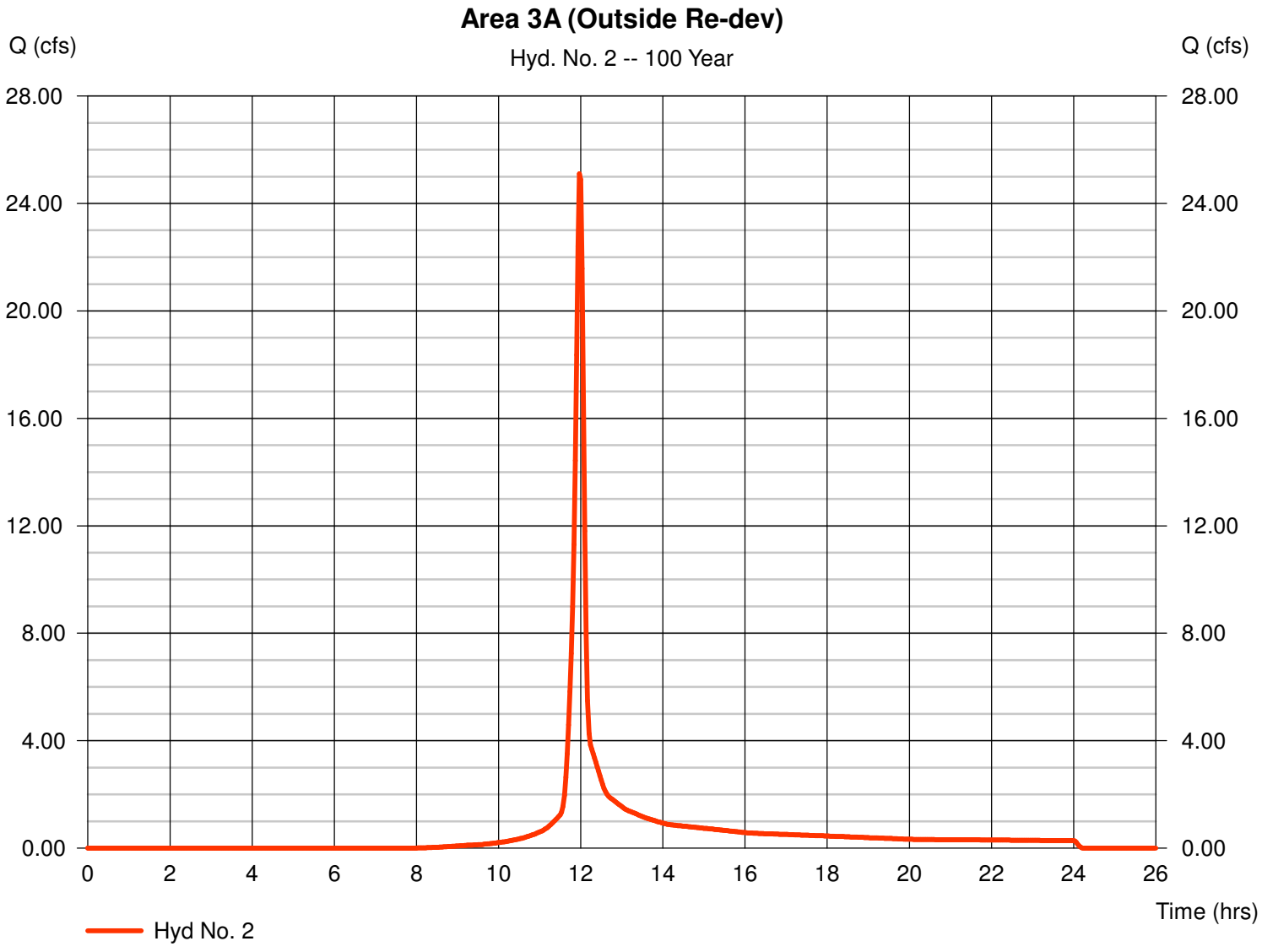
Hydrograph Report

Hyd. No. 2

Area 3A (Outside Re-dev)

Hydrograph type	=	SCS Runoff	Peak discharge	=	25.11 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	57,482 cuft
Drainage area	=	4.040 ac	Curve number	=	70*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	7.10 min
Total precip.	=	7.36 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(2.110 x 61) + (1.080 x 66) + (0.850 x 98)] / 4.040



Hydrograph Report

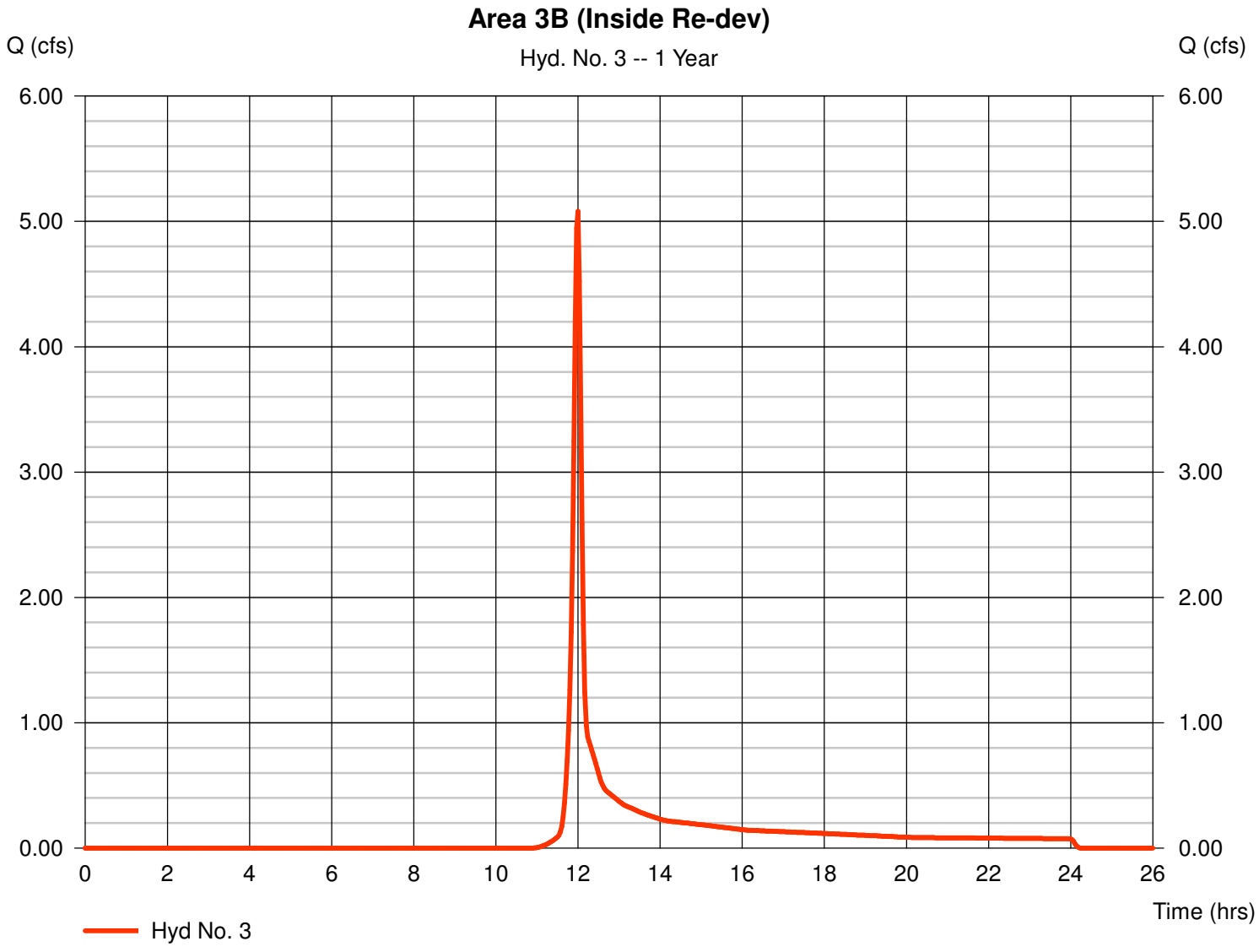
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 3

Area 3B (Inside Re-dev)

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.081 cfs
Storm frequency	=	1 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	11,788 cuft
Drainage area	=	3.120 ac	Curve number	=	73*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	7.10 min
Total precip.	=	3.29 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.500 x 61) + (0.750 x 66) + (0.870 x 98)] / 3.120



TR55 Tc Worksheet

Hyd. No. 3

Area 3B (Inside Re-dev)

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.150		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.69		0.00		0.00		
Land slope (%)	=	8.73		0.00		0.00		
Travel Time (min)	**=**	**5.06**	**+**	**0.00**	**+**	**0.00**	**=**	**5.06**
Shallow Concentrated Flow								
Flow length (ft)	=	241.00		92.00		0.00		
Watercourse slope (%)	=	1.90		23.80		0.00		
Surface description	=	Unpaved		Unpaved		Paved		
Average velocity (ft/s)	=	2.22		7.87		0.00		
Travel Time (min)	**=**	**1.81**	**+**	**0.19**	**+**	**0.00**	**=**	**2.00**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 7.10 min

Hydrograph Report

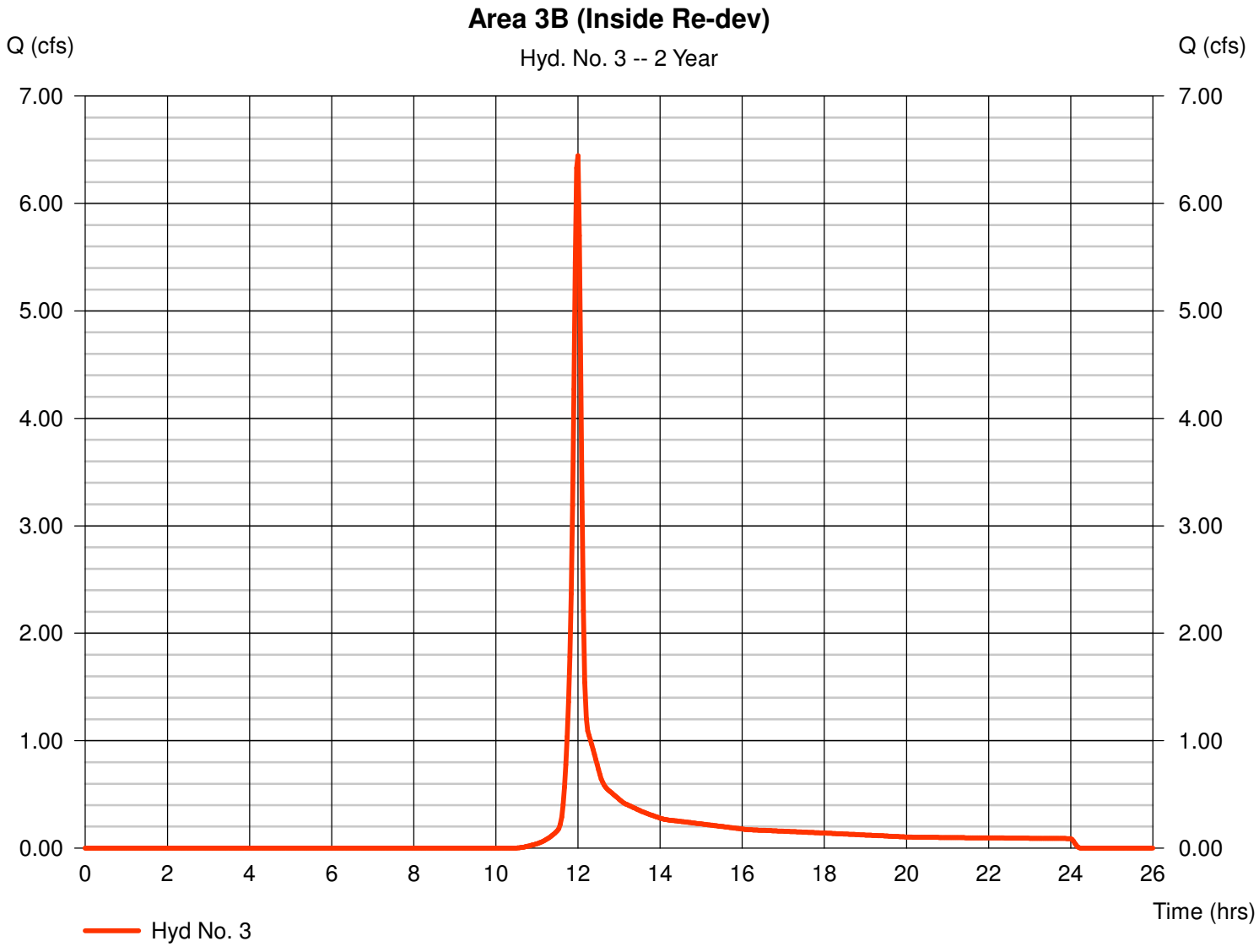
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 3

Area 3B (Inside Re-dev)

Hydrograph type	=	SCS Runoff	Peak discharge	=	6.445 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	14,826 cuft
Drainage area	=	3.120 ac	Curve number	=	73*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	7.10 min
Total precip.	=	3.69 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.500 x 61) + (0.750 x 66) + (0.870 x 98)] / 3.120



Hydrograph Report

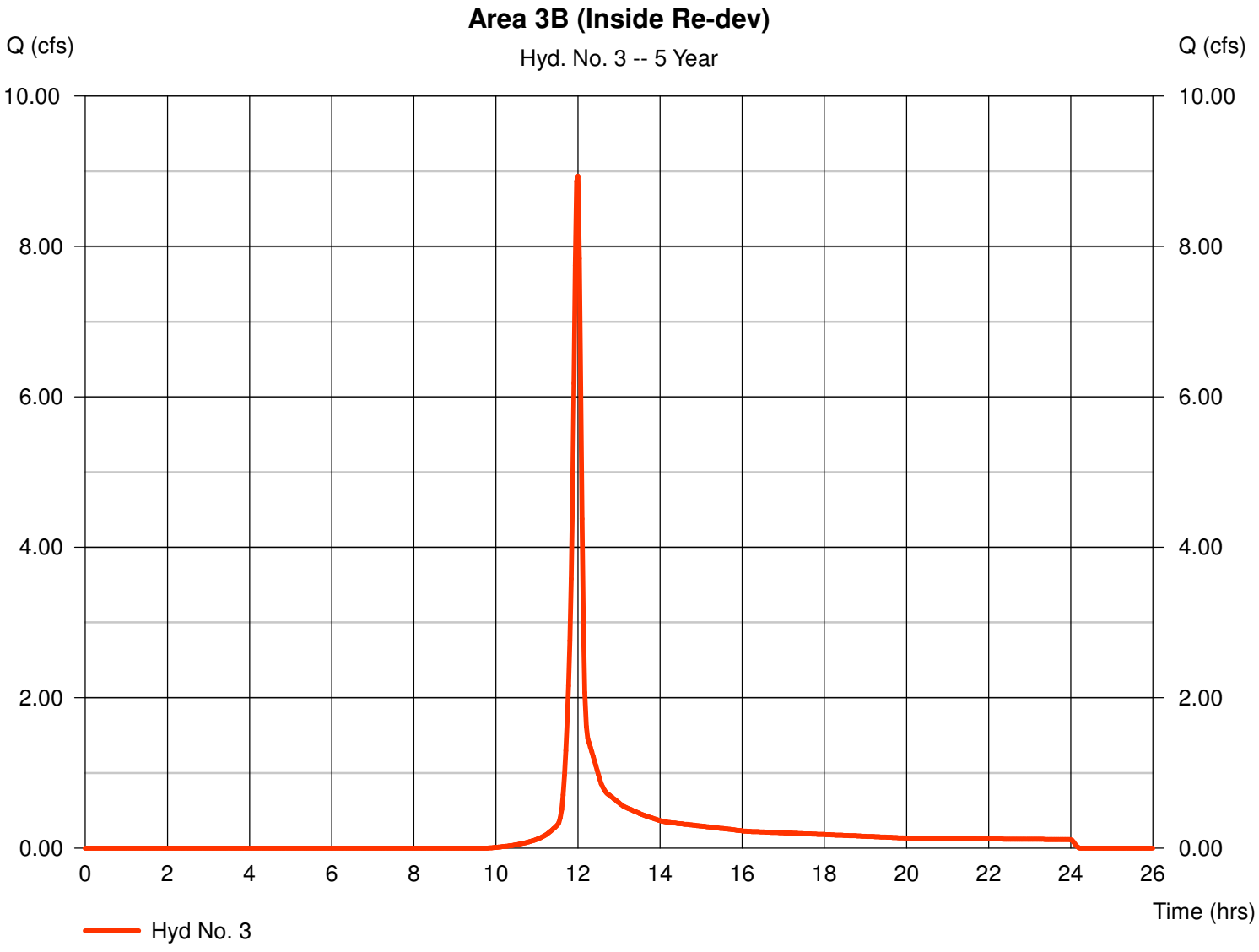
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 3

Area 3B (Inside Re-dev)

Hydrograph type	=	SCS Runoff	Peak discharge	=	8.933 cfs
Storm frequency	=	5 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	20,450 cuft
Drainage area	=	3.120 ac	Curve number	=	73*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	7.10 min
Total precip.	=	4.38 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.500 x 61) + (0.750 x 66) + (0.870 x 98)] / 3.120



Hydrograph Report

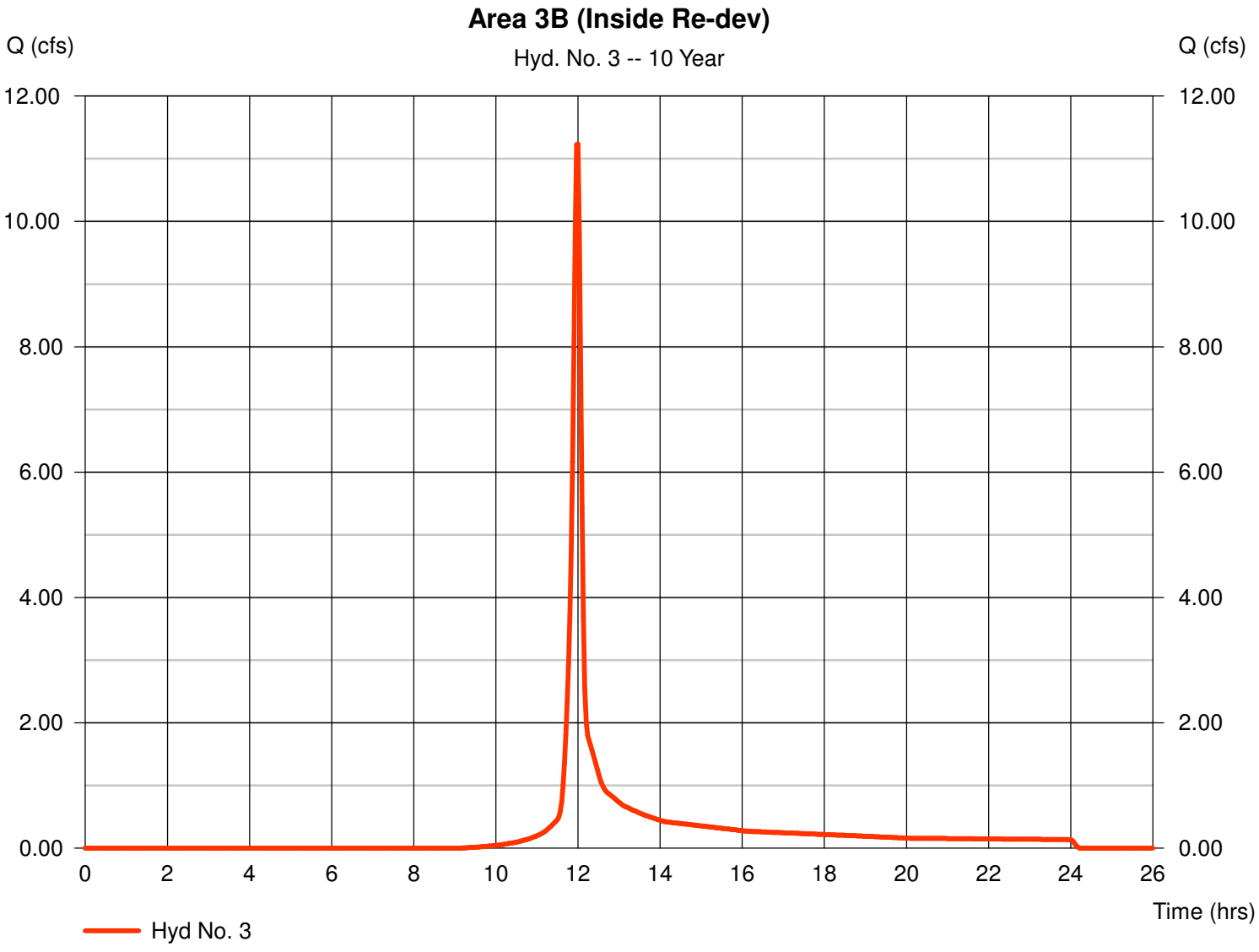
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 3

Area 3B (Inside Re-dev)

Hydrograph type	=	SCS Runoff	Peak discharge	=	11.23 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	25,739 cuft
Drainage area	=	3.120 ac	Curve number	=	73*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	7.10 min
Total precip.	=	4.99 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.500 x 61) + (0.750 x 66) + (0.870 x 98)] / 3.120



Hydrograph Report

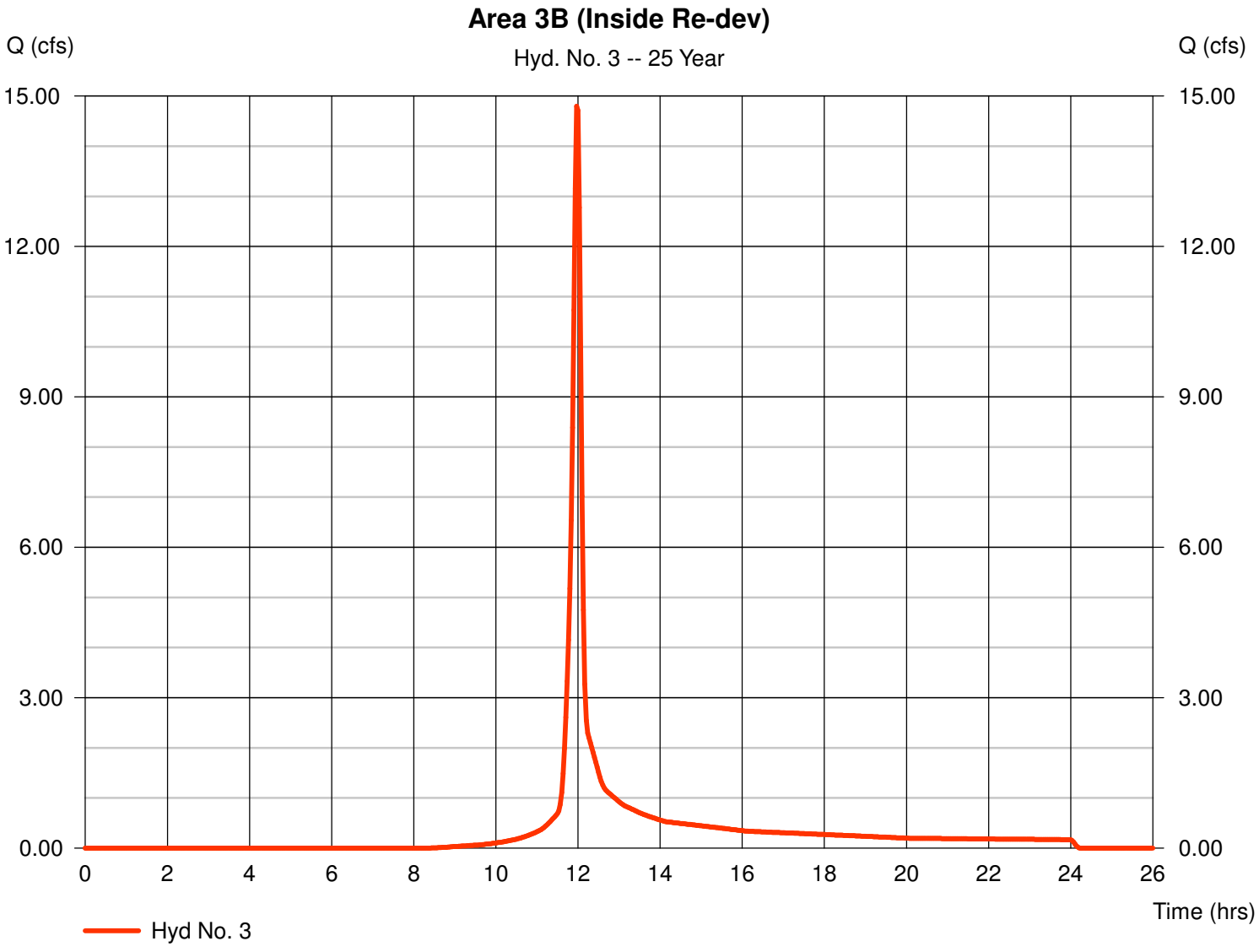
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 3

Area 3B (Inside Re-dev)

Hydrograph type	=	SCS Runoff	Peak discharge	=	14.80 cfs
Storm frequency	=	25 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	33,856 cuft
Drainage area	=	3.120 ac	Curve number	=	73*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	7.10 min
Total precip.	=	5.88 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.500 x 61) + (0.750 x 66) + (0.870 x 98)] / 3.120



Hydrograph Report

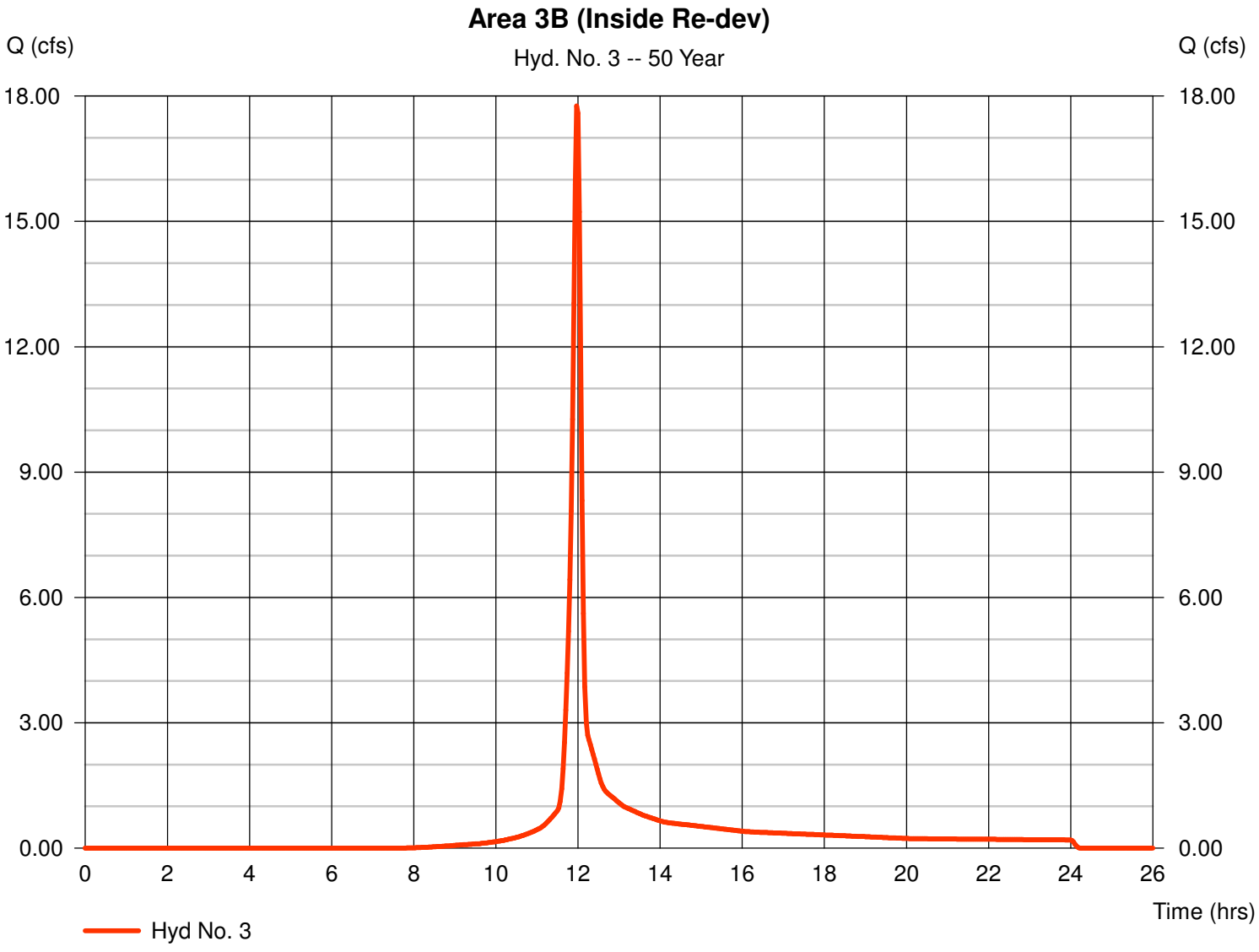
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 3

Area 3B (Inside Re-dev)

Hydrograph type	=	SCS Runoff	Peak discharge	=	17.76 cfs
Storm frequency	=	50 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	40,690 cuft
Drainage area	=	3.120 ac	Curve number	=	73*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	7.10 min
Total precip.	=	6.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.500 x 61) + (0.750 x 66) + (0.870 x 98)] / 3.120



Hydrograph Report

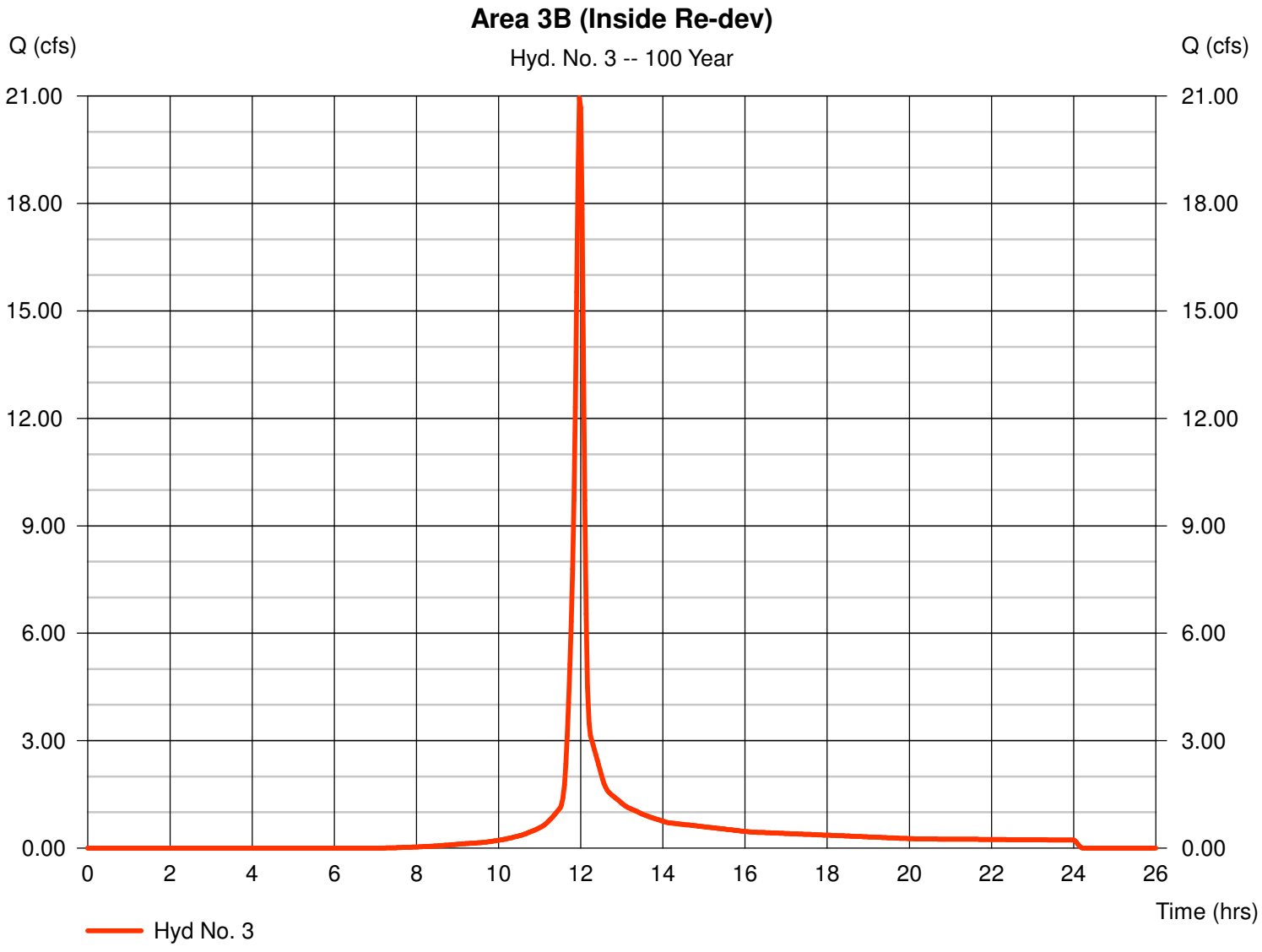
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 3

Area 3B (Inside Re-dev)

Hydrograph type	=	SCS Runoff	Peak discharge	=	20.95 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	48,104 cuft
Drainage area	=	3.120 ac	Curve number	=	73*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	7.10 min
Total precip.	=	7.36 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.500 x 61) + (0.750 x 66) + (0.870 x 98)] / 3.120



Hydrograph Report

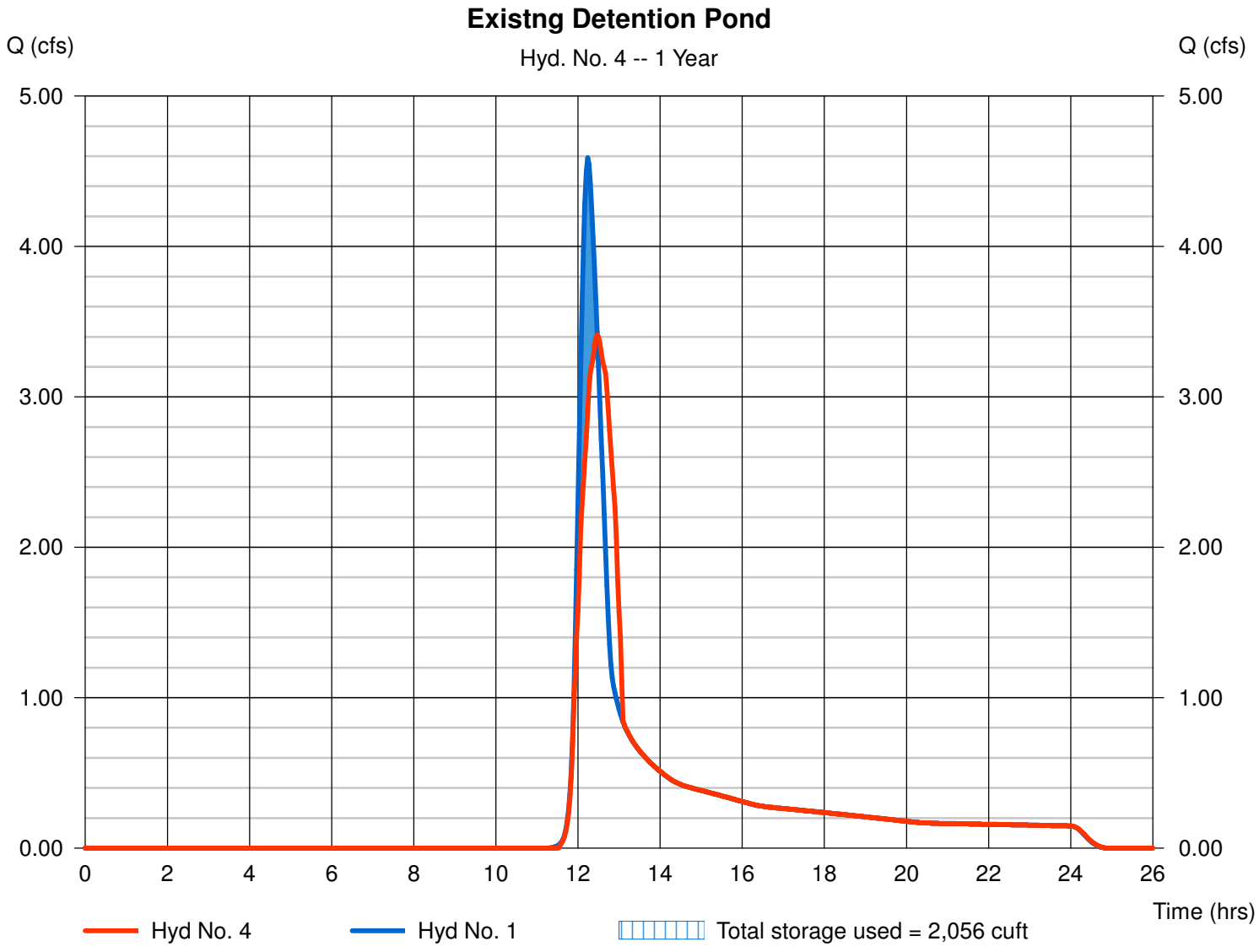
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 4

Existng Detention Pond

Hydrograph type	=	Reservoir	Peak discharge	=	3.411 cfs
Storm frequency	=	1 yrs	Time to peak	=	12.47 hrs
Time interval	=	2 min	Hyd. volume	=	22,035 cuft
Inflow hyd. No.	=	1 - Area 2	Max. Elevation	=	881.15 ft
Reservoir name	=	Existing Detention Pond	Max. Storage	=	2,056 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Pond No. 1 - Existing Detention Pond

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 876.13 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	876.13	16	0	0
0.87	877.00	16	14	14
1.87	878.00	16	16	30
2.37	878.50	16	8	38
2.87	879.00	200	45	83
3.87	880.00	487	333	416
4.87	881.00	2,039	1,174	1,590
5.87	882.00	4,291	3,096	4,686
6.87	883.00	5,297	4,785	9,471
7.87	884.00	9,755	7,413	16,883

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	Inactive	0.00	1.00
Span (in)	= 24.00	12.00	0.00	1.00
No. Barrels	= 1	1	0	88
Invert El. (ft)	= 876.13	876.13	0.00	876.55
Length (ft)	= 39.00	0.00	0.00	4.12
Slope (%)	= 12.51	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	Yes	No	Yes

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 16.00	10.00	0.00	0.00
Crest El. (ft)	= 881.17	884.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= Riser	Broad	---	---
Multi-Stage	= Yes	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	876.13	0.00	0.00	---	0.00	0.00	0.00	---	---	---	---	0.000
0.87	14	877.00	0.12 ic	0.00	---	0.11	0.00	0.00	---	---	---	---	0.113
1.87	30	878.00	0.69 ic	0.00	---	0.65	0.00	0.00	---	---	---	---	0.653
2.37	38	878.50	1.02 ic	0.00	---	1.02	0.00	0.00	---	---	---	---	1.018
2.87	83	879.00	1.41 ic	0.00	---	1.38	0.00	0.00	---	---	---	---	1.384
3.87	416	880.00	2.20 ic	0.00	---	2.20	0.00	0.00	---	---	---	---	2.198
4.87	1,590	881.00	3.15 ic	0.00	---	3.14	0.00	0.00	---	---	---	---	3.143
5.87	4,686	882.00	32.17 ic	0.00	---	0.08	32.10 s	0.00	---	---	---	---	32.17
6.87	9,471	883.00	36.51 ic	0.00	---	0.00	36.47 s	0.00	---	---	---	---	36.48
7.87	16,883	884.00	39.60 ic	0.00	---	0.00	39.53 s	0.00	---	---	---	---	39.53

Hydrograph Report

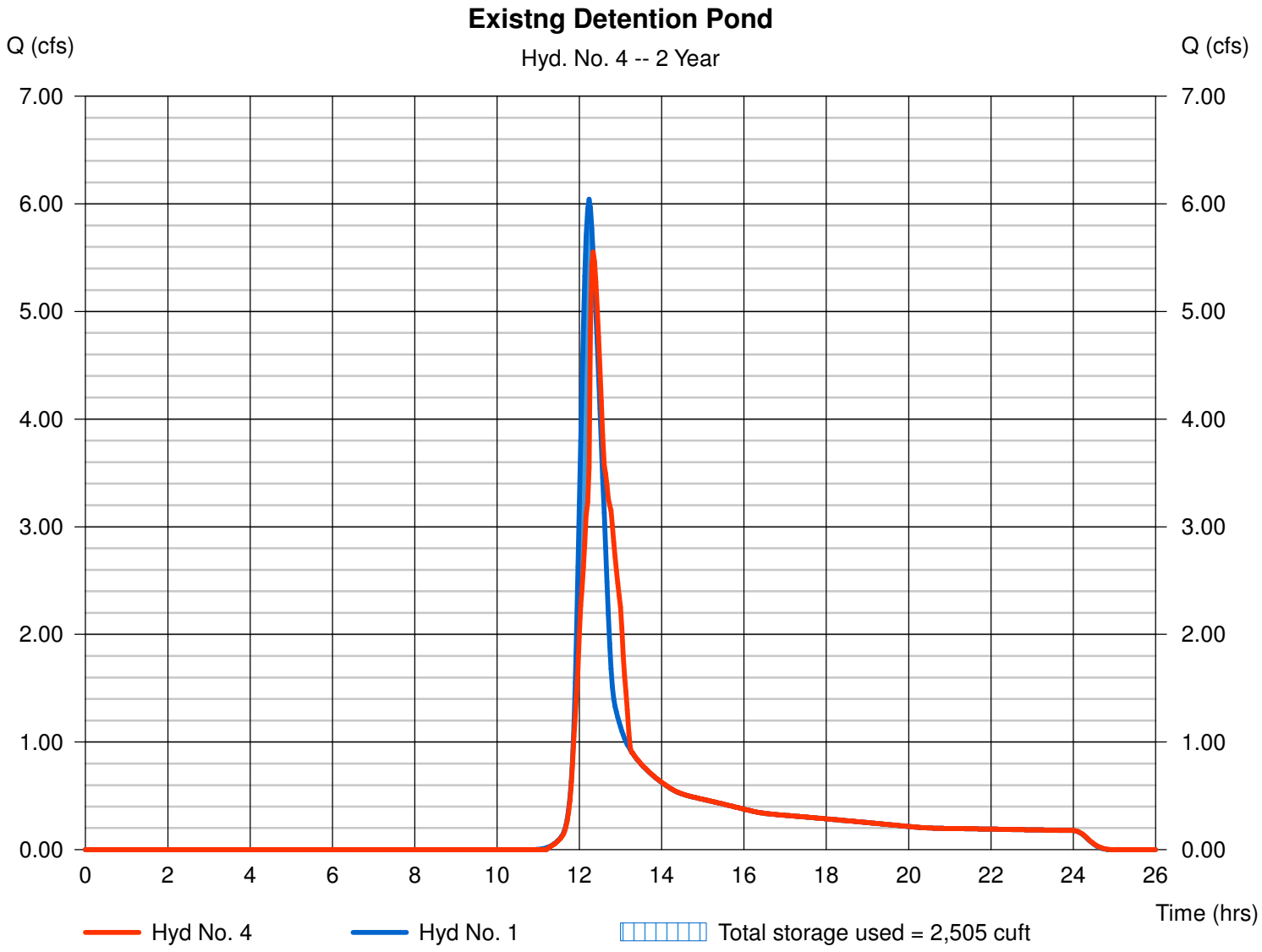
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 4

Existng Detention Pond

Hydrograph type	=	Reservoir	Peak discharge	=	5.553 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.33 hrs
Time interval	=	2 min	Hyd. volume	=	28,031 cuft
Inflow hyd. No.	=	1 - Area 2	Max. Elevation	=	881.30 ft
Reservoir name	=	Existing Detention Pond	Max. Storage	=	2,505 cuft

Storage Indication method used.



Hydrograph Report

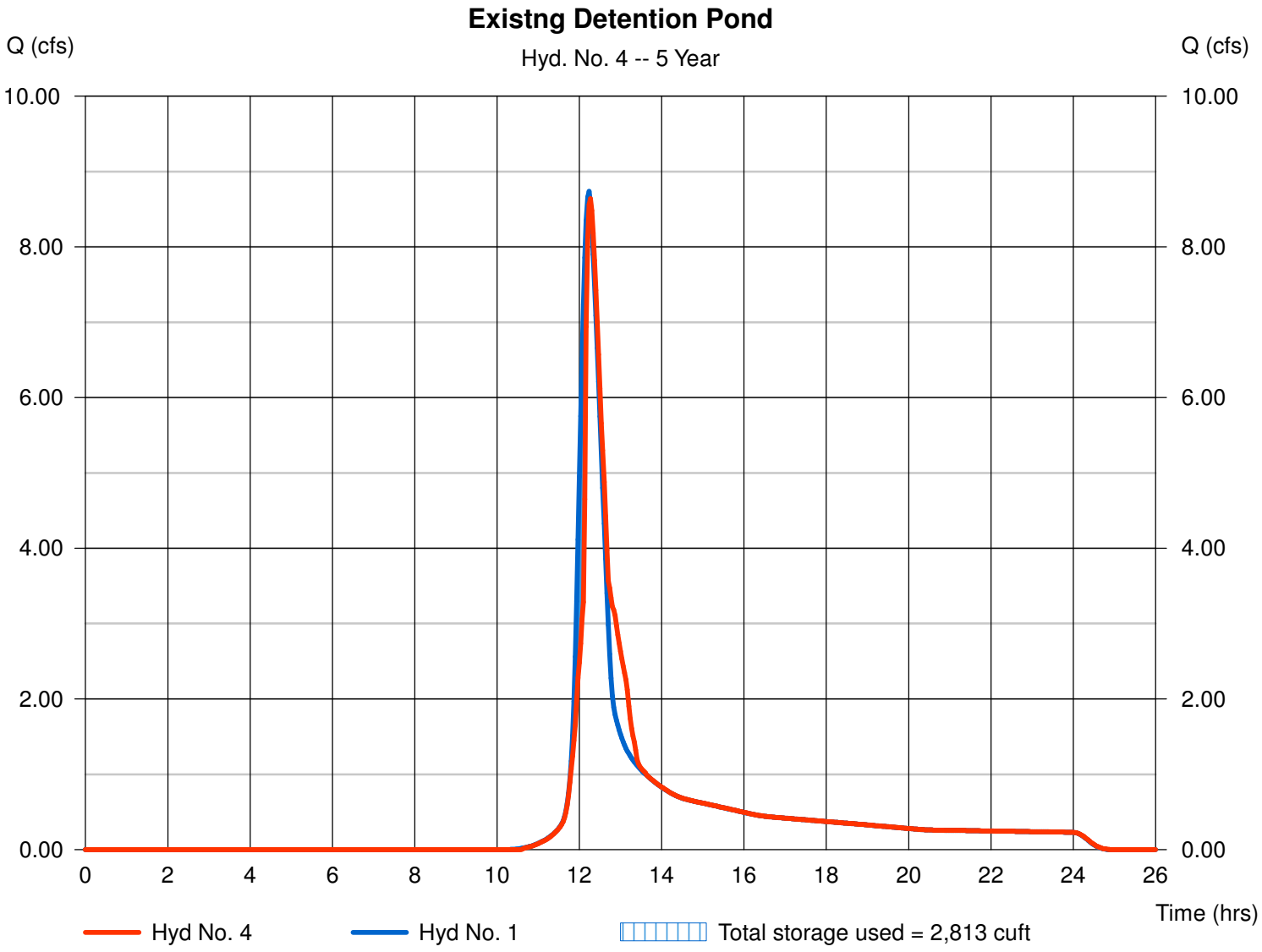
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 4

Existng Detention Pond

Hydrograph type	=	Reservoir	Peak discharge	=	8.638 cfs
Storm frequency	=	5 yrs	Time to peak	=	12.27 hrs
Time interval	=	2 min	Hyd. volume	=	39,225 cuft
Inflow hyd. No.	=	1 - Area 2	Max. Elevation	=	881.40 ft
Reservoir name	=	Existing Detention Pond	Max. Storage	=	2,813 cuft

Storage Indication method used.



Hydrograph Report

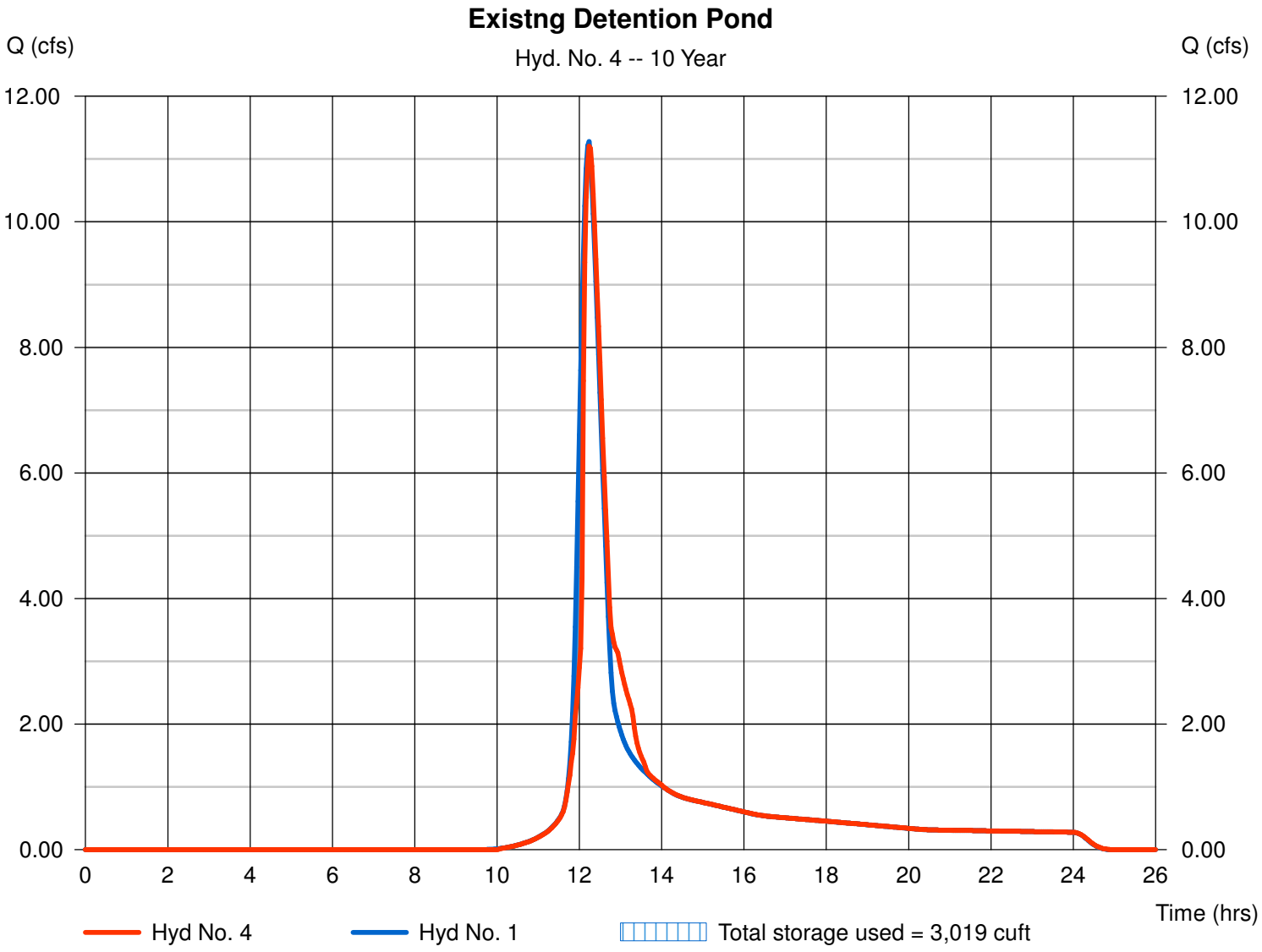
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 4

Existng Detention Pond

Hydrograph type	=	Reservoir	Peak discharge	=	11.20 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.23 hrs
Time interval	=	2 min	Hyd. volume	=	49,833 cuft
Inflow hyd. No.	=	1 - Area 2	Max. Elevation	=	881.46 ft
Reservoir name	=	Existing Detention Pond	Max. Storage	=	3,019 cuft

Storage Indication method used.



Hydrograph Report

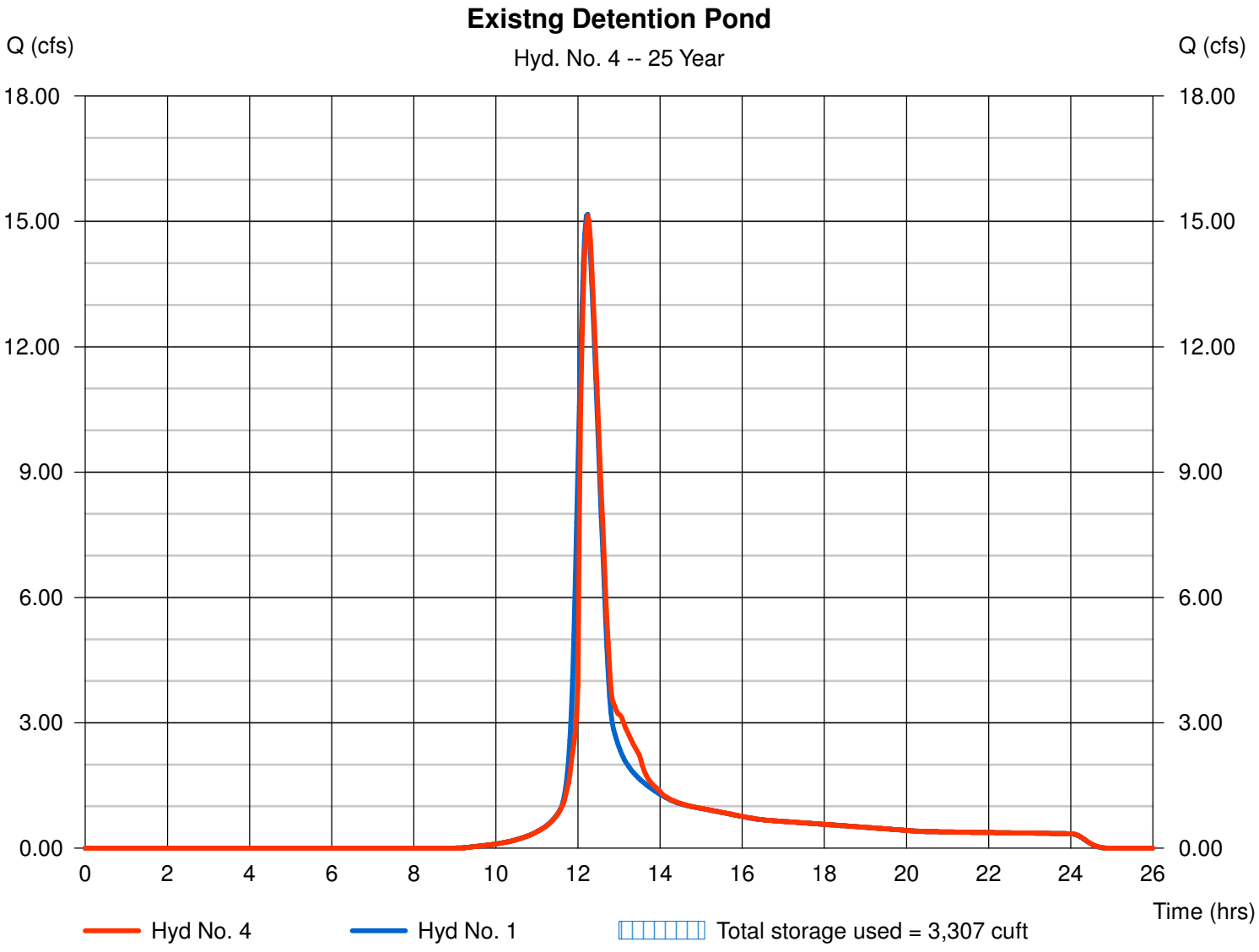
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 4

Existng Detention Pond

Hydrograph type	=	Reservoir	Peak discharge	=	15.13 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.23 hrs
Time interval	=	2 min	Hyd. volume	=	66,220 cuft
Inflow hyd. No.	=	1 - Area 2	Max. Elevation	=	881.56 ft
Reservoir name	=	Existing Detention Pond	Max. Storage	=	3,307 cuft

Storage Indication method used.



Hydrograph Report

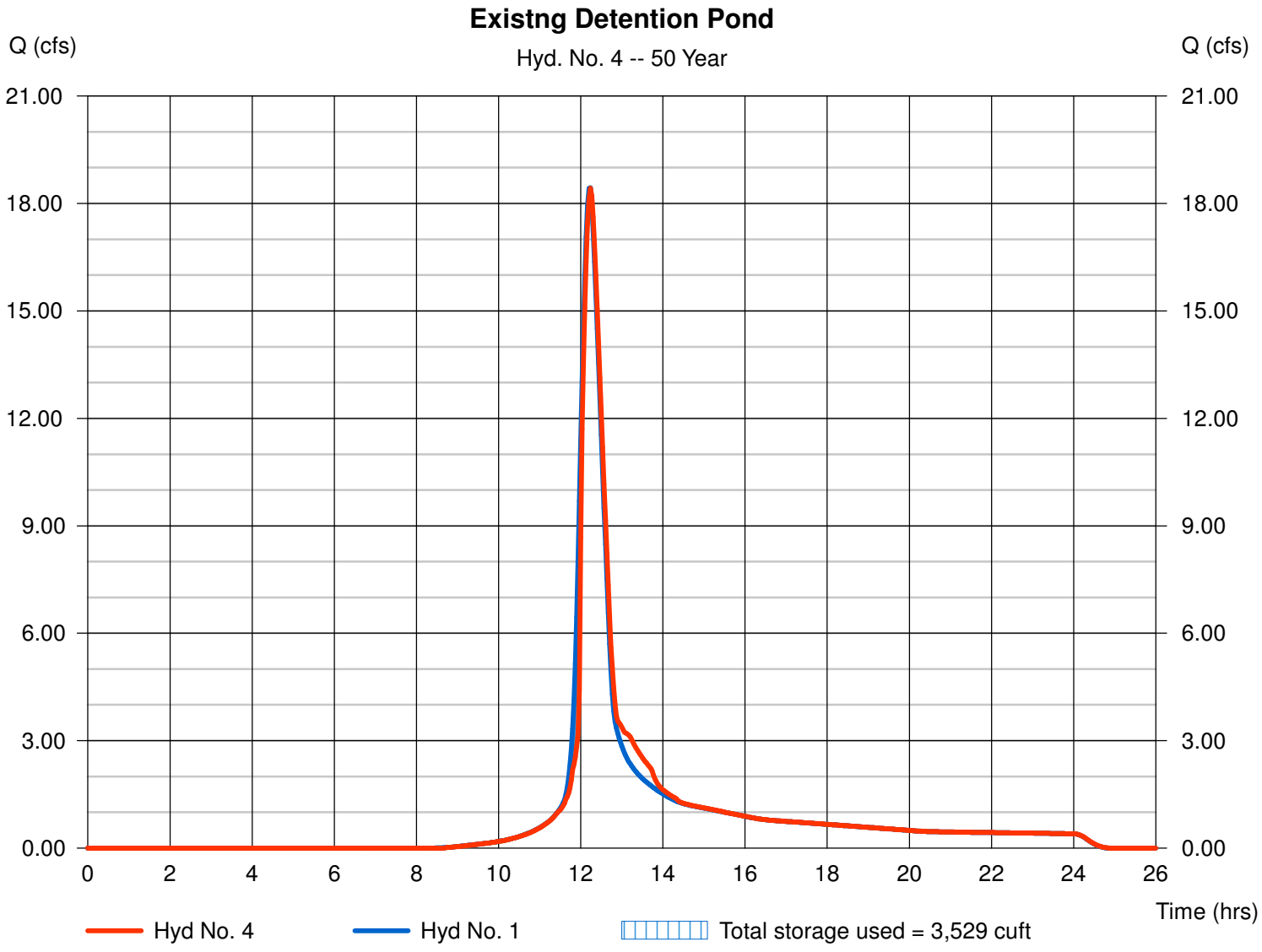
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 4

Existng Detention Pond

Hydrograph type	=	Reservoir	Peak discharge	=	18.42 cfs
Storm frequency	=	50 yrs	Time to peak	=	12.23 hrs
Time interval	=	2 min	Hyd. volume	=	80,091 cuft
Inflow hyd. No.	=	1 - Area 2	Max. Elevation	=	881.63 ft
Reservoir name	=	Existing Detention Pond	Max. Storage	=	3,529 cuft

Storage Indication method used.



Hydrograph Report

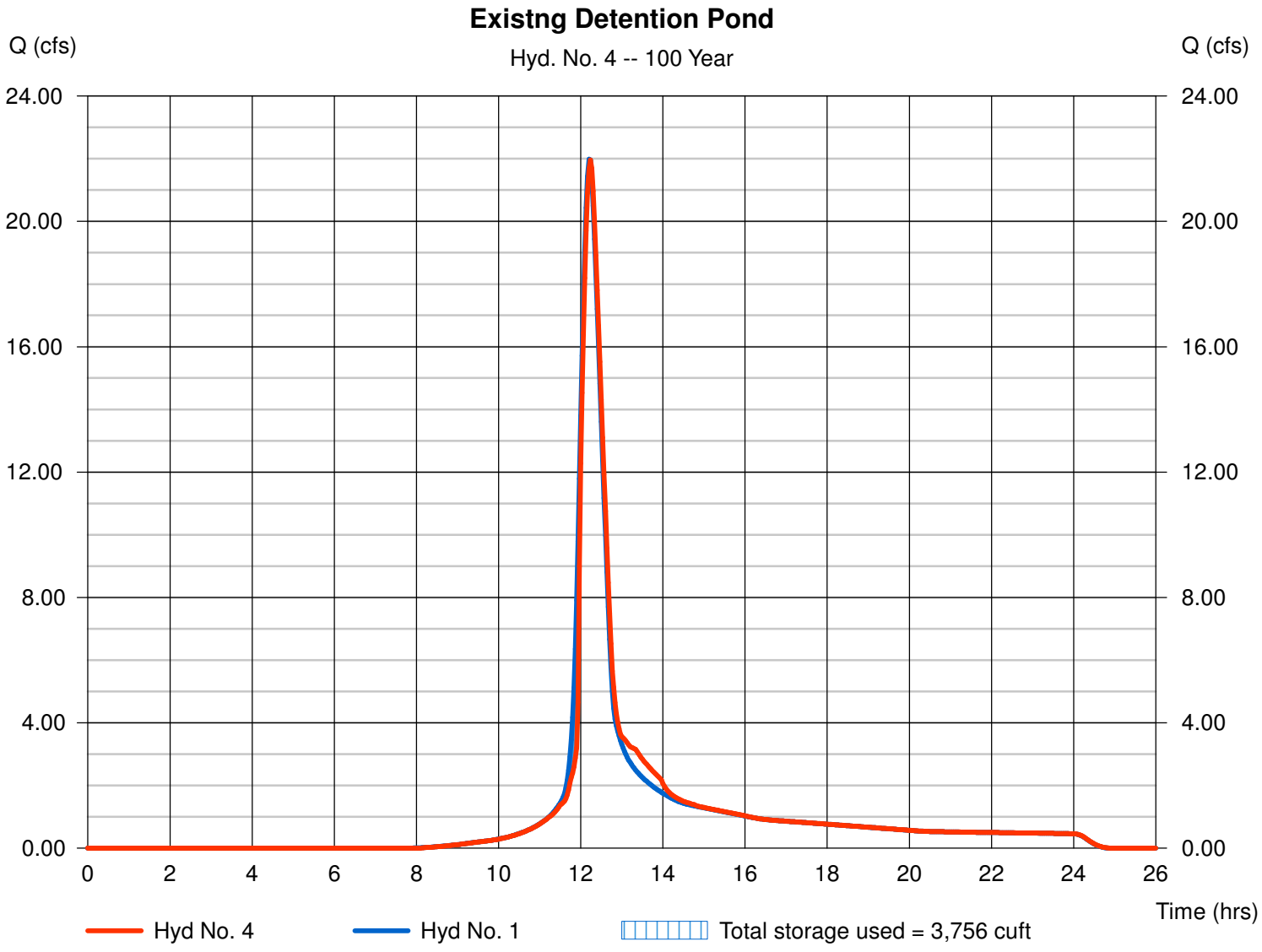
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 4

Existng Detention Pond

Hydrograph type	=	Reservoir	Peak discharge	=	21.96 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.23 hrs
Time interval	=	2 min	Hyd. volume	=	95,195 cuft
Inflow hyd. No.	=	1 - Area 2	Max. Elevation	=	881.70 ft
Reservoir name	=	Existing Detention Pond	Max. Storage	=	3,756 cuft

Storage Indication method used.



