Stormwater Management and Pollution Prevention Plan

Gan-Eden
Residential Community

Town of Thompson, Sullivan County, New York

Prepared for:

Gan-Eden Estates
90 Woodbridge Center Dr. Fl 6th
Woodbridge, New Jersey

Prepared by:

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APPENDICES

1.0 BACKGROUND INFORMATION

A. Project Background

Paulus, Sokolowski and Sartor PC (PS&S) was retained by Gan-Eden Estates to complete a stormwater management and pollution prevention plan to summarize the stormwater management, and sediment & erosion control activities associated with residential site development for the proposed total of 535 dwellings. The project is located on 199 acres of property, known as Gan-Eden, which consists of small portion of land (13.4 acres) inside the Town of Fallsburg with the majority of the property filed in tax map as Section 2, Block 1, Lot 63 and situated at northwest corner of County Road 104 and County Road 107 in the Town of Thompson, Sullivan County. The project includes the construction of a total of 535 dwellings, approximately 2.1 miles of circulation roadways, a clubhouse, tennis courts, playground, a water tower, a wastewater treatment plant and utility infrastructure. The proposed community will have 3 points of access to the adjacent County Roads. (See Appendix A-USGS Map)

B. Purpose

The purpose of this Stormwater Management and Erosion Control Plan is to identify pre-development and post-development hydrologic and hydraulic conditions, and to delineate the stormwater control practices required to prevent, minimize, or mitigate potential water quality and runoff impacts associated with stormwater runoff for the proposed development during construction and after project completion.

In addition, this report identifies the submittals required to meet the regulatory requirements for a New York State Department of Environmental Conservation (NYSDEC). Appendix B contains a Notice of Intent Form (NOI); and a sample Contractor Certification Statement Form. The site contractors and subcontractors are required to certify compliance with the Stormwater Management and Pollution Prevention Plan. The NOI form would be finalized, executed and submitted to NYSDEC prior to construction. The contractor's and subcontractor's certification statements should be executed and submitted with any contract agreement.

C. Regulatory Requirements

Based on NYSDEC regulatory requirements, construction activities disturbing one or more acres of soil must be authorized under the General Permit for Stormwater Discharges from Construction Activities (Permit No. GP-0-15-002). Permittees are required to develop a Stormwater Pollution Prevention Plan (SWPPP) to prevent discharges of construction-related pollutants to surface waters.

The NYSDEC updated the New York State Stormwater Management Design Manual to include Green Infrastructure Requirements. Green infrastructure (GI) can help manage stormwater runoff by removing pollutants and reducing the amount of runoff that enters storm sewers, wetlands, streams, etc. The SWPPP must include an evaluation of all the green infrastructure planning measures as they apply to the site.

D. Existing (Pre-Development) Conditions

The 199 acre existing site is rectangular in shape within the town of Thompson with approximately 2,500 feet north to south and 4,000 feet east to west. Approximately 11.06% of this tract (22.01 acres) is delineated as NYSDEC and ACOE wetlands including buffers at 13 locations in the property. The wetlands are located at low elevations and receive stormwater runoff from the future disturbed areas. Almost all of the wetlands are preserved under the proposed development. The west part of site is steeply sloping from the plateau with the elevation as high as 1640' to toe elevations around 1500'. In contrast, the east side of property is moderately sloping toward the north.

The soil type occurring in proposed construction areas is WeB (Wellsboro, gravelly loam) according to the Sullivan County Soil Survey by USDA (Appendix C). Permeability of this Wellsboro soil is moderate, and surface runoff is medium as described in the Soil Survey.

Table-1: Gan-Eden Site Soils Data

	Symbol	Name	Hydrologic Soil Group (HSG)	Area			Average HSG
				SF	AC	%	
1	AoC	Amot/Oquaga	C/D	971,290	22.30	10.5%	C
2	OgD	Oquaga/Amot	C	165,850	3.81	1.8%	
3	OgC	Oquaga/Amot	C	522,910	12.00	5.7%	
4	LaB	Lackawanna	C	722,190	16.58	7.8%	
5	OeB	Oquaga	C	2,402,680	55.16	26.1%	
6	AoE	Amot/Oquaga	C/D	1,007,350	23.13	10.9%	
7	SeB	Morris, extremely stony	C	100,800	2.31	1.1%	
8	MrB	Morris	C	453,410	10.41	4.9%	
9	WiC	Wellsboro, extremely stony	C	634,090	14.56	6.9%	
10	WeC	Wellsboro	C	1,025,090	23.53	11.1%	
11	WeB	Wellsboro, extremely stony	C	958,360	22.00	10.4%	
12	LaC	Lackawanna	C	58,760	1.35	0.6%	
13	Pa	Palms	A/D	55,990	1.29	0.6%	
	water			128,420	2.95	1.4%	
Total				**9,207,190**	**211.37**	100.0%	

The remaining three types of soils on site are found in wetlands areas and considered to have greater limitation to permeability. As summarize in Table-1, hydrological soil group (HSG) for all soils at the site are considered as HSG C.

E. Proposed Future (Post-Development) Conditions

This project involves the development of 199 acres of land for a residential community including 146 townhouse homes and 382 garden apartment units and associated clubhouse, pool, playground, roadways and utility infrastructure. Circulation roads within the community will be asphalt with curbs and runoff from the pavements will be collected through a closed stormwater drainage system. Building rooftop runoff will be disconnected from other impervious surfaces and conveyed to designated pervious areas to reduce runoff volumes and rates.

Proposed stormwater management facilities will consist of 5 stormwater management basins with forebays, 3 vegetated swales and stormwater piping network to achieve runoff quantity and quality controls as required by the NYSDEC Stormwater Management Design Guidelines.

2.0 STORMWATER MANAGEMENT

A. Stormwater Management Constraints and Objectives

The stormwater management field is always evolving, and new technologies are constantly emerging and being implemented. Stormwater management for this development proposes to utilize some of the NYSDEC recommended practices where site conditions demand. Understanding these specific site constraints as follows is essential to proper stormwater management designing:

1. Wetlands of nearly 9.5% of its total property;
2. Low permeable soil conditions (HSG C);
3. Relatively steep site slopes (6-35%);
4. Two natural drainage design points.

The primary objectives of the Stormwater Management Plan are as follows, with consideration for the protection of wetlands and maintenance of natural hydrology of the site.

- Reduce the post-developed rates of runoff below the pre-developed rates for all given storm events;
- Improve water quality through capture and treatment of 90% of the average annual stormwater runoff volume or ‘Water Quality Volume’.

- Achieve runoff reduction requirement by applying green infrastructure techniques

B. Stormwater Management Main Components

In order to be in compliance with the NYSDEC technical standards and to meet the objectives outlined above, the following practices have been incorporated into the stormwater management plan:

1. Three SWM basins classified as shallow wetland (W-1) by the NYDSEC design manual are proposed at the site for flow reduction and treatment of the existing subwatershed discharged northwards. Basins A and B are located at the lower end of the site along the northern property line and adjacent to natural wetlands. Basin C is located centrally on the site, just below the existing stormwater pond. These basins are designed to treat pavement runoff and attenuate peak flows as well as to create consistency with surrounding natural resources of wetlands.

2. One shallow wetland basin (Basin D) is designed for control of runoff from proposed impervious surface into the existing pond. The combination of this proposed basin and existing pond have sufficient capability to attenuate and treat tributary flows;

3. One shallow wetland basin (Basin E) is designed for flow reduction and treatment of the existing subwatershed discharged westwards;

4. Three (3) vegetated swales with combined total length of 2625 LF are proposed to be turf-lined to convey stormwater at a low velocity, promoting natural treatment and infiltration. The vegetated swales function as naturalized drainage paths to increase time of concentration and meet the green infrastructure requirements of the NYS Stormwater Management Design Manual.

3.0 COMPARISON OF EXISTING WITH PROPOSED RUNOFF

A. Methodologies

The assessment of stormwater runoff has been based upon the Soil Conservation Service Method as described in Technical Release No. 55 (TR-55), "Urban Hydrology for Small Watersheds". Theoretical storms are modeled with the 24 Hour SCS Unit Dimensionless Hydrograph utilizing a Type III rainfall distribution and recurrence intervals of 1, 10, 25 and 100 years, shown on Table 2. Hydrograph generations and routings were accomplished via Hydraflow 2014 Program. The program is tailored to model the SCS Method for hydrograph generations and to perform iterative solutions of the continuity equation (outflow=inflow +/- storage) with the intermediate values of the routing curve obtained through linear interpolation. The program has a default shape factor of 484.

Table-2: Design Storms

Event	90% Rainfall **Water Quality**	1 Year **Channel Protection**	10 Year **Overbank**	25 Year **Convey System**	100 Year **Extreme Strom**
Rainfall (inch)	**1.30**	**2.55**	**4.50**	**6.00**	**7.75**

Storm sewers hydraulics has been based upon surface runoff generated by the 25 year storm event. As recommended by NYSDEC Design Manual, 10-year storm is for a minimum sizing criterion for closed conveyance system. The corresponding Manning's "n" value for HDPE pipe utilized in the design is 0.013. Storm sewer capacity is based upon full depth gravity flow. All storm pipe sizing information is displayed in Appendix I.

Emergency spillways for all SWM basins are designed for the 100 year storm event, and the weir equation as referred to the Handbook of Hydraulics, by Brater and King. The results are presented in Appendix J.

Implementation of the Stormwater Management Plan will result in peak runoff attenuation, reducing the proposed rates of runoff to the two analysis points identified as "West" and "North" in the corresponding modeling.

B. Peak Flow Reduction Calculations

The primary objective of the storm water quantity control is to limit the composite post-developed rate of runoff from the developed portion of the site to be less than or equal to the pre-developed rate of runoff under the influence of a 1, 10, and 100-year frequency storm with peak flow reduction.

The hydrographic model of the pre-development condition is to study two watersheds (four drainage areas) identified by natural topographic features and analyzed by Hydraflow program. The results of the 1, 10 and 100-year routed hydrographs for pre-development can be found in Appendix G and are summarized in the Table-3 below.

Table 3. Runoff Peak Flows of Pre-Development

Drainage Point	Drainage Area Name	Area (ac.)			CN	Tc (Min.)	Peak Flow (cfs)		
		Pervious	Impervious	Total			1-Year	10-Year	100-Year
West	XDA-1	30.02	0	30.02	79	12.5	**21.55**	**61.13**	**133.62**
North	XDA-2	71.94	0	71.94	79	21.2	**41.40**	**132.36**	**306.48**
	XDA-3	31.55	0	31.55	79	9.7			
	XDA-4	10.95	0	10.95	79	13.6			
Total		144.46	0	144.46					

The proposed storm water management system will consist of gravity storm sewer collection systems and detention systems including five detention basins for the proposed drainage areas PDA-A, PDA-B PDA-C, PDA-D, and PDA-E. The proposed outlet structures control the rate of runoff from each of the detention systems. The discharge from the detention system Basin E and watershed PDA-X1 will drain to the westward portion of the site. The runoff from the remaining drainage areas will be conveyed northward either through stormwater basins (Basins A, B, C, and D) for treatment and detention or through swales, pipes or watershed directly to downstream wetlands areas (PDA-X2, X3, and X4). The hydrographic model of post-development condition is analyzed by the Hydraflow program and the results of the 1, 10 and 100-year routed hydrographs for post development can be found in Appendix H, and summarized in Table 4 below.

Table 4. Runoff Peak Flows for Post-Development

Drainage Point	Drainage Area Name	SWM Area (ac.)			CN	Tc (Min.)	Routing Basin	Flow & Water Surface					
								1 year		10 year		100 year	
		Perv.	Impe.	Total				W.S. ft	Flow cfs	W.S. ft	Flow cfs	W.S. ft	Flow cfs
West	PDA-E	4.18	1.90	6.08	81	10.0	**Basin E**	1495.71	**12.68**	1496.89	**41.86**	1498.65	**98.15**
	PDA-X1	22.43	1.41	23.84	75	10.0	**N/A**	N/A		N/A		N/A	
North	PDA-A	3.06	1.53	4.59	82	10.0	**Basin A**	1386.07	**35.44**	1387.74	**125.01**	1389.11	**285.75**
	PDA-B	2.12	3.24	5.36	89	10.0	**Basin B**	1376.26		1377.74		1378.99	
	PDA-X2	59.10	5.38	64.48	76	10.0	**N/A**	N/A		N/A		N/A	
	PDA-C	2.95	4.82	7.77	89	10.0	**Basin C**	1486.28		1487.35		1489.18	
	PDA-X3	14.33	2.64	16.97	77	10.0	**N/A**	N/A		N/A		N/A	
	PDA-D	2.60	1.79	4.39	84	10.0	**Basin D**	1496.65		1498.23		1498.89	
	PDA-X4	10.34	0.64	10.98	75	10.0	**N/A**	N/A		N/A		N/A	
Total		121.11	23.35	144.46									

Implementation of the Storm Water Management Plan will significantly reduce the overall discharge rates of runoff from the development area for the 1, 10, and 100-year storm events for this project as exhibited in Table 5 below at the two discharge study points, "West" and "North" respectively.

Table 5a: Summary of Storm Flows for Discharge Point: West

Description	Storm Event/Peak Flow (cfs)		
	1-Year	10-Year	100-Year
Pre-Development	21.55	61.13	133.62
Post-Development	12.68	41.86	98.15
Difference from Pre-Development	-8.87	-19.27	-35.47
% Reduction from Pre-Development	41%	32%	27%

Table 5b: Summary of Storm Flows for Discharge Point: North

Description	Storm Event/Peak Flow (cfs)		
	1-Year	10-Year	100-Year
Pre-Development	41.40	132.36	306.48
Post-Development	35.44	125.01	285.75
Difference from Pre-Development	-5.96	-7.35	-20.73
% Reduction from Pre-Development	14%	6%	7%

C. Water Quality Treatment Calculations

In accordance with NYSDEC Stormwater Management Guidelines, water quality volumes for all proposed watersheds are calculated and presented in Appendix D. Treatment considerations have been given to providing water quality enhancement practices of stormwater runoff based on the feasibility of the following methodologies:

1. The implementation of the proposed swale provides a number of advantages including the increase in time of concentration and allowing the trapping of coarse sediments before the stormwater enters the management facilities.

2. Five stormwater shallow wetland basins (Basins A, B, C, D, and E) are proposed with the integration of forebays and water quality storage volume providing water quality enhancement. These facilities are designed in locations with connections to the existing on site wetlands. As per the

New York State Stormwater Management Design Manual dated January 2015, all required elements of the proposed basins are presented in Table 6.

Table 6: Basin Required Elements

Items	Shallow Wetlands Basin (W-1)				
	Discharge: North				West
	Basin A	Basin B	Basin C	Basin D	Basin E
Drainage area (ac.)	4.59	5.36	7.77	4.39	6.08
Water Quality Volume (ac.ft.)	0.120	0.239	0.354	0.138	0.151
Basin Surface area (ac.)	0.185	0.309	0.174	0.118	0.416
Is basin more than 1% of its drainage area?	**yes**	**yes**	**yes**	**yes**	**yes**
Forebay Volume (ac.ft)	0.046	0.145	0.048	0.052	0.051
Is forebay volume more than 10% WQv?	**yes**	**yes**	**yes**	**yes**	**yes**

The stormwater runoff from proposed impervious surfaces including roads, buildings and driveways will be directed and treated within the proposed stormwater management practices utilized on site. As a result of the application of these treatment practices, both suspended and deposited excess sediments from proposed development will be minimized to the water resource.

D. Runoff Reduction Analysis & Calculations

An additional requirement of the NYSDEC Stormwater Management Design Manual is to implement green infrastructure solutions. The objective of runoff reduction is to replicate pre-development hydrology by maintaining pre-construction infiltration, peak runoff flow, discharge volume, as well as minimizing concentrated flow by using runoff control measures before runoff reaches the collection system. Green infrastructure techniques are to be implemented in two ways:

- Carefully planning to reduce runoff contributing areas;
- Utilize feasible techniques to reduce contributing volume.

In the aspect of green infrastructure planning, as demonstrated in the proposed site plan, all paved areas including roadways, sidewalks and driveways are planned to meet minimum municipal requirements and maximum function in order to minimize impervious coverage.

In the aspect of green infrastructure design, the following two techniques are applied to this project:

- Disconnect rooftops, and
- Incorporate vegetated swales

Due to moderately permeable HSG C soils on site as discussed previously, the disconnected rooftop practice will be implemented to provide sheet flow over lawn areas. The areas of rooftop account for as much as 57.40% of the total proposed impervious areas for the project. Sending runoff away from the conventional closed piping system through pervious surface will increase flow travel time and reduce peak flows. The proposed project will introduce approximately 2,625 feet of vegetated swales with bottom width 4 feet, depth 6" to 24" and 4% slope in three locations to enhance infiltration capability for the moderately permeable soil. In the use of swales for conveyance, time of concentration increases will enhance stormwater treatment. The proposed development meets the regulation of runoff reduction requirement as summarized in Table 7 below. (Refer to Appendix E for detailed calculations)

Table 7: Runoff Reduction Analysis

Items	Unit	Result
Water Quality Volume	ac.ft	3.714
Soil Specific Reduction Factor (HSG C)		0.30
Runoff Reduction Min. Volume	ac.ft	0.928
Disconnected Rooftop Reduction Volume	ac.ft	1.683
Vegetated Swale Reduction Volume	ac.ft	0.030
Total Green Infrastructure Tech. Reduction	ac.ft	1.713
Is Runoff Reduction more than Required Volume?	**yes**	
SMP Runoff Reduction	ac.ft	3.409
Total Runoff Reduction	ac.ft	5.122
Is Water Quality provided more than Water Quality Volume?	**yes**	

E. Evaluation

The assumptions used in assessing pre-development and post-development drainage conditions include:

1. Wetlands in the west portion of the tract receiving runoff discharges from the project site are combined and routed as "West" for one of the discharge points of interest;
2. Discharge point "North" is considered as the ultimate point to receive runoff from proposed developed areas collectively;

3. Pre-development runoff curve numbers are based on vegetation conditions as indicated on the site survey. Woods, rotational meadow and open space are considered in good and fair condition;
4. Impervious area and cover conditions for post-development are based on current site plans prepared by PS&S.

The proposed implementation of stormwater basins, vegetated swales and other green infrastructure in stormwater quantity and quality control meet the requirements for application under the New York State Pollutant Discharge System (SPDES) General Permit for Stormwater Discharge from Construction Activities (NYSDEC 2015 manual).

4.0 EROSION AND SEDIMENT CONTROL

The construction of the proposed development will require the excavation and grading of soils on site. The total area of disturbance is approximately 73 acres, or about 37% of the existing site. Approximately 63% of the site will remain undisturbed and all wetlands and buffers will be protected during construction.

During construction of the proposed development, temporary and permanent soil erosion and sediment control measures shall be implemented, to minimize impacts to the surrounding land areas and water bodies. Soil erosion would be controlled by the following measures:

- Keeping disturbed areas to a minimum and providing temporary seeding and mulching if construction operations cease for more than 7 days;
- Keeping topsoil stockpiles less than 35 feet high and keeping the side slopes of these stockpiles at or less than 2:1;
- Constructing a crushed stone tracking pad at the points of egress and ingress for construction vehicles of each phase; and
- Placing stone rip-rap at the outlets of storm sewer pipe networks with sizing computations provided in Appendix J.

Sedimentation would be controlled by:

- Installing silt fence barriers along the base of slopes and around the perimeter of topsoil stockpiles;
- Placing inlet filters over the grate of each stormwater inlet or catch basin as it is constructed to prevent sedimentation within the storm sewer system;

- Cleaning inlet filters and the upstream sides of all silt fencing after each erosion producing storm;
- Use of stormwater permanent basins as temporary sediment basins;
- Temporary sediment traps at low points;
- Use of temporary diversion swales.

Soil erosion and sediment control shall be ensured during the construction period through a program of daily observation and maintenance with particular emphasis on inspection and repair following rain storms. All graded areas shall be permanently seeded and landscaped to minimize erosion. All control measures shall be carried out in accordance with NYSDEC Guidelines for Urban Erosion and Sediment Control. Soil erosion and sediment control plans and details are included in plan sheets C-9 to C-9H and C-22 to C-24 of the Site Plan drawings.

In order to insure that all discharge velocities from the site will not erode the next downstream reach, the outlet protection placed at all of outlet ends of the proposed stormwater conveyance system in this project are designed based on New York Guidelines for Urban Erosion and Sediment Control. The results are presented in Appendix J.

5.0 IMPLEMENTATION SCHEDULE

A. Implementation Schedule

1. The following schedule for erosion and sediment control facilities shall be implemented:
   a. Obtain Plan Approval from municipal and regulatory agencies;
   b. Submit Notice of Intent (NOI) for Stormwater Discharge Associated with Construction Activity Under the SPDEC General Permit (by Operator)
   c. Hold pre-construction conference;
   d. Install temporary gravel construction entrance/exits as required;
   e. Install fabric silt fence;
   f. Clear/grub roadway & home sites
   g. Construct temporary drainage swales and temporary sediment traps;
   h. Strip and stockpile topsoil, rough grade home sites & reoadways;
   i. Prepare subgrade and construct subbases courses for roads and driveways;
   j. Construct utilities;
   k. Construct final drainage vegetated swales;

l. Construct final surface course for roads and driveways;
m. Topsoil; fine grade; and seed, fertilize and mulch all disturbed areas
n. Inspect all erosion and sediment controls weekly and after rainfall events, repair as required;
o. Water vegetation as required;
p. After the sites are stabilized and vegetation has become established, remove all temporary erosion control measures;
q. Submit Notice of Termination (NOT) form for Stormwater Discharges Associated with Construction Activity Under the SPDEC General Permit (by Operator)

2. The developer and contractor shall be responsible for development and implementation of appropriate temporary and permanent erosion and sediment control features on the site in compliance with all applicable rules, regulations, permits, project plans and specifications, and the Stormwater Management and Pollution Prevention Plan. Documentation of installation of stormwater management and erosion and sediment control practices should be accordance with Appendix K.

3. The Contractor Site Logbook including signed NOI, permit notification, contractor's certification statements and the Stormwater Management & Pollution Prevention Plan shall be kept on site and up to date at all times during construction and made available to authorities upon request.

4. All litter shall be cleared up by the end of each working day and properly disposed of. All debris shall be stored neatly until it can be removed and properly disposed of. All chemicals shall be properly applied according to directions and properly stored in appropriate containers when not in use.

B. Short-Term Maintenance

Short term maintenance should occur during construction and for a post-construction period of (1) year. Short term maintenance of the construction access roads, drainage features and detention basins is the responsibility of the owner.

1. Vegetated areas and drainage channels are to be maintained as follows:
    - Maintain a grass height of 4" to 6"
    - Maintain side slopes and
    - Repair erosion as necessary
2. Vegetated swales are to be maintained as follows:
    - Each grass swale shall be inspected every two (2) weeks and after rainfall events. The system shall be checked for any silt or grit built-up when 25 percent of the original

volume has been exceeded. The stone or timber check dams shall be cleaned of any silt as required, providing for free flow of stormwater.

3. Culvert are to be maintained as follows:
   - Culverts shall be inspected every two (2) weeks and after rainfall events and cleaned of any silt build-up as required to provide for free flow of stormwater.

C. Long –Term Maintenance

1. The municipality or site owner will be responsible for maintaining those facilities located within its property boundaries and easements if any.

2. Maintenance activity for vegetation include mowing, fertilizing, watering, pruning, fire controls in dry weather, weed and pest control, reseeding, and repairs as necessary to maintain a vigorous, dense vegetative cover.

3. Vegetated area and drainage channels are to be maintained as follows:
   - Maintain a grass height of 4” to 6”
   - Maintain side slops and
   - Repair erosion as necessary

4. Vegetated swales are to be maintained as follows:
   - Each grass swale shall be inspected every two (2) weeks and after rainfall events. The system shall be checked for any silt or grit built-up when 25 percent of the original volume has been exceeded. The stone or timber check dams shall be cleaned of any silt as required, providing for free flow of stormwater.

5. Culverts are to be maintained as follows:
   - Culverts shall be inspected every two (2) weeks and after rainfall events and cleaned of any silt build-up as required to provide for free flow of stormwater.

6. Detention Basin is to be maintained as follows:
   - Repair berms and outlet structures

- Maintain side slopes and
- Repair erosion as necessary

D. Maintenance Schedule

Table 8: Maintenance Schedule

Structure or Feature	Maintenance or Monitoring Task	Schedule
Grass	Mow	As required to maintain grass at required height and free of woody plant growth
Vegetated Swale	Monitor water level	Monthly and during and after each substantial rainfall
	Clean	When 25 percent of the original volume has been exceeded
Culvert	Inspect and clean as required	Annually
Detention System	Inspect	Annually
	Clean	Monthly and after major rainfalls as required

E. Record Keeping During Construction

The stormwater record keeping requirements are included in Appendix K. This appendix addresses record keeping certifications, site assessments and inspections, reporting, and final inspection. Properly completing the forms contained in the Construction Site Logbook will meet the inspection requirements for the NYSDEC SPDEC General Permit for Construction Activities. The logbook and completed forms and this Stormwater Management & Pollution Prevention Plan shall be kept on site at all times during construction and made available to authorities upon request.

F. Construction and Waste Materials and Spill Controls

1. Construction materials expected to be temporarily stored on site while the development is under construction include concrete, wood, metal, plastics and other miscellaneous materials. They shall be covered by water resistant coverings to prevent contact with rainwater and they shall be stored off the ground (on pallets for example) to prevent contact with stormwater runoff. Soil materials such as fill and topsoil stockpiles shall be surrounded with silt fence.

2. Waste materials expected to be temporarily stored on the site during the construction of the roadways include wood and brush from road clearing operations, soil from road grading operations, trimmings from geotextile soil stabilization materials, excess concrete and asphalt from

curb and pavement construction, and other miscellaneous waste material such as wood, metal and plastic trimmings, etc.

3. Miscellaneous waste shall be stored in waste containers as dumpsters or other appropriate containers, which are periodically emptied by certified waste haulers or taken to an approved landfill or disposal site.

4. All petroleum spills that occur within New York State (NYS) must be reported to the NYS Spill Hotline (1-800-457-7362) within 2 hours of discovery, except spills which meet all of the following criteria:

    a. The quantity is known to be less than 5 gallons; and
    b. The spill is contained and under the control of spiller; and
    c. The spill has not and will not reach the State's water or any land; and
    d. The spill is cleaned up within 2 hours of discovery.

A spill is considered to have not impacted land if it occurs on a paved surface such as asphalt or concrete. A spill in dirt or gravel parking lot is considered to have impacted land and is reportable.

6.0 REFERENCE:

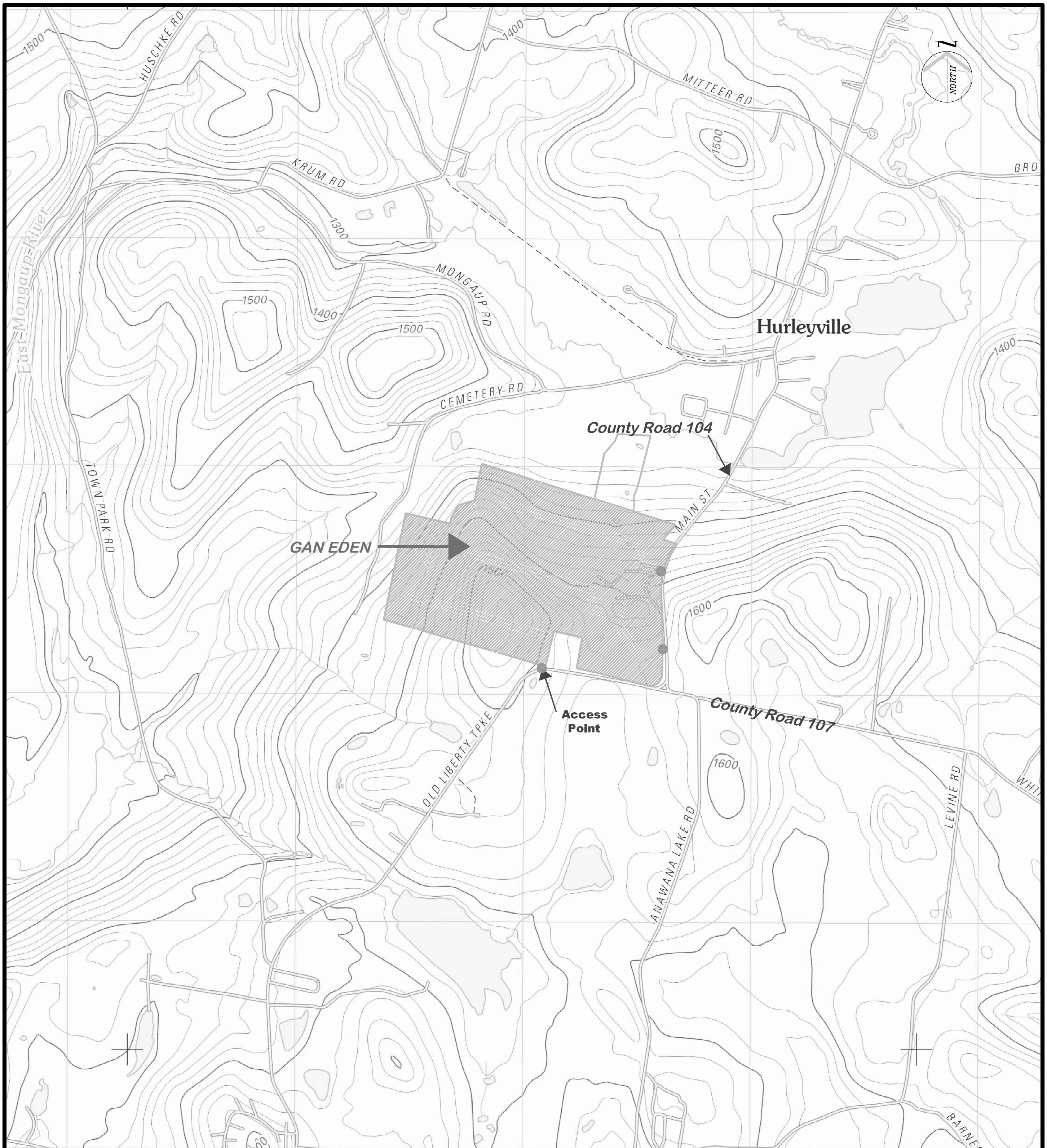
New York State Department of Environmental Conservation August 2005. New York Standard and Specification for Erosion and Sediment Control. Empire State Chapter, Soil and Water Conservation Society, Syracuse, New York.

New York State Department of Environmental Conservation. January 2015. New York State Stormwater Management Design Manual. Empire State Chapter, Soil and Water Conservation Society, Syracuse, New York.

Soil Survey of Sullivan County New York. July 1989. USDA/Cornell University. Superintendent of Documents, US Government Printing Office, Washington D. C. 20402

APPENDIX A

USGS VICINITY MAP



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CERTIFICATE OF AUTHORIZATION NO. 24GA28032700

PROJECT TITLE

Gan-Eden Estates

SHEET TITLE

PROJECT LOCATION MAP IN USGS

DATE:	DRN. BY:	PROJ. NO.:
SCALE: 1"=2000'	CK'D BY:	SHT. NO.: APP-A

APPENDIX B

STORMWATER DISCHARGE PERMIT INFORMATION

0644089821

NOTICE OF INTENT

New York State Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505

NYR ______ (for DEC use only)

Stormwater Discharges Associated with Construction Activity Under State Pollutant Discharge Elimination System (SPDES) General Permit # GP-0-15-002

All sections must be completed unless otherwise noted. Failure to complete all items may result in this form being returned to you, thereby delaying your coverage under this General Permit. Applicants must read and understand the conditions of the permit and prepare a Stormwater Pollution Prevention Plan prior to submitting this NOI. Applicants are responsible for identifying and obtaining other DEC permits that may be required.

-IMPORTANT-
RETURN THIS FORM TO THE ADDRESS ABOVE
OWNER/OPERATOR **MUST SIGN FORM**

Owner/Operator Information

Owner/Operator (Company Name/Private Owner Name/Municipality Name)
Gan-Eden Estates

Owner/Operator Contact Person Last Name (NOT CONSULTANT)

Owner/Operator Contact Person First Name

Owner/Operator Mailing Address
90 Woodbridge Center Drive

City
Woodbridge

State
NJ

Zip
07095 -

Phone (Owner/Operator)
___ - ___ - ____

Fax (Owner/Operator)
___ - ___ - ____

Email (Owner/Operator)

FED TAX ID
__ - _______ (not required for individuals)

6401089828

Project Site Information

Project/Site Name: Gan-Eden Estates

Street Address (NOT P.O. BOX): Main Street (County Road 104)

Side of Street
○ North ○ South ○ East ● West

City/Town/Village (THAT ISSUES BUILDING PERMIT): Town of Thompson

State: NY
Zip: 12701-
County: Sullivan
DEC Region: 3

Name of Nearest Cross Street: Old Liberty Turnpike (County Road 107)

Distance to Nearest Cross Street (Feet): 0

Project In Relation to Cross Street
● North ○ South ○ East ○ West

Tax Map Numbers Section-Block-Parcel: 2-1-63

Tax Map Numbers:

1. Provide the Geographic Coordinates for the project site in NYTM Units. To do this you **must** go to the NYSDEC Stormwater Interactive Map on the DEC website at:

www.dec.ny.gov/imsmaps/stormwater/viewer.htm

Zoom into your Project Location such that you can accurately click on the centroid of your site. Once you have located your project site, go to the tool boxes on the top and choose "i"(identify). Then click on the center of your site and a new window containing the X, Y coordinates in UTM will pop up. Transcribe these coordinates into the boxes below. For problems with the interactive map use the help function.

X Coordinates (Easting)	Y Coordinates (Northing)
526418	4619250

2. What is the nature of this construction project?

● **New Construction**

○ **Redevelopment with increase in impervious area**

○ **Redevelopment with no increase in impervious area**

3. Select the predominant land use for both pre and post development conditions.
SELECT ONLY ONE CHOICE FOR EACH

Pre-Development Existing Land Use

- ○ FOREST
- ● PASTURE/OPEN LAND
- ○ CULTIVATED LAND
- ○ SINGLE FAMILY HOME
- ○ SINGLE FAMILY SUBDIVISION
- ○ TOWN HOME RESIDENTIAL
- ○ MULTIFAMILY RESIDENTIAL
- ○ INSTITUTIONAL/SCHOOL
- ○ INDUSTRIAL
- ○ COMMERCIAL
- ○ ROAD/HIGHWAY
- ○ RECREATIONAL/SPORTS FIELD
- ○ BIKE PATH/TRAIL
- ○ LINEAR UTILITY
- ○ PARKING LOT
- ○ OTHER

Post-Development Future Land Use

- ○ SINGLE FAMILY HOME
- ○ SINGLE FAMILY SUBDIVISION — Number of Lots:
- ● TOWN HOME RESIDENTIAL
- ○ MULTIFAMILY RESIDENTIAL
- ○ INSTITUTIONAL/SCHOOL
- ○ INDUSTRIAL
- ○ COMMERCIAL
- ○ MUNICIPAL
- ○ ROAD/HIGHWAY
- ○ RECREATIONAL/SPORTS FIELD
- ○ BIKE PATH/TRAIL
- ○ LINEAR UTILITY (water, sewer, gas, etc.)
- ○ PARKING LOT
- ○ CLEARING/GRADING ONLY
- ○ DEMOLITION, NO REDEVELOPMENT
- ○ WELL DRILLING ACTIVITY *(Oil, Gas, etc.)
- ○ OTHER

***Note:** for gas well drilling, non-high volume hydraulic fractured wells only

4. In accordance with the larger common plan of development or sale, enter the total project site area; the total area to be disturbed; existing impervious area to be disturbed (for redevelopment activities); and the future impervious area constructed within the disturbed area. (Round to the nearest tenth of an acre.)

Total Site Area	**Total Area To Be Disturbed**	**Existing Impervious Area To Be Disturbed**	**Future Impervious Area Within Disturbed Area**
199.0	73.0	0.0	30.1

5. Do you plan to disturb more than 5 acres of soil at any one time? ○ **Yes** ● **No**

6. Indicate the percentage of each Hydrologic Soil Group(HSG) at the site.

A	**B**	**C**	**D**
1 %	0 %	98 %	0 %

7. Is this a phased project? ○ **Yes** ● **No**

8. Enter the planned start and end dates of the disturbance activities.

Start Date 09/01/2016 – **End Date** 12/31/2018

9. Identify the nearest surface waterbody(ies) to which construction site runoff will discharge.

Name

Stormwater runoff will discharge to nearby ACOE and NYSDEC Wetlands.

9a. Type of waterbody identified in Question 9?

- ● Wetland / State Jurisdiction On Site (Answer 9b)
- ○ Wetland / State Jurisdiction Off Site
- ● Wetland / Federal Jurisdiction On Site (Answer 9b)
- ○ Wetland / Federal Jurisdiction Off Site
- ○ Stream / Creek On Site
- ○ Stream / Creek Off Site
- ○ River On Site
- ○ River Off Site
- ○ Lake On Site
- ○ Lake Off Site
- ○ Other Type On Site
- ○ Other Type Off Site

9b. How was the wetland identified?

- ○ Regulatory Map
- ○ Delineated by Consultant
- ● Delineated by Army Corps of Engineers
- ○ Other (identify)

10. Has the surface waterbody(ies) in question 9 been identified as a 303(d) segment in Appendix E of GP-0-15-002? ○ **Yes** ● **No**

11. Is this project located in one of the Watersheds identified in Appendix C of GP-0-15-002? ○ **Yes** ● **No**

12. Is the project located in one of the watershed areas associated with AA and AA-S classified waters? ○ **Yes** ● **No**
If no, skip question 13.

13. Does this construction activity disturb land with no existing impervious cover and where the Soil Slope Phase is identified as an E or F on the USDA Soil Survey? ○ **Yes** ○ **No**
If Yes, what is the acreage to be disturbed?

14. Will the project disturb soils within a State regulated wetland or the protected 100 foot adjacent area? ● **Yes** ○ **No**

15. Does the site runoff enter a separate storm sewer system (including roadside drains, swales, ditches, culverts, etc)? ○ Yes ○ No ● Unknown

16. What is the name of the municipality/entity that owns the separate storm sewer system?

17. Does any runoff from the site enter a sewer classified as a Combined Sewer? ○ Yes ○ No ● Unknown

18. Will future use of this site be an agricultural property as defined by the NYS Agriculture and Markets Law? ○ Yes ● No

19. Is this property owned by a state authority, state agency, federal government or local government? ○ Yes ● No

20. Is this a remediation project being done under a Department approved work plan? (i.e. CERCLA, RCRA, Voluntary Cleanup Agreement, etc.) ○ Yes ● No

21. Has the required Erosion and Sediment Control component of the SWPPP been developed in conformance with the current NYS Standards and Specifications for Erosion and Sediment Control (aka Blue Book)? ○ Yes ● No

22. Does this construction activity require the development of a SWPPP that includes the post-construction stormwater management practice component (i.e. Runoff Reduction, Water Quality and Quantity Control practices/techniques)? ● Yes ○ No
If No, skip questions 23 and 27-39.

23. Has the post-construction stormwater management practice component of the SWPPP been developed in conformance with the current NYS Stormwater Management Design Manual? ● Yes ○ No

24. The Stormwater Pollution Prevention Plan (SWPPP) was prepared by:

- ● **Professional Engineer (P.E.)**
- ○ **Soil and Water Conservation District (SWCD)**
- ○ **Registered Landscape Architect (R.L.A)**
- ○ **Certified Professional in Erosion and Sediment Control (CPESC)**
- ○ **Owner/Operator**
- ○ **Other**

SWPPP Preparer
Paulus, Sokolowski & Sartor, LLC

Contact Name (Last, Space, First)

Mailing Address
67B Mountain Blvd Ext.

City
Warren

State: NJ Zip: 07059-

Phone: 732-560-9700 Fax: - -

Email

SWPPP Preparer Certification

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) for this project has been prepared in accordance with the terms and conditions of the GP-0-15-002. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of this permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

First Name **MI**

Last Name

Signature

Date / /

25. Has a construction sequence schedule for the planned management practices been prepared? ● Yes ○ No

26. Select **all** of the erosion and sediment control practices that will be employed on the project site:

Temporary Structural

- ○ Check Dams
- ○ Construction Road Stabilization
- ● Dust Control
- ○ Earth Dike
- ○ Level Spreader
- ○ Perimeter Dike/Swale
- ○ Pipe Slope Drain
- ○ Portable Sediment Tank
- ○ Rock Dam
- ○ Sediment Basin
- ○ Sediment Traps
- ● Silt Fence
- ● Stabilized Construction Entrance
- ● Storm Drain Inlet Protection
- ○ Straw/Hay Bale Dike
- ○ Temporary Access Waterway Crossing
- ○ Temporary Stormdrain Diversion
- ○ Temporary Swale
- ○ Turbidity Curtain
- ○ Water bars

Biotechnical

- ○ Brush Matting
- ○ Wattling

Vegetative Measures

- ○ Brush Matting
- ○ Dune Stabilization
- ○ Grassed Waterway
- ○ Mulching
- ○ Protecting Vegetation
- ○ Recreation Area Improvement
- ● Seeding
- ○ Sodding
- ○ Straw/Hay Bale Dike
- ○ Streambank Protection
- ○ Temporary Swale
- ○ Topsoiling
- ○ Vegetating Waterways

Permanent Structural

- ○ Debris Basin
- ○ Diversion
- ○ Grade Stabilization Structure
- ○ Land Grading
- ○ Lined Waterway (Rock)
- ○ Paved Channel (Concrete)
- ○ Paved Flume
- ● Retaining Wall
- ● Riprap Slope Protection
- ○ Rock Outlet Protection
- ○ Streambank Protection

Other

Post-construction Stormwater Management Practice (SMP) Requirements

Important: Completion of Questions 27-39 is not required if response to Question 22 is No.

27. Identify all site planning practices that were used to prepare the final site plan/layout for the project.

- ● **Preservation of Undisturbed Areas**
- ● **Preservation of Buffers**
- ○ **Reduction of Clearing and Grading**
- ○ **Locating Development in Less Sensitive Areas**
- ○ **Roadway Reduction**
- ○ **Sidewalk Reduction**
- ○ **Driveway Reduction**
- ○ **Cul-de-sac Reduction**
- ○ **Building Footprint Reduction**
- ○ **Parking Reduction**

27a. Indicate which of the following soil restoration criteria was used to address the requirements in Section 5.1.6("Soil Restoration") of the Design Manual (2010 version).

● All disturbed areas will be restored in accordance with the Soil Restoration requirements in Table 5.3 of the Design Manual (see page 5-22).

○ Compacted areas were considered as impervious cover when calculating the **WQv Required**, and the compacted areas were assigned a post-construction Hydrologic Soil Group (HSG) designation that is one level less permeable than existing conditions for the hydrology analysis.

28. Provide the total Water Quality Volume (WQv) required for this project (based on final site plan/layout).

Total WQv Required

3.714 **acre-feet**

29. Identify the RR techniques (Area Reduction), RR techniques(Volume Reduction) and Standard SMPs with RRv Capacity in Table 1 (See Page 9) that were used to reduce the Total WQv Required(#28).

Also, provide in Table 1 the total impervious area that contributes runoff to each technique/practice selected. For the Area Reduction Techniques, provide the total contributing area (includes pervious area) and, if applicable, the total impervious area that contributes runoff to the technique/practice.

Note: Redevelopment projects shall use Tables 1 and 2 to identify the SMPs used to treat and/or reduce the WQv required. If runoff reduction techniques will not be used to reduce the required WQv, skip to question 33a after identifying the SMPs.

7738089822

Table 1 - Runoff Reduction (RR) Techniques and Standard Stormwater Management Practices (SMPs)

RR Techniques (Area Reduction)	Total Contributing Area (acres)		Total Contributing Impervious Area (acres)
○ Conservation of Natural Areas (RR-1)	.	and/or	.
○ Sheetflow to Riparian Buffers/Filters Strips (RR-2)	.	and/or	.
○ Tree Planting/Tree Pit (RR-3)	.	and/or	.
● Disconnection of Rooftop Runoff (RR-4)	.	and/or	17.260

RR Techniques (Volume Reduction)	Total Contributing Impervious Area (acres)
● Vegetated Swale (RR-5)	2.490
○ Rain Garden (RR-6)	.
○ Stormwater Planter (RR-7)	.
○ Rain Barrel/Cistern (RR-8)	.
○ Porous Pavement (RR-9)	.
○ Green Roof (RR-10)	.

Standard SMPs with RRv Capacity	Total Contributing Impervious Area (acres)
○ Infiltration Trench (I-1)	.
○ Infiltration Basin (I-2)	.
○ Dry Well (I-3)	.
○ Underground Infiltration System (I-4)	.
○ Bioretention (F-5)	.
○ Dry Swale (O-1)	.

Standard SMPs	Total Contributing Impervious Area (acres)
○ Micropool Extended Detention (P-1)	.
○ Wet Pond (P-2)	.
○ Wet Extended Detention (P-3)	.
○ Multiple Pond System (P-4)	.
○ Pocket Pond (P-5)	.
○ Surface Sand Filter (F-1)	.
○ Underground Sand Filter (F-2)	.
○ Perimeter Sand Filter (F-3)	.
○ Organic Filter (F-4)	.
● Shallow Wetland (W-1)	13.281
○ Extended Detention Wetland (W-2)	.
○ Pond/Wetland System (W-3)	.
○ Pocket Wetland (W-4)	.
○ Wet Swale (O-2)	.

Table 2 - Alternative SMPs (DO NOT INCLUDE PRACTICES BEING USED FOR PRETREATMENT ONLY)

Alternative SMP	**Total Contributing Impervious Area(acres)**
○ Hydrodynamic	.
○ Wet Vault	.
○ Media Filter	.
○ Other	.

Provide the name and manufacturer of the Alternative SMPs (i.e. proprietary practice(s)) being used for WQv treatment.

Name

Manufacturer

Note: Redevelopment projects which do not use RR techniques, shall use questions 28, 29, 33 and 33a to provide SMPs used, total WQv required and total WQv provided for the project.

30. Indicate the Total RRv provided by the RR techniques (Area/Volume Reduction) and Standard SMPs with RRv capacity identified in question 29.

Total RRv provided

1.713 **acre-feet**

31. Is the Total RRv provided (#30) greater than or equal to the total WQv required (#28).

○ Yes ● No

If Yes, go to question 36.
If No, go to question 32.

32. Provide the Minimum RRv required based on HSG.
[Minimum RRv Required = (P)(0.95)(Ai)/12, Ai=(S)(Aic)]

Minimum RRv Required

0.928 **acre-feet**

32a. Is the Total RRv provided (#30) greater than or equal to the Minimum RRv Required (#32)?

● Yes ○ No

If Yes, go to question 33.
Note: Use the space provided in question #39 to summarize the specific site limitations and justification for not reducing 100% of WQv required (#28). A detailed evaluation of the specific site limitations and justification for not reducing 100% of the WQv required (#28) must also be included in the SWPPP.
If No, sizing criteria has not been met, so NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

33. Identify the Standard SMPs in Table 1 and, if applicable, the Alternative SMPs in Table 2 that were used to treat the remaining total WQv(=Total WQv Required in 28 - Total RRv Provided in 30).

Also, provide in Table 1 and 2 the total impervious area that contributes runoff to each practice selected.

Note: Use Tables 1 and 2 to identify the SMPs used on Redevelopment projects.

33a. Indicate the Total WQv provided (i.e. WQv treated) by the SMPs identified in question #33 and Standard SMPs with RRv Capacity identified in question 29.

WQv Provided

3.409 **acre-feet**

Note: For the standard SMPs with RRv capacity, the WQv provided by each practice = the WQv calculated using the contributing drainage area to the practice - RRv provided by the practice. (See Table 3.5 in Design Manual)

34. Provide the sum of the Total RRv provided (#30) and the WQv provided (#33a). 5.122

35. Is the sum of the RRv provided (#30) and the WQv provided (#33a) greater than or equal to the total WQv required (#28)? ● **Yes** ○ **No**

If Yes, go to question 36.
If No, sizing criteria has not been met, so NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

36. Provide the total Channel Protection Storage Volume (CPv) required and provided or select waiver (36a), if applicable.

CPv Required ___.___ **acre-feet**

CPv Provided ___.___ **acre-feet**

36a. The need to provide channel protection has been waived because:

○ Site discharges directly to tidal waters or a fifth order or larger stream.

○ Reduction of the total CPv is achieved on site through runoff reduction techniques or infiltration systems.

37. Provide the Overbank Flood (Qp) and Extreme Flood (Qf) control criteria or select waiver (37a), if applicable.

Total Overbank Flood Control Criteria (Qp)

Pre-Development 193.490 **CFS**

Post-development 166.870 **CFS**

Total Extreme Flood Control Criteria (Qf)

Pre-Development 440.100 **CFS**

Post-development 383.900 **CFS**

37a. The need to meet the Qp and Qf criteria has been waived because:

- ○ Site discharges directly to tidal waters or a fifth order or larger stream.
- ○ Downstream analysis reveals that the Qp and Qf controls are not required

38. Has a long term Operation and Maintenance Plan for the post-construction stormwater management practice(s) been developed?

● Yes ○ No

If Yes, Identify the entity responsible for the long term Operation and Maintenance

Owner/Operator

39. Use this space to summarize the specific site limitations and justification for not reducing 100% of WQv required(#28). (See question 32a) This space can also be used for other pertinent project information.

Limitations for reducing the entire WQv were that the site contains very steep slopes, has HSG type C soils, and the development was designed to maintain the existing wetland areas, buffers, and storm pond.

The steep slopes along the site make the use of vegetated swales more difficult, and the HSG C soils reduce the impact that infiltration techniques would have (also, creating infiltration areas within these slopes would require more grading, potentially encroaching into wetland buffer areas).

All units were designed to have disconnected rooftop runoff, so the runoff reduction from that technique was fully utilized.

40. Identify other DEC permits, existing and new, that are required for this project/facility.

- ○ Air Pollution Control
- ○ Coastal Erosion
- ○ Hazardous Waste
- ○ Long Island Wells
- ○ Mined Land Reclamation
- ○ Solid Waste
- ○ Navigable Waters Protection / Article 15
- ○ Water Quality Certificate
- ○ Dam Safety
- ○ Water Supply
- ○ Freshwater Wetlands/Article 24
- ○ Tidal Wetlands
- ○ Wild, Scenic and Recreational Rivers
- ○ Stream Bed or Bank Protection / Article 15
- ○ Endangered or Threatened Species(Incidental Take Permit)
- ○ Individual SPDES
- ○ SPDES Multi-Sector GP N Y R
- ○ Other
- ○ None

41. Does this project require a US Army Corps of Engineers Wetland Permit? ○ **Yes** ○ **No**
If Yes, Indicate Size of Impact. .

42. Is this project subject to the requirements of a regulated, traditional land use control MS4? ○ **Yes** ○ **No**
(If No, skip question 43)

43. Has the "MS4 SWPPP Acceptance" form been signed by the principal executive officer or ranking elected official and submitted along with this NOI? ○ **Yes** ○ **No**

44. If this NOI is being submitted for the purpose of continuing or transferring coverage under a general permit for stormwater runoff from construction activities, please indicate the former SPDES number assigned. N Y R

Owner/Operator Certification

I have read or been advised of the permit conditions and believe that I understand them. I also understand that, under the terms of the permit, there may be reporting requirements. I hereby certify that this document and the corresponding documents were prepared under my direction or supervision. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further understand that coverage under the general permit will be identified in the acknowledgment that I will receive as a result of submitting this NOI and can be as long as sixty (60) business days as provided for in the general permit. I also understand that, by submitting this NOI, I am acknowledging that the SWPPP has been developed and will be implemented as the first element of construction, and agreeing to comply with all the terms and conditions of the general permit for which this NOI is being submitted.

Print First Name **MI**

Print Last Name

Owner/Operator Signature

Date

/ /

NYS Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505

MS4 Stormwater Pollution Prevention Plan (SWPPP) Acceptance Form

for

Construction Activities Seeking Authorization Under SPDES General Permit

*(NOTE: Attach Completed Form to Notice Of Intent and Submit to Address Above)

I. Project Owner/Operator Information
1. Owner/Operator Name:
2. Contact Person:
3. Street Address:
4. City/State/Zip:
II. Project Site Information
5. Project/Site Name:
6. Street Address:
7. City/State/Zip:
III. Stormwater Pollution Prevention Plan (SWPPP) Review and Acceptance Information
8. SWPPP Reviewed by:
9. Title/Position:
10. Date Final SWPPP Reviewed and Accepted:
IV. Regulated MS4 Information
11. Name of MS4:
12. MS4 SPDES Permit Identification Number: NYR20A ____
13. Contact Person:
14. Street Address:
15. City/State/Zip:
16. Telephone Number:

MS4 SWPPP Acceptance Form - continued

V. Certification Statement - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative
I hereby certify that the final Stormwater Pollution Prevention Plan (SWPPP) for the construction project identified in question 5 has been reviewed and meets the substantive requirements in the SPDES General Permit For Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4s). Note: The MS4, through the acceptance of the SWPPP, assumes no responsibility for the accuracy and adequacy of the design included in the SWPPP. In addition, review and acceptance of the SWPPP by the MS4 does not relieve the owner/operator or their SWPPP preparer of responsibility or liability for errors or omissions in the plan.
Printed Name:
Title/Position:
Signature:
Date:
VI. Additional Information

APPENDIX C

SOIL CLASSIFICATIONS & REPORTS

Water Features

Sullivan County, New York

[Depths of layers are in feet. See text for definitions of terms used in this table. Estimates of the frequency of ponding and flooding apply to the whole year rather than to individual months. Absence of an entry indicates that the feature is not a concern or that data were not estimated. This report shows only the major soils in each map unit]

Map symbol and soil name	Hydrologic group	Surface runoff	Months	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	*Ft*	*Ft*				
AoC:										
Arnot	C/D	---	Jan-Dec			---	---	None	---	None
Oquaga	C	---	Jan-Dec			---	---	None	---	None
AoE:										
Arnot	C/D	---	Jan-Dec			---	---	None	---	None
Oquaga	C	---	Jan-Dec			---	---	None	---	None
LaB:										
Lackawanna	C	---	January	1.3-2.9	1.4-3.0	---	---	None	---	None
			February	1.3-2.9	1.4-3.0	---	---	None	---	None
			March	1.3-2.9	1.4-3.0	---	---	None	---	None
			November	1.3-2.9	1.4-3.0	---	---	None	---	None
			December	1.3-2.9	1.4-3.0	---	---	None	---	None
LaC:										
Lackawanna	C	---	January	1.3-2.9	1.4-3.0	---	---	None	---	None
			February	1.3-2.9	1.4-3.0	---	---	None	---	None
			March	1.3-2.9	1.4-3.0	---	---	None	---	None
			November	1.3-2.9	1.4-3.0	---	---	None	---	None
			December	1.3-2.9	1.4-3.0	---	---	None	---	None
MrB:										
Morris	C	---	January	0.5-1.5	0.8-1.8	---	---	None	---	None
			February	0.5-1.5	0.8-1.8	---	---	None	---	None
			March	0.5-1.5	0.8-1.8	---	---	None	---	None
			November	0.5-1.5	0.8-1.8	---	---	None	---	None
			December	0.5-1.5	0.8-1.8	---	---	None	---	None

Water Features

Sullivan County, New York

Map symbol and soil name	Hydrologic group	Surface runoff	Months	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	*Ft*	*Ft*				
OeB:										
Oquaga	C	---	Jan-Dec			---	---	None	---	None
OgC:										
Oquaga	C	---	Jan-Dec			---	---	None	---	None
Arnot	C/D	---	Jan-Dec			---	---	None	---	None
OgD:										
Oquaga	C	---	Jan-Dec			---	---	None	---	None
Arnot	C/D	---	Jan-Dec			---	---	None	---	None
Pa:										
Palms	A/D	---	January	0.0	>6.0	0.0-1.0	Very long	Frequent	---	None
			February	0.0	>6.0	0.0-1.0	Very long	Frequent	---	None
			March	0.0	>6.0	0.0-1.0	Very long	Frequent	---	None
			April	0.0	>6.0	0.0-1.0	Very long	Frequent	---	None
			May	0.0	>6.0	0.0-1.0	Very long	Frequent	---	None
			November	0.0	>6.0	0.0-1.0	Very long	Frequent	---	None
			December	0.0	>6.0	0.0-1.0	Very long	Frequent	---	None
SeB:										
Morris, extremely stony	C	---	January	0.5-1.5	0.8-1.8	---	---	None	---	None
			February	0.5-1.5	0.8-1.8	---	---	None	---	None
			March	0.5-1.5	0.8-1.8	---	---	None	---	None
			November	0.5-1.5	0.8-1.8	---	---	None	---	None
			December	0.5-1.5	0.8-1.8	---	---	None	---	None

Water Features

Sullivan County, New York

Map symbol and soil name	Hydrologic group	Surface runoff	Months	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	*Ft*	*Ft*				
SeB:										
Scriba, extremely stony	C	---	January	0.5-1.5	1.0-1.7	---	---	None	---	None
			February	0.5-1.5	1.0-1.7	---	---	None	---	None
			March	0.5-1.5	1.0-1.7	---	---	None	---	None
			April	0.5-1.5	1.0-1.7	---	---	None	---	None
WeB:										
Wellsboro	C	---	January	0.8-2.3	1.0-2.5	---	---	None	---	None
			February	0.8-2.3	1.0-2.5	---	---	None	---	None
			March	0.8-2.3	1.0-2.5	---	---	None	---	None
			November	0.8-2.3	1.0-2.5	---	---	None	---	None
			December	0.8-2.3	1.0-2.5	---	---	None	---	None
WeC:										
Wellsboro	C	---	January	0.8-2.3	1.0-2.5	---	---	None	---	None
			February	0.8-2.3	1.0-2.5	---	---	None	---	None
			March	0.8-2.3	1.0-2.5	---	---	None	---	None
			November	0.8-2.3	1.0-2.5	---	---	None	---	None
			December	0.8-2.3	1.0-2.5	---	---	None	---	None
WlC:										
Wellsboro, extremely stony	C	---	January	0.8-2.3	1.0-2.5	---	---	None	---	None
			February	0.8-2.3	1.0-2.5	---	---	None	---	None
			March	0.8-2.3	1.0-2.5	---	---	None	---	None
			November	0.8-2.3	1.0-2.5	---	---	None	---	None
			December	0.8-2.3	1.0-2.5	---	---	None	---	None
Wurtsboro, extremely stony	C	---	January	1.0-1.8	1.6-2.3	---	---	None	---	None
			February	1.0-1.8	1.6-2.3	---	---	None	---	None
			March	1.0-1.8	1.6-2.3	---	---	None	---	None
			November	1.0-1.8	1.6-2.3	---	---	None	---	None
			December	1.0-1.8	1.6-2.3	---	---	None	---	None

Water Features

Engineering Properties

Sullivan County, New York

[Absence of an entry indicates that the data were not estimated. This report shows only the major soils in each map unit]

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
AoC:												
Arnot	0-1	Moderately decomposed plant material	PT	A-8	0-5	0-10	---	---	---	---	---	---
	1-3	Channery loam	GM, ML, SM	A-2, A-4, A-5	0-5	0-10	40-90	25-80	20-80	15-70	35-45	1-9
	3-17	Very channery loam, very channery silt loam	SM	A-2, A-2-4, A-4	0-5	2-25	40-70	25-50	20-50	15-45	20-35	1-9
	17-21	Unweathered bedrock	---	---	0	0	---	---	---	---	---	---
Oquaga	0-2	Slightly decomposed plant material	PT	A-8	0-5	0-10	---	---	---	---	---	---
	2-6	Very channery silt loam	GM, ML, SM	A-1, A-2, A-4, A-5	0-5	0-15	45-75	30-60	25-60	20-55	35-45	2-7
	6-36	Very channery loam, very channery silt loam	GC-GM, GM, ML, SM	A-1-b, A-2, A-4	0-5	0-25	45-75	30-60	20-60	20-55	20-30	2-7
	36-40	Unweathered bedrock	---	---	0	0	---	---	---	---	---	---
AoE:												
Arnot	0-1	Moderately decomposed plant material	PT	A-8	0-5	0-10	---	---	---	---	---	---
	1-3	Channery loam	GM, ML, SM	A-2, A-4, A-5	0-5	0-10	40-90	25-80	20-80	15-70	35-45	1-9
	3-17	Very channery loam, very channery silt loam	SM	A-2, A-2-4, A-4	0-5	2-25	40-70	25-50	20-50	15-45	20-35	1-9
	17-21	Unweathered bedrock	---	---	0	0	---	---	---	---	---	---

Engineering Properties

Sullivan County, New York

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
AoE:												
Oquaga	0-2	Slightly decomposed plant material	PT	A-8	0-5	0-10	---	---	---	---	---	---
	2-6	Very channery silt loam	GM, ML, SM	A-1, A-2, A-4, A-5	0-5	0-15	45-75	30-60	25-60	20-55	35-45	2-7
	6-36	Very channery loam, very channery silt loam	GC-GM, GM, ML, SM	A-1-b, A-2, A-4	0-5	0-25	45-75	30-60	20-60	20-55	20-30	2-7
	36-40	Unweathered bedrock	---	---	0	0	---	---	---	---	---	---
LaB:												
Lackawanna	0-2	Moderately decomposed plant material	PT	A-8	0-5	0-5	---	---	---	---	---	---
	2-5	Channery loam	GM, ML, SC-SM	A-2, A-4	0-5	0-15	55-90	45-75	30-70	20-65	20-34	3-11
	5-34	Channery loam, channery silt loam, very gravelly silt loam	CL, GM, ML, SC	A-1, A-2, A-4, A-6	0-5	0-15	55-90	45-75	35-70	25-65	20-35	1-14
	34-60	Channery loam, very channery sandy loam, silt loam	CL, GM, ML, SC-SM	A-1, A-2, A-4, A-6	0-5	0-20	50-90	35-75	20-70	15-65	15-35	1-12

Engineering Properties

Sullivan County, New York

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
LaC:												
Lackawanna	0-2	Moderately decomposed plant material	PT	A-8	0-5	0-5	---	---	---	---	---	---
	2-5	Channery loam	GM, ML, SC-SM	A-2, A-4	0-5	0-15	55-90	45-75	30-70	20-65	20-34	3-11
	5-34	Channery loam, channery silt loam, very gravelly silt loam	CL, GM, ML, SC	A-1, A-2, A-4, A-6	0-5	0-15	55-90	45-75	35-70	25-65	20-35	1-14
	34-60	Channery loam, very channery sandy loam, silt loam	CL, GM, ML, SC-SM	A-1, A-2, A-4, A-6	0-5	0-20	50-90	35-75	20-70	15-65	15-35	1-12
MrB:												
Morris	0-6	Loam	CL, CL-ML, ML	A-4	0-1	0-10	85-95	75-85	60-80	40-70	20-30	1-10
	6-20	Gravelly loam, silt loam	CL, ML, SC-SM	A-4	0-1	0-10	85-95	75-85	60-80	40-70	20-30	1-10
	20-60	Channery silty clay loam, channery silt loam, gravelly loam	CL, GM, SC-SM, SM	A-2, A-4	0-5	0-20	60-90	45-85	35-80	25-70	15-25	NP-9

Engineering Properties

Sullivan County, New York

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
OeB:												
Oquaga	0-2	Slightly decomposed plant material	PT	A-8	0-5	0-10	---	---	---	---	---	---
	2-6	Very channery silt loam	GM, ML, SM	A-1, A-2, A-4, A-5	0-5	0-15	45-75	30-60	25-60	20-55	35-45	2-7
	6-36	Very channery loam, very channery silt loam	GC-GM, GM, ML, SM	A-1-b, A-2, A-4	0-5	0-25	45-75	30-60	20-60	20-55	20-30	2-7
	36-40	Unweathered bedrock	---	---	0	0	---	---	---	---	---	---
OgC:												
Oquaga	0-2	Slightly decomposed plant material	PT	A-8	0-5	0-10	---	---	---	---	---	---
	2-6	Very channery silt loam	GM, ML, SM	A-1, A-2, A-4, A-5	0-5	0-15	45-75	30-60	25-60	20-55	35-45	2-7
	6-36	Very channery loam, very channery silt loam	GC-GM, GM, ML, SM	A-1-b, A-2, A-4	0-5	0-25	45-75	30-60	20-60	20-55	20-30	2-7
	36-40	Unweathered bedrock	---	---	0	0	---	---	---	---	---	---
Arnot	0-1	Moderately decomposed plant material	PT	A-8	0-5	0-10	---	---	---	---	---	---
	1-3	Channery loam	GM, ML, SM	A-2, A-4, A-5	0-5	0-10	40-90	25-80	20-80	15-70	35-45	1-9
	3-17	Very channery loam, very channery silt loam	SM	A-1, A-2-4, A-4	0-5	2-25	40-70	25-50	20-50	15-45	20-35	1-9
	17-21	Unweathered bedrock	---	---	0	0	---	---	---	---	---	---

Engineering Properties

Sullivan County, New York

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
OgD:												
Oquaga	0-2	Slightly decomposed plant material	PT	A-8	0-5	0-10	---	---	---	---	---	---
	2-6	Very channery silt loam	GM, ML, SM	A-1, A-2, A-4, A-5	0-5	0-15	45-75	30-60	25-60	20-55	35-45	2-7
	6-36	Very channery loam, very channery silt loam	GC-GM, GM, ML, SM	A-1-b, A-2, A-4	0-5	0-25	45-75	30-60	20-60	20-55	20-30	2-7
	36-40	Unweathered bedrock	---	---	0	0	---	---	---	---	---	---
Arnot	0-1	Moderately decomposed plant material	PT	A-8	0-5	0-10	---	---	---	---	---	---
	1-3	Channery loam	GM, ML, SM	A-2, A-4, A-5	0-5	0-10	40-90	25-80	20-80	15-70	35-45	1-9
	3-17	Very channery loam, very channery silt loam	SM	A-1, A-2-4, A-4	0-5	2-25	40-70	25-50	20-50	15-45	20-35	1-9
	17-21	Unweathered bedrock	---	---	0	0	---	---	---	---	---	---
Pa:												
Palms	0-12	Muck	PT	A-8	0	0	---	---	---	---	---	---
	12-22	Muck	PT	A-8	0	0	---	---	---	---	---	---
	22-60	Gravelly fine sandy loam, loam, silt loam	CL, CL-ML, SC, SC-SM	A-2, A-4, A-6, A-7	0	0	85-100	75-100	50-100	30-90	20-45	5-20

Engineering Properties

Sullivan County, New York

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
SeB:												
Morris, extremely stony	0-6	Loam	CL, CL-ML, ML	A-4	1-8	0-10	85-95	75-85	60-80	40-70	20-30	1-10
	6-20	Gravelly loam, silt loam	CL, ML, SC-SM	A-4	0-3	0-10	85-95	75-85	60-80	40-70	20-30	1-10
	20-60	Channery silty clay loam, channery silt loam, gravelly loam	CL, GM, SC-SM, SM	A-2, A-4	0-5	0-20	60-90	45-85	35-80	25-70	15-25	NP-9
Scriba, extremely stony	0-2	Slightly decomposed plant material	PT	A-8	1-8	0-10	---	---	---	---	---	---
	2-8	Loam	CL-ML, ML, SC-SM, SM	A-2, A-4	1-8	0-10	65-92	50-85	35-80	20-70	15-20	NP-5
	8-20	Channery loam, very gravelly sandy loam, silt loam	CL-ML, GM, ML, SM	A-1, A-2, A-4	0-3	0-10	65-92	50-85	30-80	15-70	15-20	NP-5
	20-60	Channery loam, gravelly silt loam, very gravelly sandy loam	CL-ML, GM, ML, SM	A-1, A-2, A-4	0-5	0-15	45-85	30-70	15-65	10-60	15-20	NP-5

Engineering Properties

Sullivan County, New York

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
WeB:												
Wellsboro	0-7	Gravelly loam	ML, SC-SM	A-2, A-4	0-1	0-10	70-96	60-92	50-85	35-75	20-34	3-11
	7-23	Channery silt loam, gravelly loam, loam	CL-ML, GC-GM, ML, SC-SM	A-2, A-4	0-2	0-15	70-96	60-92	50-85	35-75	15-30	NP-10
	23-60	Channery sandy loam, gravelly loam, silt loam	CL, GM, ML, SC-SM	A-2, A-4	0-5	0-20	55-90	40-80	25-75	10-65	15-30	NP-10
WeC:												
Wellsboro	0-7	Gravelly loam	ML, SC-SM	A-2, A-4	0-1	0-10	70-96	60-92	50-85	35-75	20-34	3-11
	7-23	Channery silt loam, gravelly loam, loam	CL-ML, GC-GM, ML, SC-SM	A-2, A-4	0-2	0-15	70-96	60-92	50-85	35-75	15-30	NP-10
	23-60	Channery sandy loam, gravelly loam, silt loam	CL, GM, ML, SC-SM	A-2, A-4	0-5	0-20	55-90	40-80	25-75	10-65	15-30	NP-10

Engineering Properties

Sullivan County, New York

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
WIC:												
Wellsboro, extremely stony	0-7	Gravelly loam	ML, SC-SM	A-2, A-4	1-8	0-10	70-96	60-92	50-85	35-75	20-34	3-11
	7-23	Channery silt loam, gravelly loam, loam	CL-ML, GC-GM, ML, SC-SM	A-2, A-4	0-2	0-15	70-96	60-92	50-85	35-75	15-30	NP-10
	23-60	Channery sandy loam, gravelly loam, silt loam	CL, GM, ML, SC-SM	A-2, A-4	0-5	0-20	55-90	40-80	25-75	10-65	15-30	NP-10
Wurtsboro, extremely stony	0-2	Moderately decomposed plant material	PT	A-8	1-8	0-15	---	---	---	---	---	---
	2-4	Loam	GM, ML, SM	A-2, A-4	1-8	0-15	65-95	50-92	30-85	15-70	22-41	3-11
	4-28	Channery fine sandy loam, gravelly sandy loam, loam	GM, ML	A-2, A-4	0-3	0-15	65-95	50-92	30-85	15-70	15-30	NP-4
	28-60	Gravelly fine sandy loam, very gravelly sandy loam, loam	GM, SM	A-1, A-2, A-4	0-5	0-20	50-92	35-85	15-75	10-60	15-25	NP-4

Engineering Properties

APPENDIX D

WATER UALITY CALCULATION

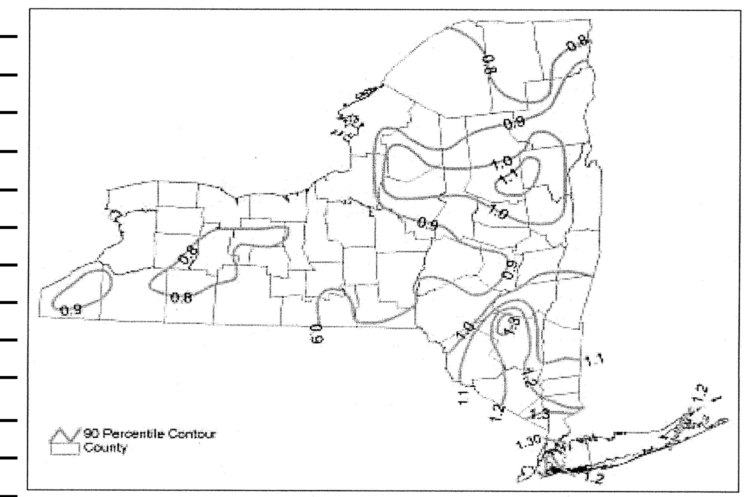
WATER QUALITY VOLUME & FOREBAY CAPACITY CALCULATION

$WQv=[(P)(Rv)(A)/12$

Variables:		
	WQ_v	= water quality volume (in acre-feet)
	P	=90% Rainfall Event Number (see figure 4.1) NYS Stormwater Management Design Manual)
	R_v	= 0.05 + 0.009(I), where I is percent impervious cover
	A	=site area in acres
	I	=impervious coverage

Note: A min. of WQv of 0.2 inches per acre shall be met at residential sites that have less than 17% impervious cover.

Figure 4.1 90% Rainfall in New York State



See Post Development Drainage Plan for Water Sheds and Basins:

Drainage Shed	Area (Ac.)	I	R_v	P	WQ_v
PDA-A	4.59	33.3	0.350	1.15	0.120
PDA-B	5.36	60.5	0.595	1.15	0.239
PDA-C	7.77	62.0	0.608	1.15	0.354
PDA-D	4.39	40.9	0.418	1.15	0.138
PDA-E	6.08	31.2	0.331	1.15	0.151
total	**28.190**				**1.002**

FOREBAY: Depth to be 4-6 feet

Volume = 10% WQ_v

Drainage Shed	TYPE OF SWM PRACTICE	Volume (ac-ft) (10% WQ_v)	Volume (ft^3) (10% WQ_v)	DEPTH (ft)	Forebay Req'd (sf)	Proposed Area (sf)	Volume (ft^3) Proposed	Volume (ac.ft.) Proposed
PDA-A	SHALLOW WETLAND	0.012	524	4	131	500	2,000	0.046
PDA-B	SHALLOW WETLAND	0.024	1,041	3	347	2,100	6,300	0.145
PDA-C	SHALLOW WETLAND	0.035	1,543	4	386	700	2,100	0.048
PDA-D	SHALLOW WETLAND	0.014	600	3	200	750	2,250	0.052
PDA-E	SHALLOW WETLAND	0.015	657	4	164	550	2,200	0.051
total proposed water quality capacity in forebays (acre-feet)							**3.409**	

APPENDIX D

APPENDIX E

RUNOFF REDUCTION CALCULATION

Gan-Eden Site Minimum Runoff Reduction Volume Calculation:

for total 144.46 Ac. development area

RRv=[(P)(Rv*)(Ai)/12

Ai=(S)(Aic)

Ai=impervious cover targeted for runoff reduction

(Aic)=Total area of new impervious cover, 30.07 Ac.

S=Hydrologic Soil Group (HSG) Specific Reduction Factor, 0.30 for HSG C

P=1.30 , Rv*=0.05 + 0.009(I), I is 100% for impervious, 0.41 for Original

RRv(min.)= 0.928 (Ac-feet) **RRv(max.)= 3.714 (Ac-feet)**

Runoff Reduction Methods, Annalysis & Sumary

1. Disconnection of Roof top Reduction Calculation

Building Type	Building No.	Roof top area per Building (sf)	Impervious area reduction (sf)	New Impervious		New Rv	New WQv (Ac-feet)	% of Reduction Using Disconnection of Rooftop Runoff	WQv Reduction (Ac-Feet)
				Area (Ac)	Rate (I)				
Townhouse	147	1225	180075	17.49	8.70%	0.128	2.01	45.9%	1.706
Apartment	388	1500	582000						

2. Vegetated Swale

Total Length (ft)	WQv (Ac-feet)	Bottom Width (ft)	Side Slope (H:V)	Swale Slope	Flow Depth (ft)	HSG	% WQv Reductio	Capacity to Runoff Reduction (Ac-Feet)
1750	0.172	4	4 to 1	4.00%	2	C	10%	0.017
875	0.125	2	4 to 1	4.00%	2	C	10%	0.013

Total Runoff Reduction (Ac-feet) = 1.736

Appendix E

APPENDIX F

VEGETATED SWALES CALCULATION SUMMARY

VEGETATED SWALE CAPACITY

WATER QUALITY SWALE	WATER SHED	TRIBUTARY DRAINAGE AREA CALCULATION										WATER QUALITY VOLUME CALCULATION				
		IMPERVIOUS			PERVIOUS			TOTAL				IMPER. COVER	Rv	P	WQv *	
		sf.	ac.	Ci	sf.	ac.	Cp	sf.	ac.	C	Q	%			TOTAL ac.ft.	10% WQv CF / Dam
D2	BASIN-D	**28,920**	0.66	0.95	39,905	0.92	0.74	**68,825**	1.58	0.83	**4.84**	42.0	0.4282	1.30	0.073	**44**
D1	BASIN-D	**40,195**	0.92	0.95	35,605	0.82	0.74	**75,800**	1.74	0.85	**5.48**	53.0	0.5272	1.30	0.099	**42**
A1	**PDA-X3**	**39,340**	0.90	0.95	254,330	5.84	0.74	**293,670**	6.74	0.77	**19.16**	13.4	0.1706	1.30	0.125	**16**
			2.49			**7.57**			**10.06**			**WQ VOL. REQUIRED (ac.ft)**				**0.03**

WATER QUALITY SWALE	Q10 10 Yr.	BOTTOM SLOPE	LENGTH	BOTTOM WIDTH	SIDE SLOPE	MAX. VELOCITY **	CHECK DAM					FILTER STRIP		
							SPACING	No.#	HEIGHT	WQv***		TOTAL	Permeability	Max. Duration
	cfs	%	ft.	ft.	(H) to 1(V)	ft/sec.	ft.		ft.	CF/Dam	sub-total		k (cm/se)	hr.****
D2	5.889	4.0	**365**	2	4	1.61	50	7	2.00	**500**	3650	SM	0.000025	**398**
D1	6.667	4.0	**510**	2	4	1.65	50	10	2.00	**500**	5100	SM	0.000025	**398**
A1	23.303	4.0	**1750**	4	4	4.78	50	35	2.00	**600**	21000	SM	0.000025	**398**
	TOTAL LENGTH		2625	**OR**	**0.50**	**MILES**	**PROVIDED SWALE VOLUME (ac.-ft)**				**0.68**			

NOTES:

*** WATER QUALITY VOLUME CALCULATION IS BASED ON THE FORMULA AS FOLLOWING:**

WQv=[(P)(Rv)(A)/12

Variables:
- **WQv** =water quality volume (in acre-feet)
- **P** =90% Rainfall Event Number (see figure 4.1) NYS Stormwater Management Design Manual)
- **Rv** = 0.05 + 0.009(**I**), where **I** is percent impervious cover
- **A** =site area in acres
- **I** =impervious coverage

**** MAX. VELOCITY IS BASED ON FlowMaster OF HEASTAD, REFER TO APPENDIX M (The Peak velocity for two-year storm must be non-erosive or less 5.0 fps)**

***** PRETREATMENT VOLUME FOR EACH CHECK DAM IS BASED ON ASSUMPTION OF RUNOFF EVENLY DISTRIBUTED.**

Volume=L*Ad (Trap Water length * Ave. Dam cross section Area)
= H/SX100 *1/2*H*(d+(d+H*s*2))
= 50*H*H/S(d+H*s) **(H=Check Dam Height: d=bottom of width; S=bottom slope: s=side slope)**

****** DURATION TIME(<48HR.) IS CALCULATED PER FOR SOIL PERMEABITILY FALLING-HEAD TEST (SOILS CHAPTER, CIVIL ENGINEERING REFERENCE MANUAL)**

$t=(A'L/Ak)\ln(h_i/h_f)$

Variables:
- **A'** =Area of Pretreament held by Check Dam
- **A** =Area of every segment between Check Dams
- **L** =Depth of planting soil
- **k** =Permeabilty of planting soil (SM)
- **hi** =Max. head of Pretreament Water (Height of Check Dam plus Depth of Soil)
- **hf** =Head decreased (Depth of Soil)

APPENDIX F

APPENDIX G

STORMWATER HYDROGRAPHS PRE DEVELOPMENT

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

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	------	21.55	-------	-------	-------	61.13	-------	-------	133.62	XDA-1-Discharge-West
2	SCS Runoff	------	35.81	-------	-------	-------	115.09	-------	-------	267.66	XDA-2
3	SCS Runoff	------	22.65	-------	-------	-------	64.24	-------	-------	140.43	XDA-3
4	SCS Runoff	------	6.289	-------	-------	-------	19.92	-------	-------	45.91	XDA-4
5	Reservoir	3	0.000	-------	-------	-------	0.000	-------	-------	0.000	Existing Pond
6	Combine	2, 4, 5	41.40	-------	-------	-------	132.36	-------	-------	306.48	Discharge-2 (North)

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	21.55	5	730	88,992	------	------	------	XDA-1-Discharge-West
2	SCS Runoff	35.81	5	740	189,326	------	------	------	XDA-2
3	SCS Runoff	22.65	5	730	93,528	------	------	------	XDA-3
4	SCS Runoff	6.289	5	730	27,016	------	------	------	XDA-4
5	Reservoir	0.000	5	n/a	0	3	1481.04	93,528	Existing Pond
6	Combine	41.40	5	735	216,342	2, 4, 5	------	------	Discharge-2 (North)

Hydrograph Report

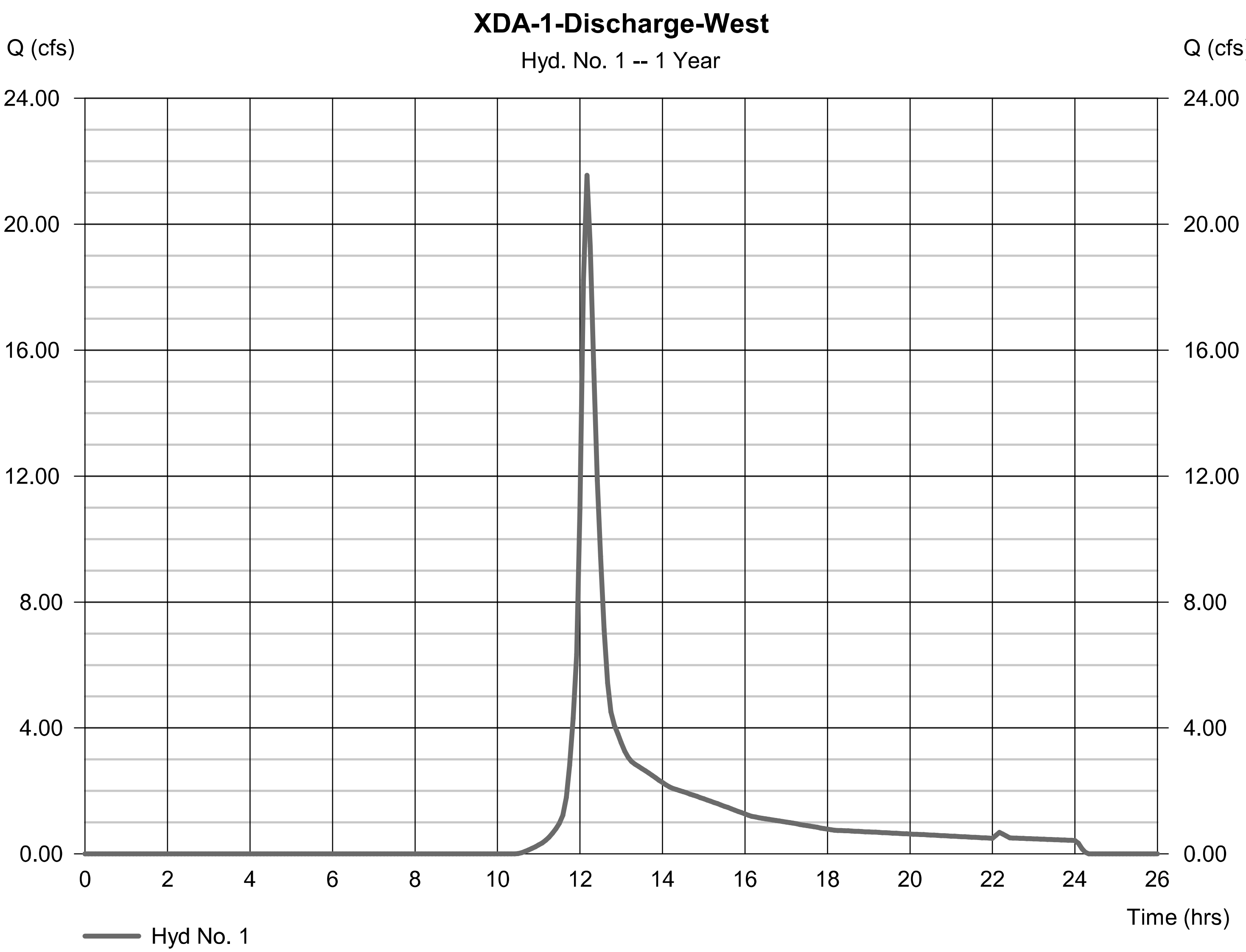
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 1

XDA-1-Discharge-West

Hydrograph type	= SCS Runoff	Peak discharge	= 21.55 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.17 hrs
Time interval	= 5 min	Hyd. volume	= 88,992 cuft
Drainage area	= 30.020 ac	Curve number	= 79*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 12.50 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(33.070 x 79)] / 30.020



Hydrograph Report

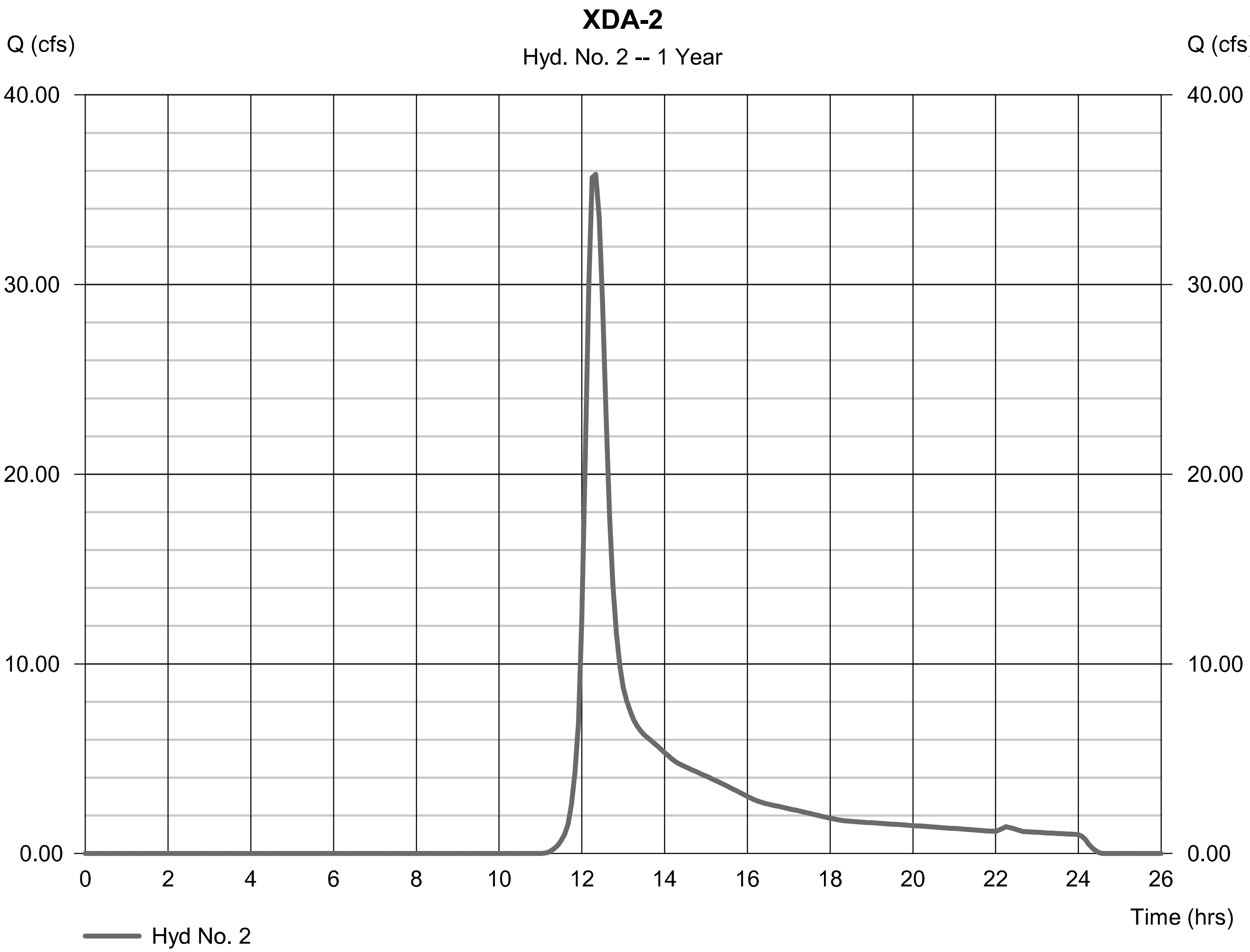
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 — Friday, 12 / 4 / 2015

Hyd. No. 2

XDA-2

Hydrograph type	= SCS Runoff	Peak discharge	= 35.81 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.33 hrs
Time interval	= 5 min	Hyd. volume	= 189,326 cuft
Drainage area	= 71.940 ac	Curve number	= 76*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 21.20 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(71.190 x 76)] / 71.940



Hydrograph Report

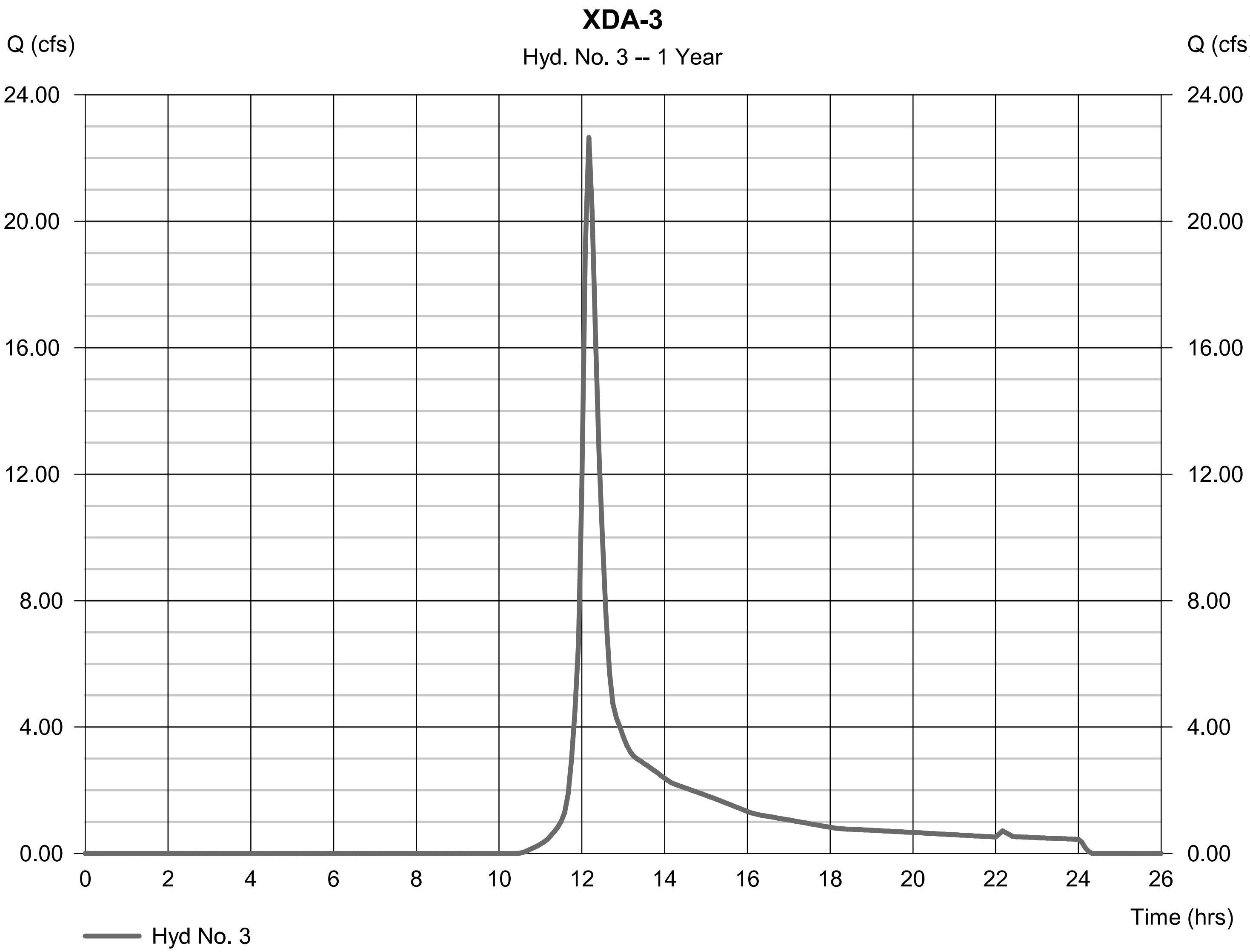
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 3

XDA-3

Hydrograph type	= SCS Runoff	Peak discharge	= 22.65 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.17 hrs
Time interval	= 5 min	Hyd. volume	= 93,528 cuft
Drainage area	= 31.550 ac	Curve number	= 79*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.70 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(33.240 x 79)] / 31.550



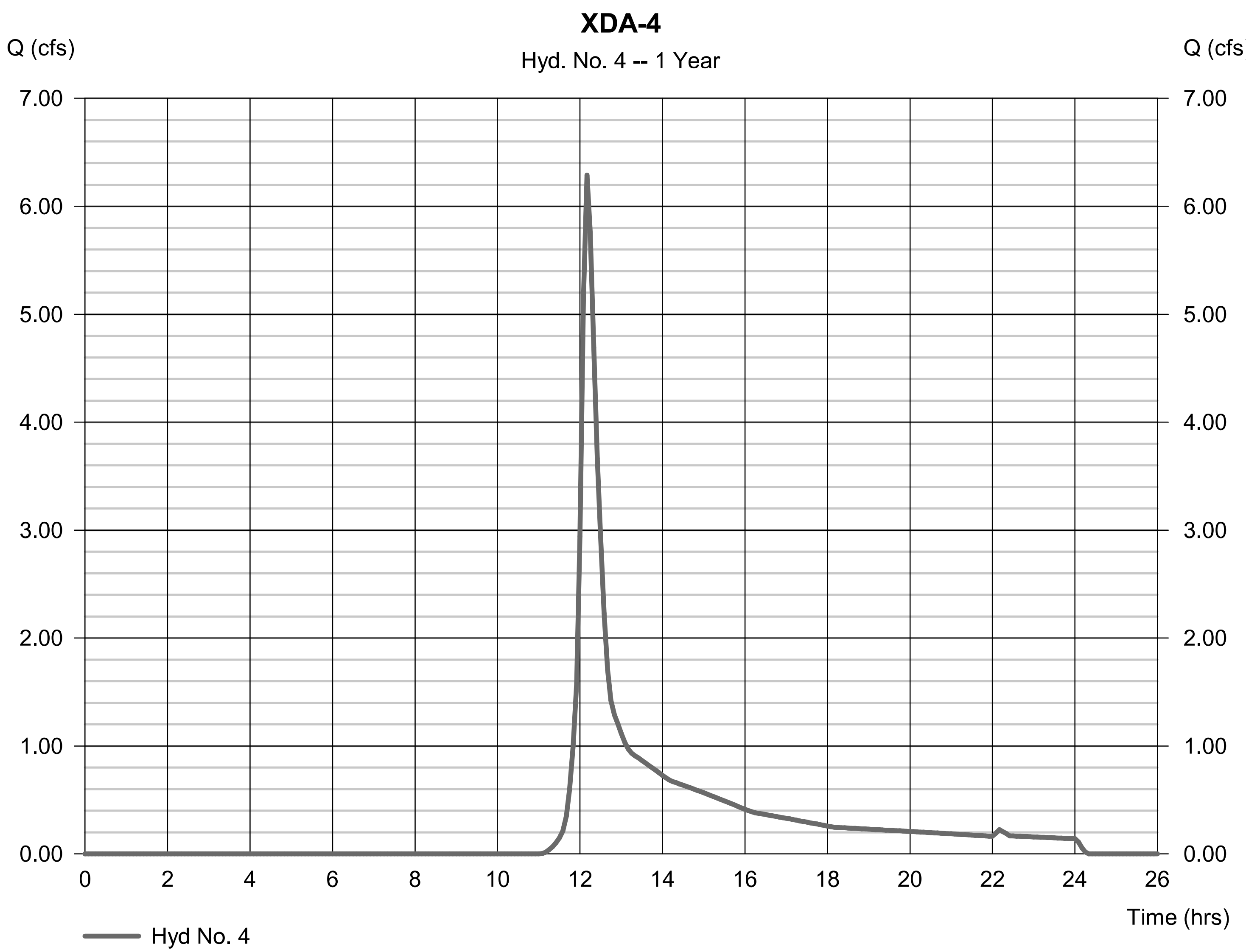
Hydrograph Report

Hyd. No. 4

XDA-4

Hydrograph type	= SCS Runoff	Peak discharge	= 6.289 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.17 hrs
Time interval	= 5 min	Hyd. volume	= 27,016 cuft
Drainage area	= 10.950 ac	Curve number	= 76*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 13.60 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(95.390 x 76)] / 10.950



Hydrograph Report

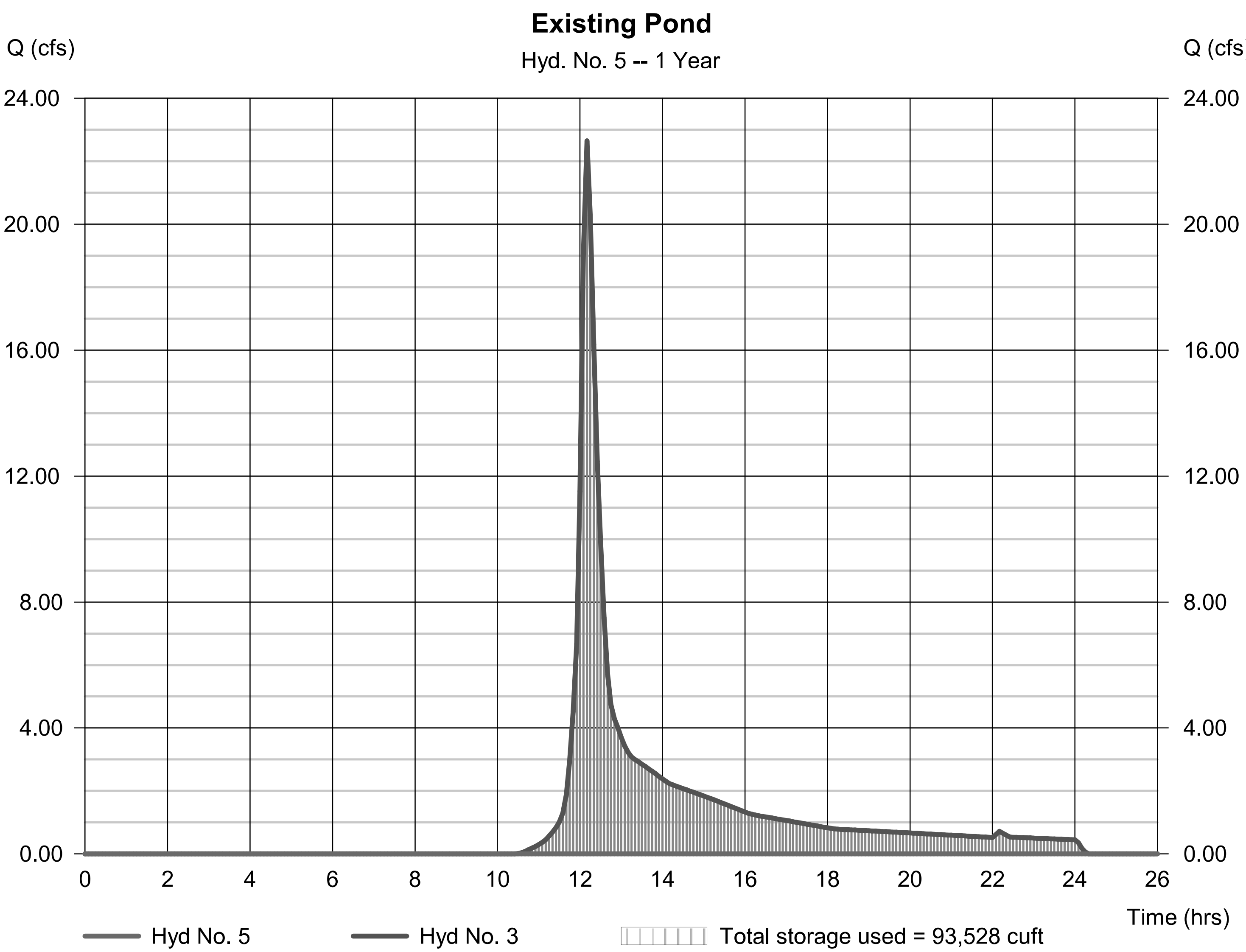
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 5

Existing Pond

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 5 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 3 - XDA-3	Max. Elevation	= 1481.04 ft
Reservoir name	= Ex Pond	Max. Storage	= 93,528 cuft

Storage Indication method used.



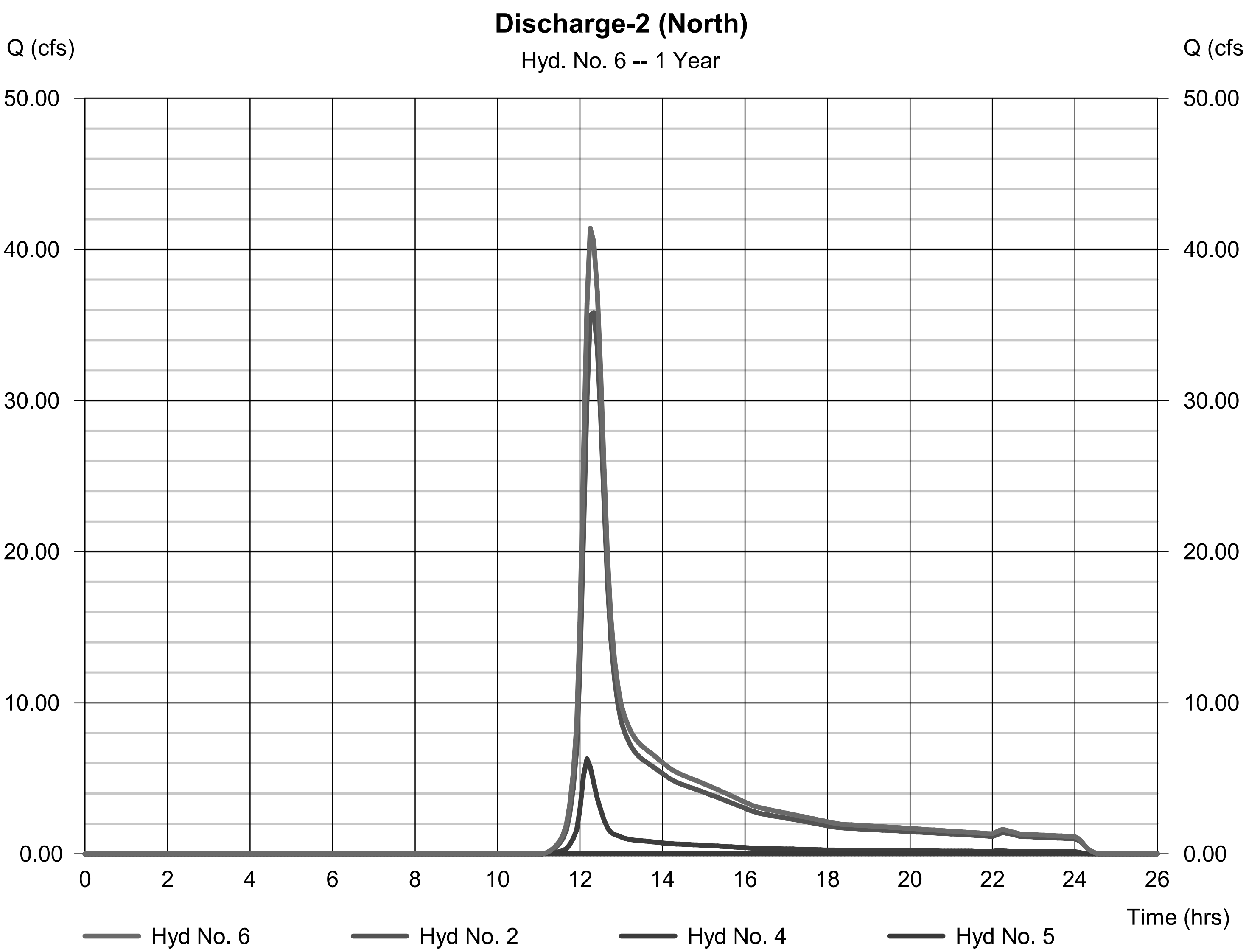
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 6

Discharge-2 (North)

Hydrograph type	= Combine	Peak discharge	= 41.40 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.25 hrs
Time interval	= 5 min	Hyd. volume	= 216,342 cuft
Inflow hyds.	= 2, 4, 5	Contrib. drain. area	= 82.890 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	61.13	5	730	242,784	------	------	------	XDA-1-Discharge-West
2	SCS Runoff	115.09	5	735	556,181	------	------	------	XDA-2
3	SCS Runoff	64.24	5	730	255,157	------	------	------	XDA-3
4	SCS Runoff	19.92	5	730	79,365	------	------	------	XDA-4
5	Reservoir	0.000	5	n/a	0	3	1482.84	255,158	Existing Pond
6	Combine	132.36	5	735	635,546	2, 4, 5	------	------	Discharge-2 (North)

GanEden-Existing.gpw	Return Period: 10 Year	Friday, 12 / 4 / 2015

Hydrograph Report

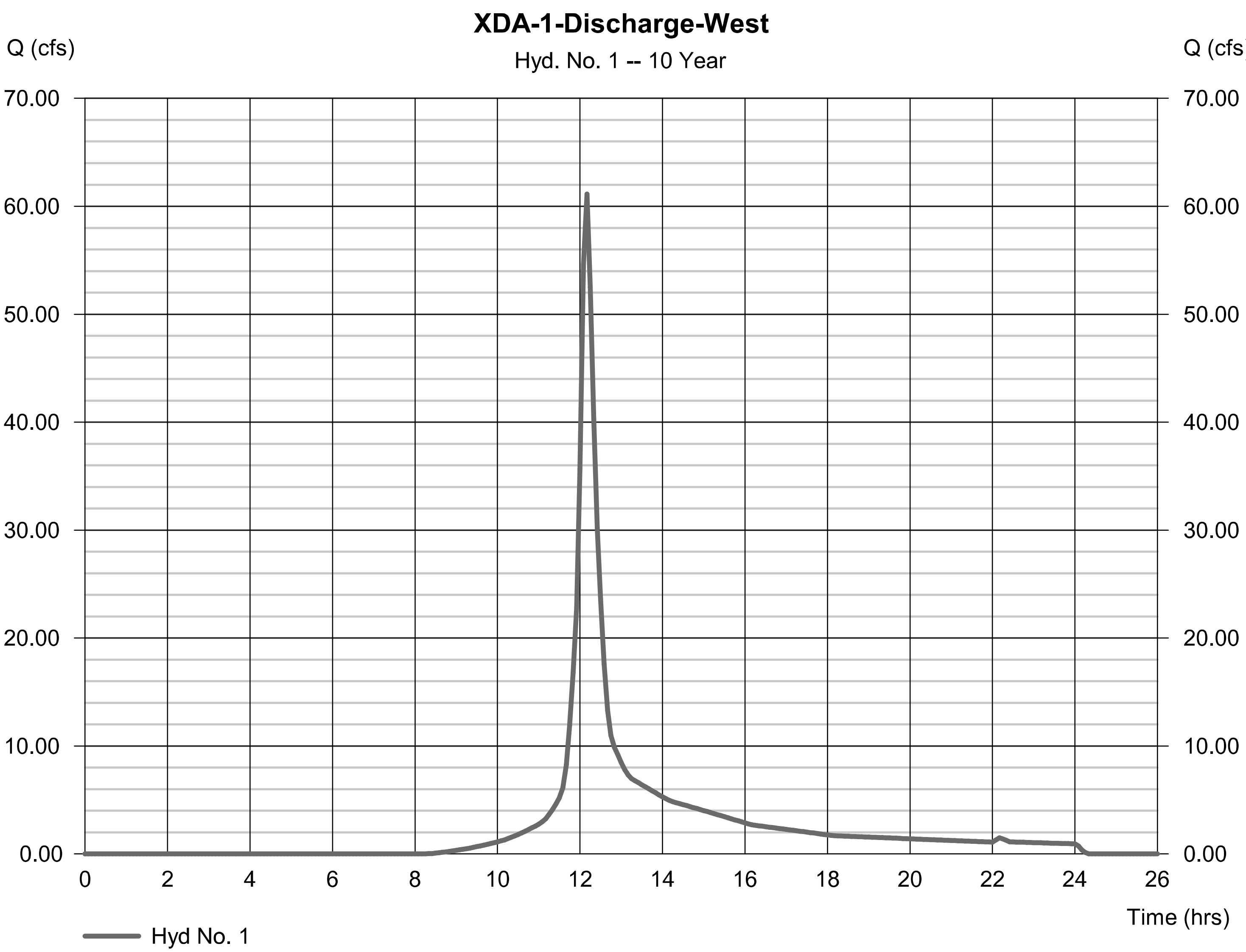
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 1

XDA-1-Discharge-West

Hydrograph type	= SCS Runoff	Peak discharge	= 61.13 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.17 hrs
Time interval	= 5 min	Hyd. volume	= 242,784 cuft
Drainage area	= 30.020 ac	Curve number	= 79*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 12.50 min
Total precip.	= 4.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(33.070 x 79)] / 30.020



Hydrograph Report

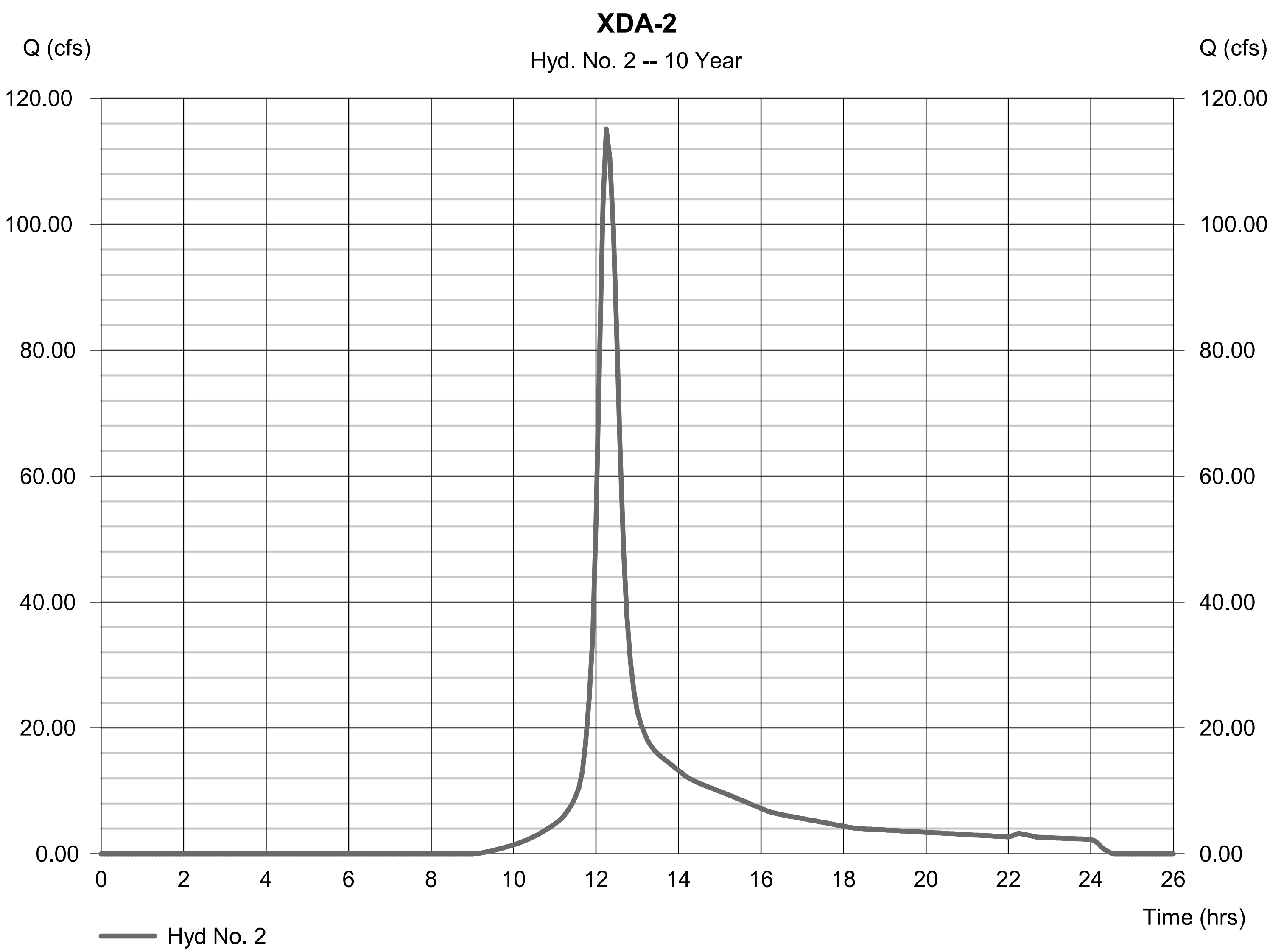
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 2

XDA-2

Hydrograph type	= SCS Runoff	Peak discharge	= 115.09 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.25 hrs
Time interval	= 5 min	Hyd. volume	= 556,181 cuft
Drainage area	= 71.940 ac	Curve number	= 76*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 21.20 min
Total precip.	= 4.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(71.190 x 76)] / 71.940



Hydrograph Report

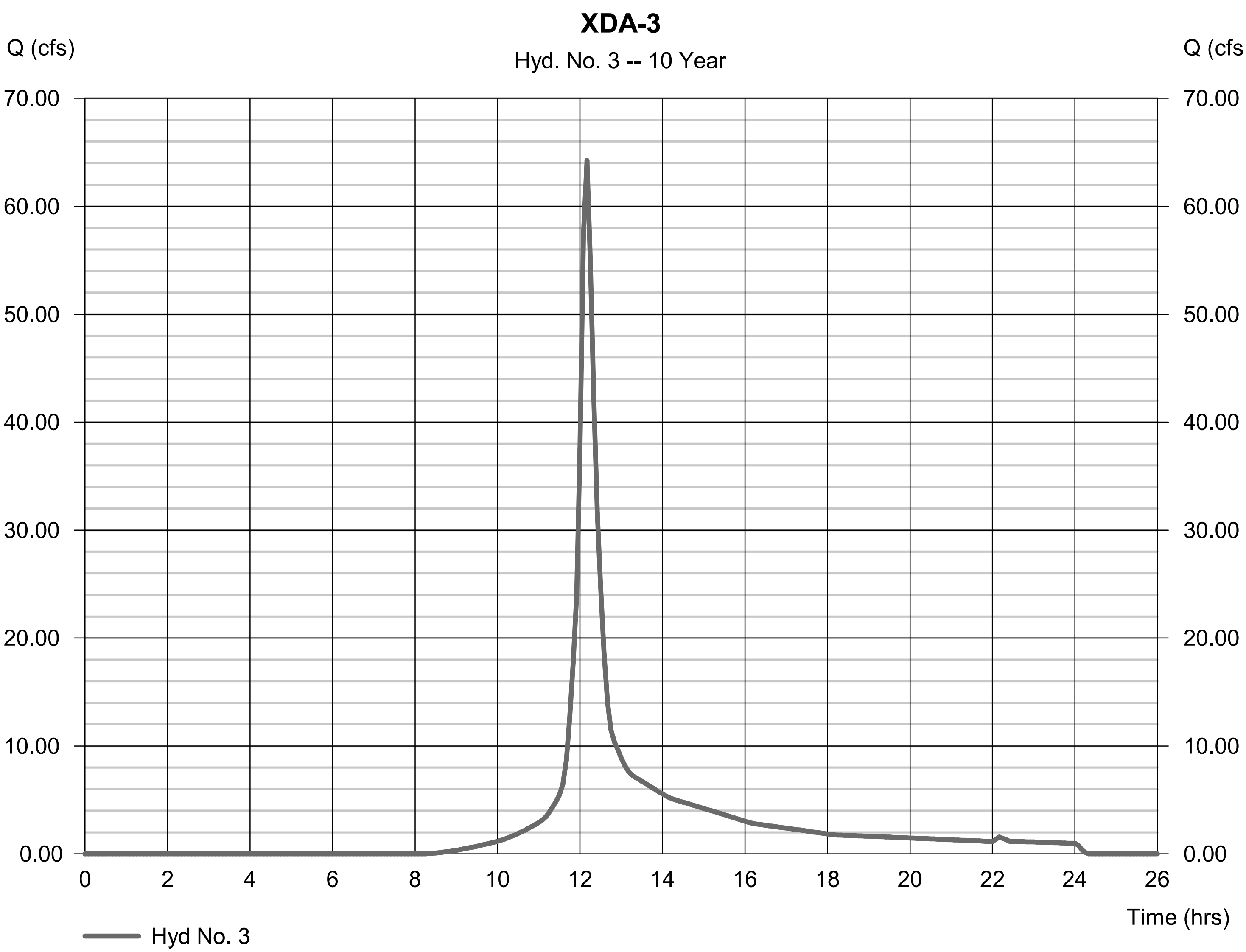
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 3

XDA-3

Hydrograph type	= SCS Runoff	Peak discharge	= 64.24 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.17 hrs
Time interval	= 5 min	Hyd. volume	= 255,157 cuft
Drainage area	= 31.550 ac	Curve number	= 79*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.70 min
Total precip.	= 4.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(33.240 x 79)] / 31.550



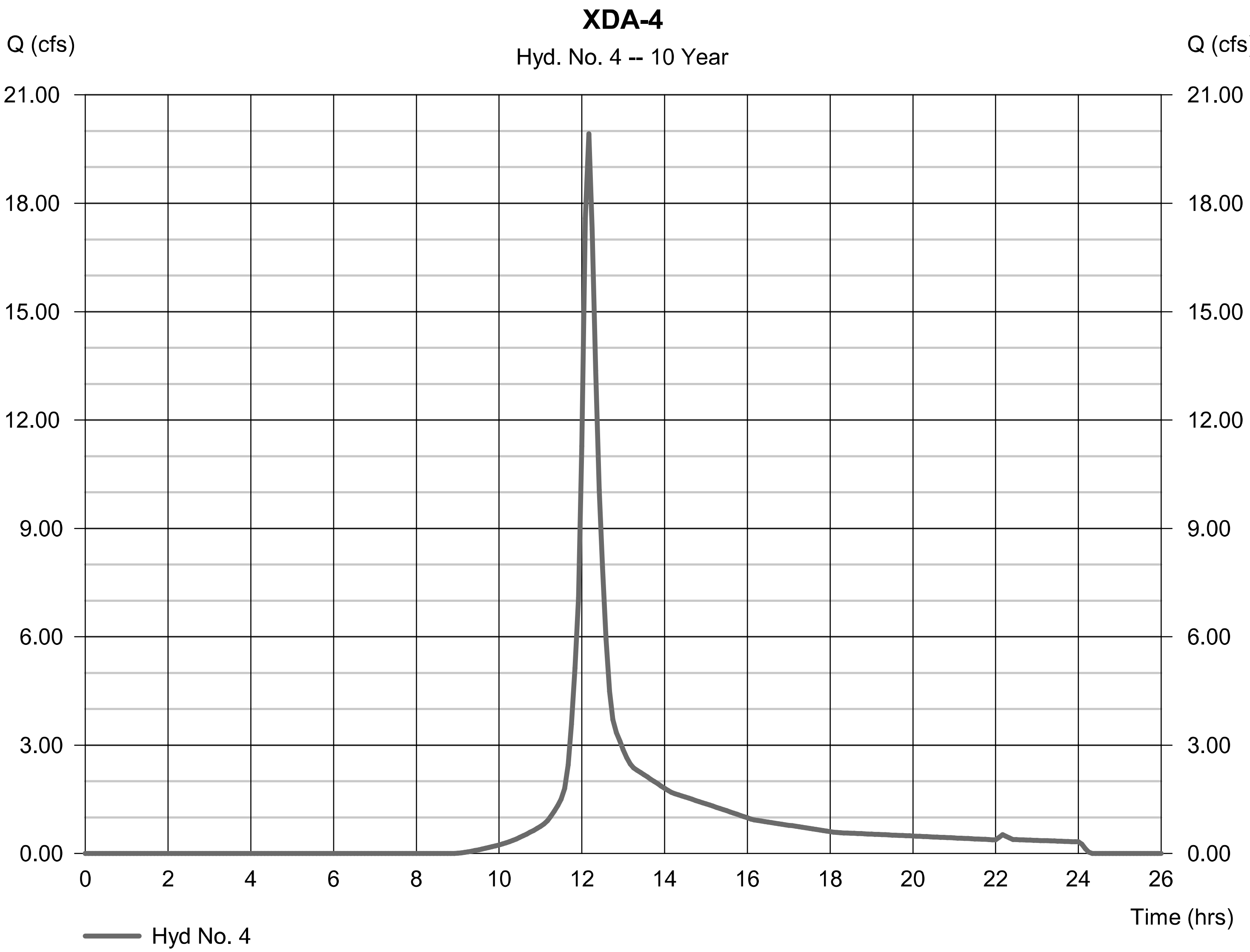
Hydrograph Report

Hyd. No. 4

XDA-4

Hydrograph type	= SCS Runoff	Peak discharge	= 19.92 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.17 hrs
Time interval	= 5 min	Hyd. volume	= 79,365 cuft
Drainage area	= 10.950 ac	Curve number	= 76*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 13.60 min
Total precip.	= 4.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(95.390 x 76)] / 10.950



Hydrograph Report

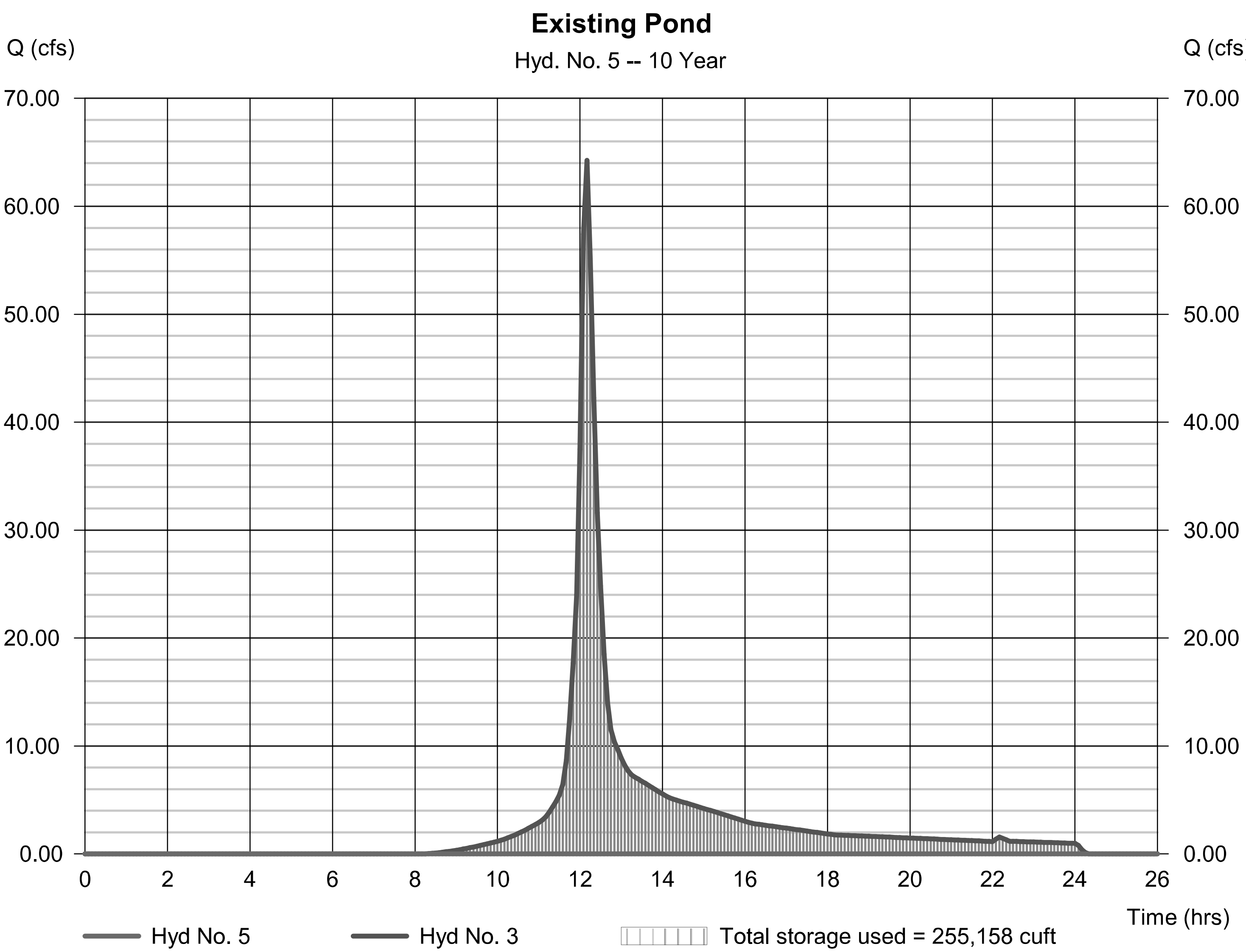
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 — Friday, 12 / 4 / 2015

Hyd. No. 5

Existing Pond

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 10 yrs	Time to peak	= n/a
Time interval	= 5 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 3 - XDA-3	Max. Elevation	= 1482.84 ft
Reservoir name	= Ex Pond	Max. Storage	= 255,158 cuft

Storage Indication method used.