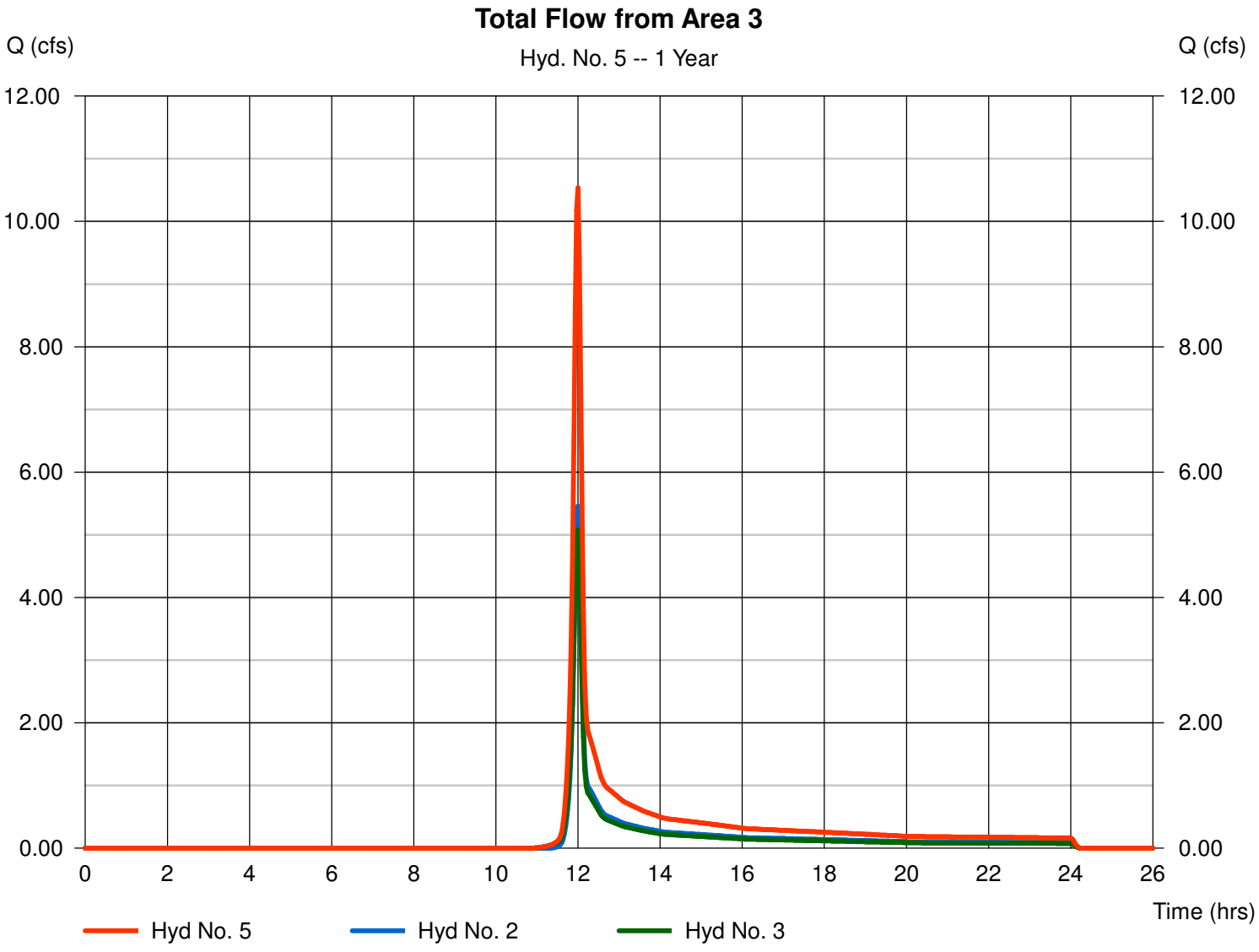
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 5

Total Flow from Area 3

Hydrograph type	= Combine	Peak discharge	= 10.53 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 24,707 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 7.160 ac



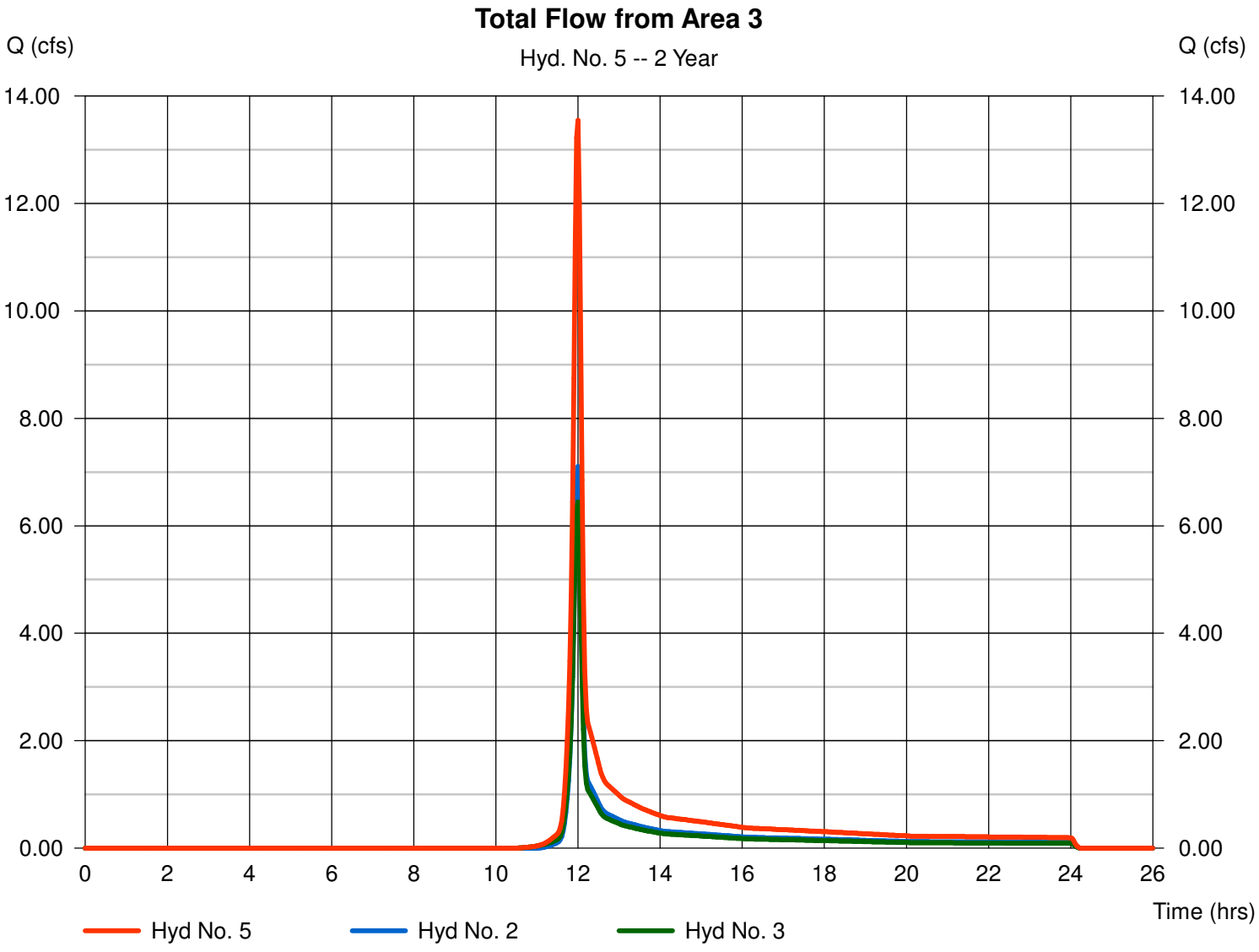
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 5

Total Flow from Area 3

Hydrograph type	= Combine	Peak discharge	= 13.55 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 31,359 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 7.160 ac



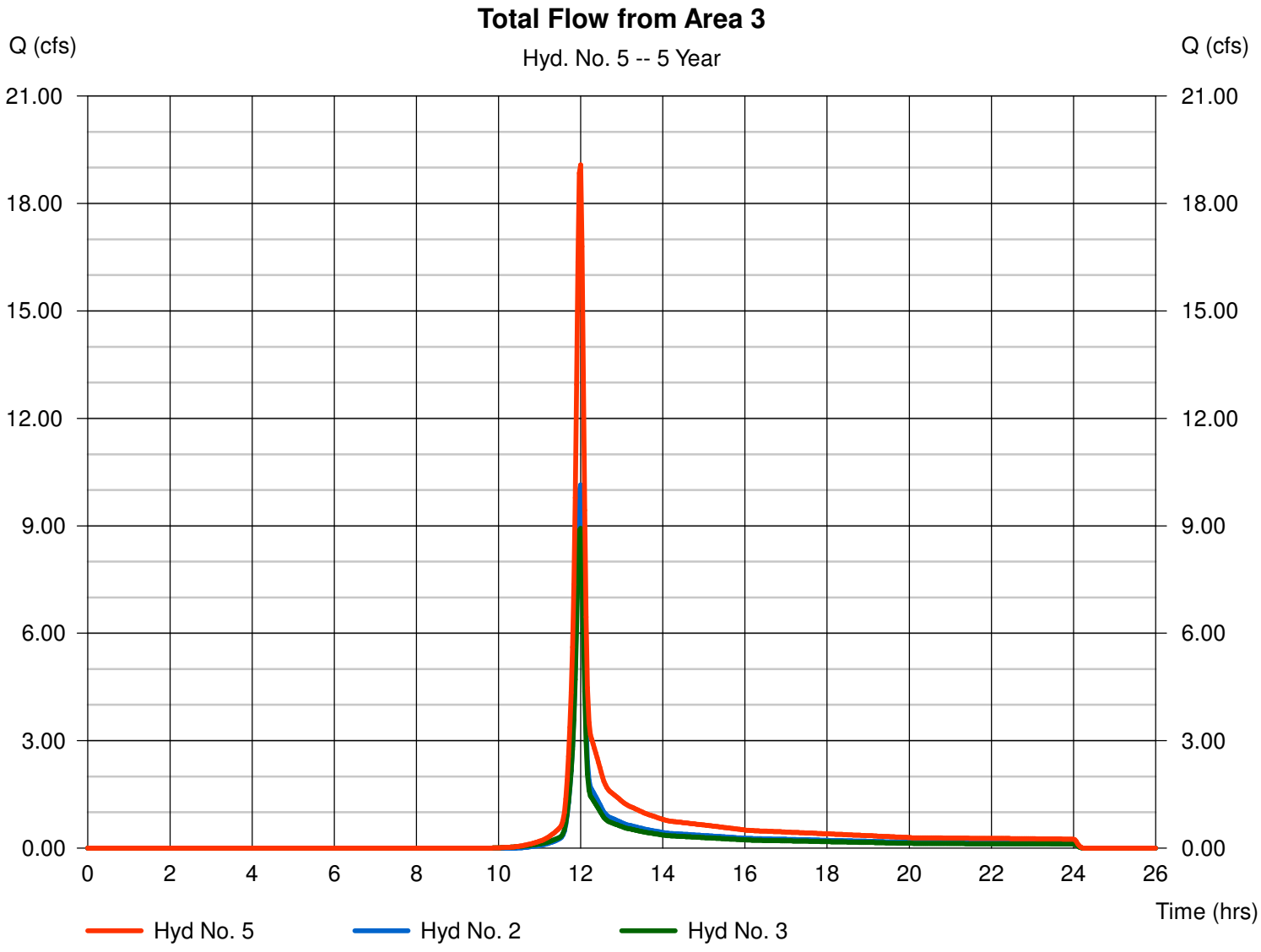
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 5

Total Flow from Area 3

Hydrograph type	= Combine	Peak discharge	= 19.08 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 43,758 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 7.160 ac



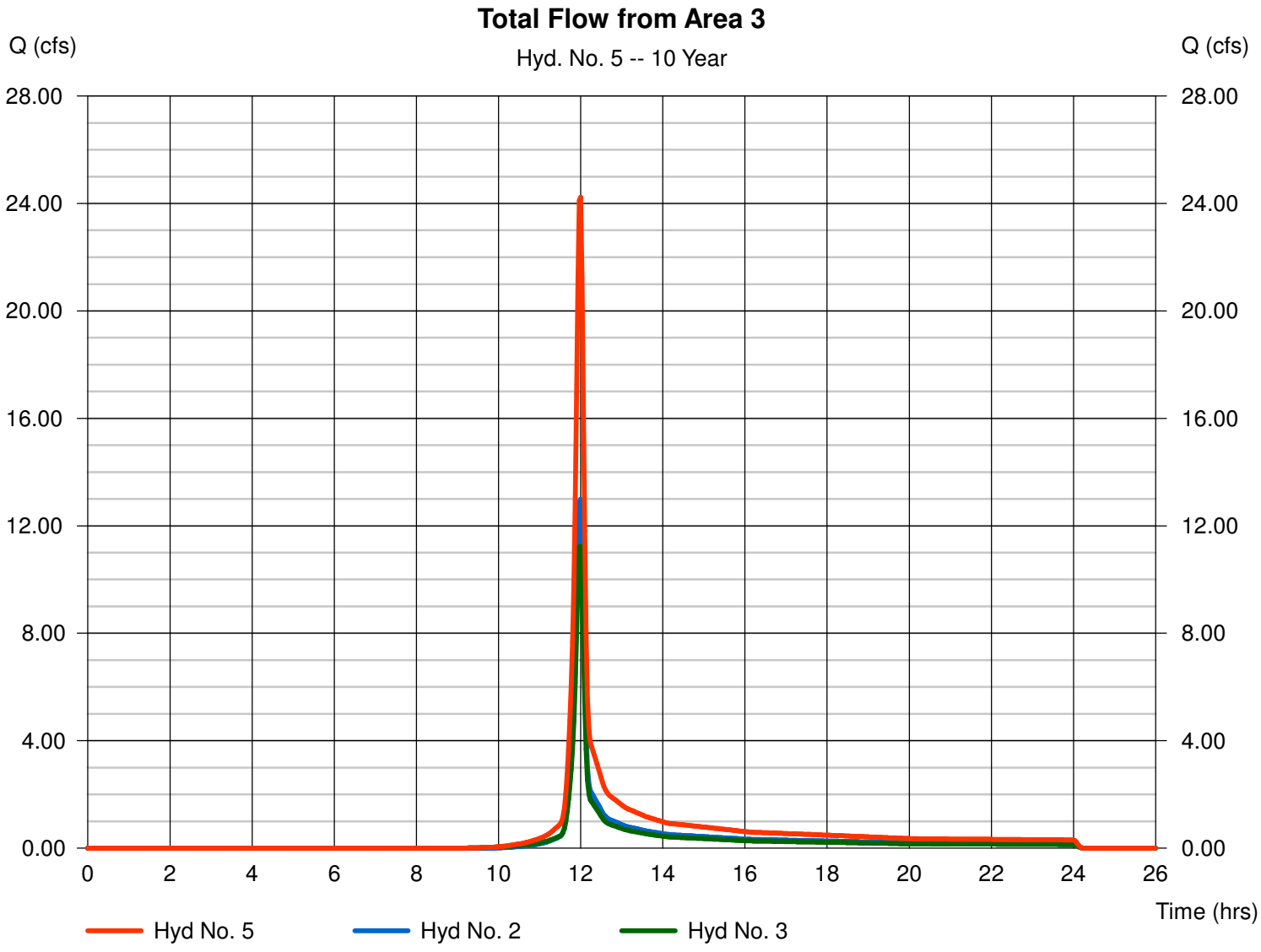
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 5

Total Flow from Area 3

Hydrograph type	= Combine	Peak discharge	= 24.23 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 55,493 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 7.160 ac



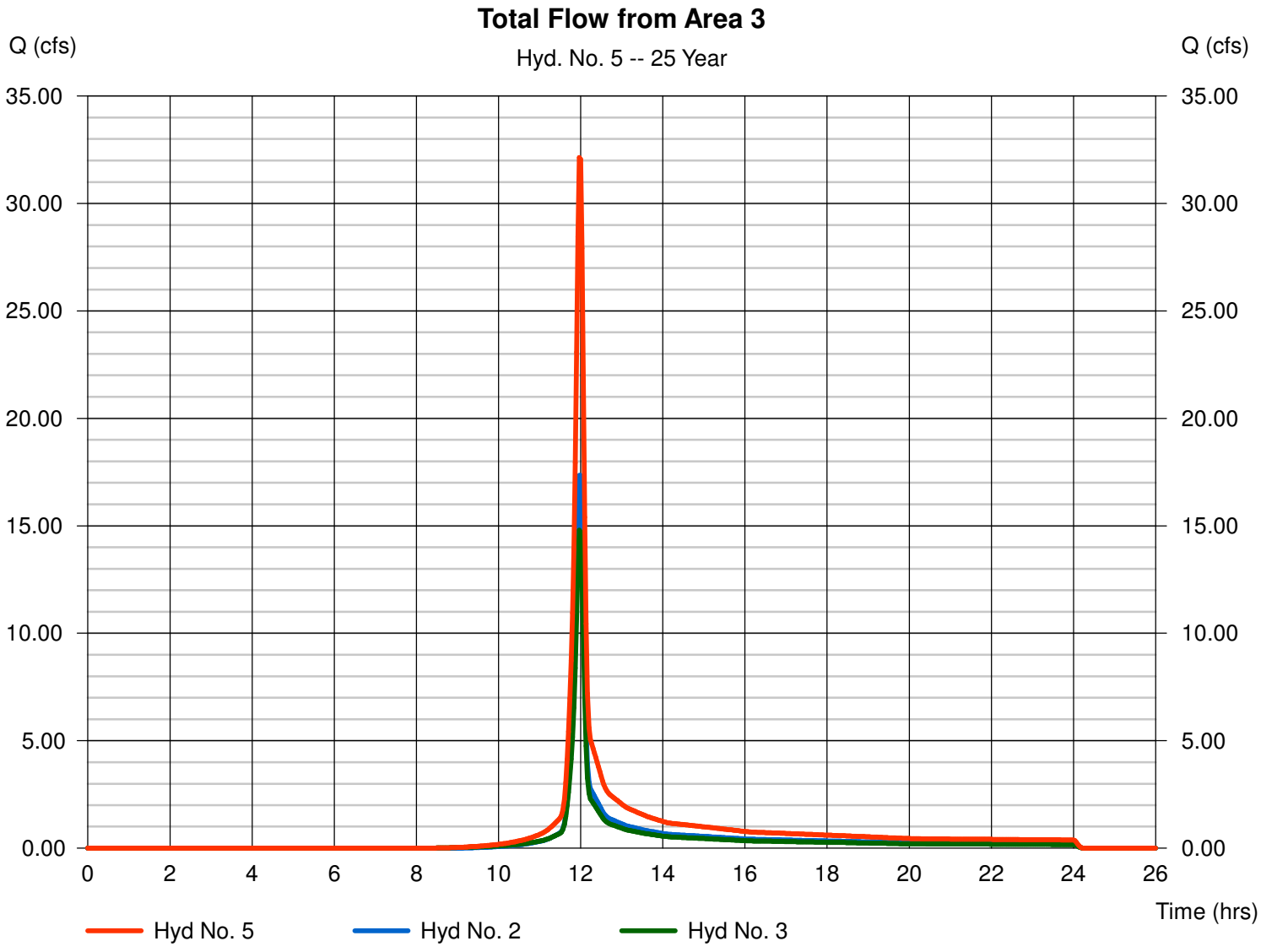
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 5

Total Flow from Area 3

Hydrograph type	= Combine	Peak discharge	= 32.14 cfs
Storm frequency	= 25 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 73,603 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 7.160 ac



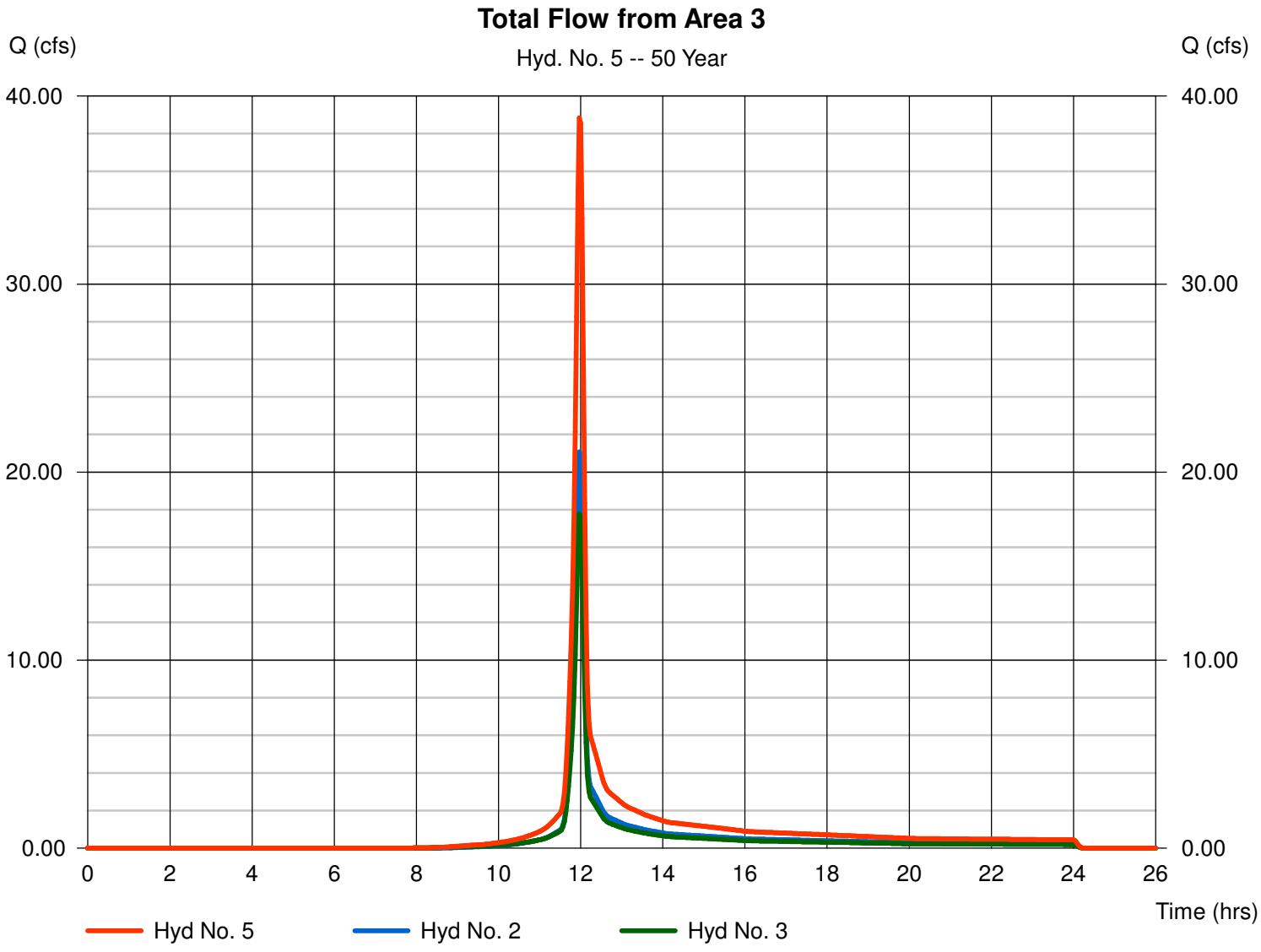
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 5

Total Flow from Area 3

Hydrograph type	= Combine	Peak discharge	= 38.84 cfs
Storm frequency	= 50 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 88,919 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 7.160 ac



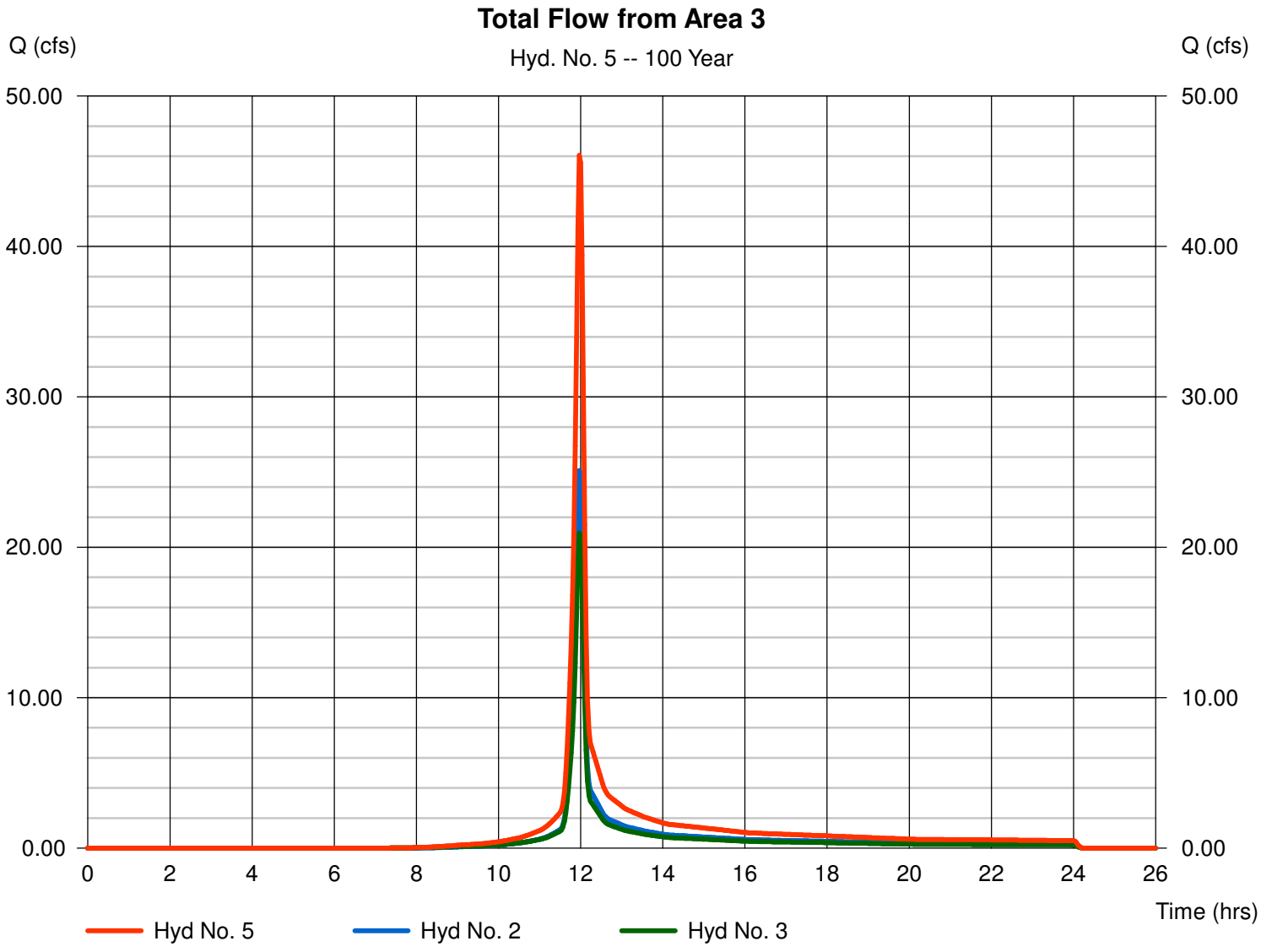
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 5

Total Flow from Area 3

Hydrograph type	= Combine	Peak discharge	= 46.06 cfs
Storm frequency	= 100 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 105,586 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 7.160 ac



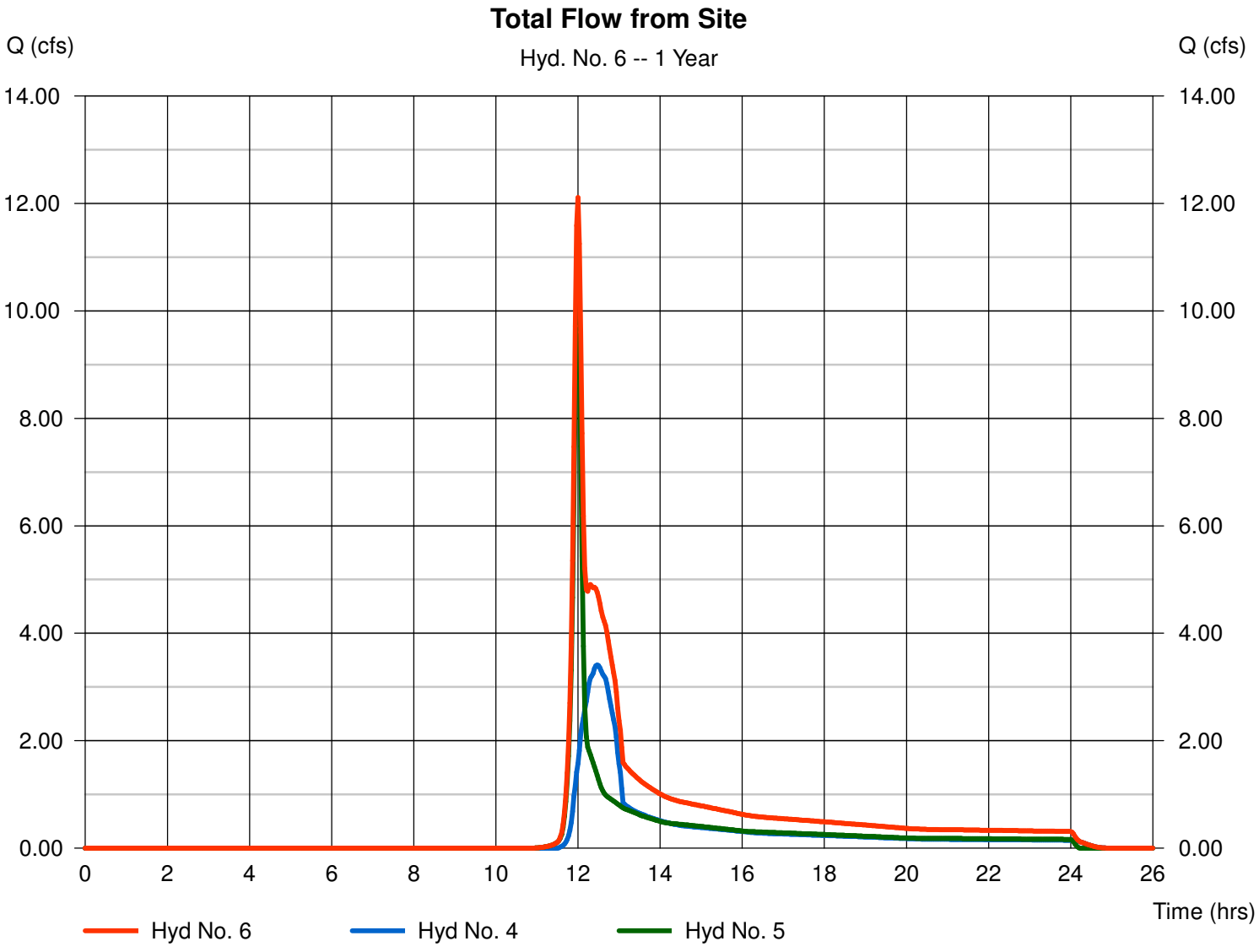
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 6

Total Flow from Site

Hydrograph type	= Combine	Peak discharge	= 12.11 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 46,742 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 0.000 ac



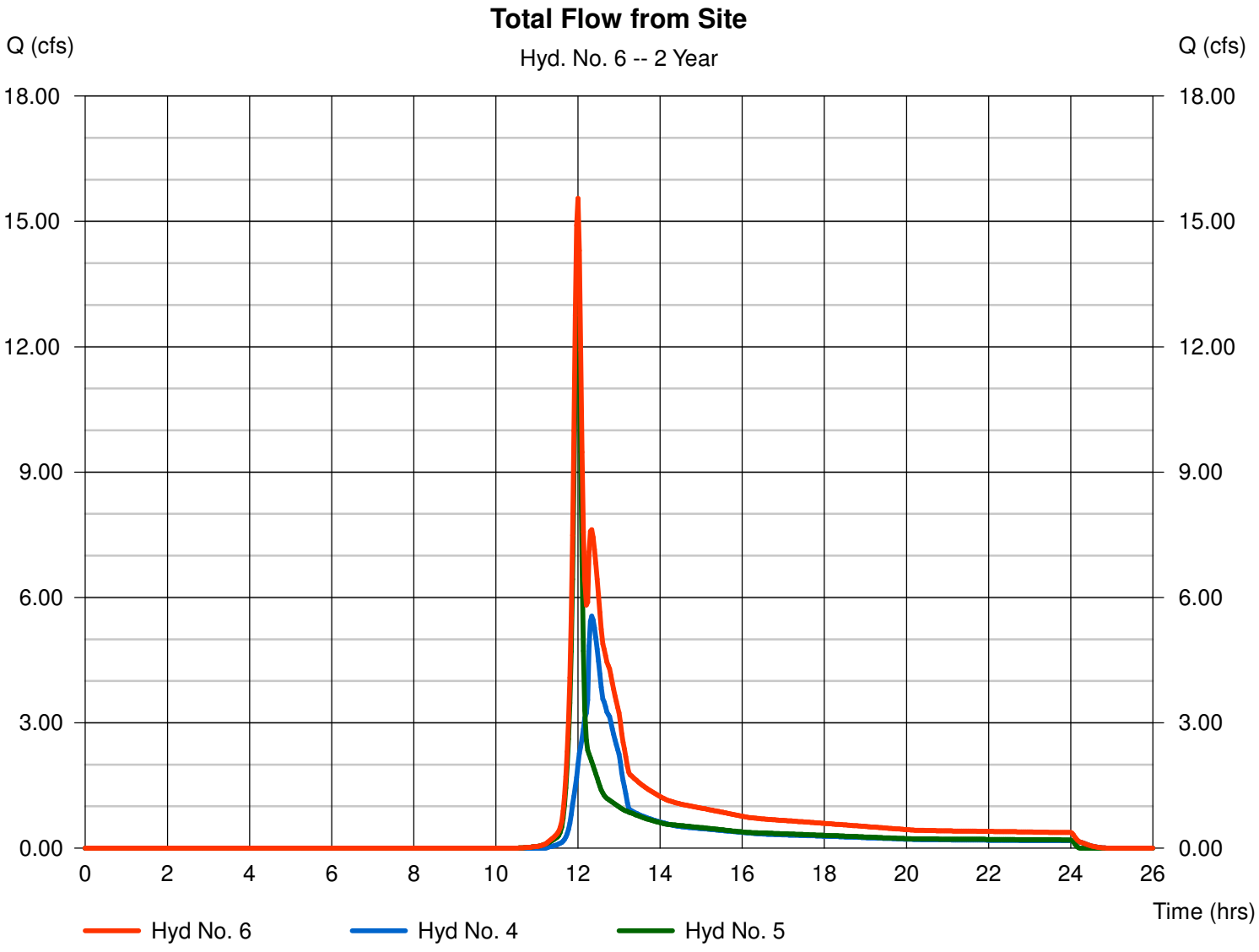
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 6

Total Flow from Site

Hydrograph type	= Combine	Peak discharge	= 15.55 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 59,391 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 0.000 ac



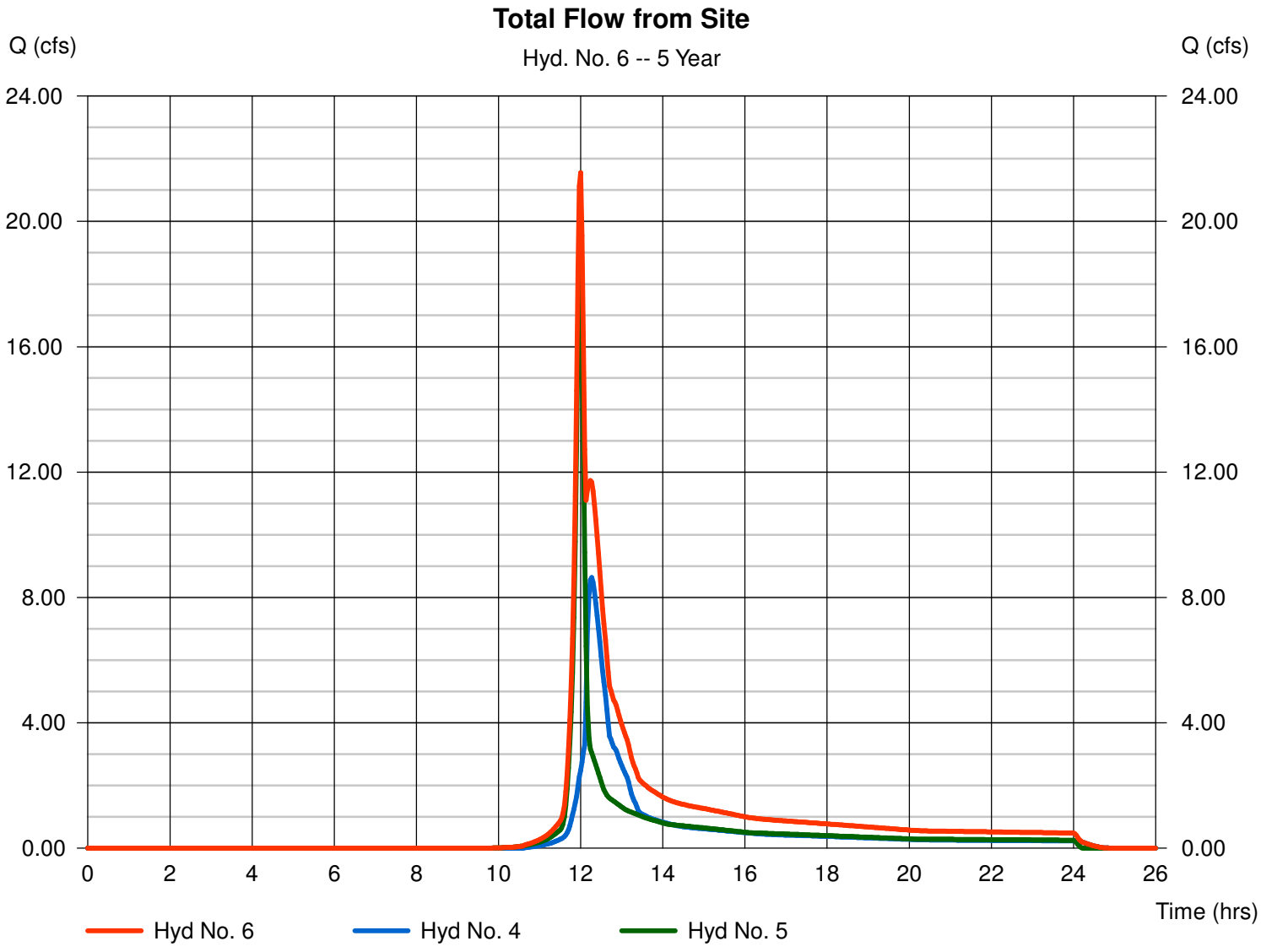
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 6

Total Flow from Site

Hydrograph type	= Combine	Peak discharge	= 21.56 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 82,984 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 0.000 ac



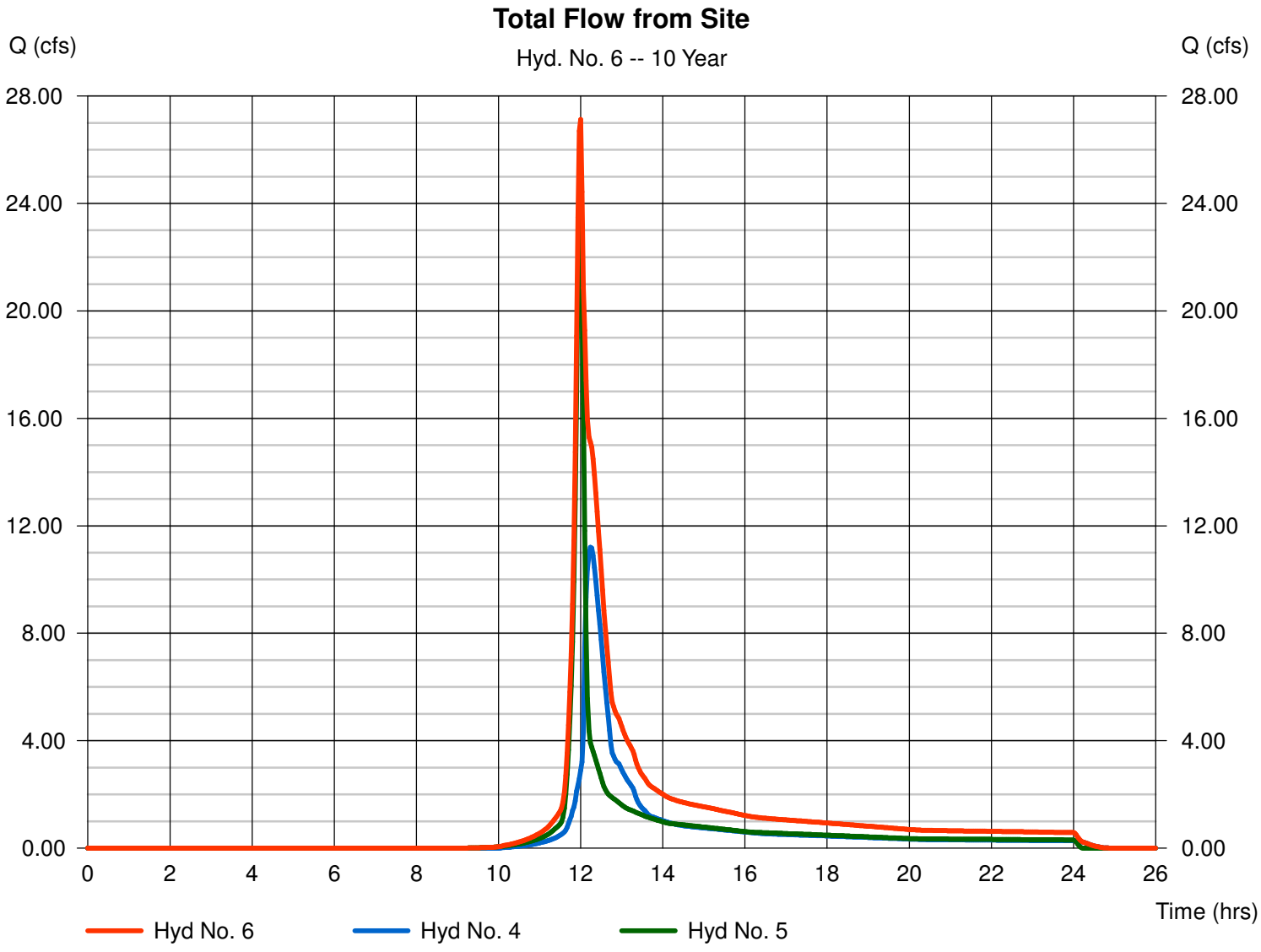
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 6

Total Flow from Site

Hydrograph type	= Combine	Peak discharge	= 27.13 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 105,326 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 0.000 ac



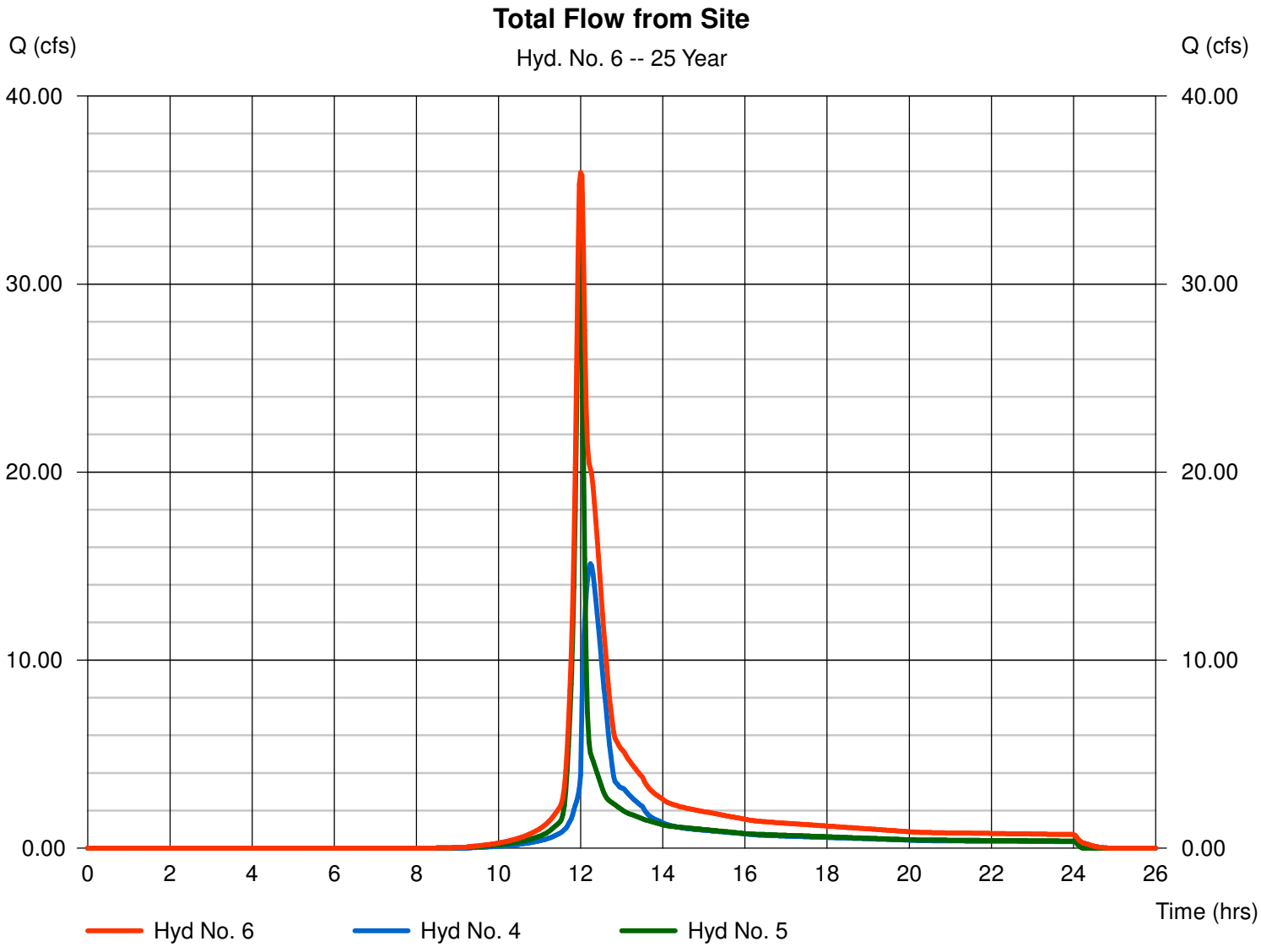
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 6

Total Flow from Site

Hydrograph type	= Combine	Peak discharge	= 35.94 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 139,824 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 0.000 ac



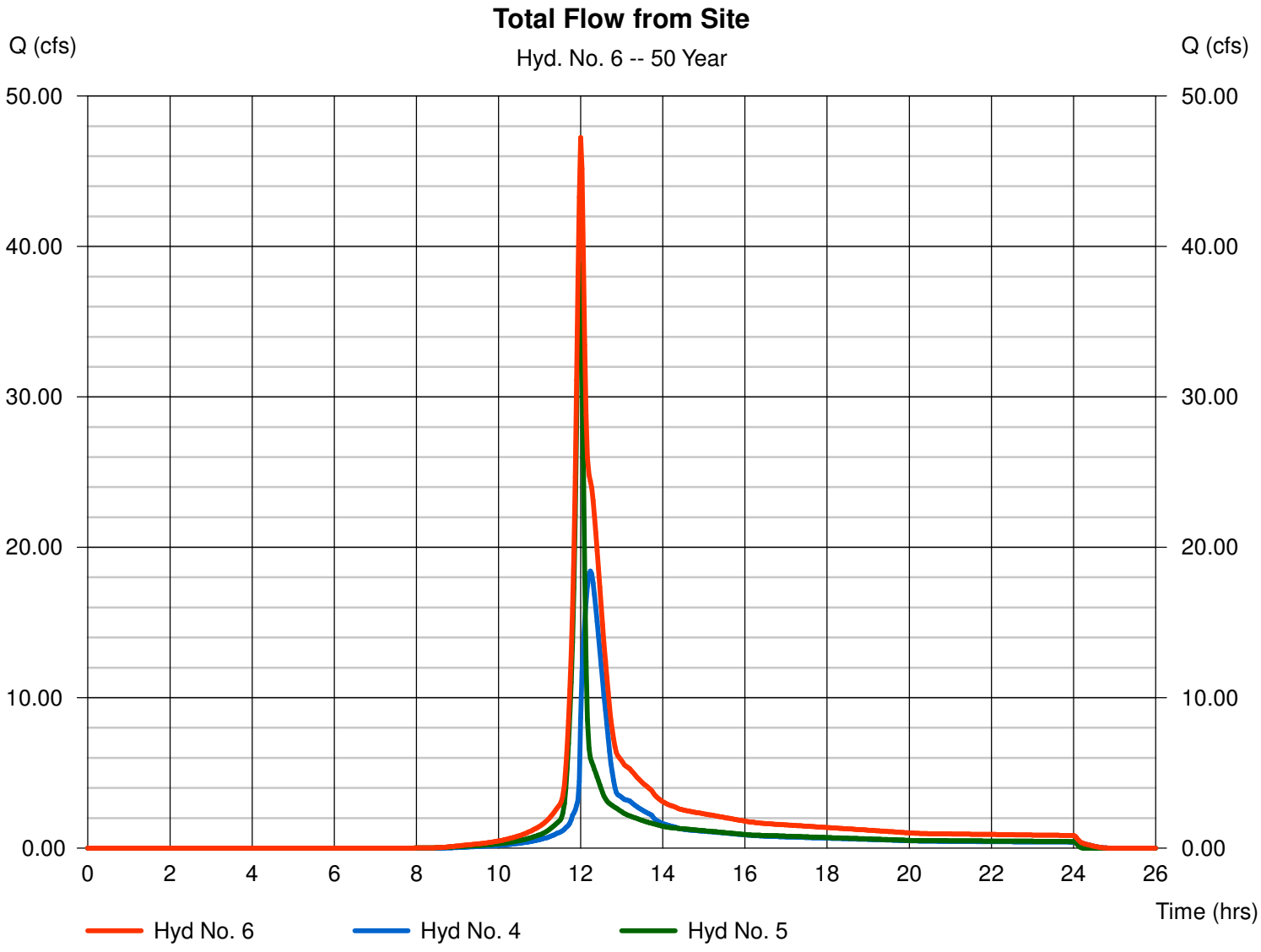
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 6

Total Flow from Site

Hydrograph type	= Combine	Peak discharge	= 47.23 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 169,010 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 0.000 ac



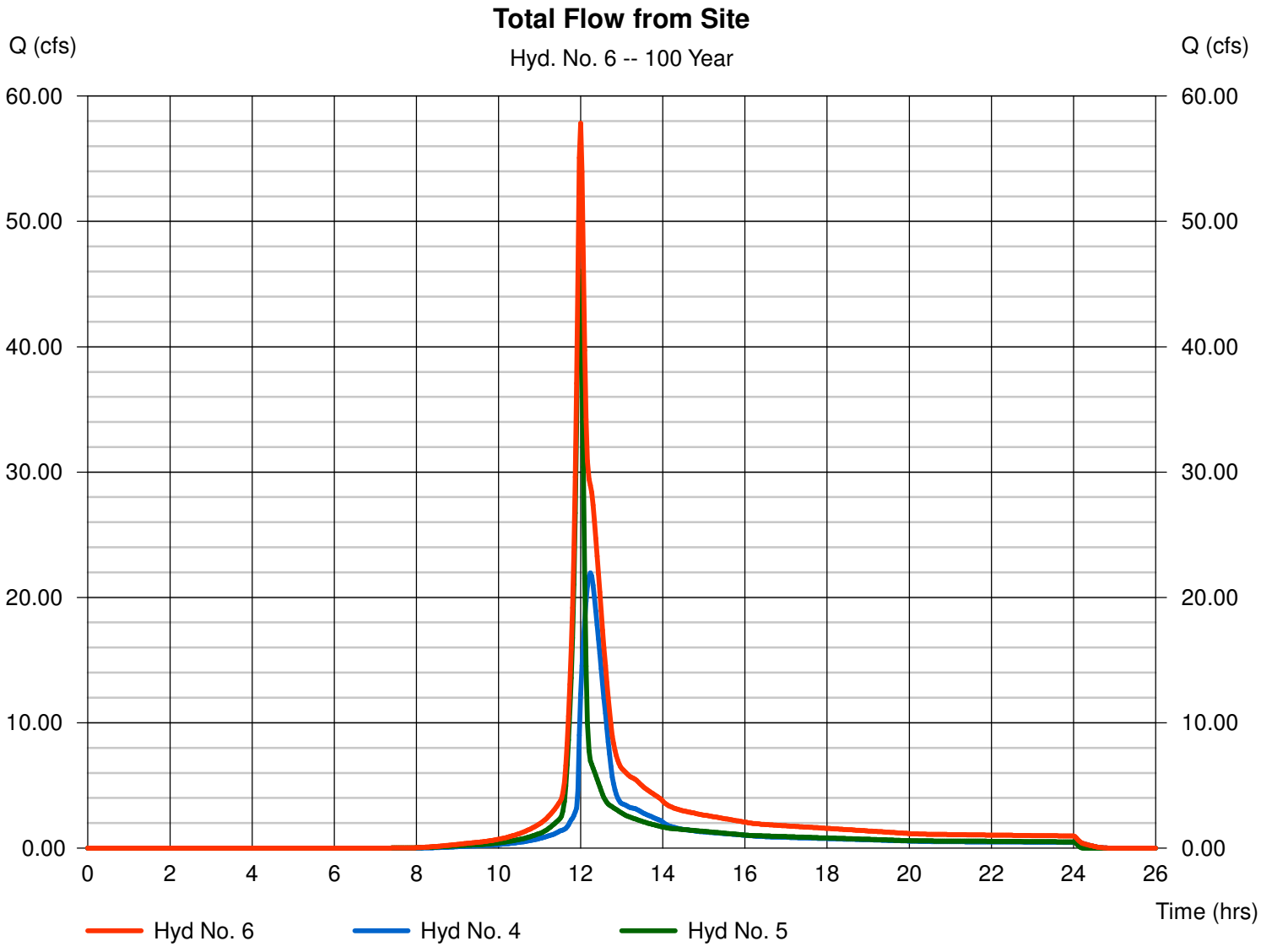
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

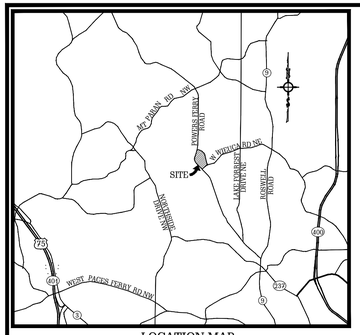
Hyd. No. 6

Total Flow from Site

Hydrograph type	= Combine	Peak discharge	= 57.83 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 200,781 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 0.000 ac



POST-DEVELOPED



LOCATION MAP
NOT TO SCALE

PROJECT NARRATIVE

1. THE PROPOSED DEVELOPMENT IS LOCATED IN THE CITY OF ATLANTA, FULTON COUNTY, GEORGIA 30327 AND IS SURROUNDED BY RESIDENTIAL AND RECREATIONAL LAND.

2. PROJECT AREA: ±15.497 ACRES; DISTURBED AREA: ±5.0 ACRES.

3. PROPERTY IS LOCATED IN LAND LOTS #118 AND #138, 17TH L.D., 4371 POWERS FERRY ROAD, ATLANTA, FULTON COUNTY, GA 30327. LATITUDE: 33.8742° N, LONGITUDE: 84.3958° W.

4. CURRENT PROPERTY USE: HORSE PARK

5. CURRENT ZONING: R-3 RESIDENTIAL - SINGLE FAMILY

6. BUILDING SETBACK LINES:
   FRONT = 50' FROM PROPERTY LINE,
   REAR = 20' FROM PROPERTY LINE,
   SIDE = 10' FROM PROPERTY LINE.

7. PROJECT OWNER/24 HOUR CONTACT:
   OWNER:
   THE BOARD OF DIRECTORS
   CHASTAIN HORSE PARK
   4371 POWERS FERRY ROAD
   ATLANTA, GA 30327
   24 HOUR CONTACT:
   MS. TRISHA CROSS
   EXECUTIVE DIRECTOR
   TEL : (206) 850-5686

GRAPHIC SCALE
0 50 100
SCALE: 1" = 50'

AREA 1 = 1.91 Ac.

AREA 2 = 6.36 Ac.
WEIGHTED CN = 71
0.13/100 = 0.13%
20.65/335 = 6.16%
25.69/559 = 4.60%

AREA 3/1 = 0.05 Ac.
WEIGHTED CN = 98
Tc = 5 MIN.

AREA 3/2 = 0.12 Ac.
WEIGHTED CN = 89
Tc = 5 MIN.

AREA 3/3 = 0.24 Ac.
WEIGHTED CN = 89
Tc = 5 MIN.

AREA 3/4 = 0.05 Ac.
WEIGHTED CN = 98
Tc = 5 MIN.

AREA 3/5 = 0.11 Ac.
WEIGHTED CN = 98
Tc = 5 MIN.

AREA 3/6 = 0.30 Ac.
WEIGHTED CN = 62
9.38/100 = 9.38%
4.00/74 = 5.41%

AREA 3/7 = 0.15 Ac.
WEIGHTED CN = 76
Tc = 5 MIN.

AREA 3/8 = 0.12 Ac.
WEIGHTED CN = 80
Tc = 5 MIN.

AREA 3/9 = 0.02 Ac.
WEIGHTED CN = 98
Tc = 5 MIN.

AREA 3/10 = 0.02 Ac.
WEIGHTED CN = 98
Tc = 5 MIN.

AREA 3/11 = 0.25 Ac.
WEIGHTED CN = 65
Tc = 5 MIN.

AREA 3/12 = 0.03 Ac.
WEIGHTED CN = 98
Tc = 5 MIN.

AREA 3/13 = 0.02 Ac.
WEIGHTED CN = 98
Tc = 5 MIN.

AREA 3/14 = 0.22 Ac.
WEIGHTED CN = 61
17.83/100 = 17.83%
0.39/58 = 1.71%

AREA 3/15 = 0.59 Ac.
WEIGHTED CN = 61
20.87/100 = 20.87%
11.38/134 = 8.49%

AREA 3/16 = 0.14 Ac.
WEIGHTED CN = 74
14.12/100 = 14.12%
0.13/3 = 3.80%

AREA 3/17 = 0.26 Ac.
WEIGHTED CN = 74
20.74/100 = 20.74%
0.13/70 = 0.18%

AREA 3/18 = 0.12 Ac.
WEIGHTED CN = 86
3.30/100 = 3.30%
0.20/3 = 6.67%

AREA 3/21 = 0.04 Ac.
WEIGHTED CN = 89
Tc = 5 MIN.

AREA 3/20 = 0.05 Ac.
WEIGHTED CN = 98
Tc = 5 MIN.

AREA 3/19 = 0.07 Ac.
WEIGHTED CN = 98
Tc = 5 MIN.

AREA 3/22 = 0.03 Ac.
WEIGHTED CN = 98
Tc = 5 MIN.

AREA 3/23 = 3.98 Ac.
WEIGHTED CN = 71
18.03/100 = 18.03%
32.74/167 = 19.59%

AREA TO ST 16 = 0.67 Ac.
(FOR PIPE DESIGN ONLY)
WEIGHTED CN = 75
20.87/100 = 20.87%
11.38/134 = 8.49%

AREA 3/3 = 0.26 Ac.
WEIGHTED CN = 98
Tc = 5 MIN.

LEGEND

EXISTING		PROPOSED	
C.M.S.	CONCRETE MONUMENT SET		
P.I.P.	IRON PIN PLACED		
C.M.F.	CONCRETE MONUMENT FOUND		
I.P.F.	IRON PIN FOUND		
G.P.F.	GALVANIZED PIPE FOUND		
—W—	EXISTING WATER MAIN	—W—	PROPOSED WATER MAIN
	EXISTING FIRE HYDRANT		PROPOSED FIRE HYDRANT
	EXISTING WATER VALVE		PROPOSED WATER VALVE
	EXISTING WATER METER		PROPOSED WATER METER
—SS—	EXISTING SANITARY SEWER	—SS—	PROPOSED SANITARY SEWER
(S)	EXISTING SANITARY SEWER MANHOLE	(S)	PROPOSED SANITARY SEWER MANHOLE
	EXISTING CONCRETE PIPE		PROPOSED CONCRETE PIPE
(ST)	EXISTING STORM SEWER MANHOLE	(ST)	PROPOSED STORM SEWER MANHOLE
	EXISTING POWER POLE (P.P.)		PROPOSED POWER POLE (P.P.)
—OHP—	EXISTING OVER HEAD POWER	—OHP—	PROPOSED OVER HEAD POWER
—UGP—	EXISTING UNDERGROUND POWER	—UGP—	PROPOSED UNDERGROUND POWER
—UGT—	EXISTING TELEPHONE LINE BURIED UNDER GROUND	—UGT—	PROPOSED TELEPHONE LINE BURIED UNDER GROUND
—CTV—	EXISTING CABLE	—CTV—	PROPOSED CABLE
—100—	EXISTING CONTOUR	—101—	PROPOSED CONTOUR
	EXISTING TREE		PROPOSED TREE
	SOILS LINES		
	100-YR FLOODPLAIN BOUNDARY		
	EXISTING ITEMS TO BE DEMOLISHED		
	EXISTING FLARED END SECTION		PROPOSED FLARED END SECTION
R/W	EXISTING RIGHT OF WAY	R/W	PROPOSED RIGHT OF WAY
	EXISTING LOT BOUNDARY CORNER		PROPOSED LOT BOUNDARY CORNER
	EXISTING FENCE		PROPOSED FENCE
C/L	EXISTING CENTERLINE	C/L	CENTERLINE
			SILT FENCE
			RIP-RAP

REDUCED SIZE DRAWING

GEORGIA 811
Utilities Protection Center, Inc.
Know what's below. Call before you dig.

VDWE
VAN DER WATT ENGINEERING, LLC
CONSULTING CIVIL ENGINEERS
84 BENT OAK CIRCLE,
THOMASVILLE, GA 31757-9502
TEL: (229) 551-0363
FAX: (229) 227-6593
E-MAIL: JJ@VDWENGINEERS.COM
CERT. OF AUTH. GA # PEF004845

PROJECT:
PROPOSED ALTERATIONS TO CHASTAIN PARK EQUESTRIAN PARK
4371 POWERS FERRY ROAD
ATLANTA, GA 30327

CLIENT:
CHASTAIN PARK
ATLANTA, GA

DRAWING TITLE:
POST-DEVELOPMENT DRAINAGE AREAS

PROJ. No.:	19-003	DRAWN BY:	jj
DWG NAME:	PRE AND POST DEVELOPMENT AREAS.dwg	CHECKED BY:	jj
SCALE:	1" = 50'	DATE:	26 JUL 2021

REVISIONS

NO.	DATE	INITIALS	DESCRIPTION
1.	07/26/2021	jj	CHANGE ALL PROPOSED NEW FACILITIES
2.	08/12/2021	jj	ADD BUILDING SETBACK LINES
3.	09/20/2021	jj	REROUTE SOME STORMWATER PIPELINES AND RECONFIGURE DETENTION POND
4.	08/15/2022	jj	CHANGE MANAGERS COTTAGE & EQUIPMENT BARN
5.	05/10/2023	jj	CHANGE EQUIPMENT BARN, COVER BOARDING ARENA AND REVISE DRAINAGE AREAS #3/9, #3/10, #3/13, #3/17, #3/18 AND 3/23.

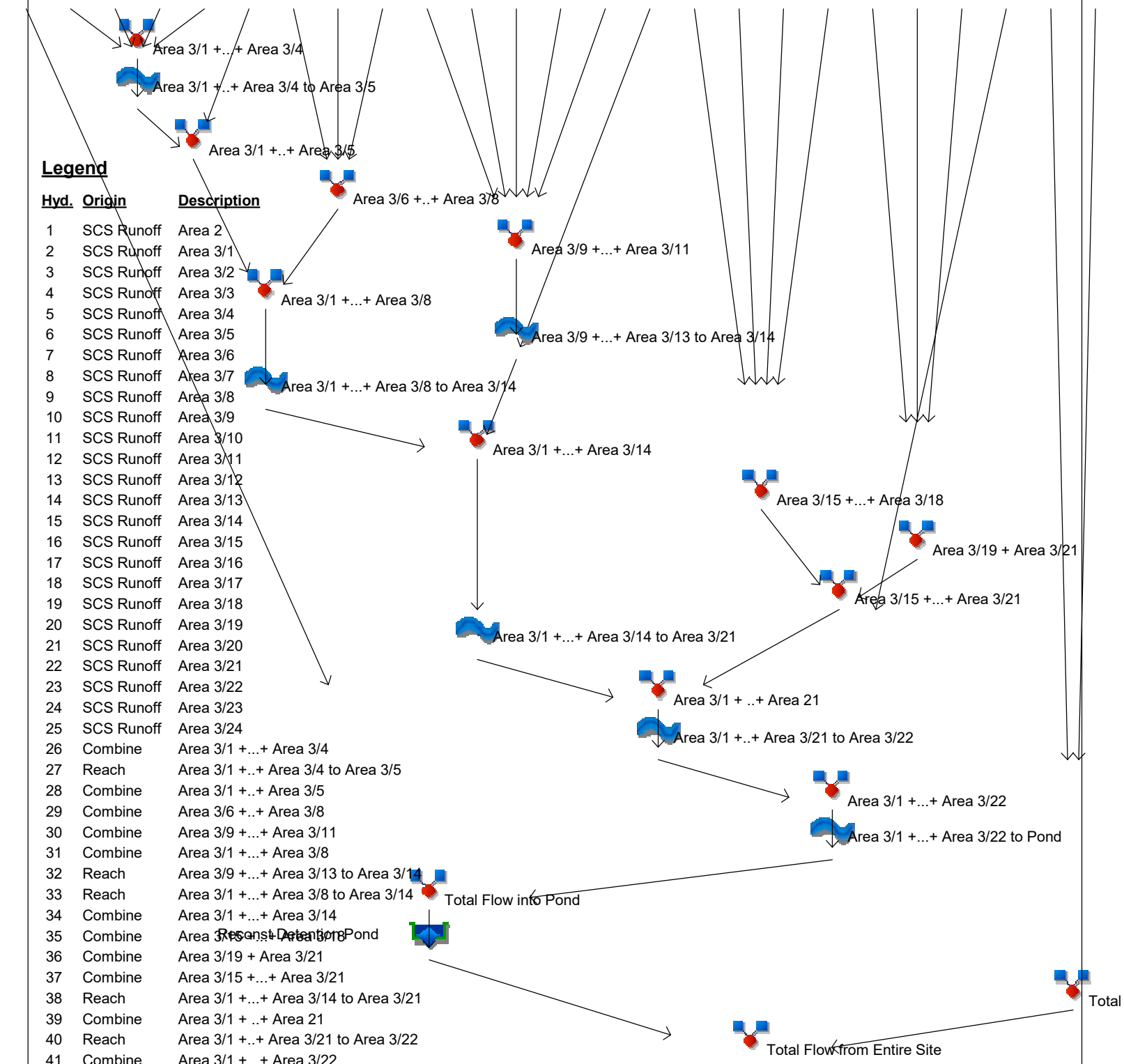
RELEASED FOR CONSTRUCTION

SHEET NO.
C16

GEORGIA REGISTERED No. 030867 PROFESSIONAL ENGINEER JOHAN VAN DER WATT

Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023



Legend

Hyd.	Origin	Description
1	SCS Runoff	Area 2
2	SCS Runoff	Area 3/1
3	SCS Runoff	Area 3/2
4	SCS Runoff	Area 3/3
5	SCS Runoff	Area 3/4
6	SCS Runoff	Area 3/5
7	SCS Runoff	Area 3/6
8	SCS Runoff	Area 3/7
9	SCS Runoff	Area 3/8
10	SCS Runoff	Area 3/9
11	SCS Runoff	Area 3/10
12	SCS Runoff	Area 3/11
13	SCS Runoff	Area 3/12
14	SCS Runoff	Area 3/13
15	SCS Runoff	Area 3/14
16	SCS Runoff	Area 3/15
17	SCS Runoff	Area 3/16
18	SCS Runoff	Area 3/17
19	SCS Runoff	Area 3/18
20	SCS Runoff	Area 3/19
21	SCS Runoff	Area 3/20
22	SCS Runoff	Area 3/21
23	SCS Runoff	Area 3/22
24	SCS Runoff	Area 3/23
25	SCS Runoff	Area 3/24
26	Combine	Area 3/1 +...+ Area 3/4
27	Reach	Area 3/1 +..+ Area 3/4 to Area 3/5
28	Combine	Area 3/1 +..+ Area 3/5
29	Combine	Area 3/6 +..+ Area 3/8
30	Combine	Area 3/9 +...+ Area 3/11
31	Combine	Area 3/1 +...+ Area 3/8
32	Reach	Area 3/9 +...+ Area 3/13 to Area 3/14
33	Reach	Area 3/1 +...+ Area 3/8 to Area 3/14
34	Combine	Area 3/1 +...+ Area 3/14
35	Combine	Area 3/15 +...+ Area 3/18
36	Combine	Area 3/19 + Area 3/21
37	Combine	Area 3/15 +...+ Area 3/21
38	Reach	Area 3/1 +...+ Area 3/14 to Area 3/21
39	Combine	Area 3/1 + ..+ Area 21
40	Reach	Area 3/1 +..+ Area 3/21 to Area 3/22
41	Combine	Area 3/1 +...+ Area 3/22
42	Reach	Area 3/1 +...+ Area 3/22 to Pond
43	Combine	Total Flow into Pond
44	Reservoir	Reconst Detention Pond
45	Combine	Total Flow Bypassing Pond
46	Combine	Total Flow from Entire Site

Hydrograph Return Period Recap

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	------	4.540	5.977	-------	8.644	11.16	15.00	18.23	21.74	Area 2
2	SCS Runoff	------	0.222	0.250	-------	0.297	0.339	0.400	0.449	0.502	Area 3/1
3	SCS Runoff	------	0.428	0.497	-------	0.617	0.722	0.875	0.999	1.128	Area 3/2
4	SCS Runoff	------	0.856	0.994	-------	1.234	1.444	1.751	1.998	2.257	Area 3/3
5	SCS Runoff	------	0.222	0.250	-------	0.297	0.339	0.400	0.449	0.502	Area 3/4
6	SCS Runoff	------	0.489	0.549	-------	0.654	0.746	0.880	0.989	1.103	Area 3/5
7	SCS Runoff	------	0.232	0.335	-------	0.533	0.724	1.025	1.282	1.563	Area 3/6
8	SCS Runoff	------	0.310	0.384	-------	0.515	0.639	0.825	0.978	1.141	Area 3/7
9	SCS Runoff	------	0.299	0.362	-------	0.476	0.579	0.732	0.856	0.988	Area 3/8
10	SCS Runoff	------	0.089	0.100	-------	0.119	0.136	0.160	0.180	0.201	Area 3/9
11	SCS Runoff	------	0.089	0.100	-------	0.119	0.136	0.160	0.180	0.201	Area 3/10
12	SCS Runoff	------	0.256	0.351	-------	0.529	0.699	0.963	1.186	1.429	Area 3/11
13	SCS Runoff	------	0.133	0.150	-------	0.178	0.203	0.240	0.270	0.301	Area 3/12
14	SCS Runoff	------	0.089	0.100	-------	0.119	0.136	0.160	0.180	0.201	Area 3/13
15	SCS Runoff	------	0.152	0.225	-------	0.366	0.504	0.720	0.905	1.109	Area 3/14
16	SCS Runoff	------	0.408	0.604	-------	0.983	1.350	1.930	2.427	2.973	Area 3/15
17	SCS Runoff	------	0.261	0.327	-------	0.446	0.556	0.727	0.868	1.019	Area 3/16
18	SCS Runoff	------	0.485	0.607	-------	0.829	1.033	1.349	1.611	1.892	Area 3/17
19	SCS Runoff	------	0.363	0.428	-------	0.542	0.643	0.790	0.909	1.034	Area 3/18
20	SCS Runoff	------	0.311	0.350	-------	0.416	0.475	0.560	0.629	0.702	Area 3/19
21	SCS Runoff	------	0.222	0.250	-------	0.297	0.339	0.400	0.449	0.502	Area 3/20
22	SCS Runoff	------	0.143	0.166	-------	0.206	0.241	0.292	0.333	0.376	Area 3/21
23	SCS Runoff	------	0.133	0.150	-------	0.178	0.203	0.240	0.270	0.301	Area 3/22
24	SCS Runoff	------	6.253	8.015	-------	11.24	14.24	18.80	22.71	26.93	Area 3/23
25	SCS Runoff	------	1.155	1.298	-------	1.545	1.763	2.081	2.337	2.608	Area 3/24
26	Combine	2, 3, 4,	1.728	1.991	-------	2.445	2.845	3.426	3.895	4.388	Area 3/1 +...+ Area 3/4
27	Reach	5, 26	1.766	2.041	-------	2.512	2.927	3.528	4.011	4.518	Area 3/1 +..+ Area 3/4 to Area 3/5
28	Combine	6, 27	2.233	2.565	-------	3.136	3.639	4.367	4.954	5.570	Area 3/1 +..+ Area 3/5
29	Combine	7, 8, 9,	0.841	1.080	-------	1.520	1.930	2.556	3.092	3.675	Area 3/6 +..+ Area 3/8
30	Combine	10, 11, 12,	0.638	0.780	-------	1.040	1.288	1.667	1.985	2.328	Area 3/9 +...+ Area 3/11
31	Combine	13, 14, 28, 29,	3.073	3.645	-------	4.656	5.569	6.923	8.032	9.211	Area 3/1 +...+ Area 3/8
32	Reach	30	0.596	0.751	-------	1.027	1.278	1.664	2.004	2.369	Area 3/9 +...+ Area 3/13 to Area 3/14
33	Reach	31	3.096	3.671	-------	4.673	5.575	7.007	8.181	9.429	Area 3/1 +...+ Area 3/8 to Area 3/14
34	Combine	15, 32, 33	3.829	4.618	-------	6.010	7.335	9.391	11.09	12.91	Area 3/1 +...+ Area 3/14

Hydrograph Return Period Recap

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	
35	Combine	16, 17, 18, 19,	1.517	1.967	-------	2.800	3.582	4.780	5.784	6.869	Area 3/15 +...+ Area 3/18
36	Combine	20, 21, 22,	0.676	0.765	-------	0.919	1.055	1.252	1.412	1.580	Area 3/19 + Area 3/21
37	Combine	35, 36	2.165	2.700	-------	3.680	4.591	5.977	7.133	8.378	Area 3/15 +...+ Area 3/21
38	Reach	34	3.690	4.543	-------	5.999	7.351	9.536	11.32	13.22	Area 3/1 +...+ Area 3/14 to Area 3/21
39	Combine	37, 38	5.210	6.549	-------	8.960	11.17	14.47	17.19	20.22	Area 3/1 + ..+ Area 21
40	Reach	39	5.233	6.587	-------	8.979	11.25	14.78	17.70	20.84	Area 3/1 +..+ Area 3/21 to Area 3/22
41	Combine	23, 40	5.295	6.657	-------	9.061	11.40	14.96	17.90	21.06	Area 3/1 +...+ Area 3/22
42	Reach	41	5.197	6.625	-------	9.074	11.53	15.18	18.17	21.37	Area 3/1 +...+ Area 3/22 to Pond
43	Combine	1, 42	8.588	10.93	-------	15.51	19.68	25.88	31.04	36.91	Total Flow into Pond
44	Reservoir	43	1.260	2.117	-------	3.214	8.394	16.29	22.03	31.39	Reconst Detention Pond
45	Combine	24, 25,	7.356	9.254	-------	12.72	15.93	20.88	25.05	29.53	Total Flow Bypassing Pond
46	Combine	44, 45	7.461	9.379	-------	12.88	16.11	21.19	26.74	36.48	Total Flow from Entire Site

Hydrograph Report

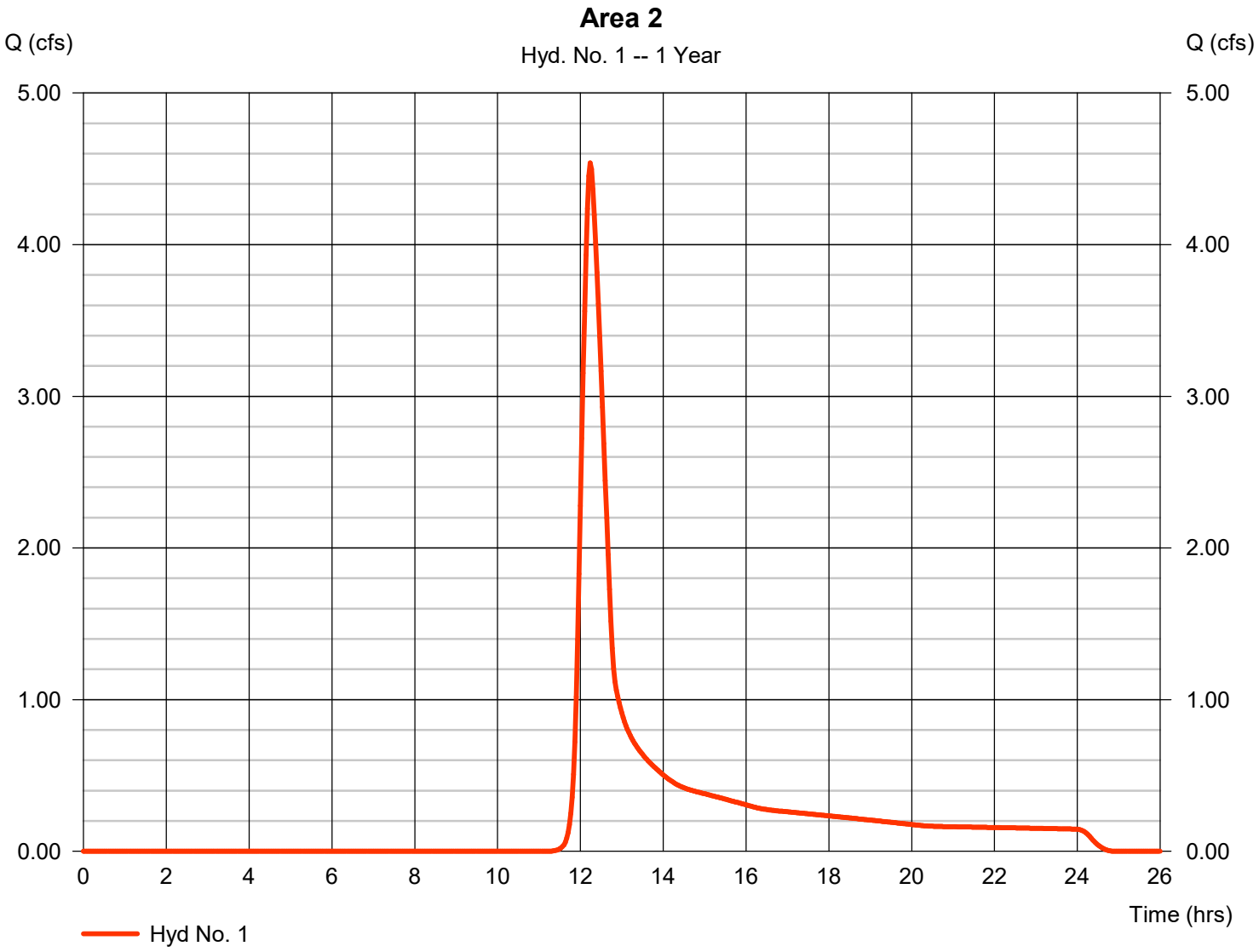
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 1

Area 2

Hydrograph type	= SCS Runoff	Peak discharge	= 4.540 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.23 hrs
Time interval	= 2 min	Hyd. volume	= 21,802 cuft
Drainage area	= 6.360 ac	Curve number	= 71*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 31.00 min
Total precip.	= 3.29 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(3.220 x 61) + (1.600 x 66) + (1.540 x 98)] / 6.360



TR55 Tc Worksheet

Hyd. No. 1

Area 2

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.150		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.69		0.00		0.00		
Land slope (%)	= 0.13		0.00		0.00		
Travel Time (min)	**= 27.23**	**+**	**0.00**	**+**	**0.00**	**=**	**27.23**
Shallow Concentrated Flow							
Flow length (ft)	= 142.00		335.00		559.00		
Watercourse slope (%)	= 8.12		6.16		4.60		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=4.60		5.05		4.36		
Travel Time (min)	**= 0.51**	**+**	**1.11**	**+**	**2.14**	**=**	**3.76**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 31.00 min

Hydrograph Report

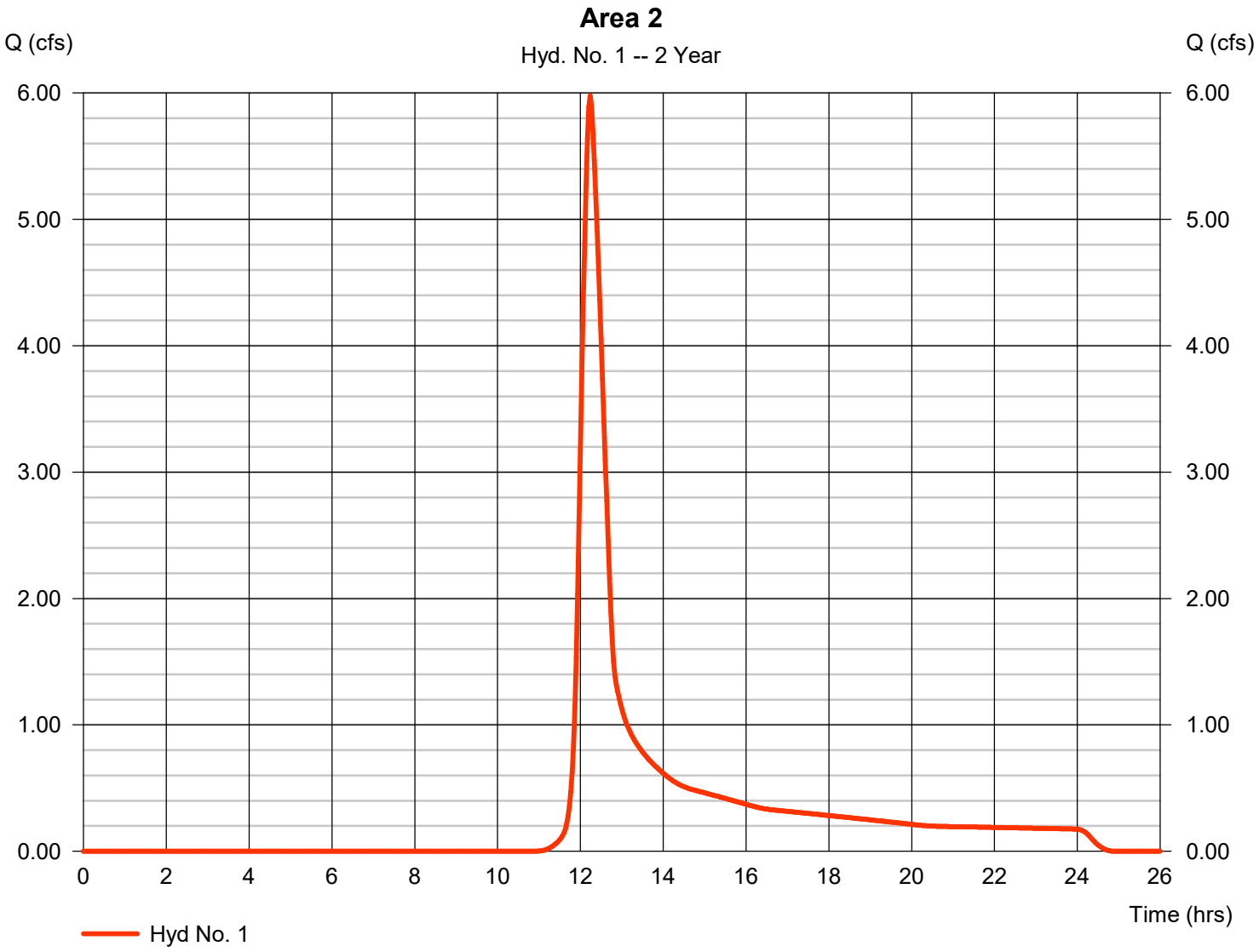
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 1

Area 2

Hydrograph type	= SCS Runoff	Peak discharge	= 5.977 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.23 hrs
Time interval	= 2 min	Hyd. volume	= 27,733 cuft
Drainage area	= 6.360 ac	Curve number	= 71*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 31.00 min
Total precip.	= 3.69 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(3.220 x 61) + (1.600 x 66) + (1.540 x 98)] / 6.360



Hydrograph Report

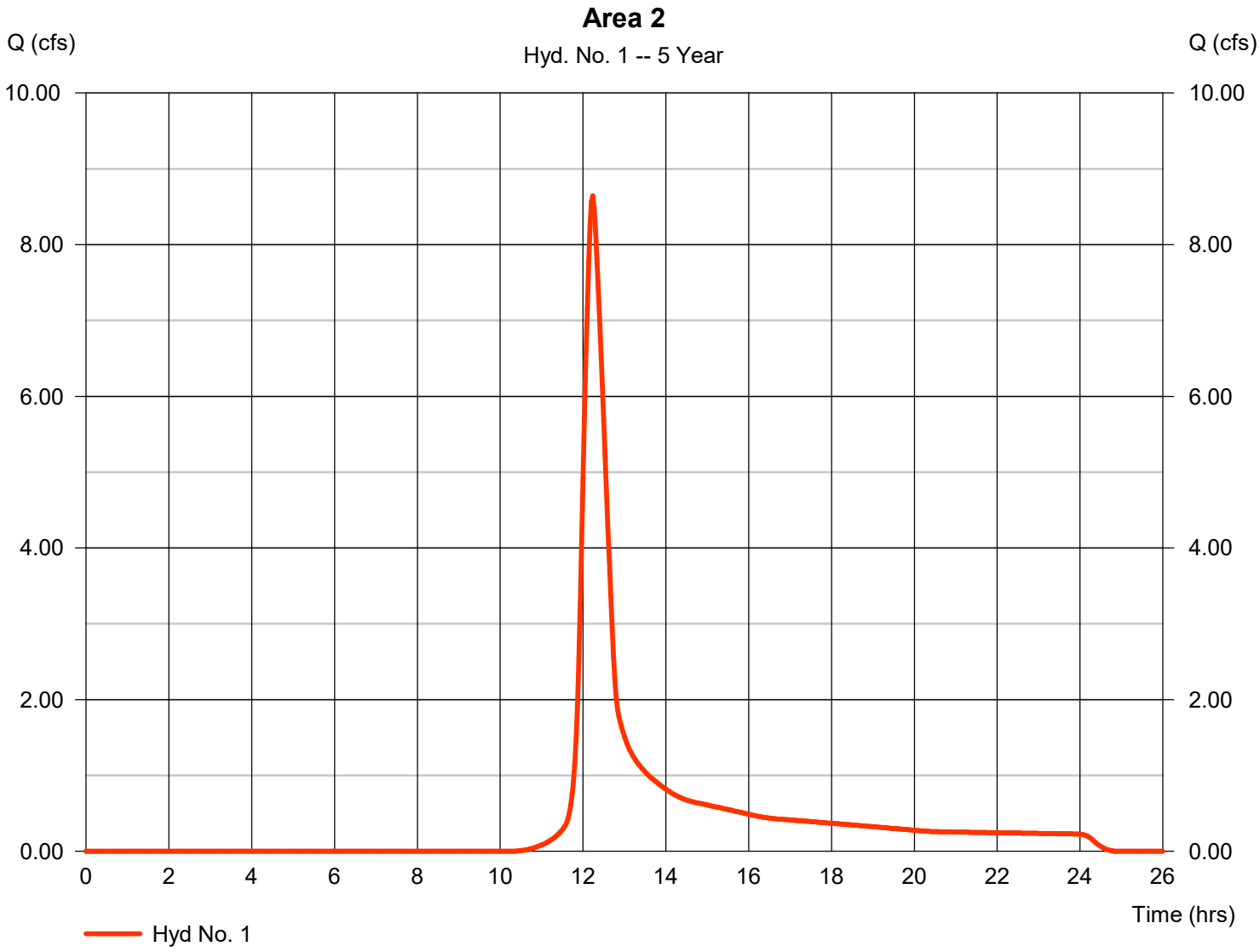
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 1

Area 2

Hydrograph type	= SCS Runoff	Peak discharge	= 8.644 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.23 hrs
Time interval	= 2 min	Hyd. volume	= 38,805 cuft
Drainage area	= 6.360 ac	Curve number	= 71*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 31.00 min
Total precip.	= 4.38 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(3.220 x 61) + (1.600 x 66) + (1.540 x 98)] / 6.360



Hydrograph Report

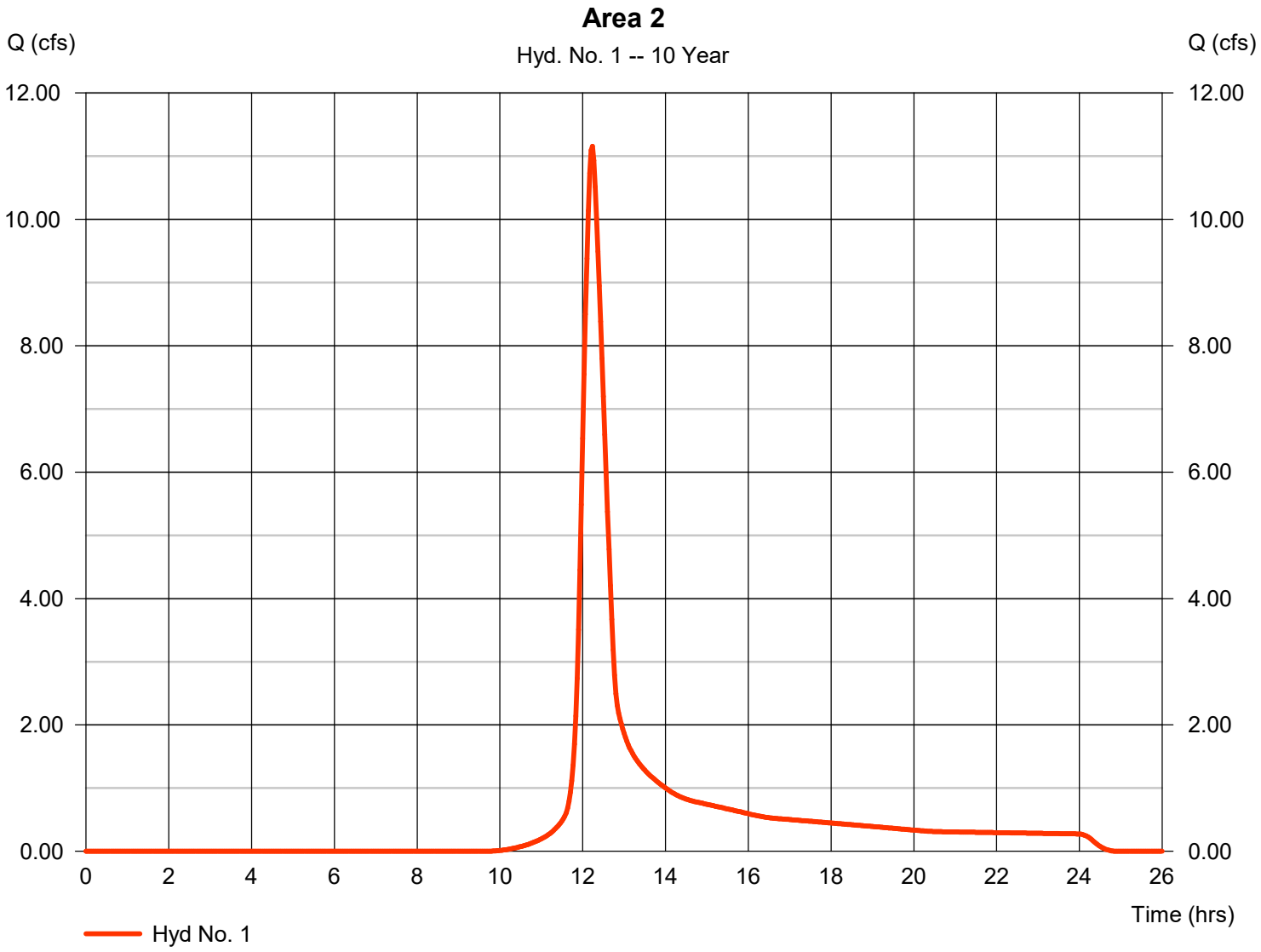
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 1

Area 2

Hydrograph type	= SCS Runoff	Peak discharge	= 11.16 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.23 hrs
Time interval	= 2 min	Hyd. volume	= 49,297 cuft
Drainage area	= 6.360 ac	Curve number	= 71*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 31.00 min
Total precip.	= 4.99 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(3.220 x 61) + (1.600 x 66) + (1.540 x 98)] / 6.360



Hydrograph Report

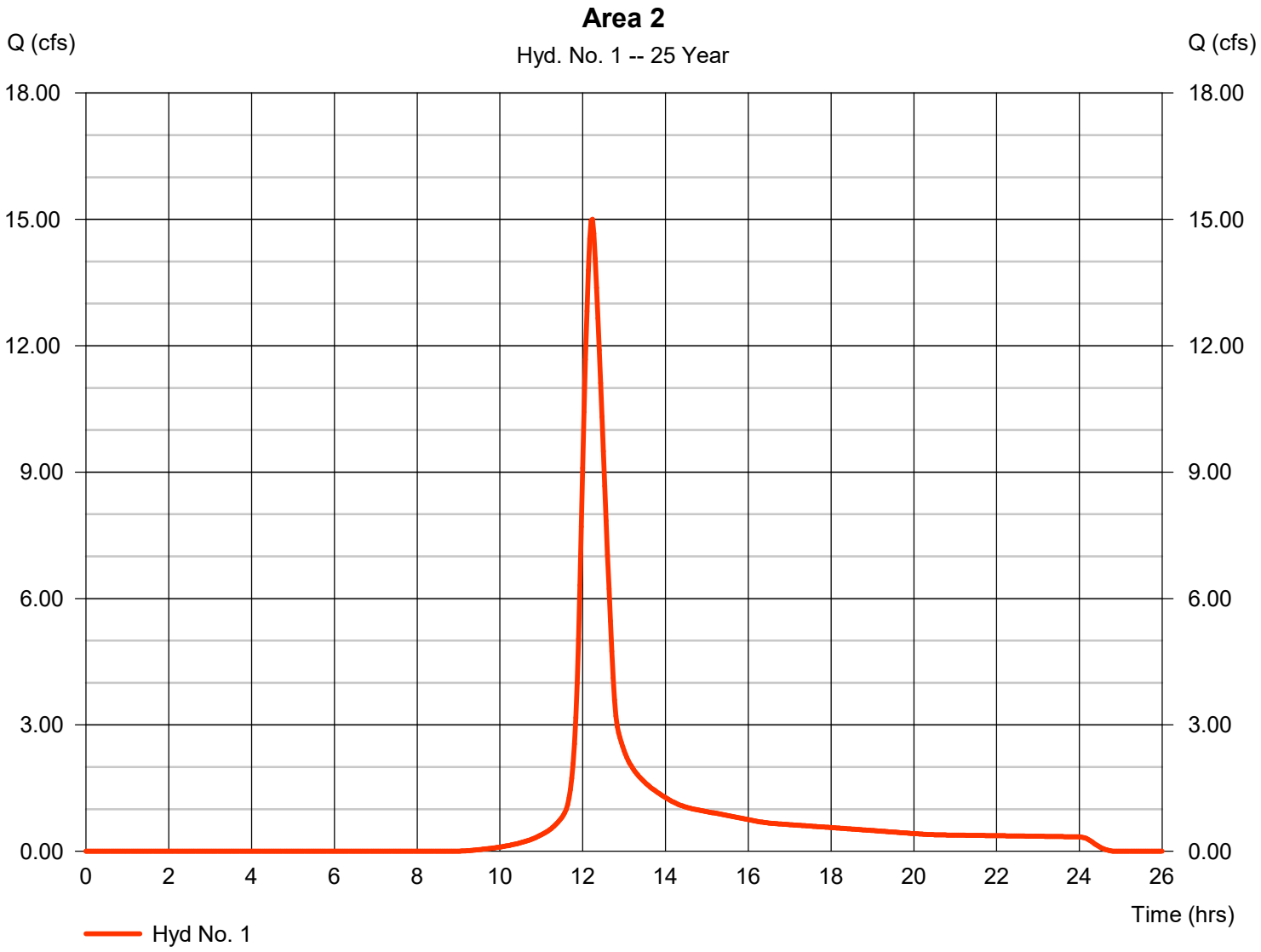
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 1

Area 2

Hydrograph type	= SCS Runoff	Peak discharge	= 15.00 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.23 hrs
Time interval	= 2 min	Hyd. volume	= 65,506 cuft
Drainage area	= 6.360 ac	Curve number	= 71*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 31.00 min
Total precip.	= 5.88 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(3.220 x 61) + (1.600 x 66) + (1.540 x 98)] / 6.360



Hydrograph Report

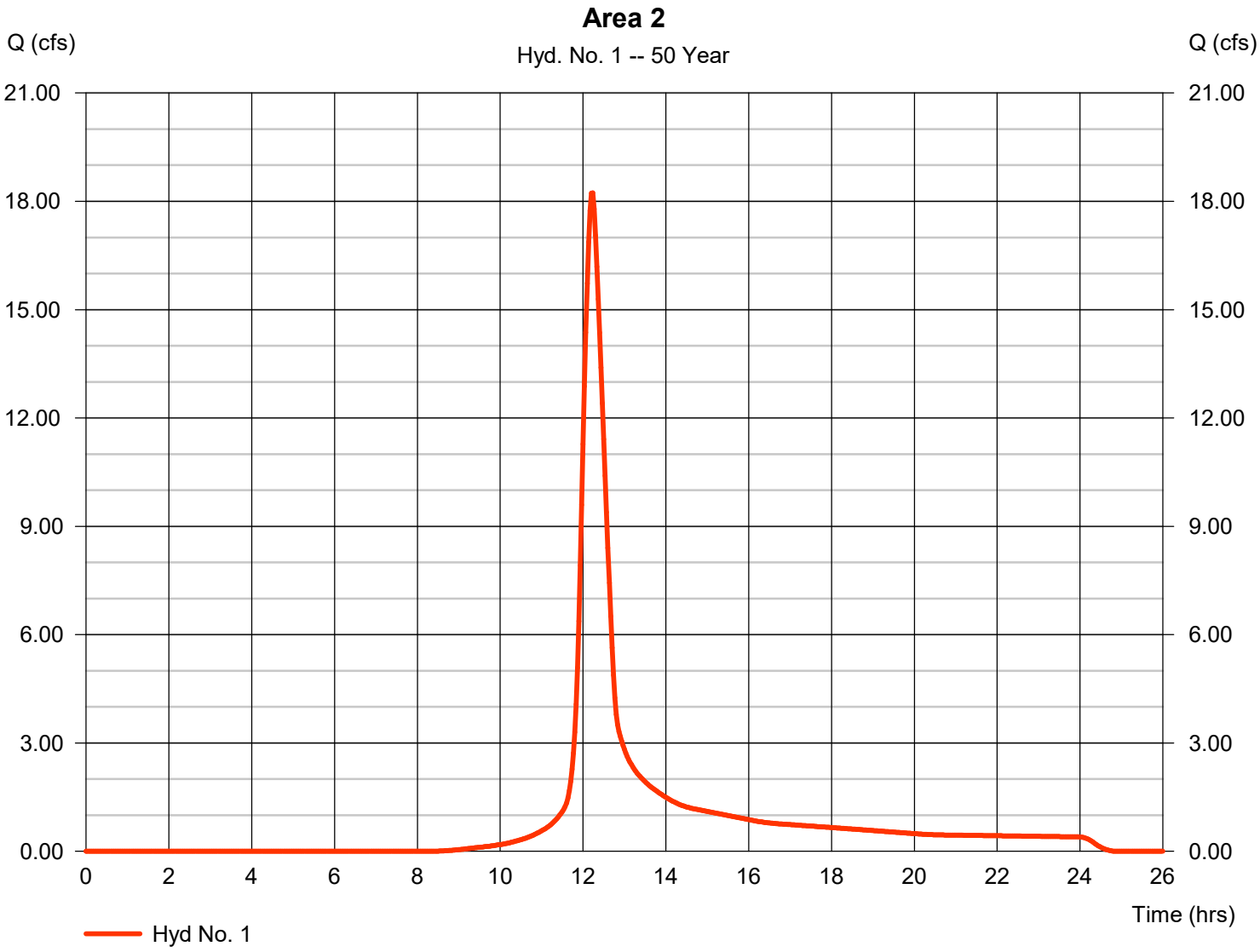
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 1

Area 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	18.23 cfs
Storm frequency	=	50 yrs	Time to peak	=	12.23 hrs
Time interval	=	2 min	Hyd. volume	=	79,226 cuft
Drainage area	=	6.360 ac	Curve number	=	71*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	31.00 min
Total precip.	=	6.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(3.220 x 61) + (1.600 x 66) + (1.540 x 98)] / 6.360



Hydrograph Report

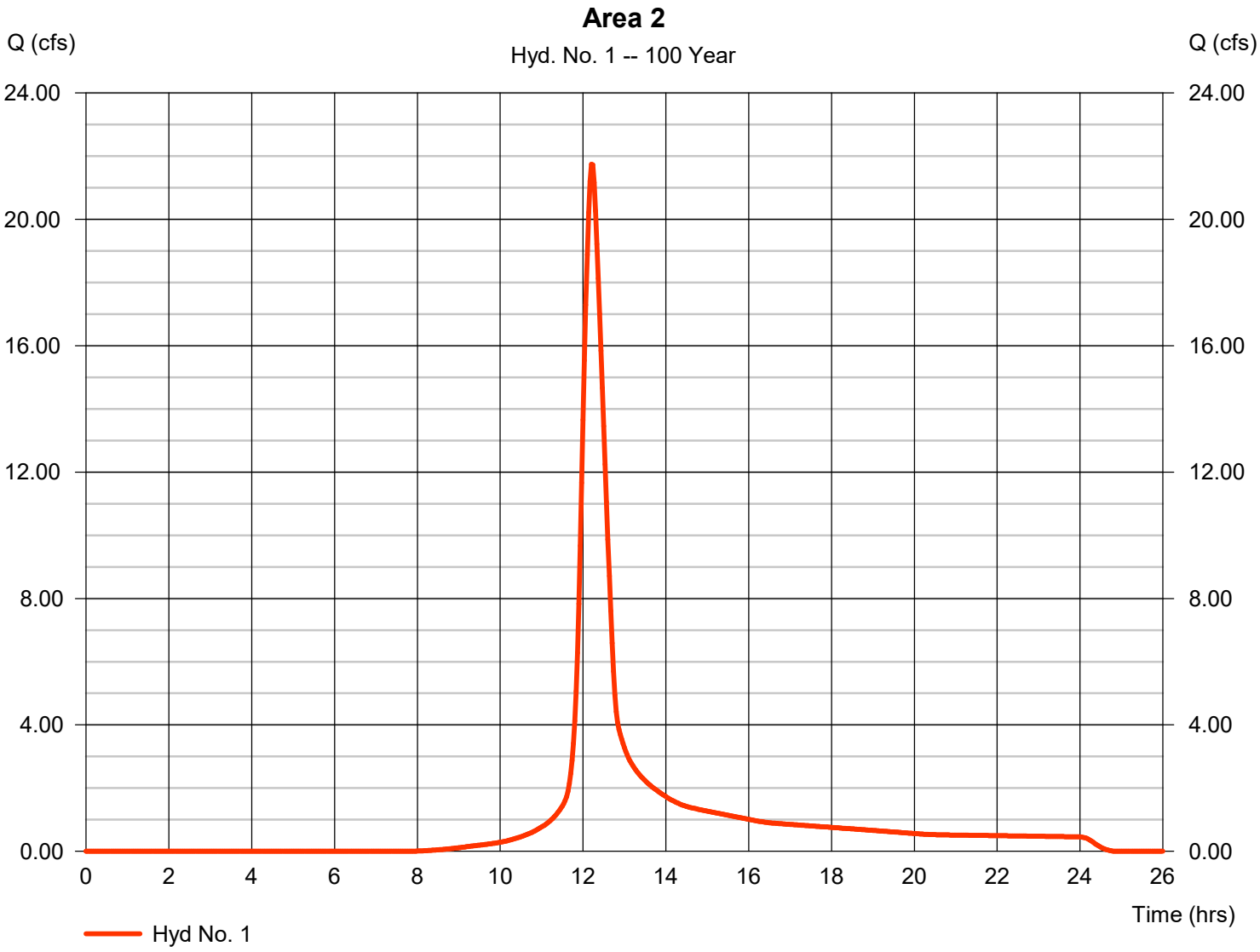
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 1

Area 2

Hydrograph type	= SCS Runoff	Peak discharge	= 21.74 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.20 hrs
Time interval	= 2 min	Hyd. volume	= 94,165 cuft
Drainage area	= 6.360 ac	Curve number	= 71*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 31.00 min
Total precip.	= 7.36 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(3.220 x 61) + (1.600 x 66) + (1.540 x 98)] / 6.360



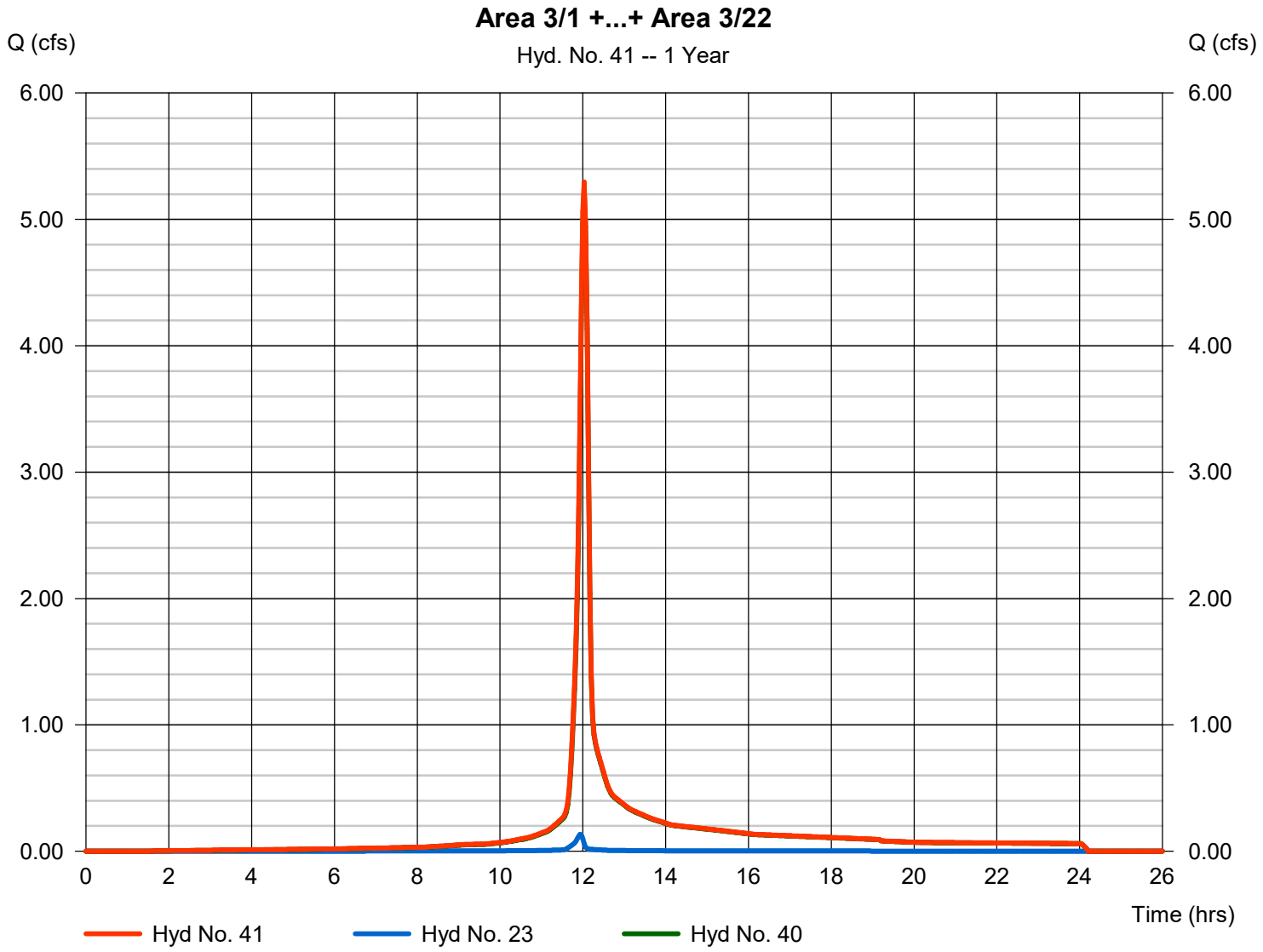
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 41

Area 3/1 +...+ Area 3/22

Hydrograph type	= Combine	Peak discharge	= 5.295 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 13,433 cuft
Inflow hyds.	= 23, 40	Contrib. drain. area	= 0.030 ac



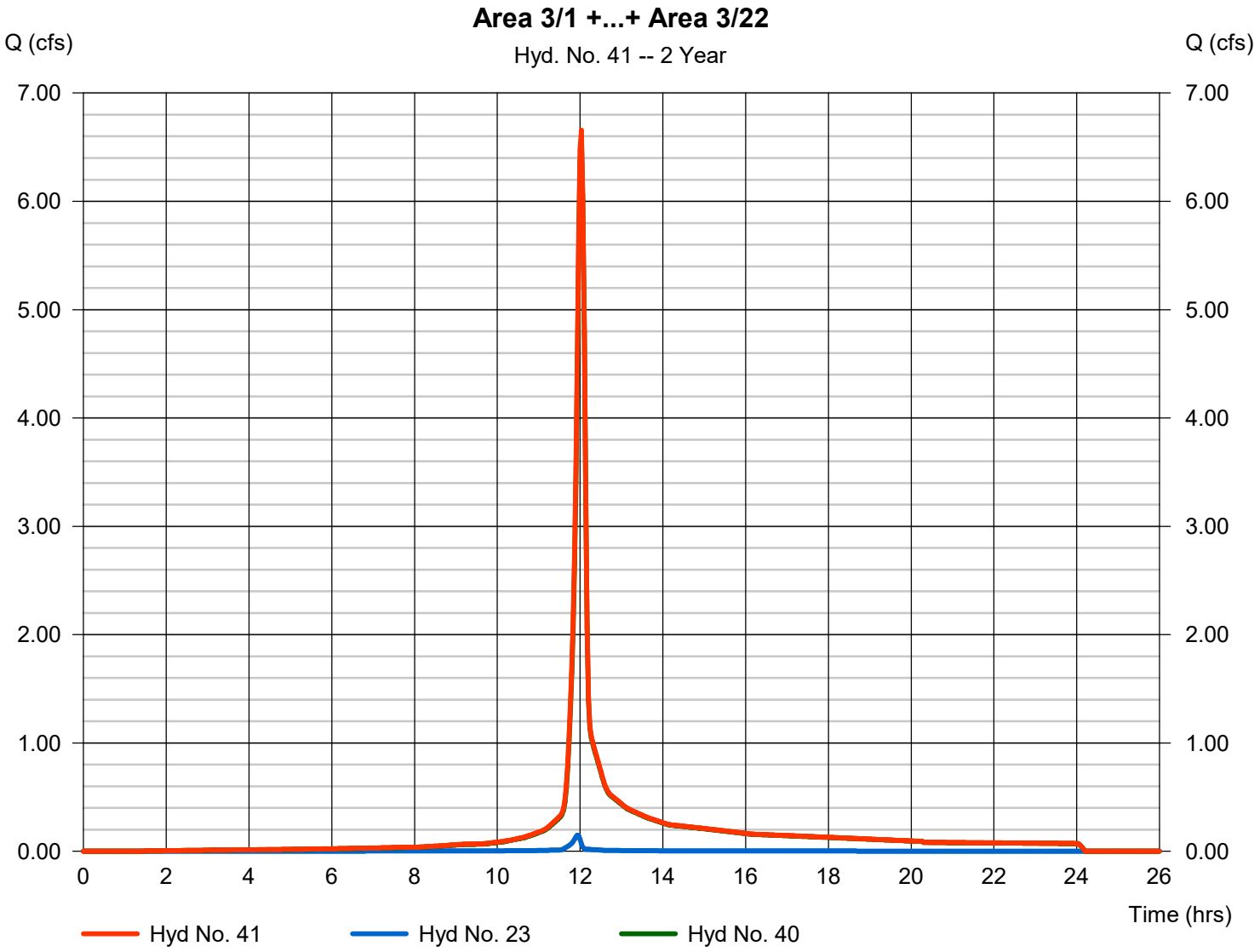
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 41

Area 3/1 +...+ Area 3/22

Hydrograph type	= Combine	Peak discharge	= 6.657 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 16,231 cuft
Inflow hyds.	= 23, 40	Contrib. drain. area	= 0.030 ac



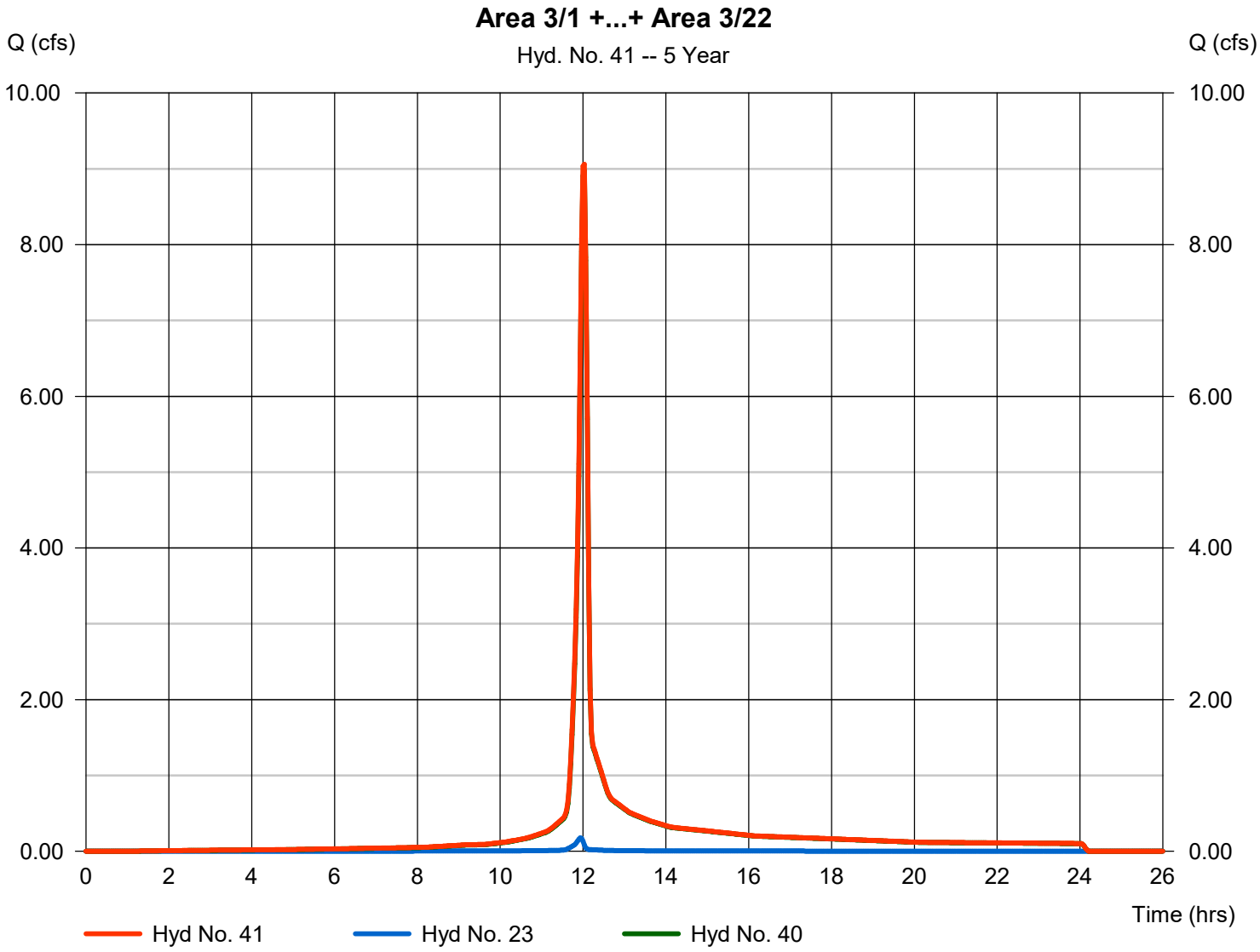
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 41

Area 3/1 +...+ Area 3/22

Hydrograph type	= Combine	Peak discharge	= 9.061 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 21,452 cuft
Inflow hyds.	= 23, 40	Contrib. drain. area	= 0.030 ac



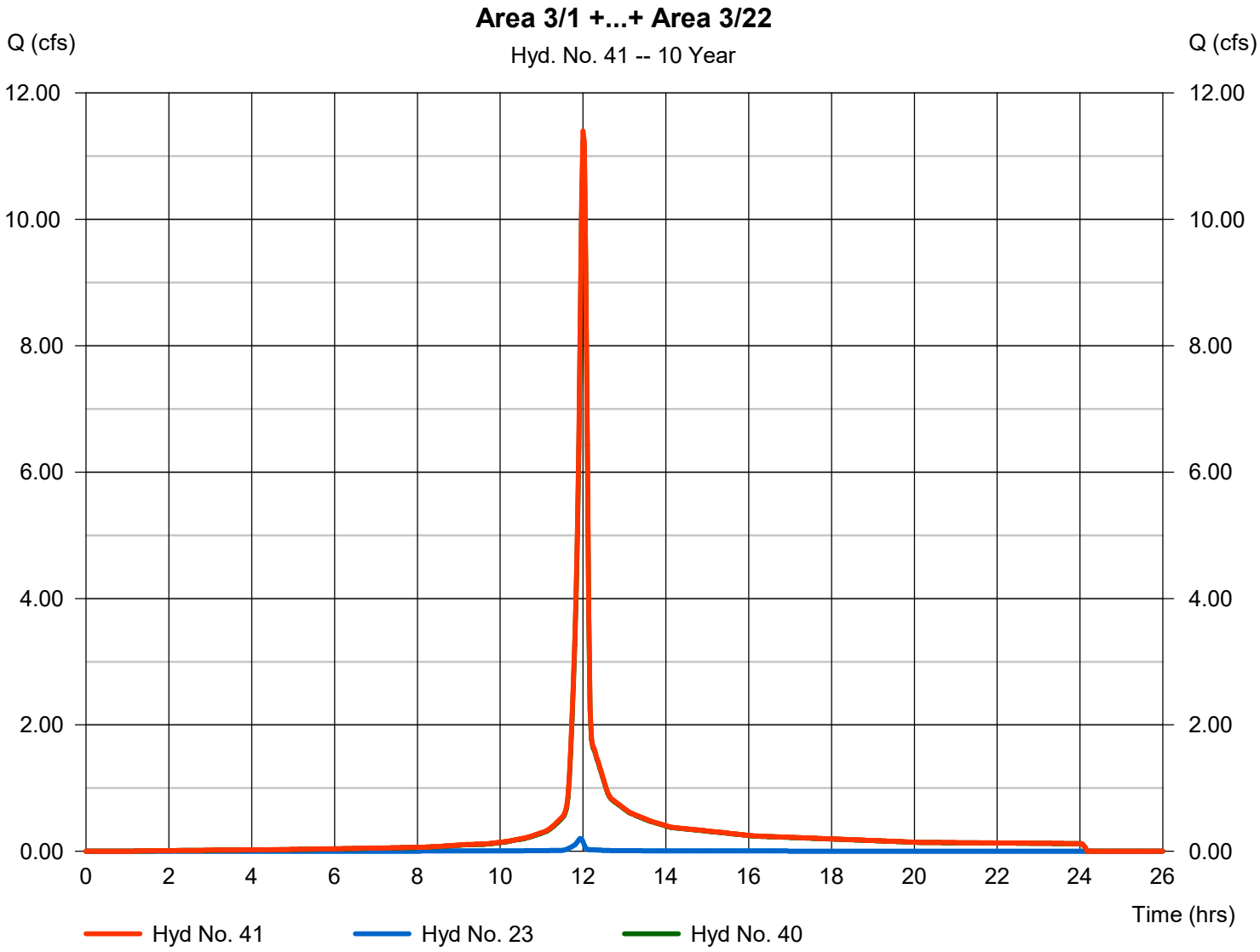
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 41

Area 3/1 +...+ Area 3/22

Hydrograph type	= Combine	Peak discharge	= 11.40 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 26,200 cuft
Inflow hyds.	= 23, 40	Contrib. drain. area	= 0.030 ac



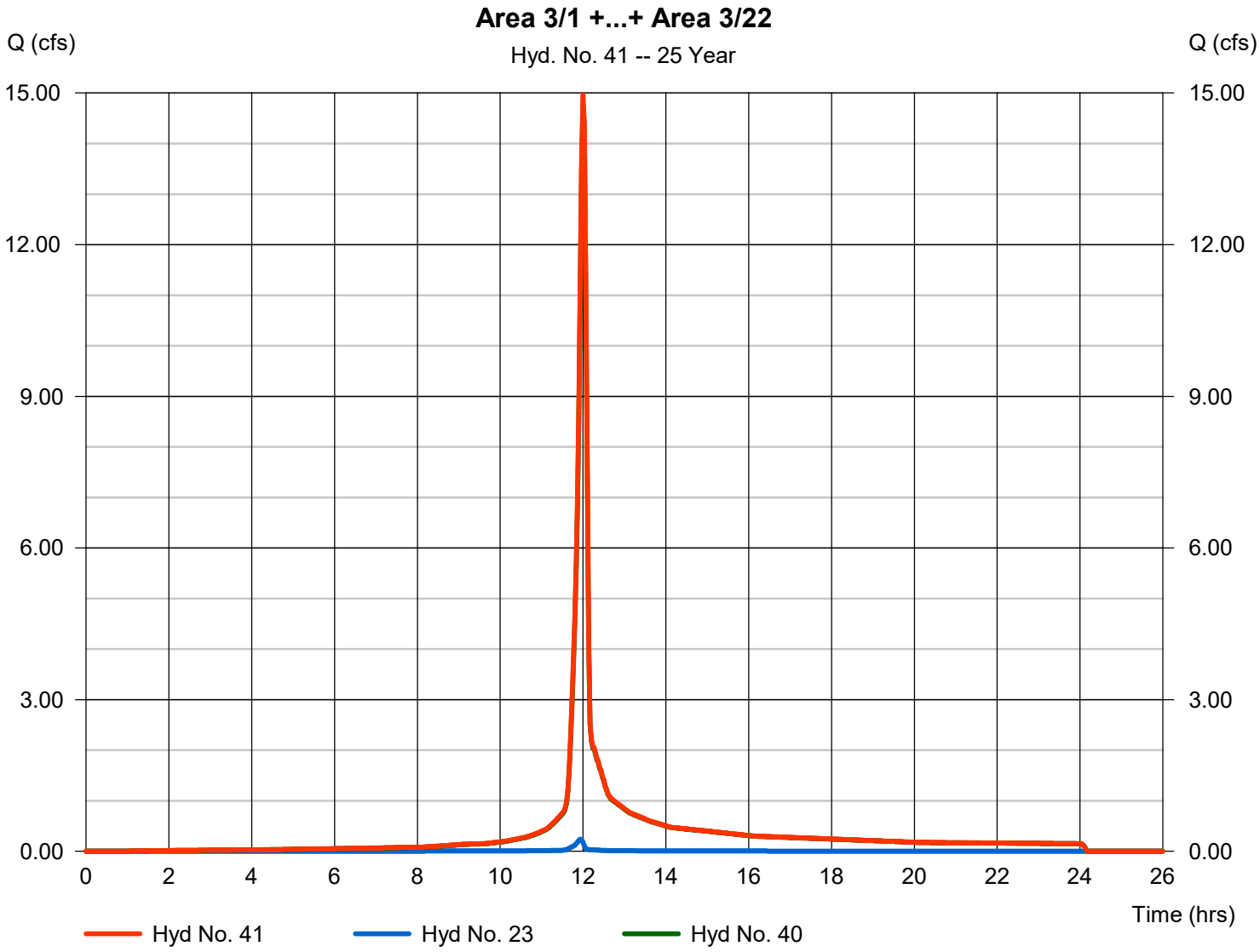
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 41

Area 3/1 +...+ Area 3/22

Hydrograph type	= Combine	Peak discharge	= 14.96 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 33,455 cuft
Inflow hyds.	= 23, 40	Contrib. drain. area	= 0.030 ac



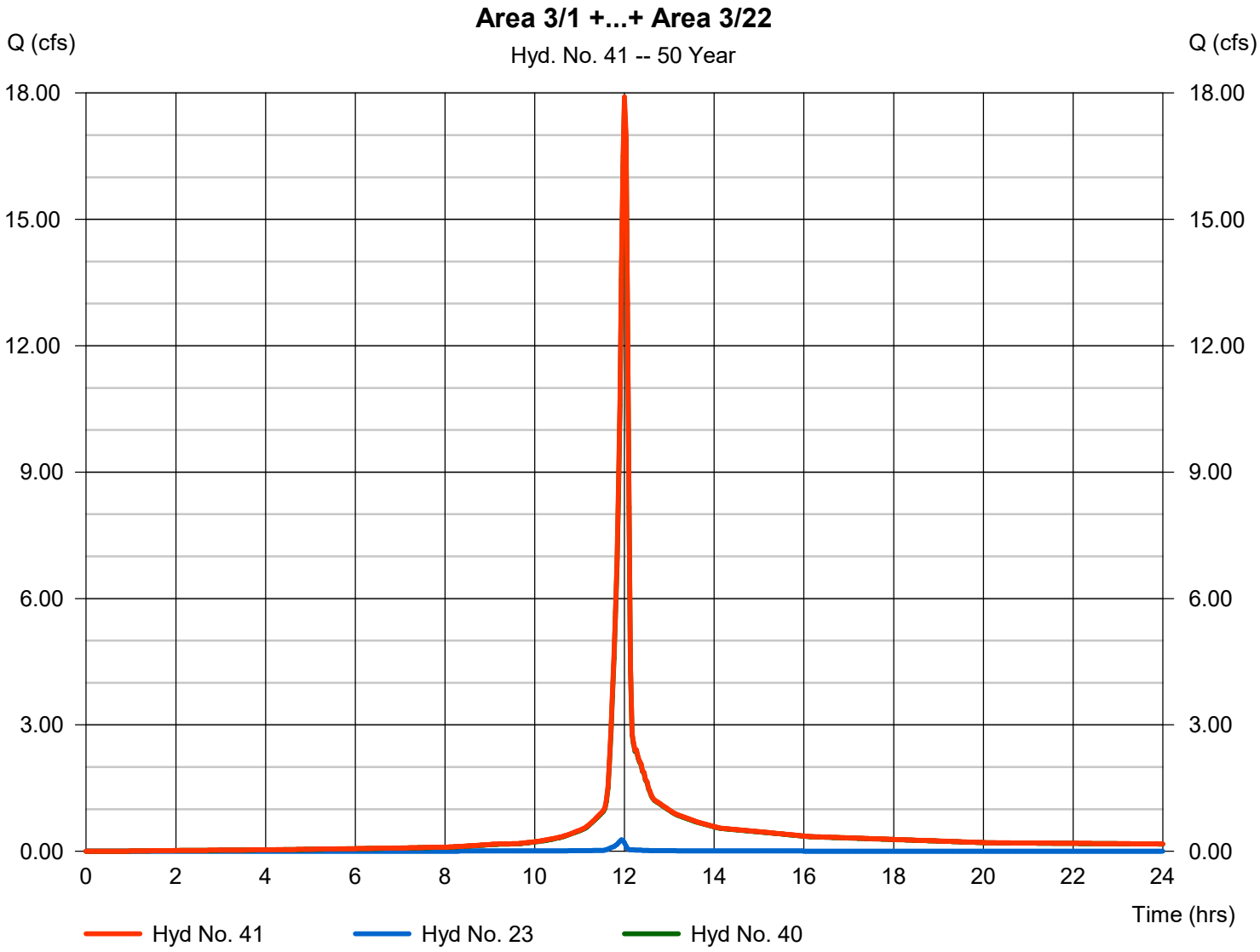
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 41

Area 3/1 +...+ Area 3/22

Hydrograph type	= Combine	Peak discharge	= 17.90 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 39,546 cuft
Inflow hyds.	= 23, 40	Contrib. drain. area	= 0.030 ac



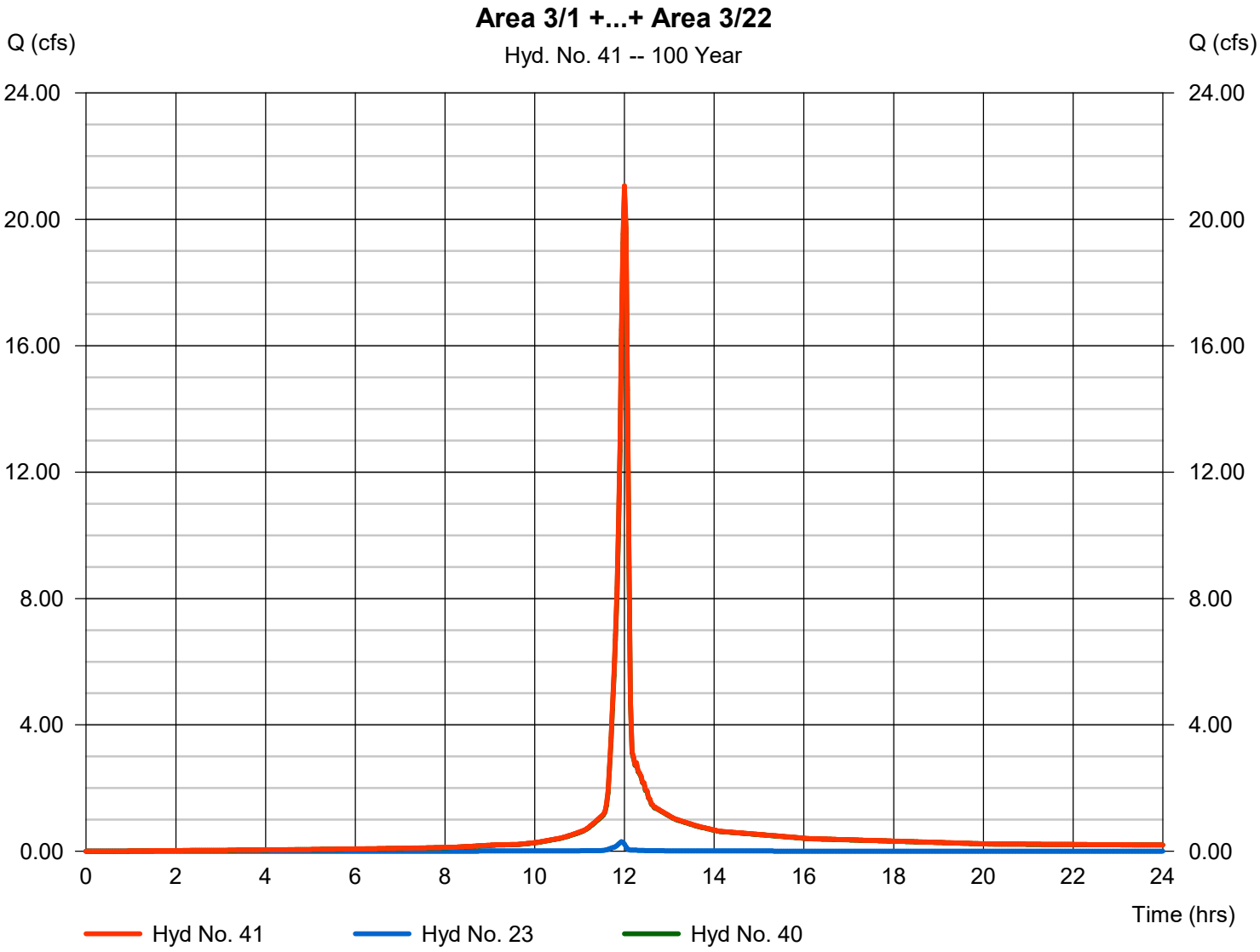
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 41

Area 3/1 +...+ Area 3/22

Hydrograph type	= Combine	Peak discharge	= 21.06 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 46,147 cuft
Inflow hyds.	= 23, 40	Contrib. drain. area	= 0.030 ac