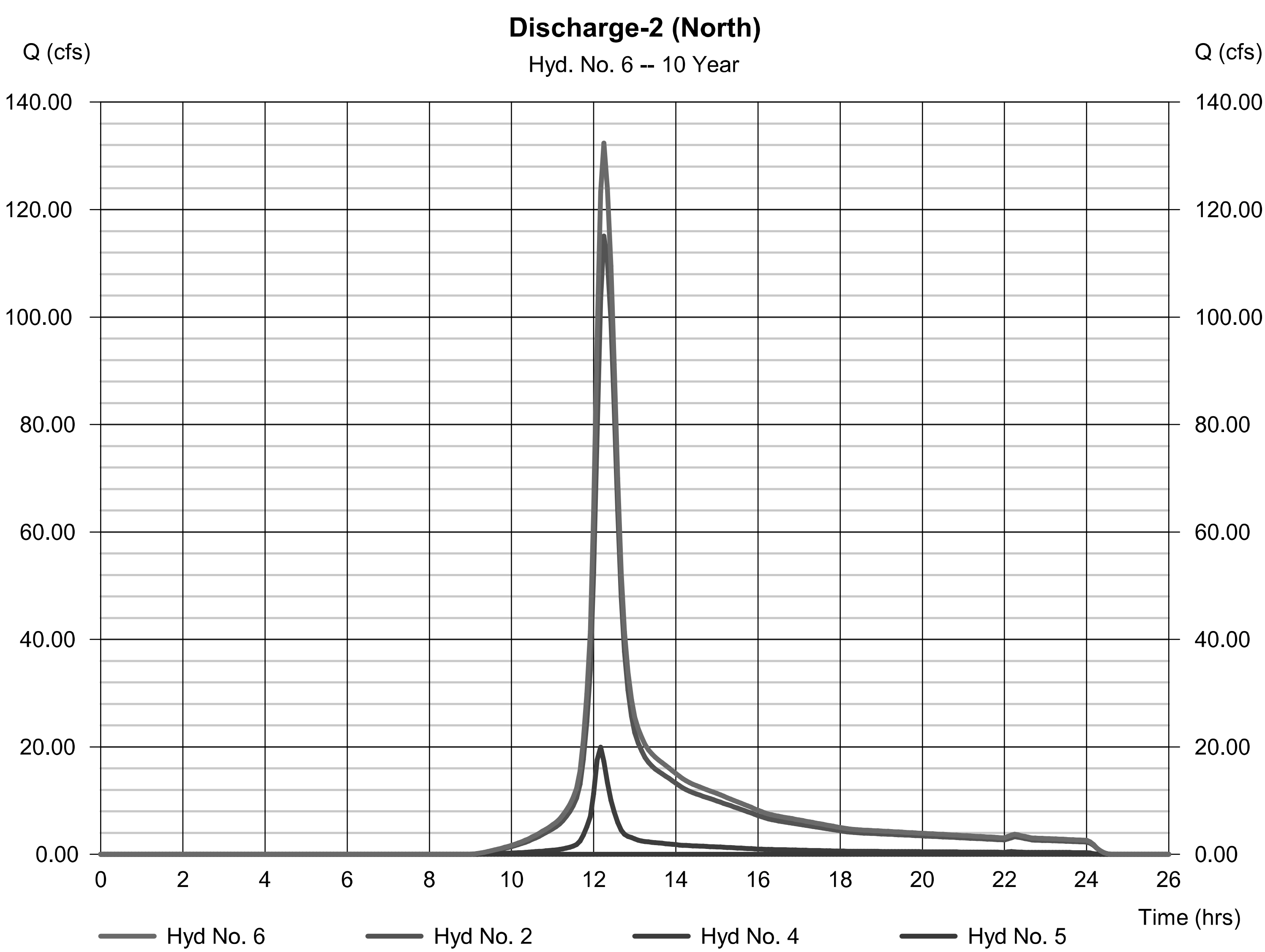
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 6

Discharge-2 (North)

Hydrograph type	= Combine	Peak discharge	= 132.36 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.25 hrs
Time interval	= 5 min	Hyd. volume	= 635,546 cuft
Inflow hyds.	= 2, 4, 5	Contrib. drain. area	= 82.890 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	133.62	5	730	538,962	------	------	------	XDA-1-Discharge-West
2	SCS Runoff	267.66	5	735	1,287,675	------	------	------	XDA-2
3	SCS Runoff	140.43	5	730	566,430	------	------	------	XDA-3
4	SCS Runoff	45.91	5	730	183,747	------	------	------	XDA-4
5	Reservoir	0.000	5	n/a	0	3	1486.29	566,430	Existing Pond
6	Combine	306.48	5	735	1,471,422	2, 4, 5	------	------	Discharge-2 (North)

Hydrograph Report

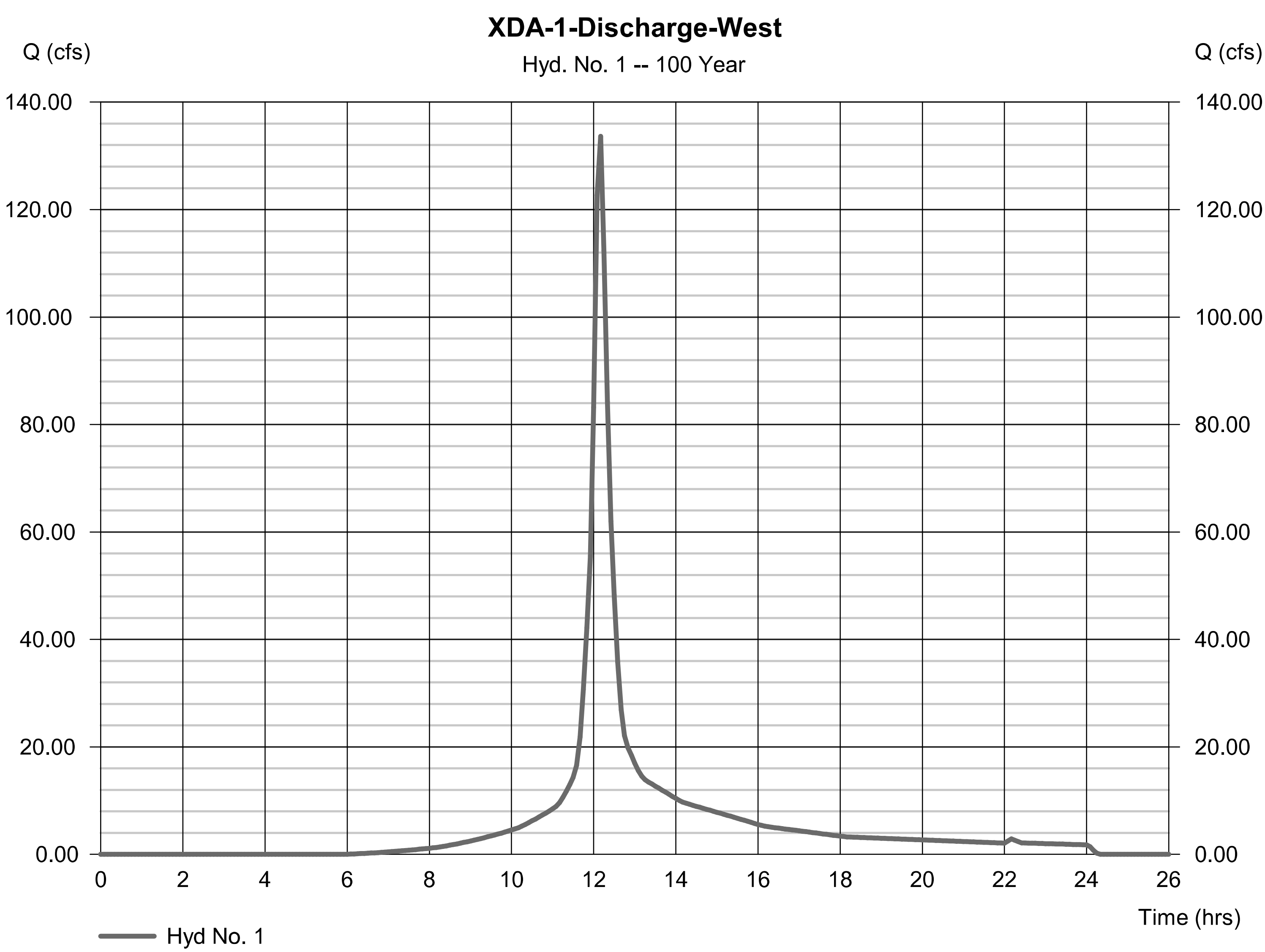
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 — Friday, 12 / 4 / 2015

Hyd. No. 1

XDA-1-Discharge-West

Hydrograph type	= SCS Runoff	Peak discharge	= 133.62 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.17 hrs
Time interval	= 5 min	Hyd. volume	= 538,962 cuft
Drainage area	= 30.020 ac	Curve number	= 79*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 12.50 min
Total precip.	= 7.75 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(33.070 x 79)] / 30.020



Hydrograph Report

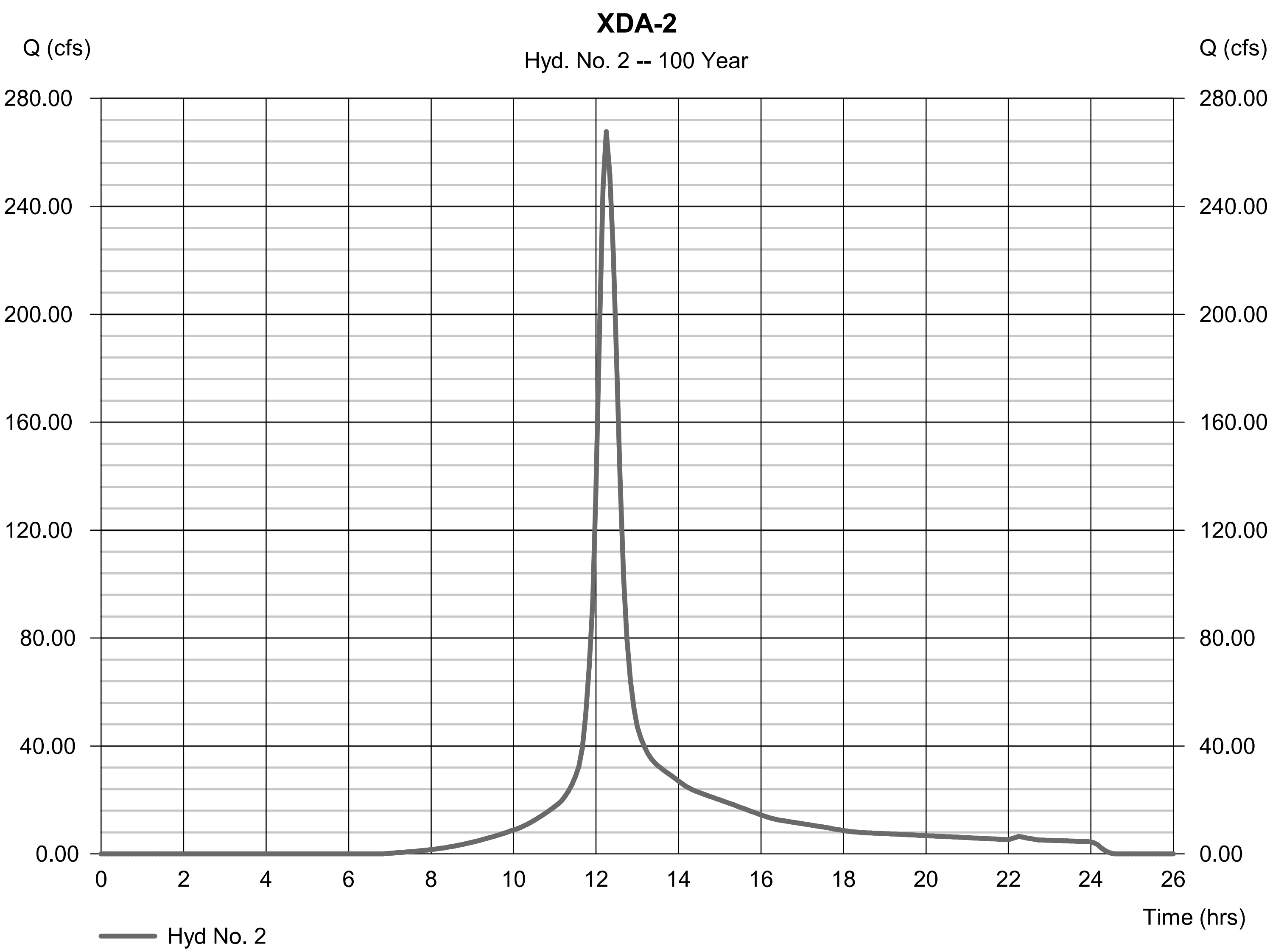
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 2

XDA-2

Hydrograph type	= SCS Runoff	Peak discharge	= 267.66 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.25 hrs
Time interval	= 5 min	Hyd. volume	= 1,287,675 cuft
Drainage area	= 71.940 ac	Curve number	= 76*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 21.20 min
Total precip.	= 7.75 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(71.190 x 76)] / 71.940



Hydrograph Report

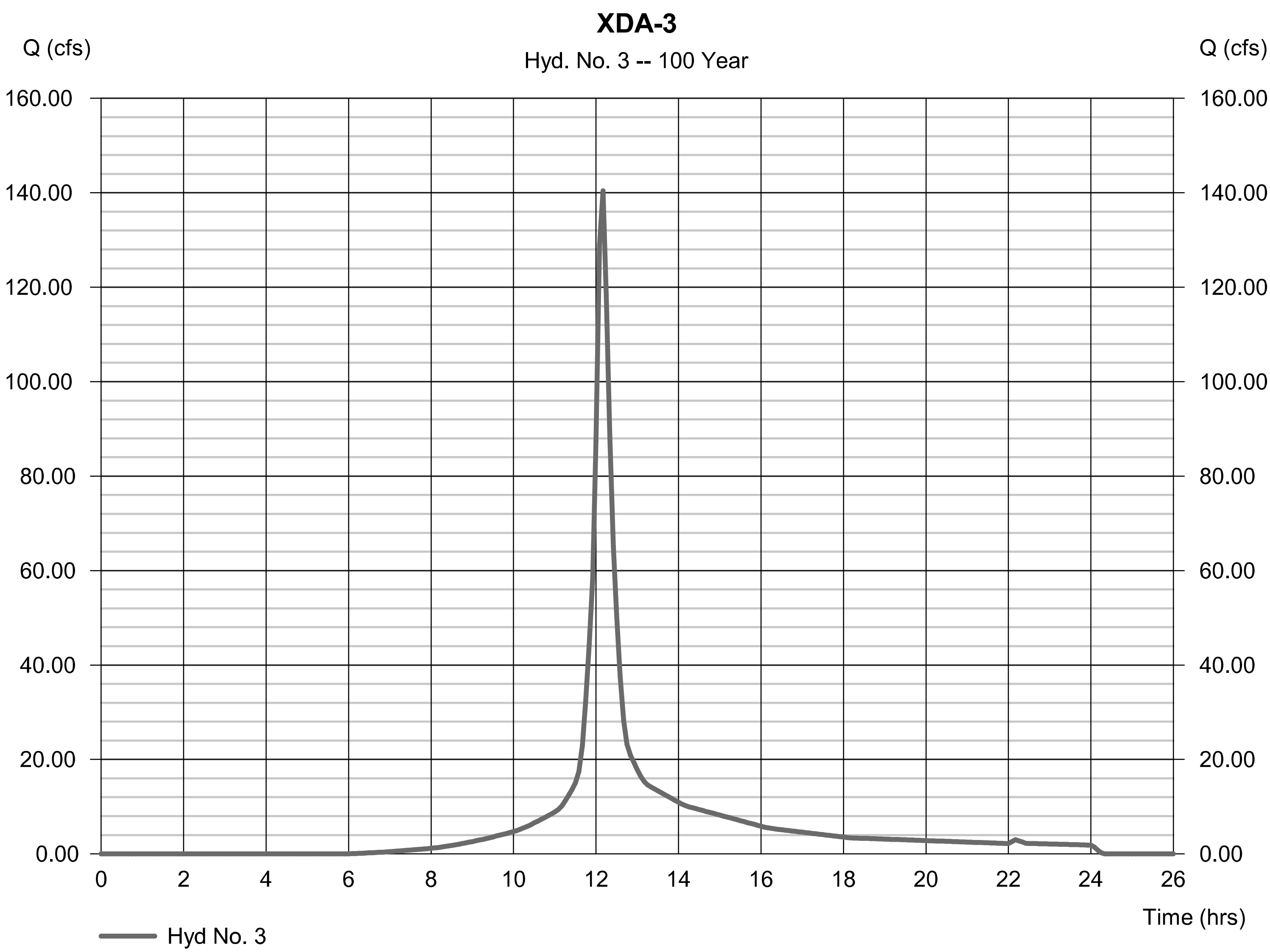
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 — Friday, 12 / 4 / 2015

Hyd. No. 3

XDA-3

Hydrograph type	= SCS Runoff	Peak discharge	= 140.43 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.17 hrs
Time interval	= 5 min	Hyd. volume	= 566,430 cuft
Drainage area	= 31.550 ac	Curve number	= 79*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.70 min
Total precip.	= 7.75 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(33.240 x 79)] / 31.550



Hydrograph Report

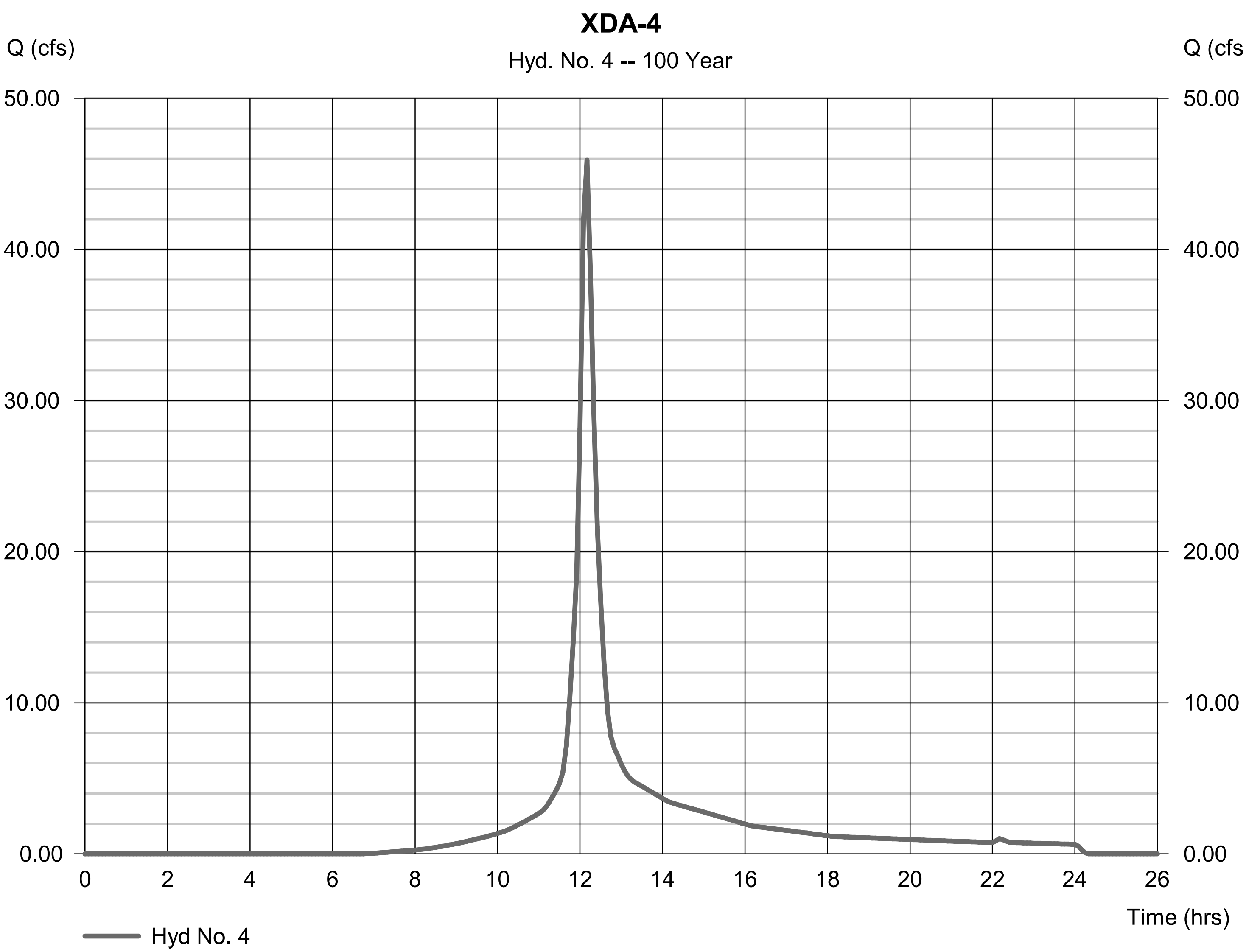
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 4

XDA-4

Hydrograph type	= SCS Runoff	Peak discharge	= 45.91 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.17 hrs
Time interval	= 5 min	Hyd. volume	= 183,747 cuft
Drainage area	= 10.950 ac	Curve number	= 76*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 13.60 min
Total precip.	= 7.75 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(95.390 x 76)] / 10.950



Hydrograph Report

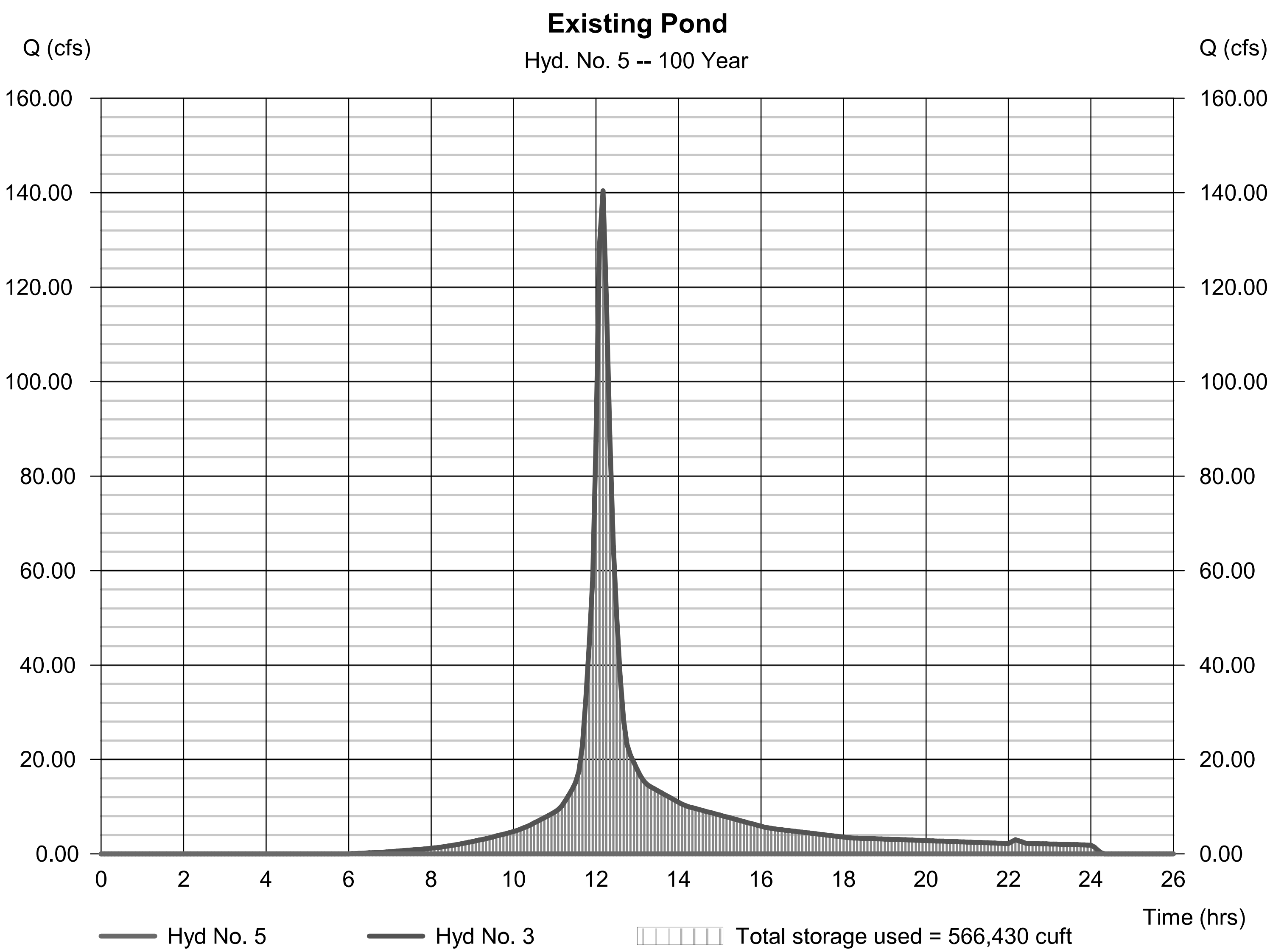
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 5

Existing Pond

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 100 yrs	Time to peak	= n/a
Time interval	= 5 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 3 - XDA-3	Max. Elevation	= 1486.29 ft
Reservoir name	= Ex Pond	Max. Storage	= 566,430 cuft

Storage Indication method used.



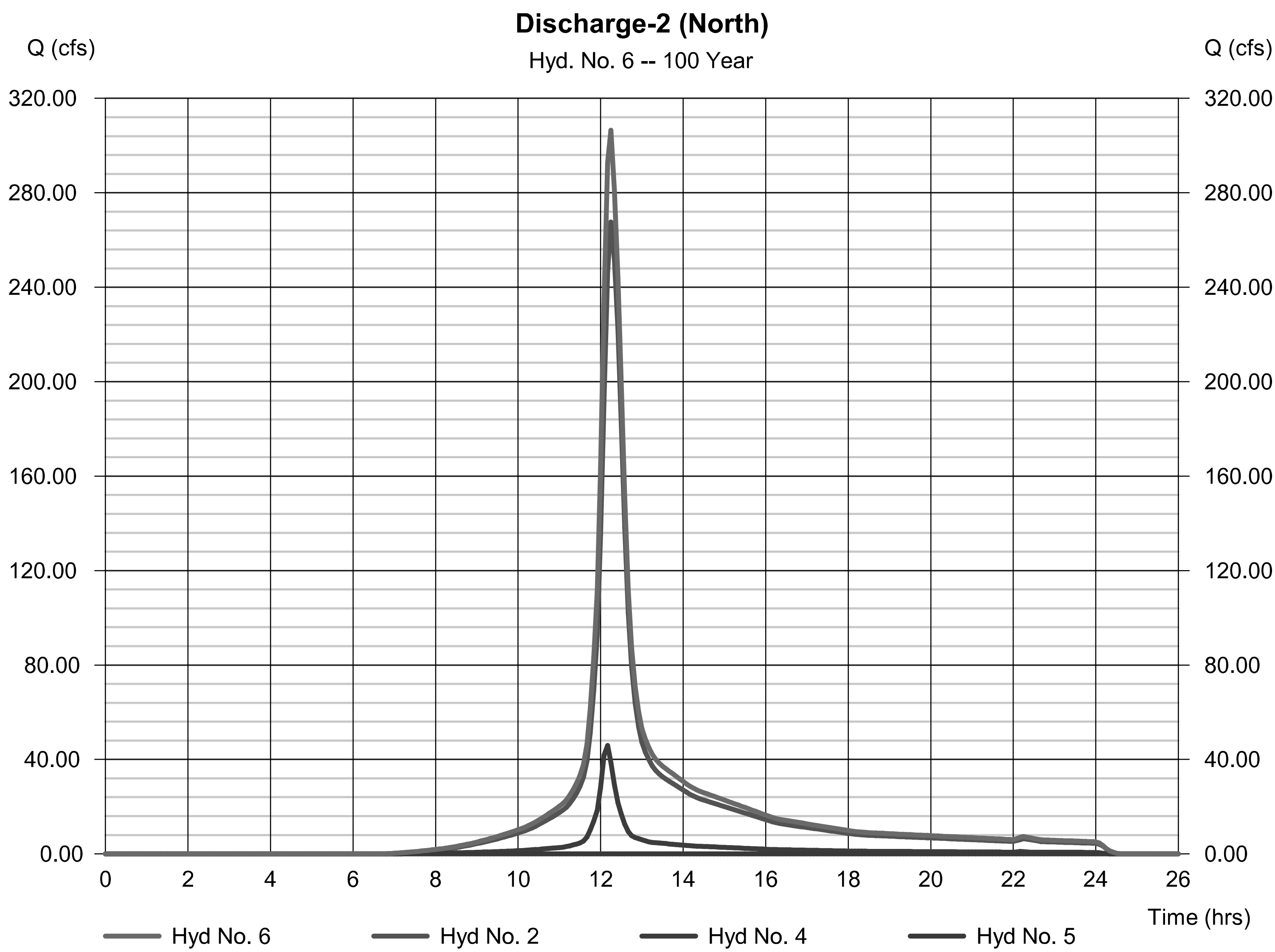
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 6

Discharge-2 (North)

Hydrograph type	= Combine	Peak discharge	= 306.48 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.25 hrs
Time interval	= 5 min	Hyd. volume	= 1,471,422 cuft
Inflow hyds.	= 2, 4, 5	Contrib. drain. area	= 82.890 ac



APPENDIX H

STORMWATER HYDROGRAPHS POST DEVELOPMENT

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

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	------	4.010	-------	-------	-------	10.35	-------	-------	21.54	PDA_A
2	SCS Runoff	------	6.868	-------	-------	-------	14.71	-------	-------	27.71	PDA_B
3	SCS Runoff	------	8.580	-------	-------	-------	28.35	-------	-------	66.57	PDA_Swale-A1
4	SCS Runoff	------	27.71	-------	-------	-------	87.79	-------	-------	202.32	PDA_X2
5	SCS Runoff	------	9.955	-------	-------	-------	21.33	-------	-------	40.18	PDA_C
6	SCS Runoff	------	0.768	-------	-------	-------	2.179	-------	-------	4.762	PDA_D
7	SCS Runoff	------	2.017	-------	-------	-------	4.542	-------	-------	8.785	PDA_Swale-D1
8	SCS Runoff	------	1.555	-------	-------	-------	3.790	-------	-------	7.652	PDA_Swale-D2
9	SCS Runoff	------	10.54	-------	-------	-------	32.10	-------	-------	72.64	PDA_X3
10	SCS Runoff	------	4.988	-------	-------	-------	13.26	-------	-------	28.05	PDA_E
11	SCS Runoff	------	12.61	-------	-------	-------	41.67	-------	-------	97.84	PDA_X1
12	SCS Runoff	------	5.808	-------	-------	-------	19.19	-------	-------	45.06	PDA_X4
13	Reach	3	3.350	-------	-------	-------	12.92	-------	-------	33.65	Swale-A1
14	Reach	7	1.083	-------	-------	-------	2.359	-------	-------	4.434	Swale-D1
15	Reach	8	0.976	-------	-------	-------	2.298	-------	-------	4.515	Swale-D2
16	Combine	6, 14, 15	2.539	-------	-------	-------	5.974	-------	-------	11.84	PDA_Basin D
17	Reservoir	1	0.220	-------	-------	-------	0.372	-------	-------	5.139	Basin A
18	Reservoir	2	0.242	-------	-------	-------	0.372	-------	-------	3.873	Basin B
19	Reservoir	5	1.808	-------	-------	-------	12.20	-------	-------	17.68	Basin C
20	Reservoir	16	0.281	-------	-------	-------	1.490	-------	-------	8.657	Basin-D
21	Reservoir	10	0.172	-------	-------	-------	0.304	-------	-------	1.052	Basin E
22	Combine	9, 20,	10.65	-------	-------	-------	32.34	-------	-------	73.02	PDA_Ex Pond
23	Reservoir	22	0.000	-------	-------	-------	0.000	-------	-------	0.329	Existing Pond
24	Combine	12, 17, 18, 19,	6.345	-------	-------	-------	29.77	-------	-------	61.62	trans
25	Combine	11, 21,	12.68	-------	-------	-------	41.86	-------	-------	98.15	Discharge 1 (West)
26	Combine	4, 13, 23, 24,	35.44	-------	-------	-------	125.01	-------	-------	285.75	Discharge 2 (North)

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	4.010	5	730	16,165	------	------	------	PDA_A
2	SCS Runoff	6.868	5	730	27,334	------	------	------	PDA_B
3	SCS Runoff	8.580	5	730	37,531	------	------	------	PDA_Swale-A1
4	SCS Runoff	27.71	5	730	119,044	------	------	------	PDA_X2
5	SCS Runoff	9.955	5	730	39,624	------	------	------	PDA_C
6	SCS Runoff	0.768	5	730	3,172	------	------	------	PDA_D
7	SCS Runoff	2.017	5	730	8,012	------	------	------	PDA_Swale-D1
8	SCS Runoff	1.555	5	730	6,210	------	------	------	PDA_Swale-D2
9	SCS Runoff	10.54	5	730	44,575	------	------	------	PDA_X3
10	SCS Runoff	4.988	5	730	20,240	------	------	------	PDA_E
11	SCS Runoff	12.61	5	730	55,162	------	------	------	PDA_X1
12	SCS Runoff	5.808	5	730	25,406	------	------	------	PDA_X4
13	Reach	3.350	5	755	37,501	3	------	------	Swale-A1
14	Reach	1.083	5	745	7,993	7	------	------	Swale-D1
15	Reach	0.976	5	745	6,199	8	------	------	Swale-D2
16	Combine	2.539	5	740	17,364	6, 14, 15	------	------	PDA_Basin D
17	Reservoir	0.220	5	955	16,116	1	1386.07	9,801	Basin A
18	Reservoir	0.242	5	1020	27,255	2	1376.26	19,222	Basin B
19	Reservoir	1.808	5	765	39,581	5	1486.28	20,348	Basin C
20	Reservoir	0.281	5	940	17,334	16	1496.65	9,943	Basin-D
21	Reservoir	0.172	5	1080	20,133	10	1495.71	14,078	Basin E
22	Combine	10.65	5	730	61,909	9, 20,	------	------	PDA_Ex Pond
23	Reservoir	0.000	5	n/a	0	22	1485.69	61,909	Existing Pond
24	Combine	6.345	5	730	108,358	12, 17, 18, 19,	------	------	trans
25	Combine	12.68	5	730	75,295	11, 21,	------	------	Discharge 1 (West)
26	Combine	35.44	5	730	264,904	4, 13, 23, 24,	------	------	Discharge 2 (North)

Hydrograph Report

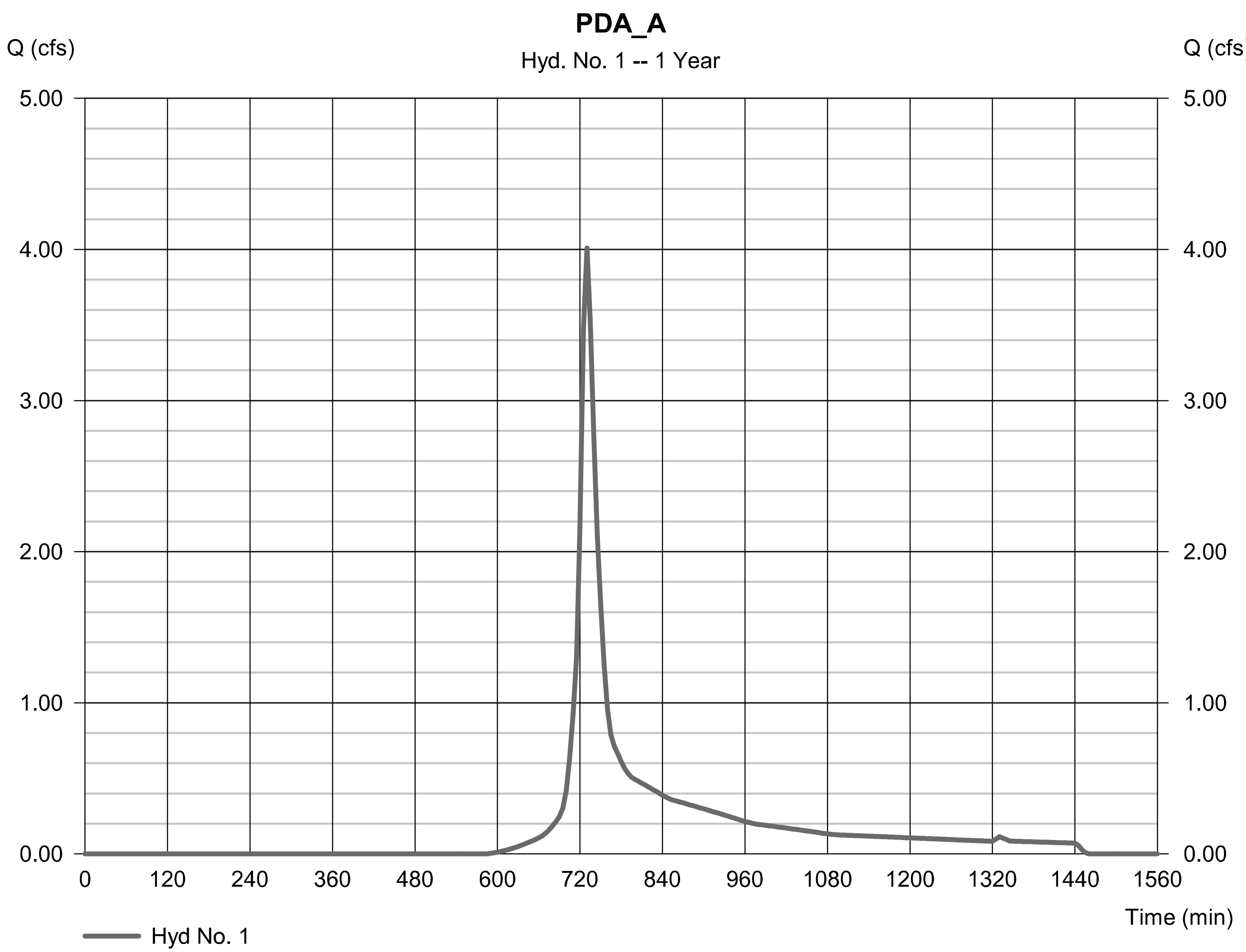
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 — Friday, 12 / 4 / 2015

Hyd. No. 1

PDA_A

Hydrograph type	= SCS Runoff	Peak discharge	= 4.010 cfs
Storm frequency	= 1 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 16,165 cuft
Drainage area	= 4.590 ac	Curve number	= 82*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(2.400 x 95) + (3.000 x 75)] / 4.590



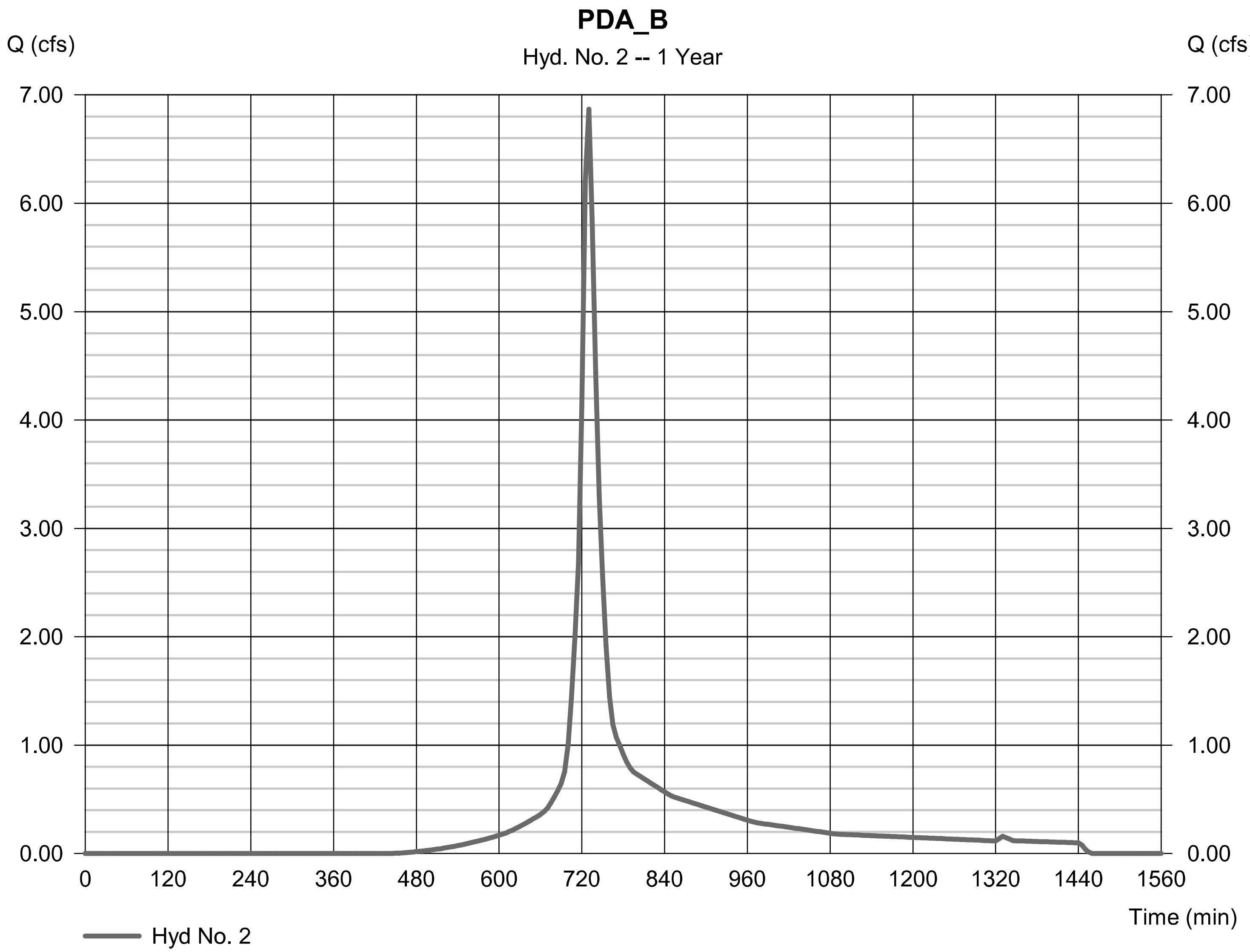
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 — Friday, 12 / 4 / 2015

Hyd. No. 2

PDA_B

Hydrograph type	= SCS Runoff	Peak discharge	= 6.868 cfs
Storm frequency	= 1 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 27,334 cuft
Drainage area	= 5.360 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

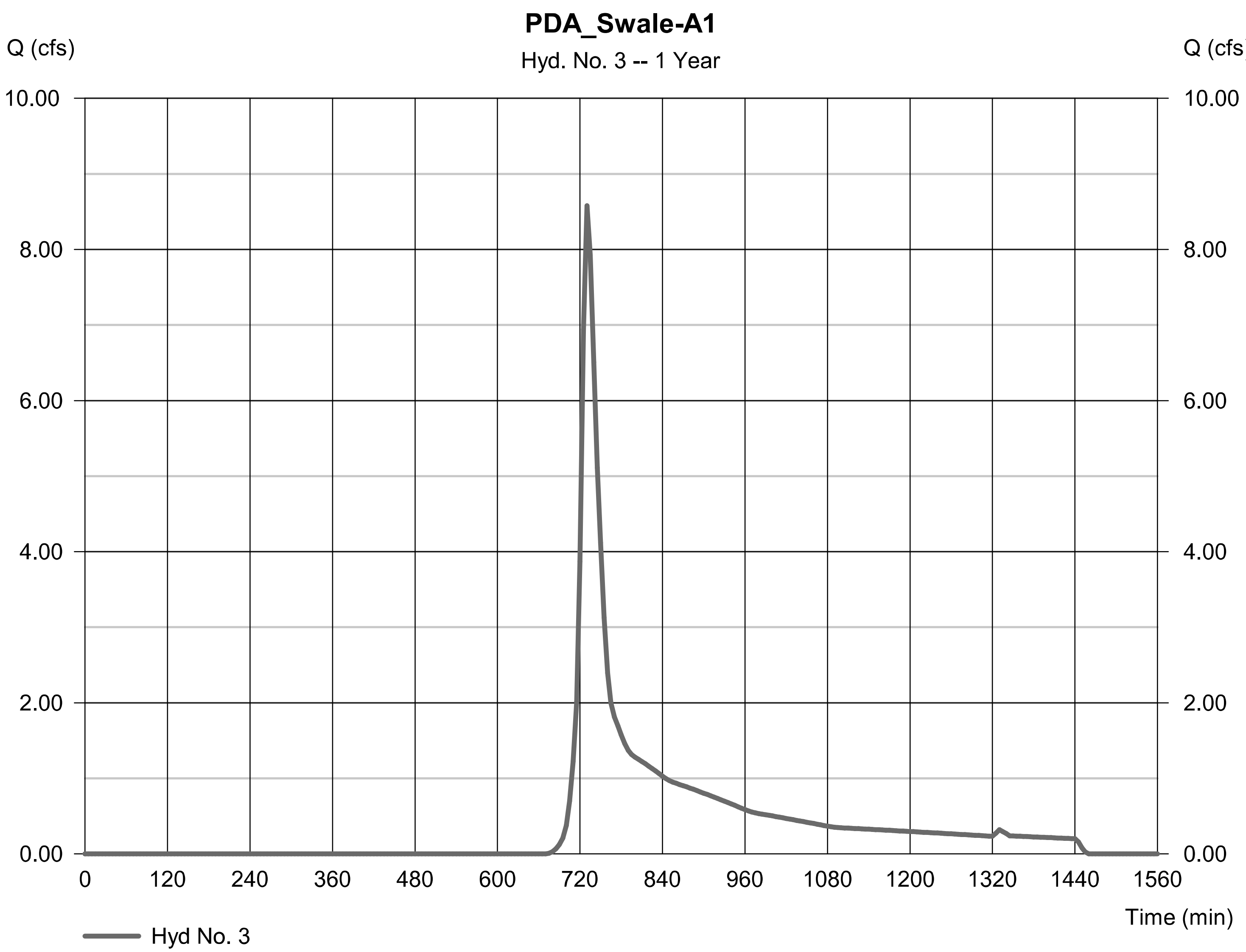
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 3

PDA_Swale-A1

Hydrograph type	= SCS Runoff	Peak discharge	= 8.580 cfs
Storm frequency	= 1 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 37,531 cuft
Drainage area	= 16.220 ac	Curve number	= 75*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(2.400 x 95) + (3.000 x 75)] / 16.220



Hydrograph Report

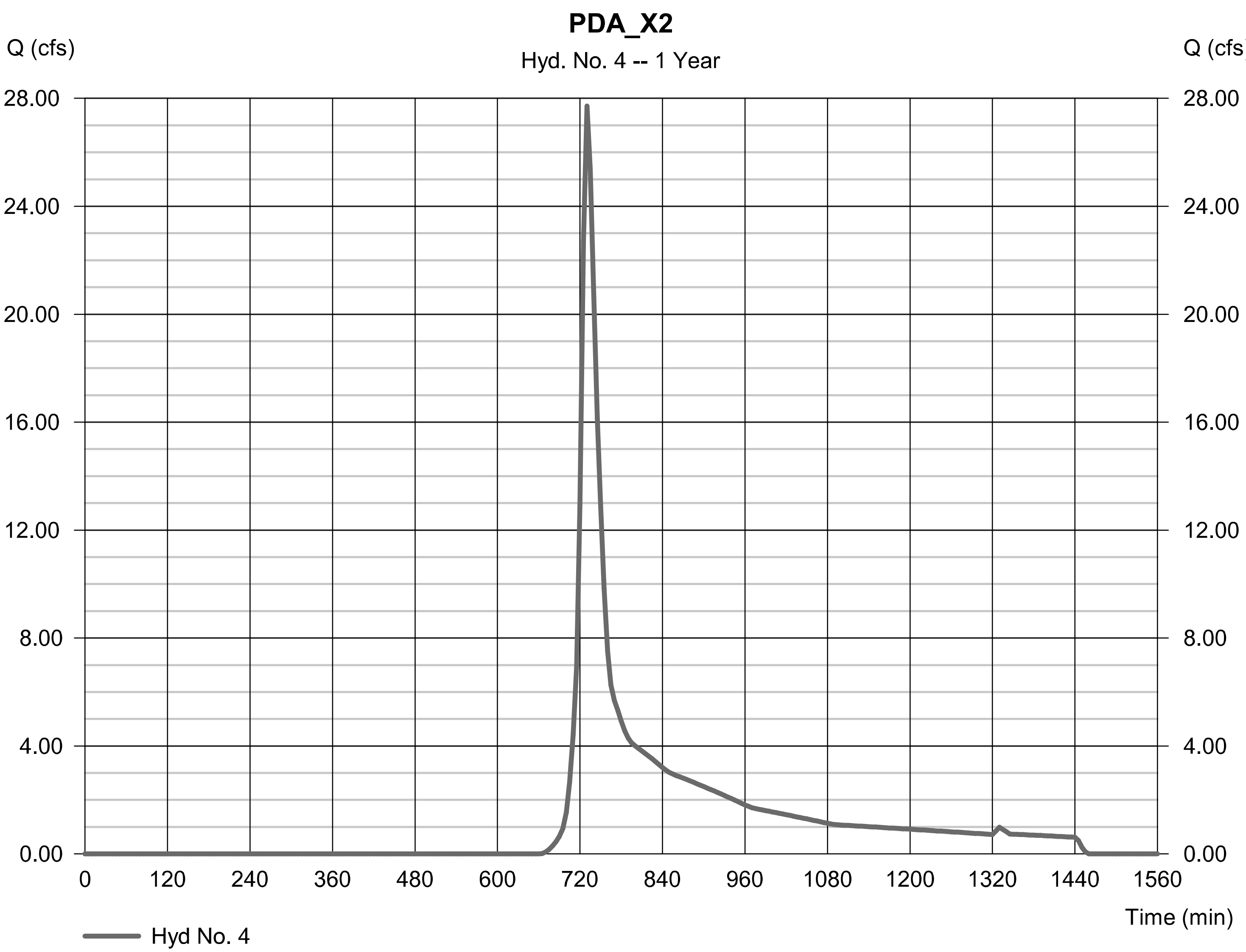
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 — Friday, 12 / 4 / 2015

Hyd. No. 4

PDA_X2

Hydrograph type	= SCS Runoff	Peak discharge	= 27.71 cfs
Storm frequency	= 1 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 119,044 cuft
Drainage area	= 48.250 ac	Curve number	= 76*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(20.000 x 75)] / 48.250