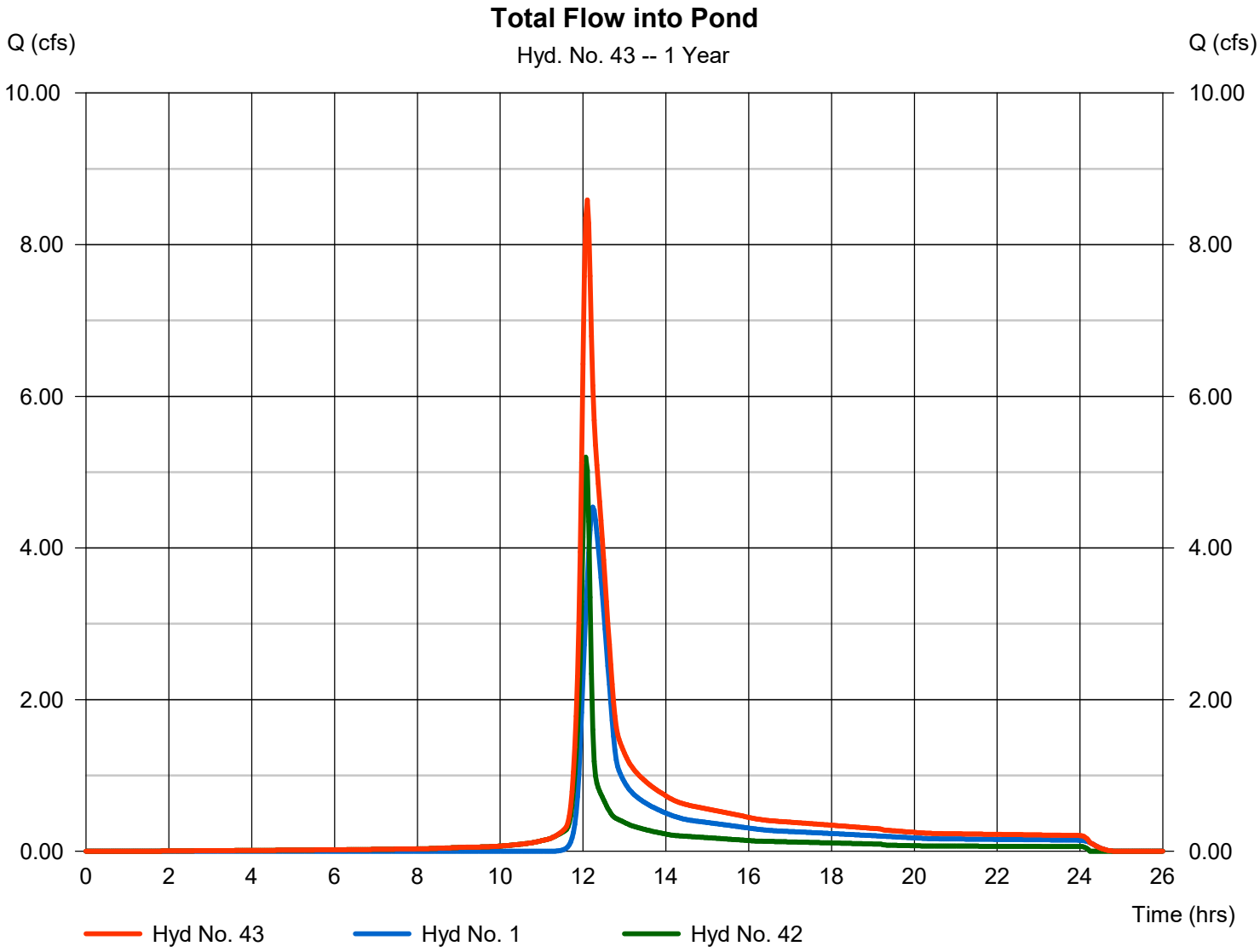
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 43

Total Flow into Pond

Hydrograph type	= Combine	Peak discharge	= 8.588 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 35,234 cuft
Inflow hyds.	= 1, 42	Contrib. drain. area	= 6.360 ac



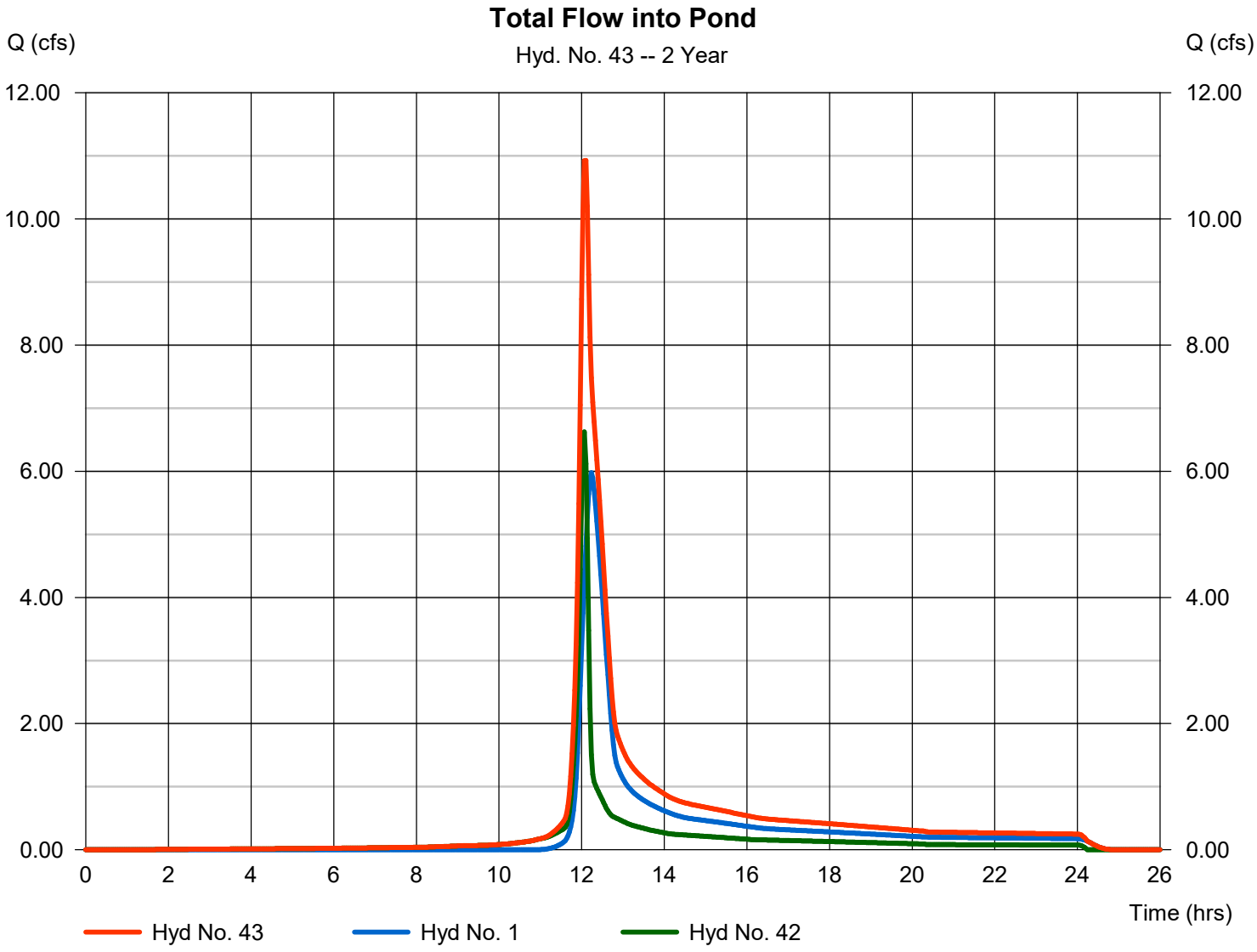
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 43

Total Flow into Pond

Hydrograph type	= Combine	Peak discharge	= 10.93 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 43,964 cuft
Inflow hyds.	= 1, 42	Contrib. drain. area	= 6.360 ac



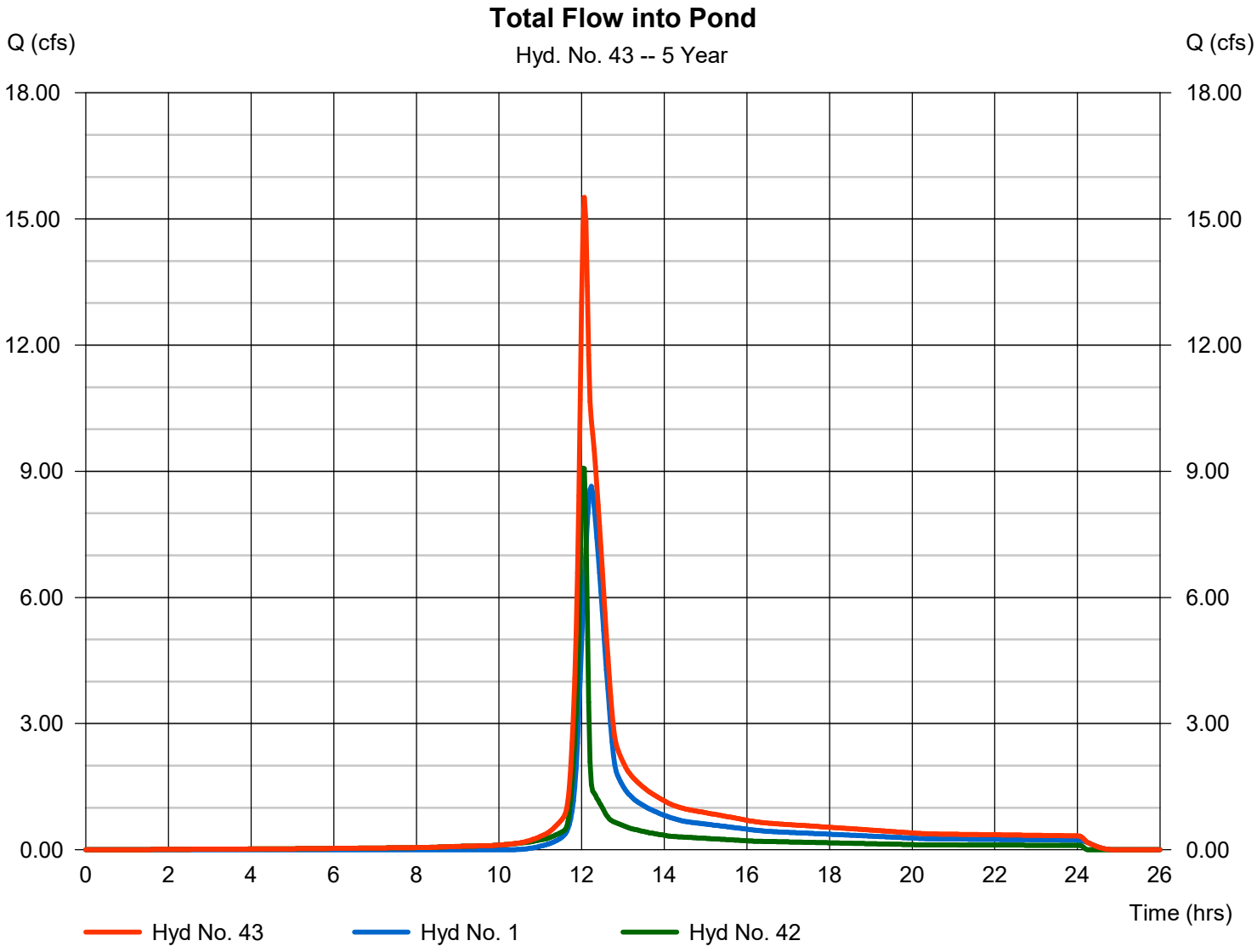
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 43

Total Flow into Pond

Hydrograph type	= Combine	Peak discharge	= 15.51 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 60,257 cuft
Inflow hyds.	= 1, 42	Contrib. drain. area	= 6.360 ac



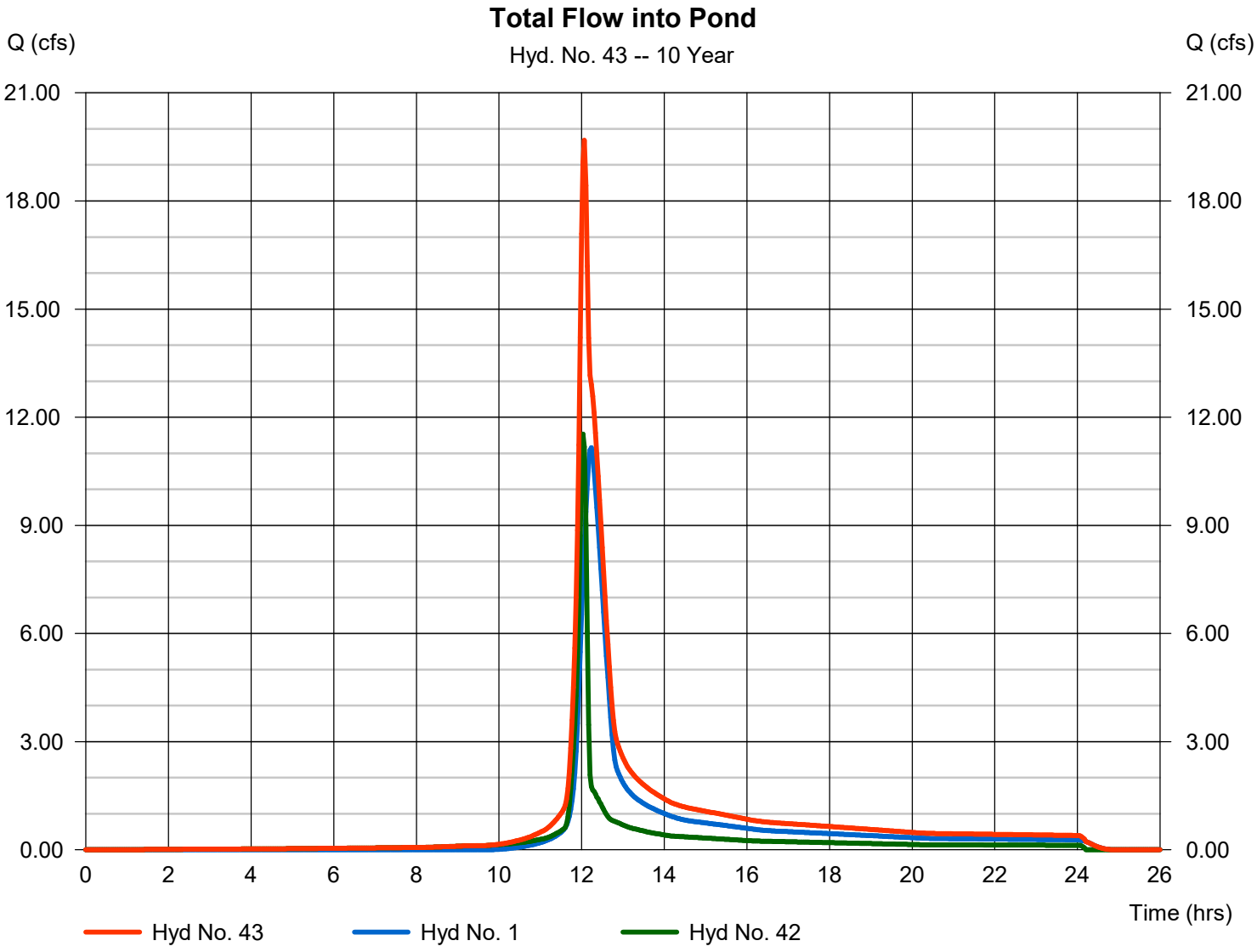
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 43

Total Flow into Pond

Hydrograph type	= Combine	Peak discharge	= 19.68 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 75,498 cuft
Inflow hyds.	= 1, 42	Contrib. drain. area	= 6.360 ac



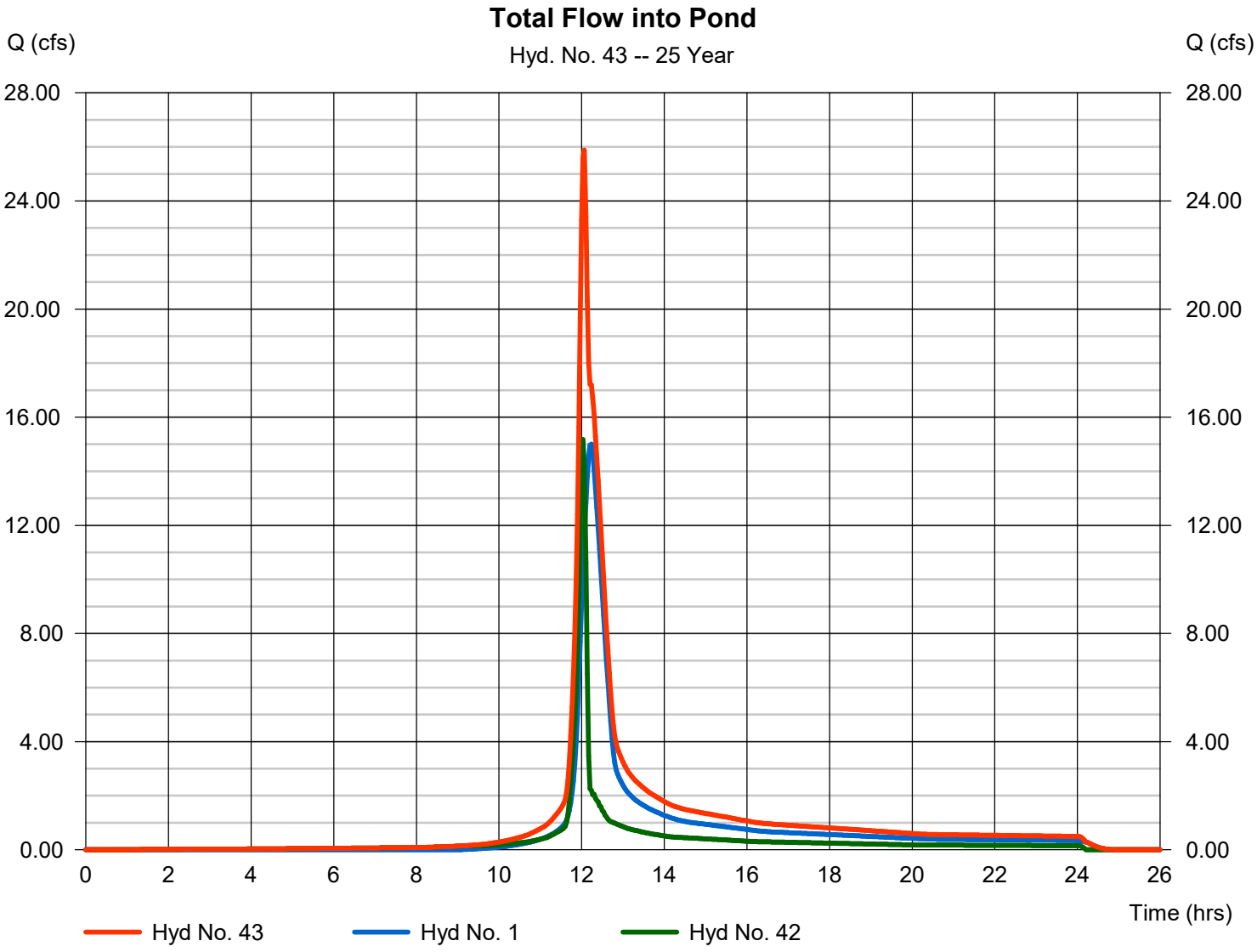
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 43

Total Flow into Pond

Hydrograph type	= Combine	Peak discharge	= 25.88 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 98,962 cuft
Inflow hyds.	= 1, 42	Contrib. drain. area	= 6.360 ac



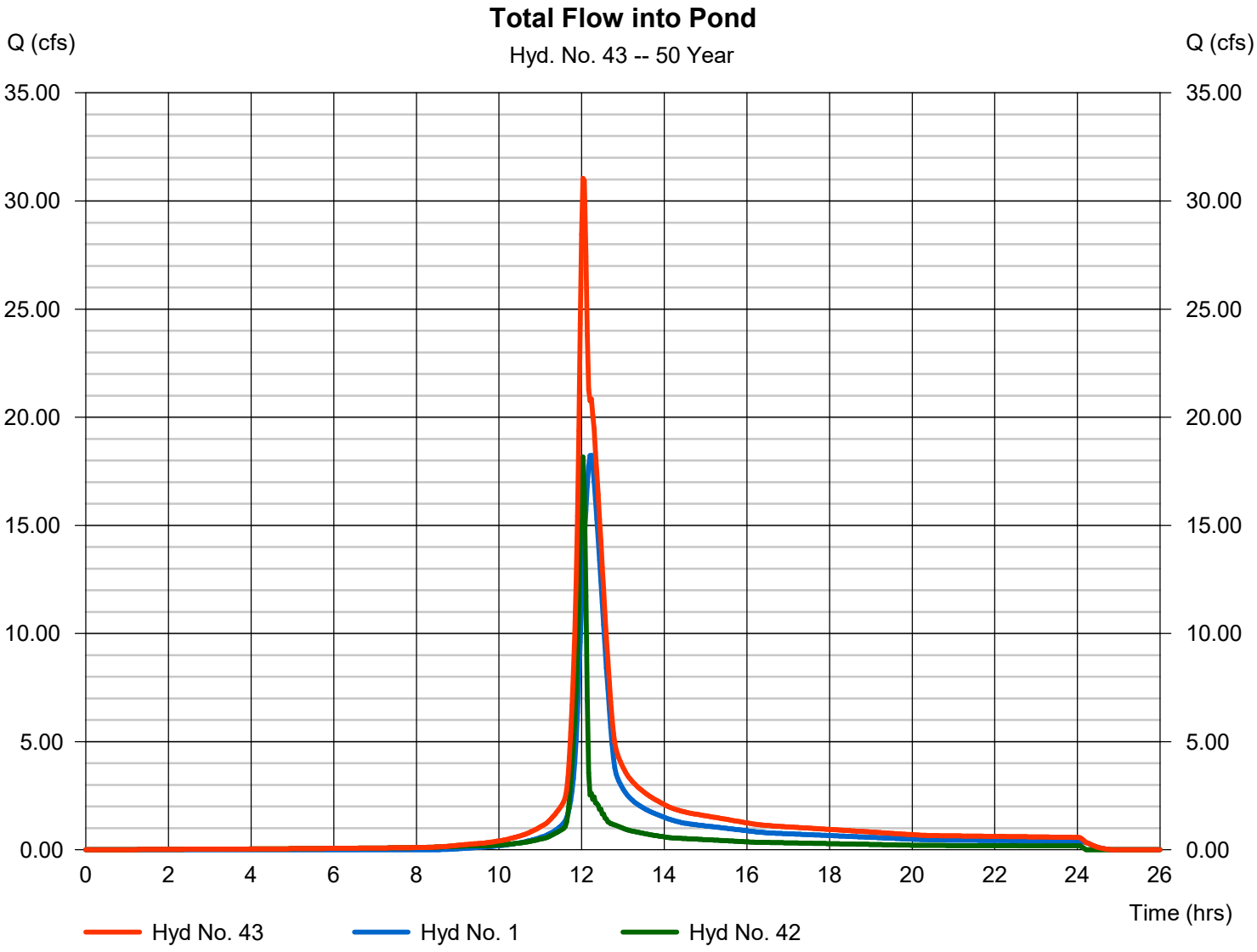
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 43

Total Flow into Pond

Hydrograph type	= Combine	Peak discharge	= 31.04 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 118,774 cuft
Inflow hyds.	= 1, 42	Contrib. drain. area	= 6.360 ac



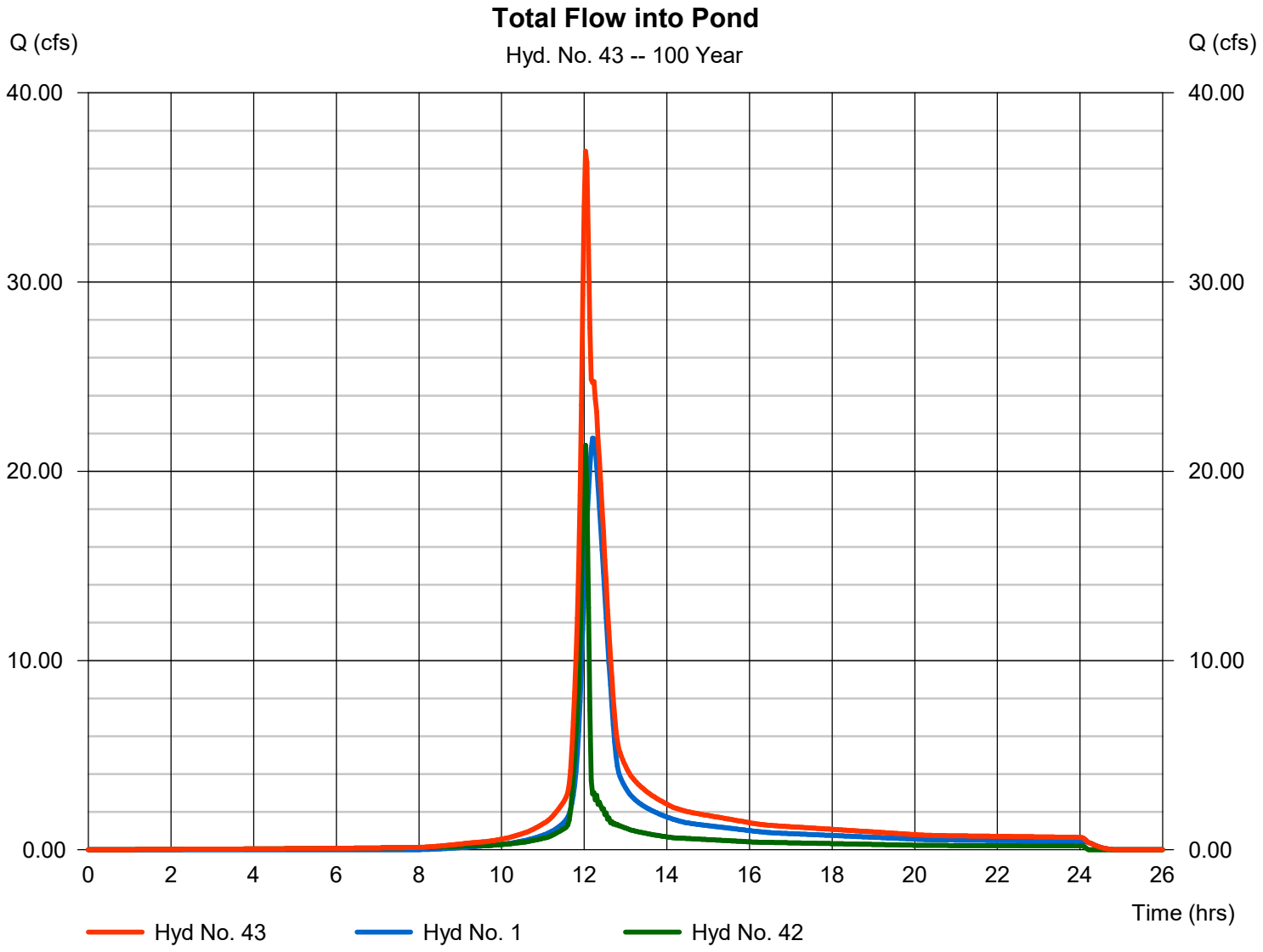
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 43

Total Flow into Pond

Hydrograph type	= Combine	Peak discharge	= 36.91 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 140,314 cuft
Inflow hyds.	= 1, 42	Contrib. drain. area	= 6.360 ac



Hydrograph Report

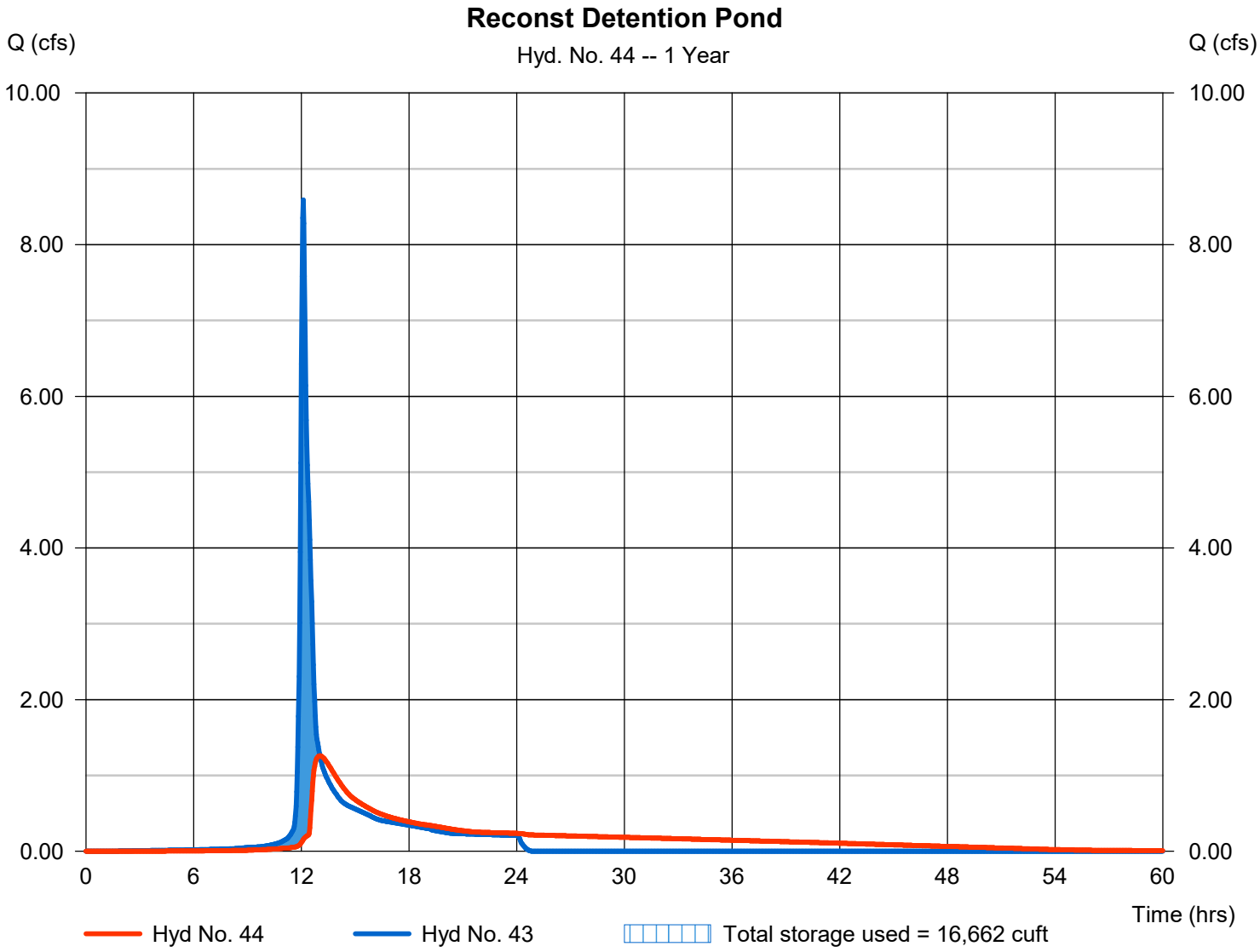
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 44

Reconst Detention Pond

Hydrograph type	= Reservoir	Peak discharge	= 1.260 cfs
Storm frequency	= 1 yrs	Time to peak	= 13.03 hrs
Time interval	= 2 min	Hyd. volume	= 35,206 cuft
Inflow hyd. No.	= 43 - Total Flow into Pond	Max. Elevation	= 879.72 ft
Reservoir name	= Reconstructed Detention Pond	Max. Storage	= 16,662 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Pond No. 1 - Reconstructed Detention Pond

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 876.13 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	876.13	3,898	0	0
0.87	877.00	4,260	3,547	3,547
1.87	878.00	4,659	4,458	8,005
2.87	879.00	5,056	4,856	12,860
3.87	880.00	5,451	5,252	18,112
4.87	881.00	5,844	5,646	23,758
5.87	882.00	6,233	6,037	29,795
6.87	883.00	6,618	6,424	36,219
7.87	884.00	7,001	6,808	43,027

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	9.00	2.22	0.00
Span (in)	= 24.00	9.00	2.22	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 876.13	879.11	876.13	0.00
Length (ft)	= 39.00	0.00	0.00	0.00
Slope (%)	= 12.51	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	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 16.00	20.00	0.00	0.00
Crest El. (ft)	= 881.84	882.50	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= 1	Broad	---	---
Multi-Stage	= Yes	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	876.13	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.87	3,547	877.00	0.12 ic	0.00	0.11 ic	---	0.00	0.00	---	---	---	---	0.111
1.87	8,005	878.00	0.18 ic	0.00	0.17 ic	---	0.00	0.00	---	---	---	---	0.169
2.87	12,860	879.00	0.22 ic	0.00	0.21 ic	---	0.00	0.00	---	---	---	---	0.212
3.87	18,112	880.00	1.81 ic	1.53 ic	0.24 ic	---	0.00	0.00	---	---	---	---	1.762
4.87	23,758	881.00	2.92 ic	2.62 ic	0.26 ic	---	0.00	0.00	---	---	---	---	2.882
5.87	29,795	882.00	7.16 ic	3.37 ic	0.28 ic	---	3.41	0.00	---	---	---	---	7.063
6.87	36,219	883.00	36.16 ic	0.83 ic	0.05 ic	---	35.27 s	18.38	---	---	---	---	54.54
7.87	43,027	884.00	39.55 ic	0.38 ic	0.02 ic	---	39.10 s	95.53	---	---	---	---	135.03

Hydrograph Report

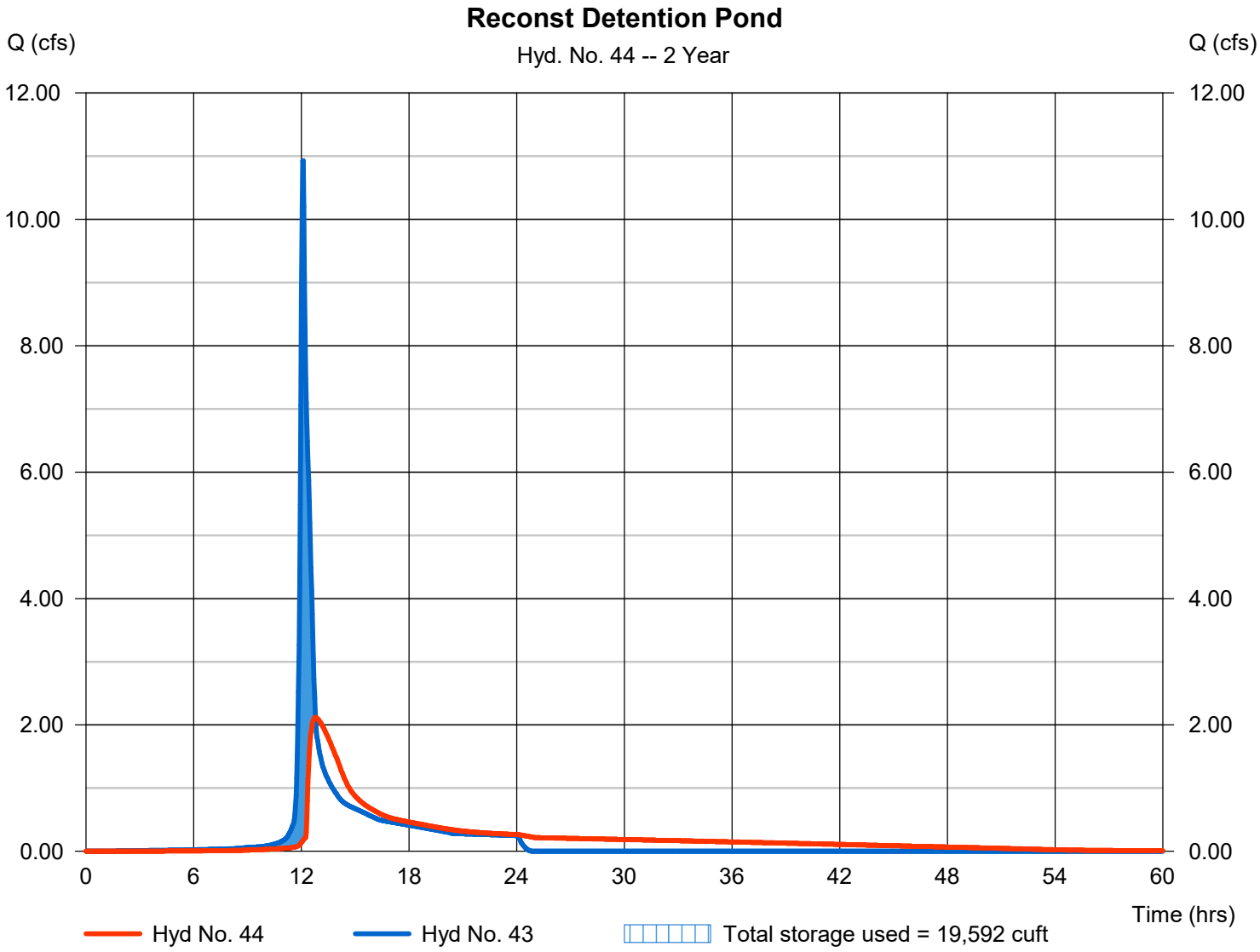
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 44

Reconst Detention Pond

Hydrograph type	= Reservoir	Peak discharge	= 2.117 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.77 hrs
Time interval	= 2 min	Hyd. volume	= 43,936 cuft
Inflow hyd. No.	= 43 - Total Flow into Pond	Max. Elevation	= 880.26 ft
Reservoir name	= Reconstructed Detention Pond	Max. Storage	= 19,592 cuft

Storage Indication method used.



Hydrograph Report

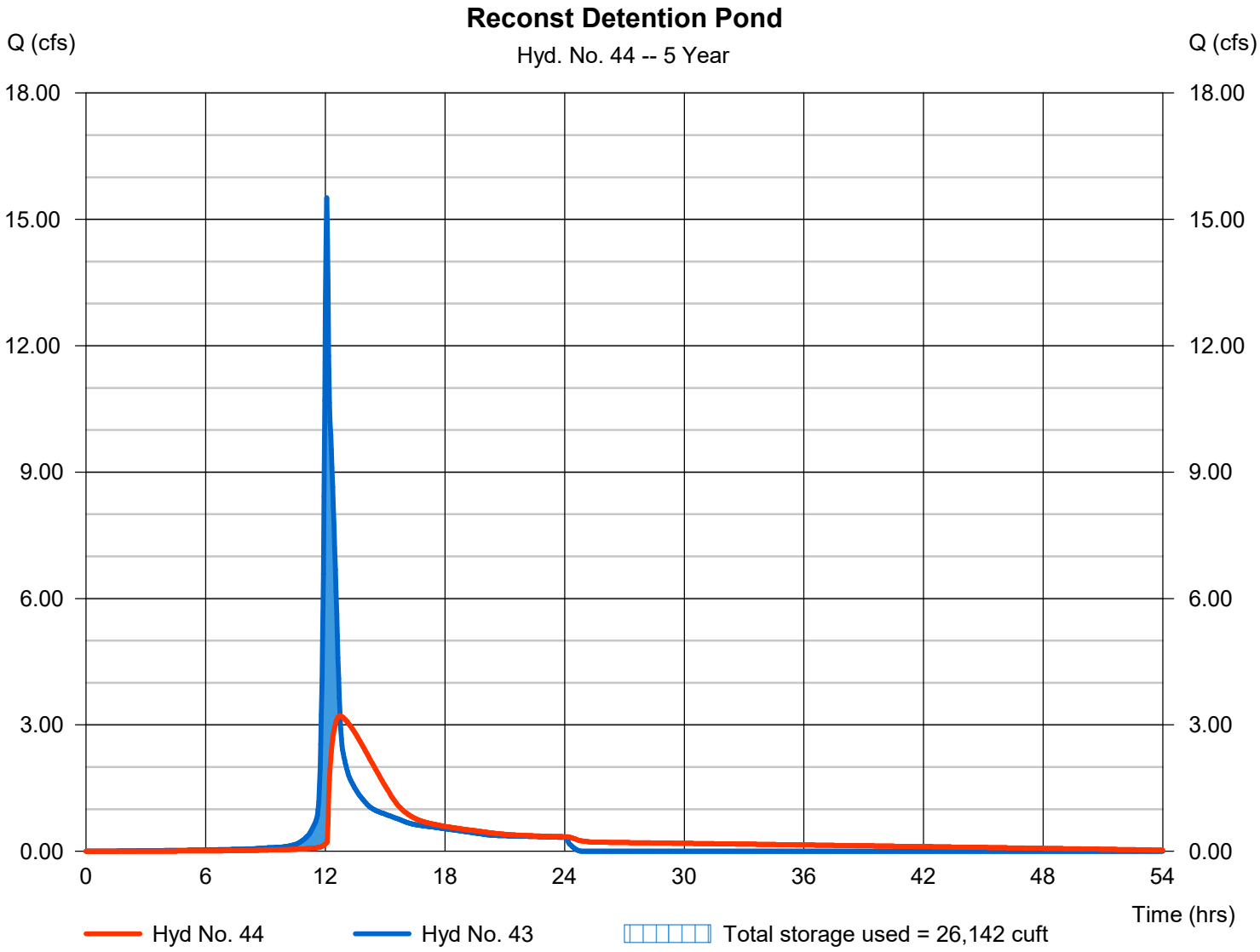
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 44

Reconst Detention Pond

Hydrograph type	=	Reservoir	Peak discharge	=	3.214 cfs
Storm frequency	=	5 yrs	Time to peak	=	12.73 hrs
Time interval	=	2 min	Hyd. volume	=	60,229 cuft
Inflow hyd. No.	=	43 - Total Flow into Pond	Max. Elevation	=	881.39 ft
Reservoir name	=	Reconstructed Detention Pond	Max. Storage	=	26,142 cuft

Storage Indication method used.



Hydrograph Report

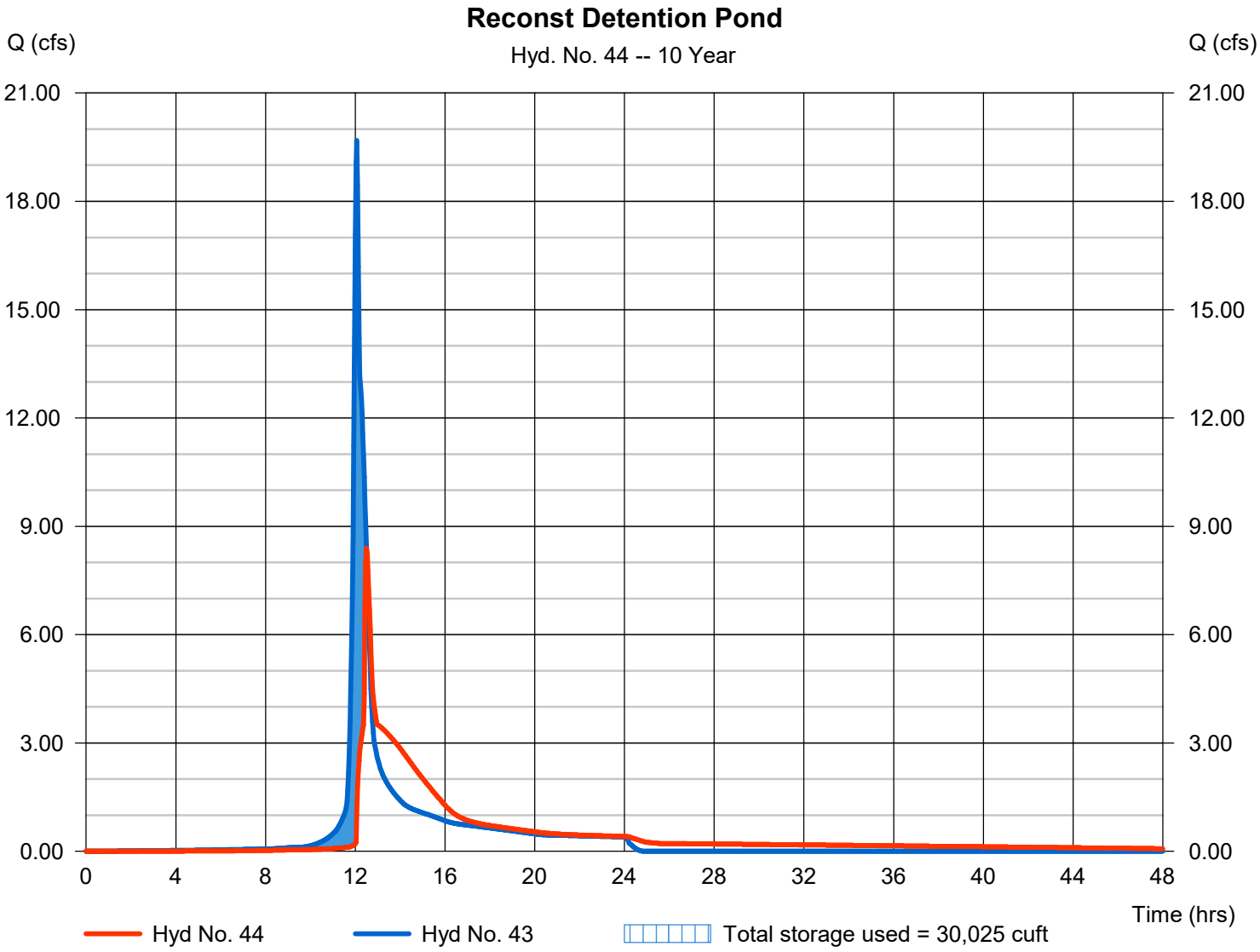
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 44

Reconst Detention Pond

Hydrograph type	=	Reservoir	Peak discharge	=	8.394 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.50 hrs
Time interval	=	2 min	Hyd. volume	=	75,470 cuft
Inflow hyd. No.	=	43 - Total Flow into Pond	Max. Elevation	=	882.04 ft
Reservoir name	=	Reconstructed Detention Pond	Max. Storage	=	30,025 cuft

Storage Indication method used.



Hydrograph Report

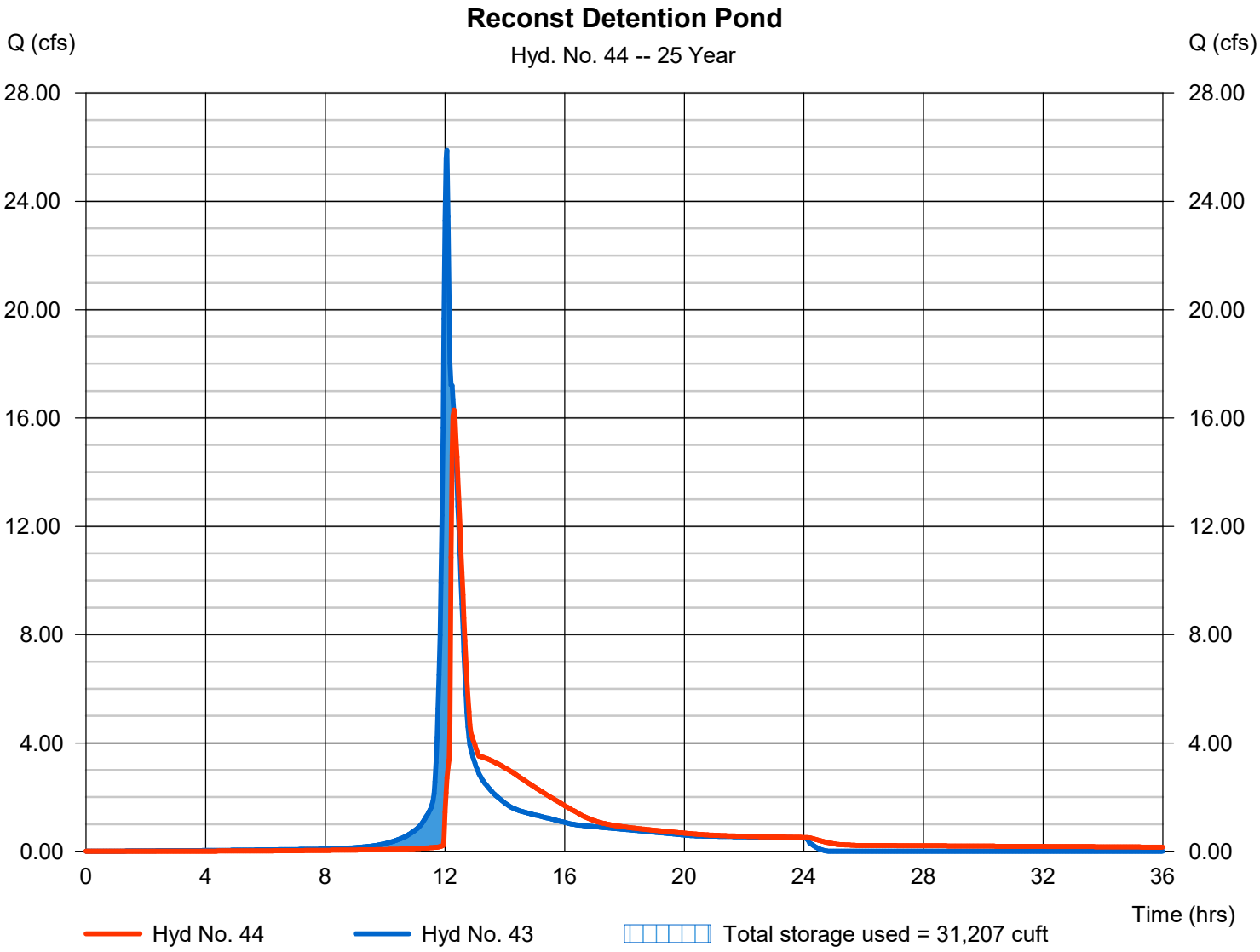
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 44

Reconst Detention Pond

Hydrograph type	=	Reservoir	Peak discharge	=	16.29 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.30 hrs
Time interval	=	2 min	Hyd. volume	=	98,934 cuft
Inflow hyd. No.	=	43 - Total Flow into Pond	Max. Elevation	=	882.22 ft
Reservoir name	=	Reconstructed Detention Pond	Max. Storage	=	31,207 cuft

Storage Indication method used.



Hydrograph Report

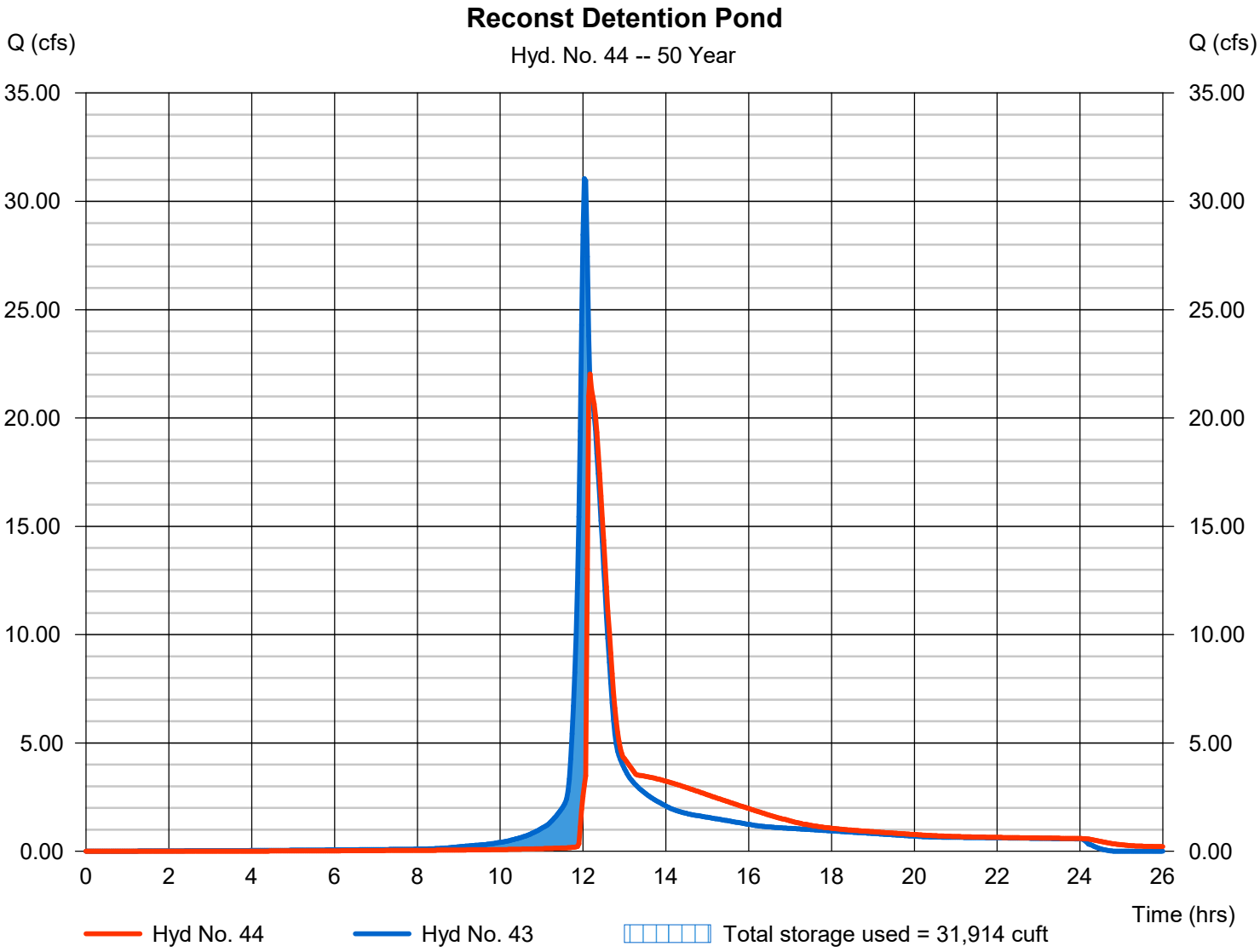
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 44

Reconst Detention Pond

Hydrograph type	=	Reservoir	Peak discharge	=	22.03 cfs
Storm frequency	=	50 yrs	Time to peak	=	12.17 hrs
Time interval	=	2 min	Hyd. volume	=	118,746 cuft
Inflow hyd. No.	=	43 - Total Flow into Pond	Max. Elevation	=	882.33 ft
Reservoir name	=	Reconstructed Detention Pond	Max. Storage	=	31,914 cuft

Storage Indication method used.



Hydrograph Report

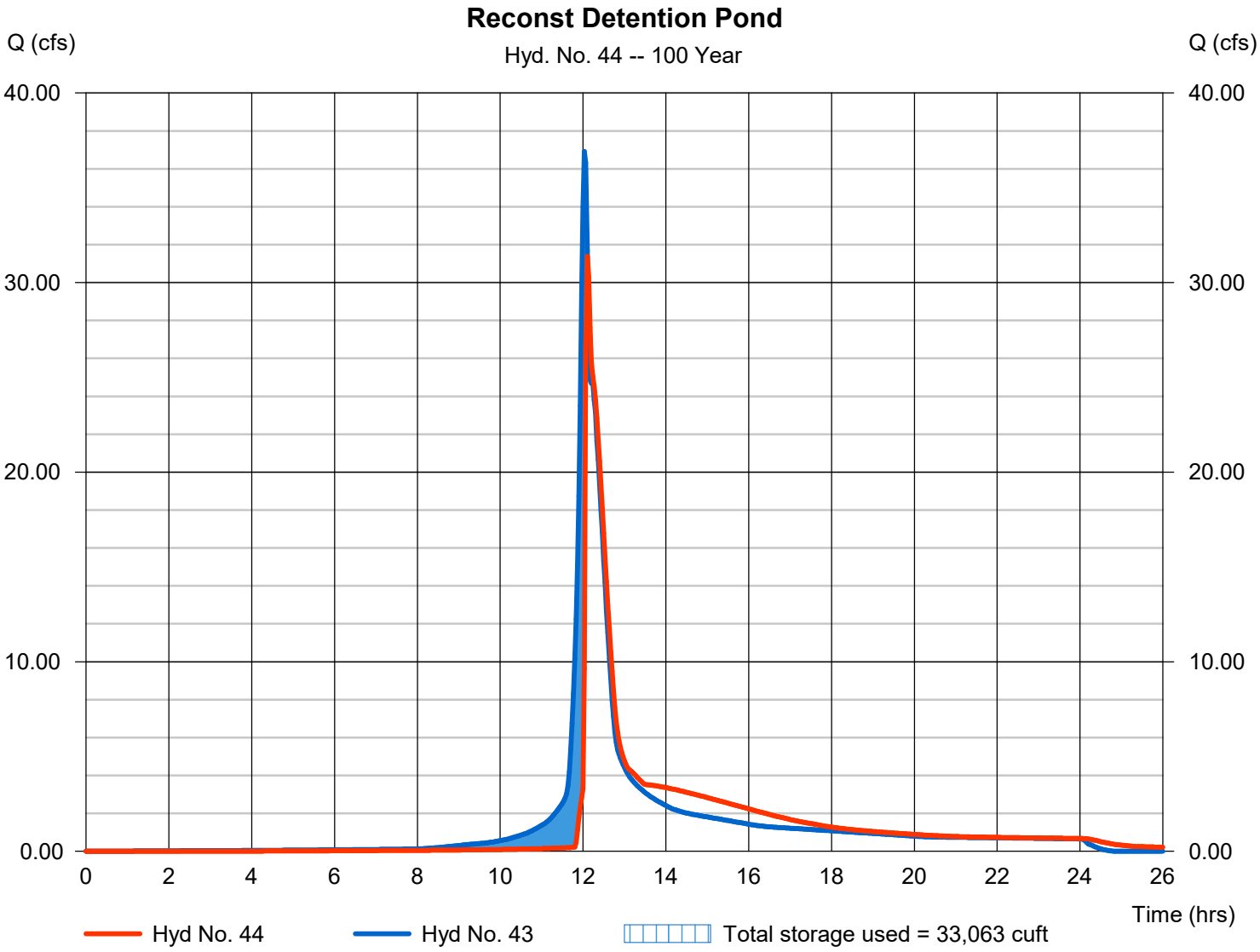
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 44

Reconst Detention Pond

Hydrograph type	=	Reservoir	Peak discharge	=	31.39 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.10 hrs
Time interval	=	2 min	Hyd. volume	=	140,286 cuft
Inflow hyd. No.	=	43 - Total Flow into Pond	Max. Elevation	=	882.51 ft
Reservoir name	=	Reconstructed Detention Pond	Max. Storage	=	33,063 cuft

Storage Indication method used.



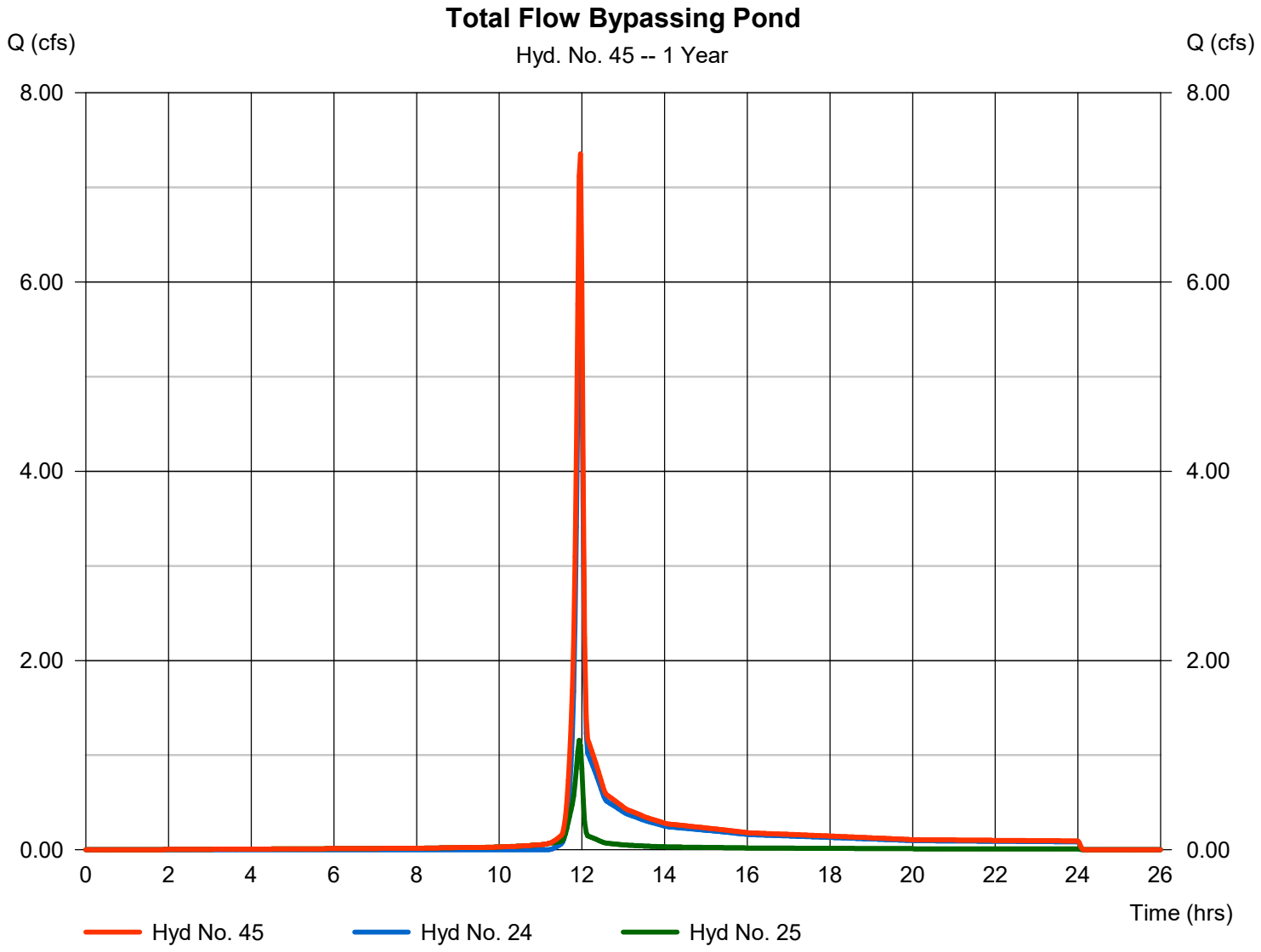
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 45

Total Flow Bypassing Pond

Hydrograph type	= Combine	Peak discharge	= 7.356 cfs
Storm frequency	= 1 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 15,338 cuft
Inflow hyds.	= 24, 25	Contrib. drain. area	= 4.240 ac



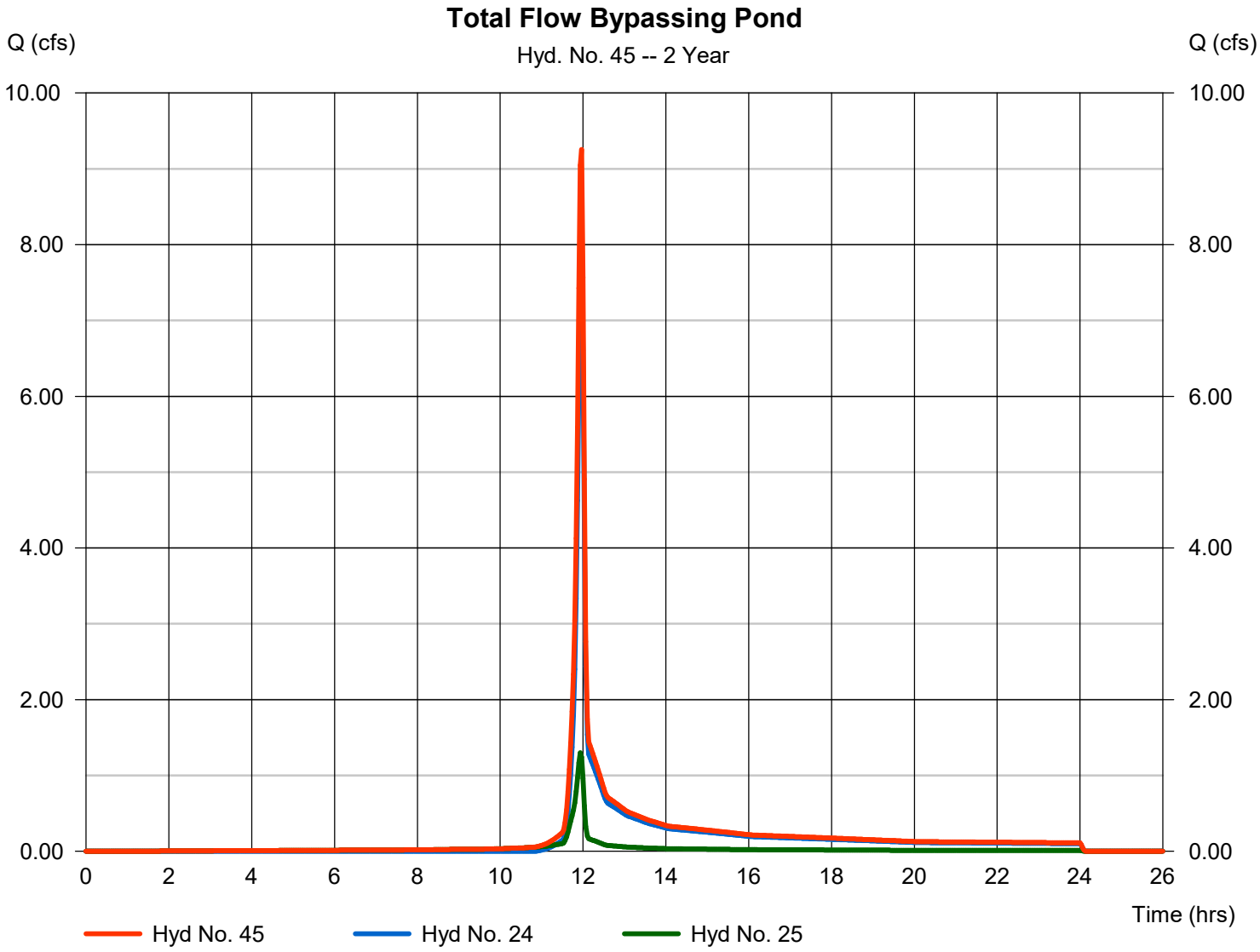
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 45

Total Flow Bypassing Pond

Hydrograph type	= Combine	Peak discharge	= 9.254 cfs
Storm frequency	= 2 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 19,127 cuft
Inflow hyds.	= 24, 25	Contrib. drain. area	= 4.240 ac



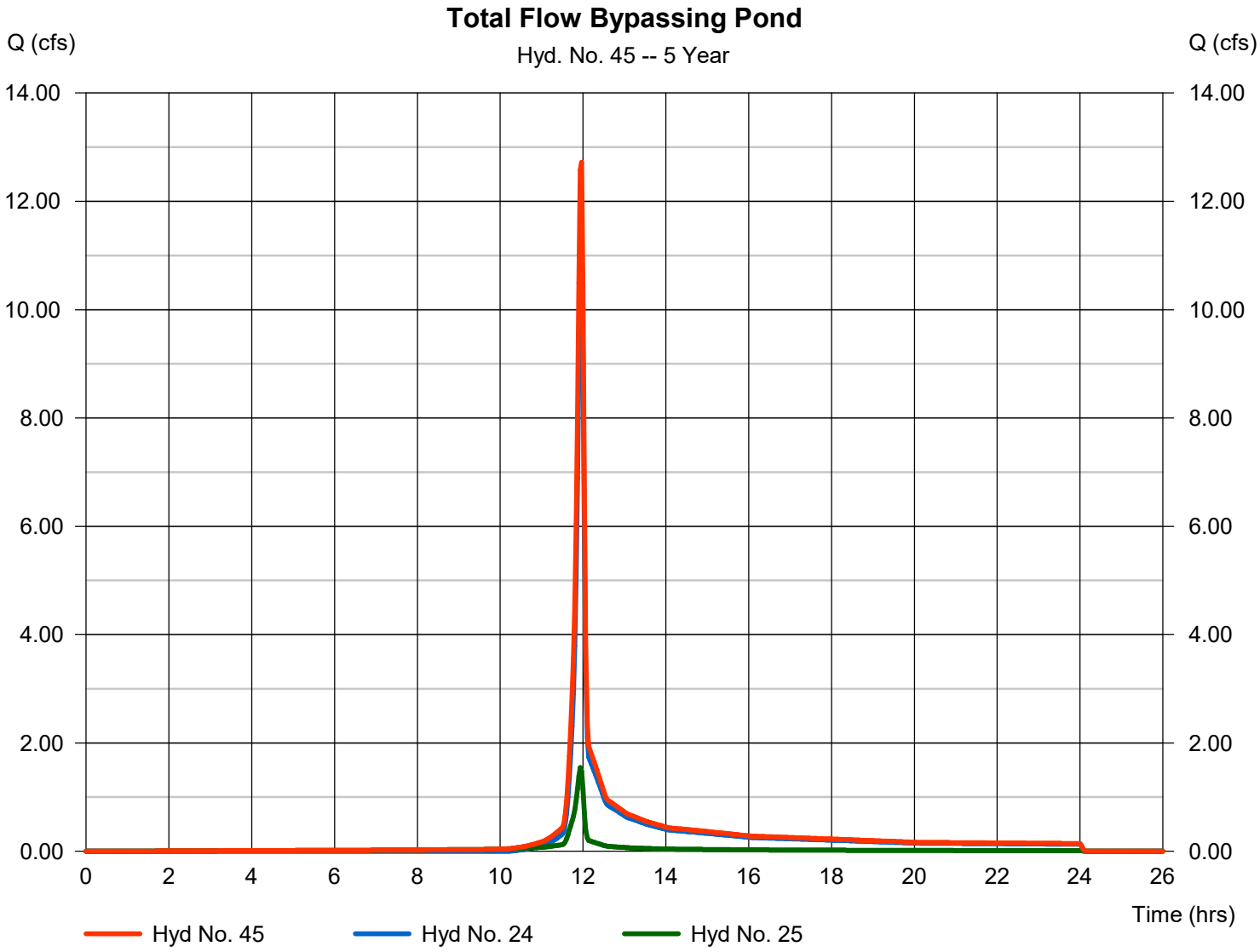
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 45

Total Flow Bypassing Pond

Hydrograph type	= Combine	Peak discharge	= 12.72 cfs
Storm frequency	= 5 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 26,152 cuft
Inflow hyds.	= 24, 25	Contrib. drain. area	= 4.240 ac



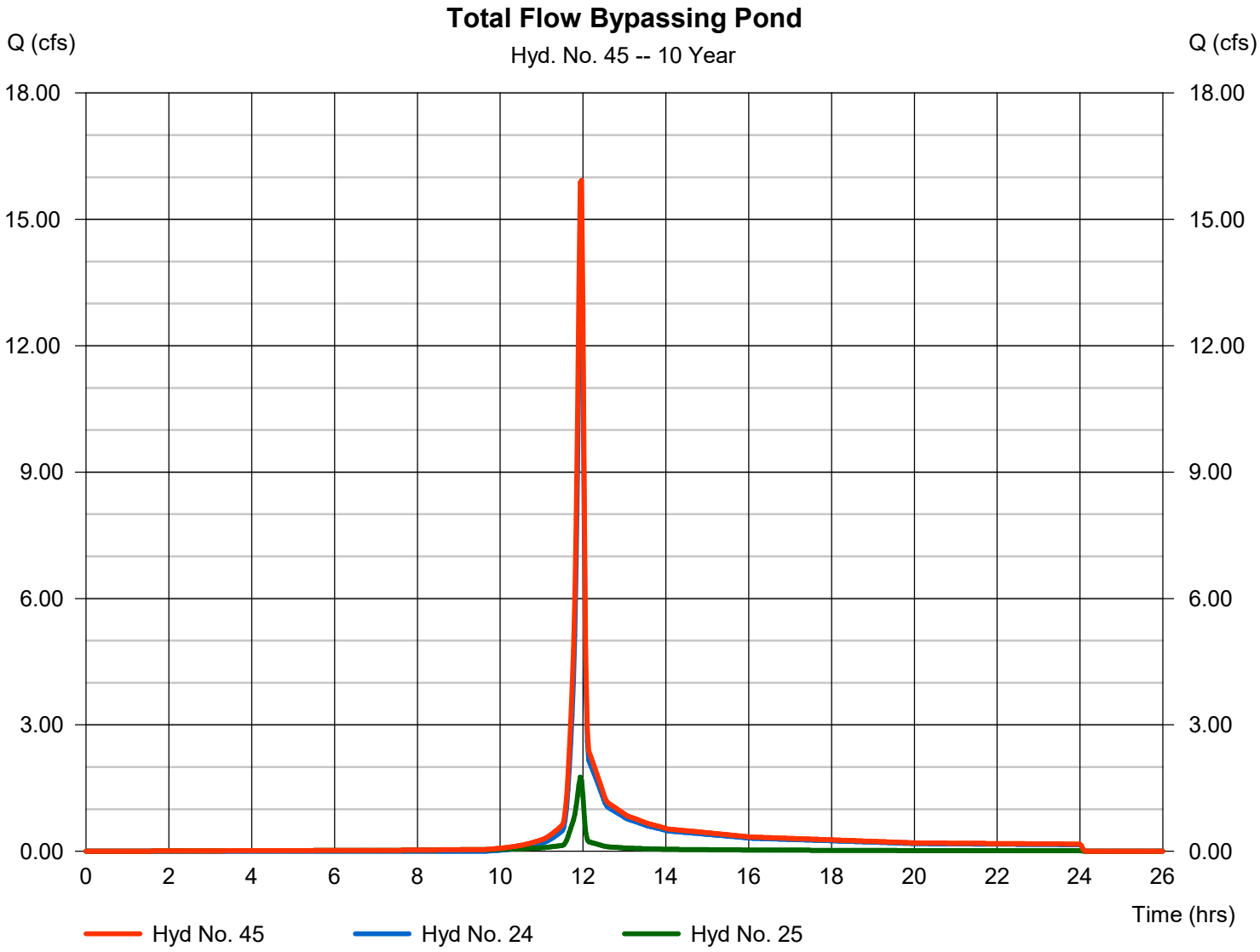
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 45

Total Flow Bypassing Pond

Hydrograph type	= Combine	Peak discharge	= 15.93 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 32,770 cuft
Inflow hyds.	= 24, 25	Contrib. drain. area	= 4.240 ac



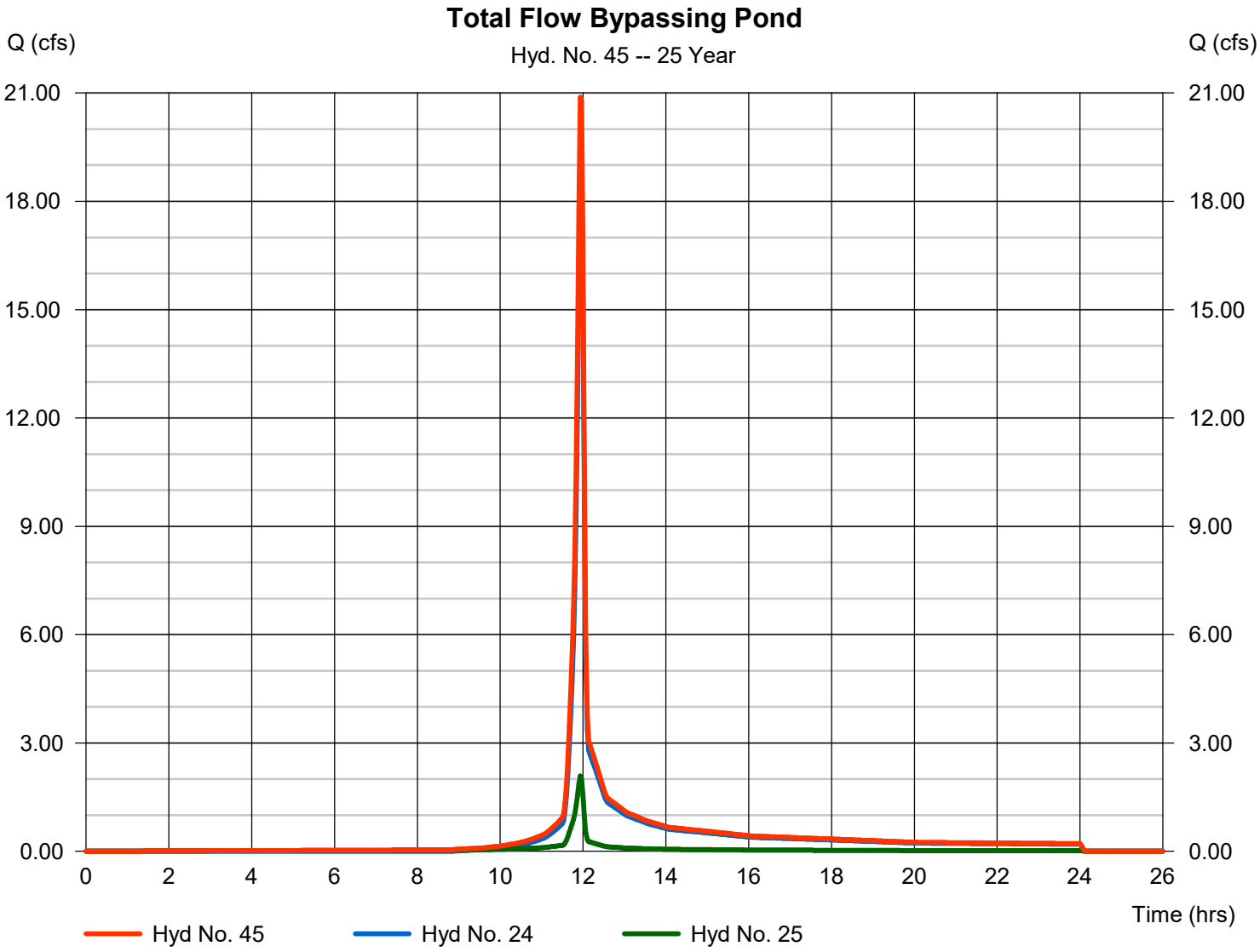
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 45

Total Flow Bypassing Pond

Hydrograph type	= Combine	Peak discharge	= 20.88 cfs
Storm frequency	= 25 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 42,949 cuft
Inflow hyds.	= 24, 25	Contrib. drain. area	= 4.240 ac



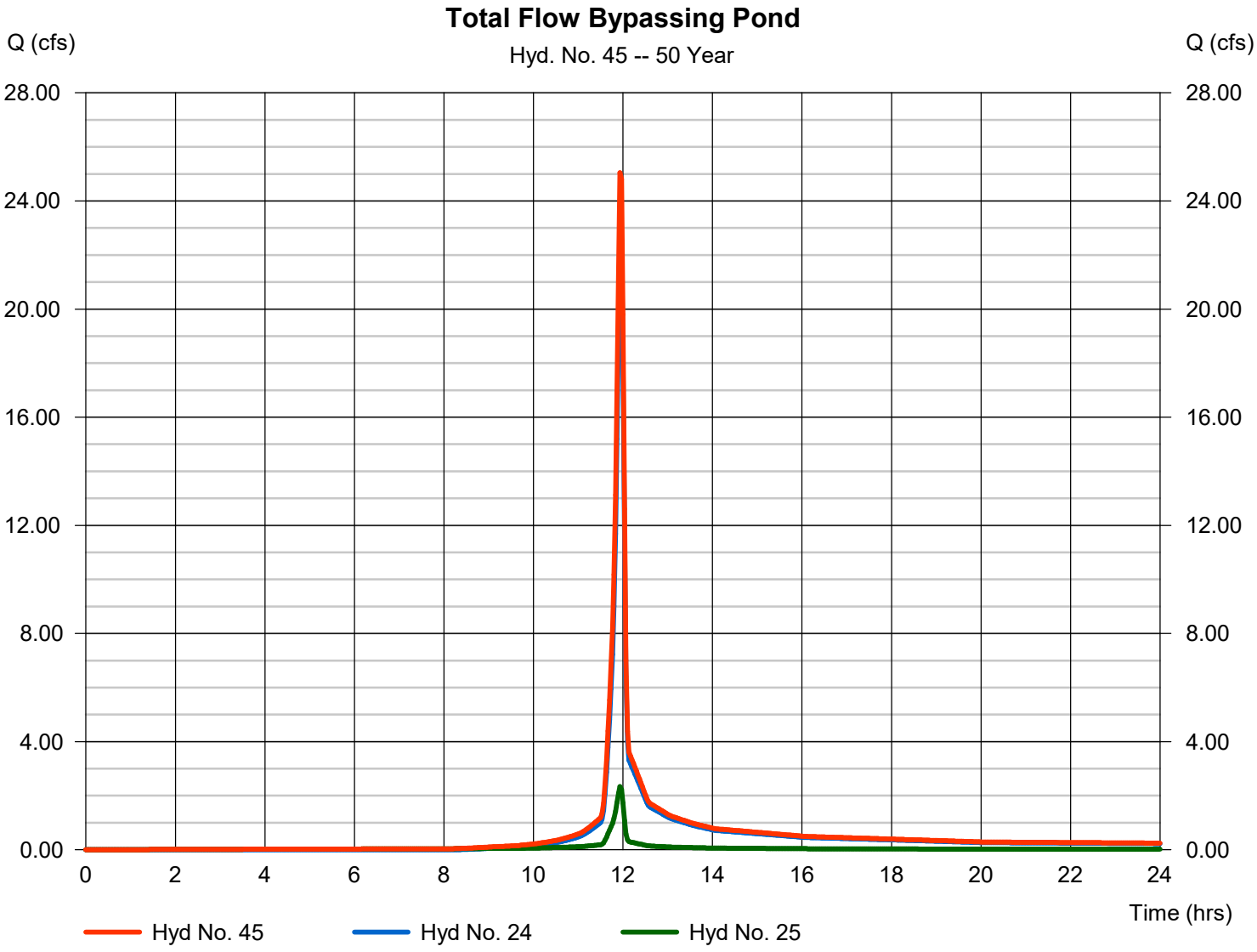
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 45

Total Flow Bypassing Pond

Hydrograph type	= Combine	Peak discharge	= 25.05 cfs
Storm frequency	= 50 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 51,535 cuft
Inflow hyds.	= 24, 25	Contrib. drain. area	= 4.240 ac



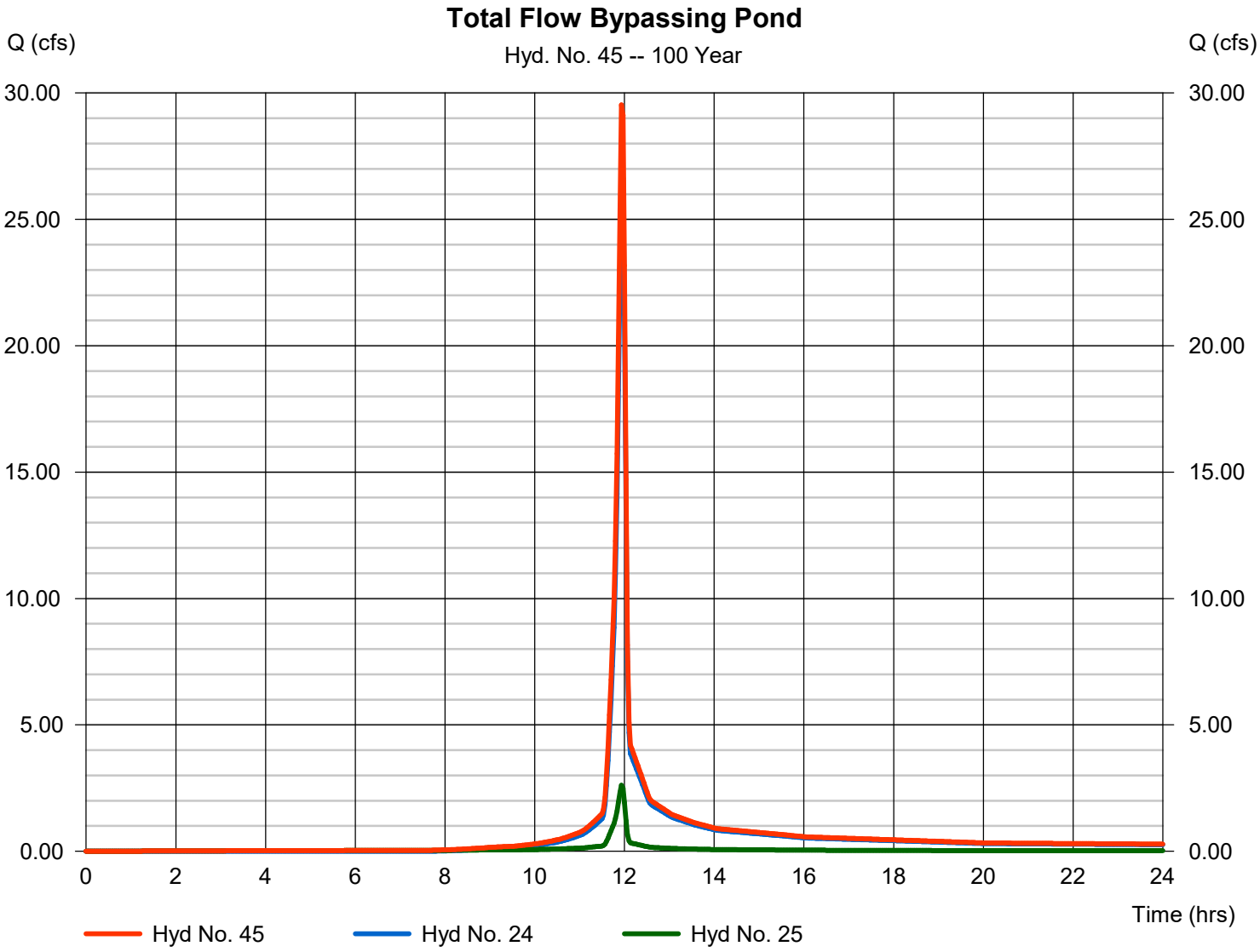
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 45

Total Flow Bypassing Pond

Hydrograph type	= Combine	Peak discharge	= 29.53 cfs
Storm frequency	= 100 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 60,863 cuft
Inflow hyds.	= 24, 25	Contrib. drain. area	= 4.240 ac



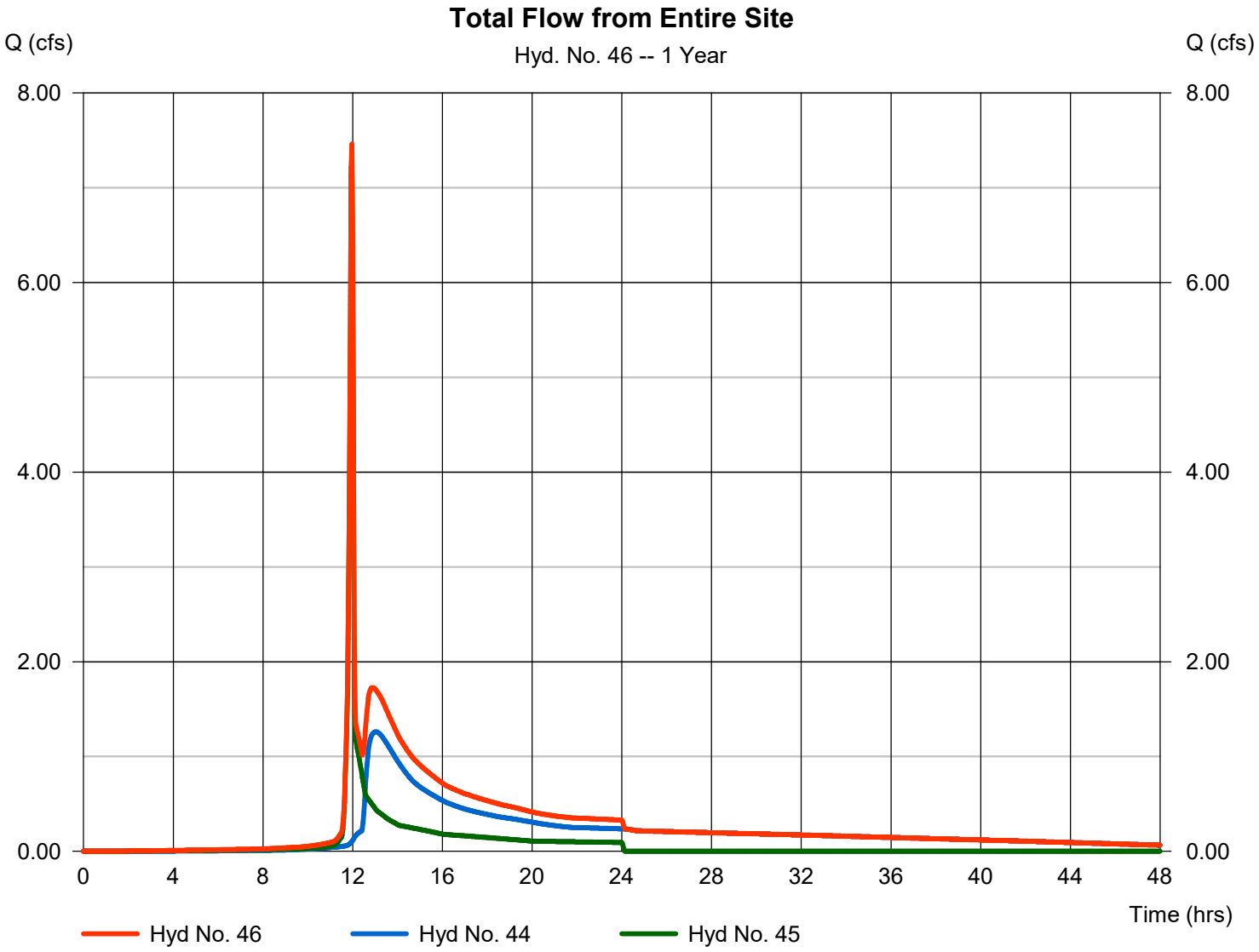
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 46

Total Flow from Entire Site

Hydrograph type	= Combine	Peak discharge	= 7.461 cfs
Storm frequency	= 1 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 50,543 cuft
Inflow hyds.	= 44, 45	Contrib. drain. area	= 0.000 ac



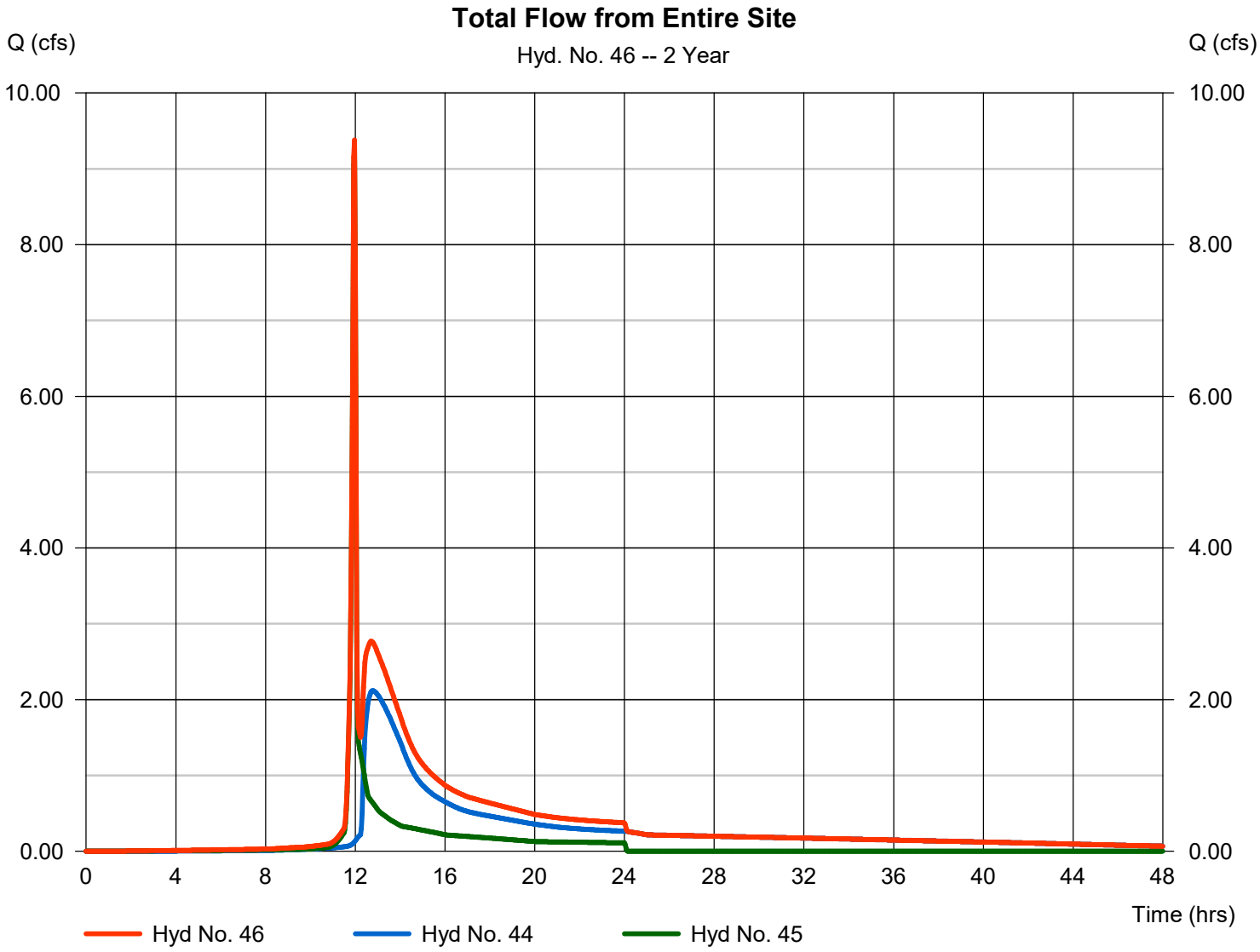
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 46

Total Flow from Entire Site

Hydrograph type	= Combine	Peak discharge	= 9.379 cfs
Storm frequency	= 2 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 63,063 cuft
Inflow hyds.	= 44, 45	Contrib. drain. area	= 0.000 ac



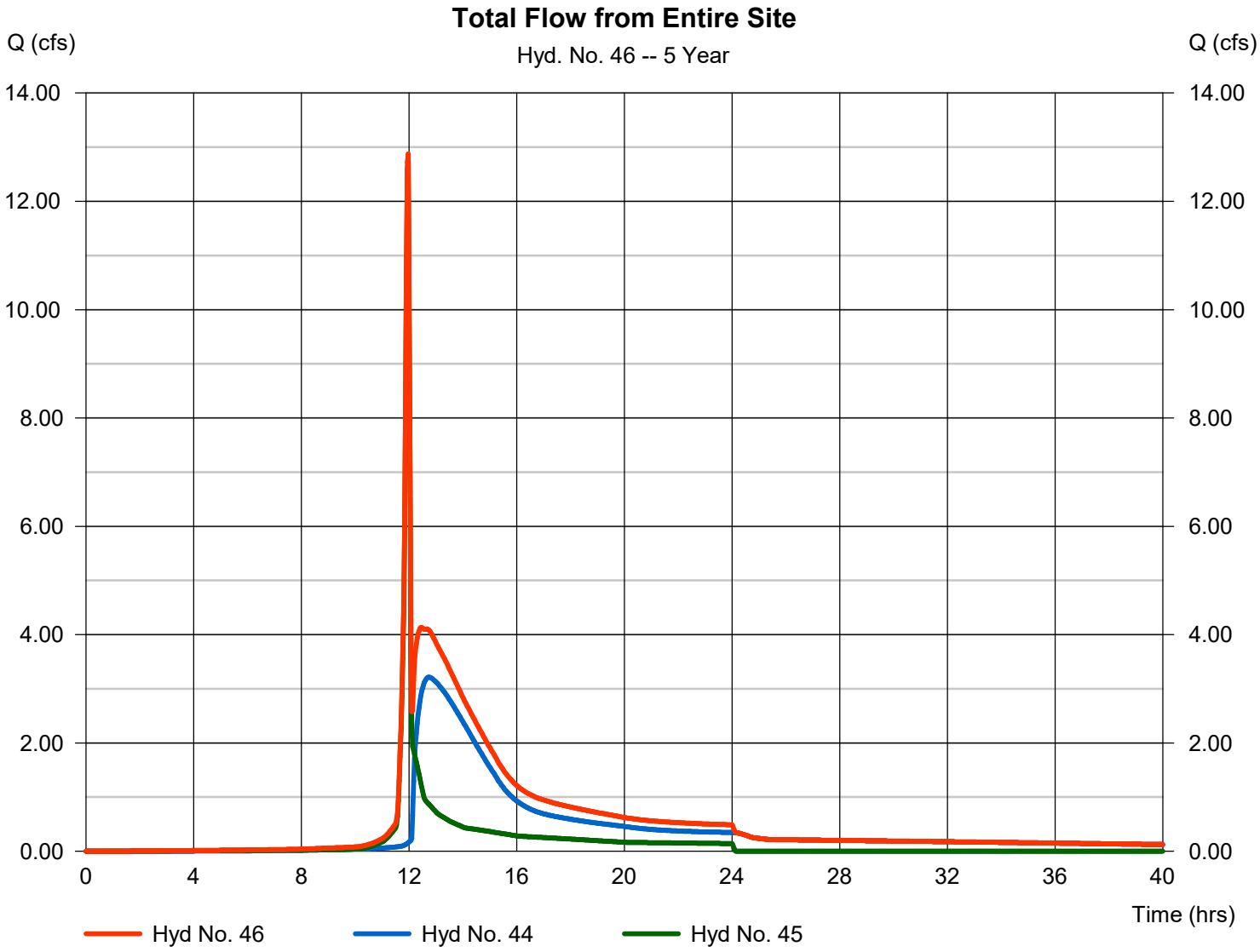
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 46

Total Flow from Entire Site

Hydrograph type	= Combine	Peak discharge	= 12.88 cfs
Storm frequency	= 5 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 86,380 cuft
Inflow hyds.	= 44, 45	Contrib. drain. area	= 0.000 ac



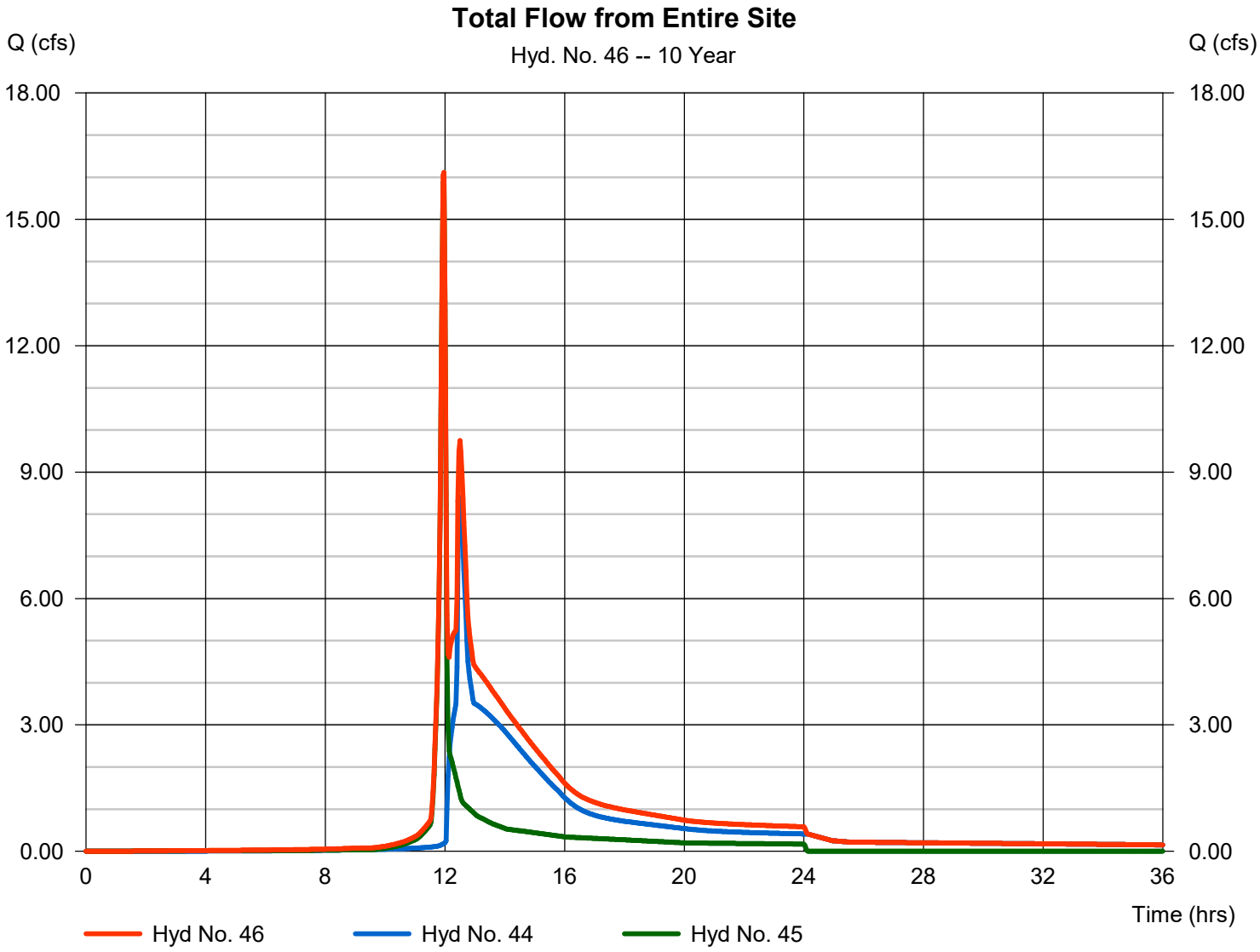
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 46

Total Flow from Entire Site

Hydrograph type	= Combine	Peak discharge	= 16.11 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 108,240 cuft
Inflow hyds.	= 44, 45	Contrib. drain. area	= 0.000 ac



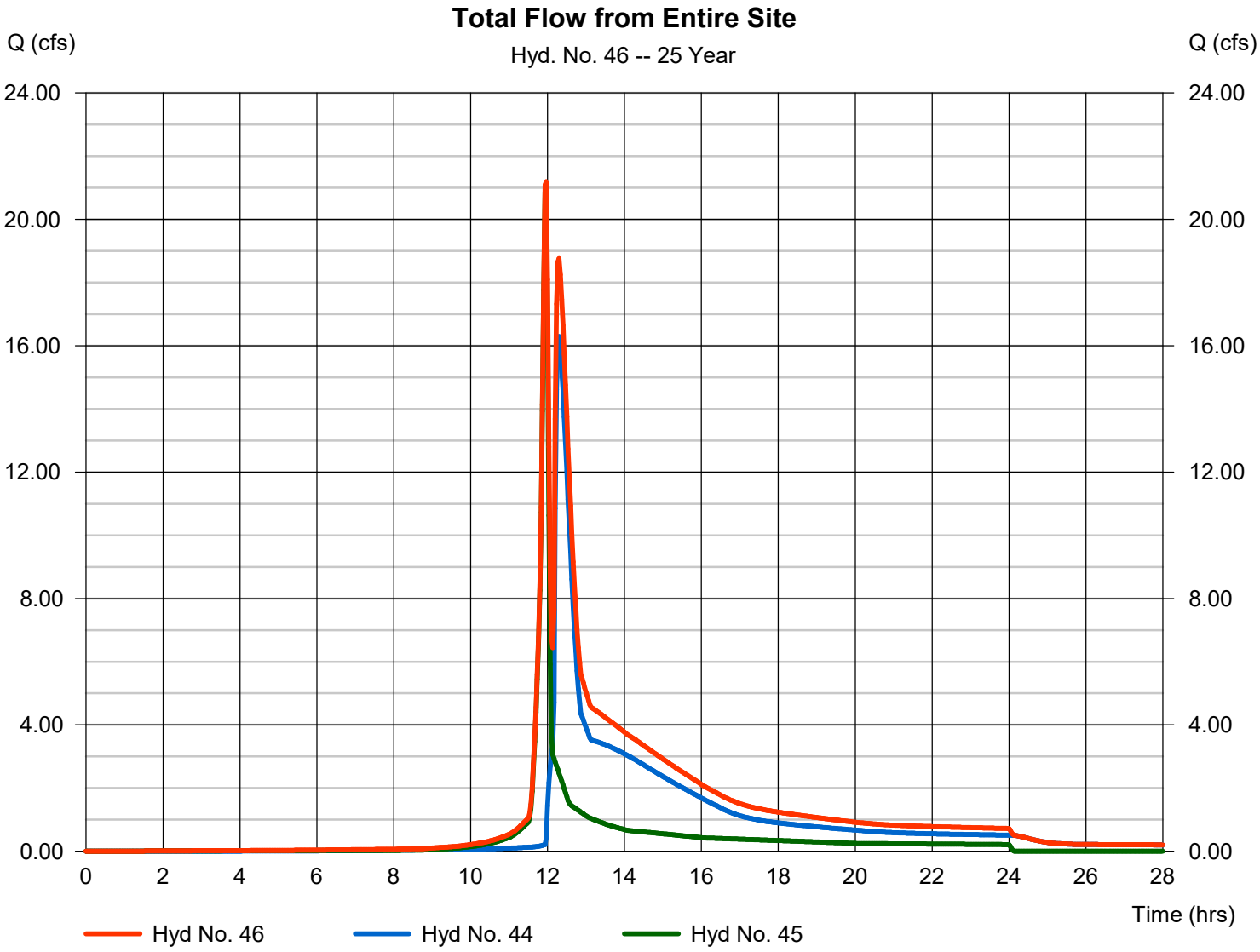
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 46

Total Flow from Entire Site

Hydrograph type	= Combine	Peak discharge	= 21.19 cfs
Storm frequency	= 25 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 141,883 cuft
Inflow hyds.	= 44, 45	Contrib. drain. area	= 0.000 ac



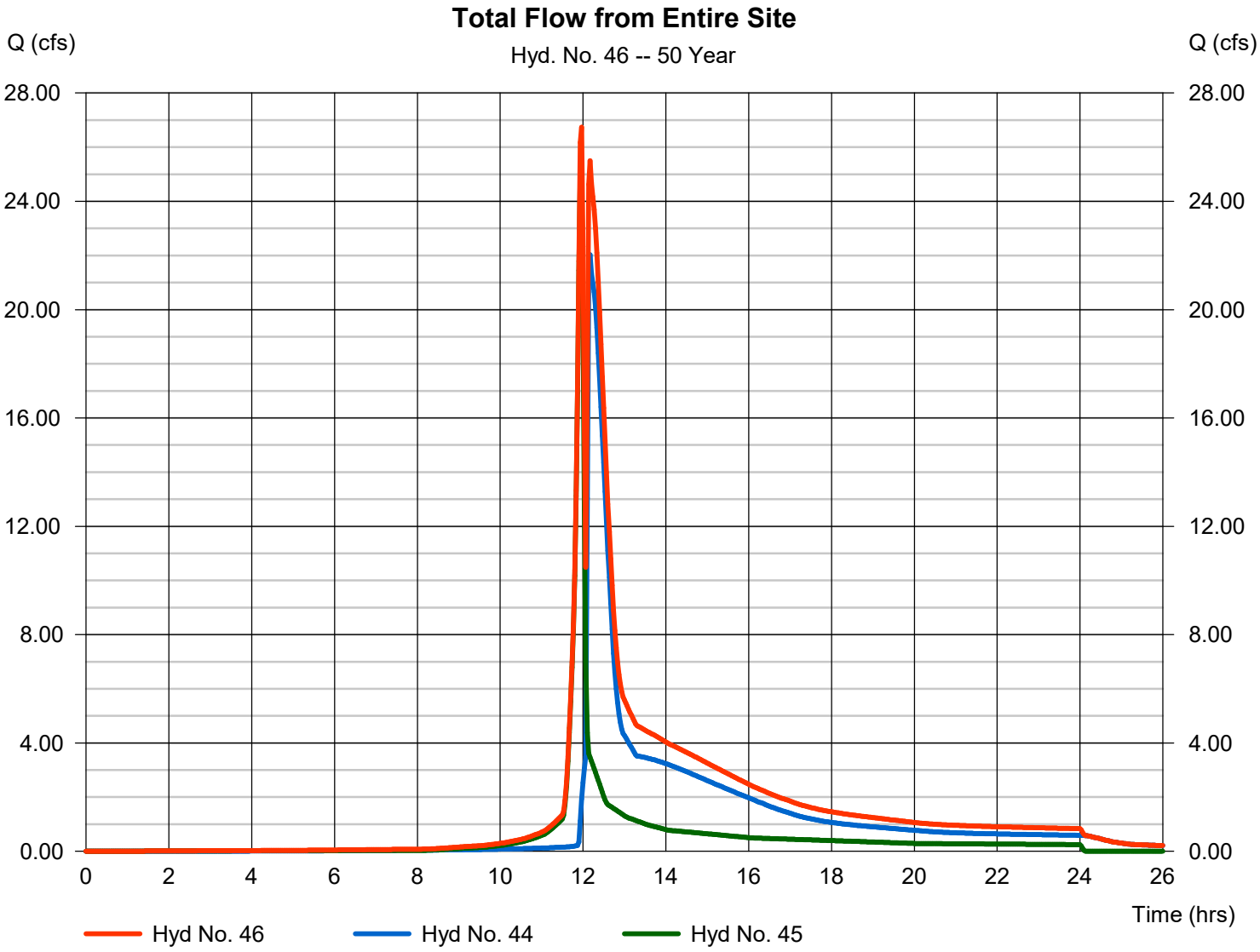
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 46

Total Flow from Entire Site

Hydrograph type	= Combine	Peak discharge	= 26.74 cfs
Storm frequency	= 50 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 170,280 cuft
Inflow hyds.	= 44, 45	Contrib. drain. area	= 0.000 ac



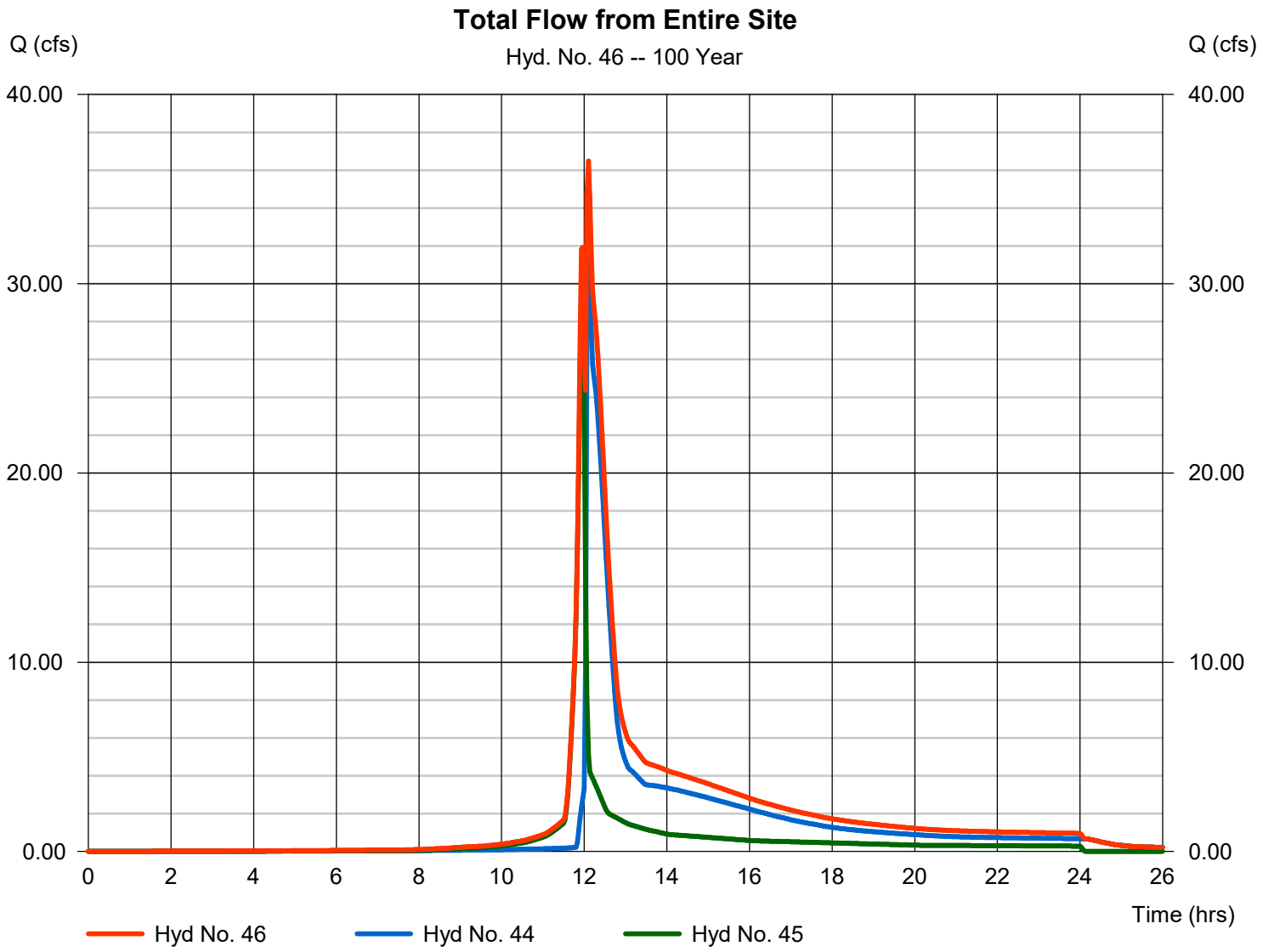
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

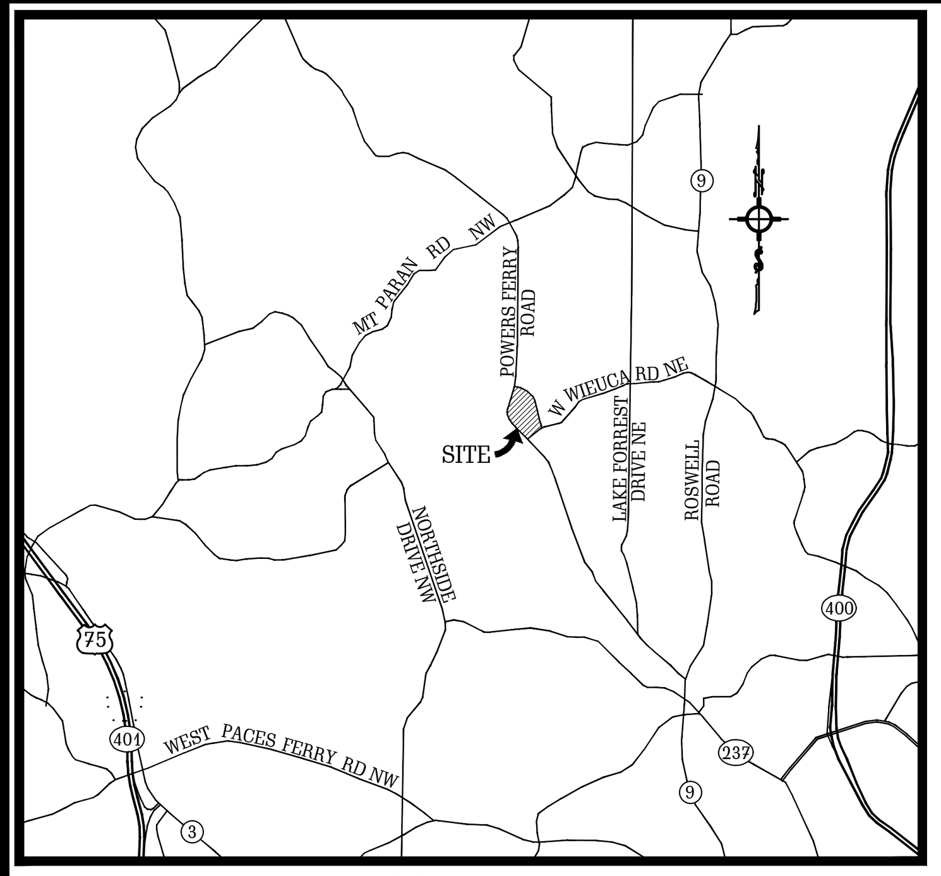
Hyd. No. 46

Total Flow from Entire Site

Hydrograph type	= Combine	Peak discharge	= 36.48 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 201,149 cuft
Inflow hyds.	= 44, 45	Contrib. drain. area	= 0.000 ac



POST-DEVELOPMENT DOWNSTREAM ANALYSIS



LOCATION MAP
NOT TO SCALE

PROJECT NARRATIVE

1. THE PROPOSED DEVELOPMENT IS LOCATED IN THE CITY OF ATLANTA, FULTON COUNTY, GEORGIA 30327 AND IS SURROUNDED BY RESIDENTIAL AND RECREATIONAL LAND.
2. PROJECT AREA: ±15.497 ACRES; DISTURBED AREA: ±5.0 ACRES.
3. PROPERTY IS LOCATED IN LAND LOTS #118 AND #138, 17TH L.D., 4371 POWERS FERRY ROAD, ATLANTA, FULTON COUNTY, GA 30327. LATITUDE: 33.8742° N; LONGITUDE: 84.3958° W.
4. CURRENT PROPERTY USE: HORSE PARK
5. CURRENT ZONING: R-3 RESIDENTIAL - SINGLE FAMILY
6. BUILDING SETBACK LINES:
   FRONT = 50' FROM PROPERTY LINE,
   REAR = 20' FROM PROPERTY LINE,
   SIDE = 10' FROM PROPERTY LINE.
7. PROJECT OWNER/24 HOUR CONTACT:
   OWNER:
   THE BOARD OF DIRECTORS
   CHASTAIN HORSE PARK
   4371 POWERS FERRY ROAD
   ATLANTA, GA 30327
   24 HOUR CONTACT:
   MS. TRISHA GROSS
   EXECUTIVE DIRECTOR
   TEL : (206) 850-5686

GRAPHIC SCALE
0 200 400
SCALE: 1"=200'

GEORGIA 811 Utilities Protection Center, Inc.
Know what's below. Call before you dig.

LEGEND

EXISTING		PROPOSED	
C.M.S.	- CONCRETE MONUMENT SET		
P.I.P.	- IRON PIN PLACED		
C.M.F.	- CONCRETE MONUMENT FOUND		
I.P.F.	- IRON PIN FOUND		
G.P.F.	- GALVANIZED PIPE FOUND		
—W—	- EXISTING WATER MAIN	—W—	- PROPOSED WATER MAIN
	- EXISTING FIRE HYDRANT		- PROPOSED FIRE HYDRANT
WV	- EXISTING WATER VALVE	WV	- PROPOSED WATER VALVE
	- EXISTING WATER METER		- PROPOSED WATER METER
— SS —	- EXISTING SANITARY SEWER	— SS —	- PROPOSED SANITARY SEWER
S	- EXISTING SANITARY SEWER MANHOLE	S	- PROPOSED SANITARY SEWER MANHOLE
	- EXISTING CONCRETE PIPE		- PROPOSED CONCRETE PIPE
ST	- EXISTING STORM SEWER MANHOLE	ST	- PROPOSED STORM SEWER MANHOLE
	- EXISTING POWER POLE (P.P.)		- PROPOSED POWER POLE (P.P.)
—OHP—	- EXISTING OVER HEAD POWER	—OHP—	- PROPOSED OVER HEAD POWER
—UGP—	- EXISTING UNDERGROUND POWER	—UGP—	- PROPOSED UNDERGROUND POWER
—UGT—	- EXISTING TELEPHONE LINE BURIED UNDER GROUND	—UGT—	- PROPOSED TELEPHONE LINE BURIED UNDER GROUND
—CTV—	- EXISTING CABLE	—CTV—	- PROPOSED CABLE
– –100– –	- EXISTING CONTOUR	—101—	- PROPOSED CONTOUR
	- EXISTING TREE		- PROPOSED TREE
	- SOILS LINES		
	- 100-YR FLOODPLAIN BOUNDARY		
	- EXISTING ITEMS TO BE DEMOLISHED		
	- EXISTING FLARED END SECTION		- PROPOSED FLARED END SECTION
R/W	- EXISTING RIGHT OF WAY	R/W	- PROPOSED RIGHT OF WAY
○	- EXISTING LOT BOUNDARY CORNER	○	- PROPOSED LOT BOUNDARY CORNER
	- EXISTING FENCE		- PROPOSED FENCE
C/L	- EXISTING CENTERLINE	C/L	- CENTERLINE
		—X—	- SILT FENCE
			- RIP-RAP

VDWE
VAN DER WATT ENGINEERING, LLC
CONSULTING CIVIL ENGINEERS
84 BENT OAK CIRCLE,
THOMASVILLE, GA 31757-9502
TEL: (229) 551-0363
FAX: (229) 227-6593
E-MAIL: JJ@VDWENGINEERS.COM
CERT. OF AUTH. GA # PEF004845

PROJECT:
PROPOSED ALTERATIONS TO CHASTAIN PARK EQUESTRIAN PARK
4371 POWERS FERRY ROAD
ATLANTA, GA 30327

CLIENT:
CHASTAIN PARK
ATLANTA, GA

DRAWING TITLE:
POST-DEVELOPMENT DRAINAGE AREAS 10% RULE

PROJ. No.: 19-003		DRAWN BY:	jj
DWG NAME: PRE AND POST DEVELOPMENT AREAS.dwg		CHECKED BY:	jj
SCALE: 1" = 200'		DATE:	26 JUL 2021

REVISIONS

NO.	DATE	INITIALS	DESCRIPTION
1.	07/26/2021	jj	CHANGE ALL PROPOSED NEW FACILITIES

RELEASED FOR CONSTRUCTION

SHEET NO.
C17

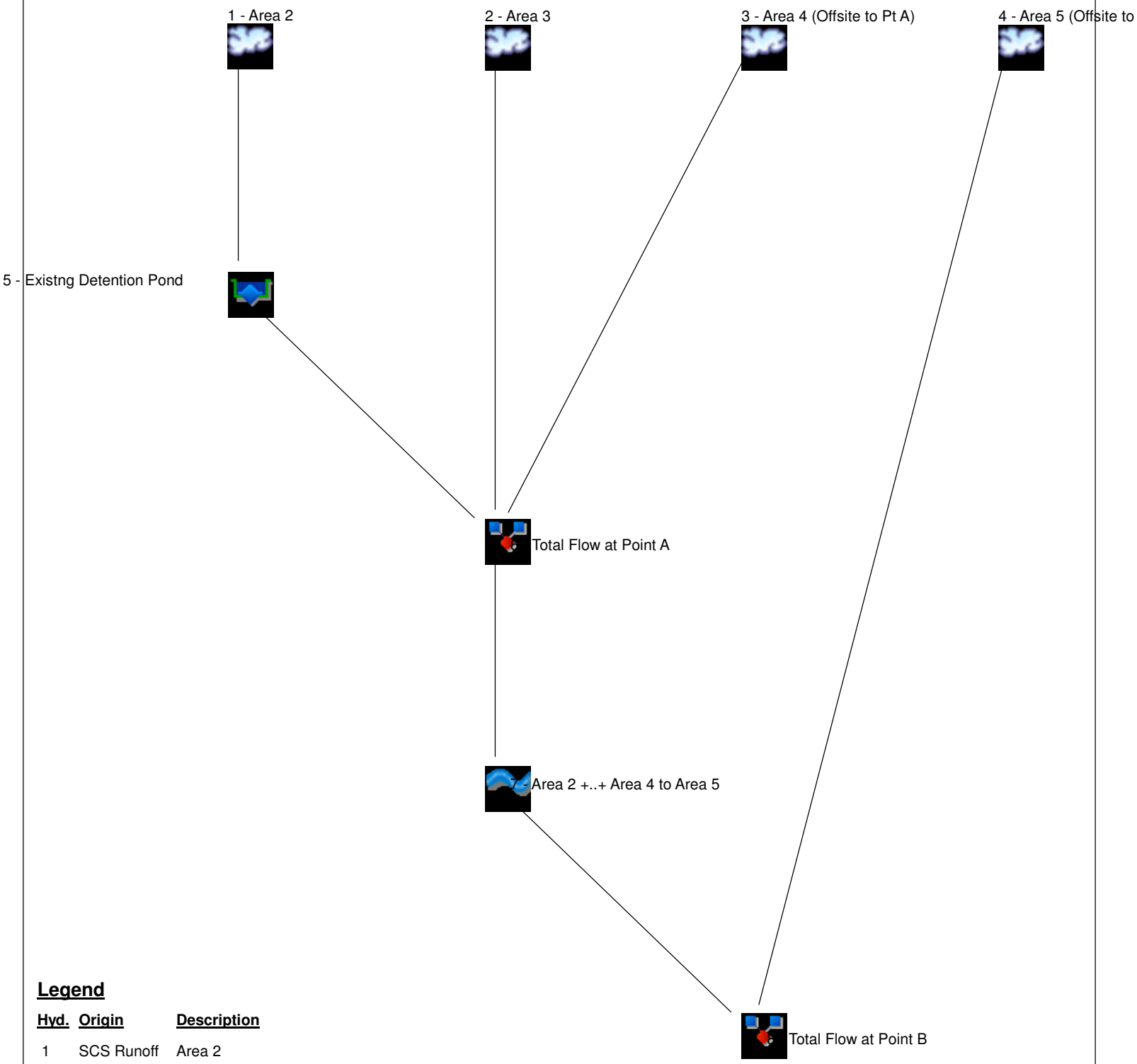
GEORGIA REGISTERED PROFESSIONAL ENGINEER No. 030867 JOHAN VAN DER WATT

REDUCED SIZE DRAWING

PRE-DEVELOPED 10% RULE

Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066



Legend

Hyd.	Origin	Description
1	SCS Runoff	Area 2
2	SCS Runoff	Area 3
3	SCS Runoff	Area 4 (Offsite to Pt A)
4	SCS Runoff	Area 5 (Offsite to Pt B)
5	Reservoir	Existng Detention Pond
6	Combine	Total Flow at Point A
7	Reach	Area 2 +..+ Area 4 to Area 5
8	Combine	Total Flow at Point B

Hydrograph Return Period Recap

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	------	4.590	6.042	-------	8.739	11.28	15.17	18.43	21.98	Area 2
2	SCS Runoff	------	10.32	13.31	-------	18.81	23.94	31.81	38.50	45.70	Area 3
3	SCS Runoff	------	26.50	37.88	-------	59.73	80.83	113.89	142.14	173.25	Area 4 (Offsite to Pt A)
4	SCS Runoff	------	25.34	39.19	-------	68.10	97.13	143.47	183.69	228.20	Area 5 (Offsite to Pt B)
5	Reservoir	1	3.411	5.553	-------	8.638	11.20	15.13	18.42	21.96	Existng Detention Pond
6	Combine	2, 3, 5	32.92	46.01	-------	71.19	99.01	140.66	175.18	212.82	Total Flow at Point A
7	Reach	6	18.35	26.76	-------	44.03	61.67	89.97	114.61	141.94	Area 2 +..+ Area 4 to Area 5
8	Combine	4, 7	40.17	60.97	-------	104.27	148.90	220.53	282.92	352.39	Total Flow at Point B

Hydrograph Report

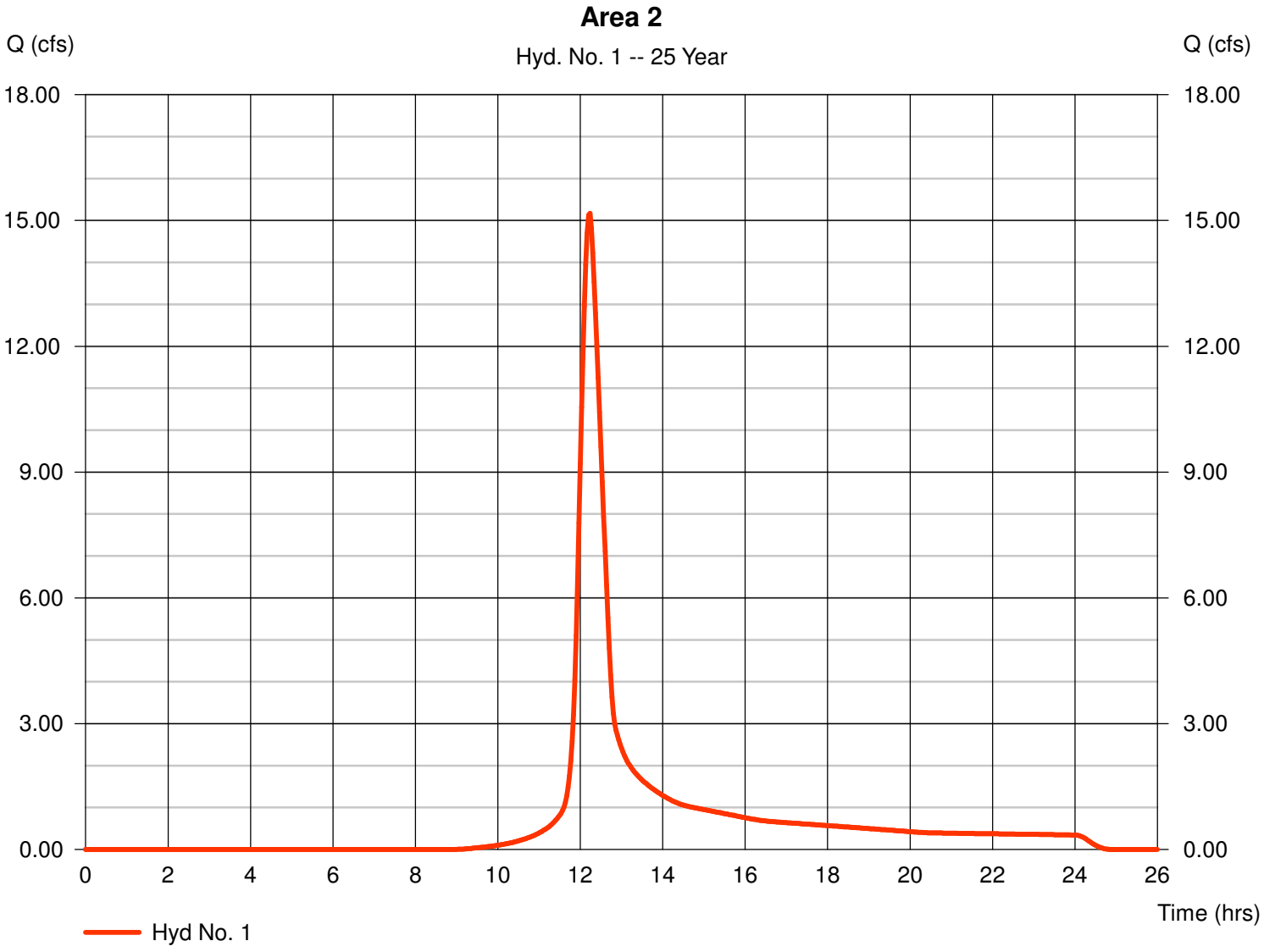
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 1

Area 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	15.17 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.23 hrs
Time interval	=	2 min	Hyd. volume	=	66,227 cuft
Drainage area	=	6.430 ac	Curve number	=	71*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	31.00 min
Total precip.	=	5.88 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(3.230 x 61) + (1.650 x 66) + (1.550 x 98)] / 6.430



TR55 Tc Worksheet

Hyd. No. 1

Area 2

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.150		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.69		0.00		0.00		
Land slope (%)	=	0.13		0.00		0.00		
Travel Time (min)	**=**	**27.23**	**+**	**0.00**	**+**	**0.00**	**=**	**27.23**
Shallow Concentrated Flow								
Flow length (ft)	=	142.00		335.00		559.00		
Watercourse slope (%)	=	8.12		6.16		4.60		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (ft/s)	=	4.60		5.05		4.36		
Travel Time (min)	**=**	**0.51**	**+**	**1.11**	**+**	**2.14**	**=**	**3.76**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 31.00 min

Hydrograph Report

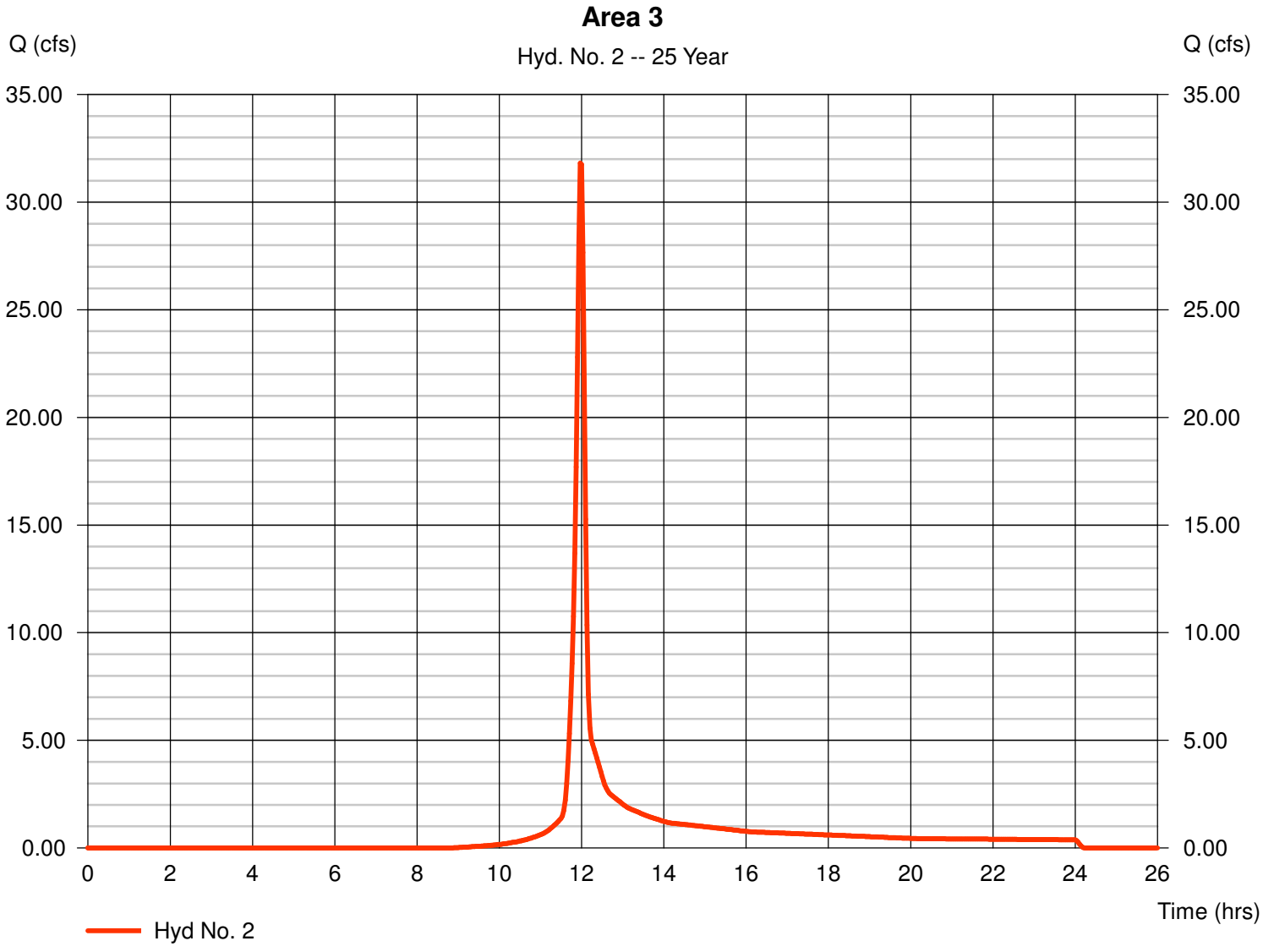
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 2