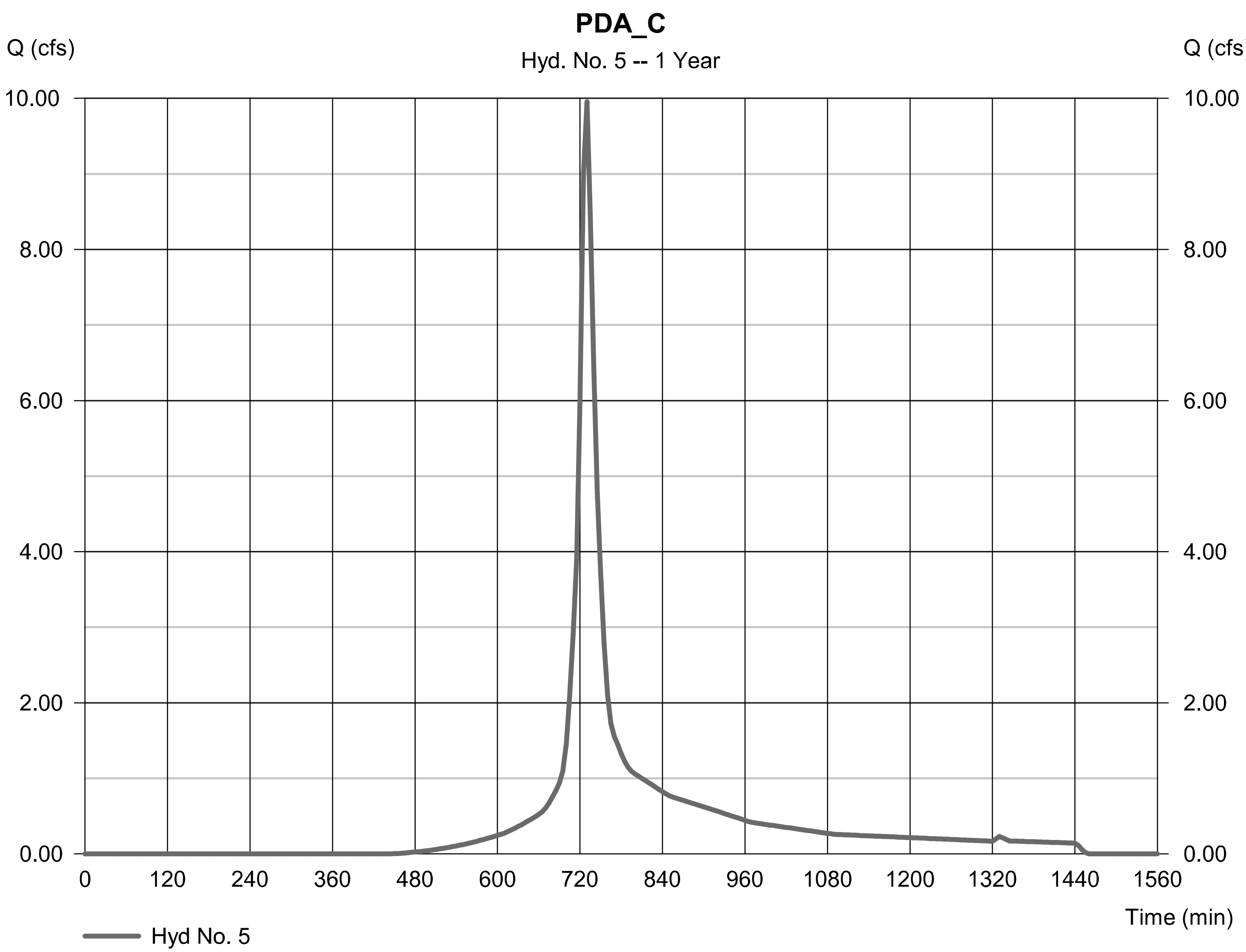
Hydrograph Report

Hyd. No. 5

PDA_C

Hydrograph type	= SCS Runoff	Peak discharge	= 9.955 cfs
Storm frequency	= 1 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 39,624 cuft
Drainage area	= 7.770 ac	Curve number	= 89*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(2.400 x 95) + (3.000 x 75)] / 7.770



Hydrograph Report

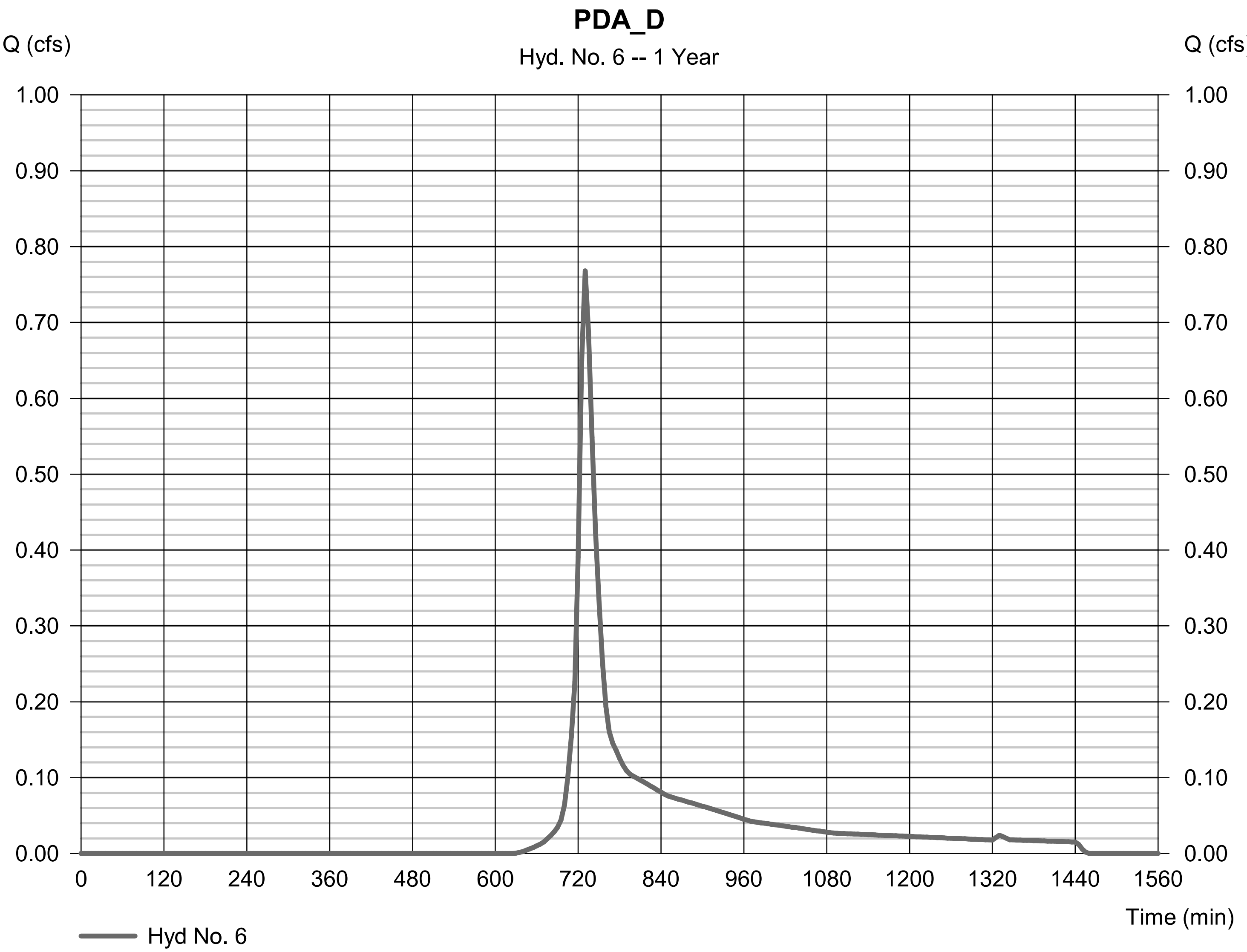
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 6

PDA_D

Hydrograph type	= SCS Runoff	Peak discharge	= 0.768 cfs
Storm frequency	= 1 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 3,172 cuft
Drainage area	= 1.070 ac	Curve number	= 79*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(20.000 x 75)] / 1.070



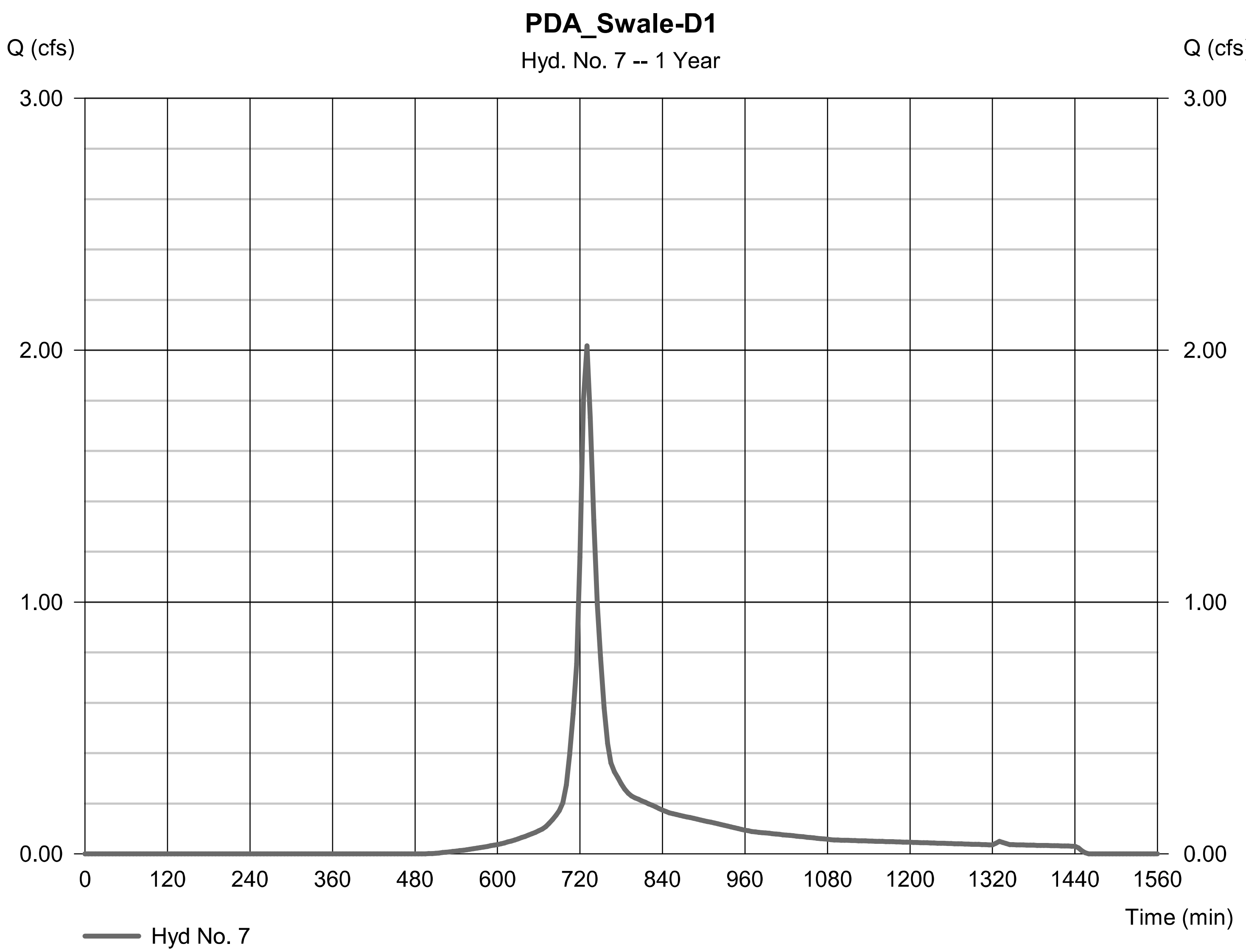
Hydrograph Report

Hyd. No. 7

PDA_Swale-D1

Hydrograph type	= SCS Runoff	Peak discharge	= 2.017 cfs
Storm frequency	= 1 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 8,012 cuft
Drainage area	= 1.740 ac	Curve number	= 87*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(2.400 x 95) + (3.000 x 75)] / 1.740



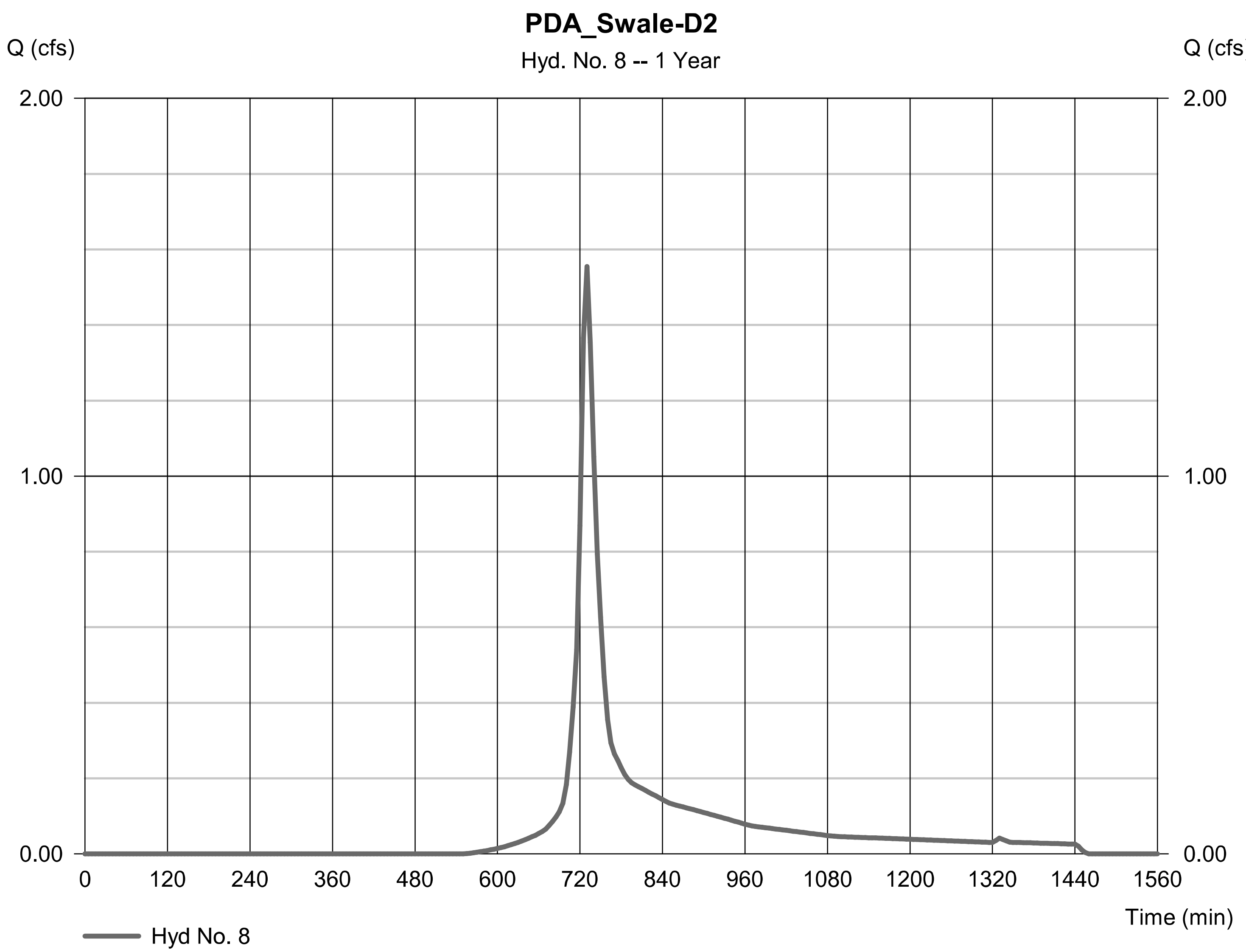
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 8

PDA_Swale-D2

Hydrograph type	= SCS Runoff	Peak discharge	= 1.555 cfs
Storm frequency	= 1 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 6,210 cuft
Drainage area	= 1.580 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



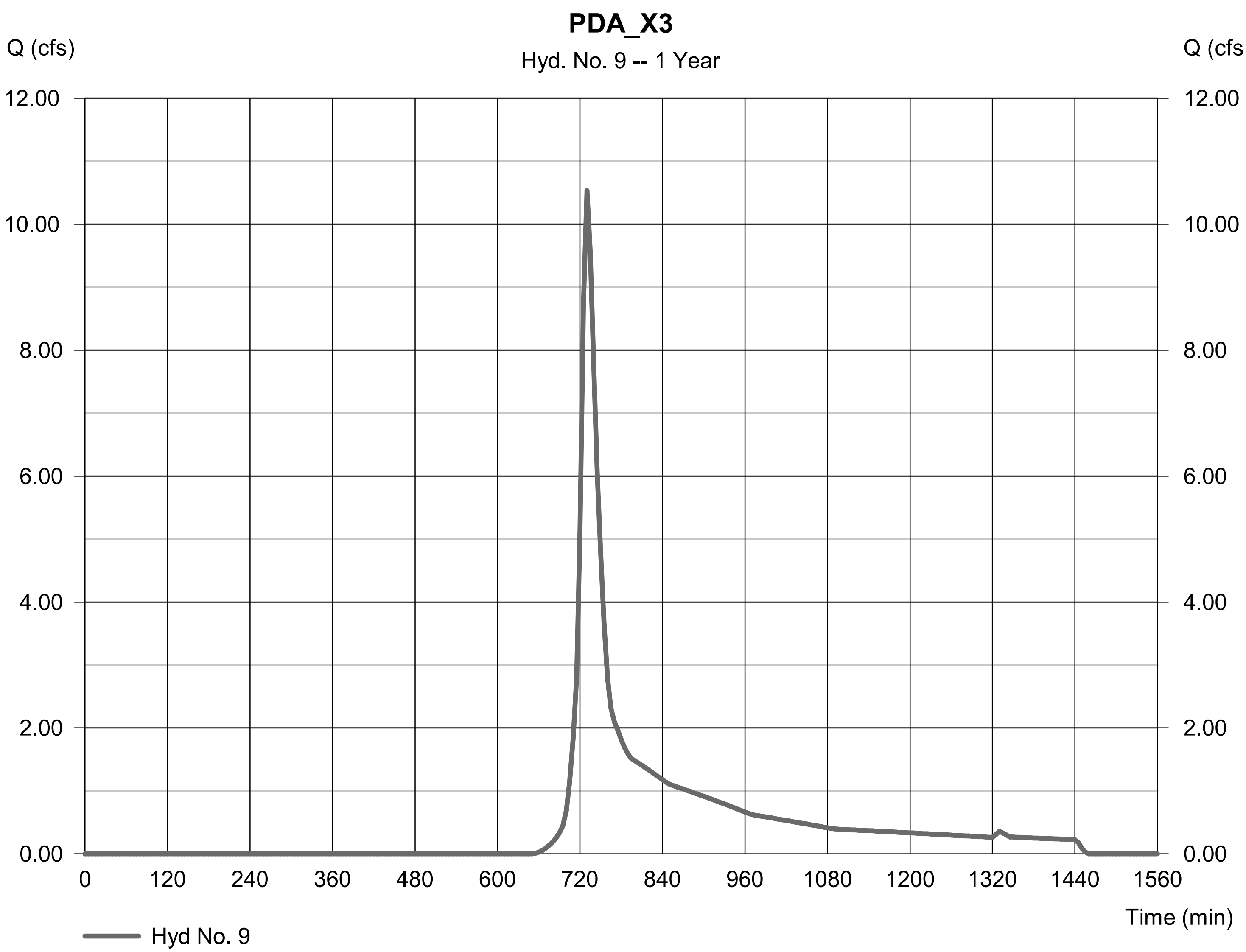
Hydrograph Report

Hyd. No. 9

PDA_X3

Hydrograph type	= SCS Runoff	Peak discharge	= 10.54 cfs
Storm frequency	= 1 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 44,575 cuft
Drainage area	= 16.970 ac	Curve number	= 77*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(20.000 x 75)] / 16.970



Hydrograph Report

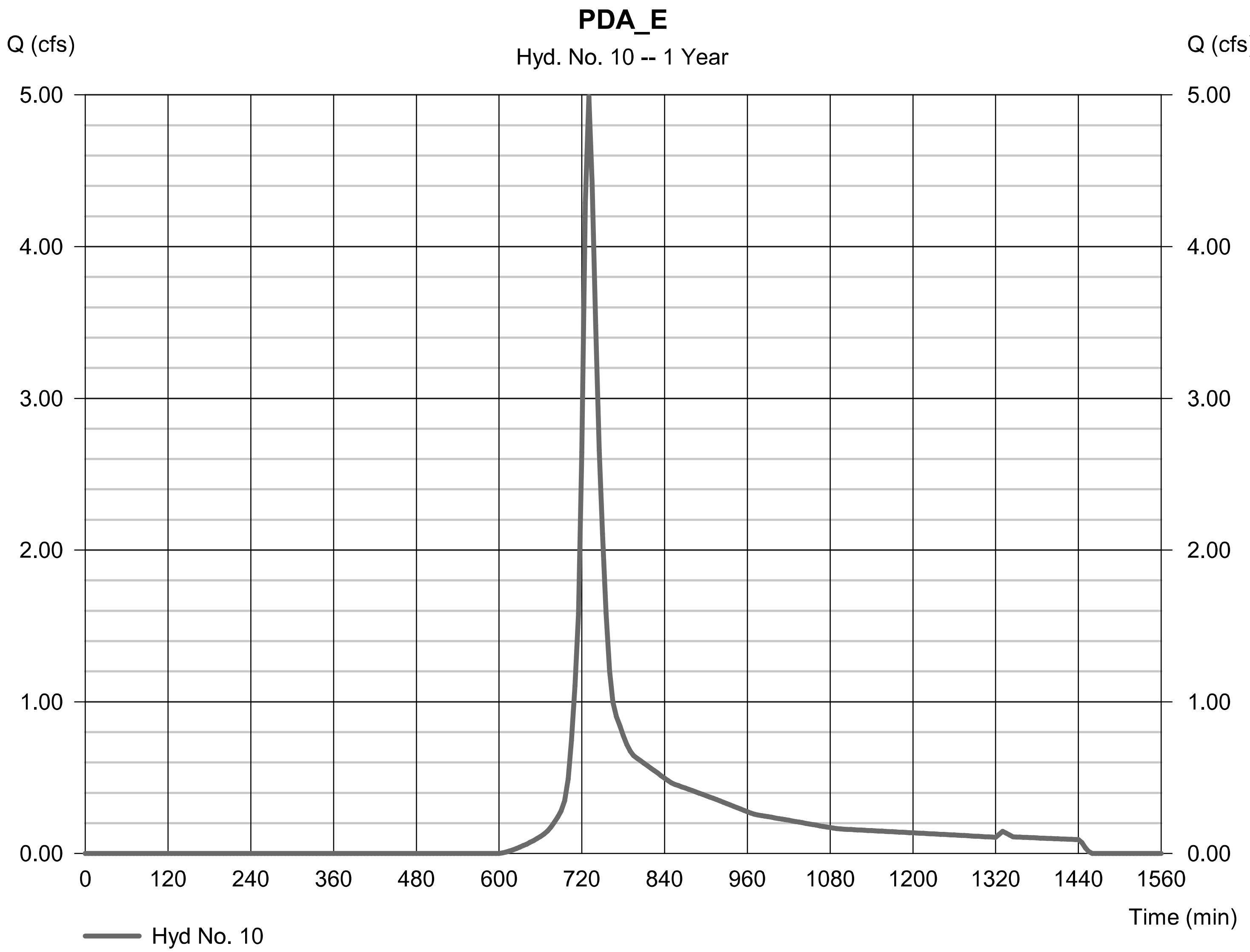
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 10

PDA_E

Hydrograph type	= SCS Runoff	Peak discharge	= 4.988 cfs
Storm frequency	= 1 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 20,240 cuft
Drainage area	= 6.080 ac	Curve number	= 81*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(2.400 x 95) + (3.000 x 75)] / 6.080



Hydrograph Report

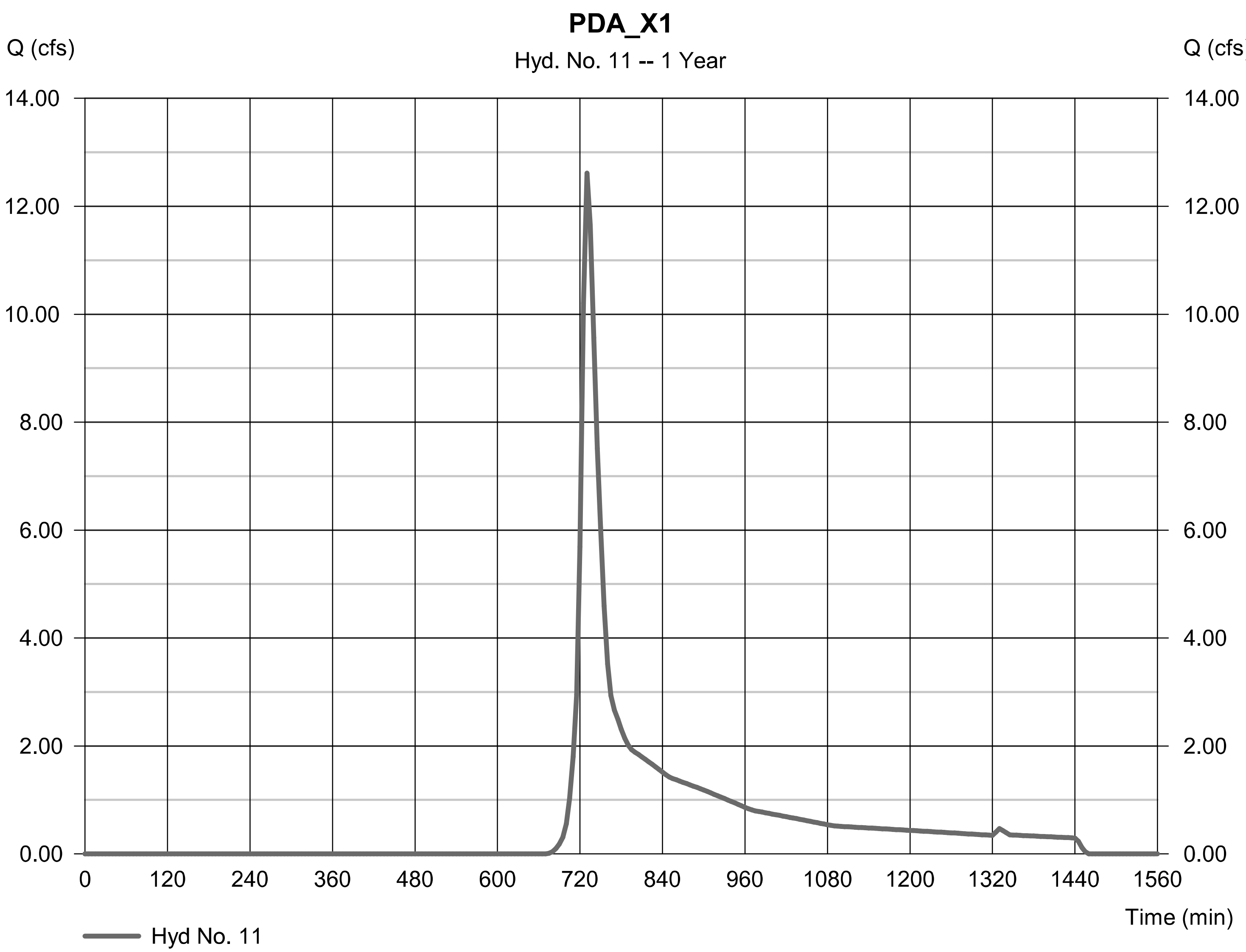
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 | Friday, 12 / 4 / 2015

Hyd. No. 11

PDA_X1

Hydrograph type	= SCS Runoff	Peak discharge	= 12.61 cfs
Storm frequency	= 1 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 55,162 cuft
Drainage area	= 23.840 ac	Curve number	= 75*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(20.000 x 75)] / 23.840



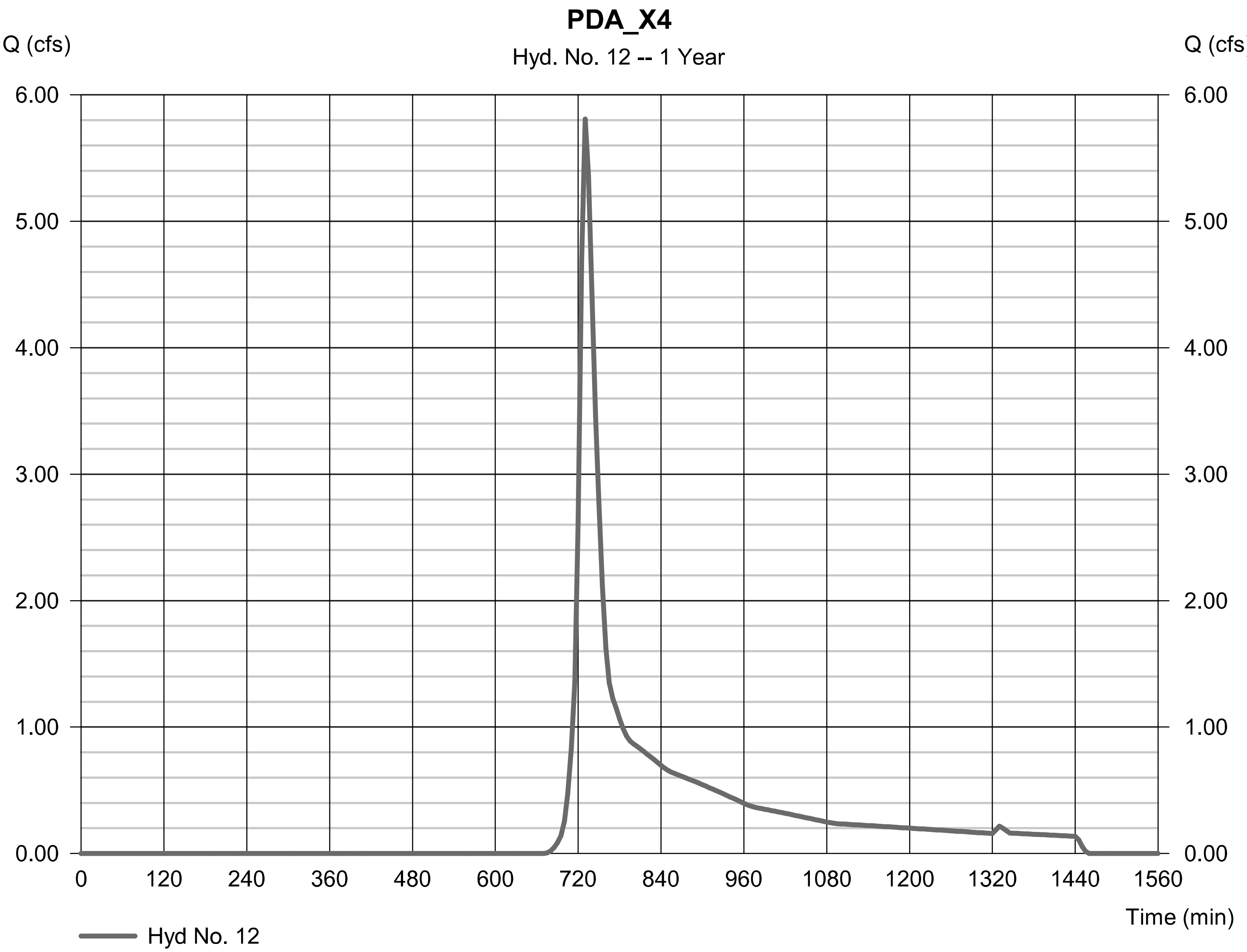
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 12

PDA_X4

Hydrograph type	= SCS Runoff	Peak discharge	= 5.808 cfs
Storm frequency	= 1 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 25,406 cuft
Drainage area	= 10.980 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.60 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

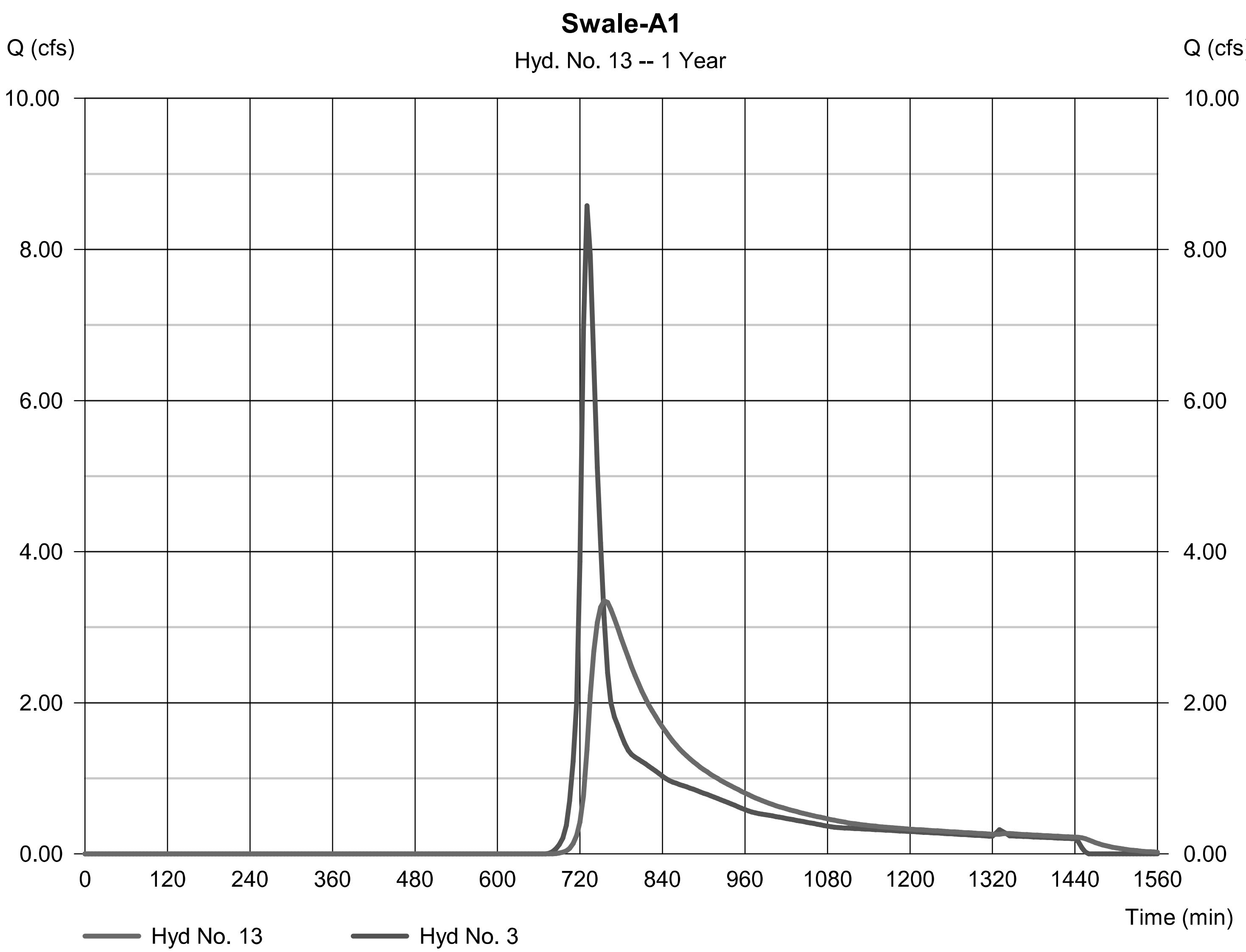
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 13

Swale-A1

Hydrograph type	= Reach	Peak discharge	= 3.350 cfs
Storm frequency	= 1 yrs	Time to peak	= 755 min
Time interval	= 5 min	Hyd. volume	= 37,501 cuft
Inflow hyd. No.	= 3 - PDA_Swale-A1	Section type	= Trapezoidal
Reach length	= 1750.0 ft	Channel slope	= 5.0 %
Manning's n	= 0.500	Bottom width	= 4.0 ft
Side slope	= 4.0:1	Max. depth	= 2.0 ft
Rating curve x	= 0.264	Rating curve m	= 1.224
Ave. velocity	= 0.50 ft/s	Routing coeff.	= 0.0997

Modified Att-Kin routing method used.



Hydrograph Report

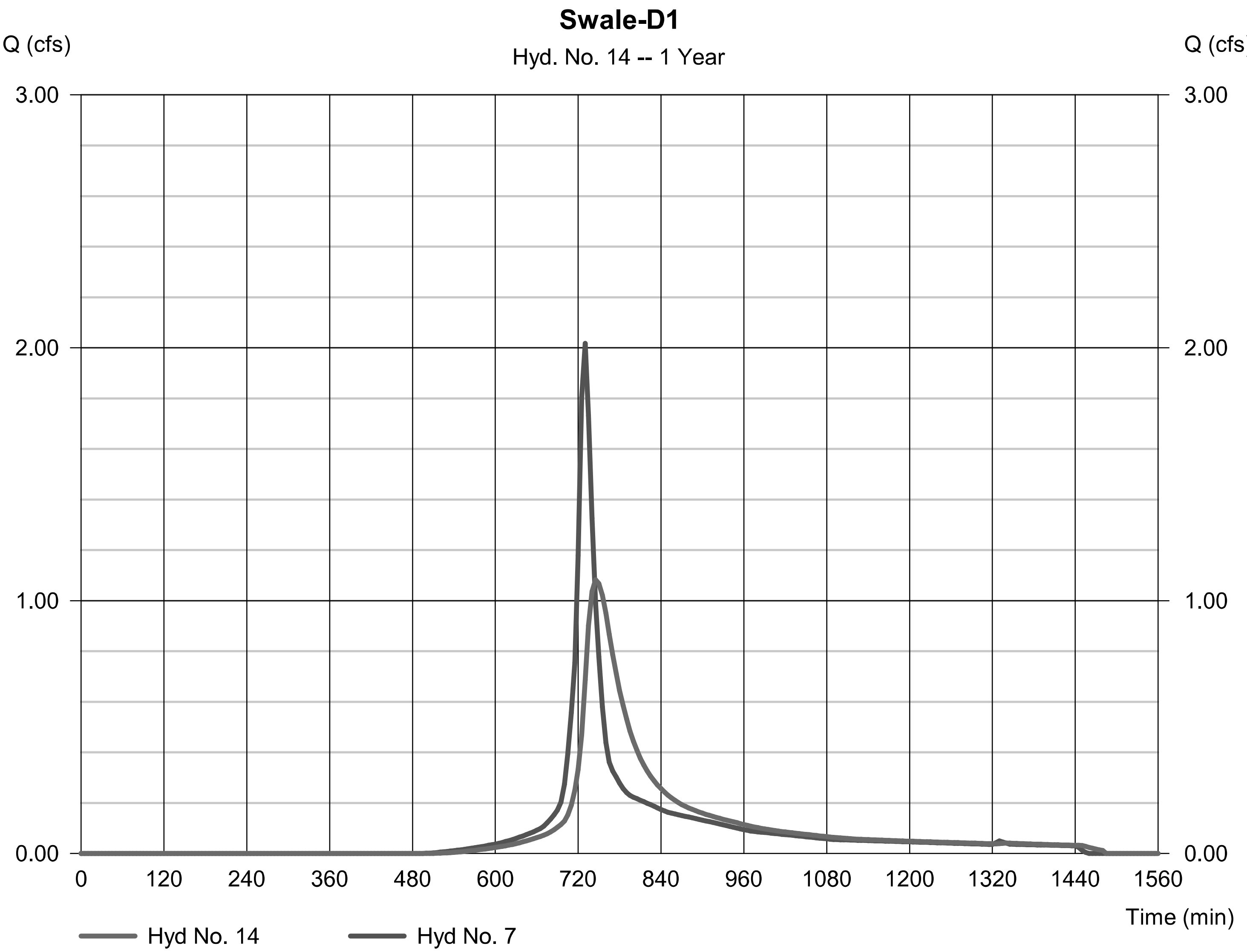
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 14

Swale-D1

Hydrograph type	= Reach	Peak discharge	= 1.083 cfs
Storm frequency	= 1 yrs	Time to peak	= 745 min
Time interval	= 5 min	Hyd. volume	= 7,993 cuft
Inflow hyd. No.	= 7 - PDA_Swale-D1	Section type	= Trapezoidal
Reach length	= 510.0 ft	Channel slope	= 5.0 %
Manning's n	= 0.500	Bottom width	= 2.0 ft
Side slope	= 4.0:1	Max. depth	= 1.0 ft
Rating curve x	= 0.420	Rating curve m	= 0.882
Ave. velocity	= 0.34 ft/s	Routing coeff.	= 0.1620

Modified Att-Kin routing method used.



Hydrograph Report

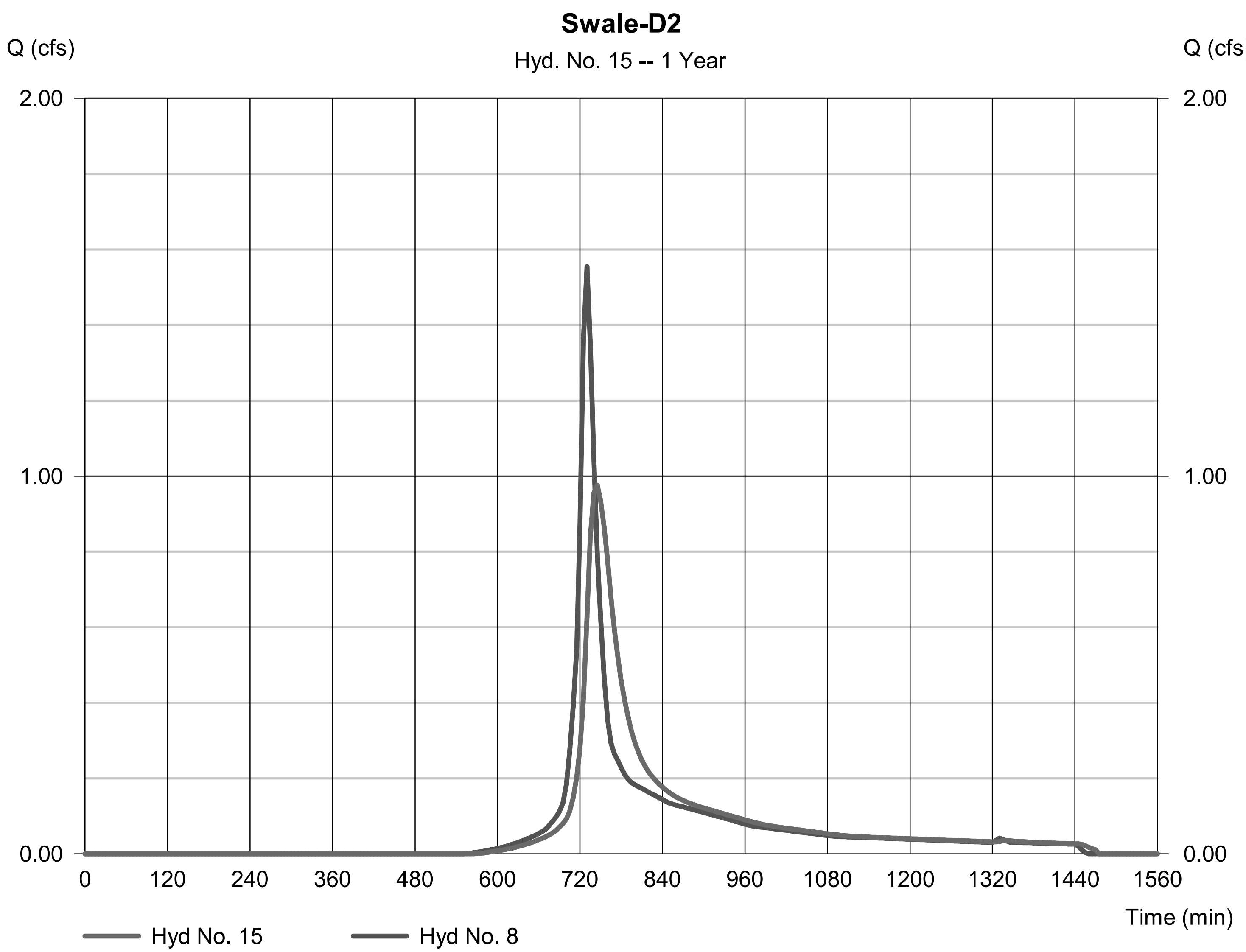
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 — Friday, 12 / 4 / 2015

Hyd. No. 15

Swale-D2

Hydrograph type	= Reach	Peak discharge	= 0.976 cfs
Storm frequency	= 1 yrs	Time to peak	= 745 min
Time interval	= 5 min	Hyd. volume	= 6,199 cuft
Inflow hyd. No.	= 8 - PDA_Swale-D2	Section type	= Trapezoidal
Reach length	= 365.0 ft	Channel slope	= 5.0 %
Manning's n	= 0.500	Bottom width	= 2.0 ft
Side slope	= 4.0:1	Max. depth	= 1.0 ft
Rating curve x	= 0.420	Rating curve m	= 0.882
Ave. velocity	= 0.35 ft/s	Routing coeff.	= 0.2262

Modified Att-Kin routing method used.



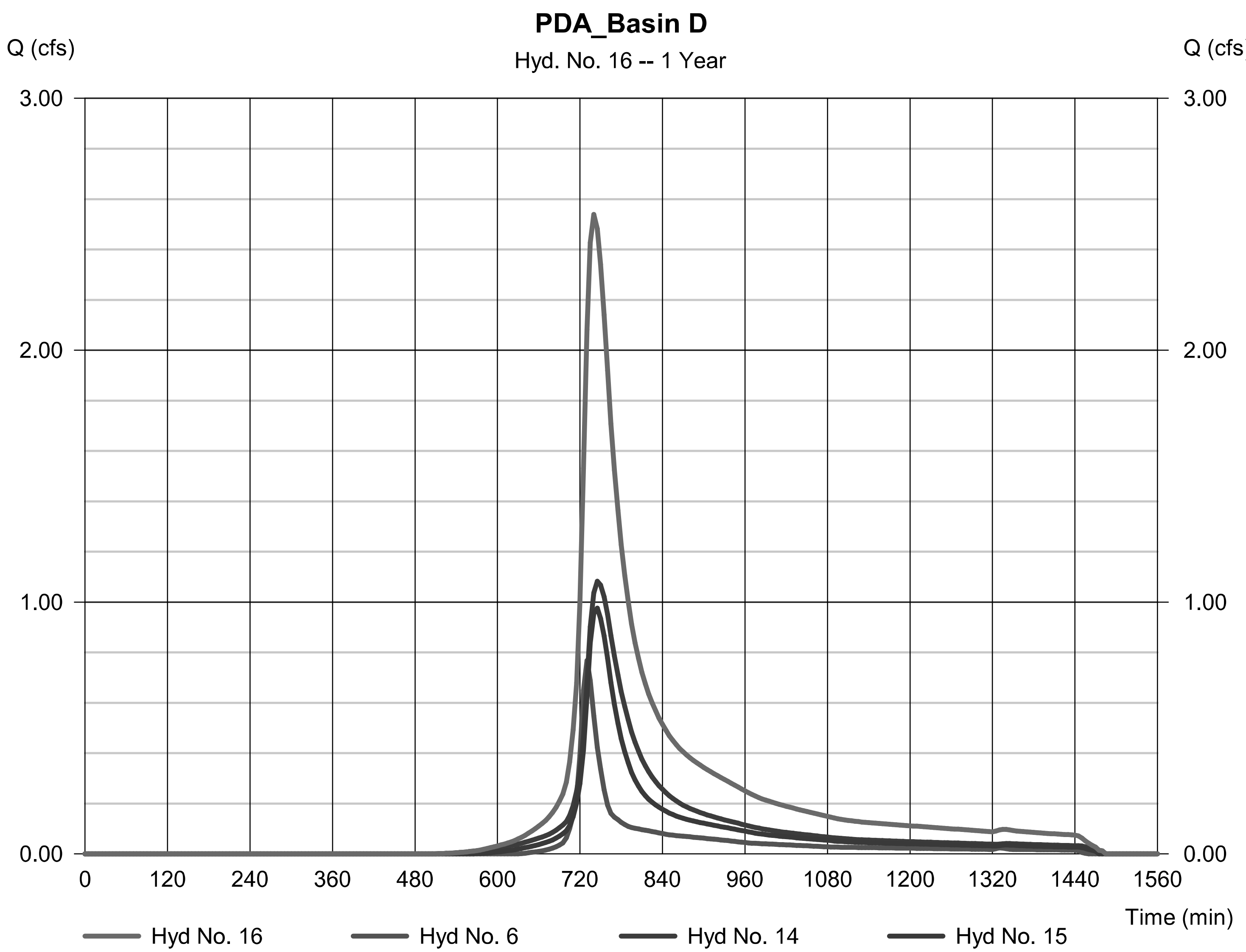
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 16

PDA_Basin D

Hydrograph type	= Combine	Peak discharge	= 2.539 cfs
Storm frequency	= 1 yrs	Time to peak	= 740 min
Time interval	= 5 min	Hyd. volume	= 17,364 cuft
Inflow hyds.	= 6, 14, 15	Contrib. drain. area	= 1.070 ac



Hydrograph Report

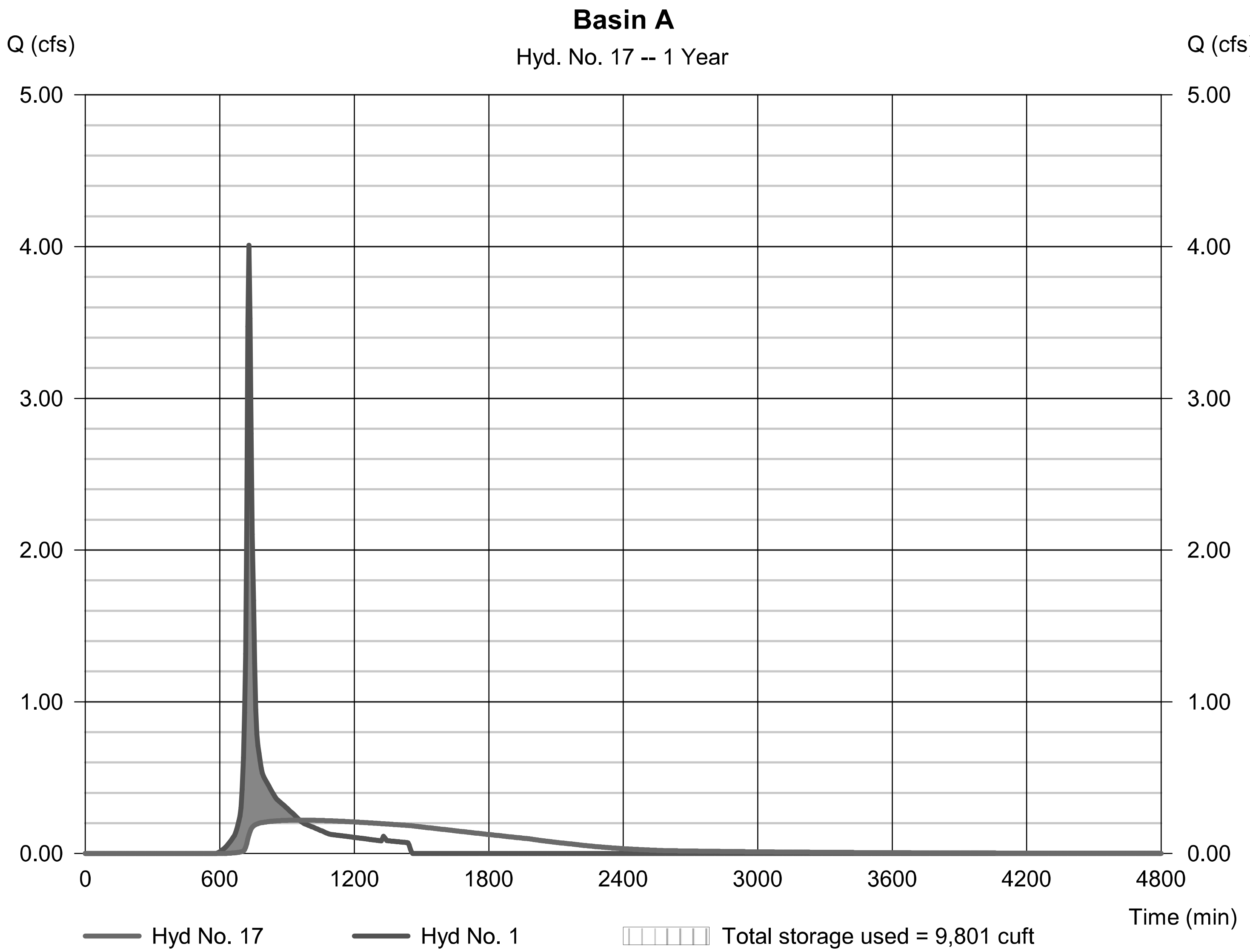
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 17

Basin A

Hydrograph type	= Reservoir	Peak discharge	= 0.220 cfs
Storm frequency	= 1 yrs	Time to peak	= 955 min
Time interval	= 5 min	Hyd. volume	= 16,116 cuft
Inflow hyd. No.	= 1 - PDA_A	Max. Elevation	= 1386.07 ft
Reservoir name	= Basin A	Max. Storage	= 9,801 cuft

Storage Indication method used.



Hydrograph Report

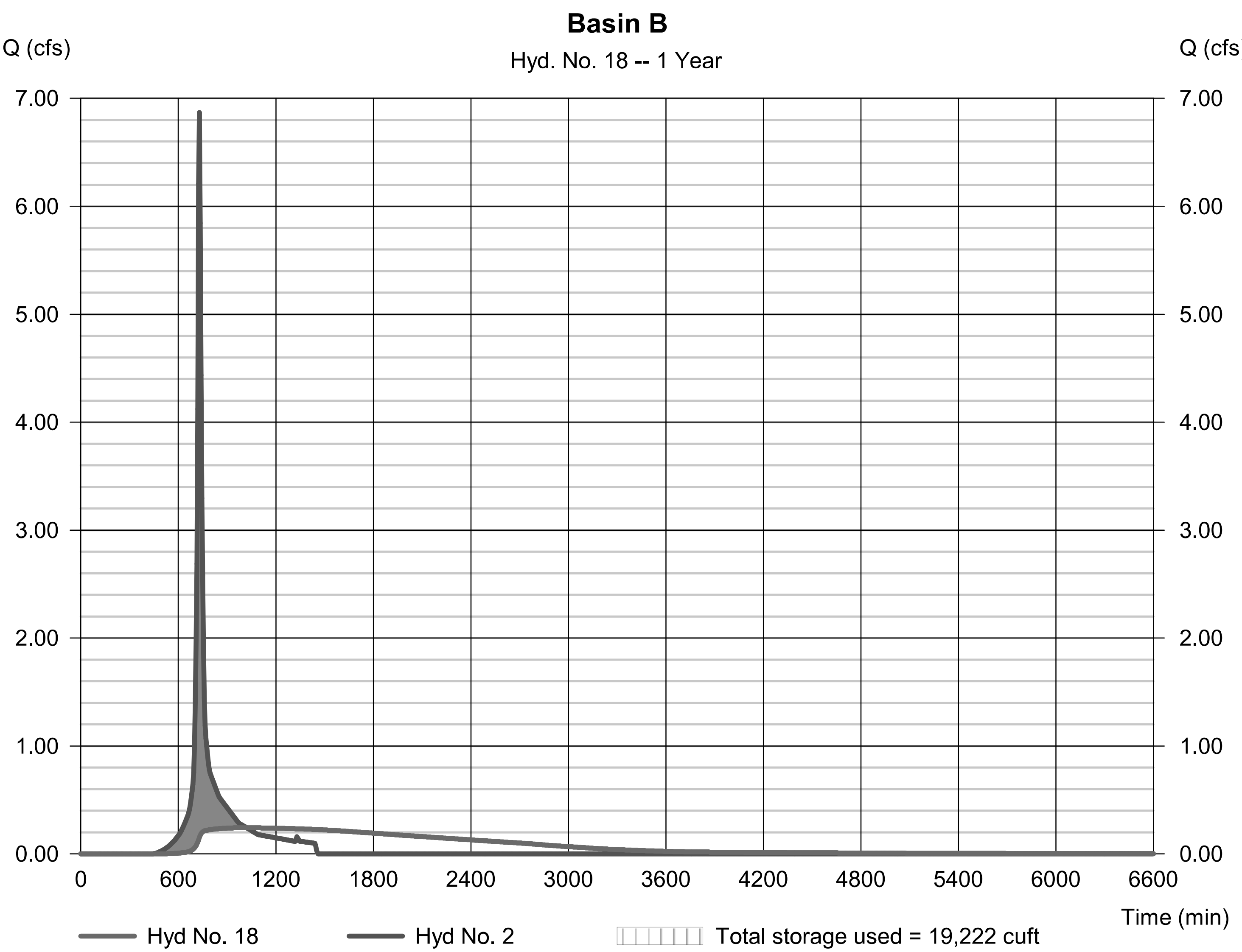
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 — Friday, 12 / 4 / 2015

Hyd. No. 18

Basin B

Hydrograph type	= Reservoir	Peak discharge	= 0.242 cfs
Storm frequency	= 1 yrs	Time to peak	= 1020 min
Time interval	= 5 min	Hyd. volume	= 27,255 cuft
Inflow hyd. No.	= 2 - PDA_B	Max. Elevation	= 1376.26 ft
Reservoir name	= Basin B	Max. Storage	= 19,222 cuft

Storage Indication method used.



Hydrograph Report

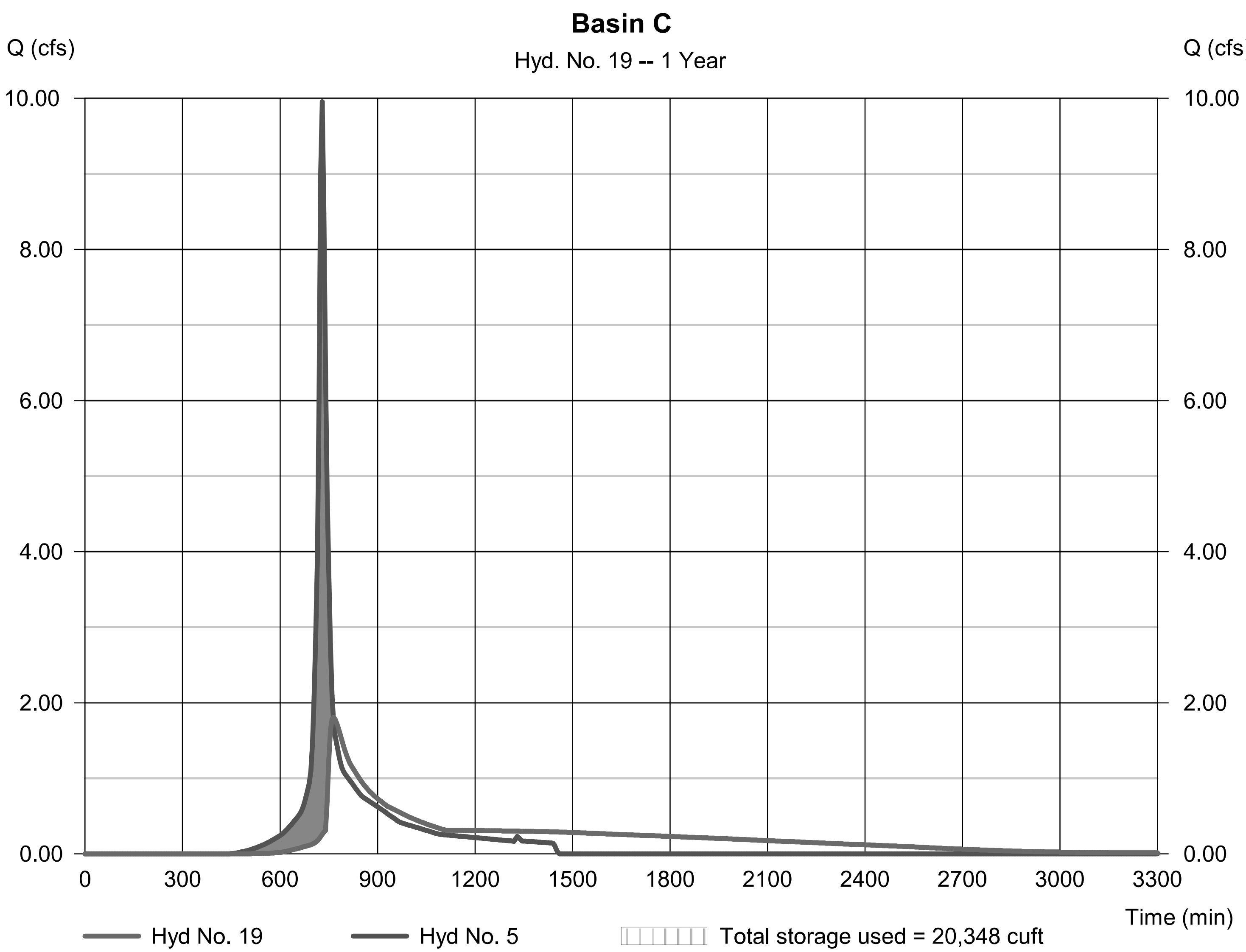
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 19

Basin C

Hydrograph type	= Reservoir	Peak discharge	= 1.808 cfs
Storm frequency	= 1 yrs	Time to peak	= 765 min
Time interval	= 5 min	Hyd. volume	= 39,581 cuft
Inflow hyd. No.	= 5 - PDA_C	Max. Elevation	= 1486.28 ft
Reservoir name	= Basin C	Max. Storage	= 20,348 cuft

Storage Indication method used.



Hydrograph Report

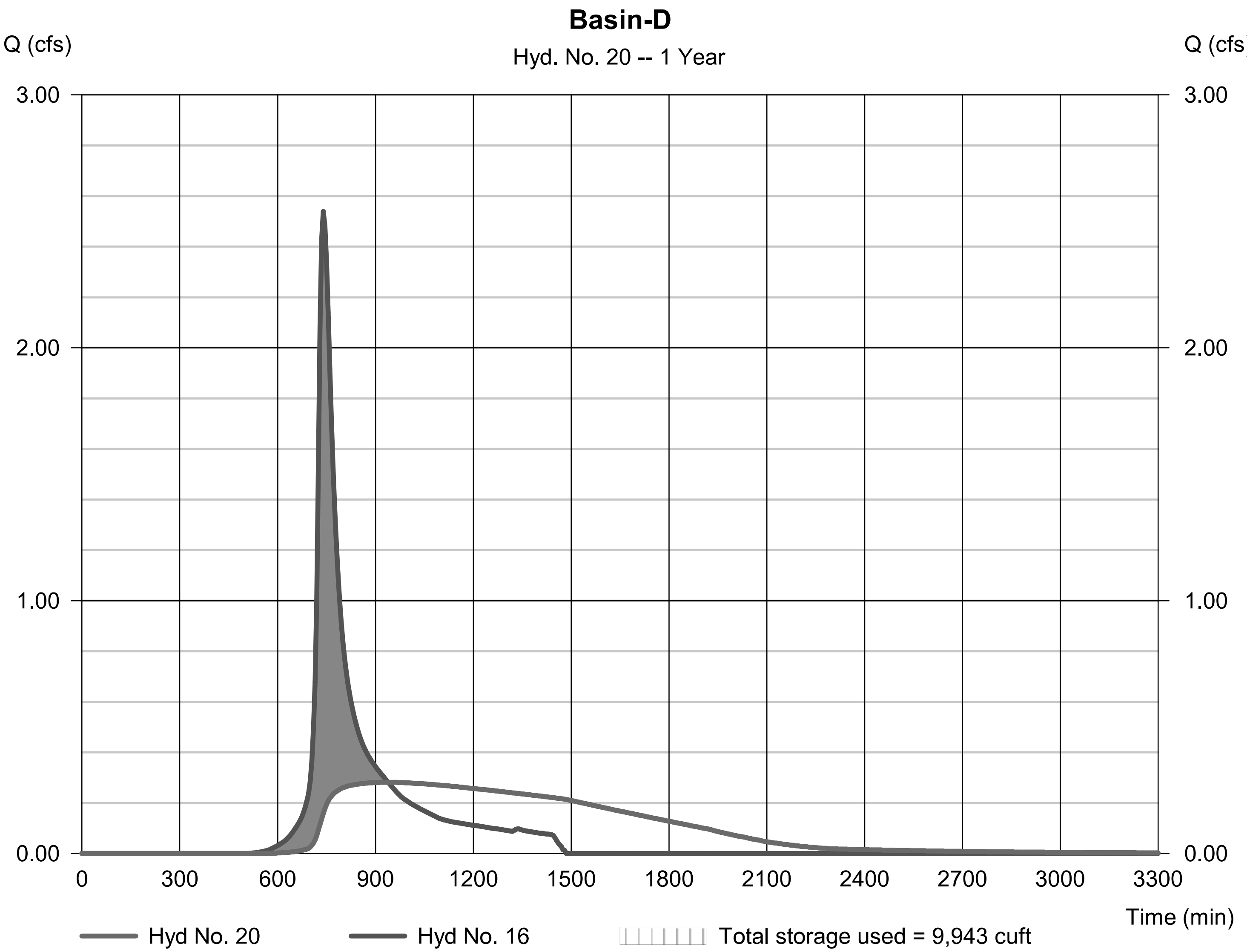
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 20

Basin-D

Hydrograph type	= Reservoir	Peak discharge	= 0.281 cfs
Storm frequency	= 1 yrs	Time to peak	= 940 min
Time interval	= 5 min	Hyd. volume	= 17,334 cuft
Inflow hyd. No.	= 16 - PDA_Basin D	Max. Elevation	= 1496.65 ft
Reservoir name	= Basin D	Max. Storage	= 9,943 cuft

Storage Indication method used.



Hydrograph Report

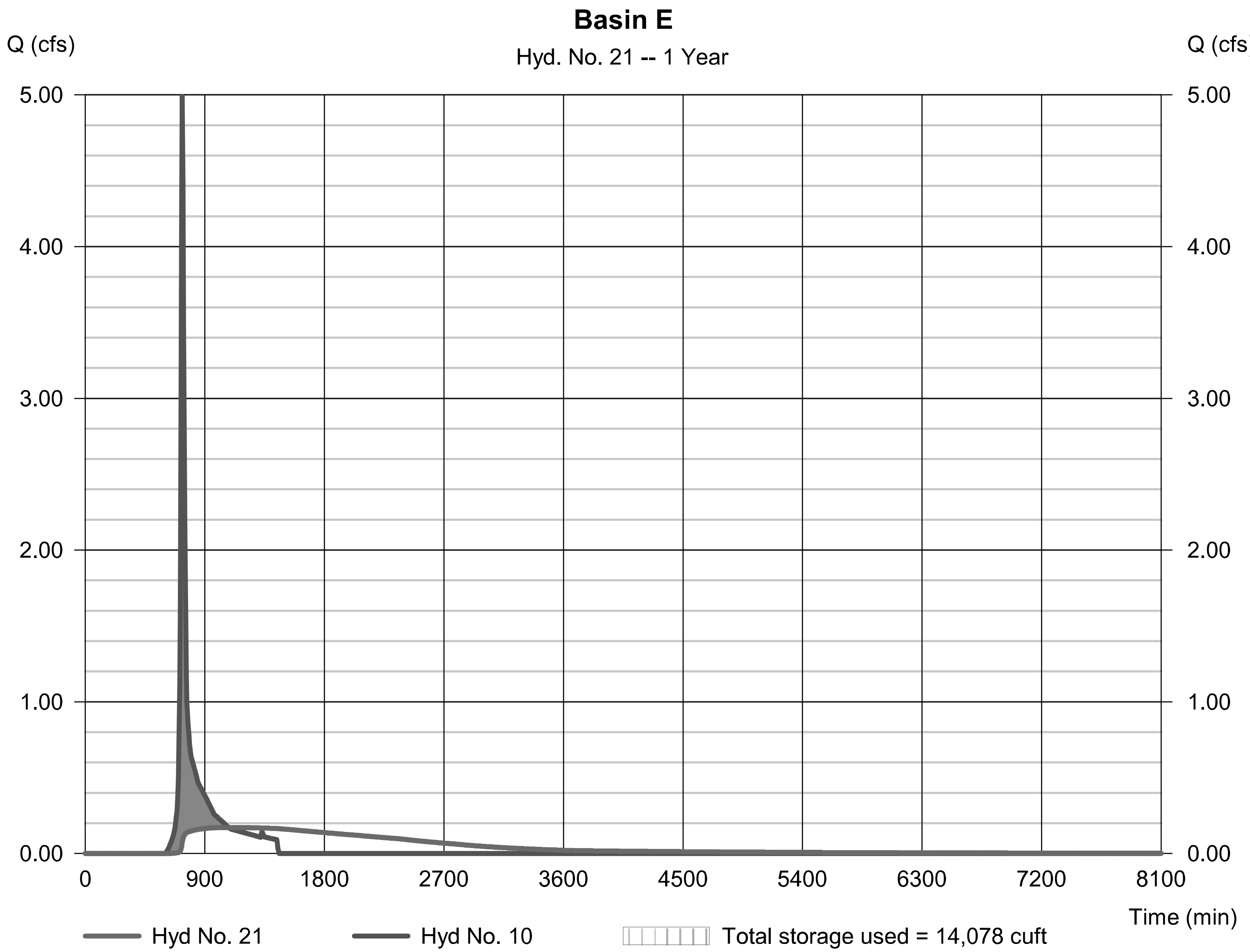
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 21

Basin E

Hydrograph type	= Reservoir	Peak discharge	= 0.172 cfs
Storm frequency	= 1 yrs	Time to peak	= 1080 min
Time interval	= 5 min	Hyd. volume	= 20,133 cuft
Inflow hyd. No.	= 10 - PDA_E	Max. Elevation	= 1495.71 ft
Reservoir name	= Basin E	Max. Storage	= 14,078 cuft

Storage Indication method used.



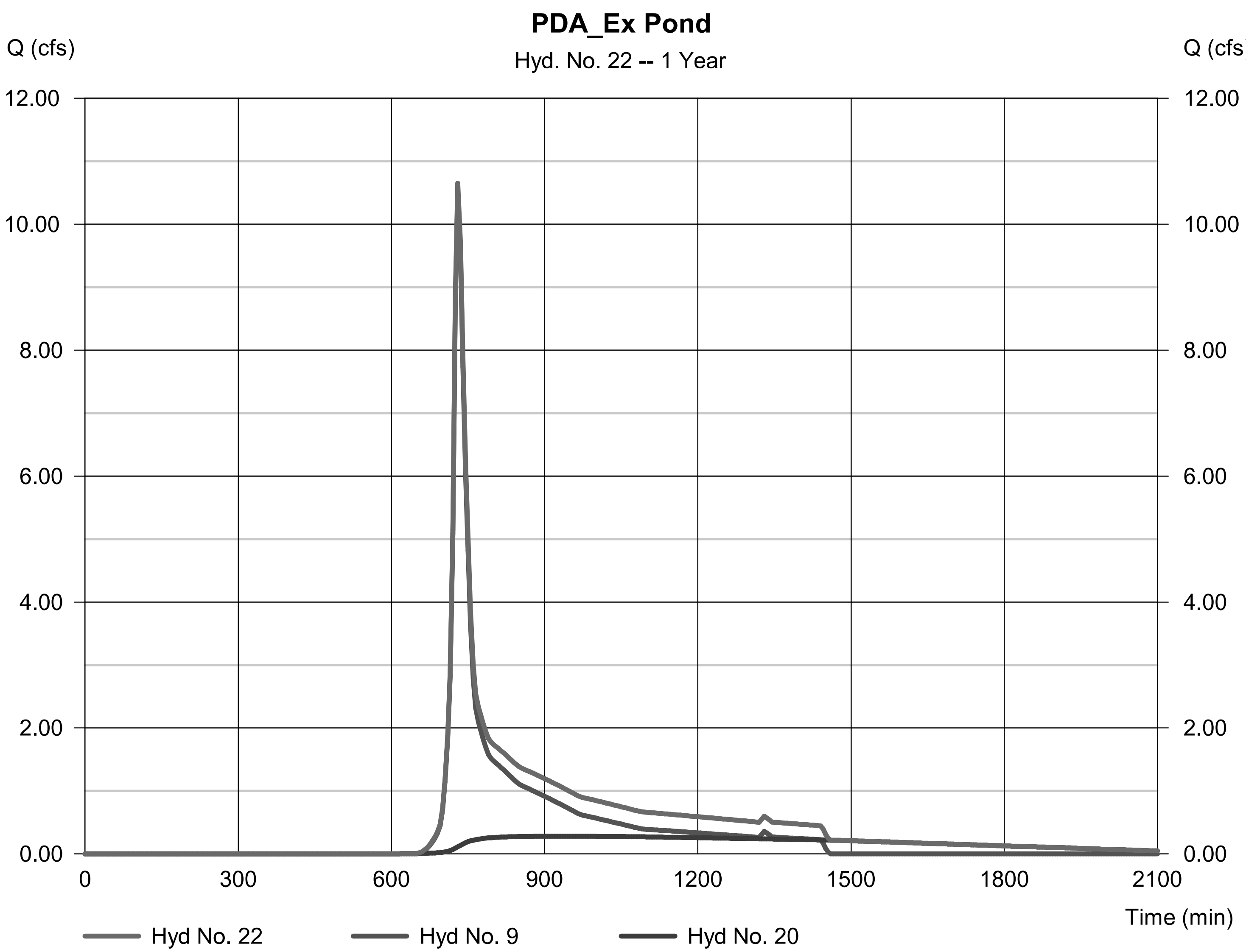
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 22

PDA_Ex Pond

Hydrograph type	= Combine	Peak discharge	= 10.65 cfs
Storm frequency	= 1 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 61,909 cuft
Inflow hyds.	= 9, 20	Contrib. drain. area	= 16.970 ac



Hydrograph Report

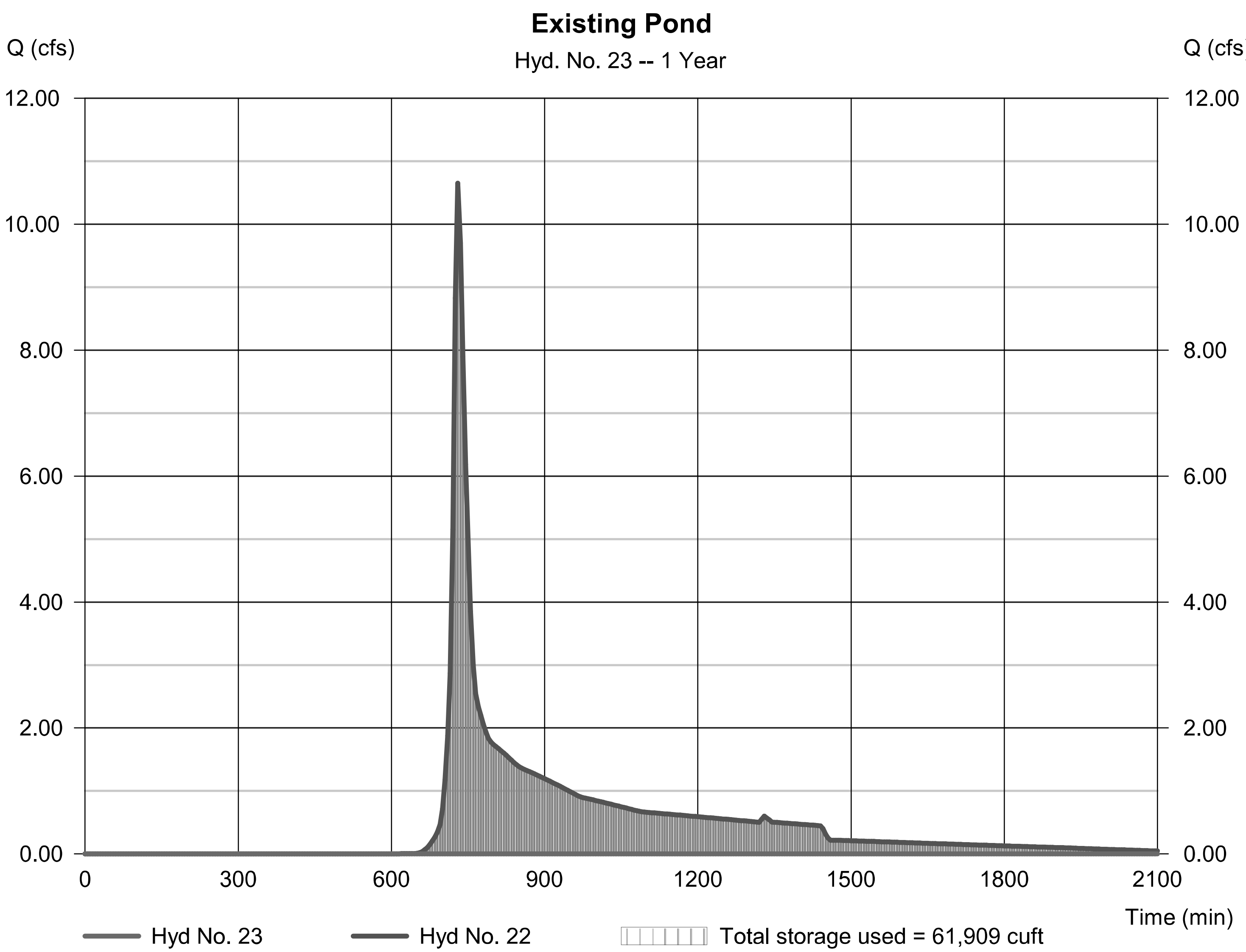
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 23

Existing Pond

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 5 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 22 - PDA_Ex Pond	Max. Elevation	= 1485.69 ft
Reservoir name	= Ex. Pond	Max. Storage	= 61,909 cuft

Storage Indication method used.



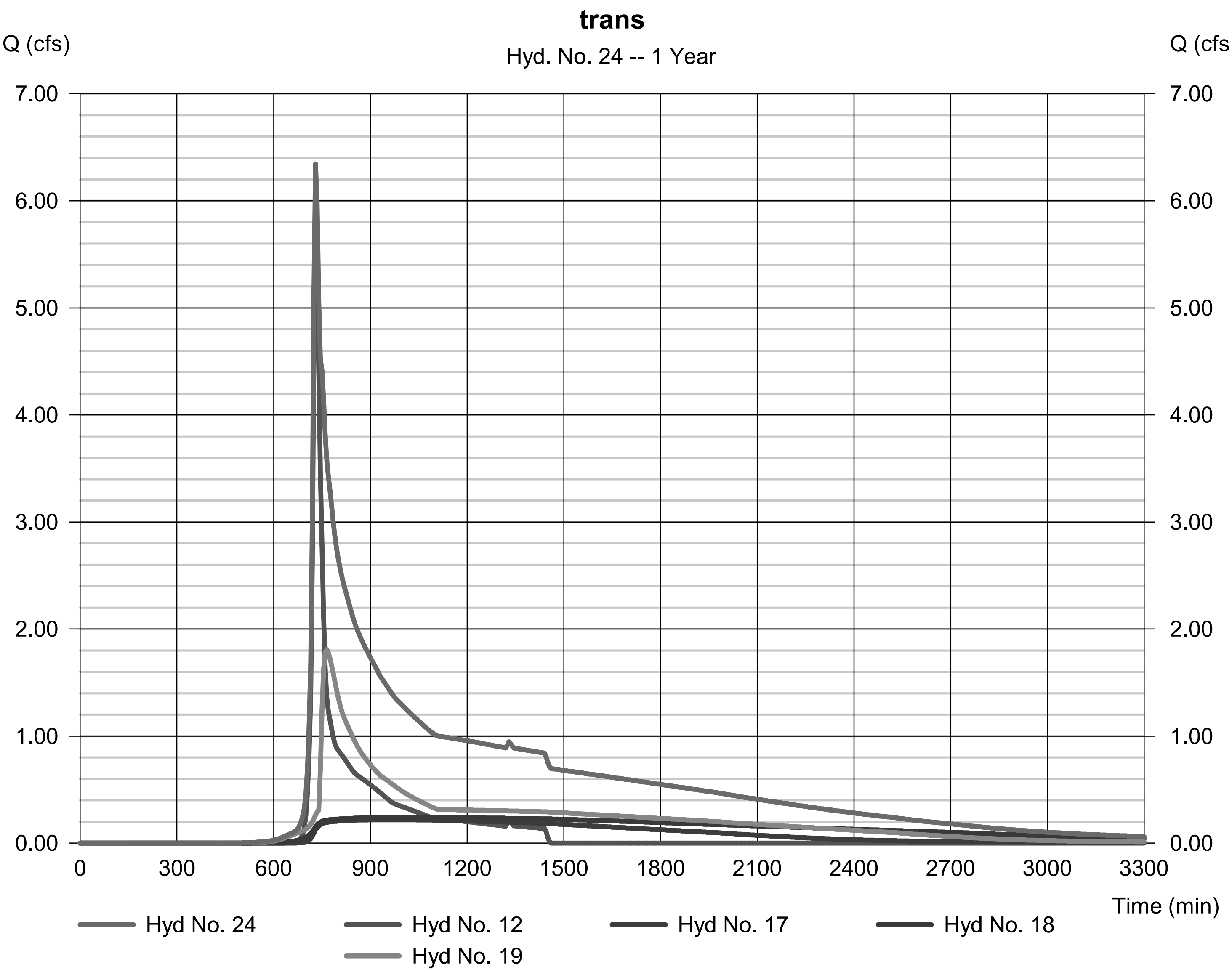
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 24

trans

Hydrograph type	= Combine	Peak discharge	= 6.345 cfs
Storm frequency	= 1 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 108,358 cuft
Inflow hyds.	= 12, 17, 18, 19	Contrib. drain. area	= 10.980 ac



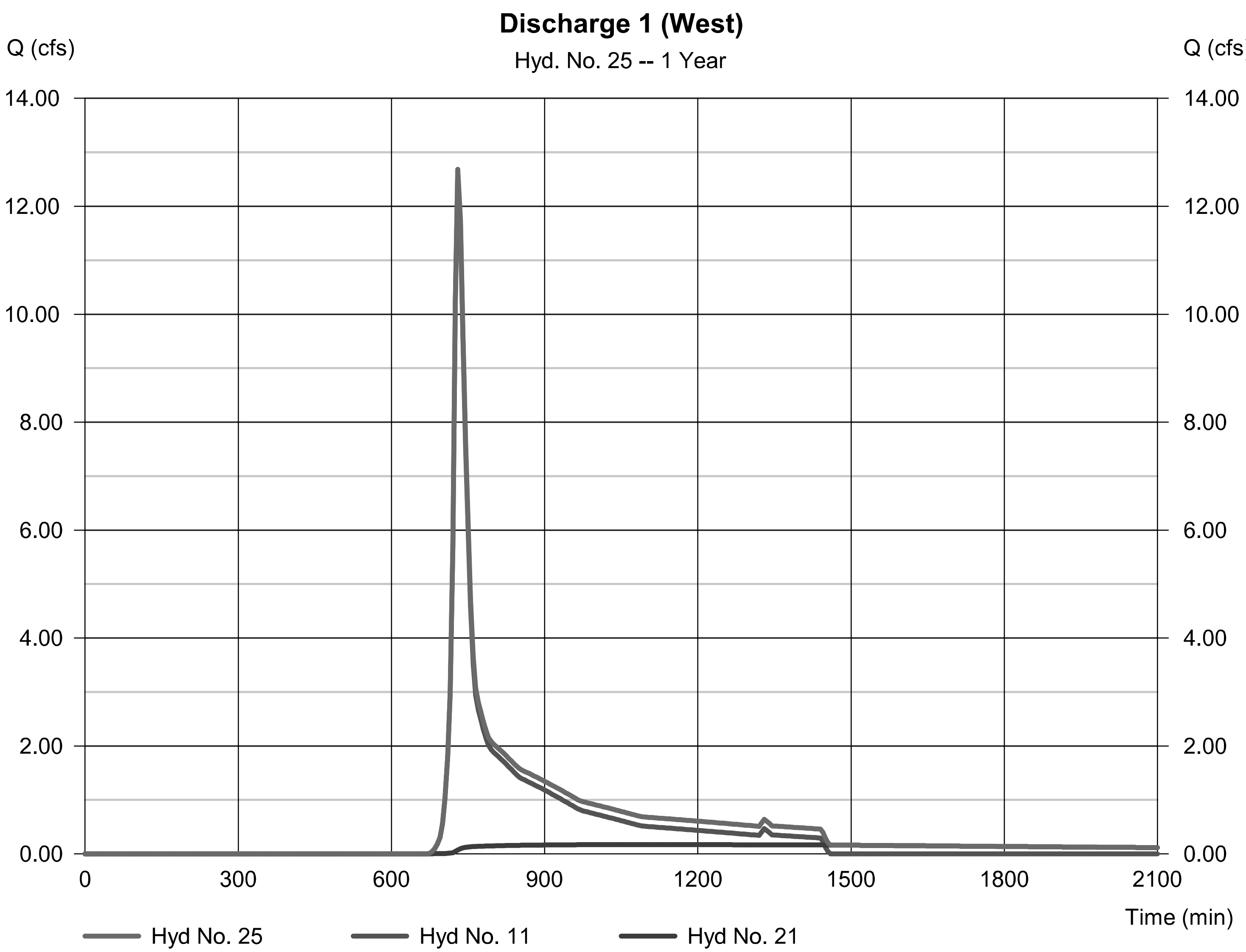
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 | Friday, 12 / 4 / 2015

Hyd. No. 25

Discharge 1 (West)

Hydrograph type	= Combine	Peak discharge	= 12.68 cfs
Storm frequency	= 1 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 75,295 cuft
Inflow hyds.	= 11, 21	Contrib. drain. area	= 23.840 ac



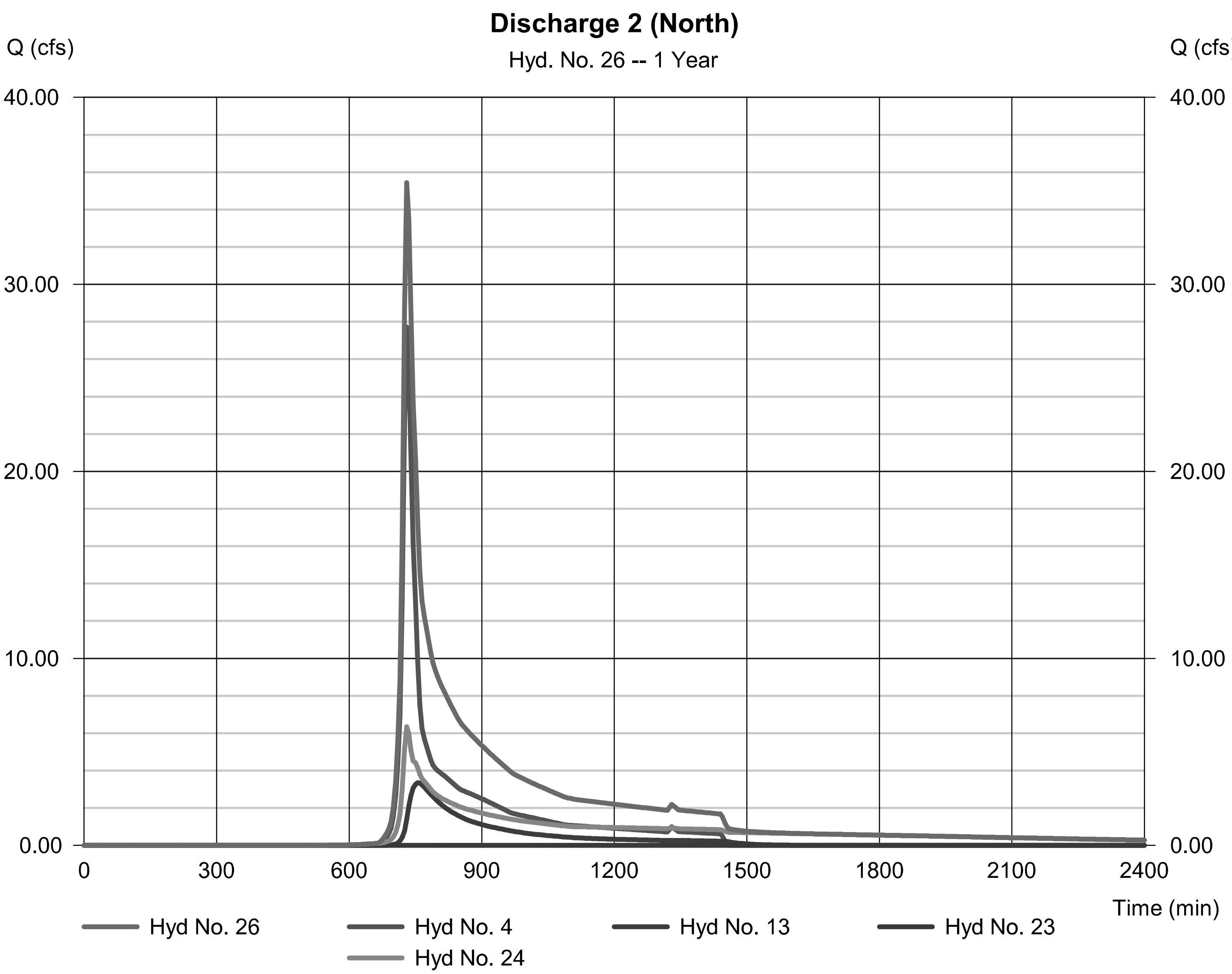
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 — Friday, 12 / 4 / 2015

Hyd. No. 26

Discharge 2 (North)

Hydrograph type	= Combine	Peak discharge	= 35.44 cfs
Storm frequency	= 1 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 264,904 cuft
Inflow hyds.	= 4, 13, 23, 24	Contrib. drain. area	= 48.250 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	10.35	5	730	41,176	------	------	------	PDA_A
2	SCS Runoff	14.71	5	730	60,106	------	------	------	PDA_B
3	SCS Runoff	28.35	5	730	113,178	------	------	------	PDA_Swale-A1
4	SCS Runoff	87.79	5	730	349,715	------	------	------	PDA_X2
5	SCS Runoff	21.33	5	730	87,132	------	------	------	PDA_C
6	SCS Runoff	2.179	5	730	8,654	------	------	------	PDA_D
7	SCS Runoff	4.542	5	730	18,350	------	------	------	PDA_Swale-D1
8	SCS Runoff	3.790	5	730	15,145	------	------	------	PDA_Swale-D2
9	SCS Runoff	32.10	5	730	127,665	------	------	------	PDA_X3
10	SCS Runoff	13.26	5	730	52,722	------	------	------	PDA_E
11	SCS Runoff	41.67	5	730	166,349	------	------	------	PDA_X1
12	SCS Runoff	19.19	5	730	76,615	------	------	------	PDA_X4
13	Reach	12.92	5	750	113,156	3	------	------	Swale-A1
14	Reach	2.359	5	745	18,333	7	------	------	Swale-D1
15	Reach	2.298	5	745	15,130	8	------	------	Swale-D2
16	Combine	5.974	5	740	42,116	6, 14, 15	------	------	PDA_Basin D
17	Reservoir	0.372	5	1015	41,128	1	1387.74	28,524	Basin A
18	Reservoir	0.372	5	1075	60,027	2	1377.74	45,607	Basin B
19	Reservoir	12.20	5	740	87,088	5	1487.35	31,806	Basin C
20	Reservoir	1.490	5	820	42,086	16	1498.23	22,491	Basin-D
21	Reservoir	0.304	5	1180	52,615	10	1496.89	40,527	Basin E
22	Combine	32.34	5	730	169,751	9, 20,	------	------	PDA_Ex Pond
23	Reservoir	0.000	5	n/a	0	22	1486.89	169,751	Existing Pond
24	Combine	29.77	5	730	264,858	12, 17, 18, 19,	------	------	trans
25	Combine	41.86	5	730	218,964	11, 21,	------	------	Discharge 1 (West)
26	Combine	125.01	5	730	727,729	4, 13, 23, 24,	------	------	Discharge 2 (North)

Hydrograph Report

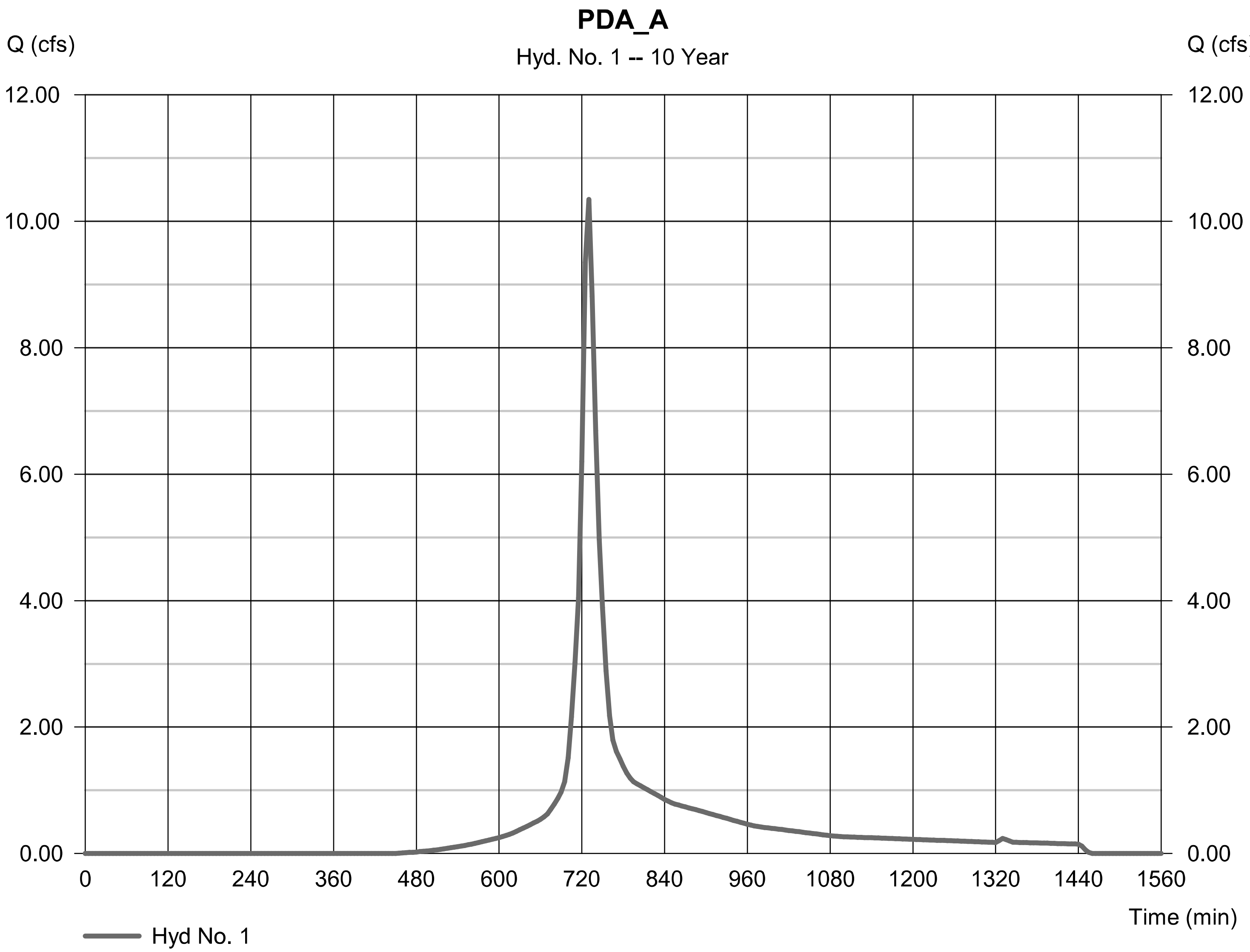
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 1

PDA_A

Hydrograph type	= SCS Runoff	Peak discharge	= 10.35 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 41,176 cuft
Drainage area	= 4.590 ac	Curve number	= 82*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 4.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(2.400 x 95) + (3.000 x 75)] / 4.590



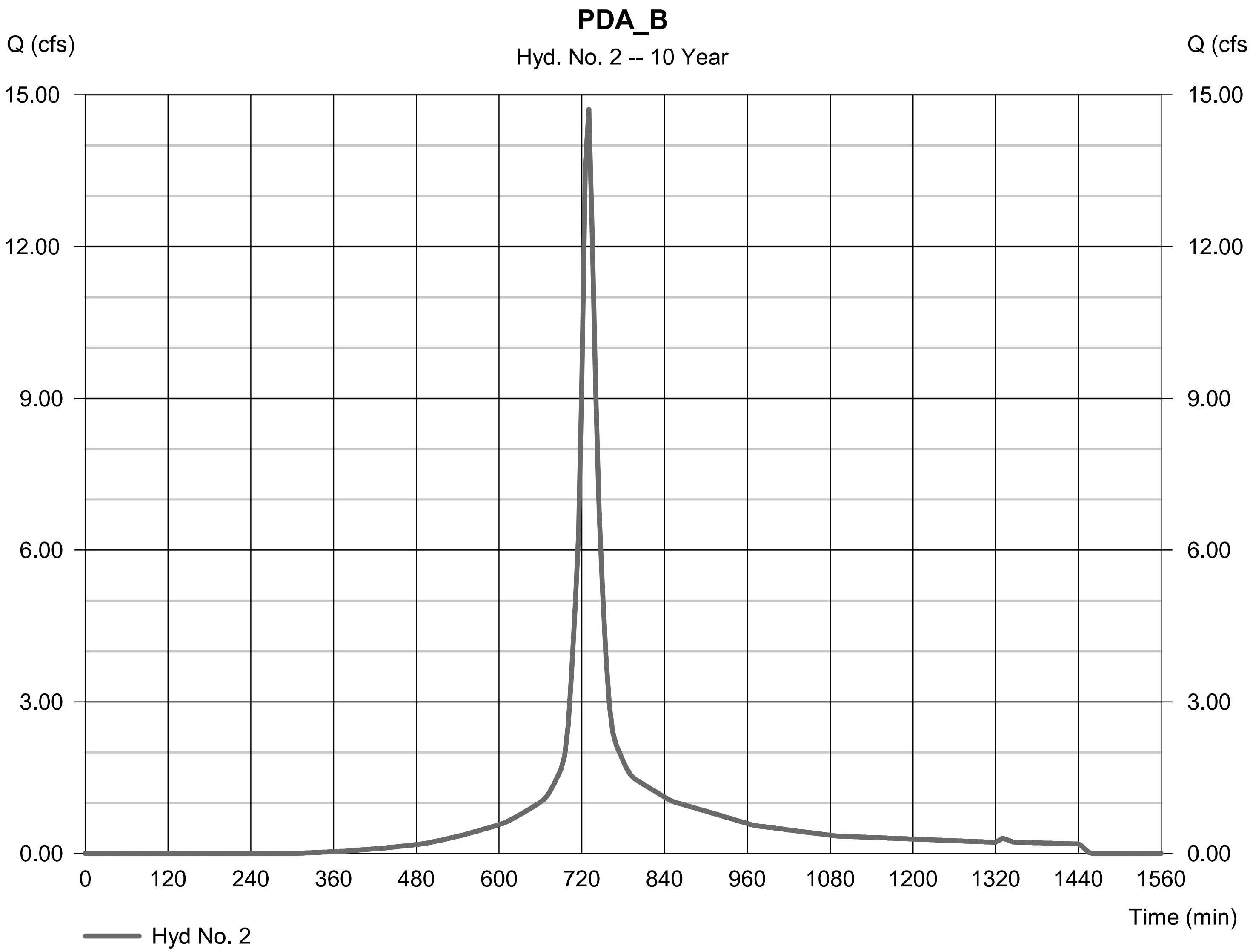
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 2

PDA_B

Hydrograph type	= SCS Runoff	Peak discharge	= 14.71 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 60,106 cuft
Drainage area	= 5.360 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 4.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

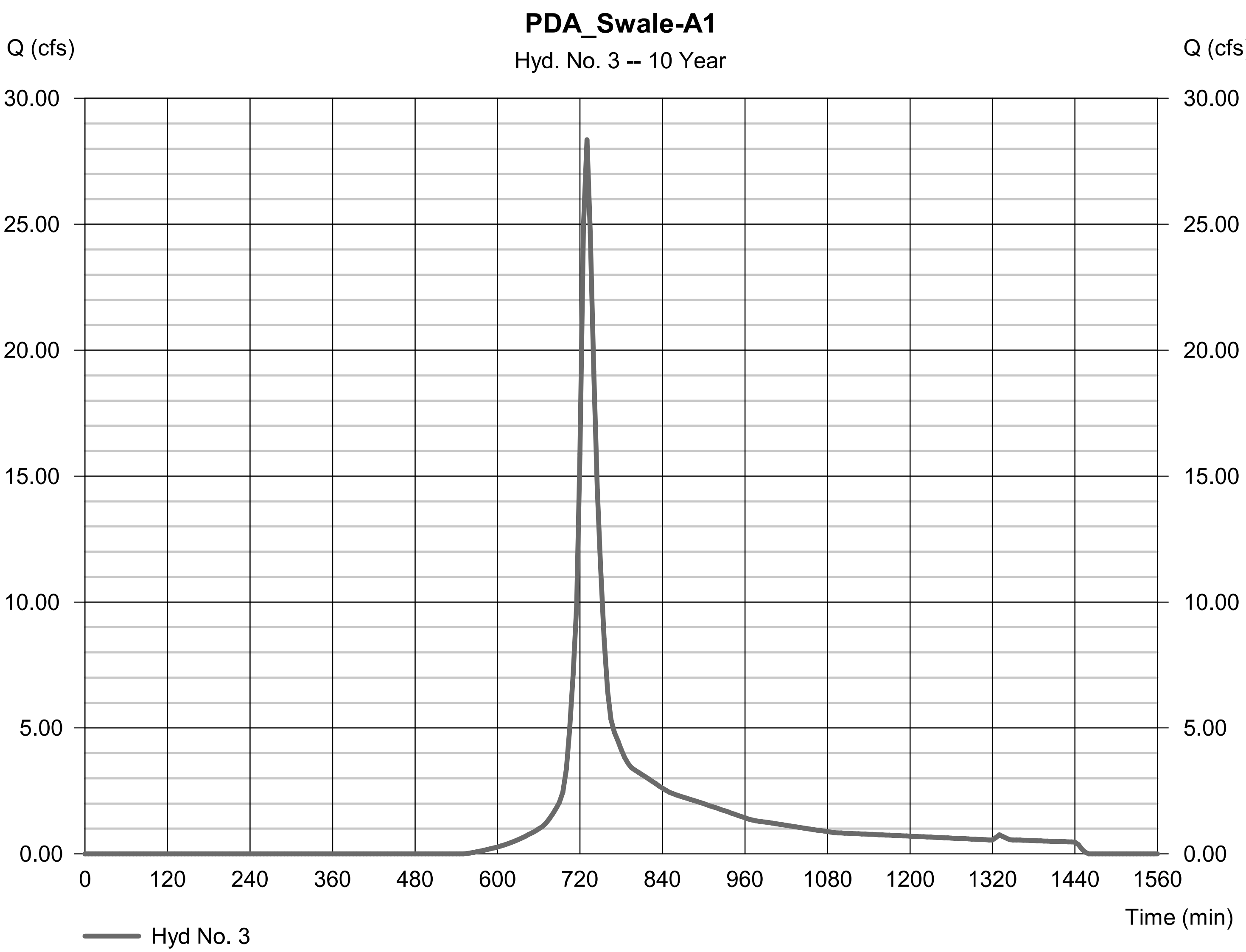
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 3

PDA_Swale-A1

Hydrograph type	= SCS Runoff	Peak discharge	= 28.35 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 113,178 cuft
Drainage area	= 16.220 ac	Curve number	= 75*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 4.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(2.400 x 95) + (3.000 x 75)] / 16.220



Hydrograph Report

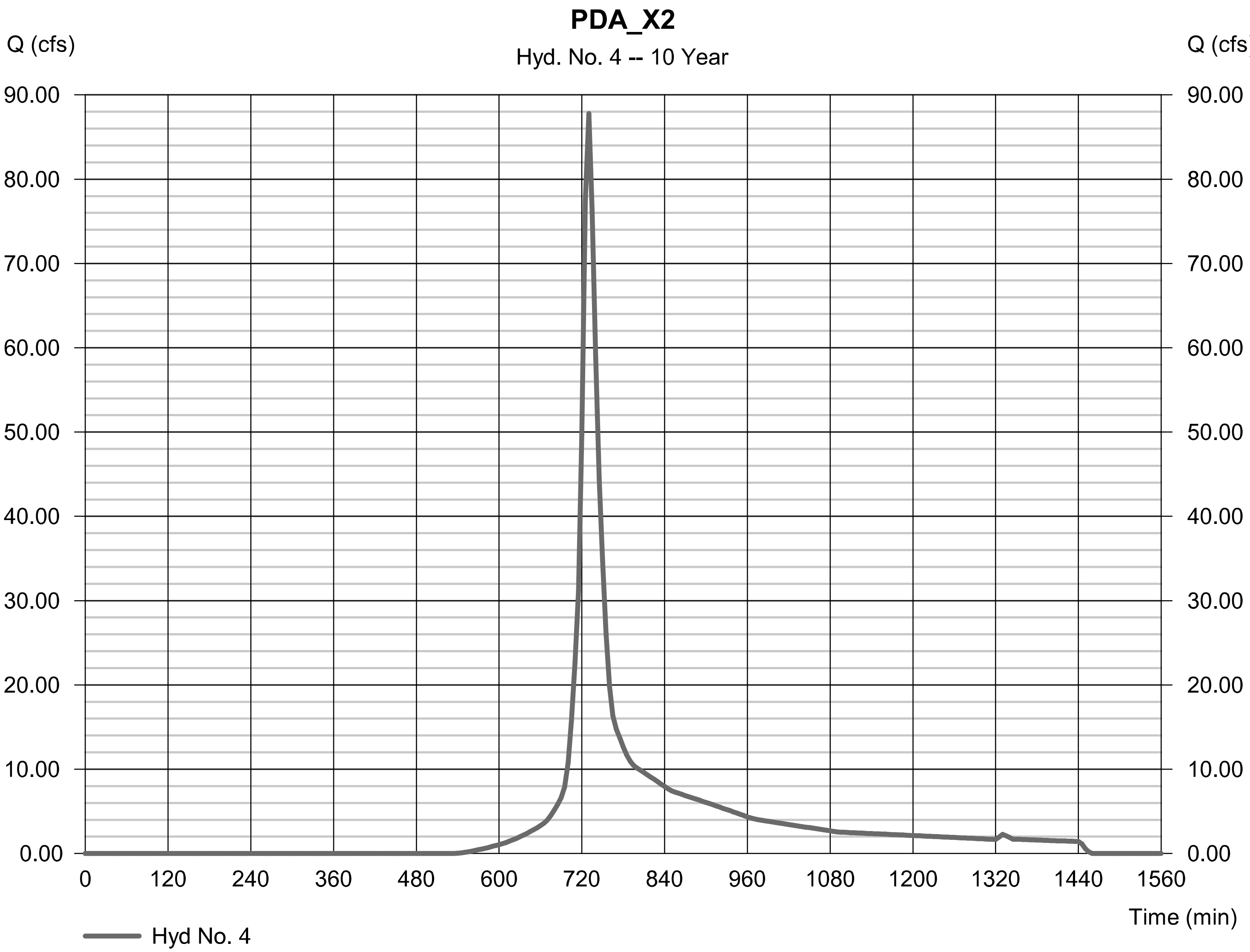
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 4

PDA_X2

Hydrograph type	= SCS Runoff	Peak discharge	= 87.79 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 349,715 cuft
Drainage area	= 48.250 ac	Curve number	= 76*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 4.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(20.000 x 75)] / 48.250



Hydrograph Report

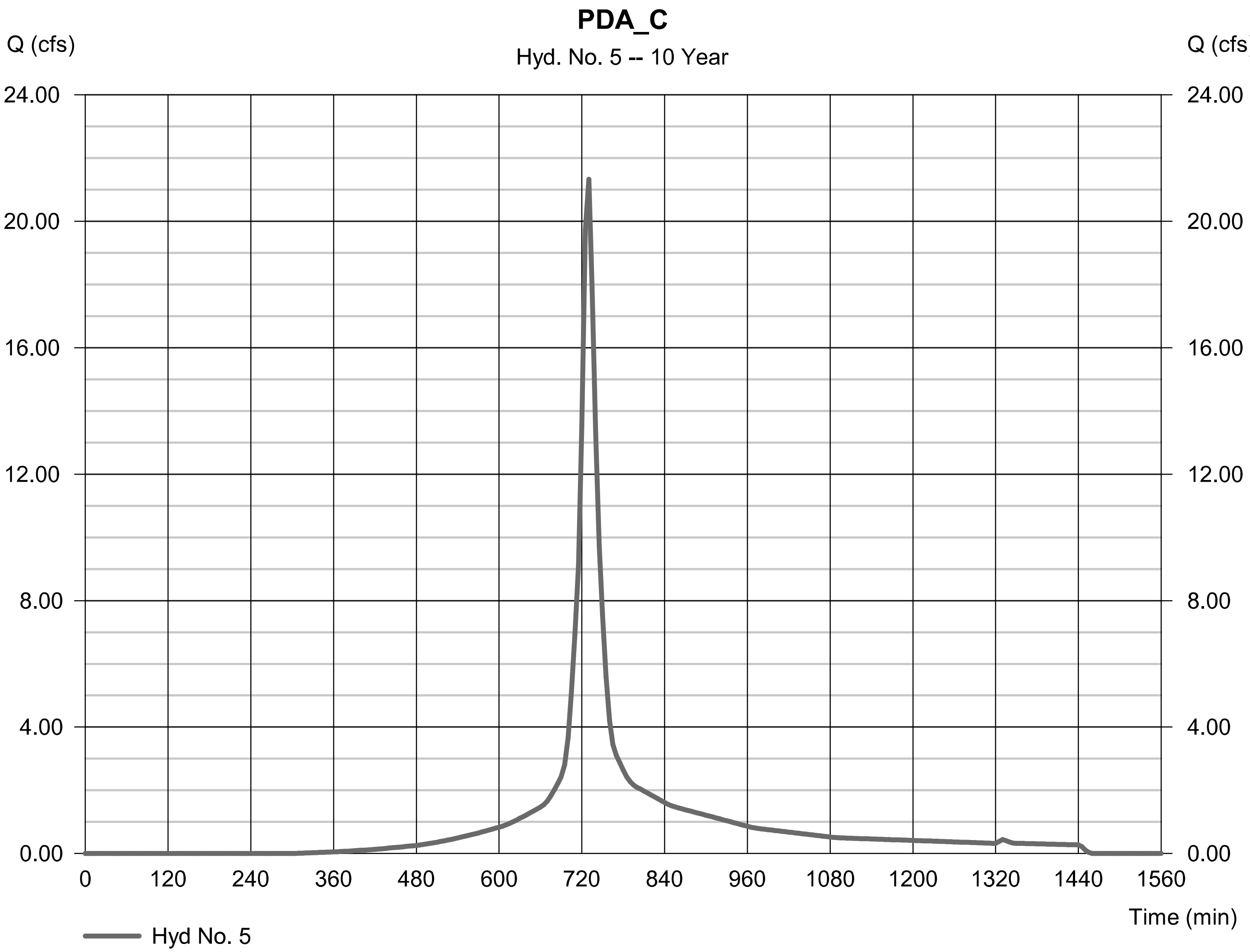
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 5

PDA_C

Hydrograph type	= SCS Runoff	Peak discharge	= 21.33 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 87,132 cuft
Drainage area	= 7.770 ac	Curve number	= 89*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 4.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(2.400 x 95) + (3.000 x 75)] / 7.770



Hydrograph Report

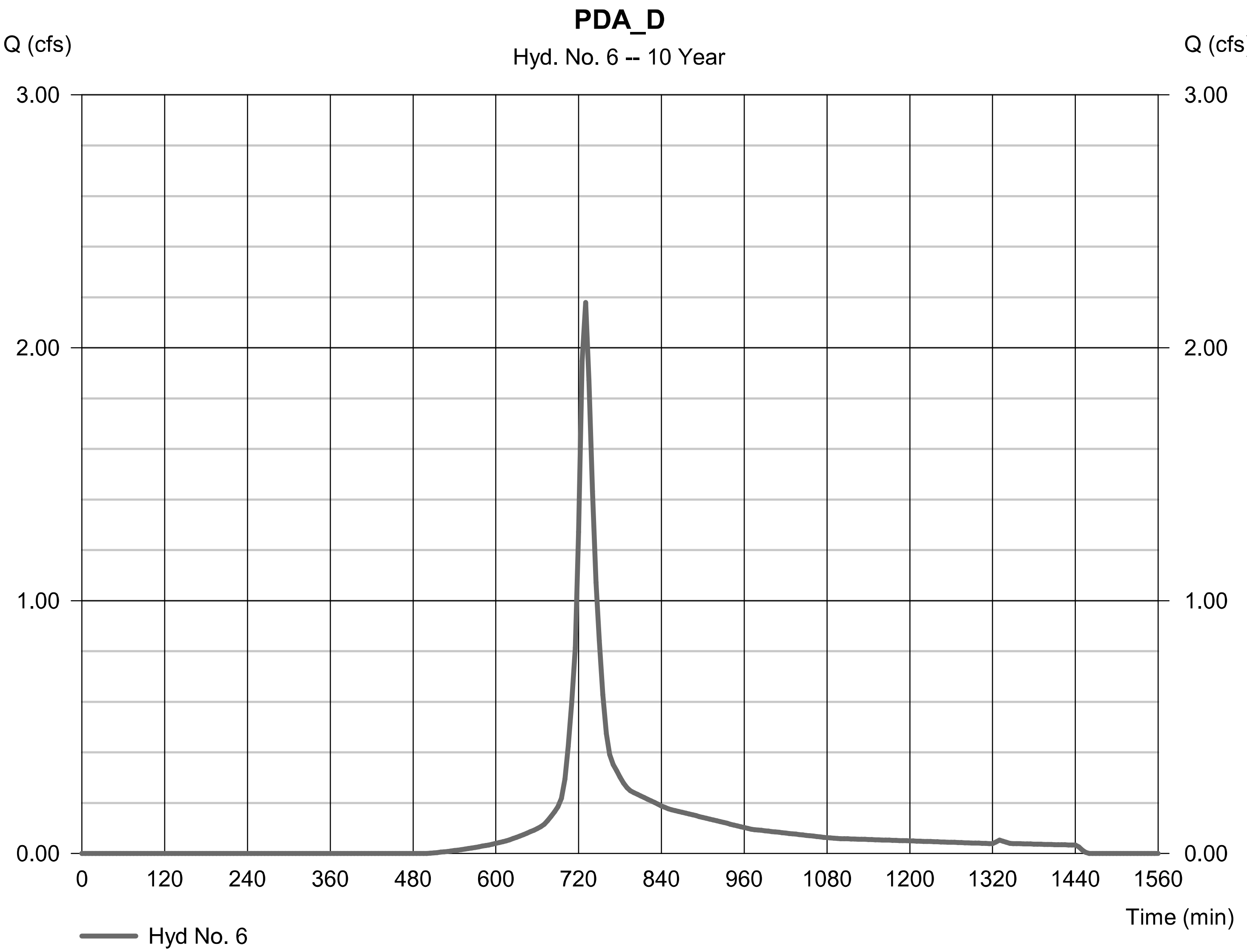
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 6

PDA_D

Hydrograph type	= SCS Runoff	Peak discharge	= 2.179 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 8,654 cuft
Drainage area	= 1.070 ac	Curve number	= 79*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 4.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(20.000 x 75)] / 1.070



Hydrograph Report

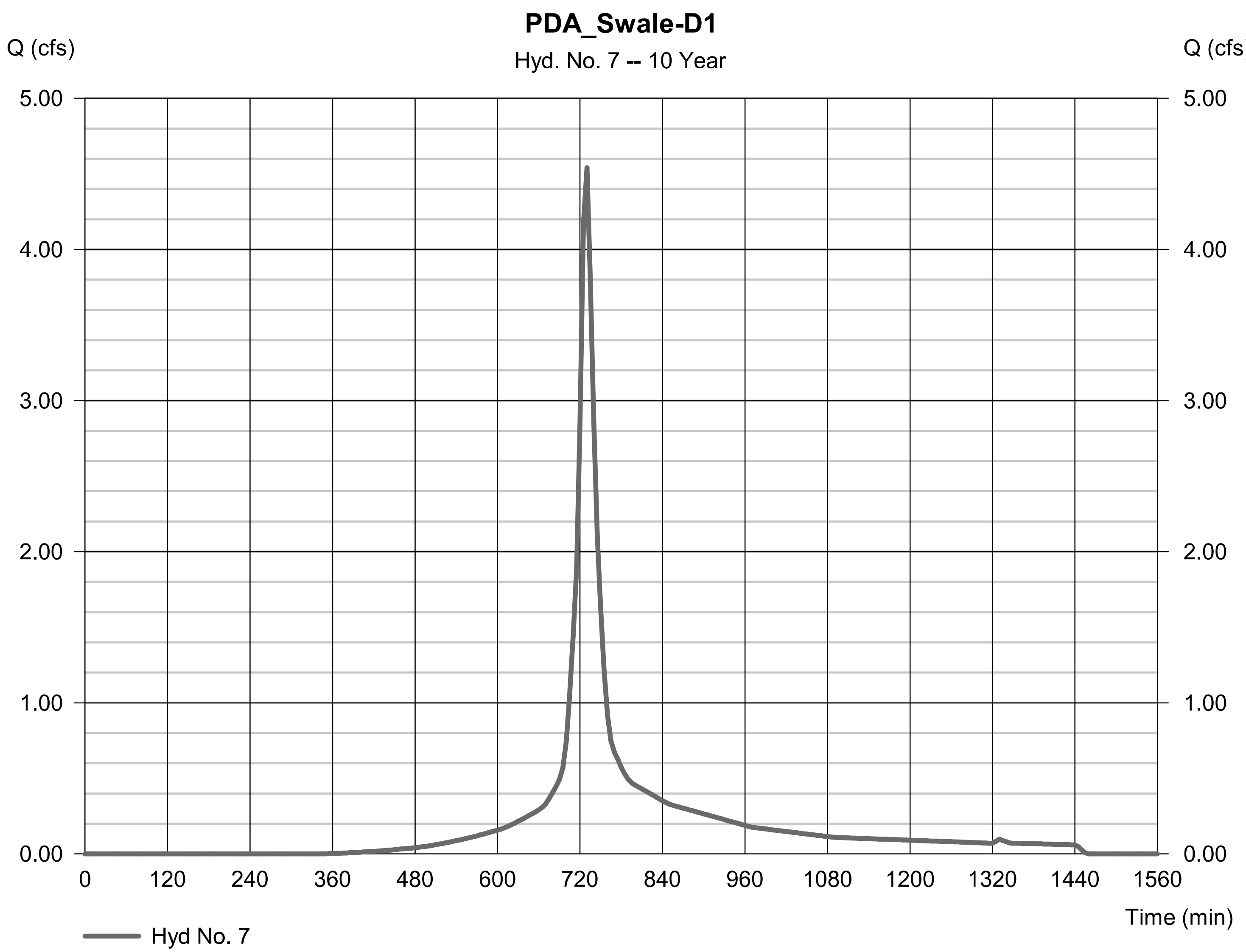
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 7