Area 3

Hydrograph type	=	SCS Runoff	Peak discharge	=	31.81 cfs
Storm frequency	=	25 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	72,836 cuft
Drainage area	=	7.160 ac	Curve number	=	71*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	7.10 min
Total precip.	=	5.88 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(3.610 x 61) + (1.830 x 66) + (1.720 x 98)] / 7.160



TR55 Tc Worksheet

Hyd. No. 2

Area 3

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.150		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.69		0.00		0.00		
Land slope (%)	=	8.73		0.00		0.00		
Travel Time (min)	**=**	**5.06**	**+**	**0.00**	**+**	**0.00**	**=**	**5.06**
Shallow Concentrated Flow								
Flow length (ft)	=	241.00		92.00		0.00		
Watercourse slope (%)	=	1.90		23.80		0.00		
Surface description	=	Unpaved		Unpaved		Paved		
Average velocity (ft/s)	=	2.22		7.87		0.00		
Travel Time (min)	**=**	**1.81**	**+**	**0.19**	**+**	**0.00**	**=**	**2.00**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 7.10 min

Hydrograph Report

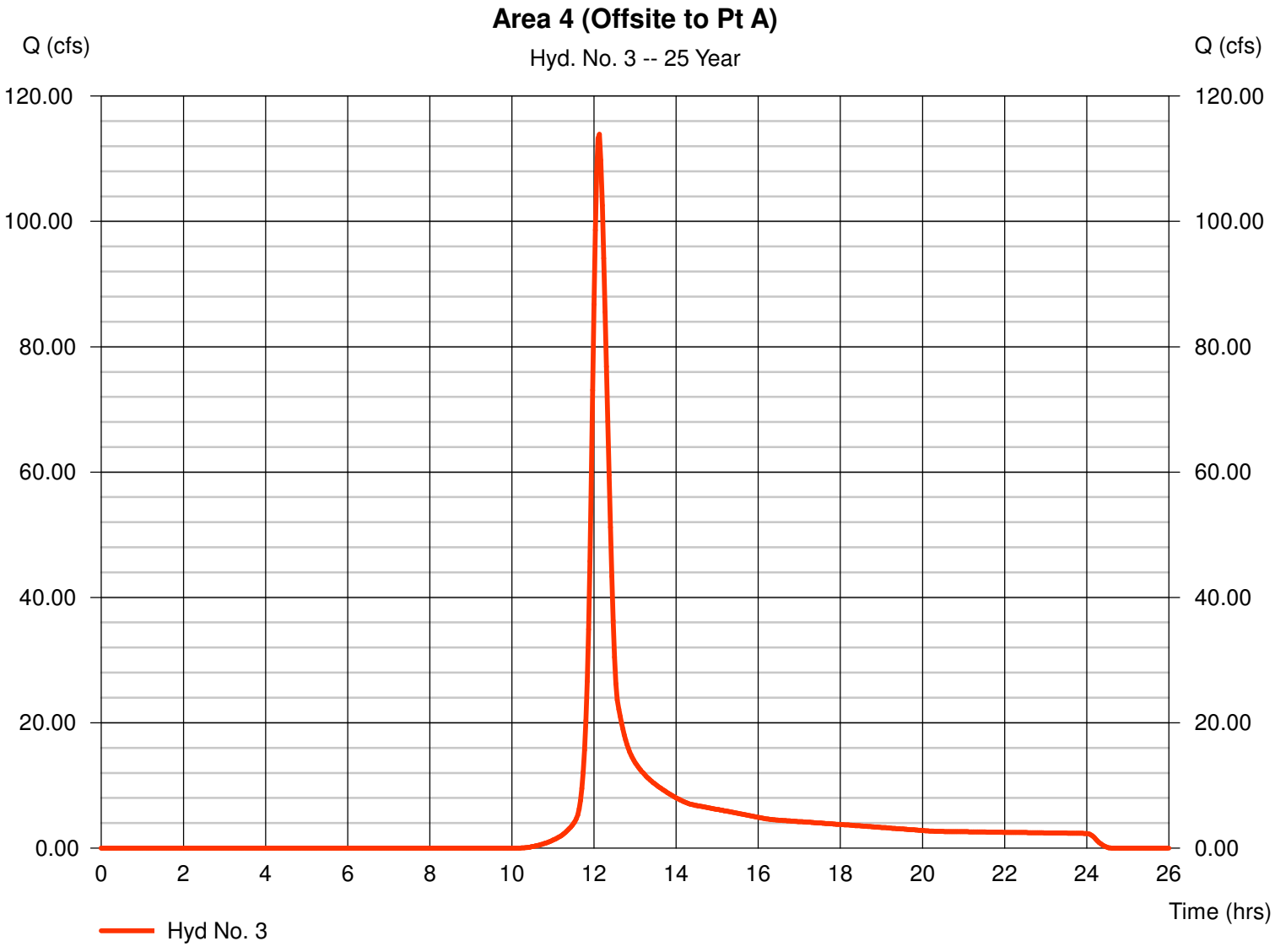
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 3

Area 4 (Offsite to Pt A)

Hydrograph type	=	SCS Runoff	Peak discharge	=	113.89 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.13 hrs
Time interval	=	2 min	Hyd. volume	=	405,201 cuft
Drainage area	=	48.430 ac	Curve number	=	65*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	21.30 min
Total precip.	=	5.88 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(26.290 x 61) + (22.140 x 69)] / 48.430



TR55 Tc Worksheet

Hyd. No. 3

Area 4 (Offsite to Pt A)

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.150		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.69		0.00		0.00		
Land slope (%)	=	3.00		0.00		0.00		
Travel Time (min)	**=**	**7.76**	**+**	**0.00**	**+**	**0.00**	**=**	**7.76**
Shallow Concentrated Flow								
Flow length (ft)	=	3108.00		0.00		0.00		
Watercourse slope (%)	=	5.66		0.00		0.00		
Surface description	=	Unpaved		Unpaved		Paved		
Average velocity (ft/s)	=	3.84		0.00		0.00		
Travel Time (min)	**=**	**13.49**	**+**	**0.00**	**+**	**0.00**	**=**	**13.49**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 21.30 min

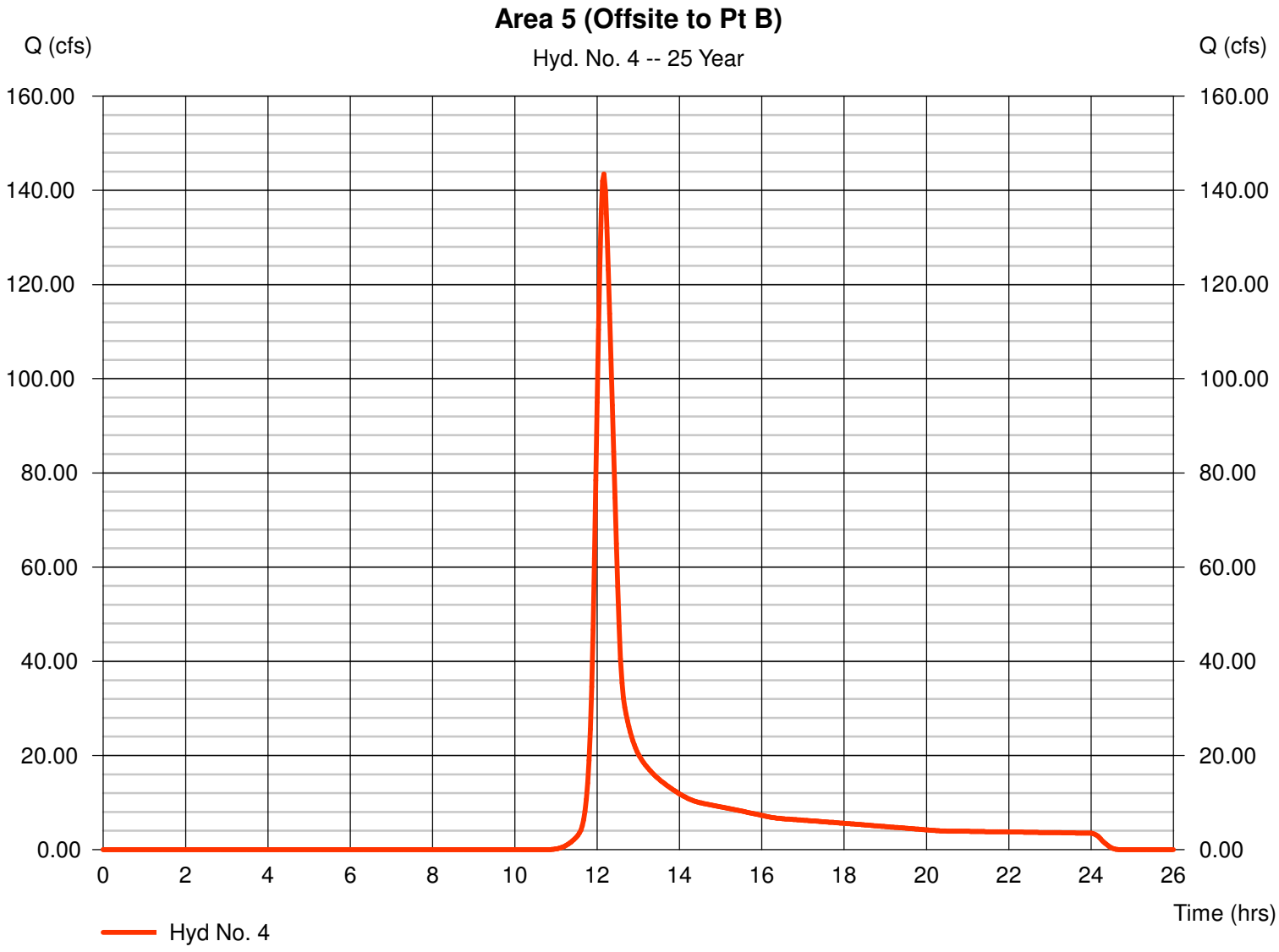
Hydrograph Report

Hyd. No. 4

Area 5 (Offsite to Pt B)

Hydrograph type	=	SCS Runoff	Peak discharge	=	143.47 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.17 hrs
Time interval	=	2 min	Hyd. volume	=	558,660 cuft
Drainage area	=	81.190 ac	Curve number	=	61*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	26.40 min
Total precip.	=	5.88 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(78.400 x 61) + (2.790 x 69)] / 81.190



TR55 Tc Worksheet

Hyd. No. 4

Area 5 (Offsite to Pt B)

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.150		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.69		0.00		0.00		
Land slope (%)	=	2.11		0.00		0.00		
Travel Time (min)	**=**	**8.93**	**+**	**0.00**	**+**	**0.00**	**=**	**8.93**
Shallow Concentrated Flow								
Flow length (ft)	=	2458.00		0.00		0.00		
Watercourse slope (%)	=	2.11		0.00		0.00		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (ft/s)	=	2.34		0.00		0.00		
Travel Time (min)	**=**	**17.48**	**+**	**0.00**	**+**	**0.00**	**=**	**17.48**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 26.40 min

Hydrograph Report

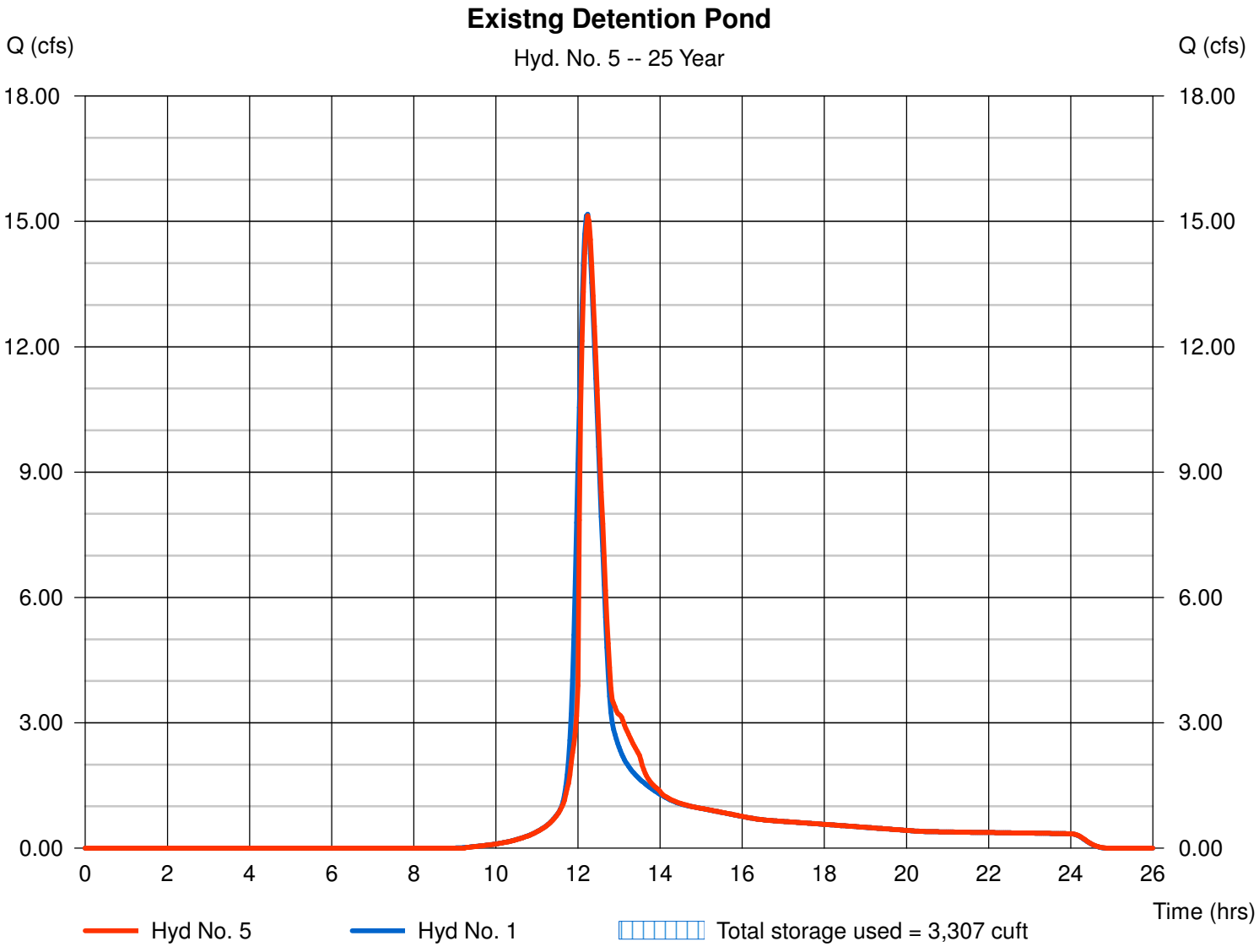
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 5

Existng Detention Pond

Hydrograph type	=	Reservoir	Peak discharge	=	15.13 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.23 hrs
Time interval	=	2 min	Hyd. volume	=	66,220 cuft
Inflow hyd. No.	=	1 - Area 2	Max. Elevation	=	881.56 ft
Reservoir name	=	Existing Detention Pond	Max. Storage	=	3,307 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Pond No. 1 - Existing Detention Pond

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 876.13 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	876.13	16	0	0
0.87	877.00	16	14	14
1.87	878.00	16	16	30
2.37	878.50	16	8	38
2.87	879.00	200	45	83
3.87	880.00	487	333	416
4.87	881.00	2,039	1,174	1,590
5.87	882.00	4,291	3,096	4,686
6.87	883.00	5,297	4,785	9,471
7.87	884.00	9,755	7,413	16,883

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	Inactive	0.00	1.00
Span (in)	= 24.00	12.00	0.00	1.00
No. Barrels	= 1	1	0	88
Invert El. (ft)	= 876.13	876.13	0.00	876.55
Length (ft)	= 39.00	0.00	0.00	4.12
Slope (%)	= 12.51	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	Yes	No	Yes

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 16.00	10.00	0.00	0.00
Crest El. (ft)	= 881.17	884.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= Riser	Broad	---	---
Multi-Stage	= Yes	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	876.13	0.00	0.00	---	0.00	0.00	0.00	---	---	---	---	0.000
0.87	14	877.00	0.12 ic	0.00	---	0.11	0.00	0.00	---	---	---	---	0.113
1.87	30	878.00	0.69 ic	0.00	---	0.65	0.00	0.00	---	---	---	---	0.653
2.37	38	878.50	1.02 ic	0.00	---	1.02	0.00	0.00	---	---	---	---	1.018
2.87	83	879.00	1.41 ic	0.00	---	1.38	0.00	0.00	---	---	---	---	1.384
3.87	416	880.00	2.20 ic	0.00	---	2.20	0.00	0.00	---	---	---	---	2.198
4.87	1,590	881.00	3.15 ic	0.00	---	3.14	0.00	0.00	---	---	---	---	3.143
5.87	4,686	882.00	32.17 ic	0.00	---	0.08	32.10 s	0.00	---	---	---	---	32.17
6.87	9,471	883.00	36.51 ic	0.00	---	0.00	36.47 s	0.00	---	---	---	---	36.48
7.87	16,883	884.00	39.60 ic	0.00	---	0.00	39.53 s	0.00	---	---	---	---	39.53

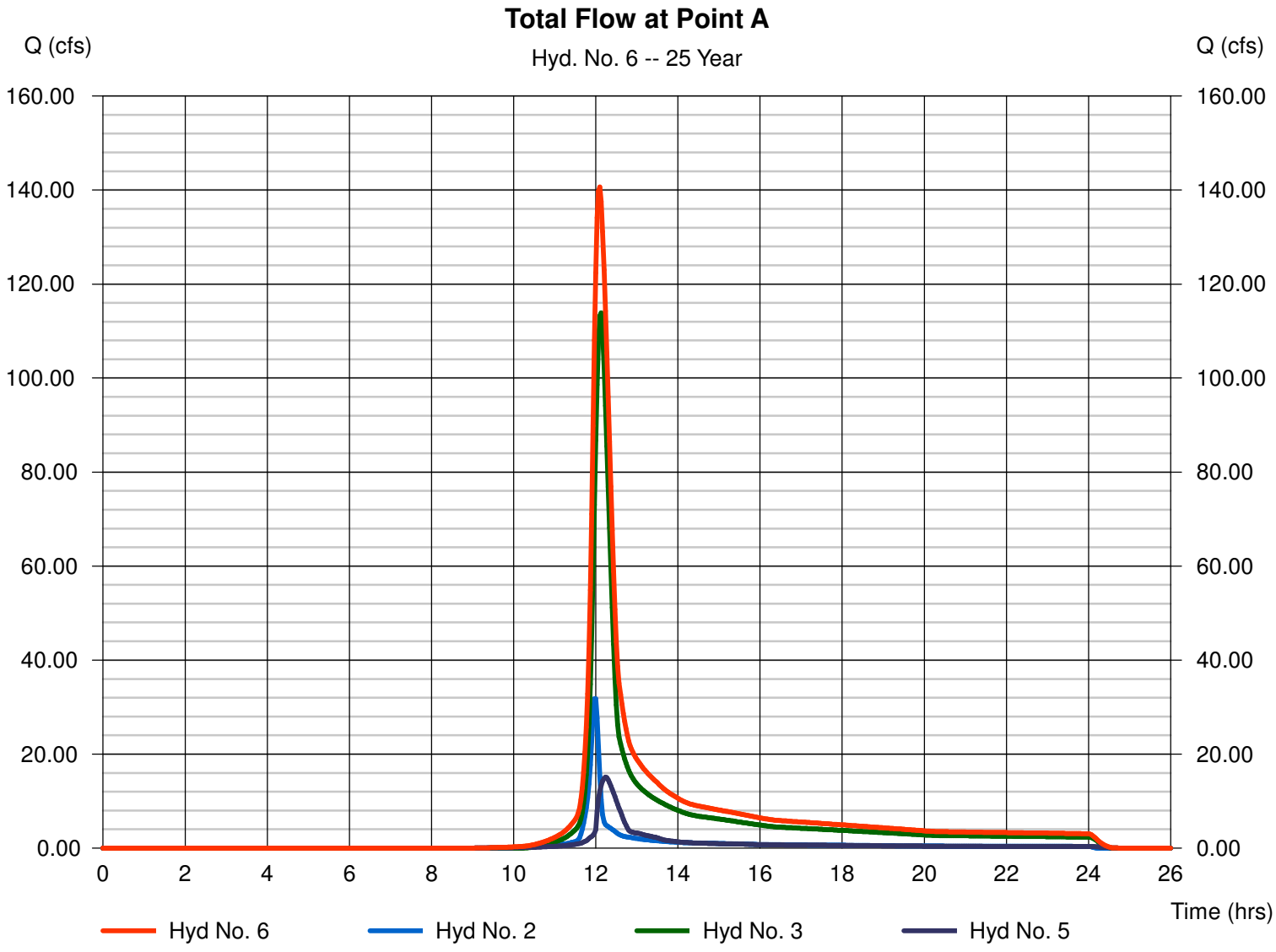
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 6

Total Flow at Point A

Hydrograph type	= Combine	Peak discharge	= 140.66 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 544,258 cuft
Inflow hyds.	= 2, 3, 5	Contrib. drain. area	= 55.590 ac



Hydrograph Report

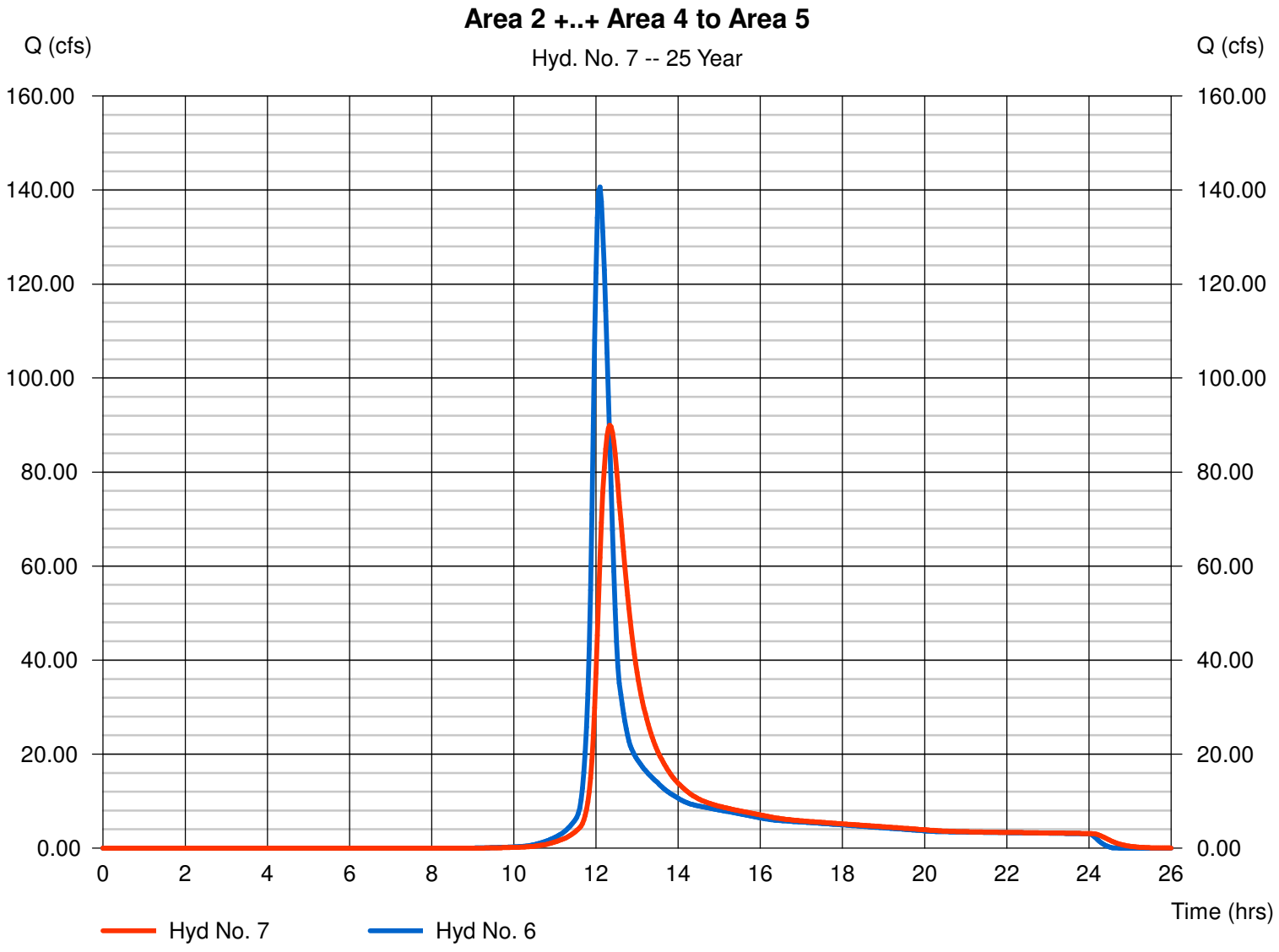
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 7

Area 2 +..+ Area 4 to Area 5

Hydrograph type	=	Reach	Peak discharge	=	89.97 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.33 hrs
Time interval	=	2 min	Hyd. volume	=	544,246 cuft
Inflow hyd. No.	=	6 - Total Flow at Point A	Section type	=	Trapezoidal
Reach length	=	2558.0 ft	Channel slope	=	2.1 %
Manning's n	=	0.150	Bottom width	=	5.0 ft
Side slope	=	5.0:1	Max. depth	=	3.0 ft
Rating curve x	=	0.493	Rating curve m	=	1.273
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.0944

Modified Att-Kin routing method used.



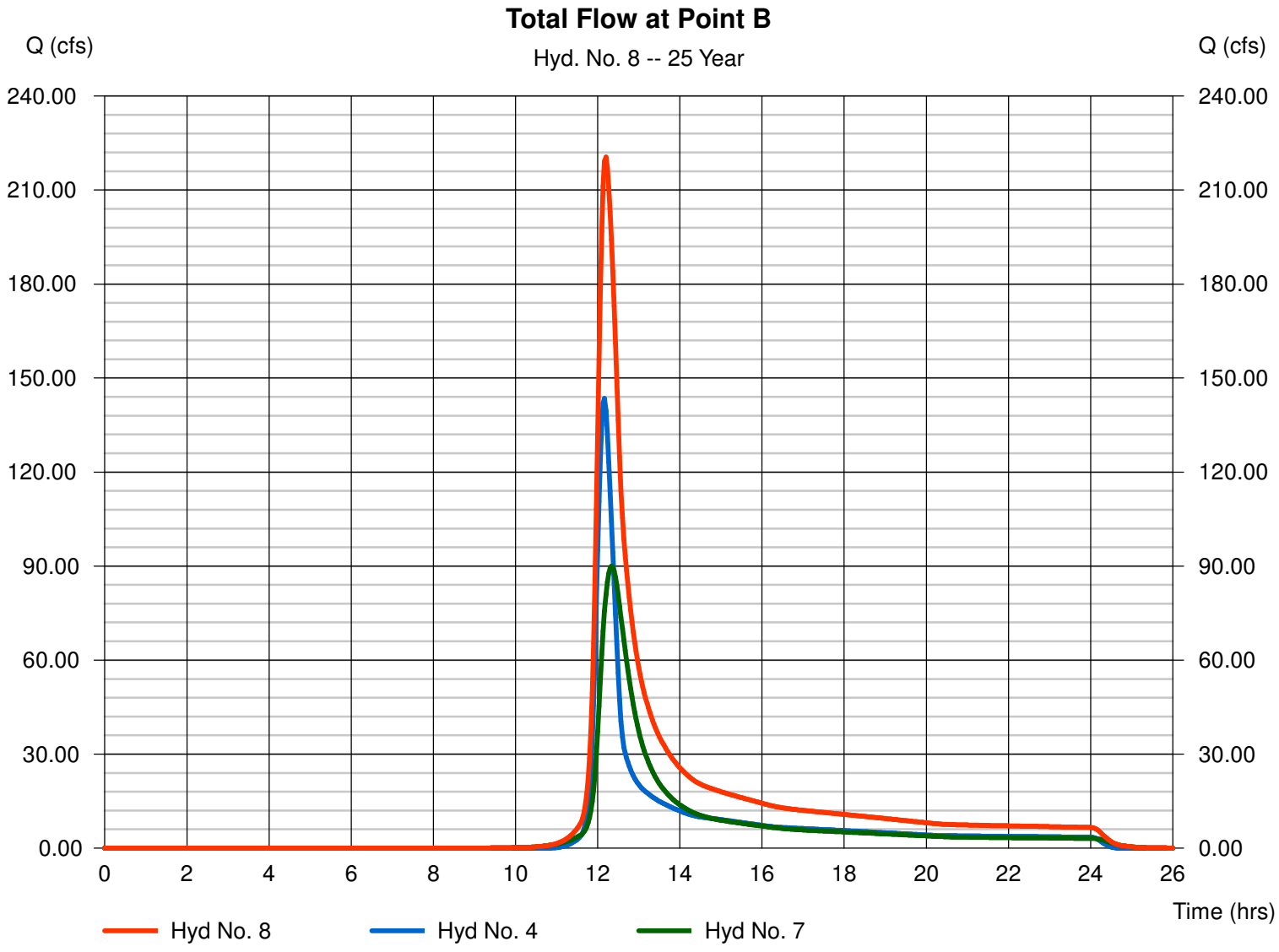
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Jul 26, 2021

Hyd. No. 8

Total Flow at Point B

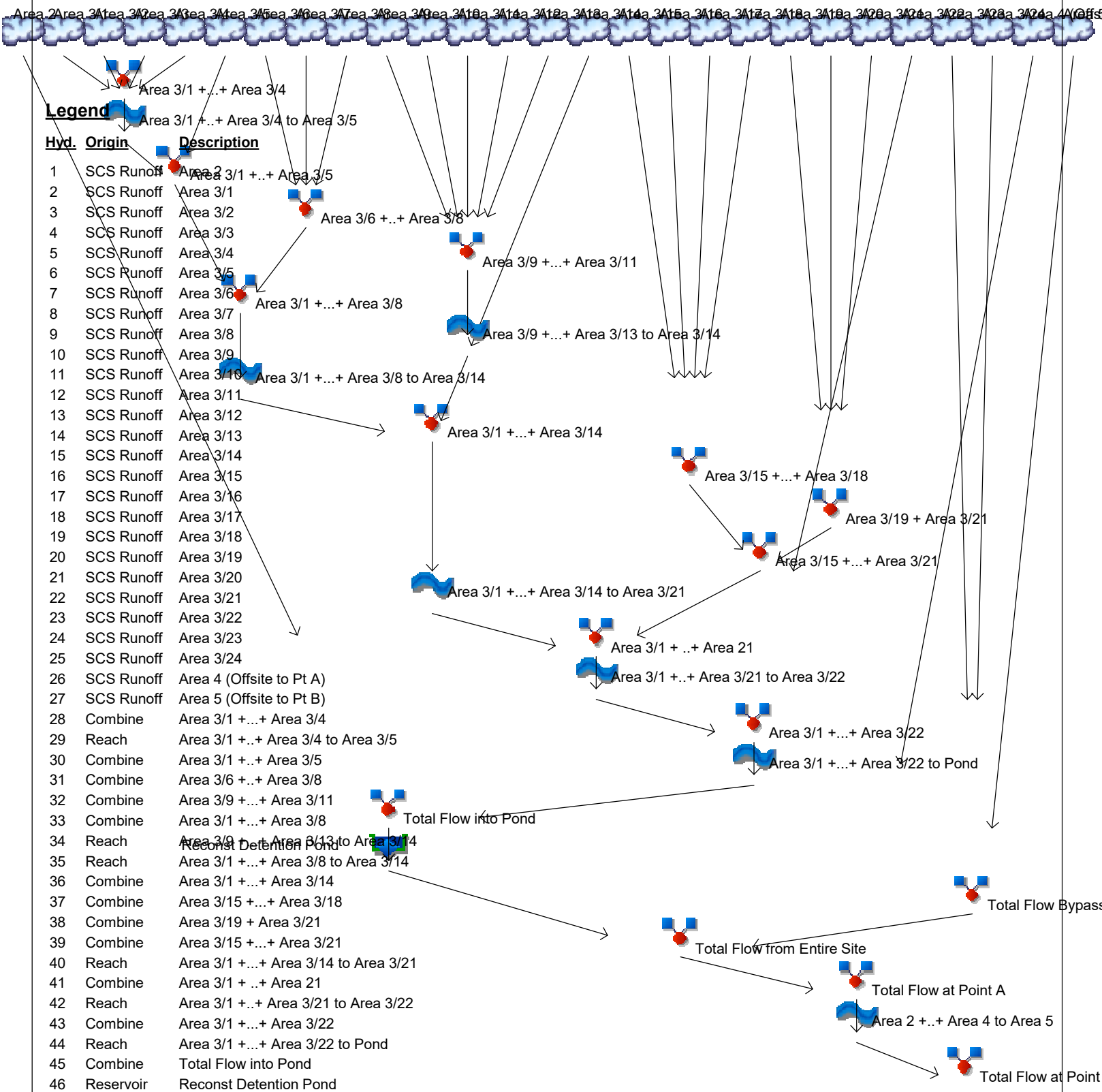
Hydrograph type	= Combine	Peak discharge	= 220.53 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.20 hrs
Time interval	= 2 min	Hyd. volume	= 1,102,905 cuft
Inflow hyds.	= 4, 7	Contrib. drain. area	= 81.190 ac



POST-DEVELOPED 10% RULE

Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023



Legend

Hyd.	Origin	Description
1	SCS Runoff	Area 2
2	SCS Runoff	Area 3/1
3	SCS Runoff	Area 3/2
4	SCS Runoff	Area 3/3
5	SCS Runoff	Area 3/4
6	SCS Runoff	Area 3/5
7	SCS Runoff	Area 3/6
8	SCS Runoff	Area 3/7
9	SCS Runoff	Area 3/8
10	SCS Runoff	Area 3/9
11	SCS Runoff	Area 3/10
12	SCS Runoff	Area 3/11
13	SCS Runoff	Area 3/12
14	SCS Runoff	Area 3/13
15	SCS Runoff	Area 3/14
16	SCS Runoff	Area 3/15
17	SCS Runoff	Area 3/16
18	SCS Runoff	Area 3/17
19	SCS Runoff	Area 3/18
20	SCS Runoff	Area 3/19
21	SCS Runoff	Area 3/20
22	SCS Runoff	Area 3/21
23	SCS Runoff	Area 3/22
24	SCS Runoff	Area 3/23
25	SCS Runoff	Area 3/24
26	SCS Runoff	Area 4 (Offsite to Pt A)
27	SCS Runoff	Area 5 (Offsite to Pt B)
28	Combine	Area 3/1 +...+ Area 3/4
29	Reach	Area 3/1 +..+ Area 3/4 to Area 3/5
30	Combine	Area 3/1 +..+ Area 3/5
31	Combine	Area 3/6 +..+ Area 3/8
32	Combine	Area 3/9 +...+ Area 3/11
33	Combine	Area 3/1 +...+ Area 3/8
34	Reach	Area 3/9 +...+ Area 3/13 to Area 3/14
35	Reach	Area 3/1 +...+ Area 3/8 to Area 3/14
36	Combine	Area 3/1 +...+ Area 3/14
37	Combine	Area 3/15 +...+ Area 3/18
38	Combine	Area 3/19 + Area 3/21
39	Combine	Area 3/15 +...+ Area 3/21
40	Reach	Area 3/1 +...+ Area 3/14 to Area 3/21
41	Combine	Area 3/1 + ..+ Area 21
42	Reach	Area 3/1 +..+ Area 3/21 to Area 3/22
43	Combine	Area 3/1 +...+ Area 3/22
44	Reach	Area 3/1 +...+ Area 3/22 to Pond
45	Combine	Total Flow into Pond
46	Reservoir	Reconst Detention Pond
47	Combine	Total Flow Bypassing Pond
48	Combine	Total Flow from Entire Site
49	Combine	Total Flow at Point A
50	Reach	Area 2 +..+ Area 4 to Area 5
51	Combine	Total Flow at Point B

Hydrograph Return Period Recap

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	------	4.540	5.977	-------	8.644	11.16	15.00	18.23	21.74	Area 2
2	SCS Runoff	------	0.222	0.250	-------	0.297	0.339	0.400	0.449	0.502	Area 3/1
3	SCS Runoff	------	0.428	0.497	-------	0.617	0.722	0.875	0.999	1.128	Area 3/2
4	SCS Runoff	------	0.856	0.994	-------	1.234	1.444	1.751	1.998	2.257	Area 3/3
5	SCS Runoff	------	0.222	0.250	-------	0.297	0.339	0.400	0.449	0.502	Area 3/4
6	SCS Runoff	------	0.489	0.549	-------	0.654	0.746	0.880	0.989	1.103	Area 3/5
7	SCS Runoff	------	0.232	0.335	-------	0.533	0.724	1.025	1.282	1.563	Area 3/6
8	SCS Runoff	------	0.310	0.384	-------	0.515	0.639	0.825	0.978	1.141	Area 3/7
9	SCS Runoff	------	0.299	0.362	-------	0.476	0.579	0.732	0.856	0.988	Area 3/8
10	SCS Runoff	------	0.089	0.100	-------	0.119	0.136	0.160	0.180	0.201	Area 3/9
11	SCS Runoff	------	0.089	0.100	-------	0.119	0.136	0.160	0.180	0.201	Area 3/10
12	SCS Runoff	------	0.256	0.351	-------	0.529	0.699	0.963	1.186	1.429	Area 3/11
13	SCS Runoff	------	0.133	0.150	-------	0.178	0.203	0.240	0.270	0.301	Area 3/12
14	SCS Runoff	------	0.089	0.100	-------	0.119	0.136	0.160	0.180	0.201	Area 3/13
15	SCS Runoff	------	0.152	0.225	-------	0.366	0.504	0.720	0.905	1.109	Area 3/14
16	SCS Runoff	------	0.408	0.604	-------	0.983	1.350	1.930	2.427	2.973	Area 3/15
17	SCS Runoff	------	0.261	0.327	-------	0.446	0.556	0.727	0.868	1.019	Area 3/16
18	SCS Runoff	------	0.485	0.607	-------	0.829	1.033	1.349	1.611	1.892	Area 3/17
19	SCS Runoff	------	0.363	0.428	-------	0.542	0.643	0.790	0.909	1.034	Area 3/18
20	SCS Runoff	------	0.311	0.350	-------	0.416	0.475	0.560	0.629	0.702	Area 3/19
21	SCS Runoff	------	0.222	0.250	-------	0.297	0.339	0.400	0.449	0.502	Area 3/20
22	SCS Runoff	------	0.143	0.166	-------	0.206	0.241	0.292	0.333	0.376	Area 3/21
23	SCS Runoff	------	0.133	0.150	-------	0.178	0.203	0.240	0.270	0.301	Area 3/22
24	SCS Runoff	------	6.253	8.015	-------	11.24	14.24	18.80	22.71	26.93	Area 3/23
25	SCS Runoff	------	1.155	1.298	-------	1.545	1.763	2.081	2.337	2.608	Area 3/24
26	SCS Runoff	------	26.50	37.88	-------	59.74	80.84	113.90	142.15	173.26	Area 4 (Offsite to Pt A)
27	SCS Runoff	------	25.35	39.19	-------	68.10	97.14	143.48	183.70	228.21	Area 5 (Offsite to Pt B)
28	Combine	2, 3, 4, 5,	1.728	1.991	-------	2.445	2.845	3.426	3.895	4.388	Area 3/1 +...+ Area 3/4
29	Reach	28	1.766	2.041	-------	2.512	2.927	3.528	4.011	4.518	Area 3/1 +..+ Area 3/4 to Area 3/5
30	Combine	6, 29	2.233	2.565	-------	3.136	3.639	4.367	4.954	5.570	Area 3/1 +..+ Area 3/5
31	Combine	7, 8, 9,	0.841	1.080	-------	1.520	1.930	2.556	3.092	3.675	Area 3/6 +..+ Area 3/8
32	Combine	10, 11, 12, 13, 14,	0.638	0.780	-------	1.040	1.288	1.667	1.985	2.328	Area 3/9 +...+ Area 3/11
33	Combine	30, 31,	3.073	3.645	-------	4.656	5.569	6.923	8.032	9.211	Area 3/1 +...+ Area 3/8
34	Reach	32	0.596	0.751	-------	1.027	1.278	1.664	2.004	2.369	Area 3/9 +...+ Area 3/13 to Area 3/14

Hydrograph Return Period Recap

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	
35	Reach	33	3.096	3.671	-------	4.673	5.575	7.007	8.181	9.429	Area 3/1 +...+ Area 3/8 to Area 3/14
36	Combine	15, 34, 35	3.829	4.618	-------	6.010	7.335	9.391	11.09	12.91	Area 3/1 +...+ Area 3/14
37	Combine	16, 17, 18,	1.517	1.967	-------	2.800	3.582	4.780	5.784	6.869	Area 3/15 +...+ Area 3/18
38	Combine	19, 20, 21, 22,	0.676	0.765	-------	0.919	1.055	1.252	1.412	1.580	Area 3/19 + Area 3/21
39	Combine	37, 38	2.165	2.700	-------	3.680	4.591	5.977	7.133	8.378	Area 3/15 +...+ Area 3/21
40	Reach	36	3.690	4.543	-------	5.999	7.351	9.536	11.32	13.22	Area 3/1 +...+ Area 3/14 to Area 3/21
41	Combine	39, 40	5.210	6.549	-------	8.960	11.17	14.47	17.19	20.22	Area 3/1 + ..+ Area 21
42	Reach	41	5.233	6.587	-------	8.979	11.25	14.78	17.70	20.84	Area 3/1 +..+ Area 3/21 to Area 3/22
43	Combine	23, 42	5.295	6.657	-------	9.061	11.40	14.96	17.90	21.06	Area 3/1 +...+ Area 3/22
44	Reach	43	5.197	6.625	-------	9.074	11.53	15.18	18.17	21.37	Area 3/1 +...+ Area 3/22 to Pond
45	Combine	1, 44	8.588	10.93	-------	15.51	19.68	25.88	31.04	36.91	Total Flow into Pond
46	Reservoir	45	1.260	2.117	-------	3.214	8.394	16.29	22.03	31.39	Reconst Detention Pond
47	Combine	24, 25,	7.356	9.254	-------	12.72	15.93	20.88	25.05	29.53	Total Flow Bypassing Pond
48	Combine	46, 47	7.461	9.379	-------	12.88	16.11	21.19	26.74	36.48	Total Flow from Entire Site
49	Combine	26, 48	27.84	39.52	-------	62.34	85.44	120.34	166.77	209.74	Total Flow at Point A
50	Reach	49	15.20	22.38	-------	37.44	52.71	81.11	107.42	136.12	Area 2 +..+ Area 4 to Area 5
51	Combine	27, 50	37.41	57.19	-------	98.44	140.55	208.30	272.26	343.45	Total Flow at Point B

Hydrograph Report

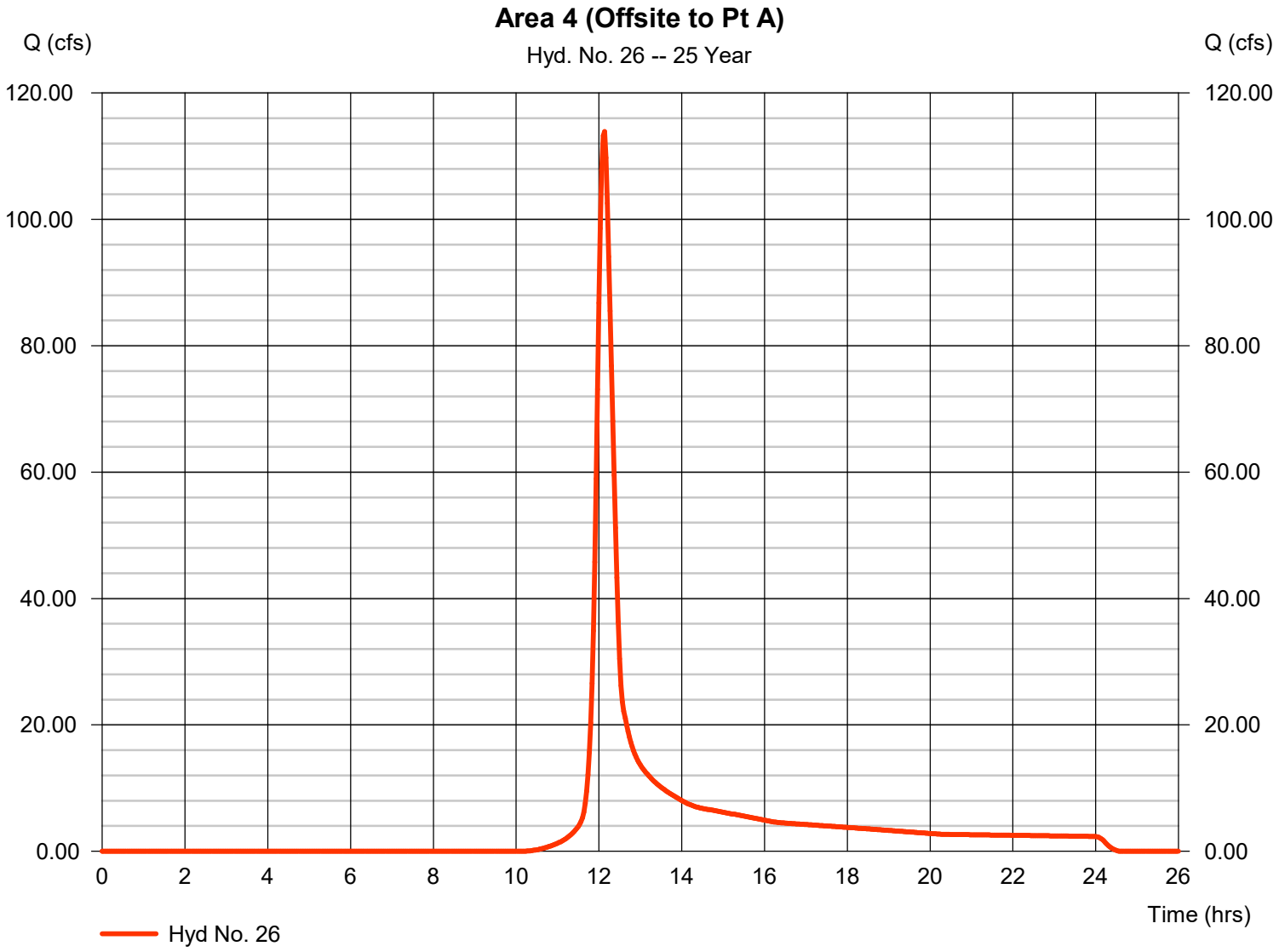
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 26

Area 4 (Offsite to Pt A)

Hydrograph type	= SCS Runoff	Peak discharge	= 113.90 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 405,201 cuft
Drainage area	= 48.430 ac	Curve number	= 65*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 21.30 min
Total precip.	= 5.88 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(26.290 x 61) + (22.140 x 69)] / 48.430



TR55 Tc Worksheet

Hyd. No. 26

Area 4 (Offsite to Pt A)

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.150		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.69		0.00		0.00		
Land slope (%)	= 3.00		0.00		0.00		
Travel Time (min)	**= 7.76**	**+**	**0.00**	**+**	**0.00**	**=**	**7.76**
Shallow Concentrated Flow							
Flow length (ft)	= 3108.00		0.00		0.00		
Watercourse slope (%)	= 5.66		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=3.84		0.00		0.00		
Travel Time (min)	**= 13.49**	**+**	**0.00**	**+**	**0.00**	**=**	**13.49**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 21.30 min

Hydrograph Report

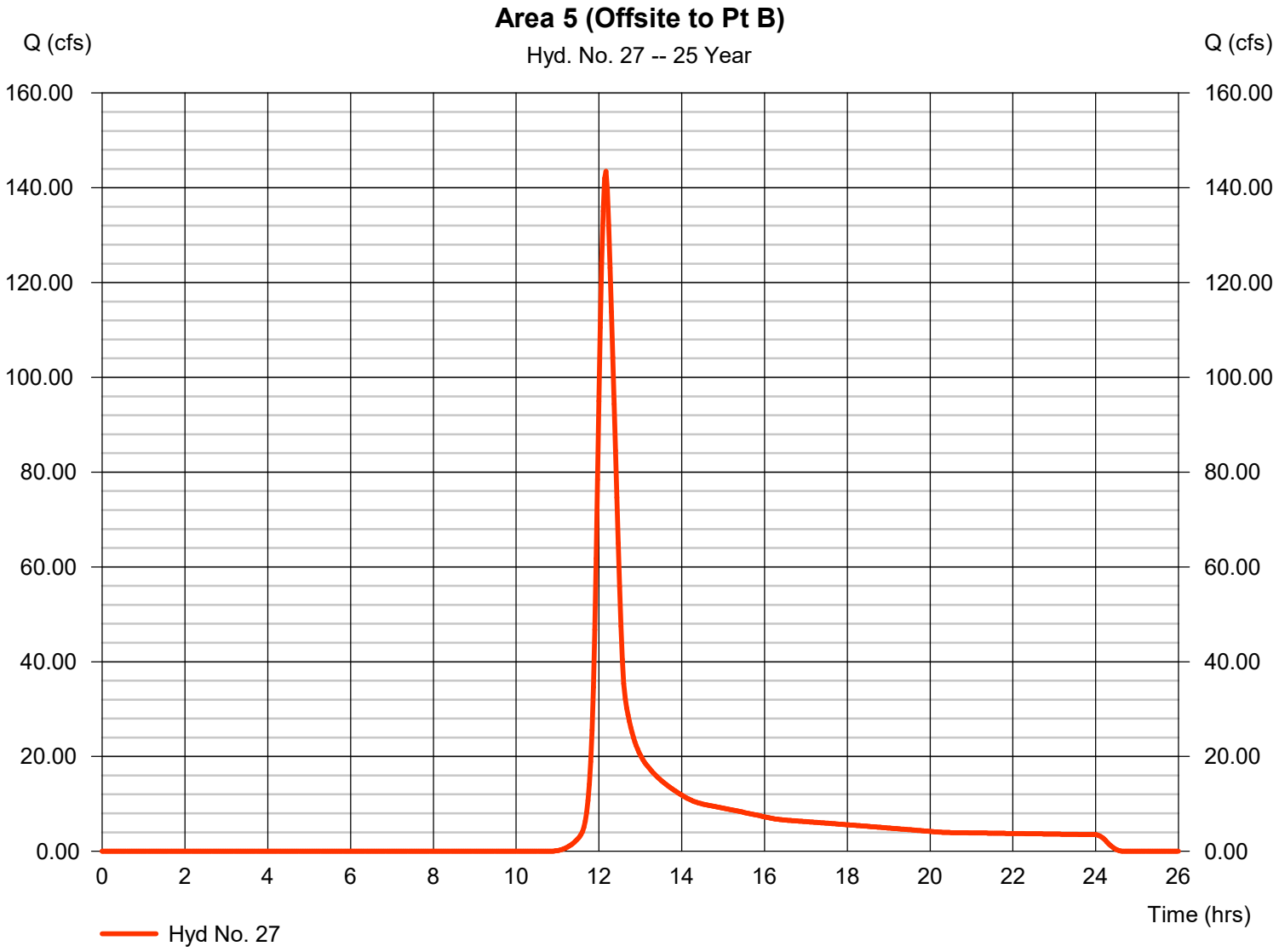
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 27

Area 5 (Offsite to Pt B)

Hydrograph type	= SCS Runoff	Peak discharge	= 143.48 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.17 hrs
Time interval	= 2 min	Hyd. volume	= 558,661 cuft
Drainage area	= 81.190 ac	Curve number	= 61*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 26.40 min
Total precip.	= 5.88 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(78.400 x 61) + (2.790 x 69)] / 81.190



TR55 Tc Worksheet

Hyd. No. 27

Area 5 (Offsite to Pt B)

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.150		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.69		0.00		0.00		
Land slope (%)	= 2.11		0.00		0.00		
Travel Time (min)	**= 8.93**	**+**	**0.00**	**+**	**0.00**	**=**	**8.93**
Shallow Concentrated Flow							
Flow length (ft)	= 2458.00		0.00		0.00		
Watercourse slope (%)	= 2.11		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=2.34		0.00		0.00		
Travel Time (min)	**= 17.48**	**+**	**0.00**	**+**	**0.00**	**=**	**17.48**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 26.40 min

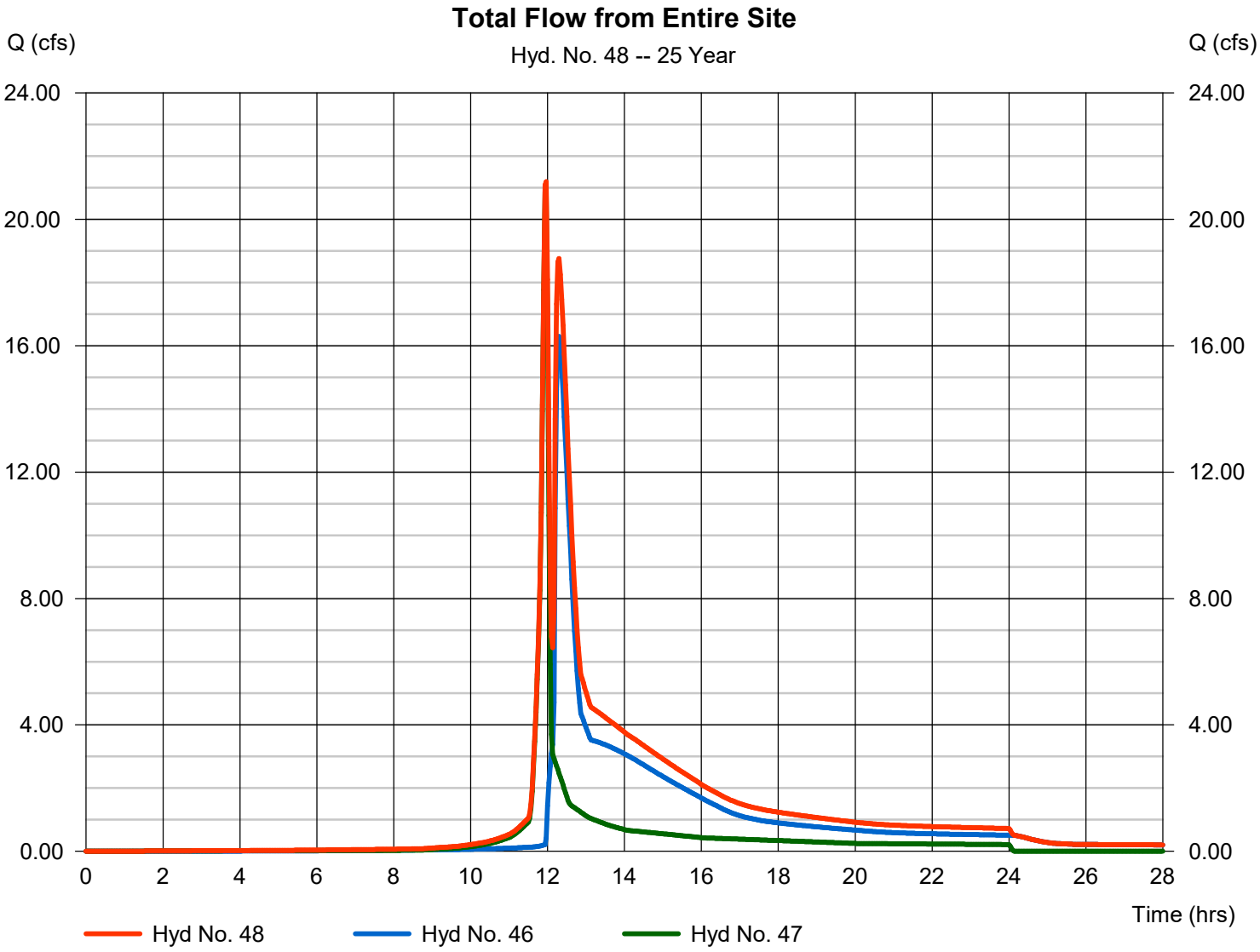
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 48

Total Flow from Entire Site

Hydrograph type	= Combine	Peak discharge	= 21.19 cfs
Storm frequency	= 25 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 141,883 cuft
Inflow hyds.	= 46, 47	Contrib. drain. area	= 0.000 ac



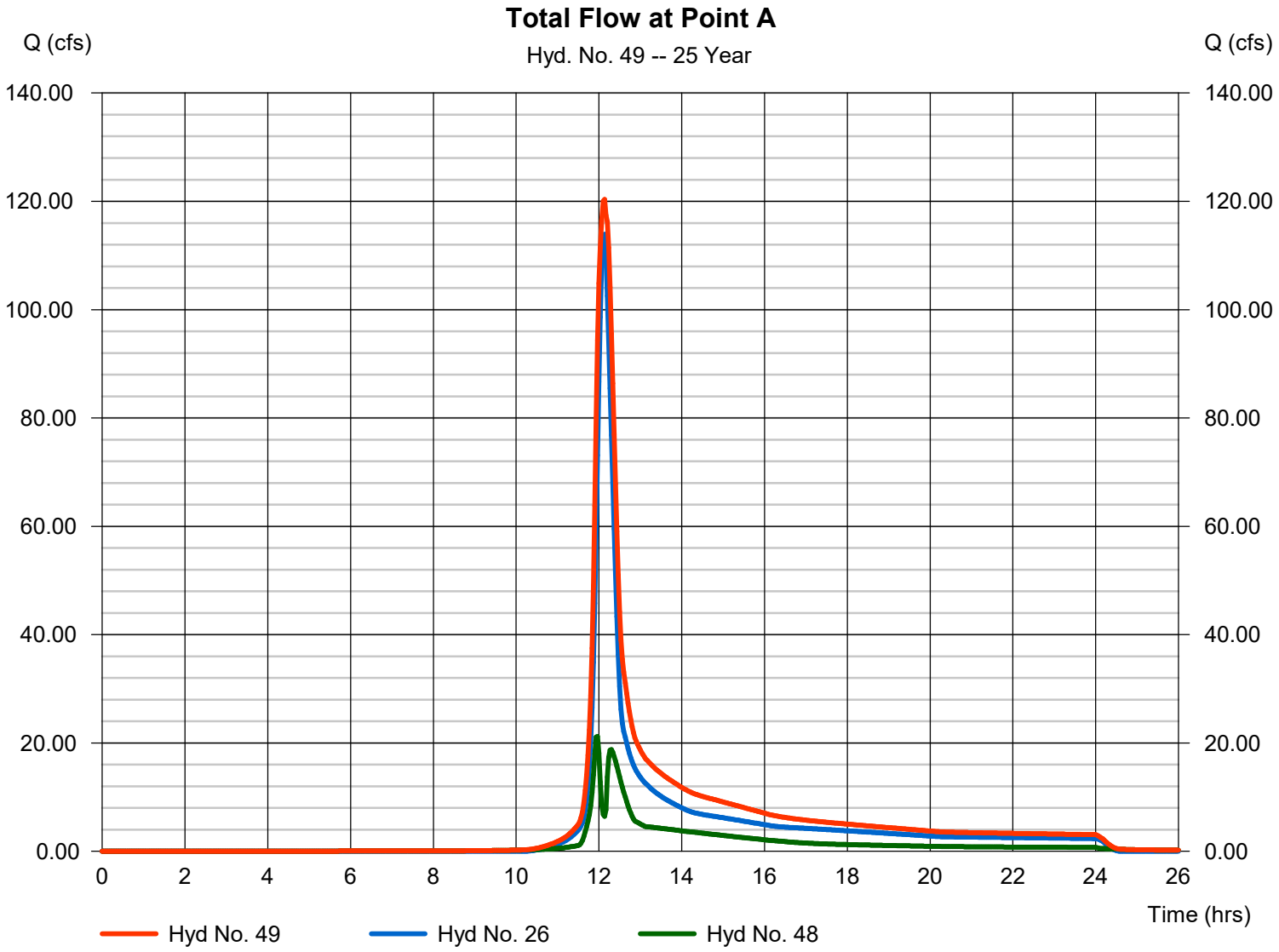
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 49

Total Flow at Point A

Hydrograph type	= Combine	Peak discharge	= 120.34 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 547,084 cuft
Inflow hyds.	= 26, 48	Contrib. drain. area	= 48.430 ac



Hydrograph Report

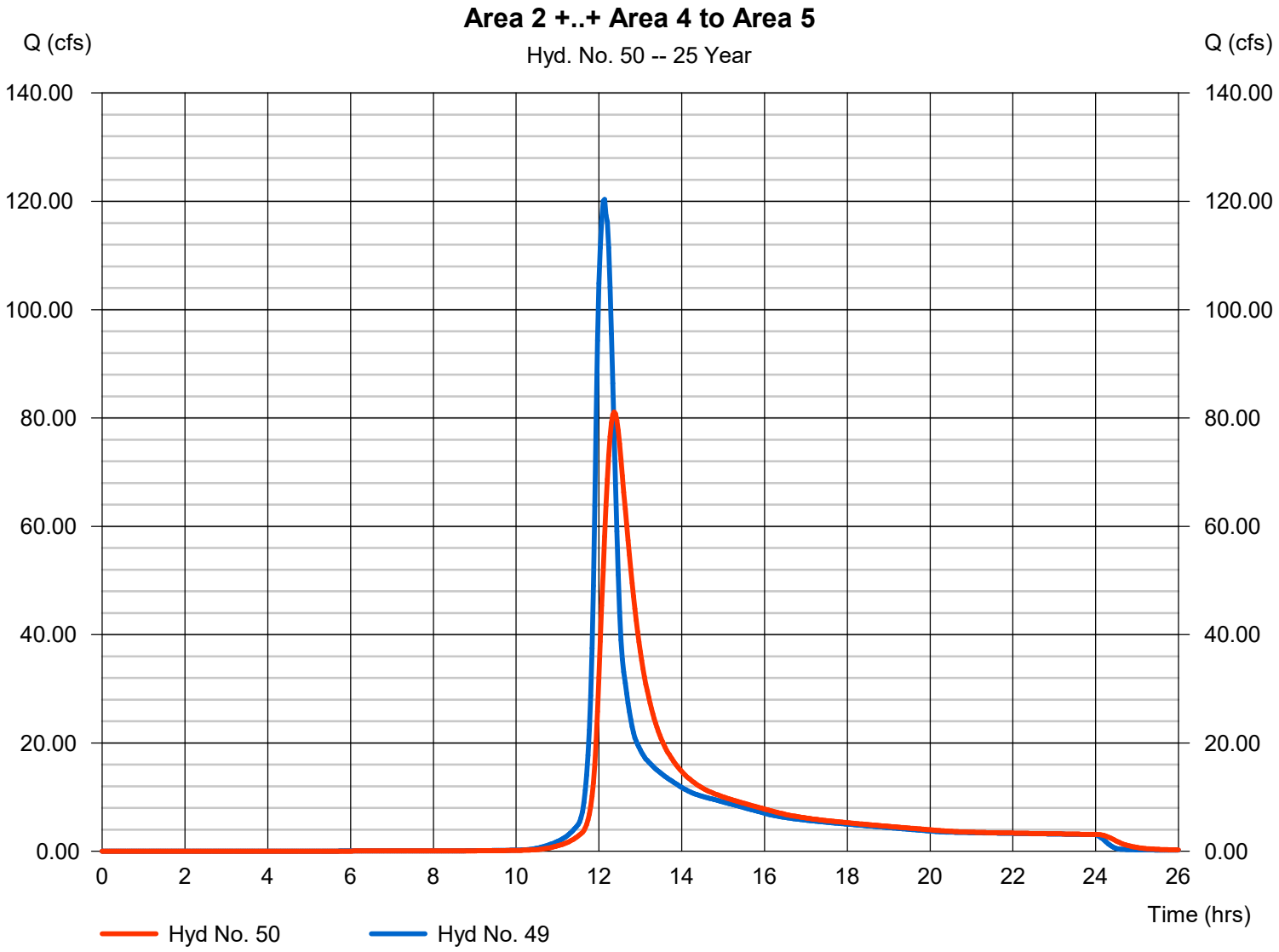
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 50

Area 2 +..+ Area 4 to Area 5

Hydrograph type	= Reach	Peak discharge	= 81.11 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.37 hrs
Time interval	= 2 min	Hyd. volume	= 546,830 cuft
Inflow hyd. No.	= 49 - Total Flow at Point A	Section type	= Trapezoidal
Reach length	= 2558.0 ft	Channel slope	= 2.1 %
Manning's n	= 0.150	Bottom width	= 5.0 ft
Side slope	= 5.0:1	Max. depth	= 3.0 ft
Rating curve x	= 0.493	Rating curve m	= 1.273
Ave. velocity	= 0.00 ft/s	Routing coeff.	= 0.0914

Modified Att-Kin routing method used.