PDA_Swale-D1

Hydrograph type	= SCS Runoff	Peak discharge	= 4.542 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 18,350 cuft
Drainage area	= 1.740 ac	Curve number	= 87*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 4.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(2.400 x 95) + (3.000 x 75)] / 1.740



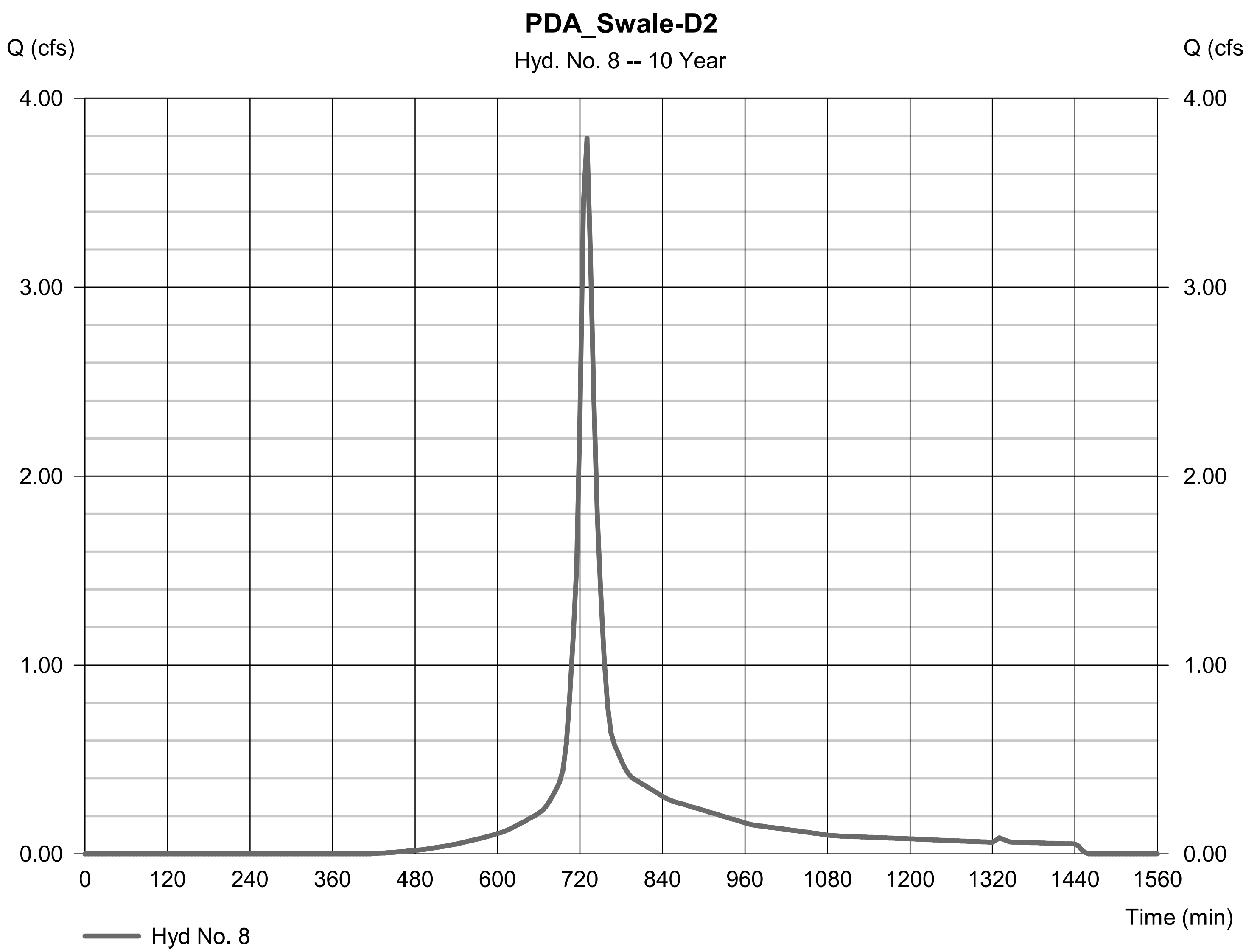
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 — Friday, 12 / 4 / 2015

Hyd. No. 8

PDA_Swale-D2

Hydrograph type	= SCS Runoff	Peak discharge	= 3.790 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 15,145 cuft
Drainage area	= 1.580 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 4.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

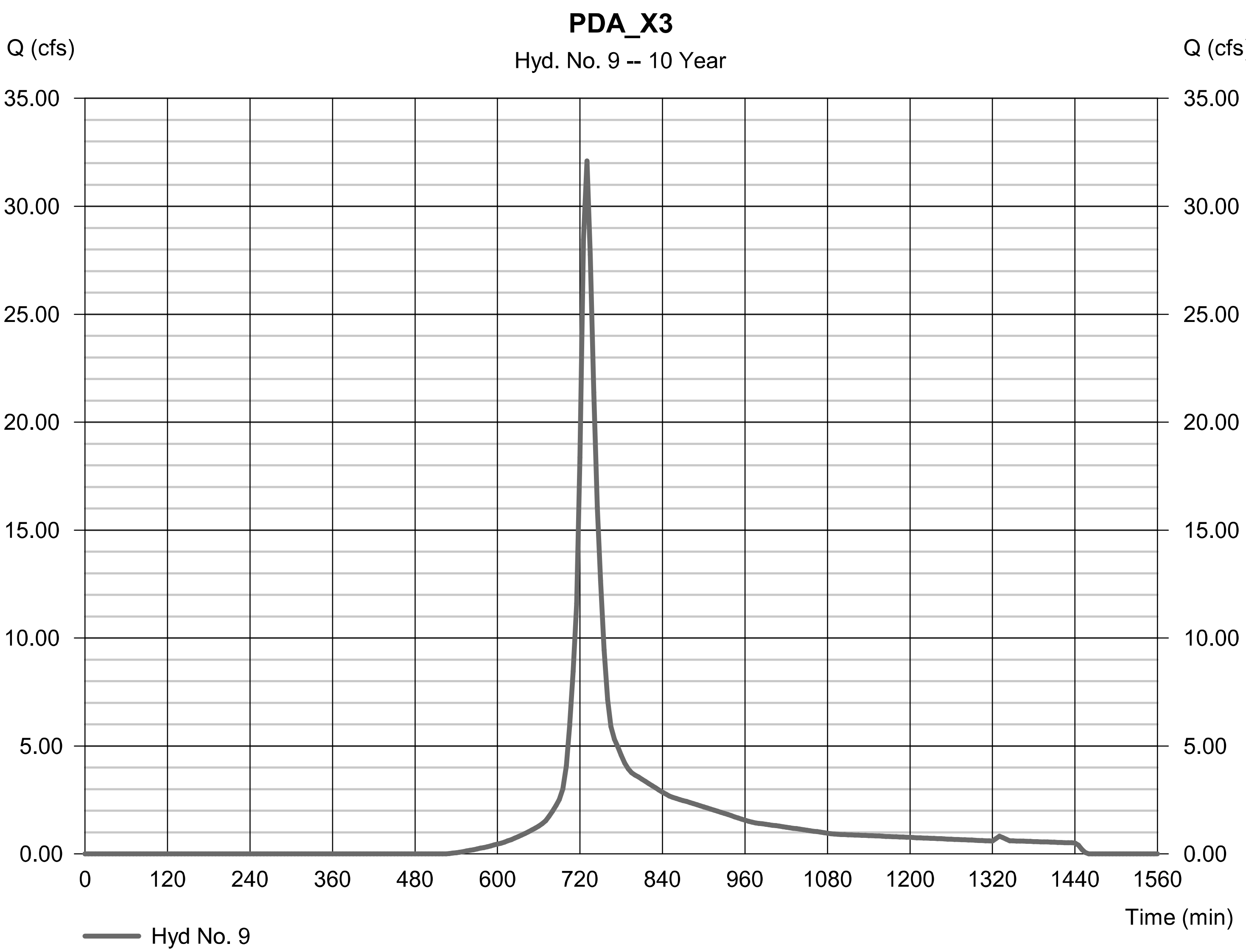
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 9

PDA_X3

Hydrograph type	= SCS Runoff	Peak discharge	= 32.10 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 127,665 cuft
Drainage area	= 16.970 ac	Curve number	= 77*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 4.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(20.000 x 75)] / 16.970



Hydrograph Report

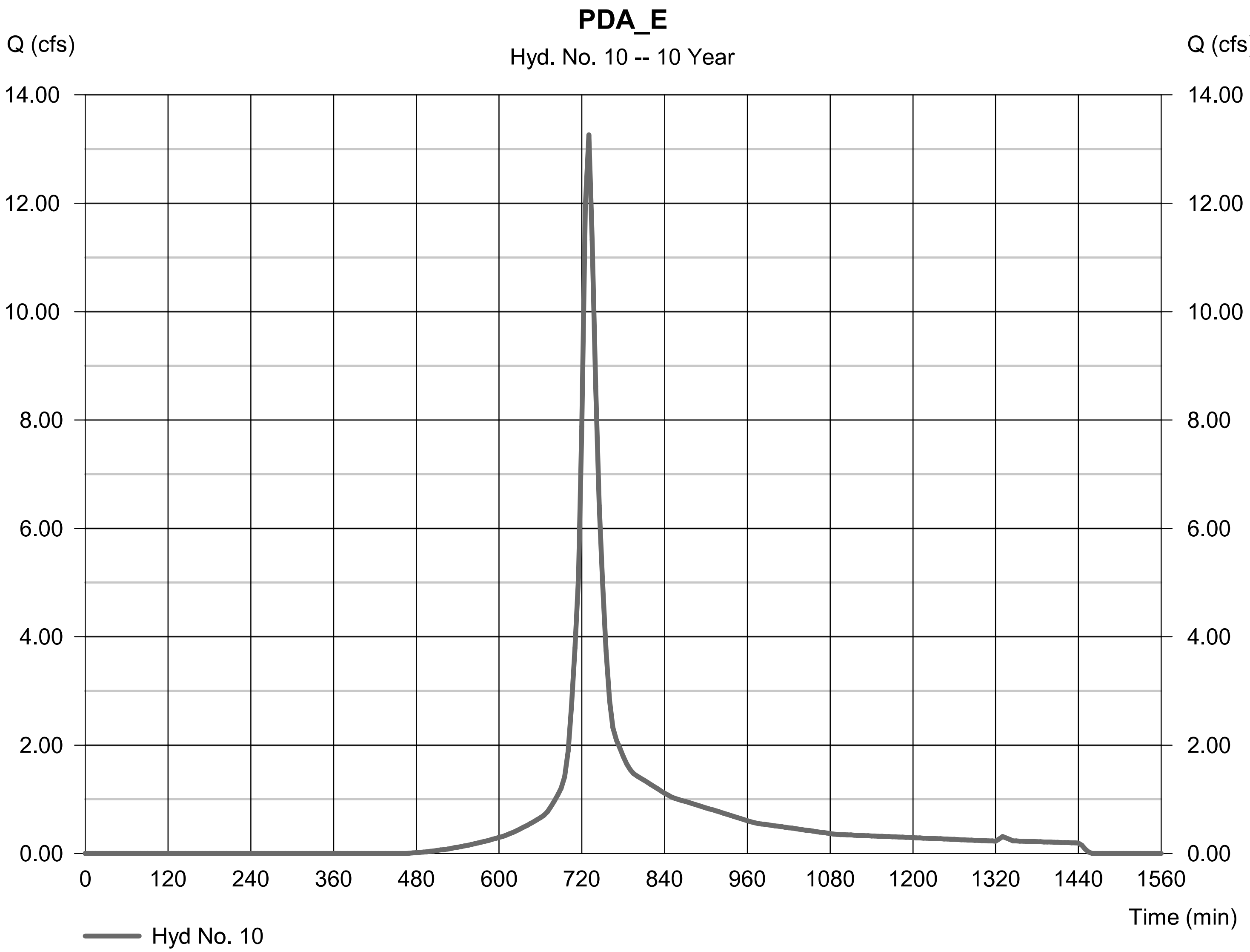
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 10

PDA_E

Hydrograph type	= SCS Runoff	Peak discharge	= 13.26 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 52,722 cuft
Drainage area	= 6.080 ac	Curve number	= 81*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 4.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(2.400 x 95) + (3.000 x 75)] / 6.080



Hydrograph Report

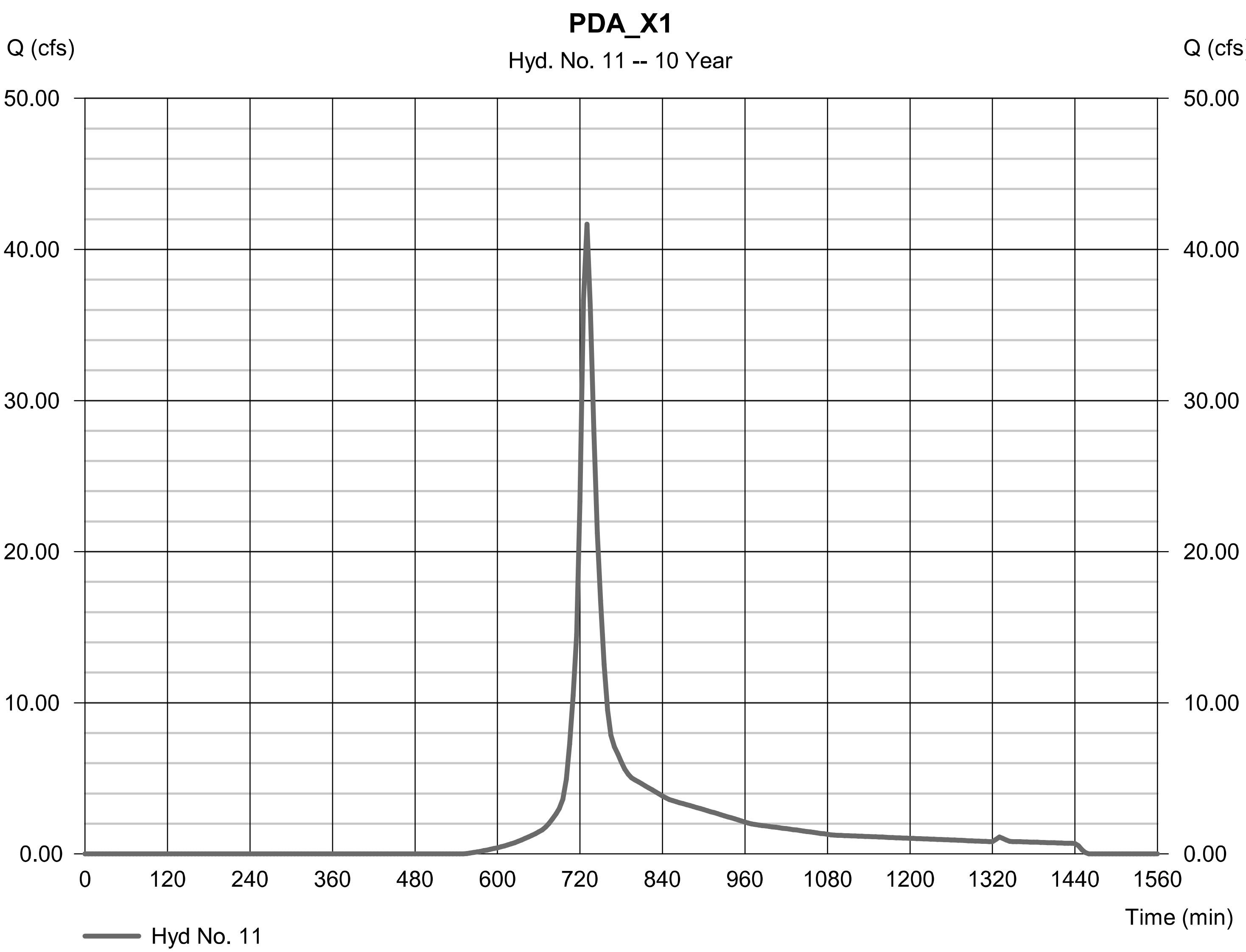
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 11

PDA_X1

Hydrograph type	= SCS Runoff	Peak discharge	= 41.67 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 166,349 cuft
Drainage area	= 23.840 ac	Curve number	= 75*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 4.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(20.000 x 75)] / 23.840



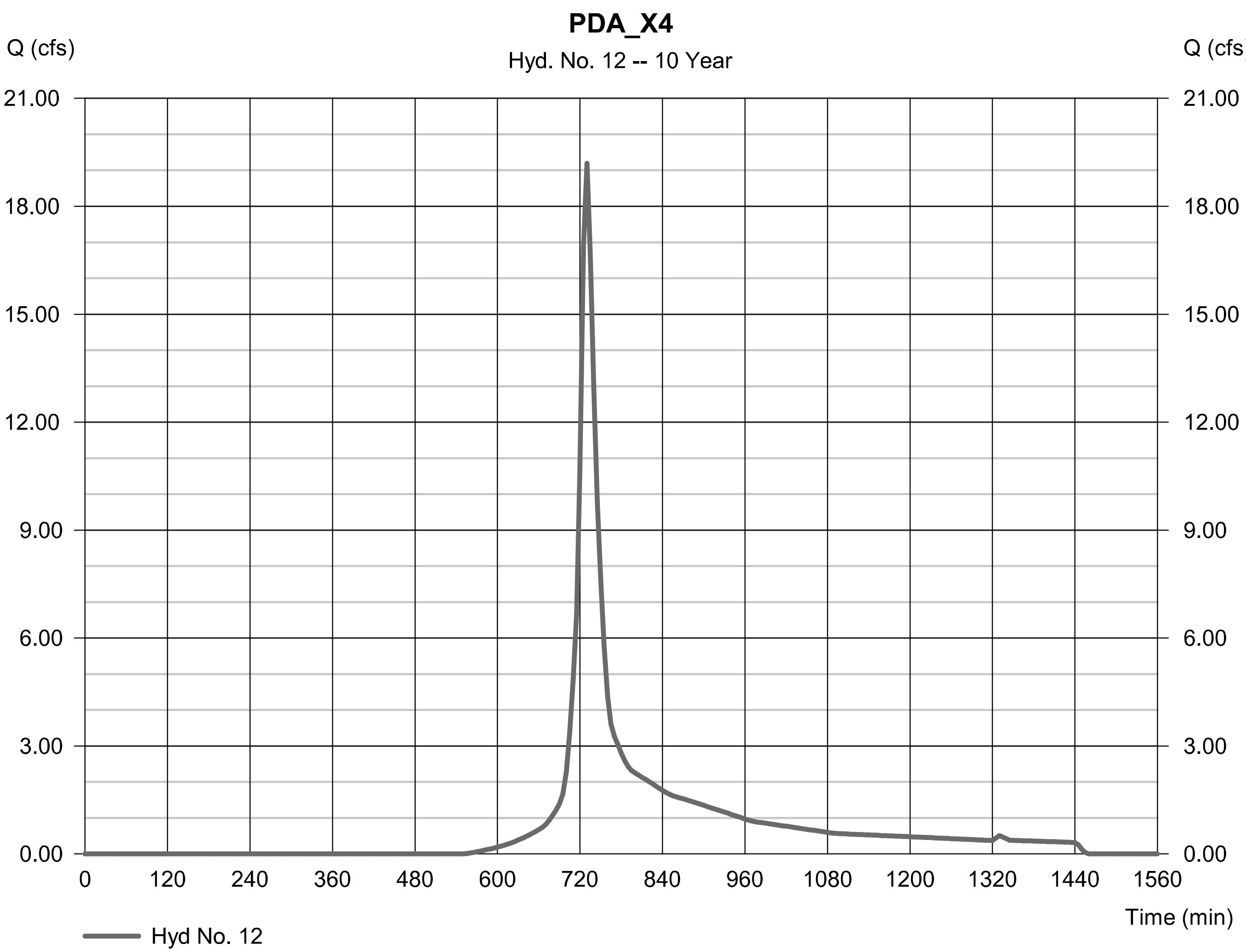
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 12

PDA_X4

Hydrograph type	= SCS Runoff	Peak discharge	= 19.19 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 76,615 cuft
Drainage area	= 10.980 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.60 min
Total precip.	= 4.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

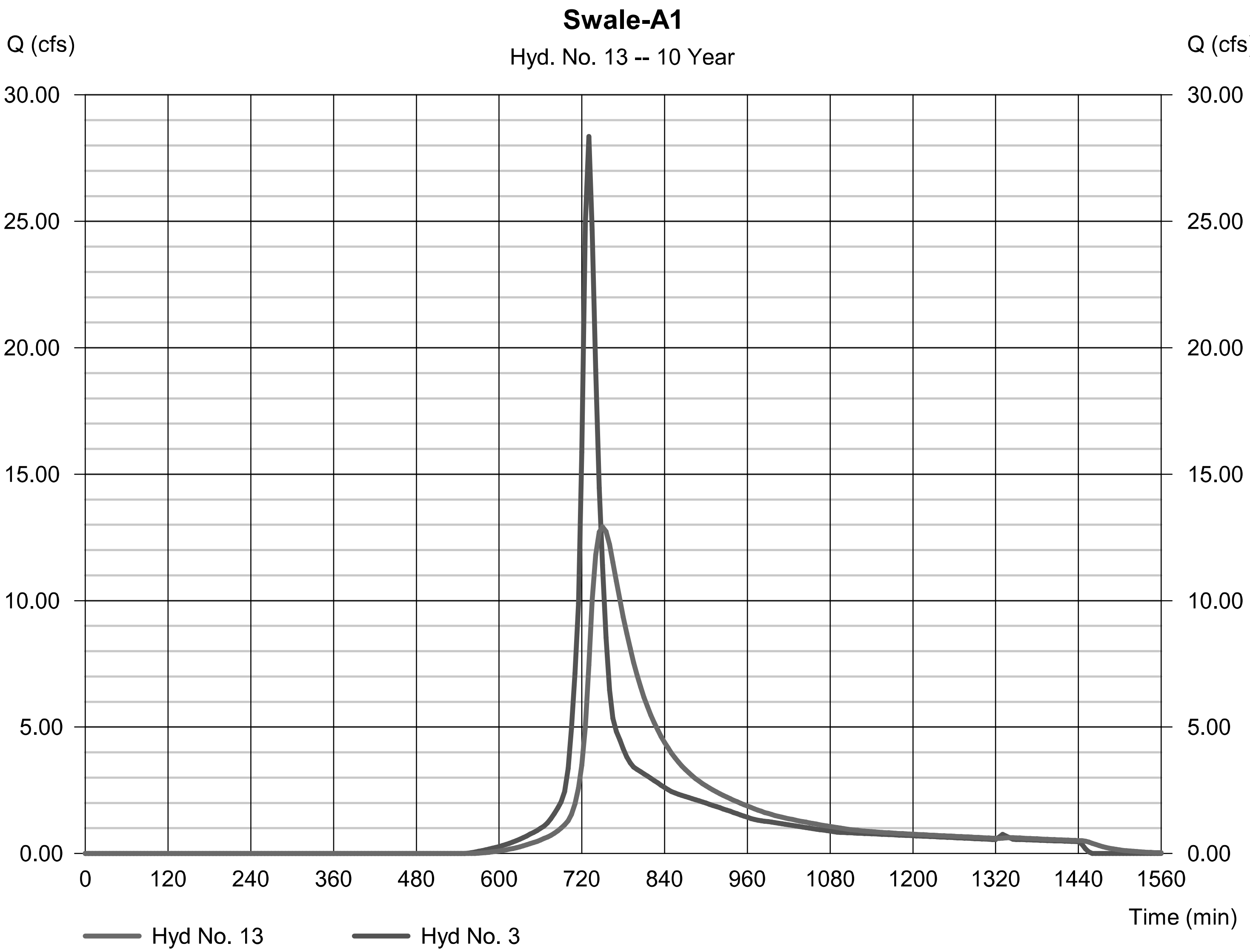
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 — Friday, 12 / 4 / 2015

Hyd. No. 13

Swale-A1

Hydrograph type	= Reach	Peak discharge	= 12.92 cfs
Storm frequency	= 10 yrs	Time to peak	= 750 min
Time interval	= 5 min	Hyd. volume	= 113,156 cuft
Inflow hyd. No.	= 3 - PDA_Swale-A1	Section type	= Trapezoidal
Reach length	= 1750.0 ft	Channel slope	= 5.0 %
Manning's n	= 0.500	Bottom width	= 4.0 ft
Side slope	= 4.0:1	Max. depth	= 2.0 ft
Rating curve x	= 0.264	Rating curve m	= 1.224
Ave. velocity	= 0.62 ft/s	Routing coeff.	= 0.1226

Modified Att-Kin routing method used.



Hydrograph Report

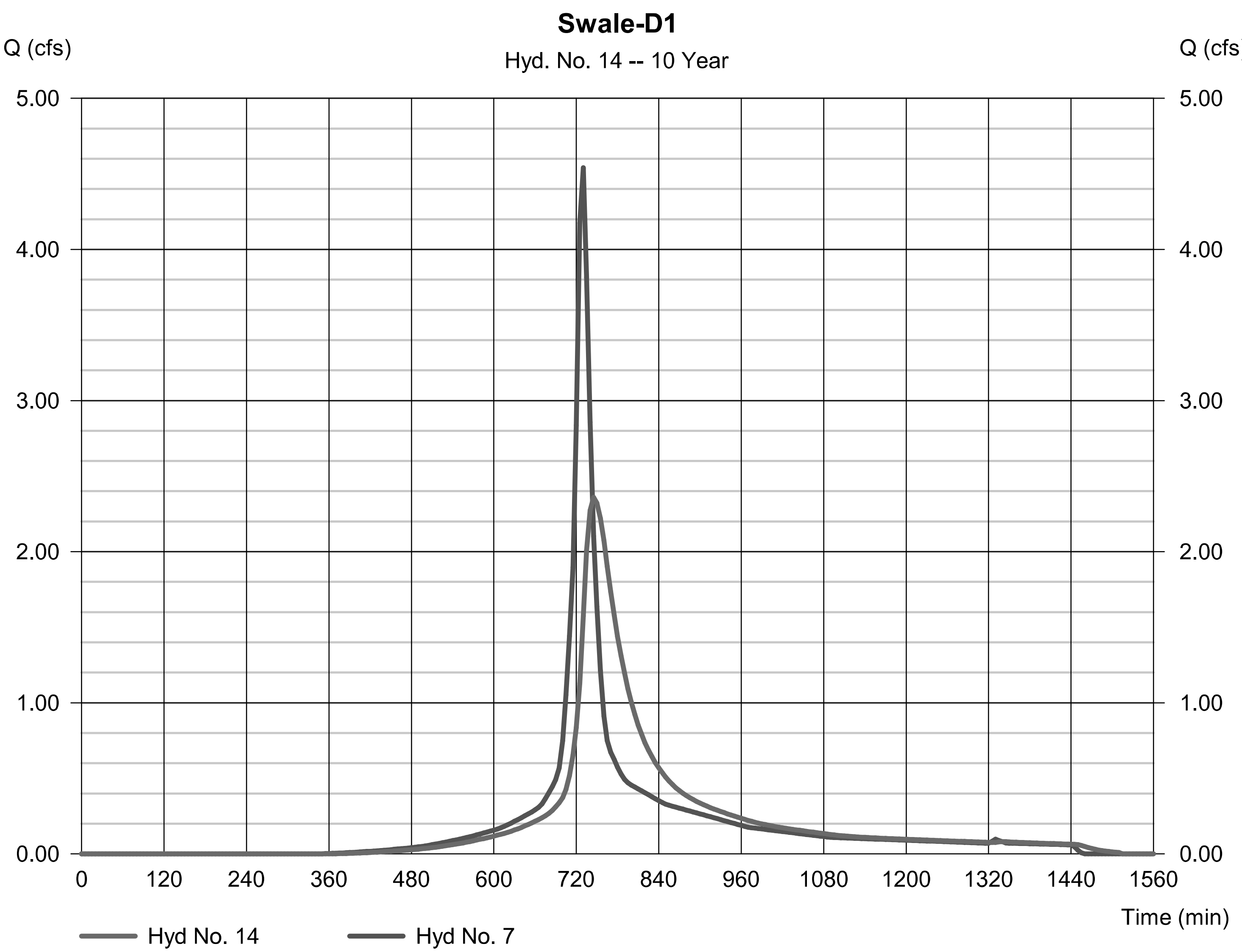
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 — Friday, 12 / 4 / 2015

Hyd. No. 14

Swale-D1

Hydrograph type	= Reach	Peak discharge	= 2.359 cfs
Storm frequency	= 10 yrs	Time to peak	= 745 min
Time interval	= 5 min	Hyd. volume	= 18,333 cuft
Inflow hyd. No.	= 7 - PDA_Swale-D1	Section type	= Trapezoidal
Reach length	= 510.0 ft	Channel slope	= 5.0 %
Manning's n	= 0.500	Bottom width	= 2.0 ft
Side slope	= 4.0:1	Max. depth	= 1.0 ft
Rating curve x	= 0.420	Rating curve m	= 0.882
Ave. velocity	= 0.30 ft/s	Routing coeff.	= 0.1465

Modified Att-Kin routing method used.



Hydrograph Report

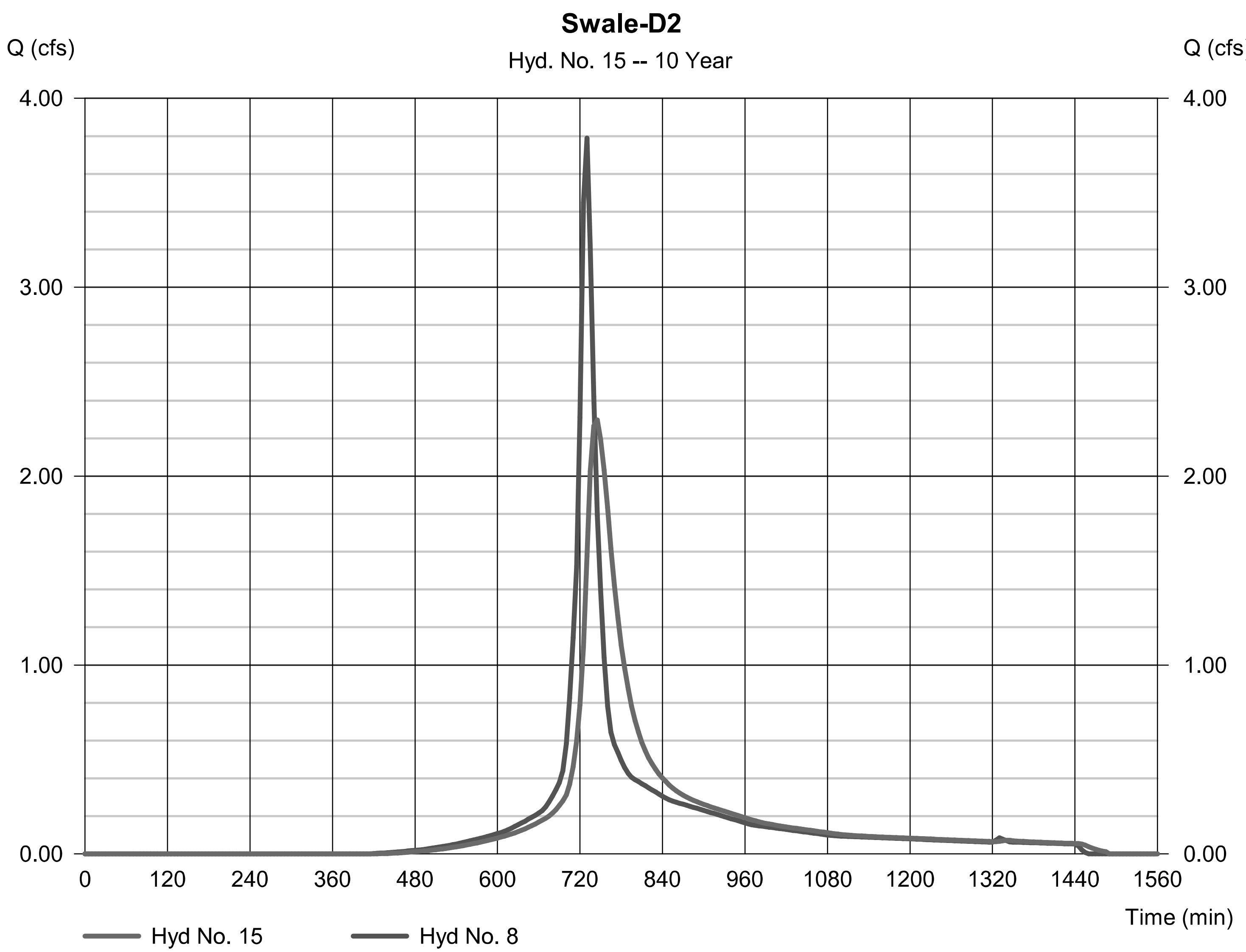
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 — Friday, 12 / 4 / 2015

Hyd. No. 15

Swale-D2

Hydrograph type	= Reach	Peak discharge	= 2.298 cfs
Storm frequency	= 10 yrs	Time to peak	= 745 min
Time interval	= 5 min	Hyd. volume	= 15,130 cuft
Inflow hyd. No.	= 8 - PDA_Swale-D2	Section type	= Trapezoidal
Reach length	= 365.0 ft	Channel slope	= 5.0 %
Manning's n	= 0.500	Bottom width	= 2.0 ft
Side slope	= 4.0:1	Max. depth	= 1.0 ft
Rating curve x	= 0.420	Rating curve m	= 0.882
Ave. velocity	= 0.31 ft/s	Routing coeff.	= 0.2033

Modified Att-Kin routing method used.



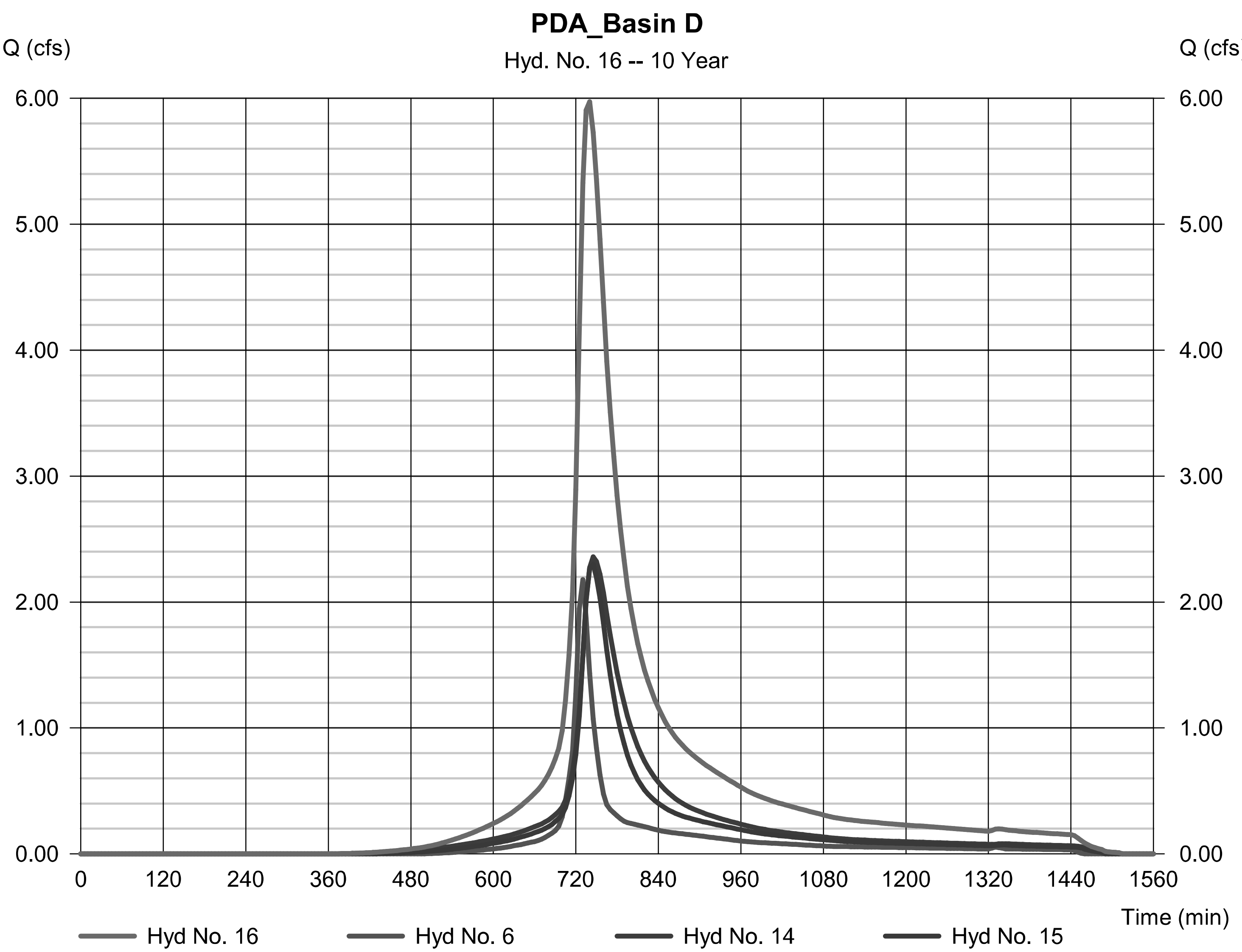
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 16

PDA_Basin D

Hydrograph type	= Combine	Peak discharge	= 5.974 cfs
Storm frequency	= 10 yrs	Time to peak	= 740 min
Time interval	= 5 min	Hyd. volume	= 42,116 cuft
Inflow hyds.	= 6, 14, 15	Contrib. drain. area	= 1.070 ac



Hydrograph Report

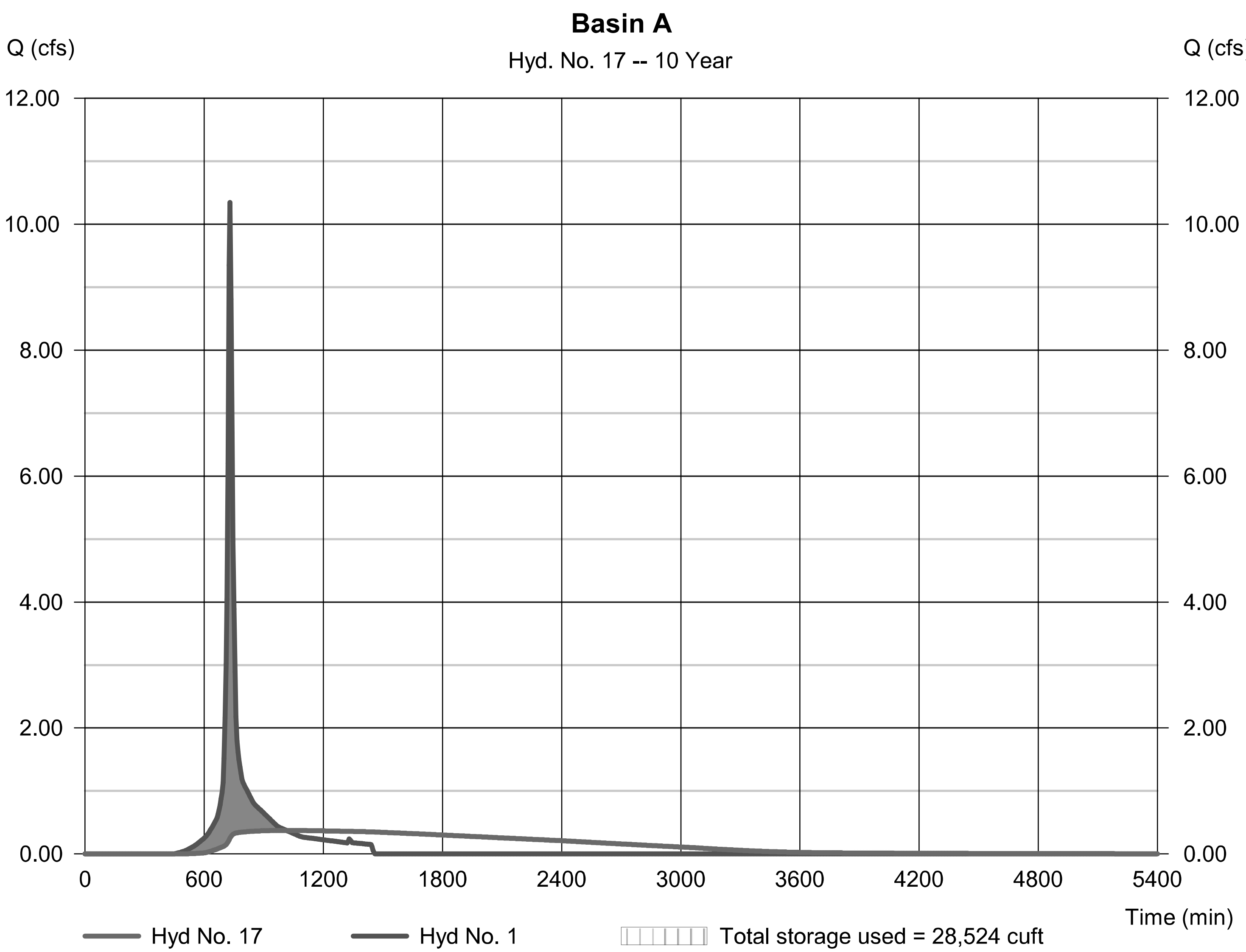
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 — Friday, 12 / 4 / 2015

Hyd. No. 17

Basin A

Hydrograph type	= Reservoir	Peak discharge	= 0.372 cfs
Storm frequency	= 10 yrs	Time to peak	= 1015 min
Time interval	= 5 min	Hyd. volume	= 41,128 cuft
Inflow hyd. No.	= 1 - PDA_A	Max. Elevation	= 1387.74 ft
Reservoir name	= Basin A	Max. Storage	= 28,524 cuft

Storage Indication method used.



Hydrograph Report

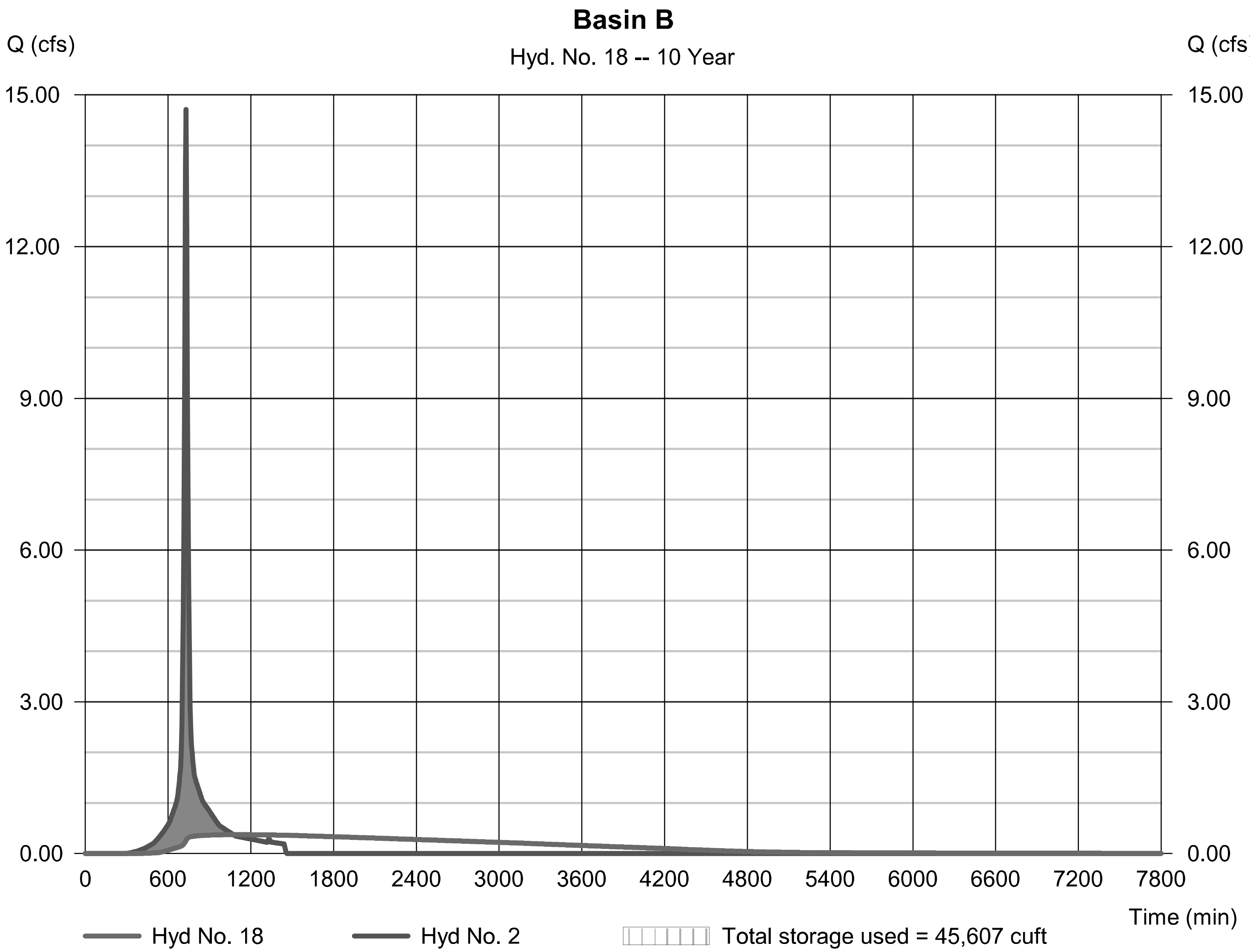
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 18

Basin B

Hydrograph type	= Reservoir	Peak discharge	= 0.372 cfs
Storm frequency	= 10 yrs	Time to peak	= 1075 min
Time interval	= 5 min	Hyd. volume	= 60,027 cuft
Inflow hyd. No.	= 2 - PDA_B	Max. Elevation	= 1377.74 ft
Reservoir name	= Basin B	Max. Storage	= 45,607 cuft

Storage Indication method used.



Hydrograph Report

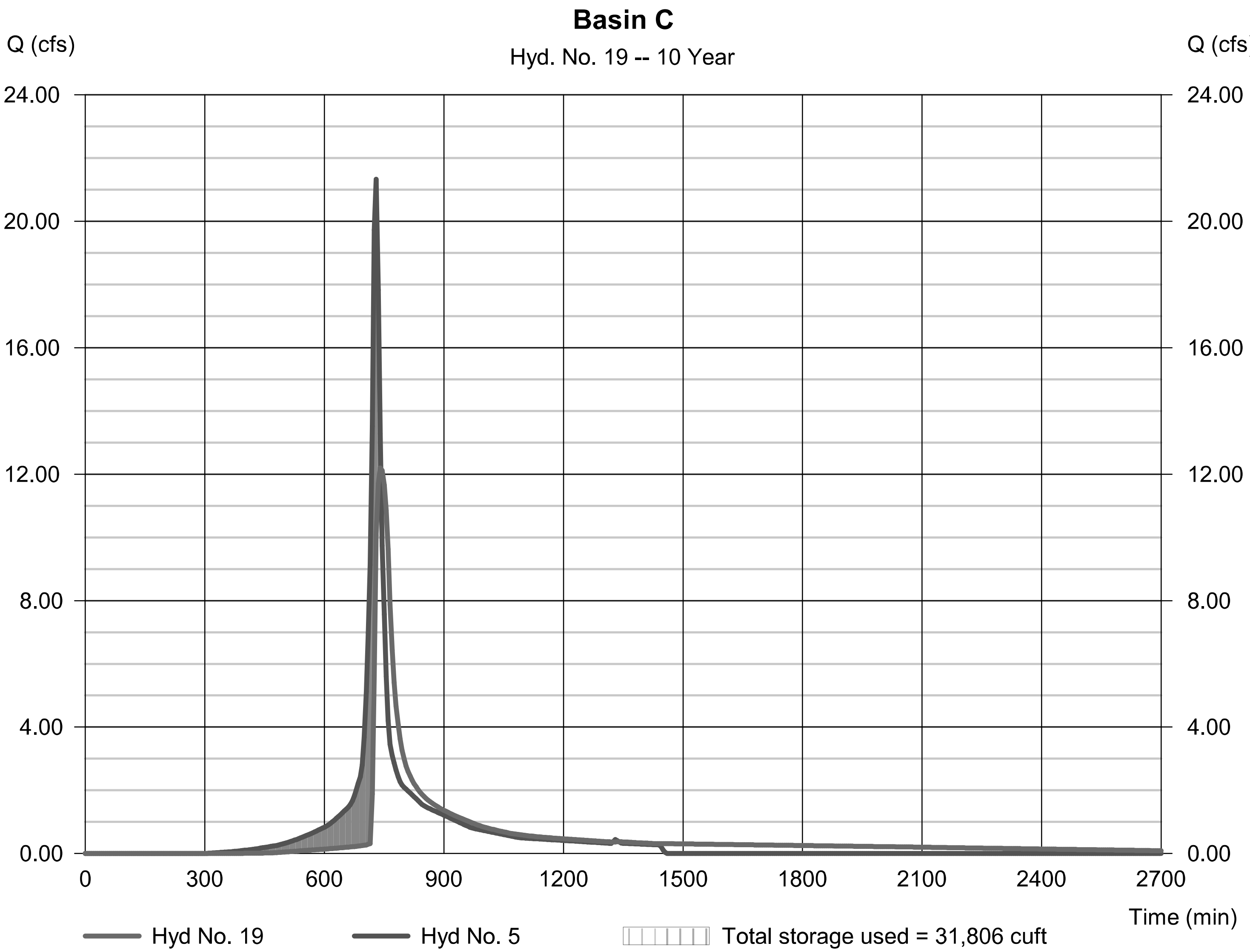
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 19

Basin C

Hydrograph type	= Reservoir	Peak discharge	= 12.20 cfs
Storm frequency	= 10 yrs	Time to peak	= 740 min
Time interval	= 5 min	Hyd. volume	= 87,088 cuft
Inflow hyd. No.	= 5 - PDA_C	Max. Elevation	= 1487.35 ft
Reservoir name	= Basin C	Max. Storage	= 31,806 cuft

Storage Indication method used.



Hydrograph Report

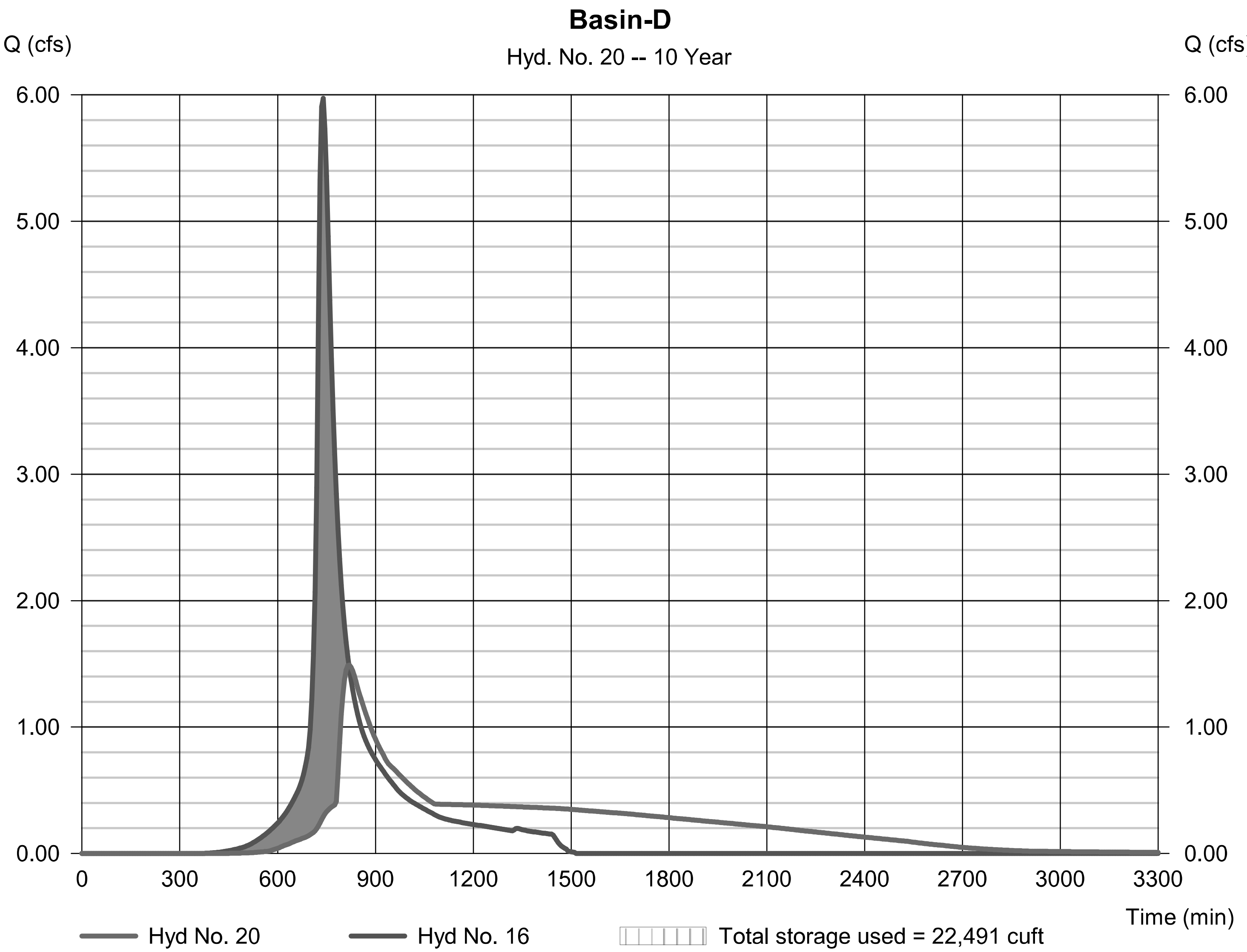
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 20

Basin-D

Hydrograph type	= Reservoir	Peak discharge	= 1.490 cfs
Storm frequency	= 10 yrs	Time to peak	= 820 min
Time interval	= 5 min	Hyd. volume	= 42,086 cuft
Inflow hyd. No.	= 16 - PDA_Basin D	Max. Elevation	= 1498.23 ft
Reservoir name	= Basin D	Max. Storage	= 22,491 cuft

Storage Indication method used.



Hydrograph Report

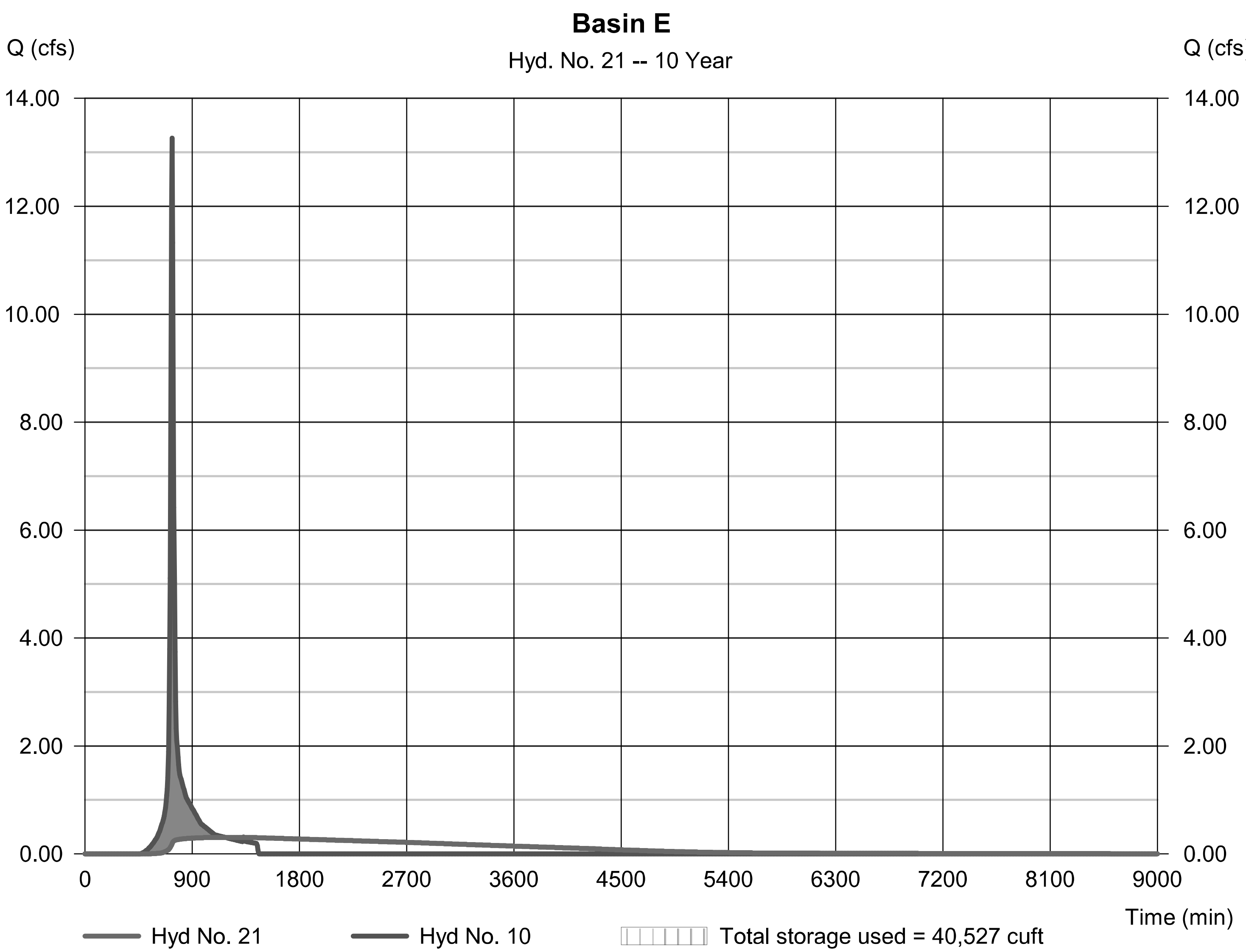
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 21

Basin E

Hydrograph type	= Reservoir	Peak discharge	= 0.304 cfs
Storm frequency	= 10 yrs	Time to peak	= 1180 min
Time interval	= 5 min	Hyd. volume	= 52,615 cuft
Inflow hyd. No.	= 10 - PDA_E	Max. Elevation	= 1496.89 ft
Reservoir name	= Basin E	Max. Storage	= 40,527 cuft

Storage Indication method used.



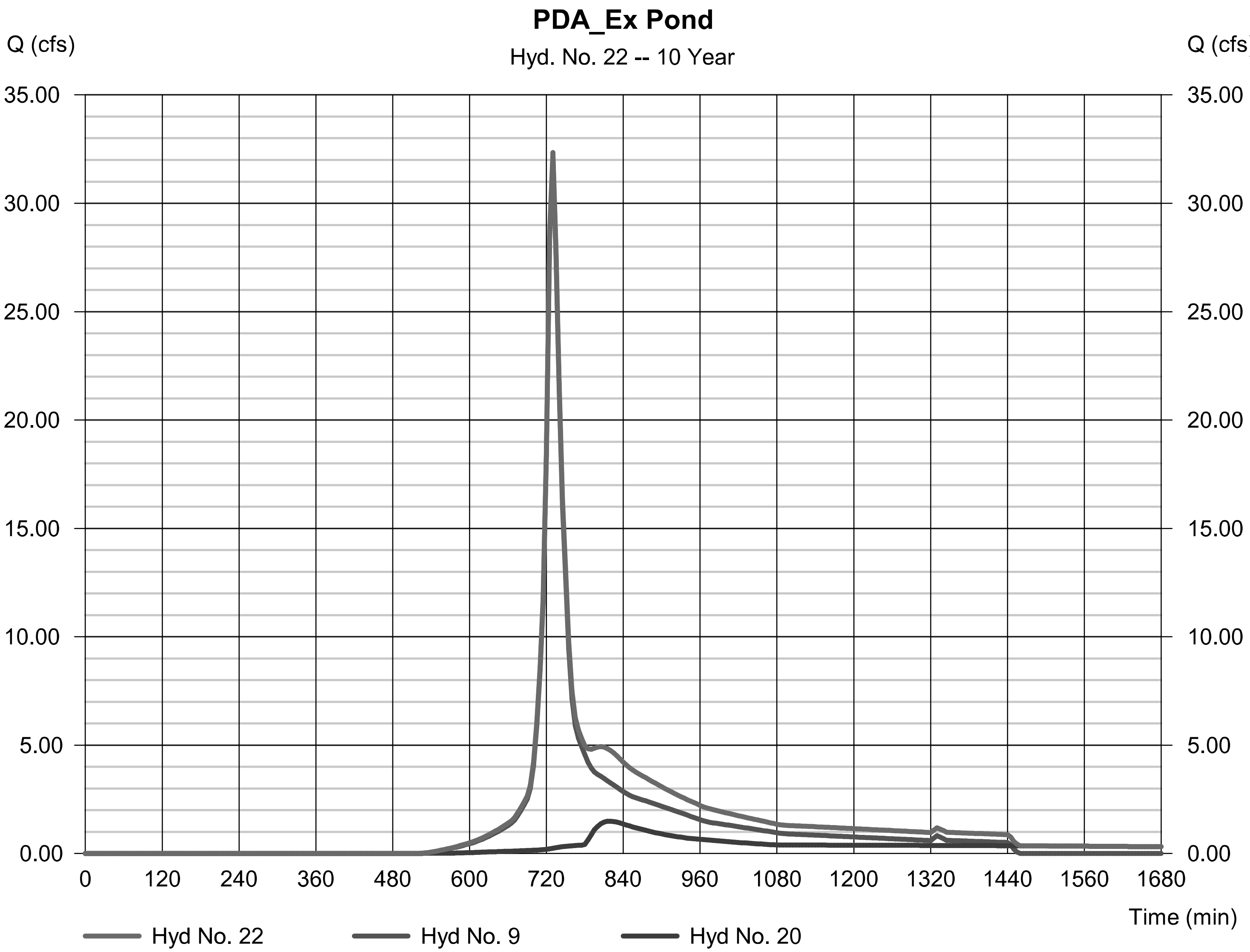
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 — Friday, 12 / 4 / 2015

Hyd. No. 22

PDA_Ex Pond

Hydrograph type	= Combine	Peak discharge	= 32.34 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 169,751 cuft
Inflow hyds.	= 9, 20	Contrib. drain. area	= 16.970 ac



Hydrograph Report

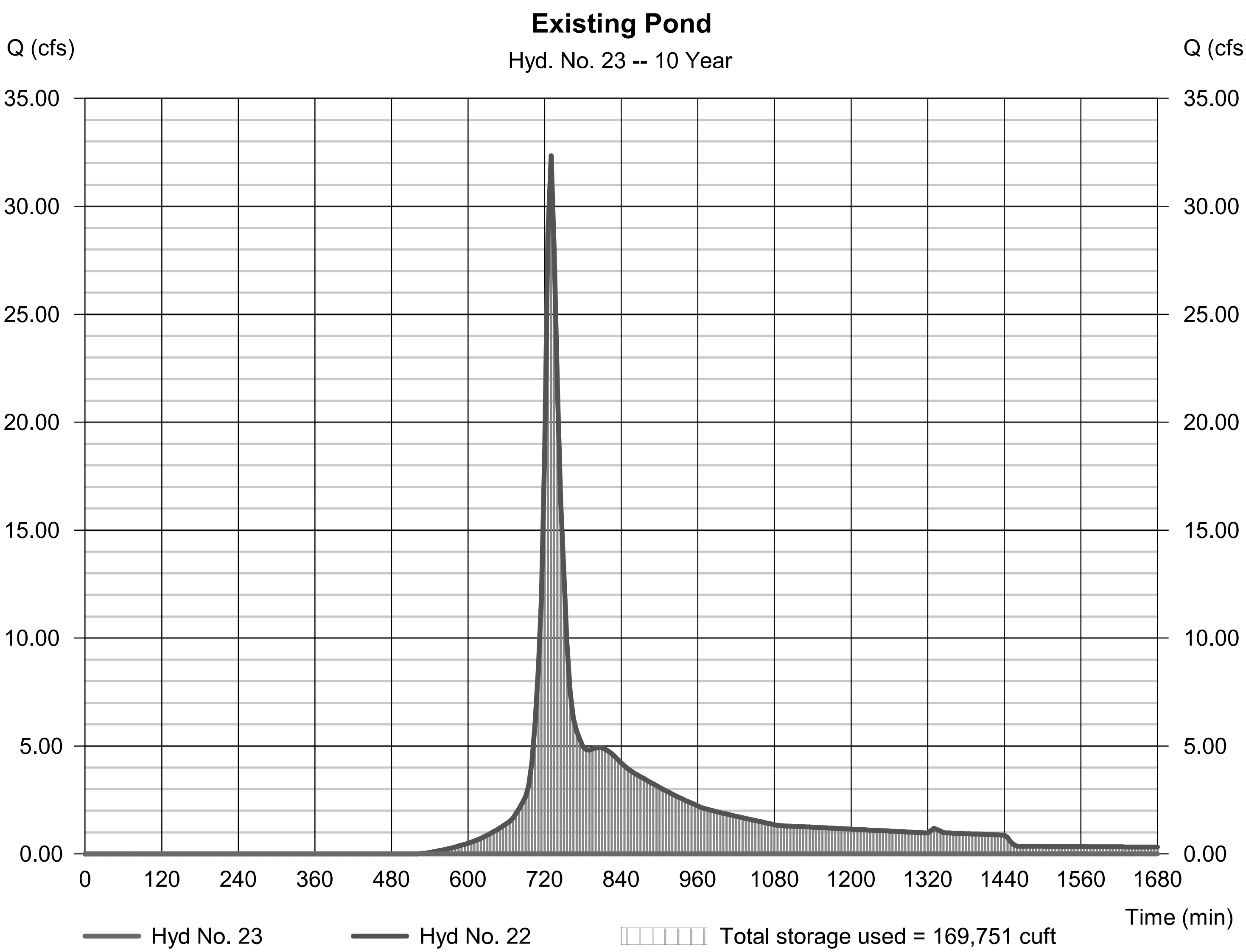
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 | Friday, 12 / 4 / 2015

Hyd. No. 23

Existing Pond

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 10 yrs	Time to peak	= n/a
Time interval	= 5 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 22 - PDA_Ex Pond	Max. Elevation	= 1486.89 ft
Reservoir name	= Ex. Pond	Max. Storage	= 169,751 cuft

Storage Indication method used.



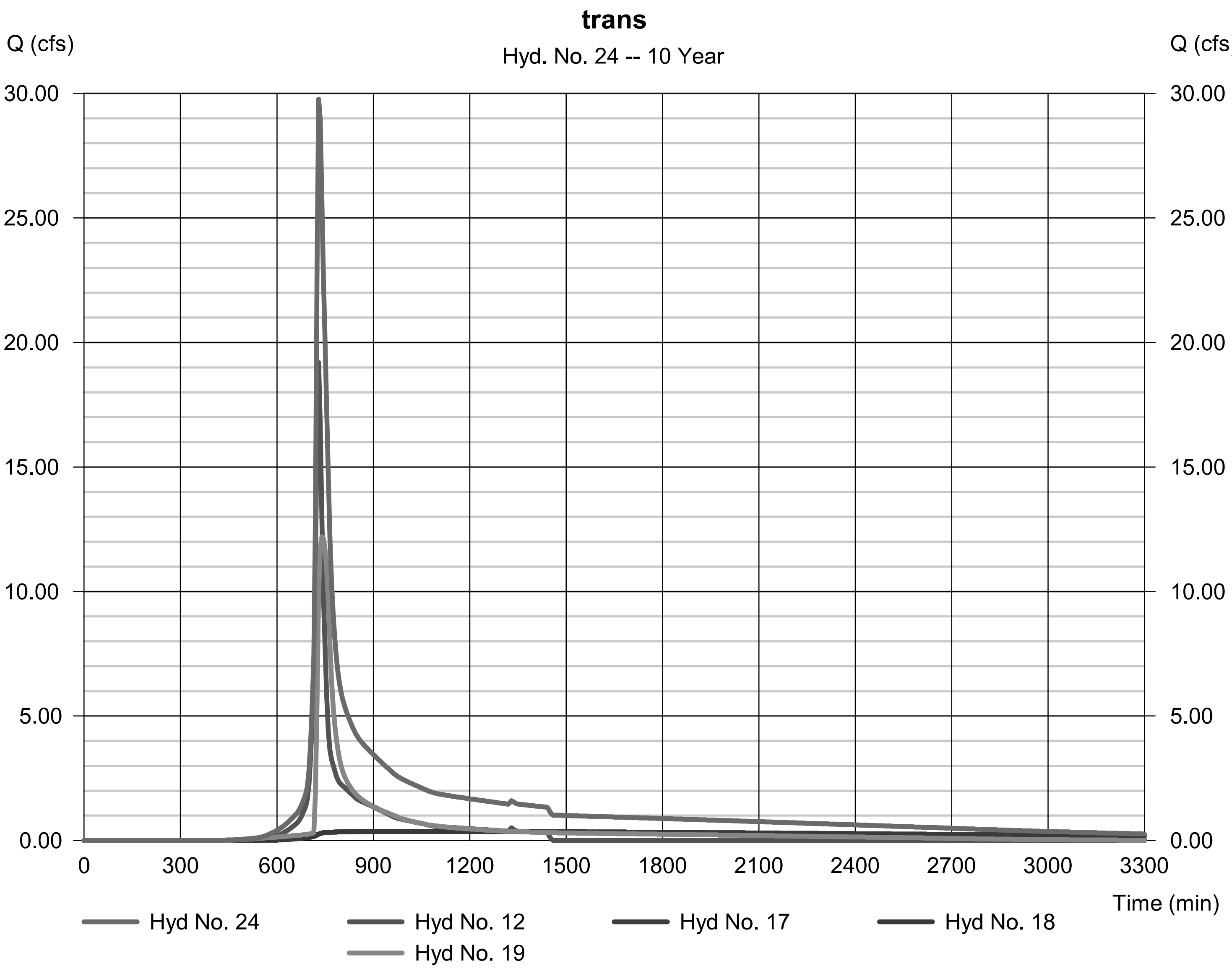
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 | Friday, 12 / 4 / 2015

Hyd. No. 24

trans

Hydrograph type	= Combine	Peak discharge	= 29.77 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 264,858 cuft
Inflow hyds.	= 12, 17, 18, 19	Contrib. drain. area	= 10.980 ac



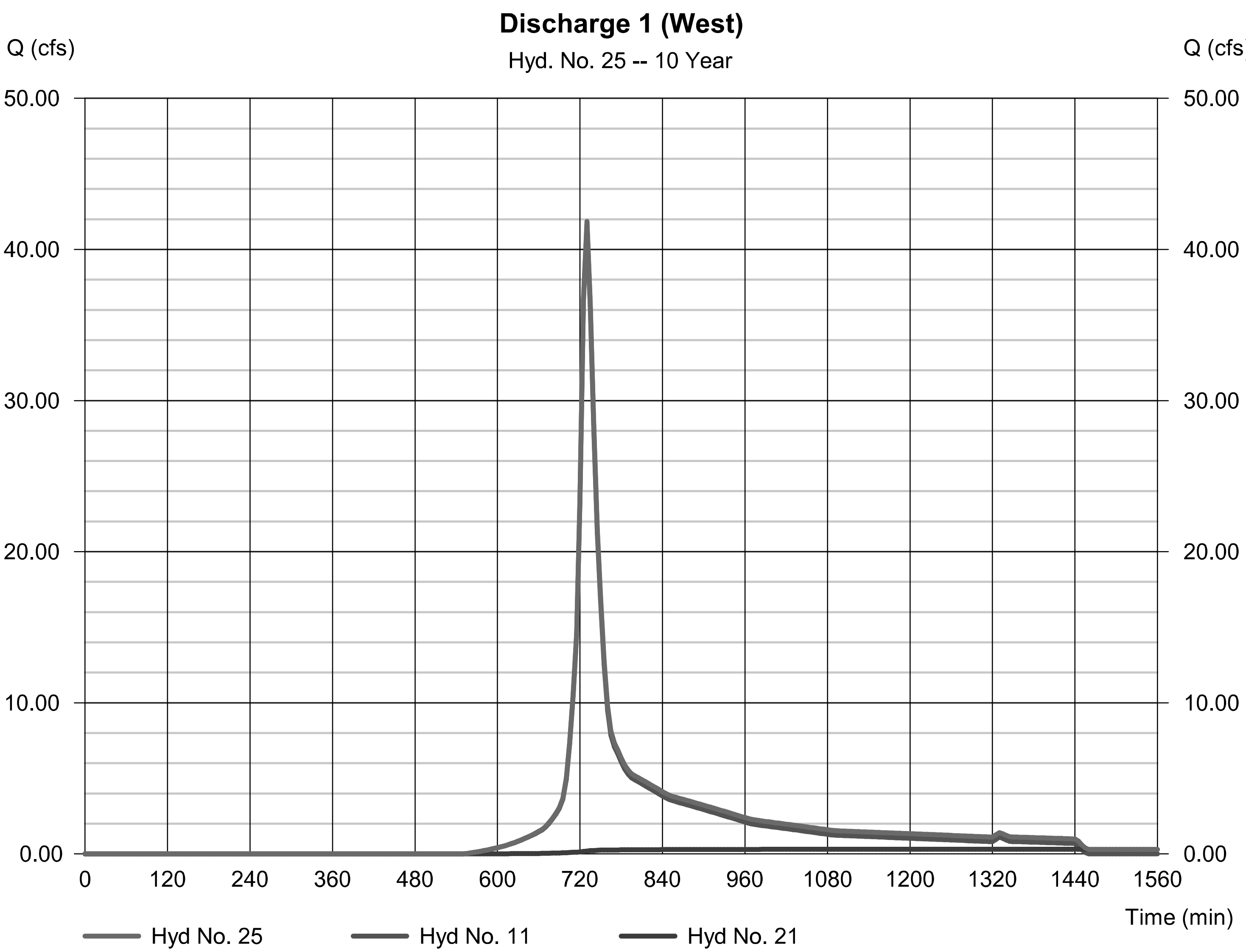
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 — Friday, 12 / 4 / 2015

Hyd. No. 25

Discharge 1 (West)

Hydrograph type	= Combine	Peak discharge	= 41.86 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 218,964 cuft
Inflow hyds.	= 11, 21	Contrib. drain. area	= 23.840 ac



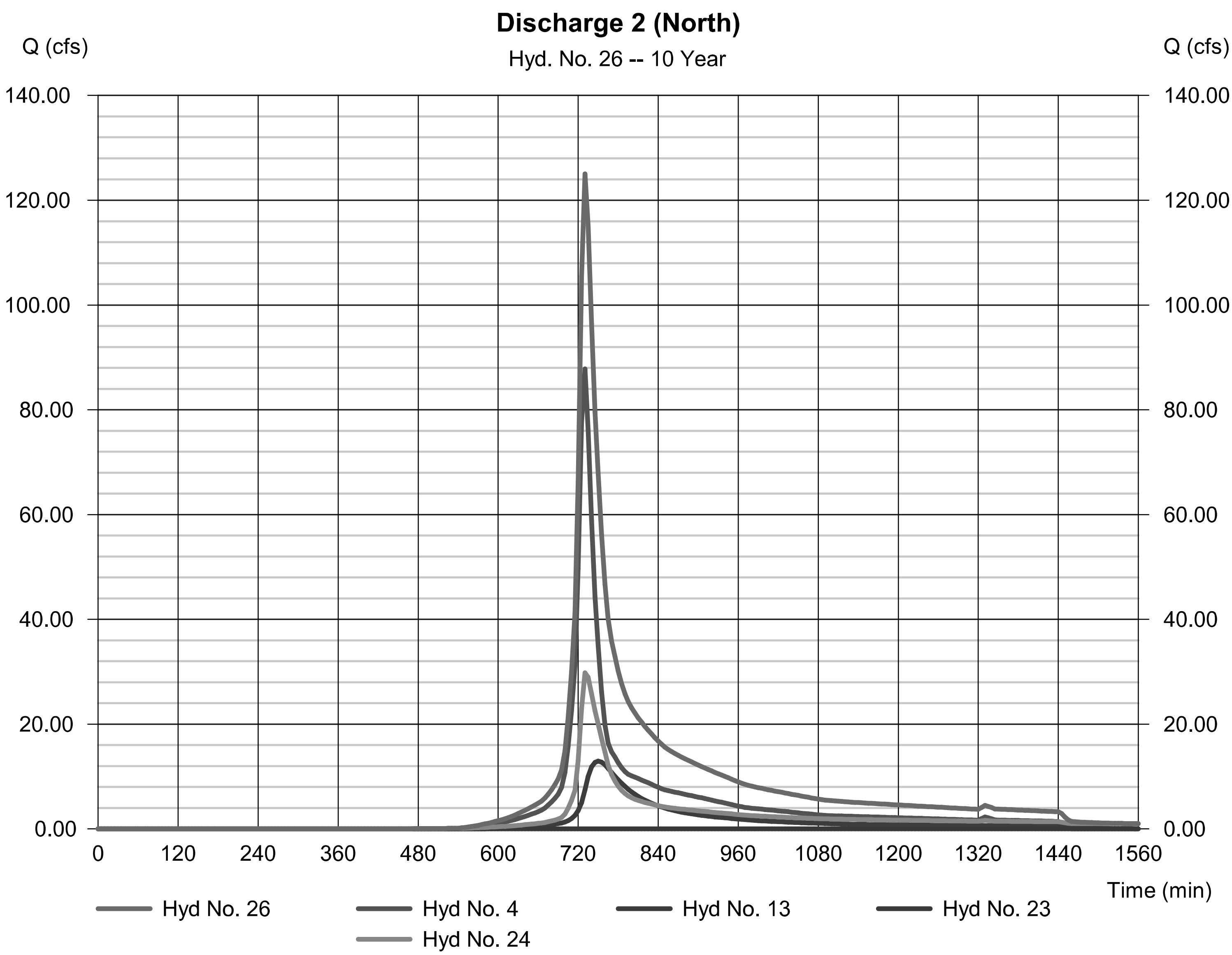
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 26

Discharge 2 (North)

Hydrograph type	= Combine	Peak discharge	= 125.01 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 727,729 cuft
Inflow hyds.	= 4, 13, 23, 24	Contrib. drain. area	= 48.250 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	21.54	5	730	87,829	------	------	------	PDA_A
2	SCS Runoff	27.71	5	730	117,501	------	------	------	PDA_B
3	SCS Runoff	66.57	5	730	265,873	------	------	------	PDA_Swale-A1
4	SCS Runoff	202.32	5	730	809,663	------	------	------	PDA_X2
5	SCS Runoff	40.18	5	730	170,332	------	------	------	PDA_C
6	SCS Runoff	4.762	5	730	19,210	------	------	------	PDA_D
7	SCS Runoff	8.785	5	730	36,751	------	------	------	PDA_Swale-D1
8	SCS Runoff	7.652	5	730	31,485	------	------	------	PDA_Swale-D2
9	SCS Runoff	72.64	5	730	291,384	------	------	------	PDA_X3
10	SCS Runoff	28.05	5	730	113,940	------	------	------	PDA_E
11	SCS Runoff	97.84	5	730	390,778	------	------	------	PDA_X1
12	SCS Runoff	45.06	5	730	179,981	------	------	------	PDA_X4
13	Reach	33.65	5	745	265,854	3	------	------	Swale-A1
14	Reach	4.434	5	745	36,732	7	------	------	Swale-D1
15	Reach	4.515	5	745	31,470	8	------	------	Swale-D2
16	Combine	11.84	5	735	87,412	6, 14, 15	------	------	PDA_Basin D
17	Reservoir	5.139	5	755	87,781	1	1389.11	46,510	Basin A
18	Reservoir	3.873	5	770	117,421	2	1378.99	70,924	Basin B
19	Reservoir	17.68	5	745	170,289	5	1489.18	55,119	Basin C
20	Reservoir	8.657	5	760	87,382	16	1498.89	28,765	Basin-D
21	Reservoir	1.052	5	975	113,833	10	1498.65	86,959	Basin E
22	Combine	73.02	5	730	378,766	9, 20,	------	------	PDA_Ex Pond
23	Reservoir	0.329	5	1745	18,798	22	1489.02	361,404	Existing Pond
24	Combine	61.62	5	730	555,472	12, 17, 18, 19,	------	------	trans
25	Combine	98.15	5	730	504,611	11, 21,	------	------	Discharge 1 (West)
26	Combine	285.75	5	730	1,649,788	4, 13, 23, 24,	------	------	Discharge 2 (North)

GanEden-Prop.gpw	Return Period: 100 Year	Friday, 12 / 4 / 2015

Hydrograph Report

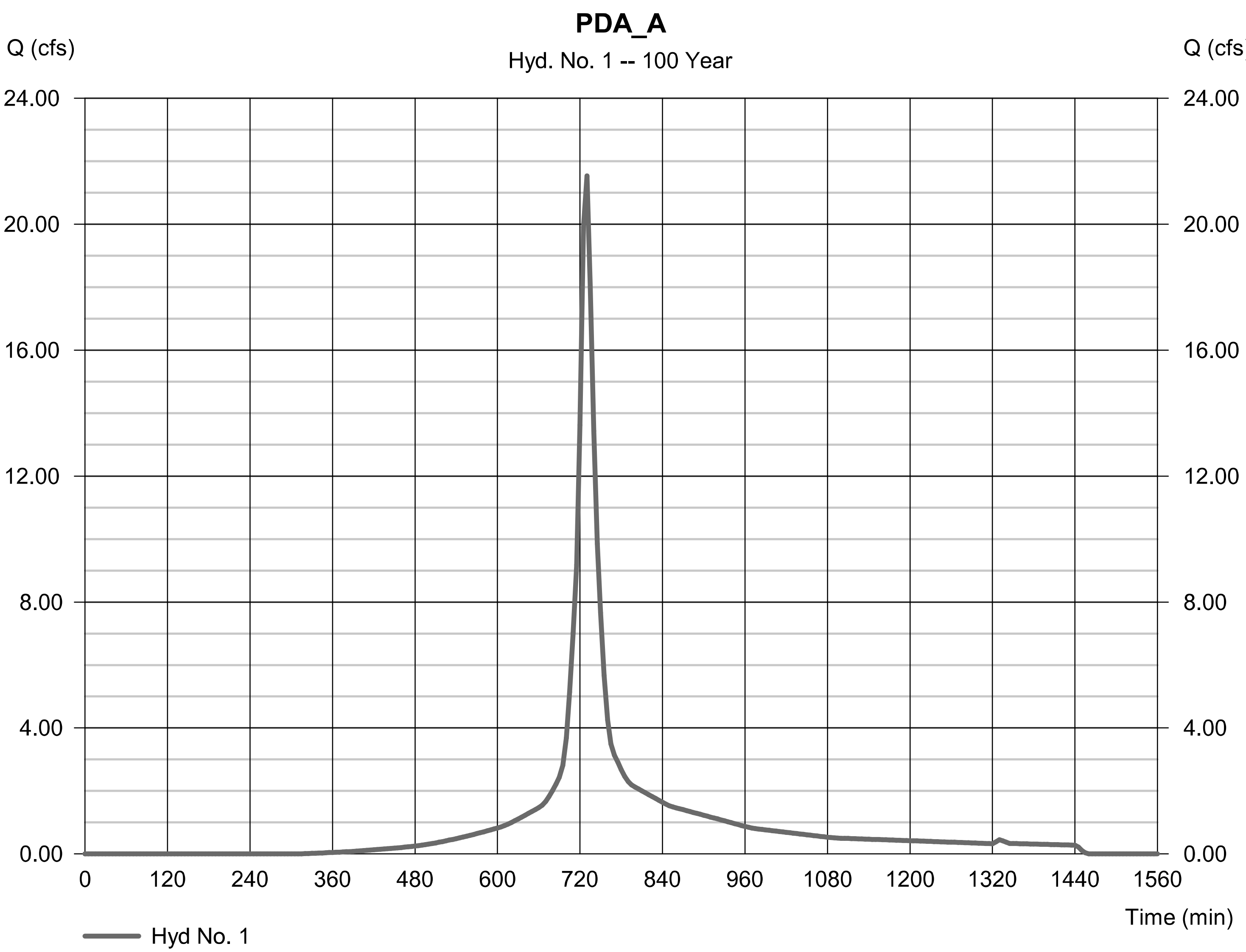
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 1

PDA_A

Hydrograph type	= SCS Runoff	Peak discharge	= 21.54 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 87,829 cuft
Drainage area	= 4.590 ac	Curve number	= 82*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 7.75 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(2.400 x 95) + (3.000 x 75)] / 4.590



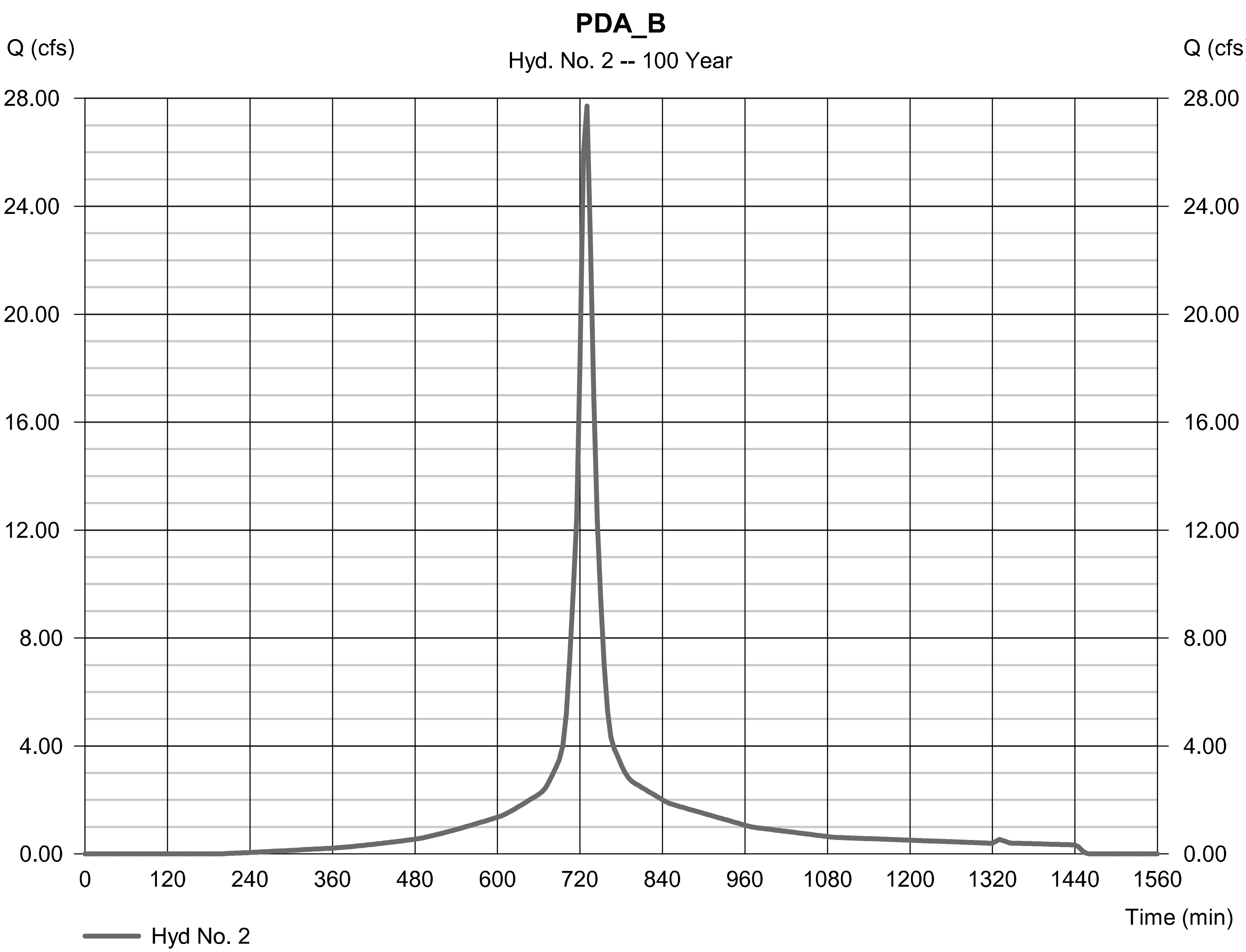
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 — Friday, 12 / 4 / 2015

Hyd. No. 2

PDA_B

Hydrograph type	= SCS Runoff	Peak discharge	= 27.71 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 117,501 cuft
Drainage area	= 5.360 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 7.75 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

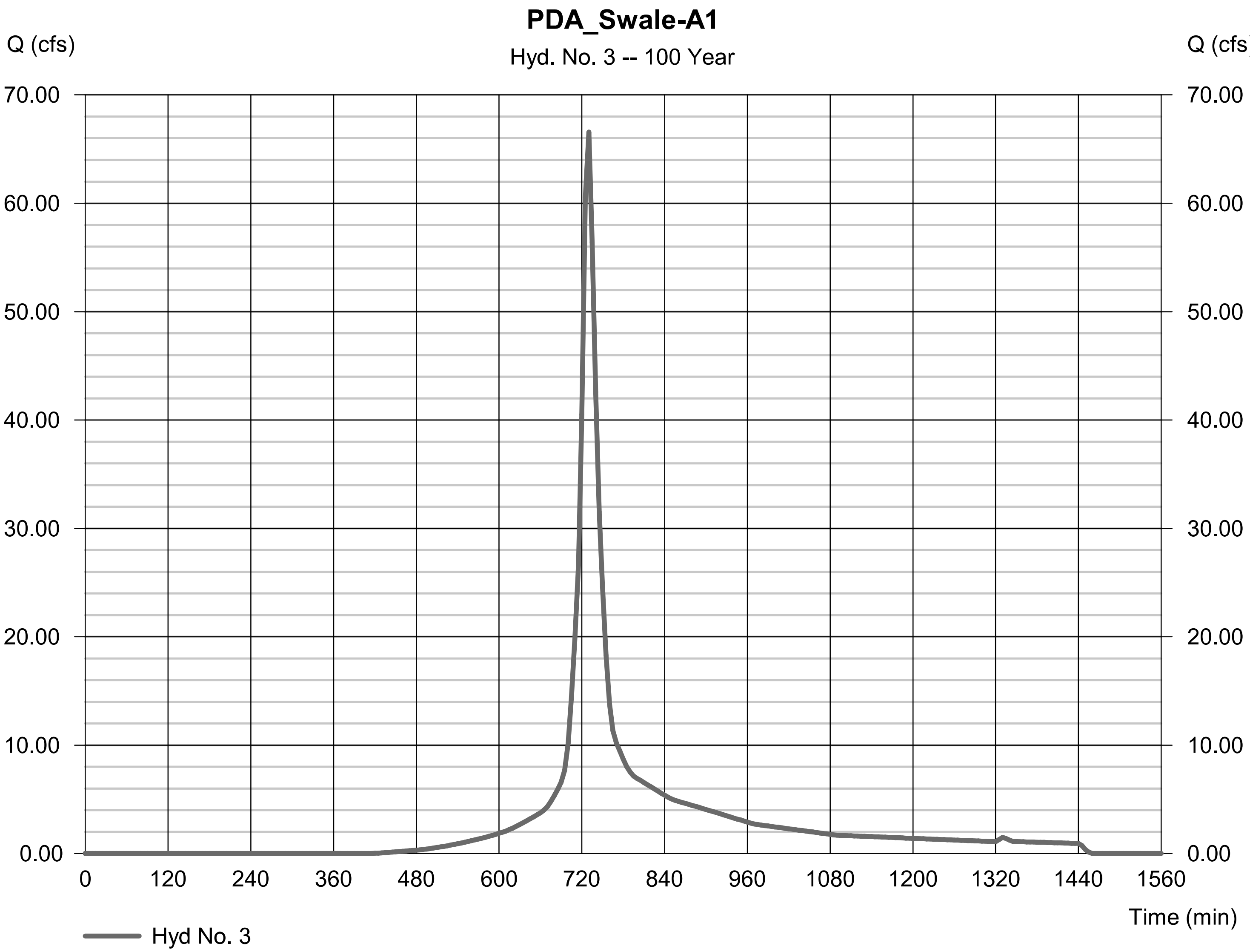
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 — Friday, 12 / 4 / 2015

Hyd. No. 3

PDA_Swale-A1

Hydrograph type	= SCS Runoff	Peak discharge	= 66.57 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 265,873 cuft
Drainage area	= 16.220 ac	Curve number	= 75*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 7.75 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(2.400 x 95) + (3.000 x 75)] / 16.220



Hydrograph Report

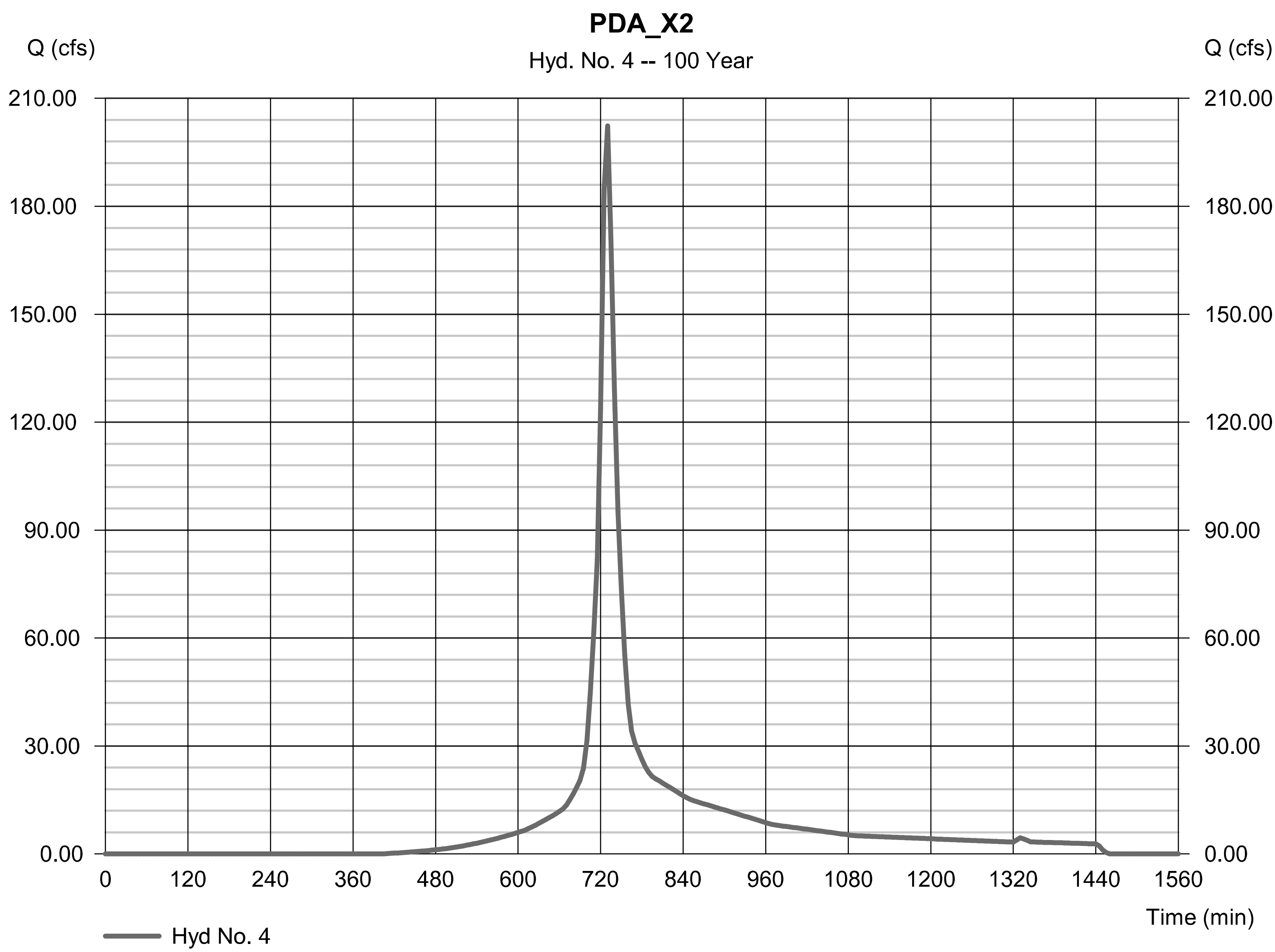
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 — Friday, 12 / 4 / 2015

Hyd. No. 4

PDA_X2

Hydrograph type	= SCS Runoff	Peak discharge	= 202.32 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 809,663 cuft
Drainage area	= 48.250 ac	Curve number	= 76*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 7.75 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(20.000 x 75)] / 48.250



Hydrograph Report

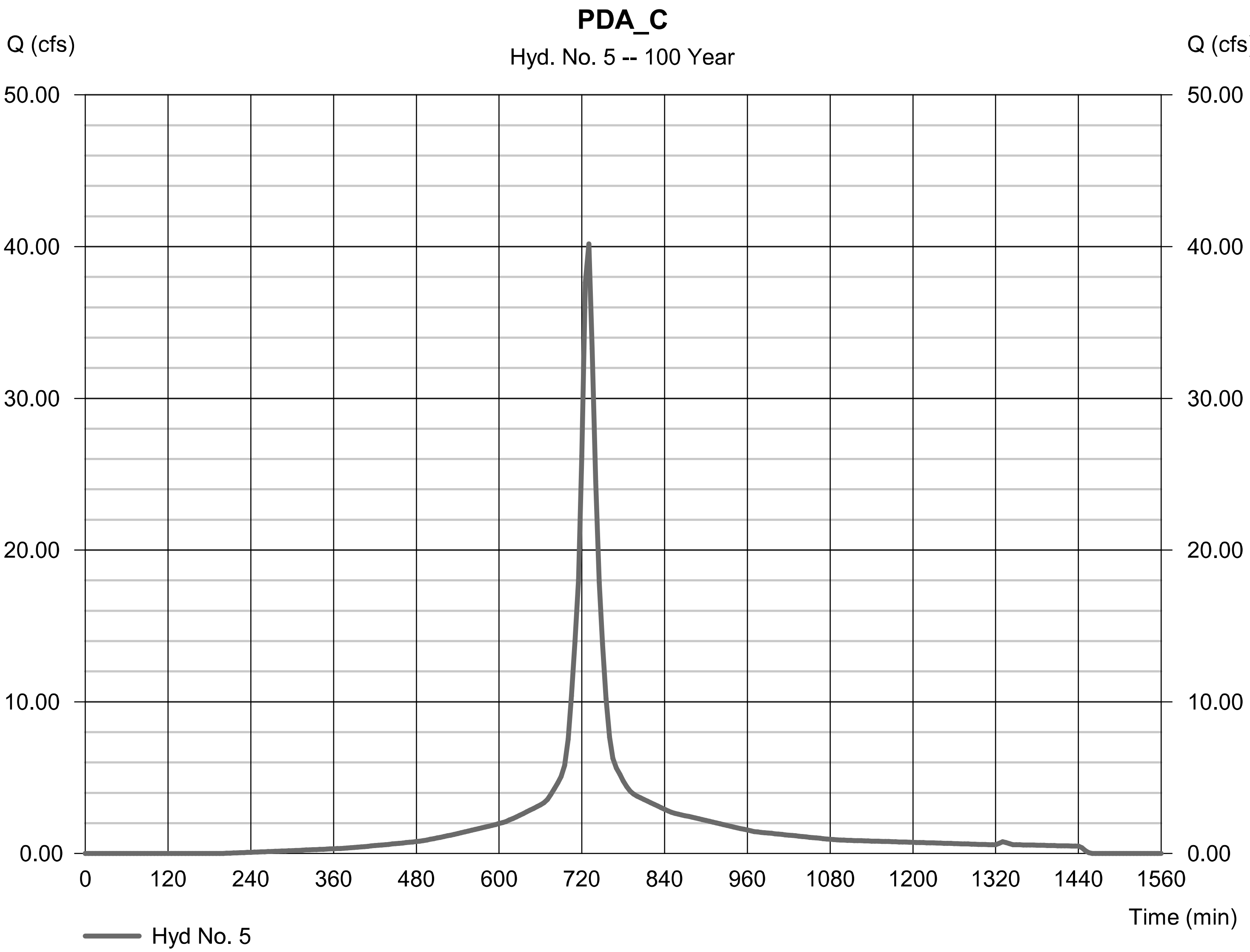
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 5

PDA_C

Hydrograph type	= SCS Runoff	Peak discharge	= 40.18 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 170,332 cuft
Drainage area	= 7.770 ac	Curve number	= 89*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 7.75 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(2.400 x 95) + (3.000 x 75)] / 7.770



Hydrograph Report

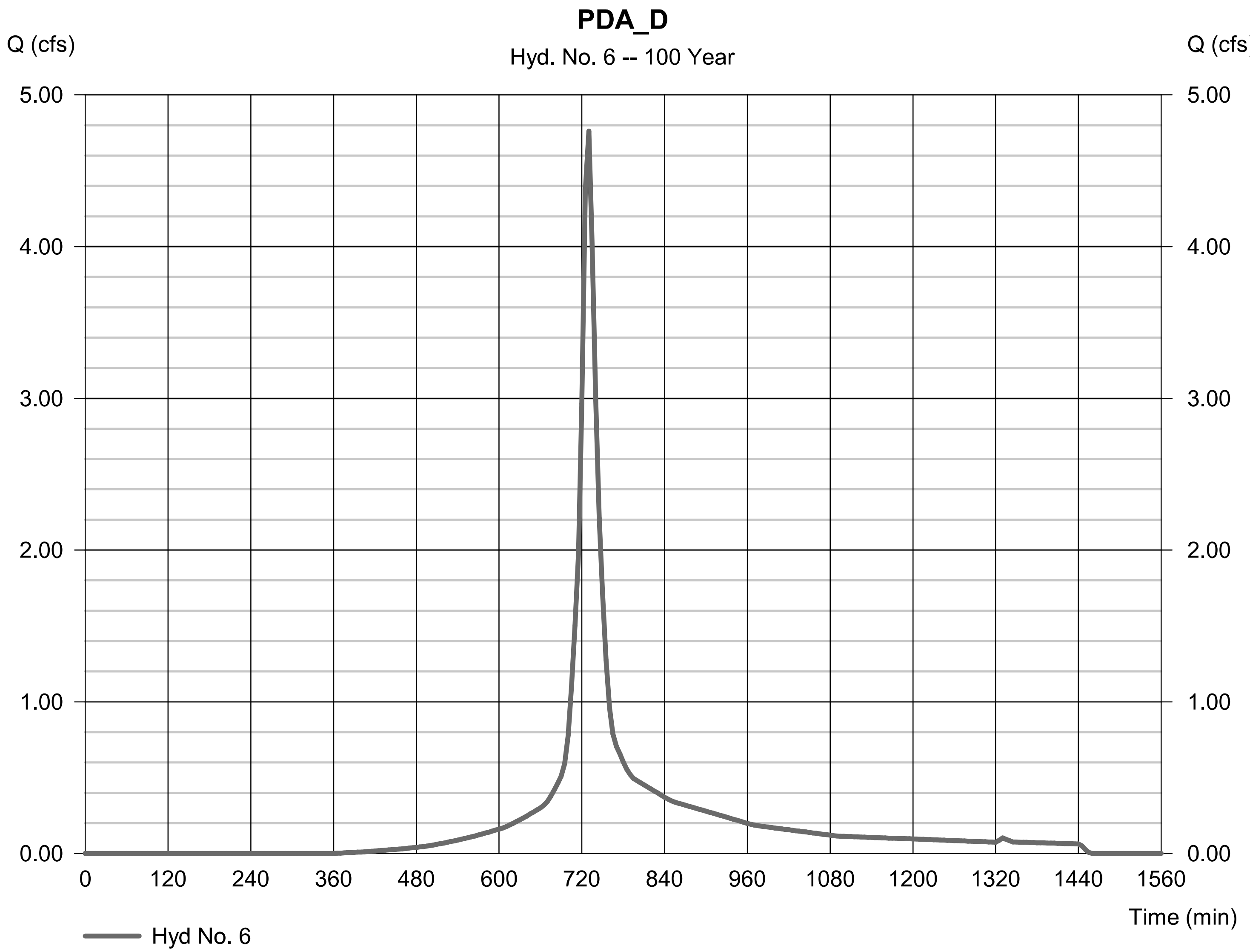
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 6

PDA_D

Hydrograph type	= SCS Runoff	Peak discharge	= 4.762 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 19,210 cuft
Drainage area	= 1.070 ac	Curve number	= 79*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 7.75 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(20.000 x 75)] / 1.070



Hydrograph Report

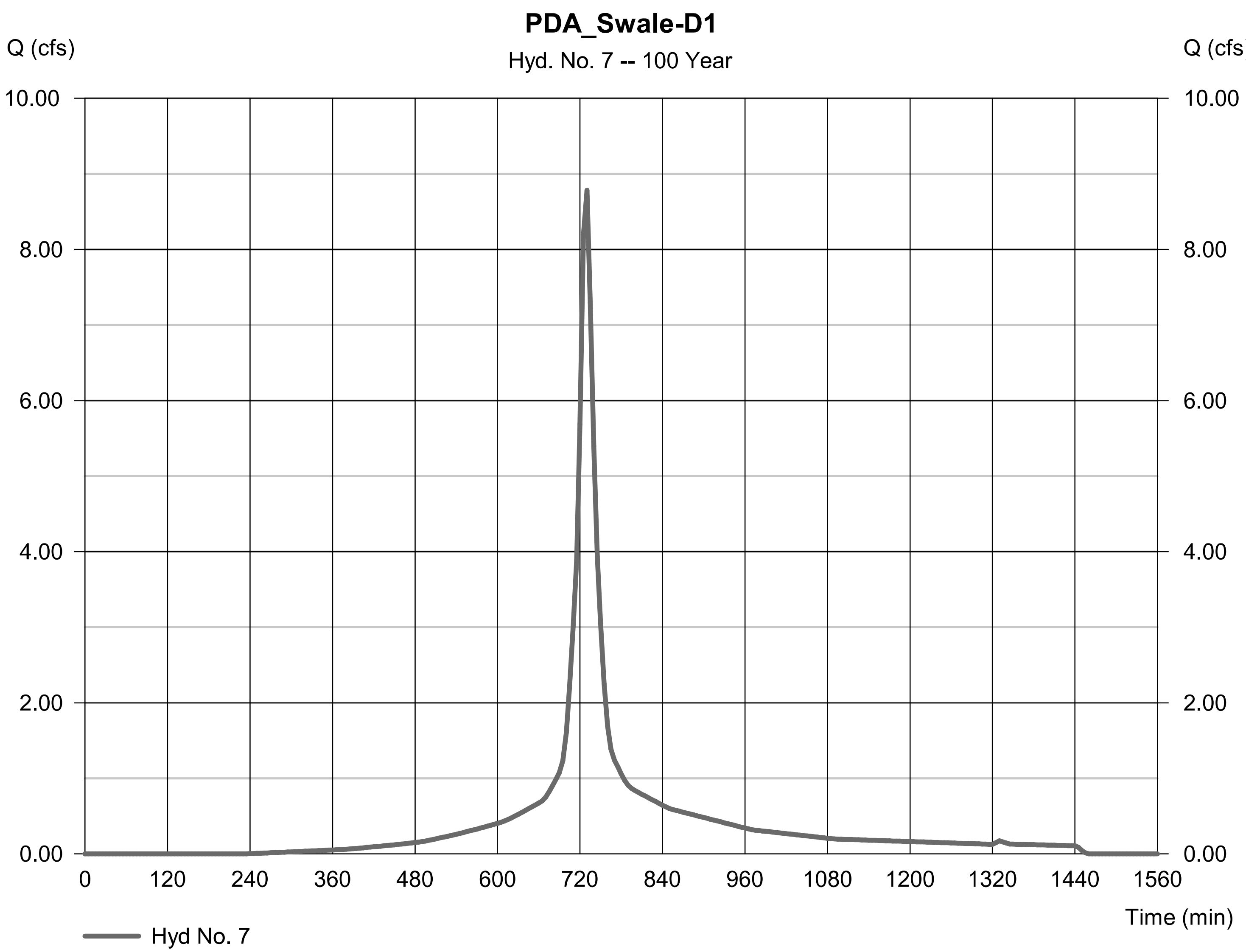
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 7

PDA_Swale-D1

Hydrograph type	= SCS Runoff	Peak discharge	= 8.785 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 36,751 cuft
Drainage area	= 1.740 ac	Curve number	= 87*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 7.75 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(2.400 x 95) + (3.000 x 75)] / 1.740



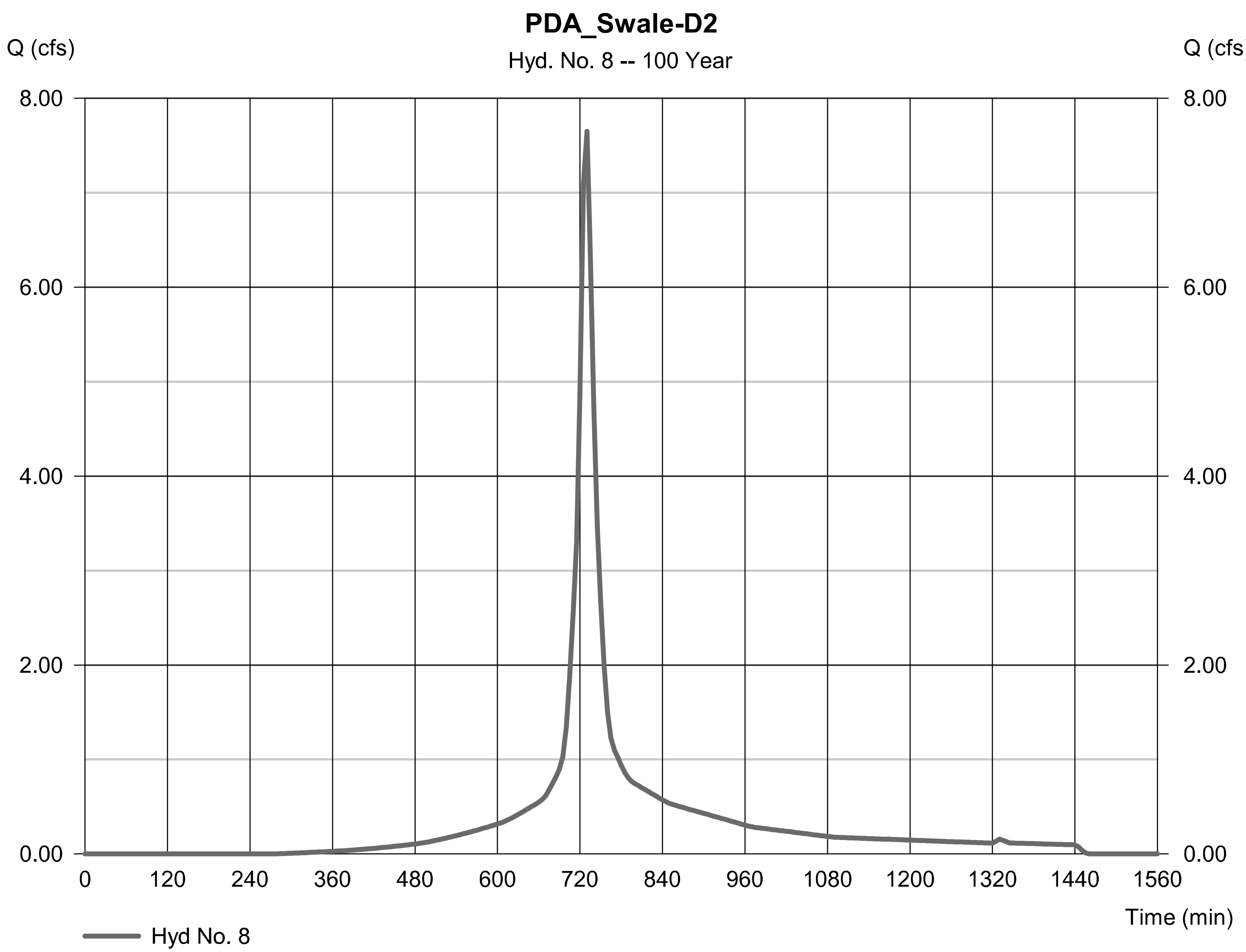
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 — Friday, 12 / 4 / 2015

Hyd. No. 8

PDA_Swale-D2

Hydrograph type	= SCS Runoff	Peak discharge	= 7.652 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 31,485 cuft
Drainage area	= 1.580 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 7.75 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

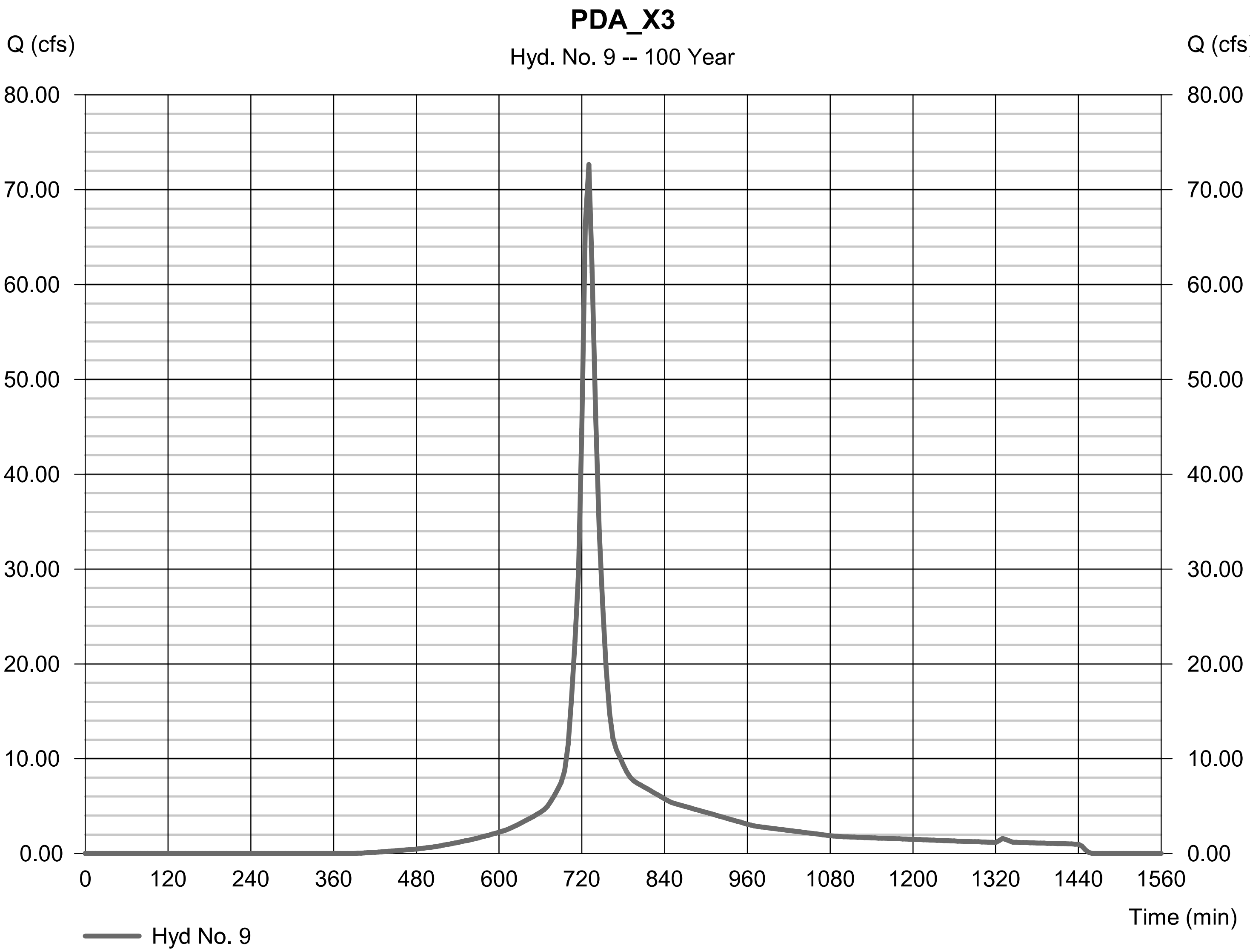
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 | Friday, 12 / 4 / 2015