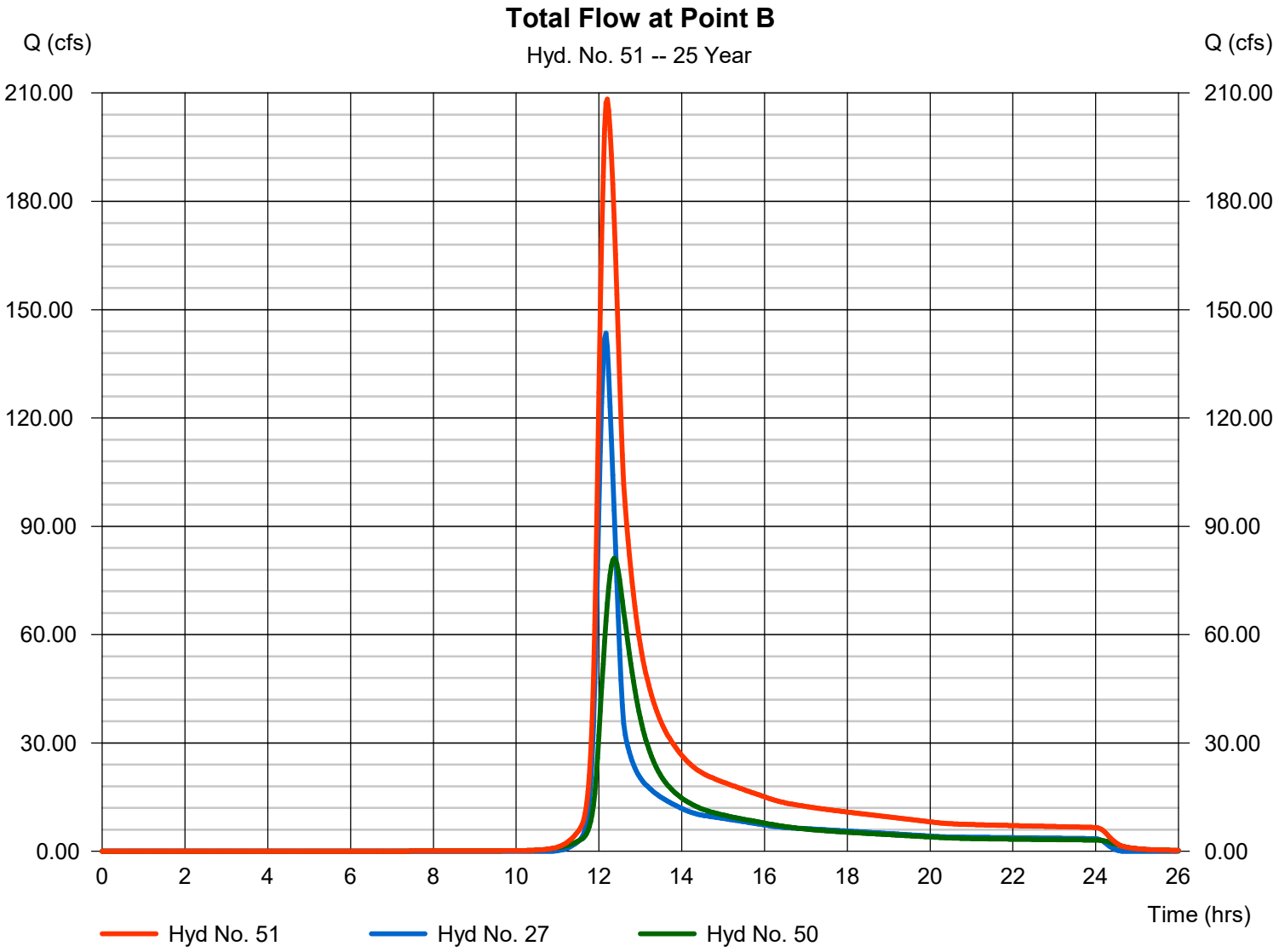
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 05 / 11 / 2023

Hyd. No. 51

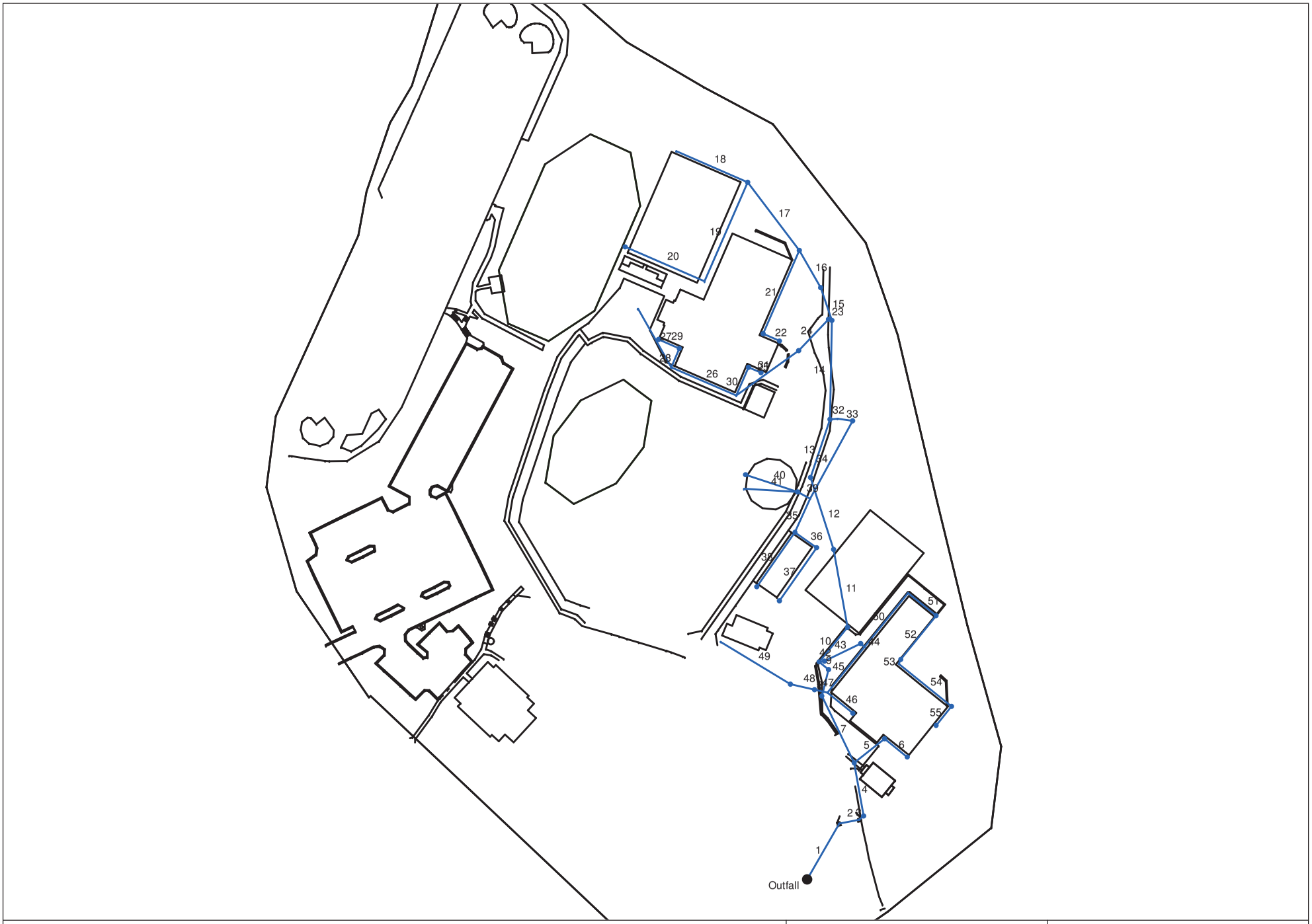
Total Flow at Point B

Hydrograph type	= Combine	Peak discharge	= 208.30 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.20 hrs
Time interval	= 2 min	Hyd. volume	= 1,105,490 cuft
Inflow hyds.	= 27, 50	Contrib. drain. area	= 81.190 ac



STORM SYSTEM DESIGN

Hydraflow Storm Sewers Extension for AutoCAD® Civil 3D® 2009 Plan



Project File: New.stm	Number of lines: 55	Date: 05-11-2023

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	74.971	-60.107	Curb	0.01	0.00	0.00	0.0	876.13	5.04	879.91	24	Cir	0.013	1.19	884.89	D.PIPE 21 (Storm)
2	1	23.506	49.173	Curb	0.00	0.67	0.45	5.0	879.91	0.94	880.13	24	Cir	0.013	0.83	884.79	D.PIPE 20 (Storm)
3	2	6.990	-30.000	MH	0.00	0.00	0.00	0.0	880.63	10.87	881.39	18	Cir	0.013	0.88	886.34	D.PIPE 19 (Storm)
4	3	62.841	-59.139	MH	0.00	0.00	0.00	0.0	881.39	10.30	887.86	18	Cir	0.013	0.90	893.44	D.PIPE 18 (Storm)
5	4	45.174	61.898	MH	0.00	0.03	0.95	5.0	890.37	5.05	892.65	12	Cir	0.013	0.98	895.88	D.PIPE 24 (Storm)
6	5	33.820	77.111	MH	0.00	0.03	0.95	5.0	892.65	1.03	893.00	12	Cir	0.013	1.00	895.81	D.PIPE 23 (Storm)
7	4	86.465	-15.696	MH	0.00	0.00	0.00	0.0	887.86	2.07	889.65	18	Cir	0.013	0.69	896.00	D.PIPE 17 (Storm)
8	7	31.770	39.828	MH	0.00	0.00	0.00	0.0	889.65	2.08	890.31	18	Cir	0.013	0.92	895.82	D.PIPE 16 (Storm)
9	8	14.038	-63.880	MH	0.00	0.00	0.00	0.0	890.31	2.07	890.60	18	Cir	0.013	1.00	897.50	D.PIPE 15 (Storm)
10	9	51.971	89.015	MH	0.00	0.00	0.00	0.0	890.60	2.07	891.68	18	Cir	0.013	0.80	896.10	D.PIPE 14 (Storm)
11	10	92.283	-49.367	MH	0.00	0.00	0.00	0.0	891.68	2.06	893.58	18	Cir	0.013	0.16	899.74	D.PIPE 13 (Storm)
12	11	87.926	-7.668	MH	0.00	0.00	0.00	0.0	893.58	14.00	905.89	15	Cir	0.013	0.65	916.52	D.PIPE 42 (Storm)
13	12	71.676	36.460	MH	0.00	0.00	0.00	0.0	908.17	2.50	909.96	15	Cir	0.013	0.94	916.67	D.PIPE 41 (Storm)
14	13	115.370	-17.492	MH	0.00	0.00	0.00	0.0	909.96	2.49	912.83	15	Cir	0.013	0.96	922.94	D.PIPE 40 (Storm)
15	14	40.492	-20.157	MH	0.00	0.00	0.00	0.0	912.83	2.47	913.83	12	Cir	0.013	0.22	919.11	PIPE 56 (Storm)
16	15	50.056	-10.666	MH	0.00	0.00	0.00	0.0	913.83	12.17	919.92	12	Cir	0.013	1.00	923.17	D.PIPE 27 (Storm)
17	16	99.742	-7.531	MH	0.00	0.00	0.00	0.0	919.92	5.42	925.33	12	Cir	0.013	1.00	928.60	D.PIPE 26 (Storm)
18	17	90.500	-29.279	DrGrt	0.00	0.05	0.95	5.0	925.33	1.85	927.00	12	Cir	0.013	1.00	929.81	D.PIPE 25 (Storm)
19	17	126.000	-119.279	DrGrt	0.00	0.29	0.78	5.0	925.33	4.49	930.99	12	Cir	0.013	1.50	935.25	D.PIPE 29 (Storm)
20	19	100.786	90.000	DrGrt	0.00	0.12	0.75	5.3	930.99	1.50	932.50	12	Cir	0.013	1.00	935.81	D.PIPE 28 (Storm)
21	16	106.220	-126.810	MH	0.00	0.00	0.00	0.0	919.92	10.43	931.00	12	Cir	0.013	1.00	933.95	D.PIPE 31 (Storm)
22	21	21.000	-90.000	MH	0.00	0.11	0.95	5.0	931.00	1.00	931.21	12	Cir	0.013	1.00	934.62	D.PIPE 30 (Storm)
23	14	4.304	-72.254	MH	0.00	0.00	0.00	0.0	912.83	17.43	913.58	15	Cir	0.013	0.92	925.00	PIPE 57 (Storm)

Project File: Storm Design.stm

Number of lines: 55

Date: 5/11/2023

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
24	23	50.591	-65.286	MH	0.00	0.00	0.00	0.0	913.58	5.08	916.15	15	Cir	0.013	0.22	920.80	D.PIPE 35 (Storm)
25	24	89.602	10.629	DrGrt	0.00	0.12	0.55	5.0	916.15	15.12	929.70	15	Cir	0.013	1.50	934.00	D.PIPE 34 (Storm)
26	25	82.500	59.278	DrGrt	0.00	0.15	0.47	5.0	929.70	0.50	930.11	15	Cir	0.013	1.50	934.02	D.PIPE 33 (Storm)
27	26	78.696	36.934	DrGrt	0.00	0.30	0.18	5.3	930.11	0.50	930.50	15	Cir	0.013	1.00	933.50	D.PIPE 32 (Storm)
28	26	24.000	90.000	MH	0.00	0.00	0.00	0.0	931.50	1.00	931.74	12	Cir	0.013	1.00	935.00	D.PIPE 37 (Storm)
29	28	26.500	-90.000	MH	0.01	0.00	0.00	0.0	931.74	0.98	932.00	12	Cir	0.013	1.00	935.00	D.PIPE 36 (Storm)
30	25	36.000	149.278	MH	0.00	0.00	0.00	0.0	931.48	1.00	931.84	12	Cir	0.013	1.00	934.93	D.PIPE 39 (Storm)
31	30	15.698	90.000	MH	0.01	0.00	0.00	0.0	931.84	1.02	932.00	12	Cir	0.013	1.00	934.81	D.PIPE 38 (Storm)
32	13	8.968	67.959	DrGrt	0.00	0.22	0.15	5.0	909.96	4.13	910.33	15	Cir	0.013	0.50	916.60	D.PIPE 51 (Storm)
33	32	17.668	11.309	MH	0.00	0.00	0.00	0.0	910.33	5.66	911.33	12	Cir	0.013	1.00	916.10	PIPE 58 (Storm)
34	33	103.468	110.912	DrGrt	0.00	0.01	0.95	5.0	911.33	0.52	911.87	12	Cir	0.013	1.50	916.22	D.PIPE 46 (Storm)
35	34	43.000	-4.750	MH	0.00	0.00	0.00	0.0	911.87	0.30	912.00	12	Cir	0.013	0.99	916.24	D.PIPE 45 (Storm)
36	35	31.000	-78.989	MH	0.00	0.00	0.00	0.0	912.33	0.45	912.47	8	Cir	0.013	1.00	913.66	D.PIPE 44 (Storm)
37	36	75.750	89.976	MH	0.00	0.03	0.95	5.0	912.47	0.75	913.04	8	Cir	0.013	1.00	914.23	D.PIPE 43 (Storm)
38	35	77.500	11.011	MH	0.00	0.03	0.95	5.0	912.33	0.45	912.68	8	Cir	0.013	1.00	915.84	D.PIPE 47 (Storm)
39	34	16.501	90.281	MH	0.00	0.00	0.00	0.0	911.87	6.12	912.88	12	Cir	0.013	0.49	917.55	D.PIPE 49 (Storm)
40	39	63.967	-10.856	MH	0.00	0.03	0.95	5.0	913.21	1.23	914.00	8	Cir	0.013	1.00	917.61	D.PIPE 48 (Storm)
41	39	62.329	-25.813	DrGrt	0.00	0.25	0.25	5.0	912.88	1.80	914.00	12	Cir	0.013	1.00	917.65	D.PIPE 50 (Storm)
42	9	6.021	132.097	MH	0.00	0.00	0.00	0.0	890.85	2.49	891.00	15	Cir	0.013	0.36	897.01	D.PIPE 22 (Storm)
43	42	46.818	-18.059	MH	0.00	0.00	0.00	0.0	891.00	1.60	891.75	15	Cir	0.013	0.92	895.53	PIPE 59 (Storm)
44	43	5.845	64.719	DrGrt	0.00	0.28	0.32	5.3	891.75	1.88	891.86	15	Cir	0.013	2.25	895.50	D.PIPE 5 (Storm)
45	44	68.747	90.000	DrGrt	0.00	0.14	0.44	5.0	891.86	1.91	893.17	15	Cir	0.013	2.06	895.50	D.PIPE 4 (Storm)
46	45	38.000	-90.000	MH	0.01	0.00	0.00	0.0	893.42	1.53	894.00	12	Cir	0.013	1.00	896.50	D.PIPE 6 (Storm)

Storm Sewer Inventory Report

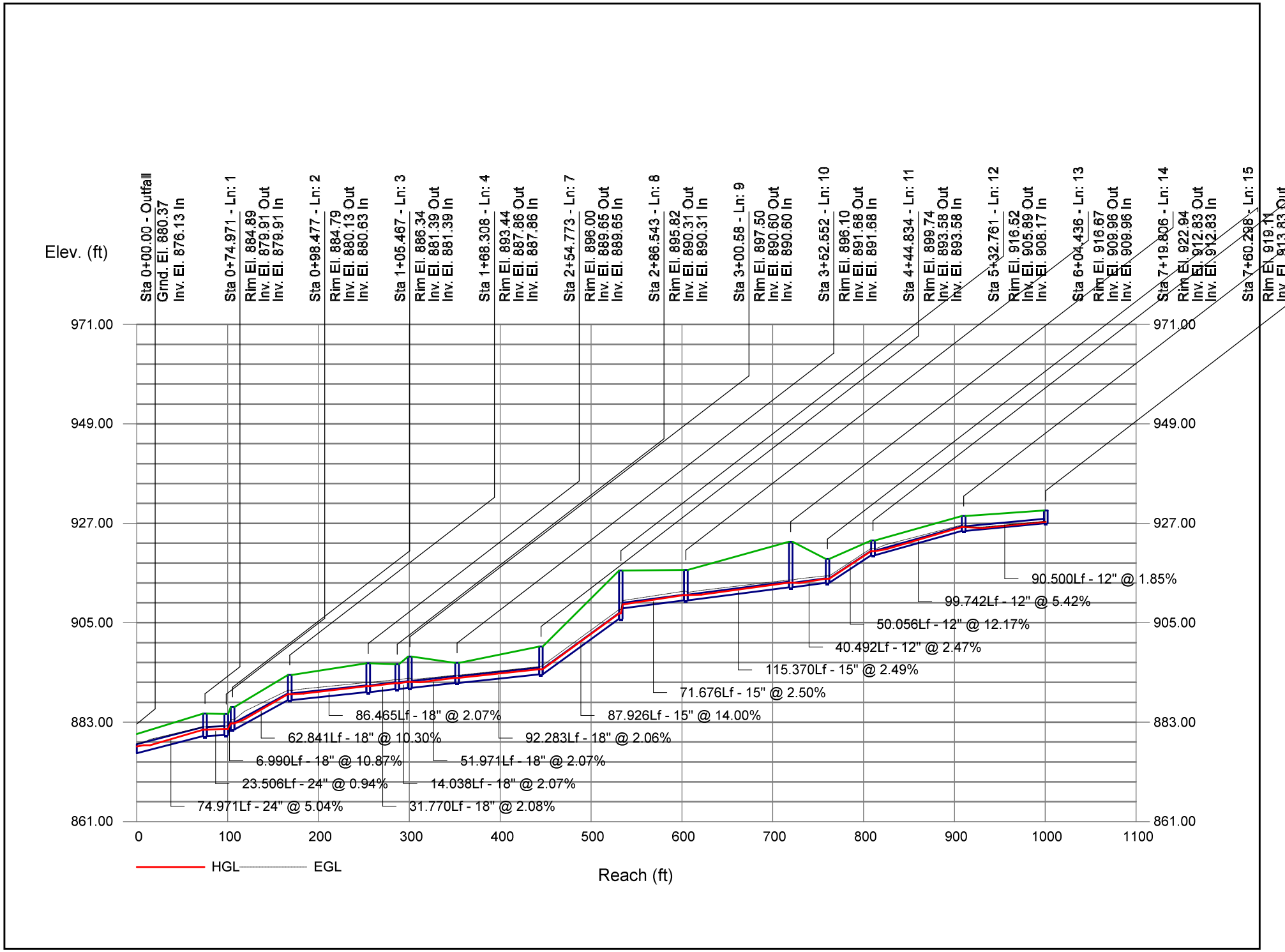
Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
47	45	15.381	64.036	MH	0.00	0.00	0.00	0.0	893.17	1.95	893.47	15	Cir	0.013	0.15	900.78	D.PIPE 3 (Storm)
48	47	28.917	0.000	MH	0.00	0.00	0.00	0.0	898.69	14.00	902.74	15	Cir	0.013	0.36	906.85	D.PIPE 2 (Storm)
49	48	95.214	18.200	DrGrt	0.00	0.59	0.15	5.0	902.74	8.56	910.89	15	Cir	0.013	1.00	914.10	D.PIPE 1 (Storm)
50	44	80.753	-90.000	DrGrt	0.00	0.20	0.19	7.5	891.86	1.00	892.67	15	Cir	0.013	1.50	894.97	D.PIPE 12 (Storm)
51	50	42.100	90.000	MH	0.00	0.04	0.75	5.0	892.67	1.00	893.09	12	Cir	0.013	1.00	894.61	D.PIPE 11 (Storm)
52	51	65.600	90.000	MH	0.00	0.04	0.75	5.0	893.09	0.79	893.61	12	Cir	0.013	0.30	896.00	D.PIPE 10 (Storm)
53	52	5.579	-14.534	DrGrt	0.00	0.05	0.95	5.0	893.61	0.72	893.65	12	Cir	0.013	1.46	897.51	D.PIPE 9 (Storm)
54	53	79.000	-75.466	MH	0.00	0.00	0.00	0.0	893.65	0.78	894.27	12	Cir	0.013	1.00	895.80	D.PIPE 8 (Storm)
55	54	28.634	90.000	MH	0.00	0.07	0.95	5.0	894.27	0.80	894.50	12	Cir	0.013	1.00	896.02	D.PIPE 7 (Storm)

Project File: Storm Design.stm | Number of lines: 55 | Date: 5/11/2023

25-YEAR EVENT

Storm Sewer Profile

Proj. file: Storm Design.stm



Storm Sewer Profile

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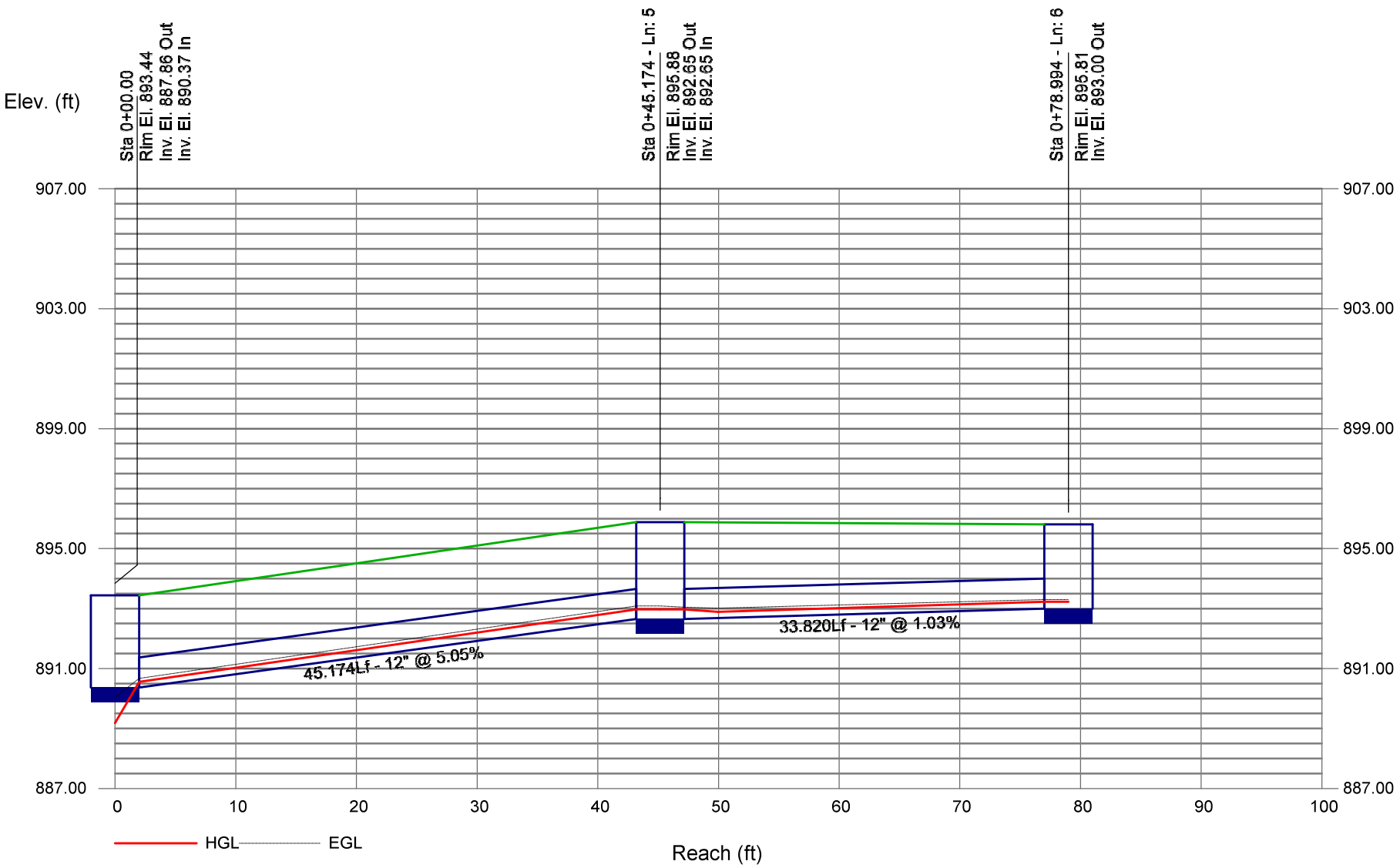

Storm Sewer Profile

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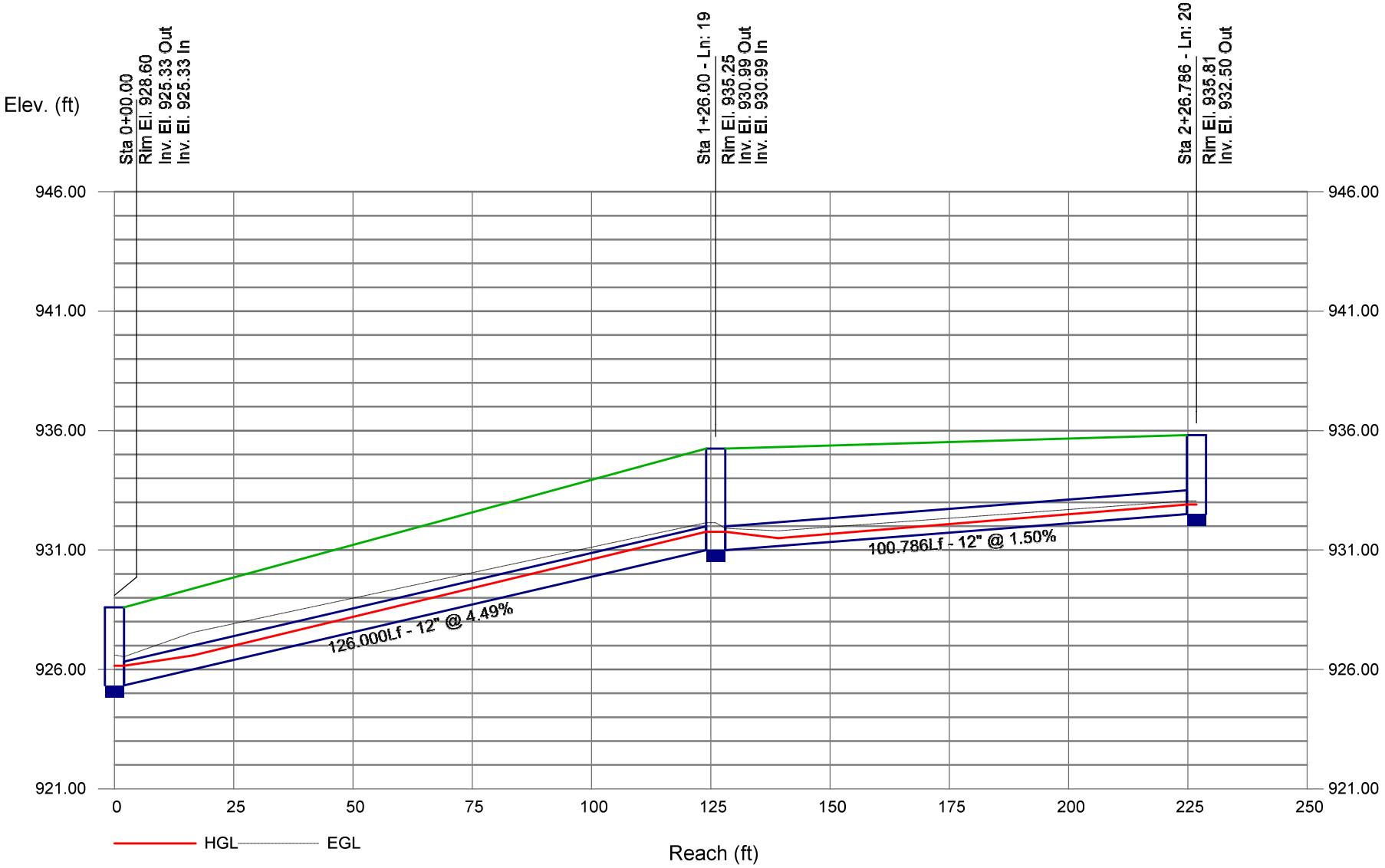

Storm Sewer Profile

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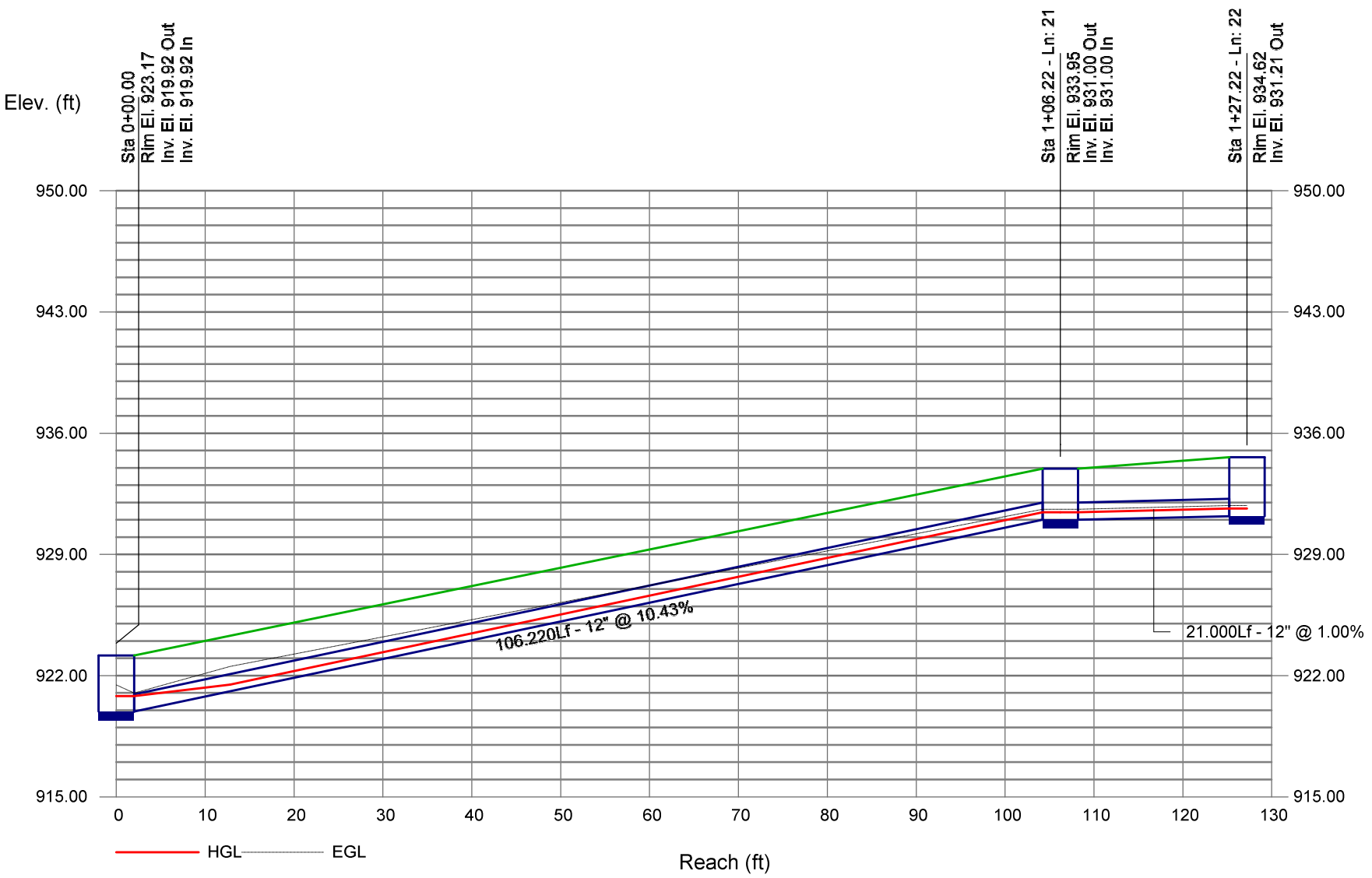

Storm Sewer Profile

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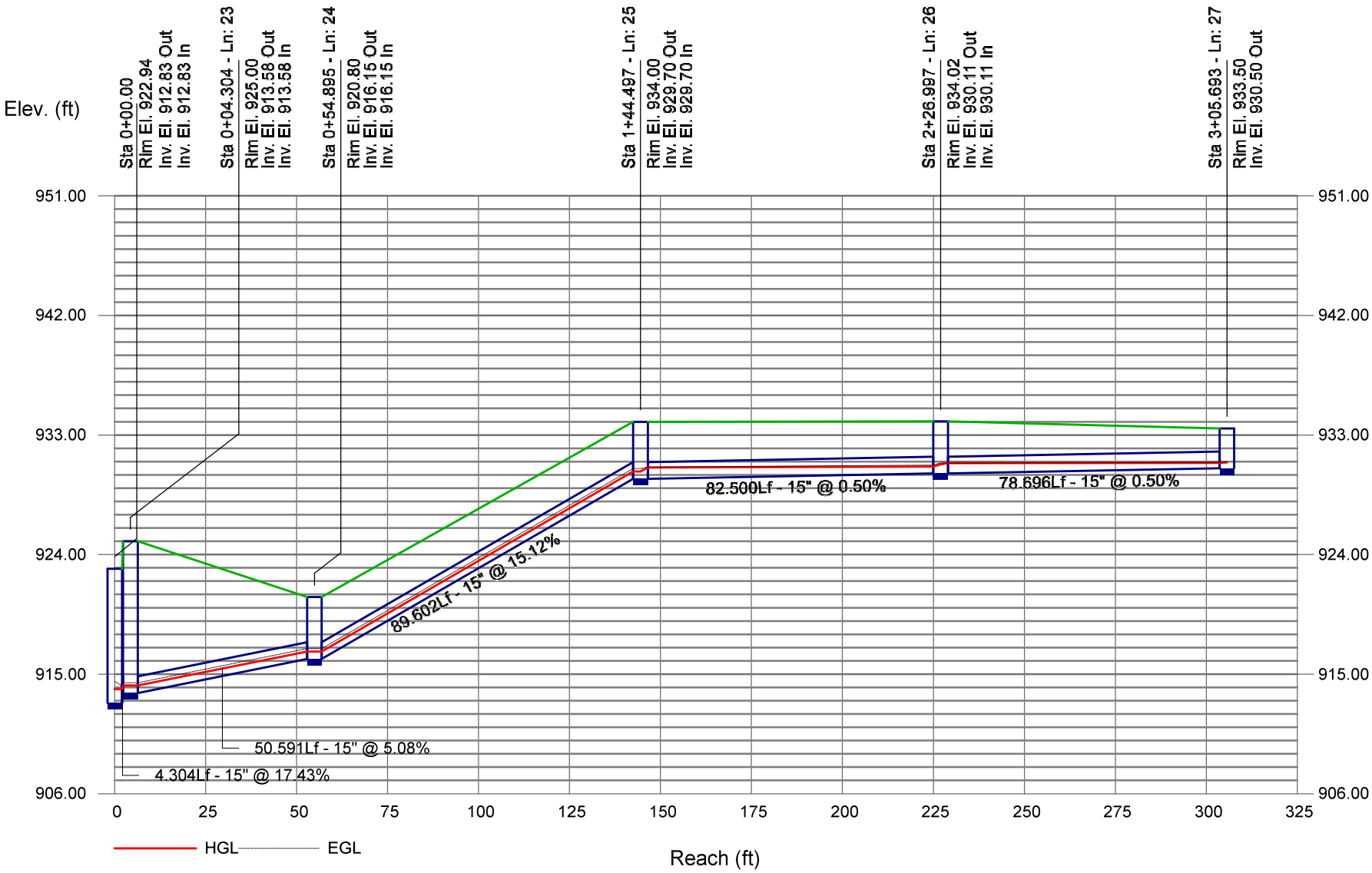

Storm Sewer Profile

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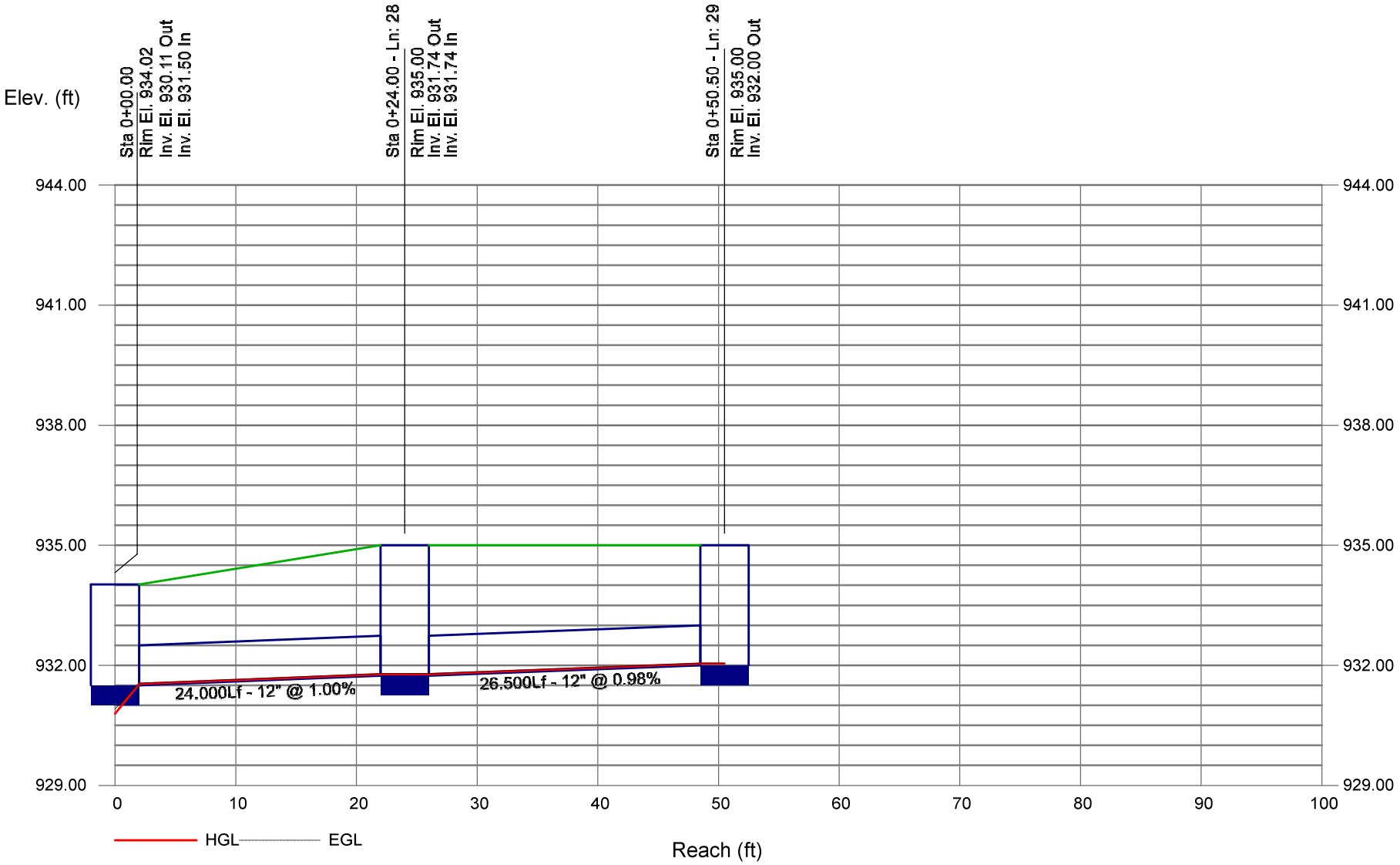

Storm Sewer Profile

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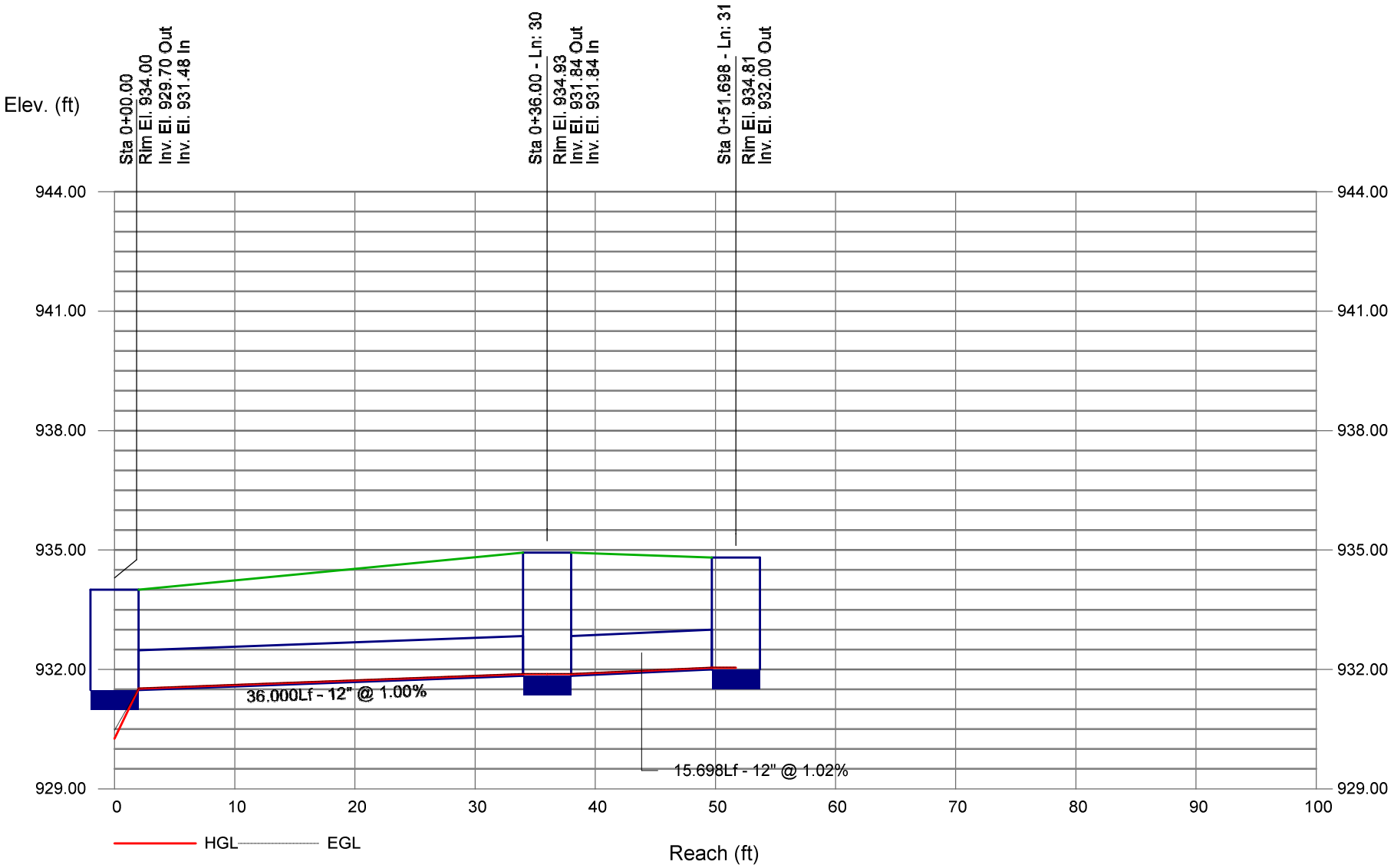

Storm Sewer Profile

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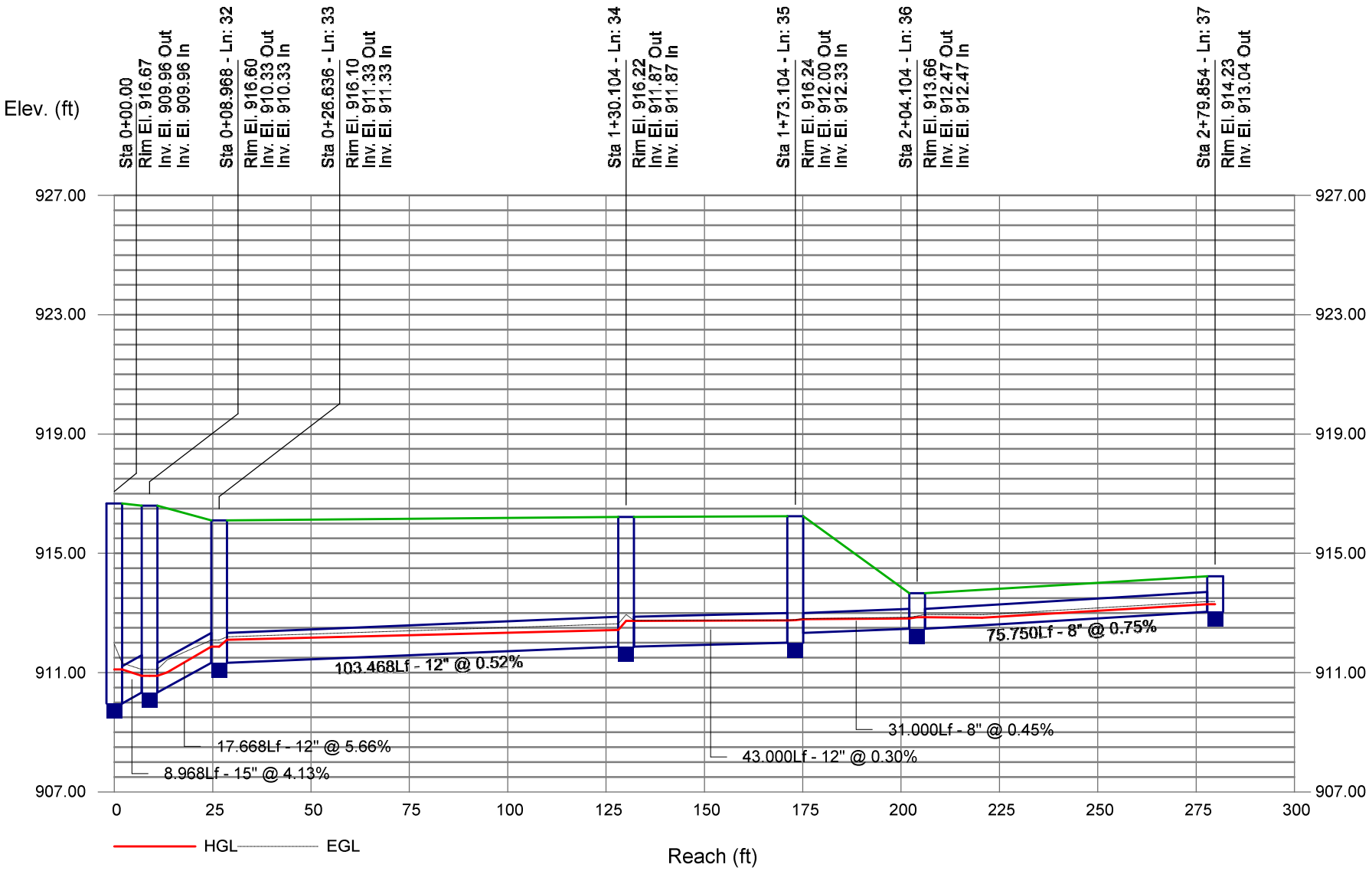

Storm Sewer Profile

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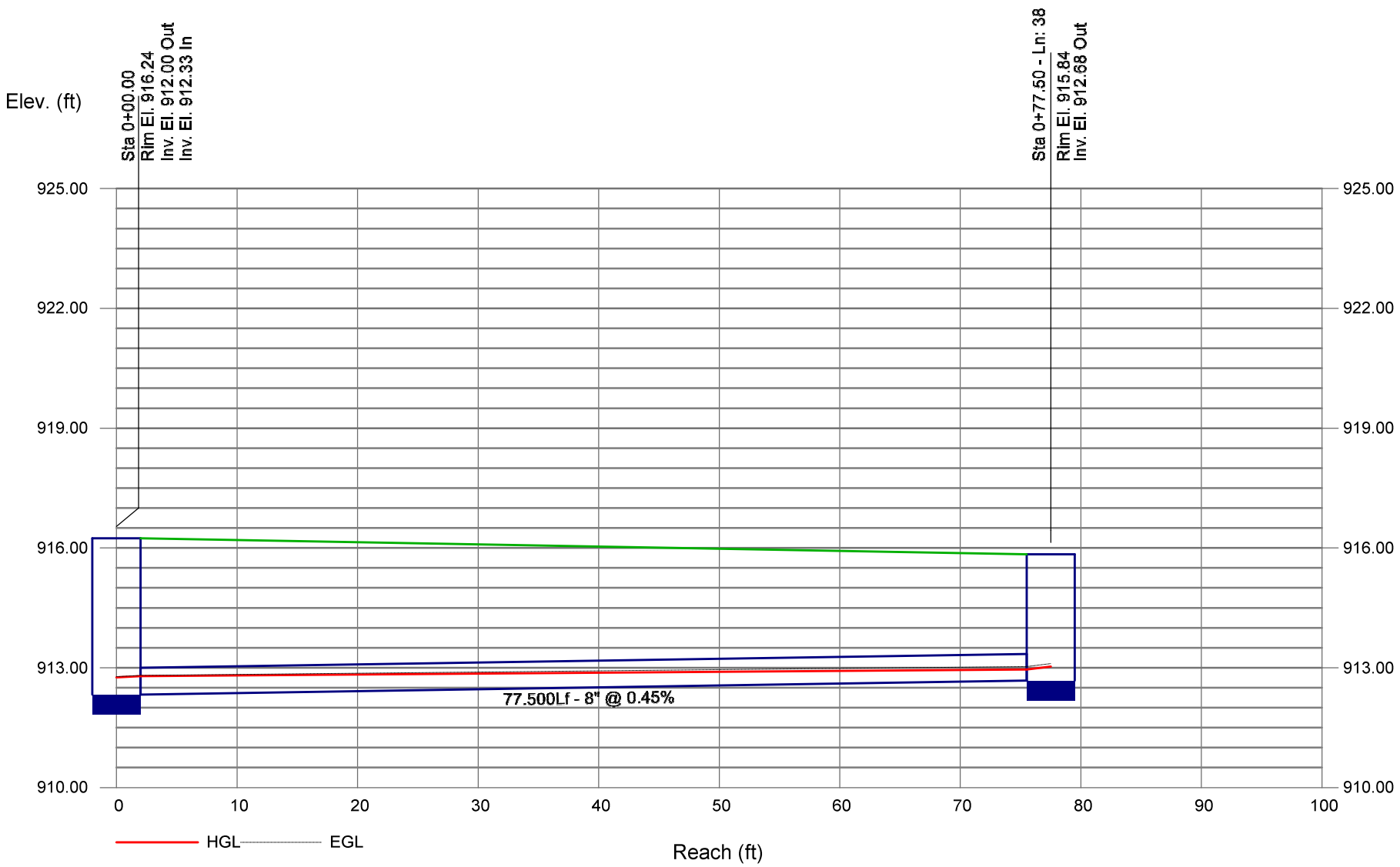

Storm Sewer Profile

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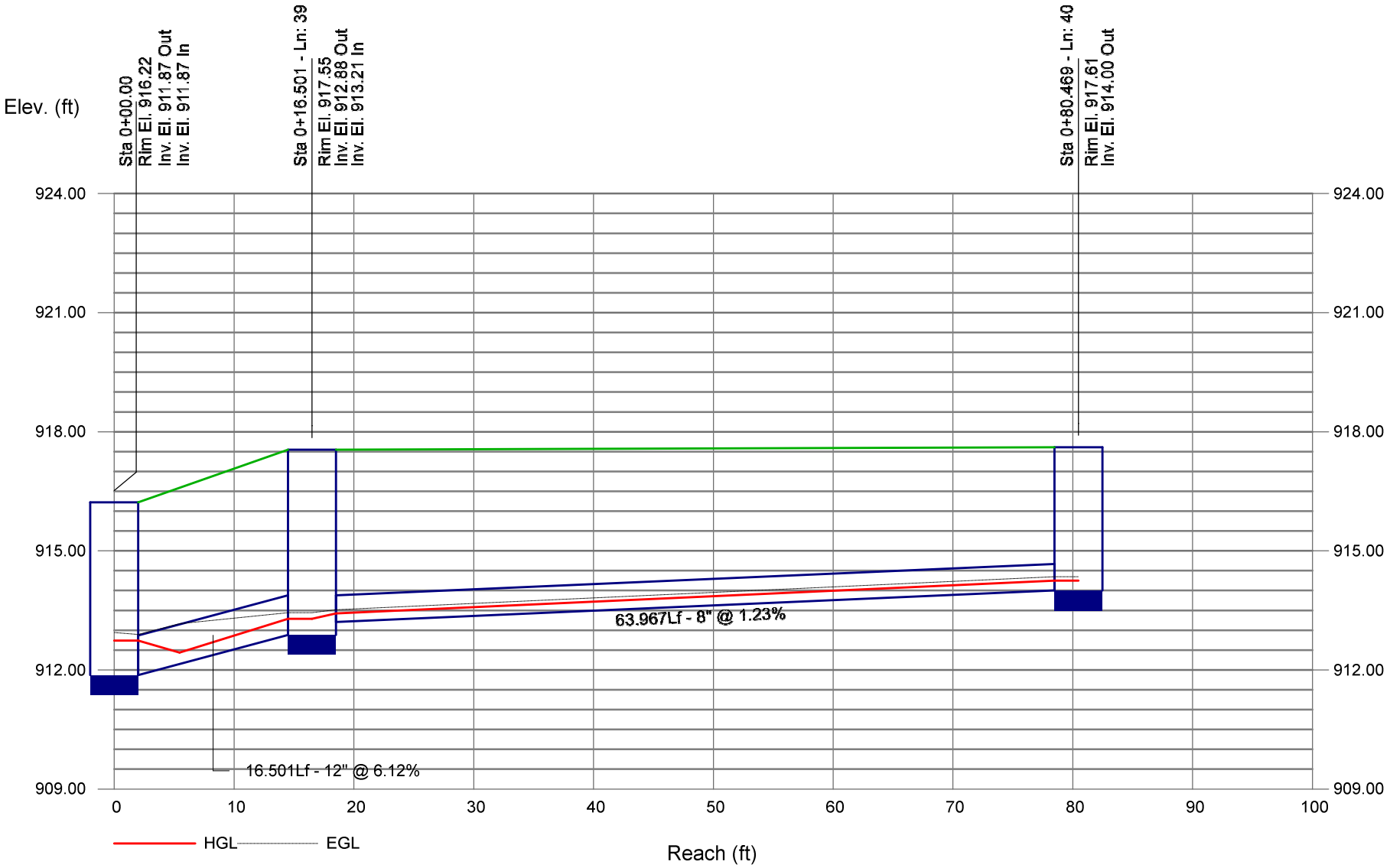

Storm Sewer Profile

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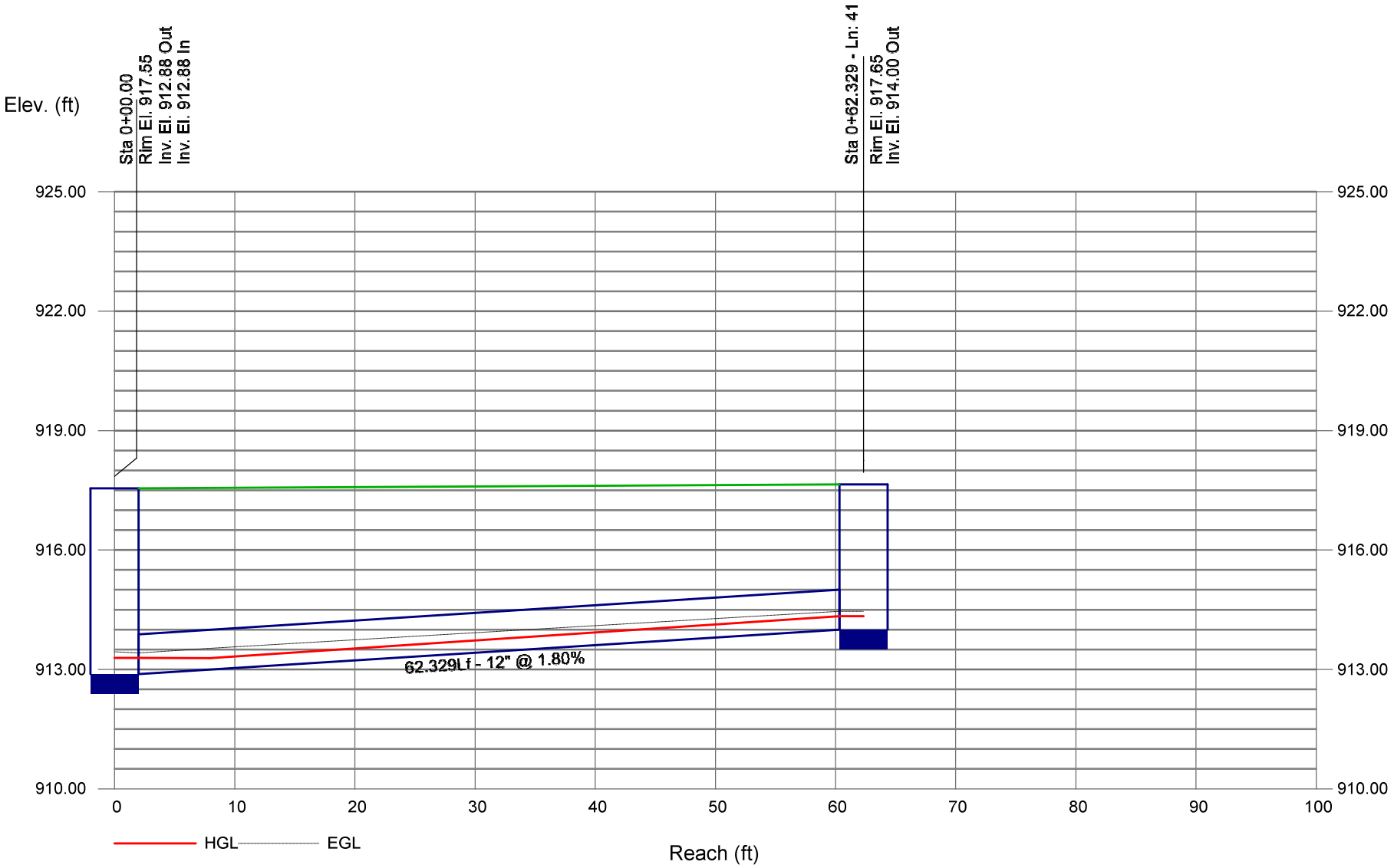

Storm Sewer Profile

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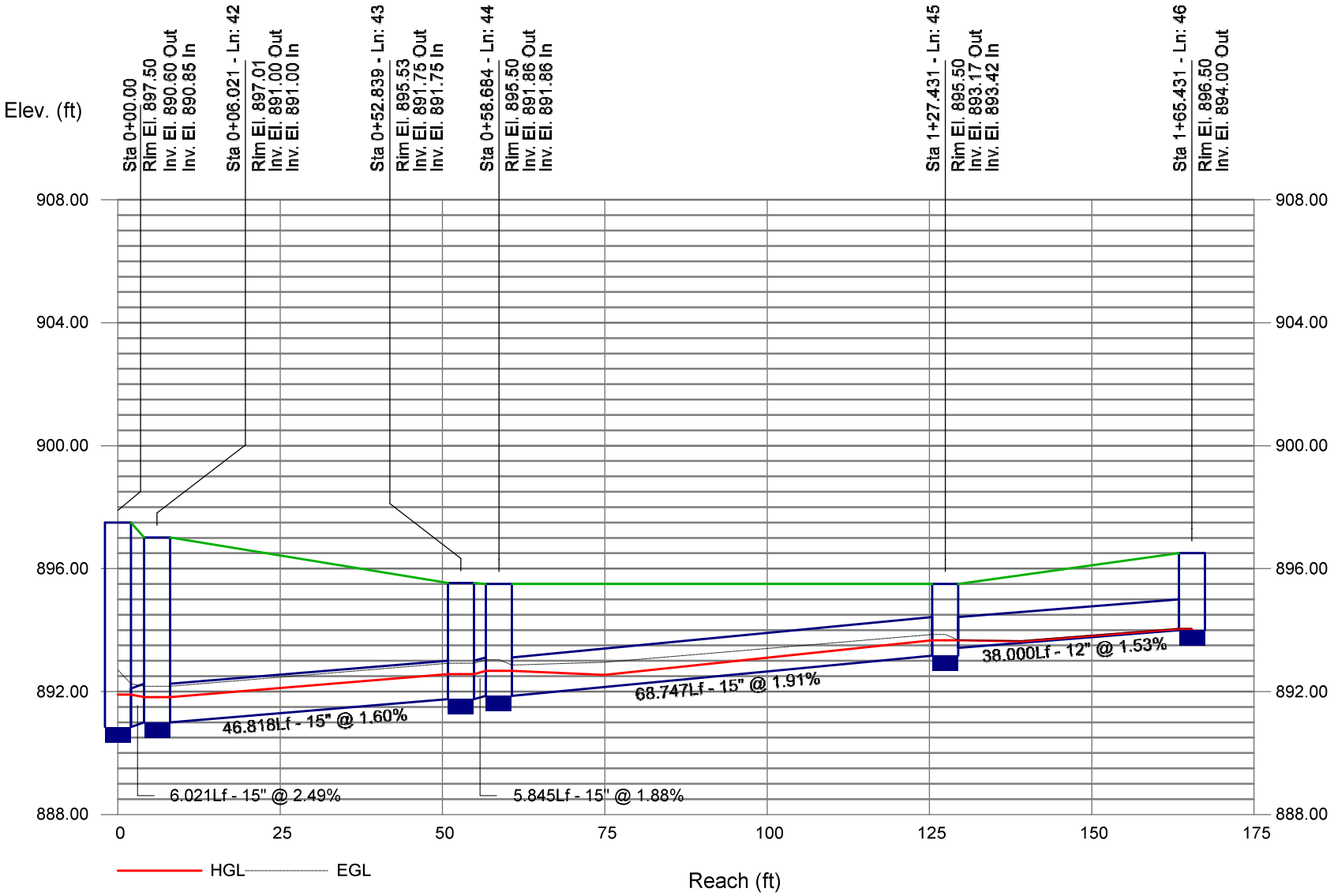

Storm Sewer Profile

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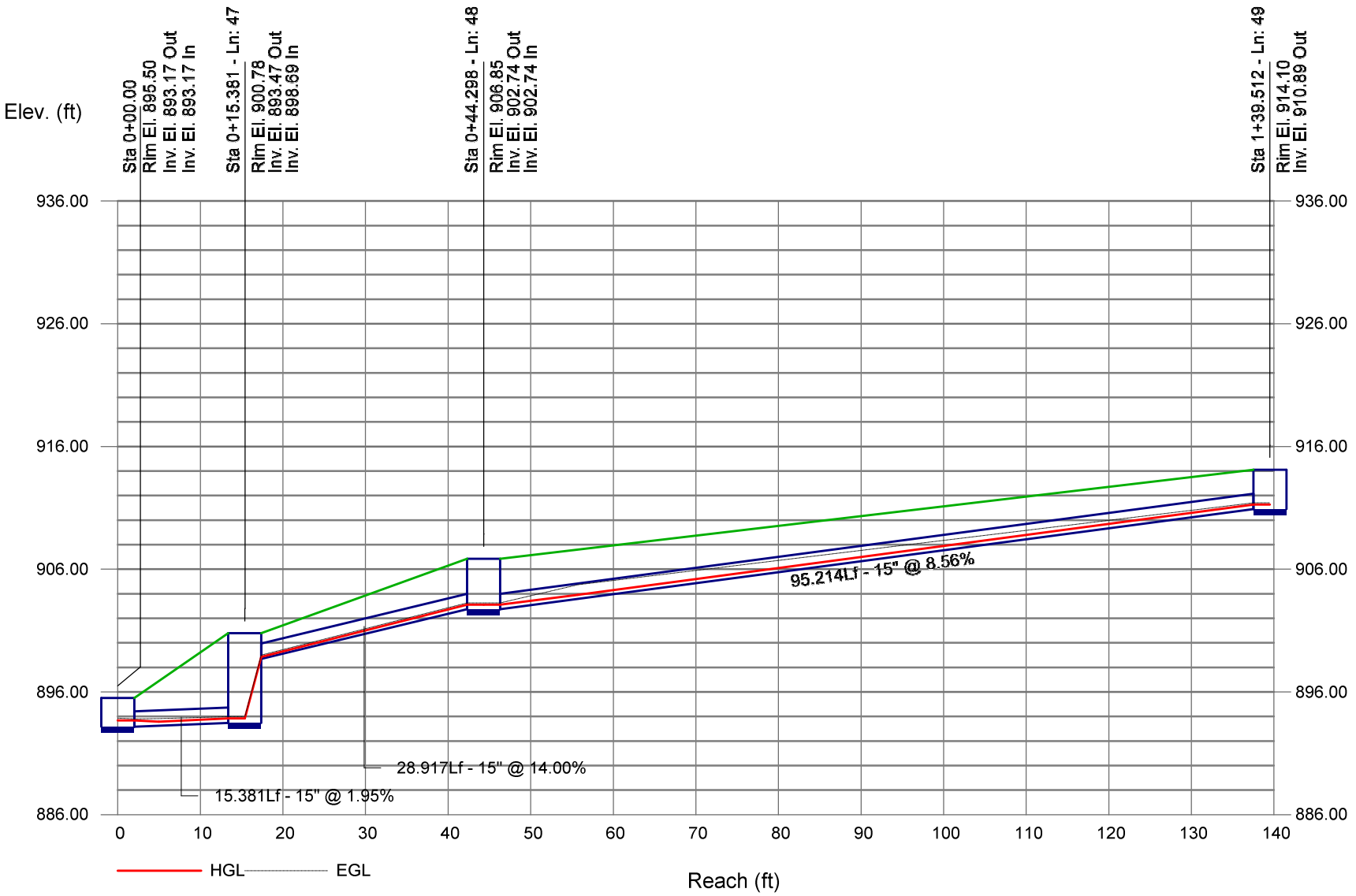

Storm Sewer Profile

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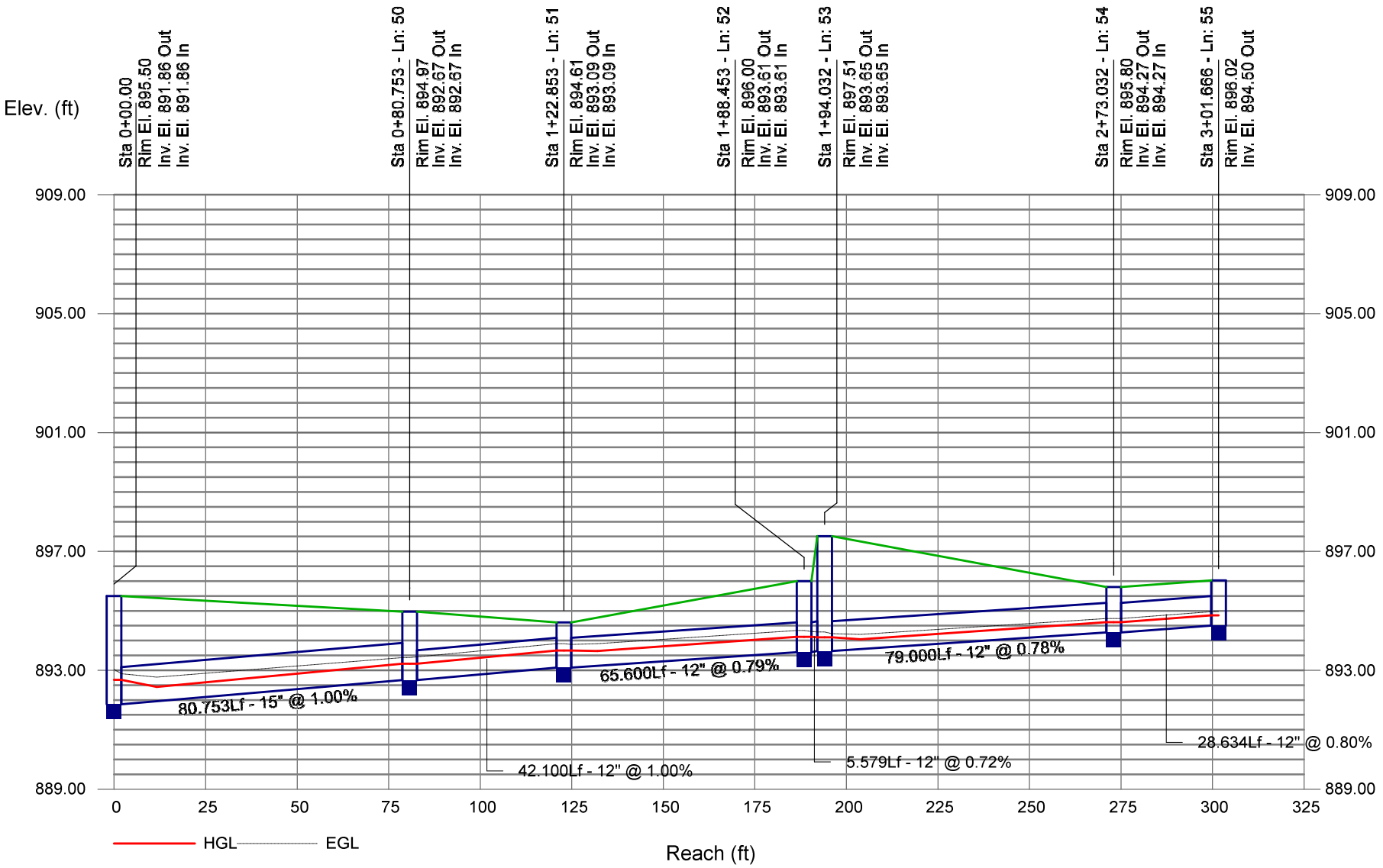

100-YEAR EVENT

Storm Sewer Profile

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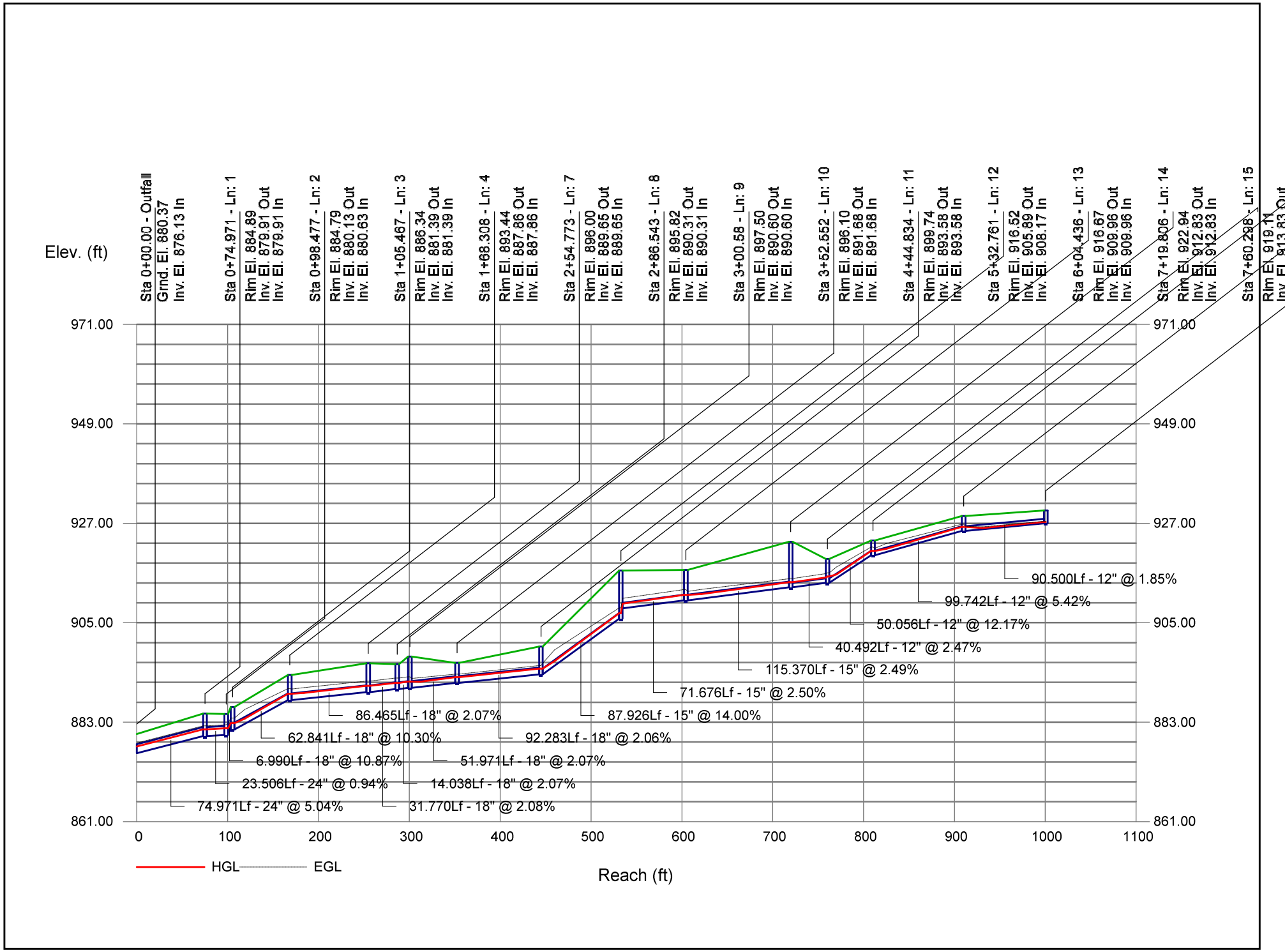

Storm Sewer Profile

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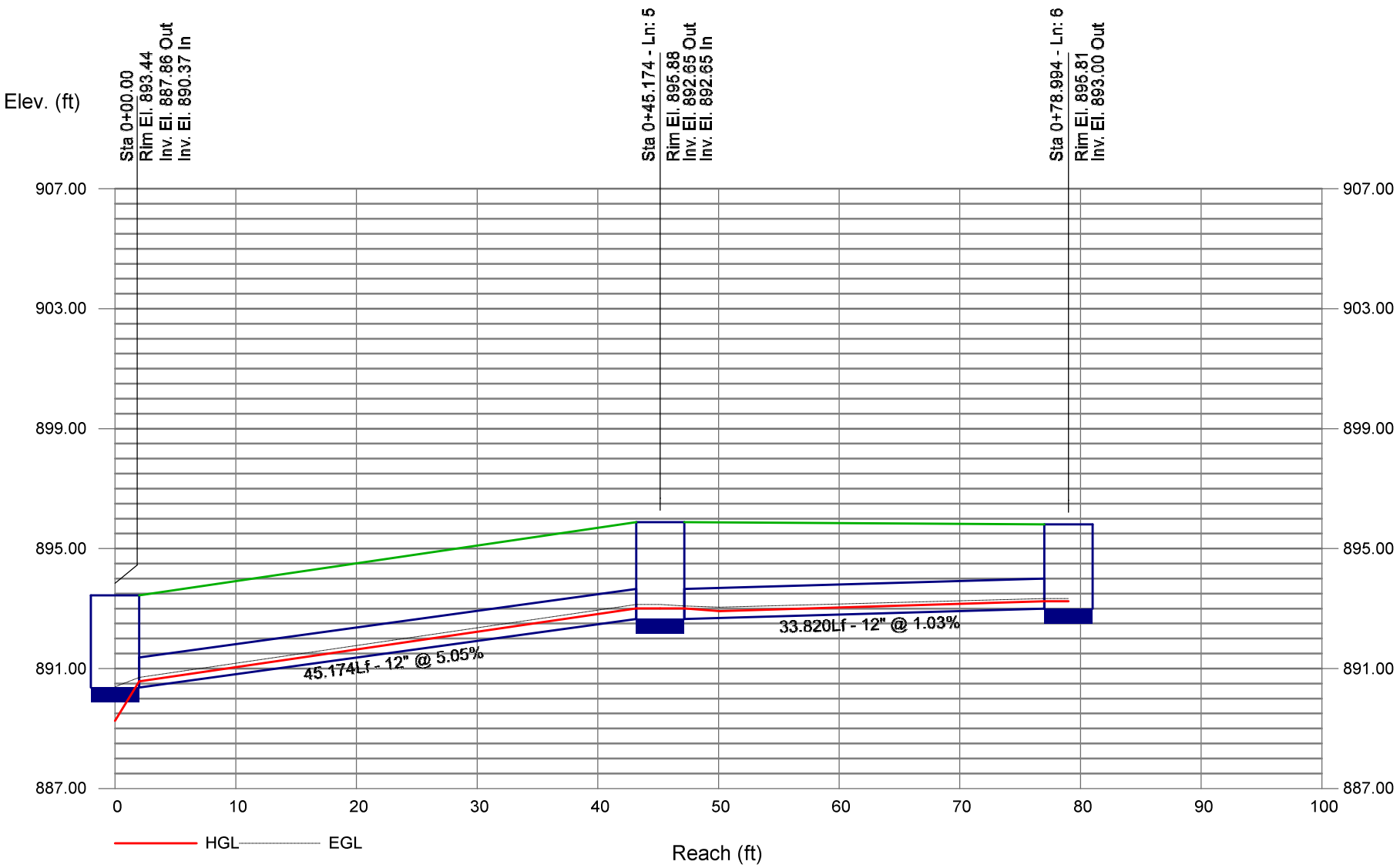

Storm Sewer Profile

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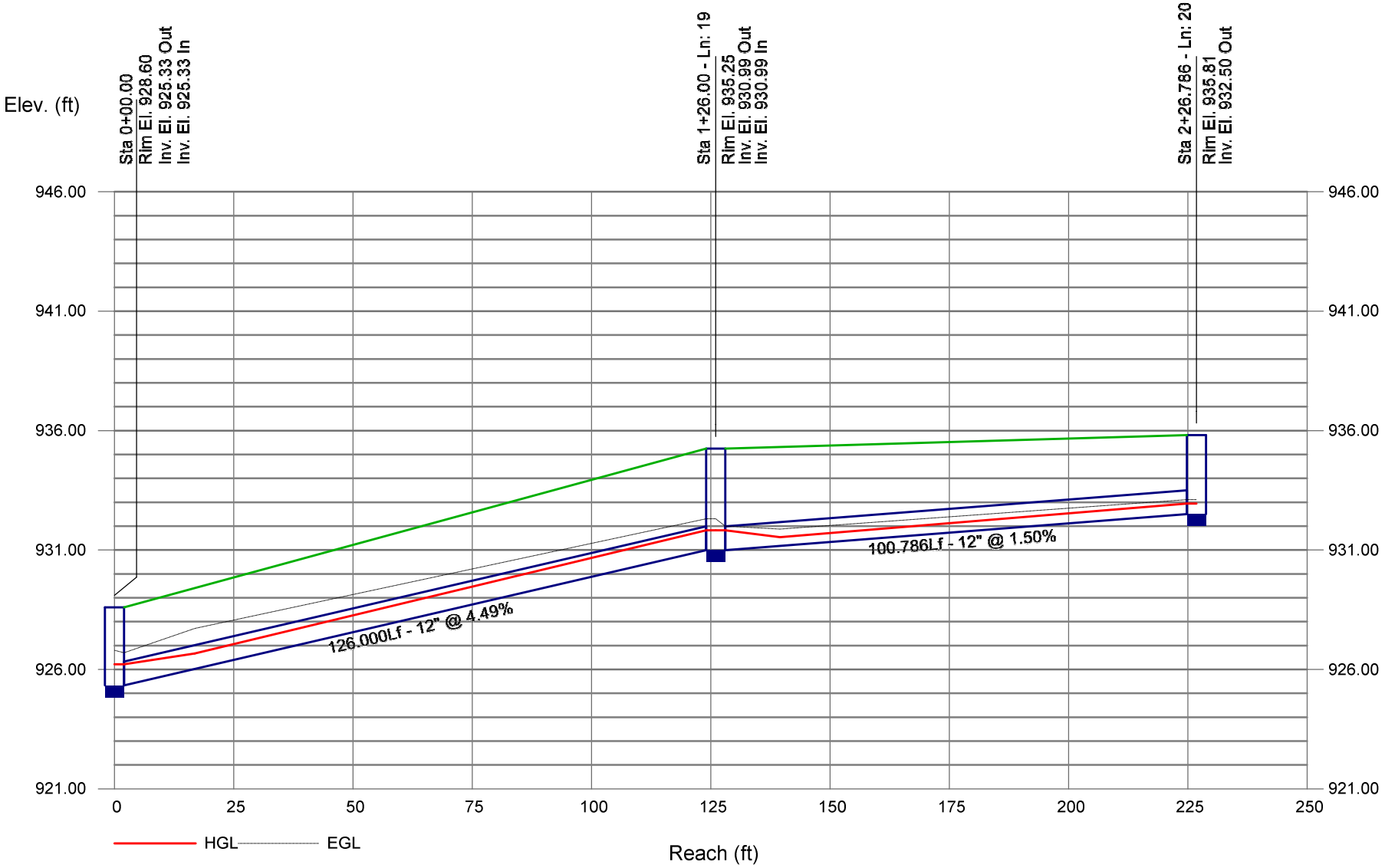

Storm Sewer Profile

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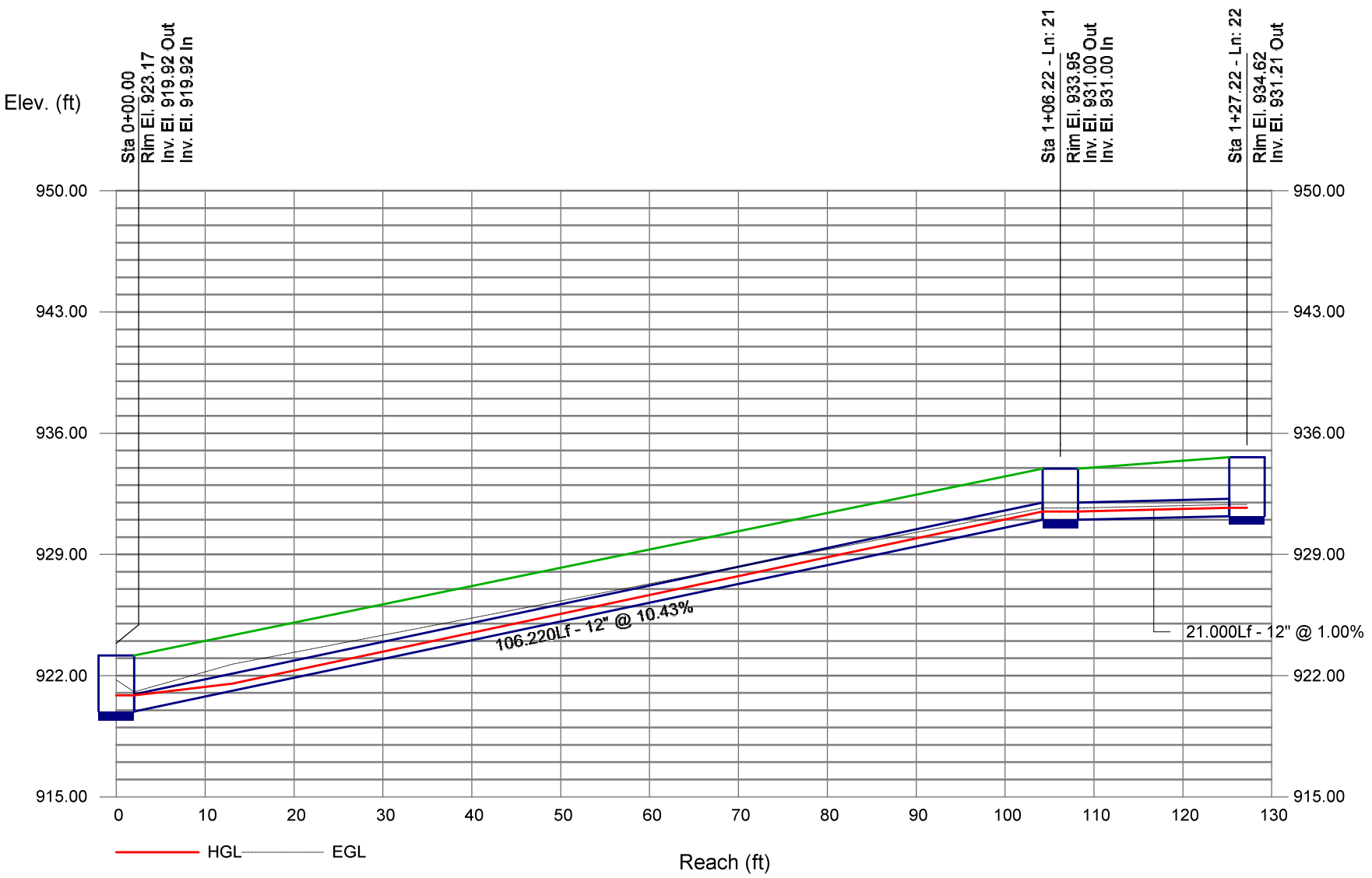

Storm Sewer Profile

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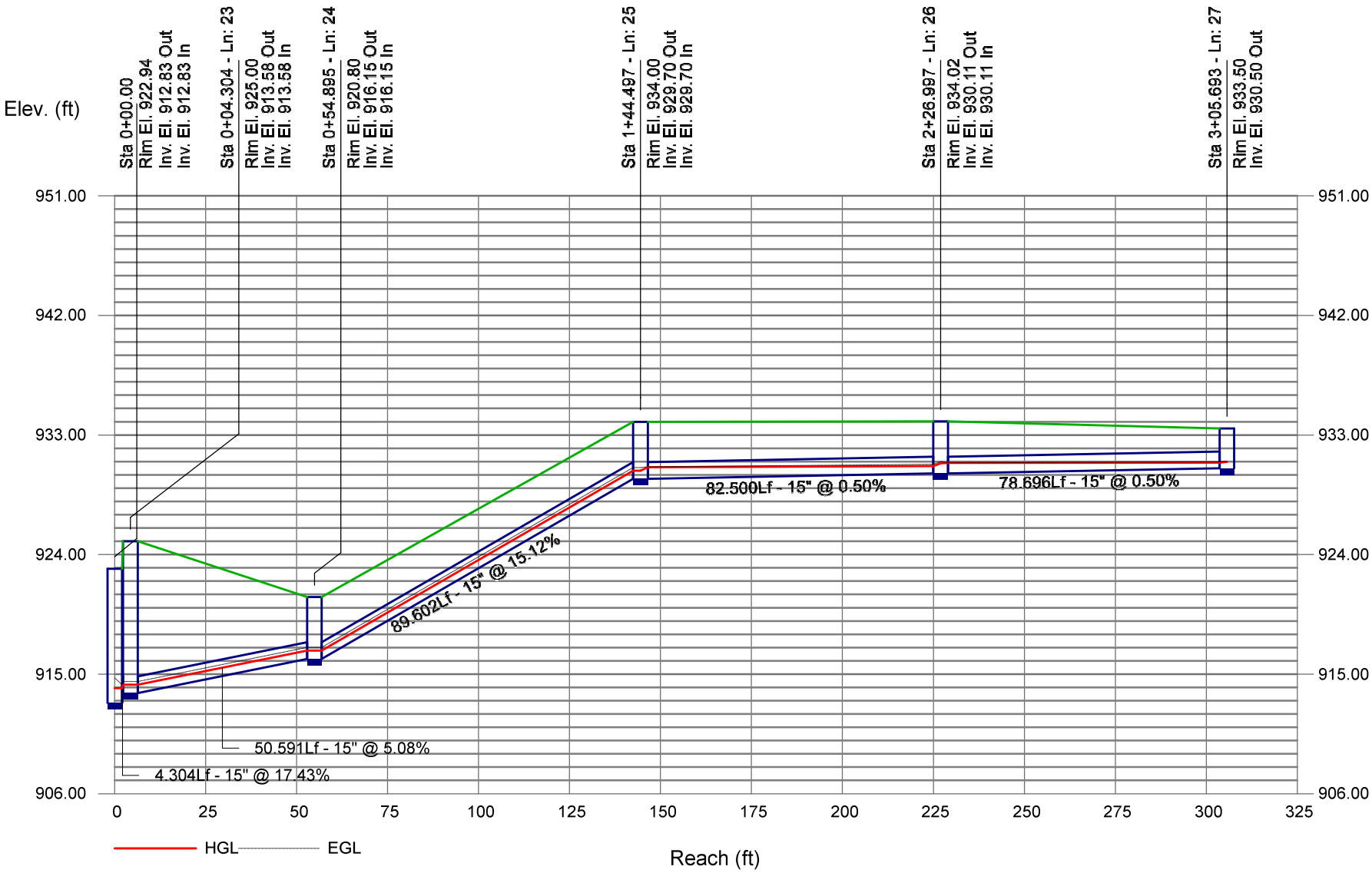

Storm Sewer Profile

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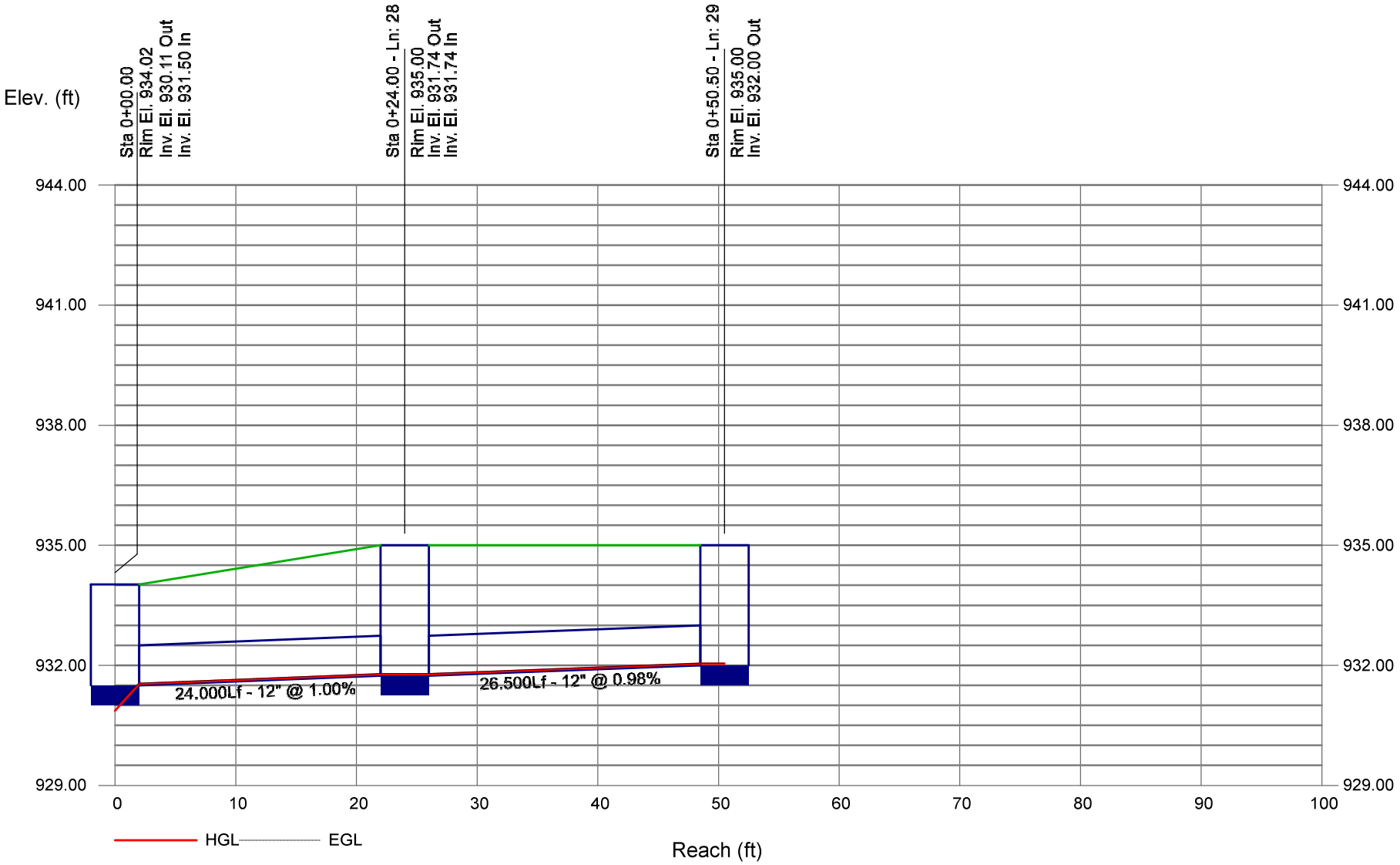

Storm Sewer Profile

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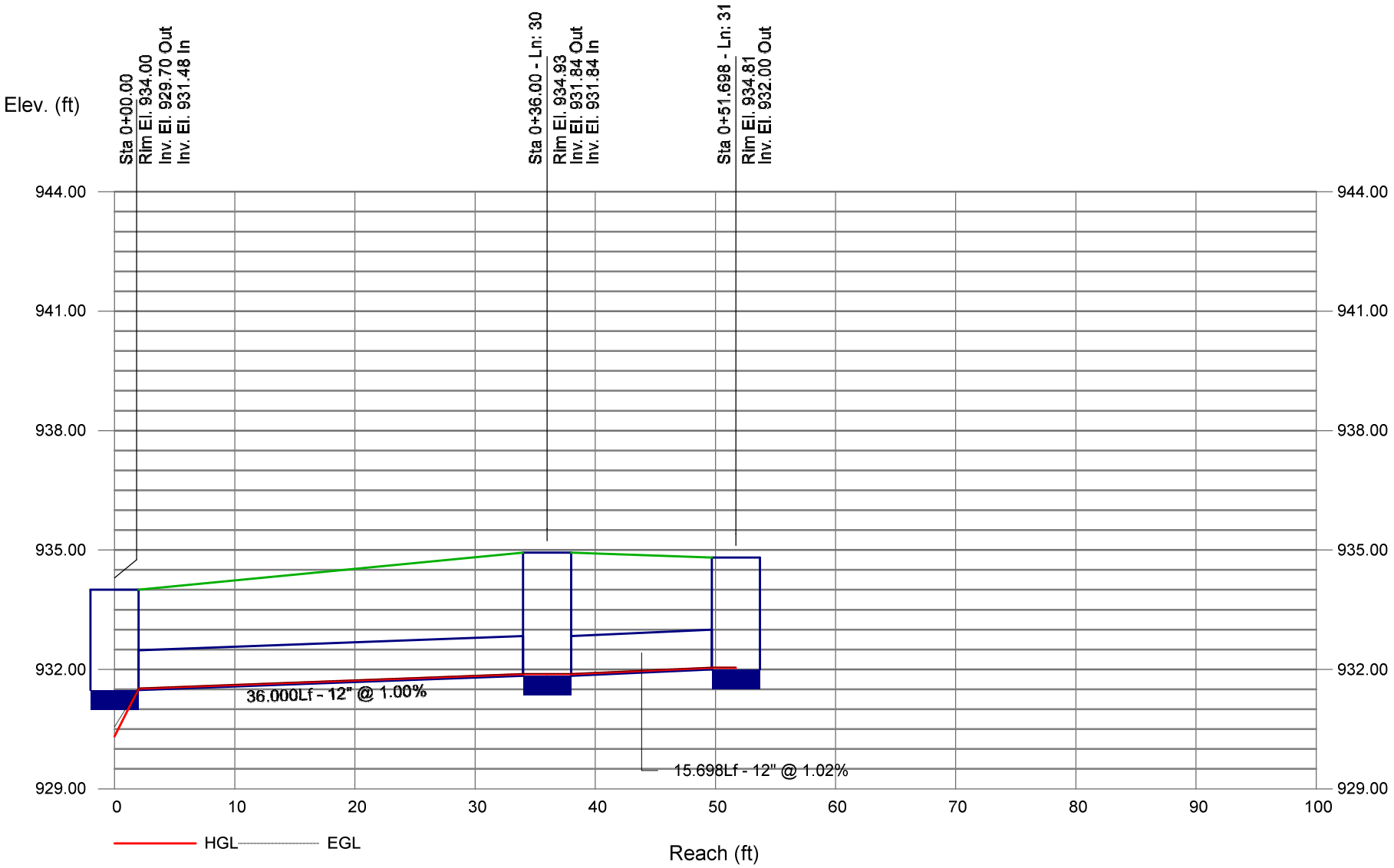

Storm Sewer Profile

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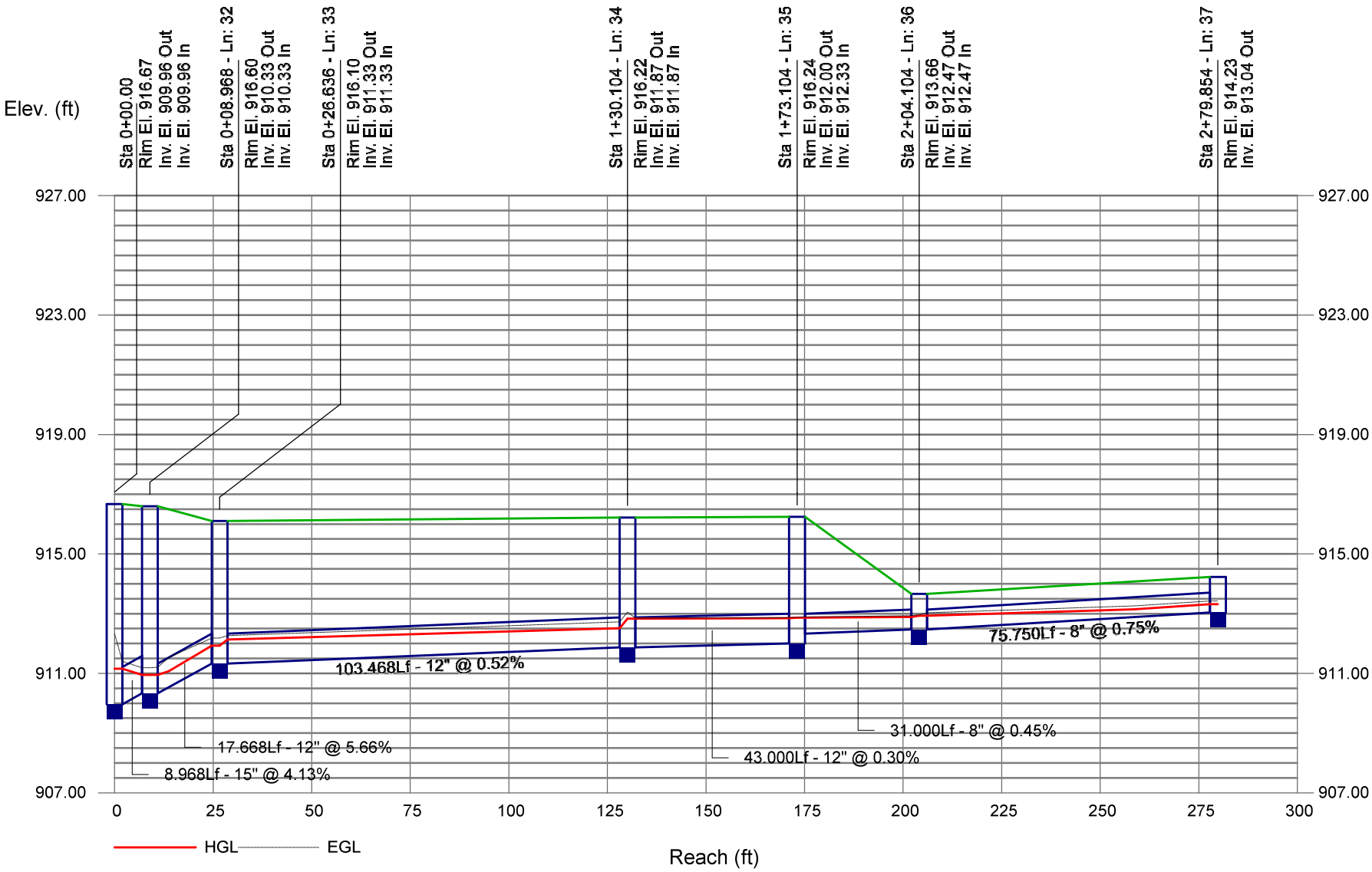

Storm Sewer Profile

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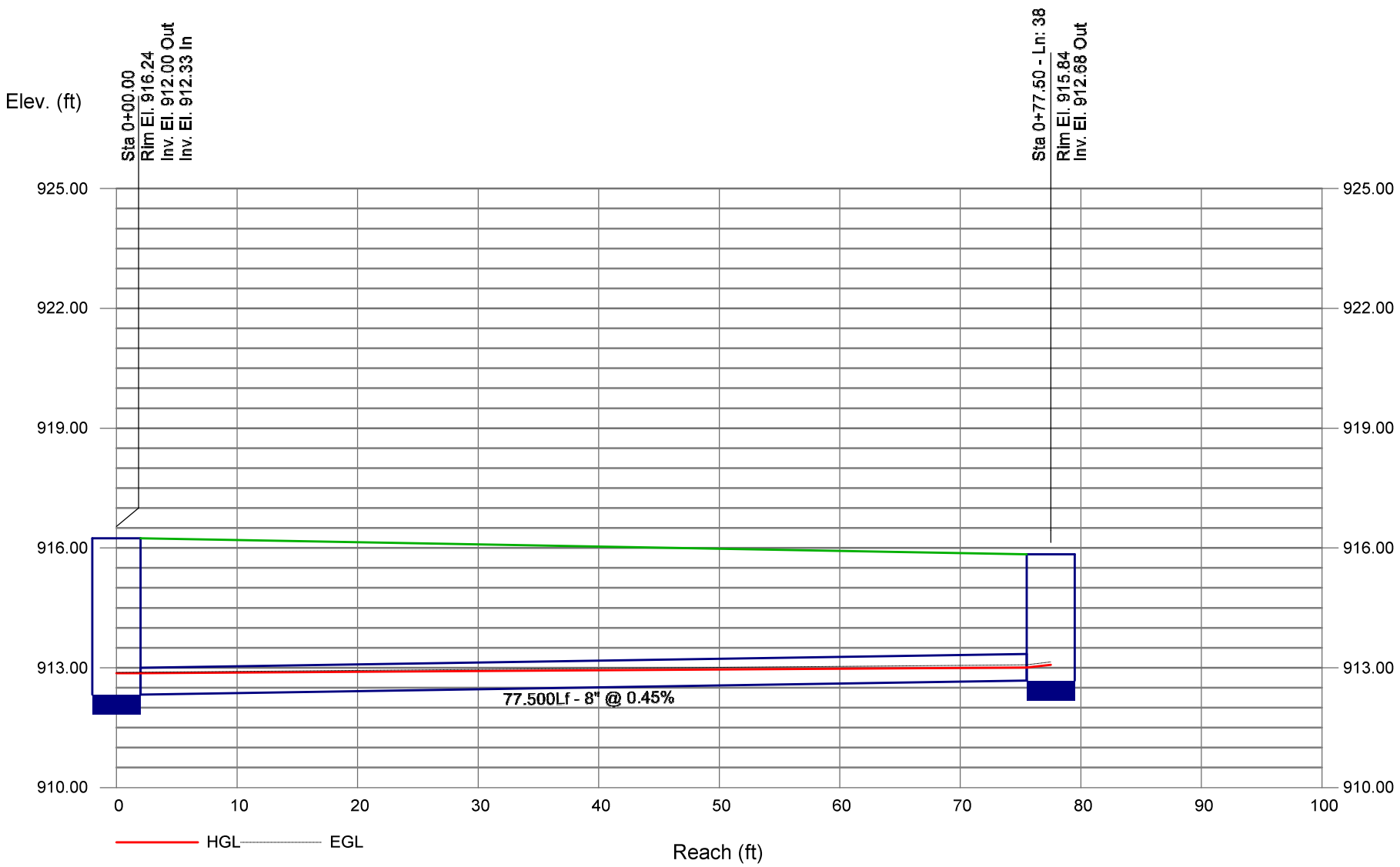

Storm Sewer Profile

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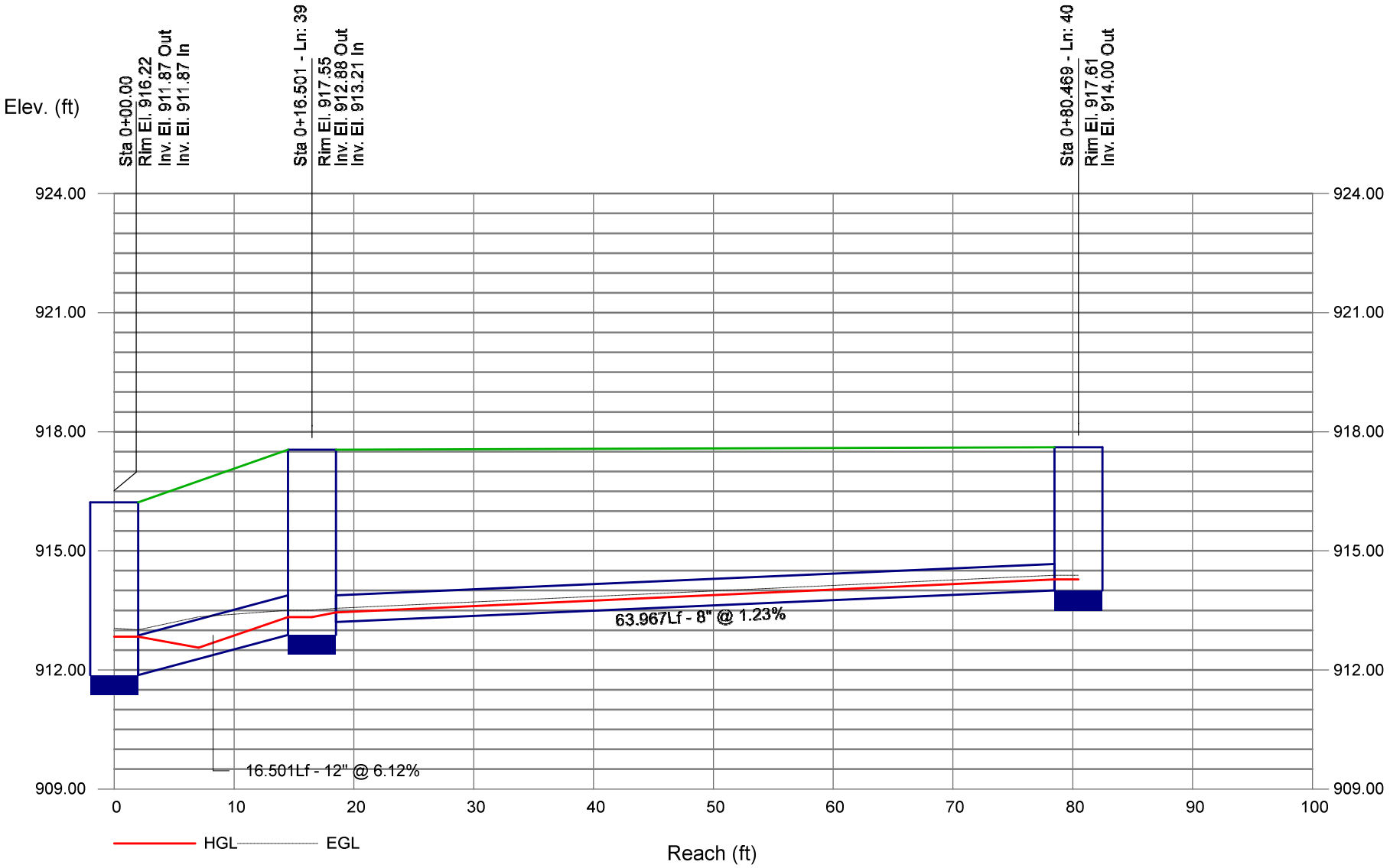

Storm Sewer Profile

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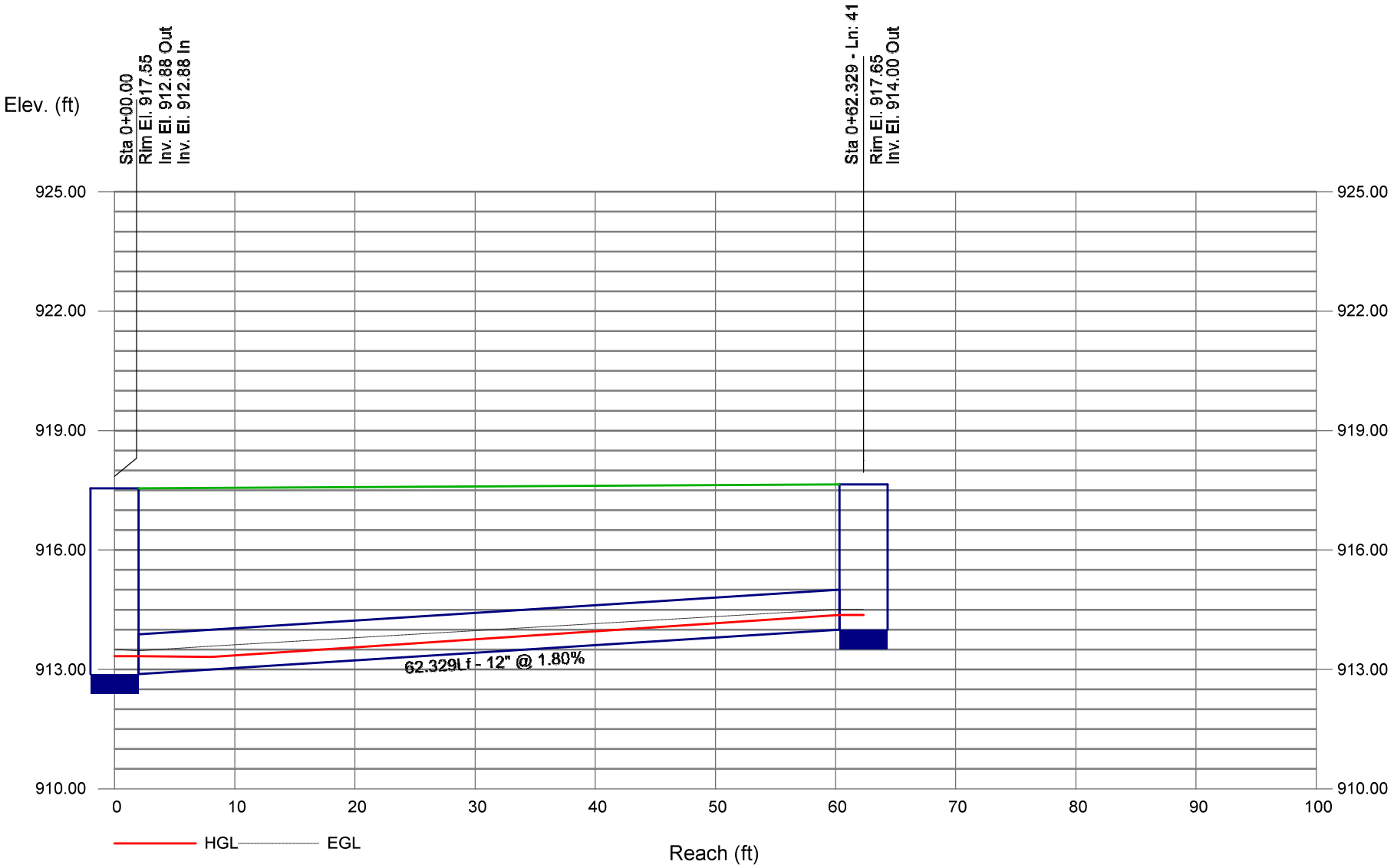

Storm Sewer Profile

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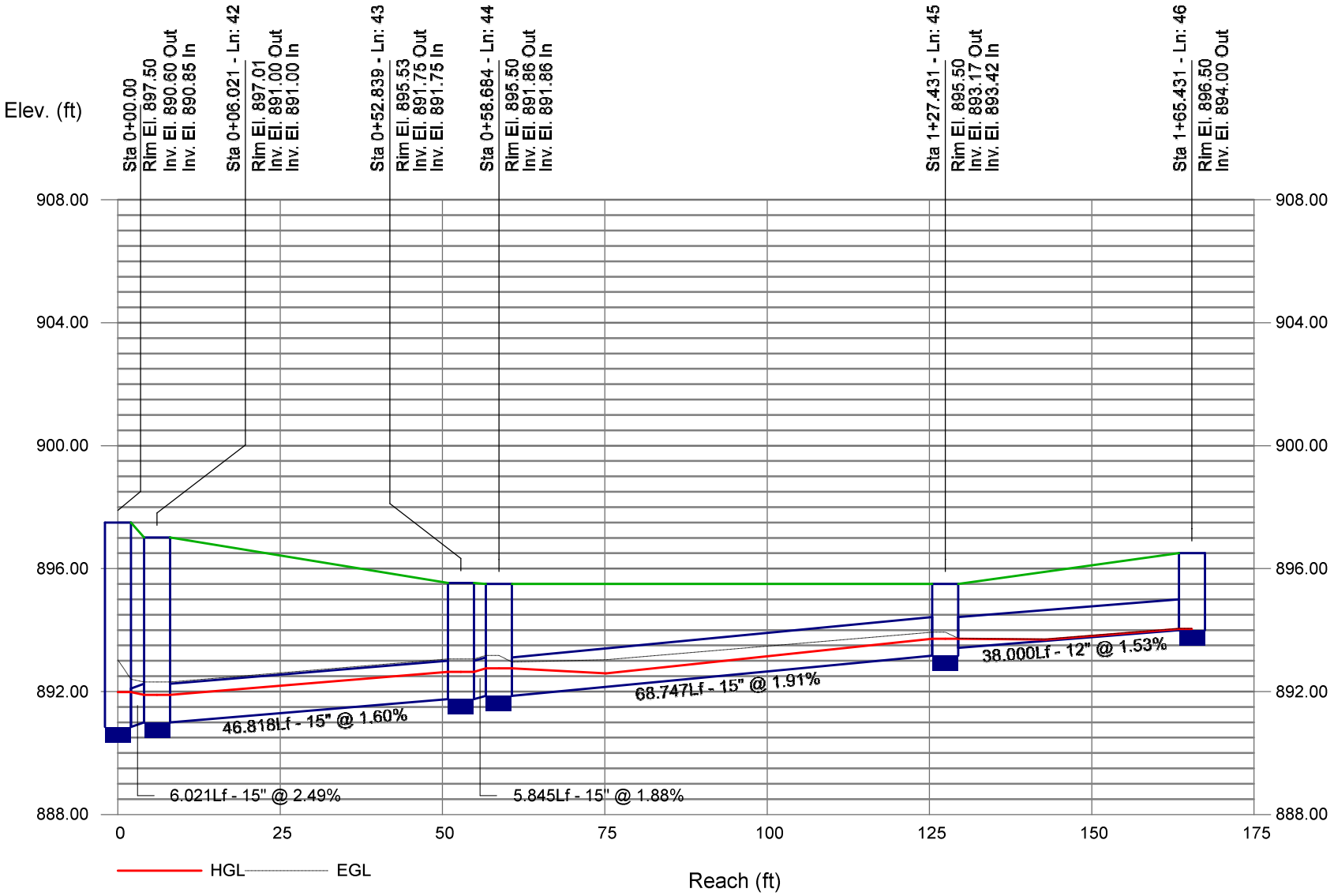
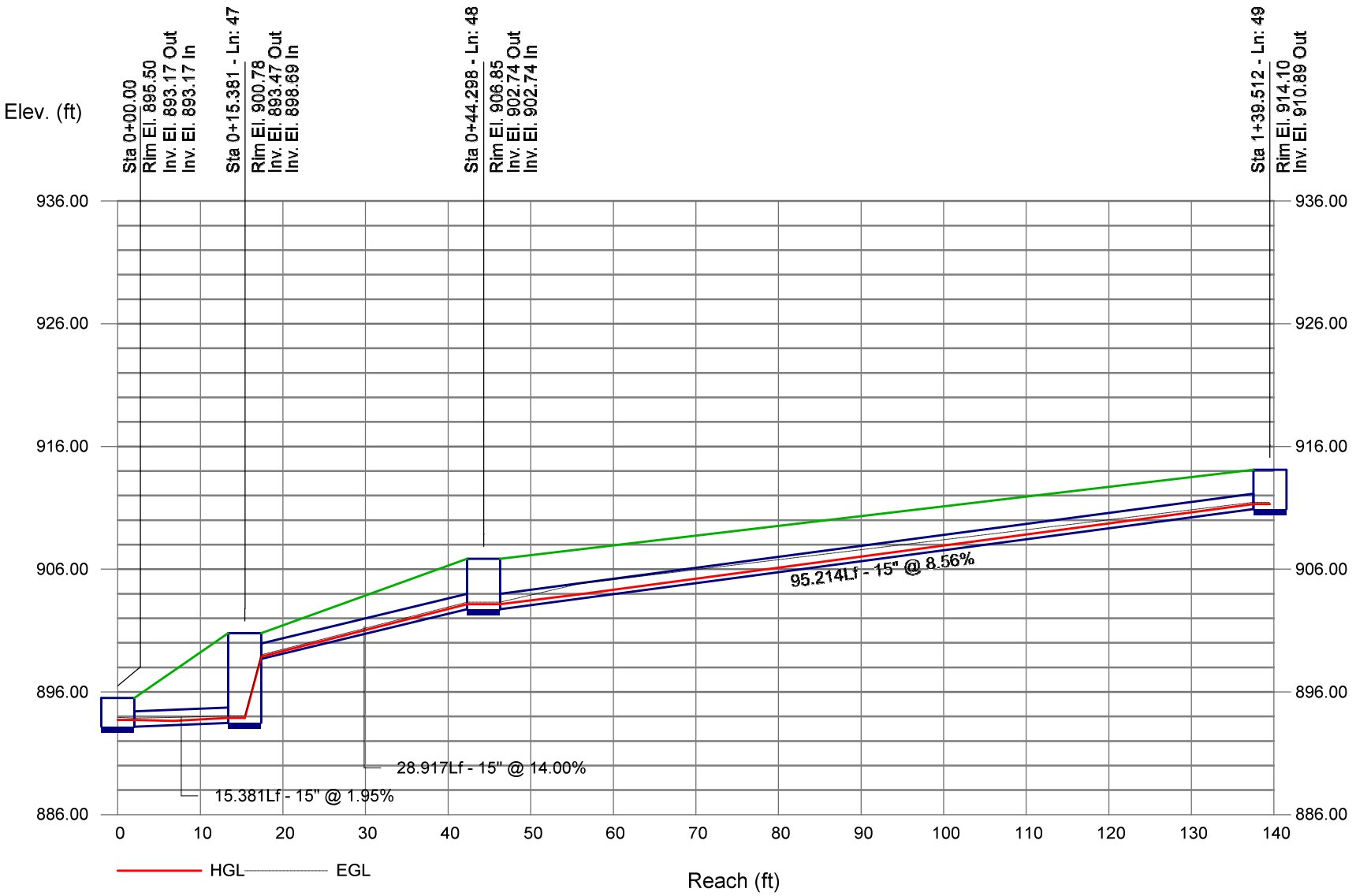


Storm Sewer Profile

Proj. file: Storm Design.stm



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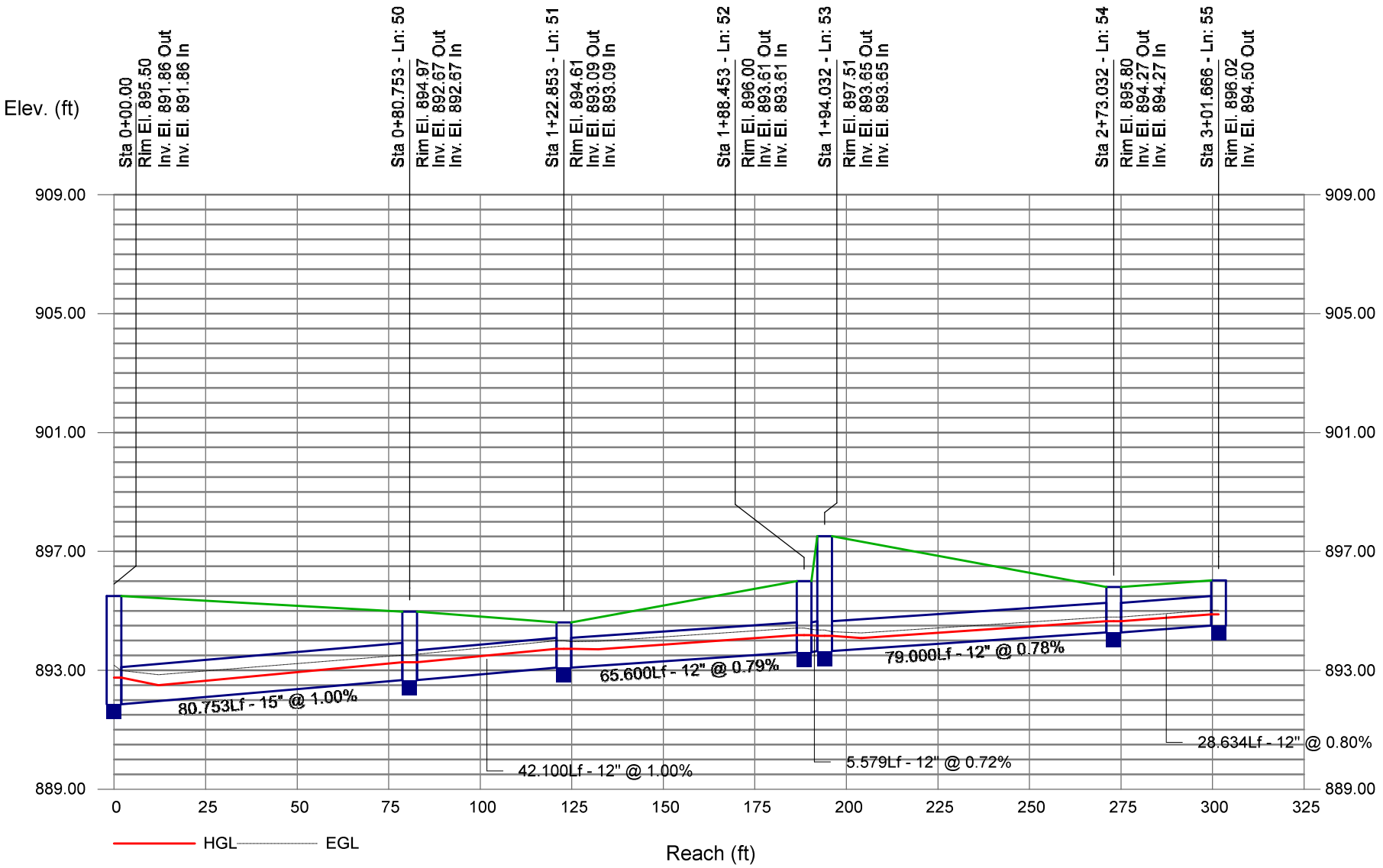


REPORT ON LIMITED PERCOLATION TESTING BY PIEDMONT GEOTECHNICAL CONSULTANTS, LLC.

PIEDMONT
GEOTECHNICAL CONSULTANTS, LLC
— AN ATLAS COMPANY —
3000 Northfield Place, Suite 1100
Roswell, Georgia 30076
Office: 770-752-9205 * Fax: 770-752-0890**

December 30, 2019

Stein Equestrian, LLC
P.O. Box 1053
Cartersville, GA 30120

Attention: Mr. John R. Stein
770.262.8723
jstein@steinequestrian.com

Subject: **Report of Limited Percolation Testing**
Chastain Horse Park – Percolation Testing
4371 Powers Ferry Road NW
Atlanta, Georgia 30327
PGC Project No. 119478

Dear Mr. Stein:

Piedmont Geotechnical Consultants, LLC (PGC) is pleased to provide this report of infiltration testing for the referenced project. The field study and this report were accomplished in general accordance with PGC Proposal No. P19779, dated December 16, 2019.

We understand that as part of a storm drainage system you will have to incorporate BMP's utilizing infiltration of storm water into the ground. For the design of the system(s), percolation tests were requested to be conducted at a depth of approximately ten (10) feet below the existing grade at five (5) locations. Piedmont Geotechnical Consultants was provided an "Existing Conditions Plan" by Van Der Watt Engineering, LLC, showing the five (5) areas where potential installation of BMP's would be located.

Test locations and depths were selected by Van Der Watt Engineering. The testing began by drilling five (5) mechanical auger borings to depths of approximately 9.5 to 10 feet below the existing grade at each proposed location. The borings were advanced by utilizing a drill rig to twist continuous hollow stem auger flights into the ground. Test location P-1 was not accessible to the drill rig at its original proposed location, so this test location was moved approximately 40 feet to the southeast along the western side of the boarding stall barn. Test locations are presented on the attached Figure 1 – Site and Test Location Plan.

Percolation tests were performed using a falling head method and were conducted over a two-day period. The holes were saturated upon completion of the borings. The following day the holes were refilled and the rate of flow out of the test holes was measured over a period of time. The tests were repeated four (4) times at each test location.

When percolation testing is performed in a borehole, the column of water seeps both radially and vertically from the borehole (essentially 3-D seepage) and the column of water falls or reduces over time. The time-rate of this seepage is the percolation rate. Design of most stormwater or pervious pavement systems is based on one-dimensional vertical flow, or an infiltration rate. Thus, calculated infiltration rates are less than measured percolation rates. Results from each percolation test are converted to a corresponding infiltration rate which takes into account the effects of seepage from the borehole below the initial water depth. Based on the field percolation test data and our calculated reduction factor, the resulting infiltration rates, per test location, are as follows:

Test Location	Depth of Test (ft.)	Infiltration Rate (in/hr.)
P-1	9.5	0.50
P-2	9.5	0.68
P-3	10.0	0.56
P-4	9.5	1.03
P-5	9.5	1.06

At the time of construction, we request the opportunity to evaluate soil conditions to verify that the conditions anticipated in design actually exist. Otherwise, we assume no responsibility for construction compliance with the design concepts, specifications or recommendations. The infiltration rates may be different at other locations and depths and are dependent on soil properties at specific locations. If variations become evident during the course of construction, it will be necessary to reevaluate the recommendations of this letter after on-site observations of the conditions.

Should you have any questions regarding items discussed in this report, please do not hesitate to contact the undersigned.

Sincerely,
Piedmont Geotechnical Consultants, LLC

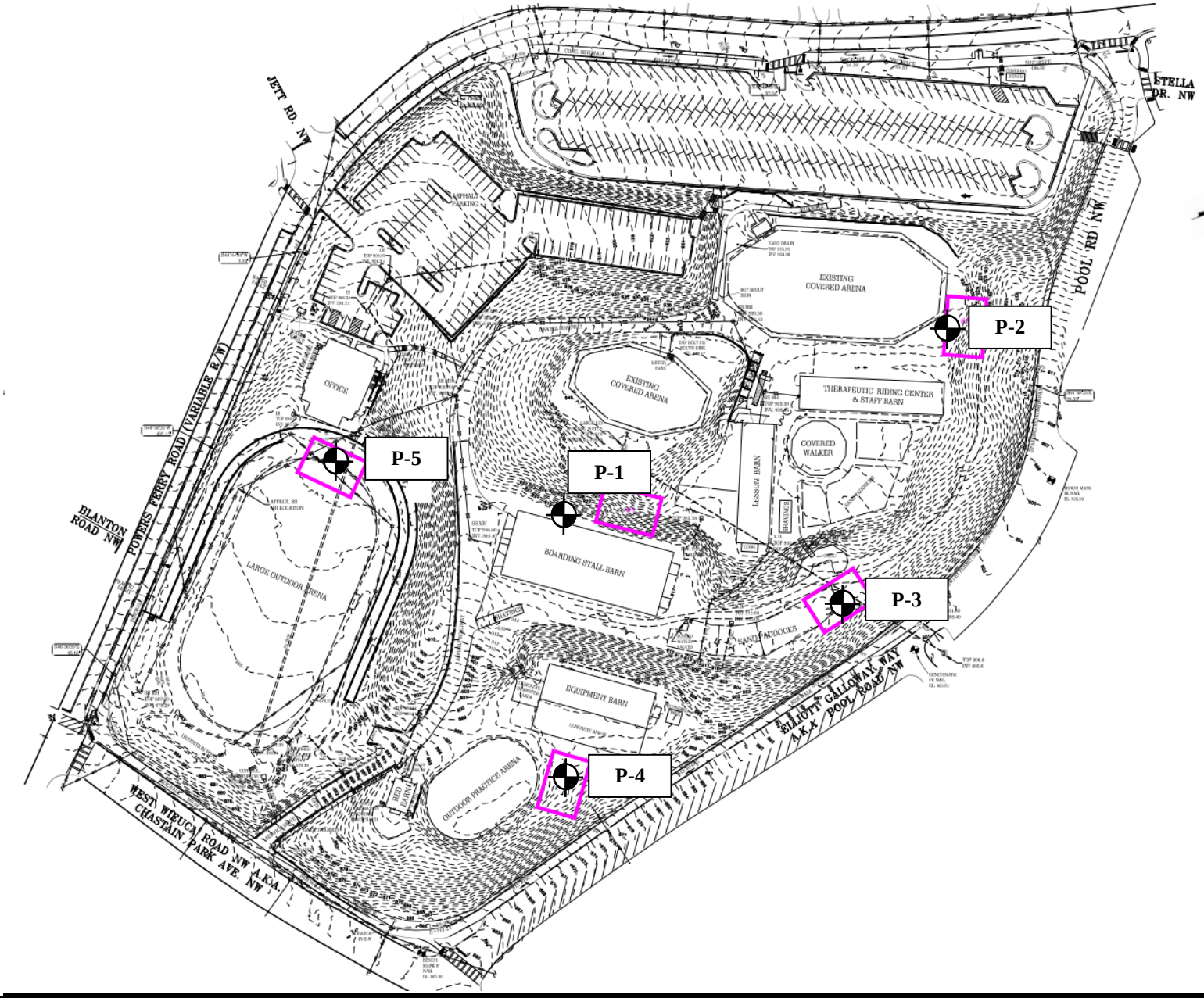
David Howell
Staff Engineer

Bob L. Whitfield, P.E.
Senior Registered Engineer

GEORGIA REGISTERED No. 19785 PROFESSIONAL ENGINEER BOB L. WHITFIELD, JR.

Attachment: Figure 1 - Site and Test Location Plan

BLW/DH:mds



LEGEND

PERCOLATION TEST LOCATION

FIGURE 1: SITE AND TEST LOCATION PLAN

CHASTAIN HORSE PARK – PERCOLATION TESTING
4371 POWERS FERRY ROAD NW
ATLANTA, GEORGIA

PIEDMONT
GEOTECHNICAL CONSULTANTS, LLC
—AN ATLAS COMPANY—

3000 NORTHFIELD PLACE, SUITE 1100
ROSWELL, GA 30076

DRAWN BY: DH	**NOTES:**
APPROVED BY: BLW	
PROJECT NO.: 119478	
DATE: 12/19/2019	
SCALE: NTS	