Hyd. No. 9

PDA_X3

Hydrograph type	= SCS Runoff	Peak discharge	= 72.64 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 291,384 cuft
Drainage area	= 16.970 ac	Curve number	= 77*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 7.75 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(20.000 x 75)] / 16.970



Hydrograph Report

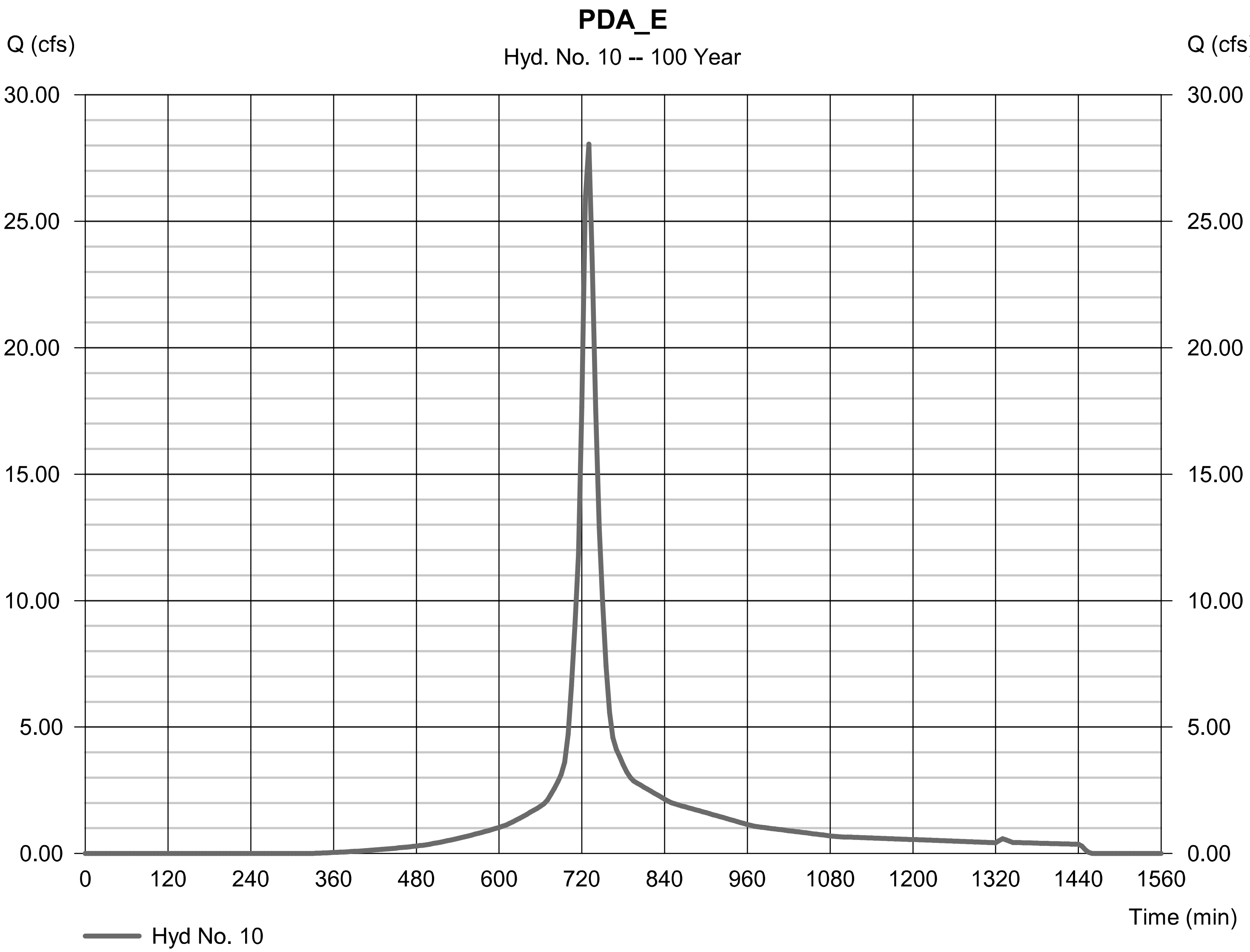
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 10

PDA_E

Hydrograph type	= SCS Runoff	Peak discharge	= 28.05 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 113,940 cuft
Drainage area	= 6.080 ac	Curve number	= 81*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 7.75 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(2.400 x 95) + (3.000 x 75)] / 6.080



Hydrograph Report

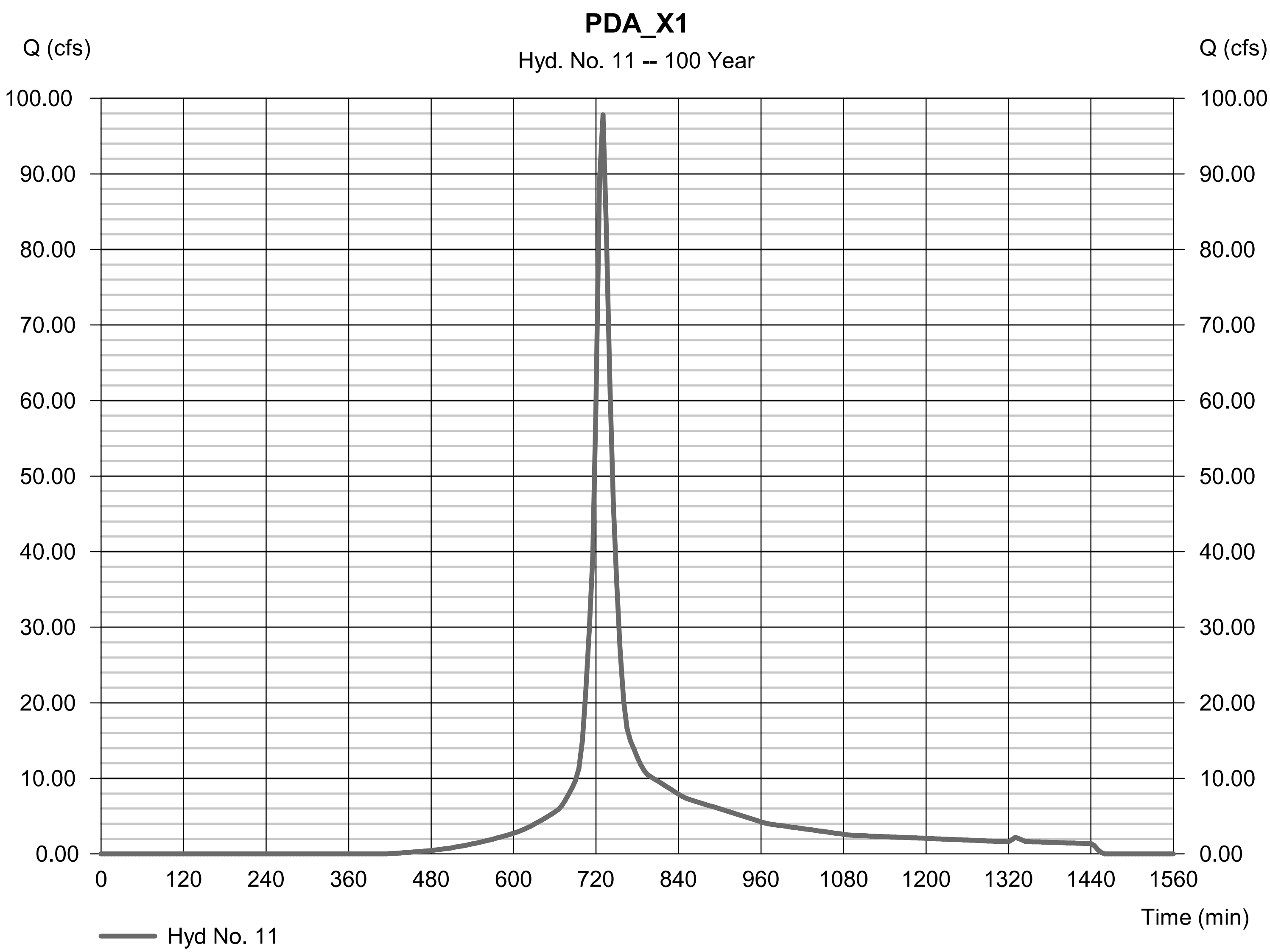
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 11

PDA_X1

Hydrograph type	= SCS Runoff	Peak discharge	= 97.84 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 390,778 cuft
Drainage area	= 23.840 ac	Curve number	= 75*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 7.75 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(20.000 x 75)] / 23.840



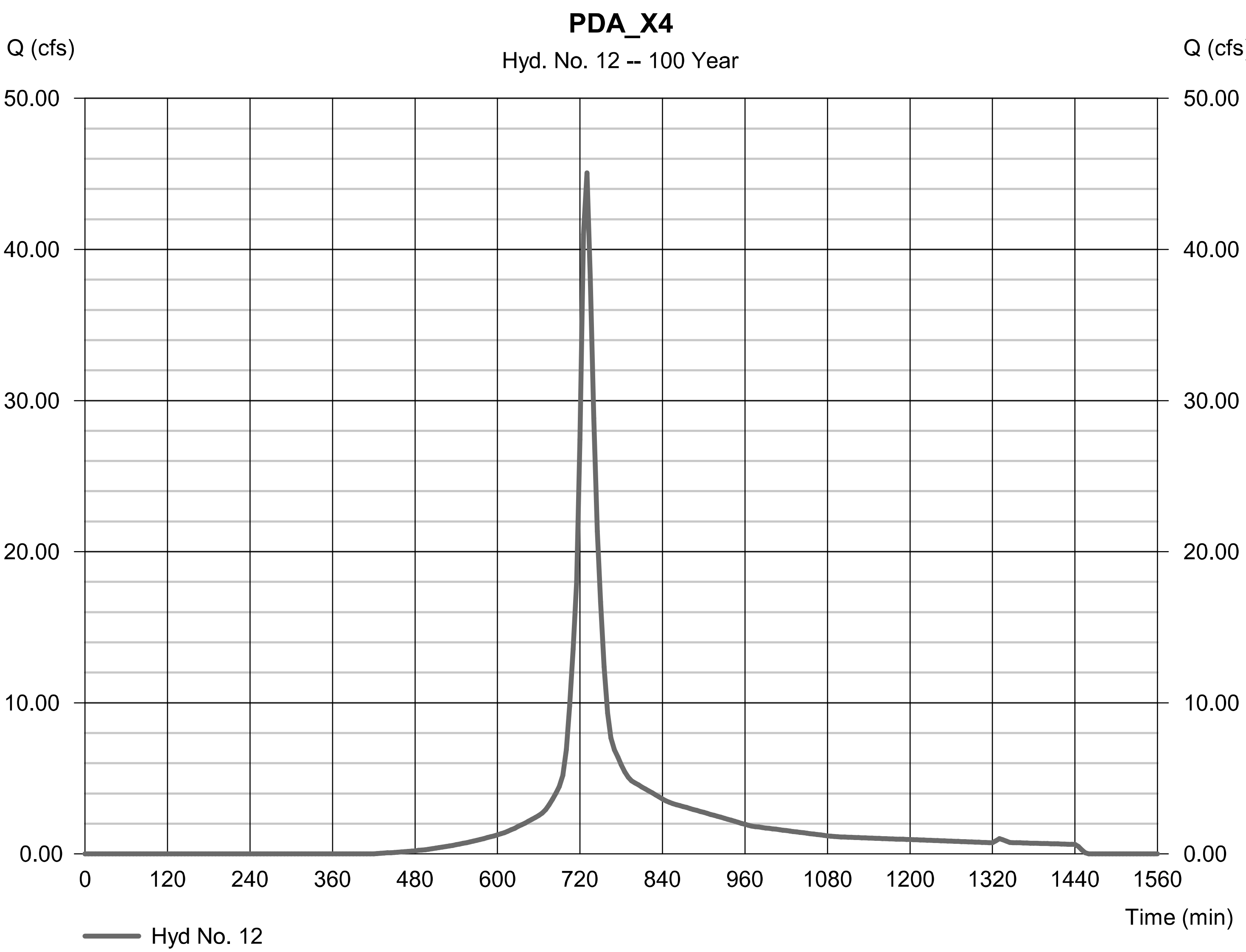
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 — Friday, 12 / 4 / 2015

Hyd. No. 12

PDA_X4

Hydrograph type	= SCS Runoff	Peak discharge	= 45.06 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 179,981 cuft
Drainage area	= 10.980 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.60 min
Total precip.	= 7.75 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

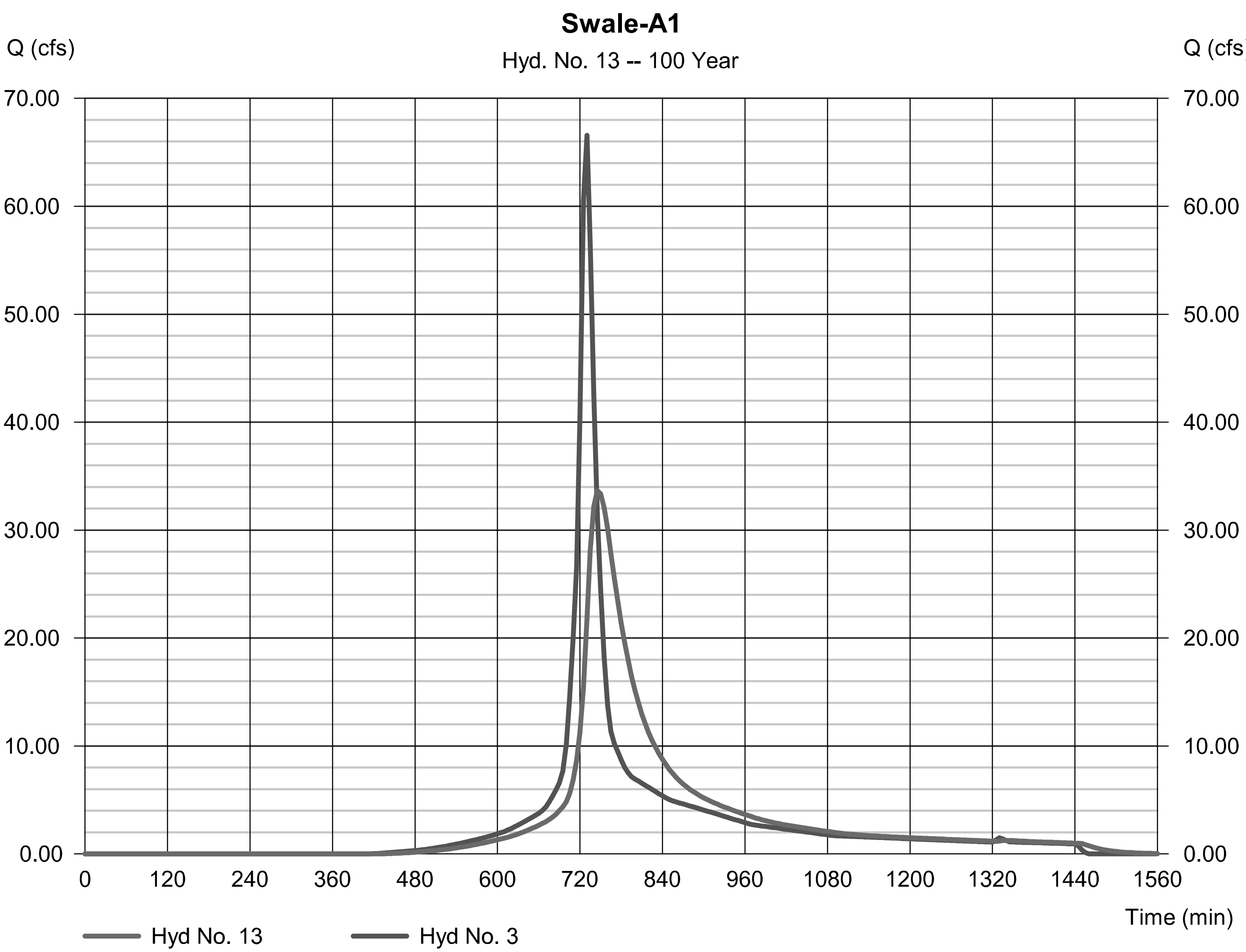
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 13

Swale-A1

Hydrograph type	= Reach	Peak discharge	= 33.65 cfs
Storm frequency	= 100 yrs	Time to peak	= 745 min
Time interval	= 5 min	Hyd. volume	= 265,854 cuft
Inflow hyd. No.	= 3 - PDA_Swale-A1	Section type	= Trapezoidal
Reach length	= 1750.0 ft	Channel slope	= 5.0 %
Manning's n	= 0.500	Bottom width	= 4.0 ft
Side slope	= 4.0:1	Max. depth	= 2.0 ft
Rating curve x	= 0.264	Rating curve m	= 1.224
Ave. velocity	= 0.73 ft/s	Routing coeff.	= 0.1419

Modified Att-Kin routing method used.



Hydrograph Report

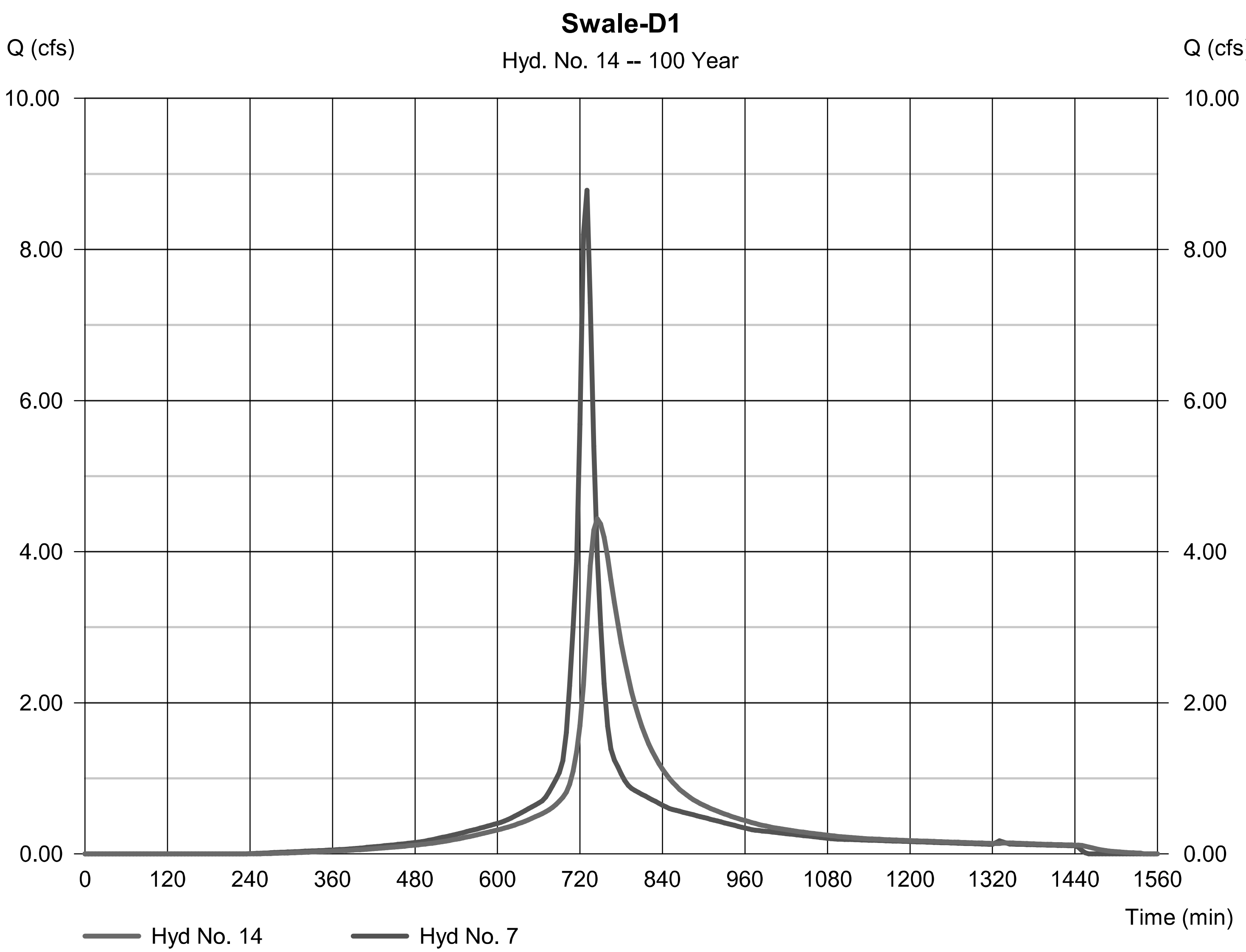
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 14

Swale-D1

Hydrograph type	= Reach	Peak discharge	= 4.434 cfs
Storm frequency	= 100 yrs	Time to peak	= 745 min
Time interval	= 5 min	Hyd. volume	= 36,732 cuft
Inflow hyd. No.	= 7 - PDA_Swale-D1	Section type	= Trapezoidal
Reach length	= 510.0 ft	Channel slope	= 5.0 %
Manning's n	= 0.500	Bottom width	= 2.0 ft
Side slope	= 4.0:1	Max. depth	= 1.0 ft
Rating curve x	= 0.420	Rating curve m	= 0.882
Ave. velocity	= 0.28 ft/s	Routing coeff.	= 0.1349

Modified Att-Kin routing method used.



Hydrograph Report

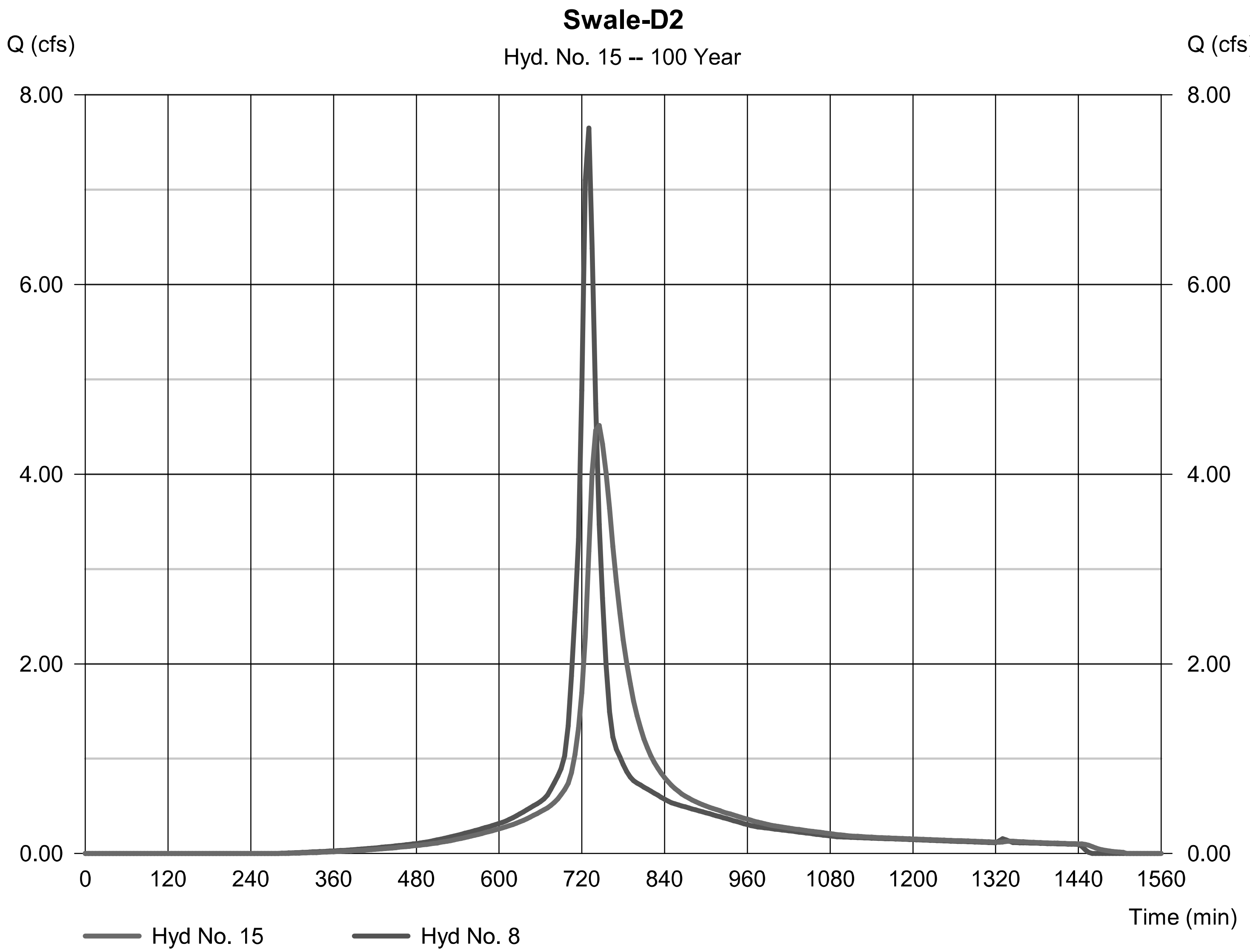
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 — Friday, 12 / 4 / 2015

Hyd. No. 15

Swale-D2

Hydrograph type	= Reach	Peak discharge	= 4.515 cfs
Storm frequency	= 100 yrs	Time to peak	= 745 min
Time interval	= 5 min	Hyd. volume	= 31,470 cuft
Inflow hyd. No.	= 8 - PDA_Swale-D2	Section type	= Trapezoidal
Reach length	= 365.0 ft	Channel slope	= 5.0 %
Manning's n	= 0.500	Bottom width	= 2.0 ft
Side slope	= 4.0:1	Max. depth	= 1.0 ft
Rating curve x	= 0.420	Rating curve m	= 0.882
Ave. velocity	= 0.28 ft/s	Routing coeff.	= 0.1867

Modified Att-Kin routing method used.



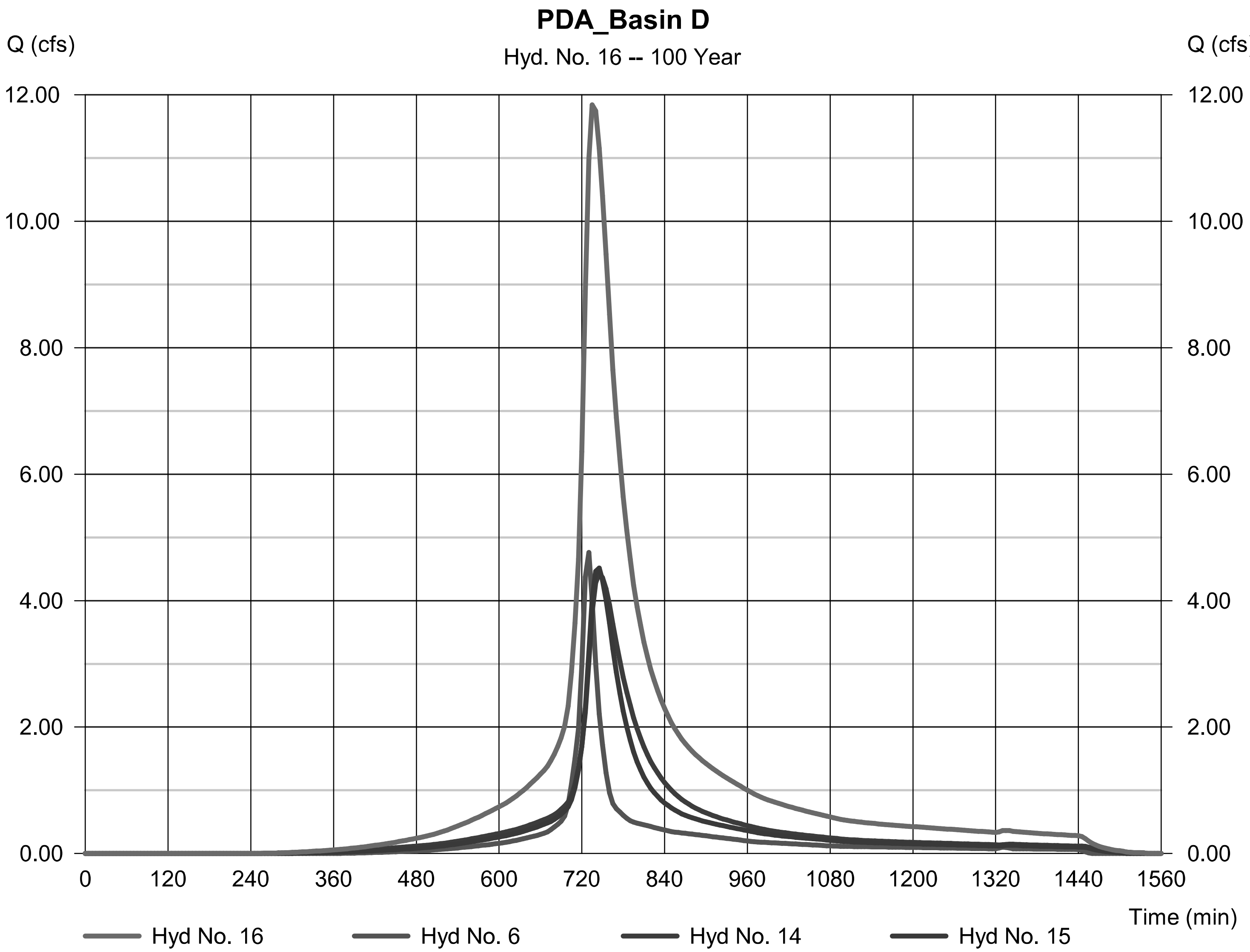
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 16

PDA_Basin D

Hydrograph type	= Combine	Peak discharge	= 11.84 cfs
Storm frequency	= 100 yrs	Time to peak	= 735 min
Time interval	= 5 min	Hyd. volume	= 87,412 cuft
Inflow hyds.	= 6, 14, 15	Contrib. drain. area	= 1.070 ac



Hydrograph Report

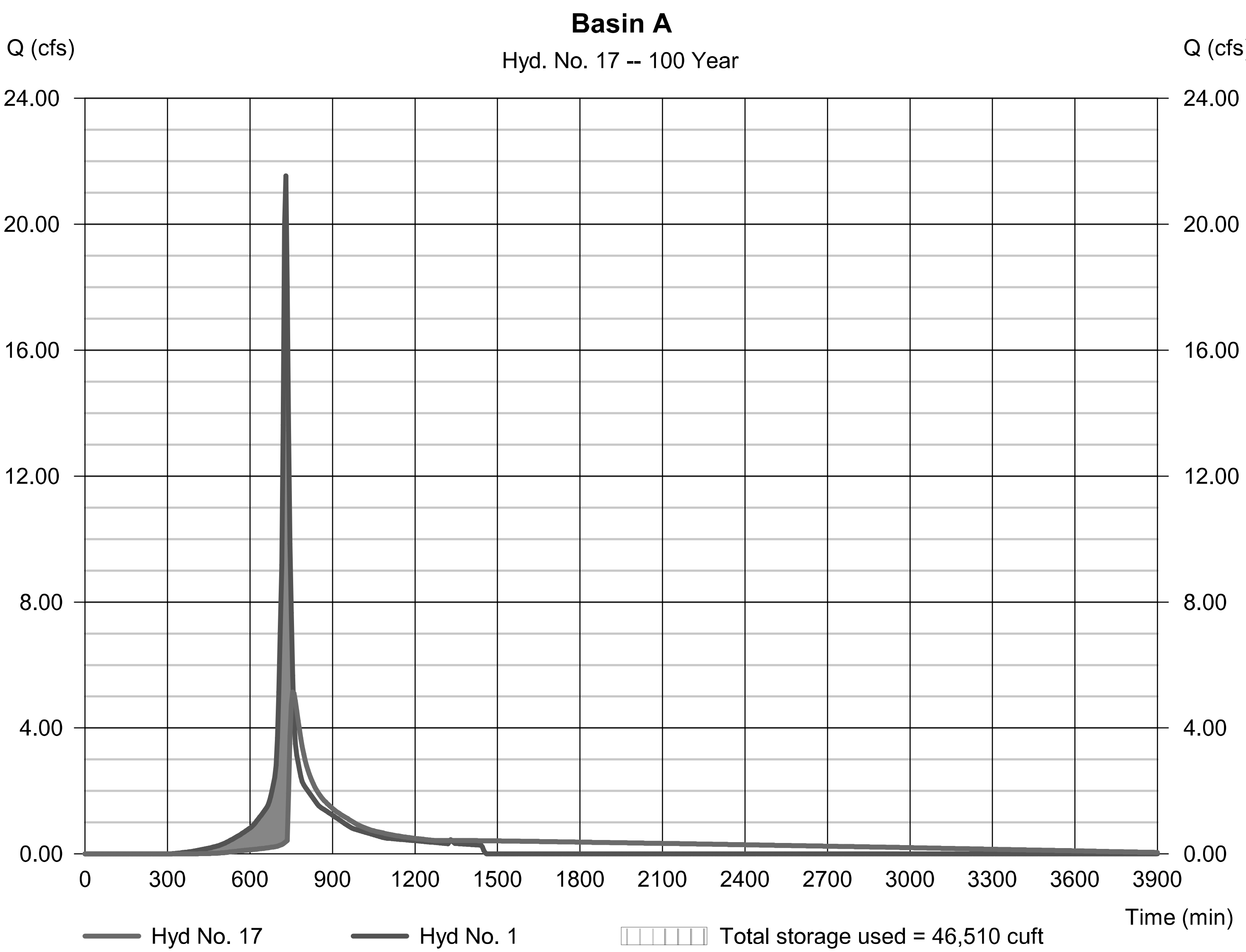
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 17

Basin A

Hydrograph type	= Reservoir	Peak discharge	= 5.139 cfs
Storm frequency	= 100 yrs	Time to peak	= 755 min
Time interval	= 5 min	Hyd. volume	= 87,781 cuft
Inflow hyd. No.	= 1 - PDA_A	Max. Elevation	= 1389.11 ft
Reservoir name	= Basin A	Max. Storage	= 46,510 cuft

Storage Indication method used.



Hydrograph Report

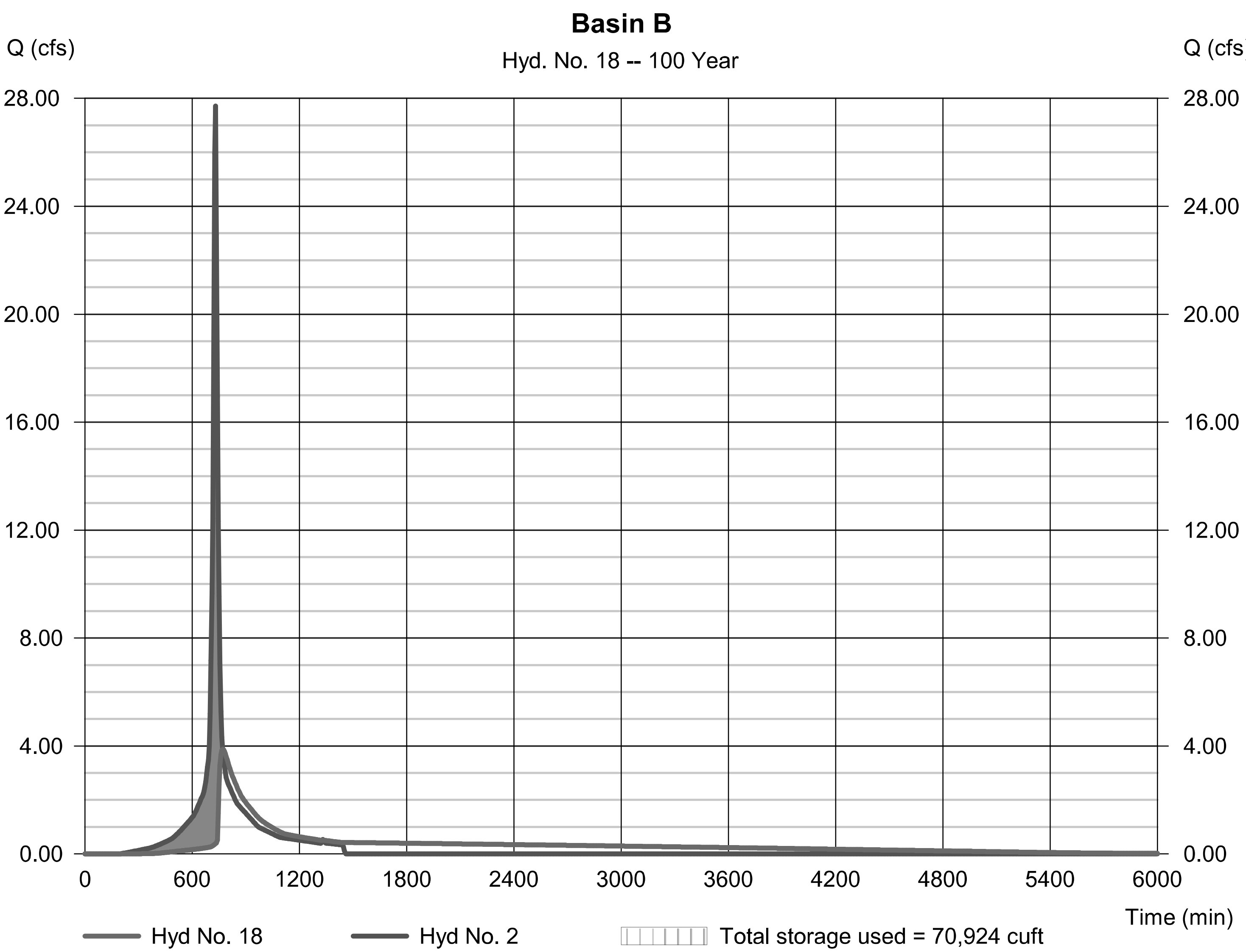
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 18

Basin B

Hydrograph type	= Reservoir	Peak discharge	= 3.873 cfs
Storm frequency	= 100 yrs	Time to peak	= 770 min
Time interval	= 5 min	Hyd. volume	= 117,421 cuft
Inflow hyd. No.	= 2 - PDA_B	Max. Elevation	= 1378.99 ft
Reservoir name	= Basin B	Max. Storage	= 70,924 cuft

Storage Indication method used.



Hydrograph Report

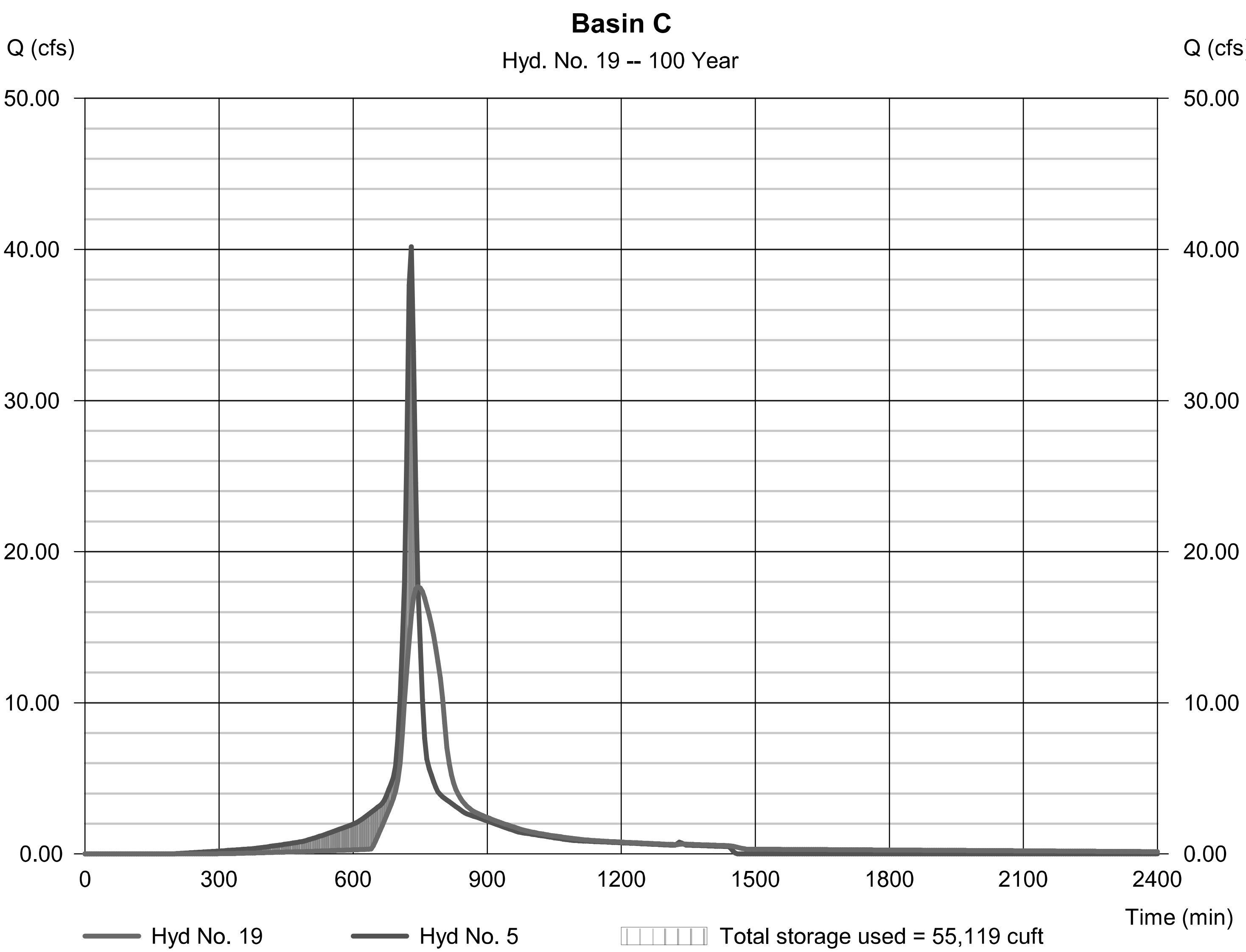
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 19

Basin C

Hydrograph type	= Reservoir	Peak discharge	= 17.68 cfs
Storm frequency	= 100 yrs	Time to peak	= 745 min
Time interval	= 5 min	Hyd. volume	= 170,289 cuft
Inflow hyd. No.	= 5 - PDA_C	Max. Elevation	= 1489.18 ft
Reservoir name	= Basin C	Max. Storage	= 55,119 cuft

Storage Indication method used.



Hydrograph Report

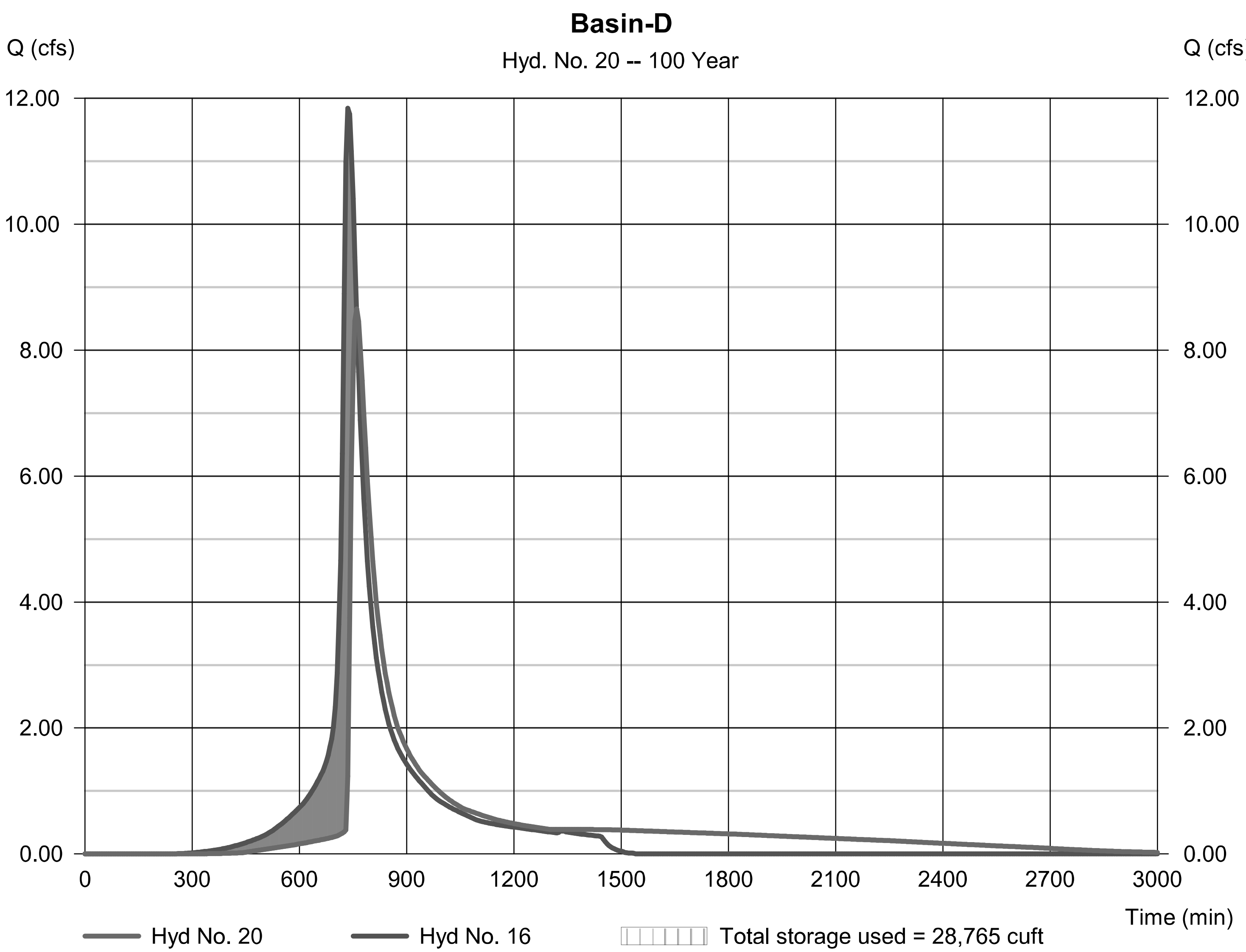
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 20

Basin-D

Hydrograph type	= Reservoir	Peak discharge	= 8.657 cfs
Storm frequency	= 100 yrs	Time to peak	= 760 min
Time interval	= 5 min	Hyd. volume	= 87,382 cuft
Inflow hyd. No.	= 16 - PDA_Basin D	Max. Elevation	= 1498.89 ft
Reservoir name	= Basin D	Max. Storage	= 28,765 cuft

Storage Indication method used.



Hydrograph Report

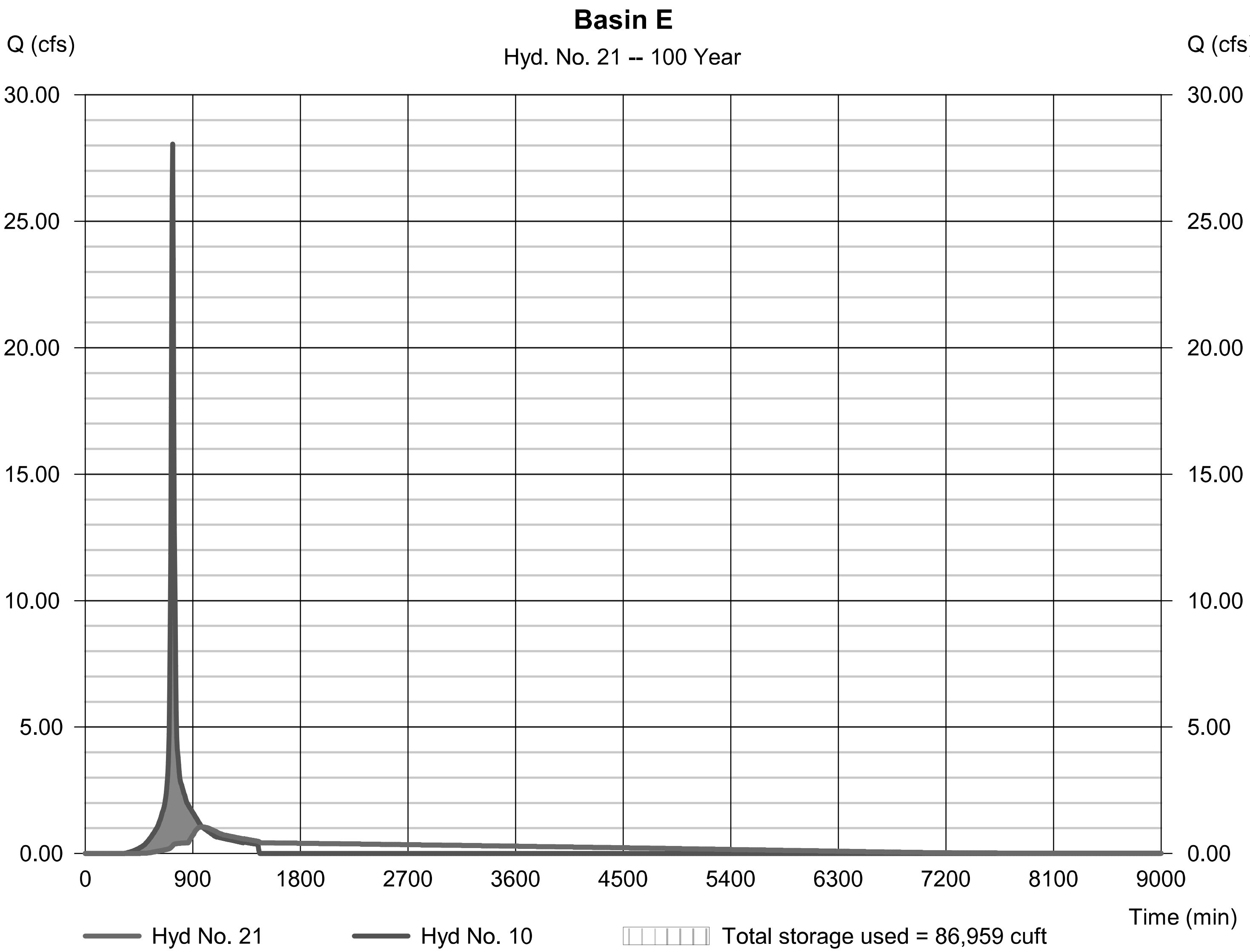
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 — Friday, 12 / 4 / 2015

Hyd. No. 21

Basin E

Hydrograph type	= Reservoir	Peak discharge	= 1.052 cfs
Storm frequency	= 100 yrs	Time to peak	= 975 min
Time interval	= 5 min	Hyd. volume	= 113,833 cuft
Inflow hyd. No.	= 10 - PDA_E	Max. Elevation	= 1498.65 ft
Reservoir name	= Basin E	Max. Storage	= 86,959 cuft

Storage Indication method used.



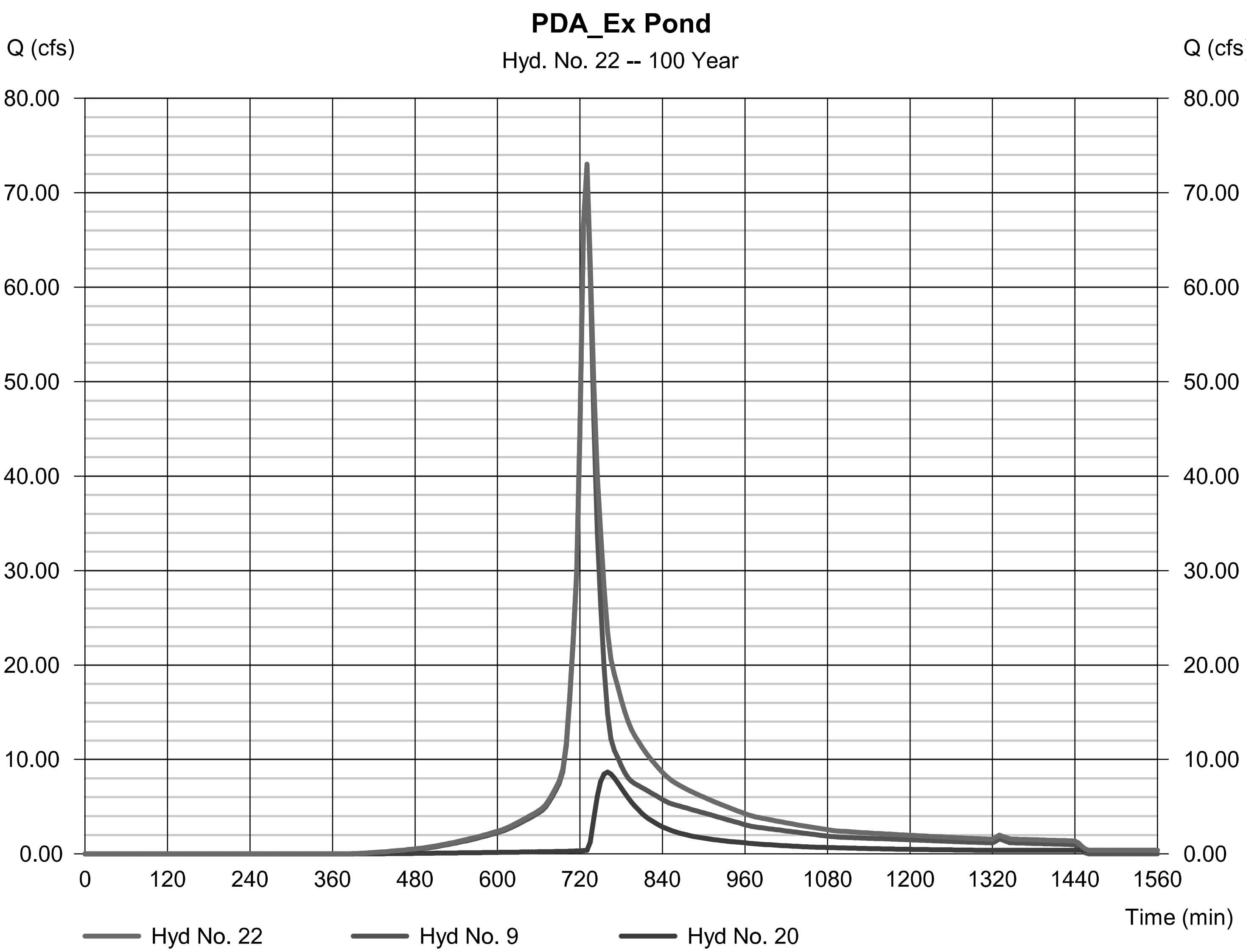
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 22

PDA_Ex Pond

Hydrograph type	= Combine	Peak discharge	= 73.02 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 378,766 cuft
Inflow hyds.	= 9, 20	Contrib. drain. area	= 16.970 ac



Hydrograph Report

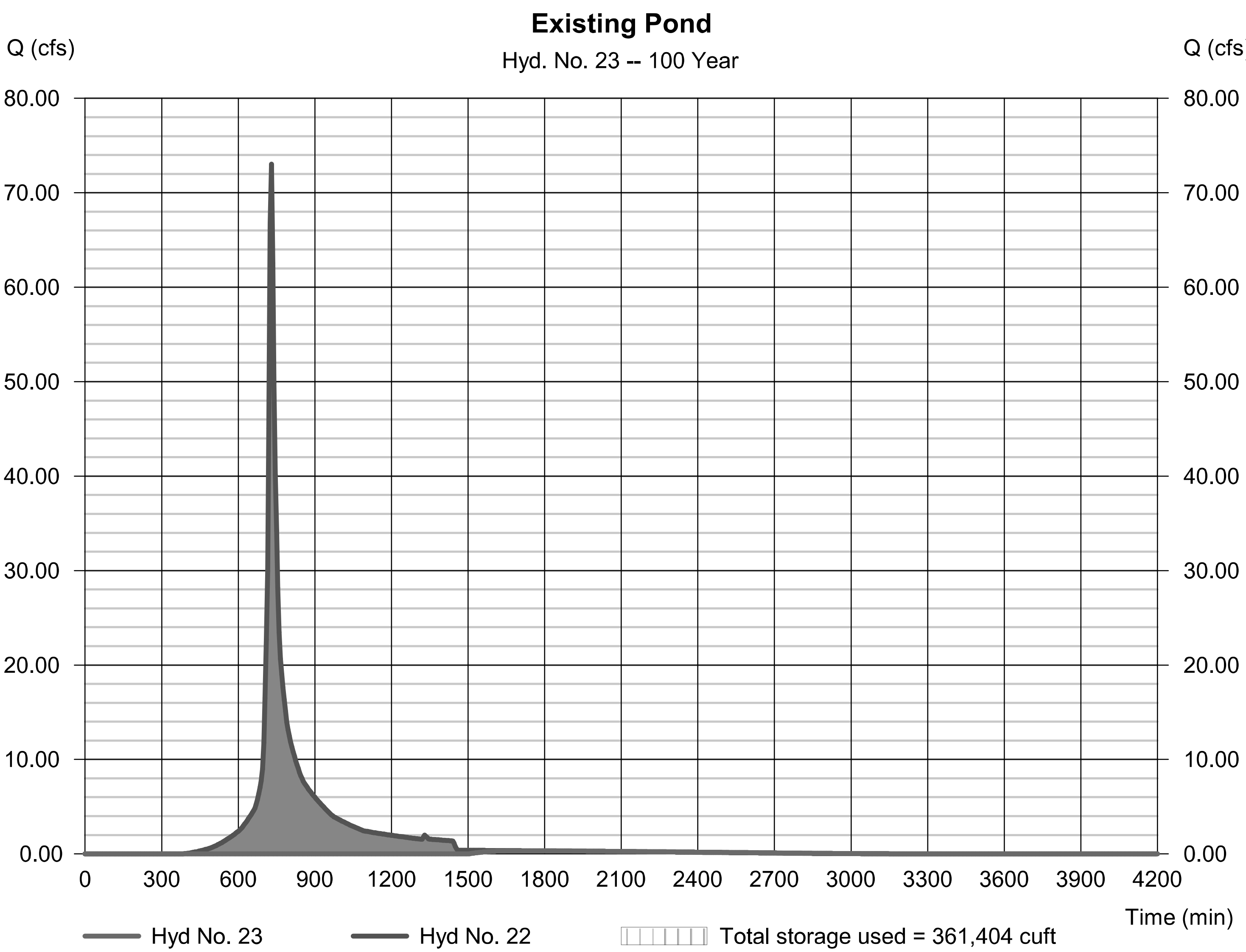
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 23

Existing Pond

Hydrograph type	= Reservoir	Peak discharge	= 0.329 cfs
Storm frequency	= 100 yrs	Time to peak	= 1745 min
Time interval	= 5 min	Hyd. volume	= 18,798 cuft
Inflow hyd. No.	= 22 - PDA_Ex Pond	Max. Elevation	= 1489.02 ft
Reservoir name	= Ex. Pond	Max. Storage	= 361,404 cuft

Storage Indication method used.



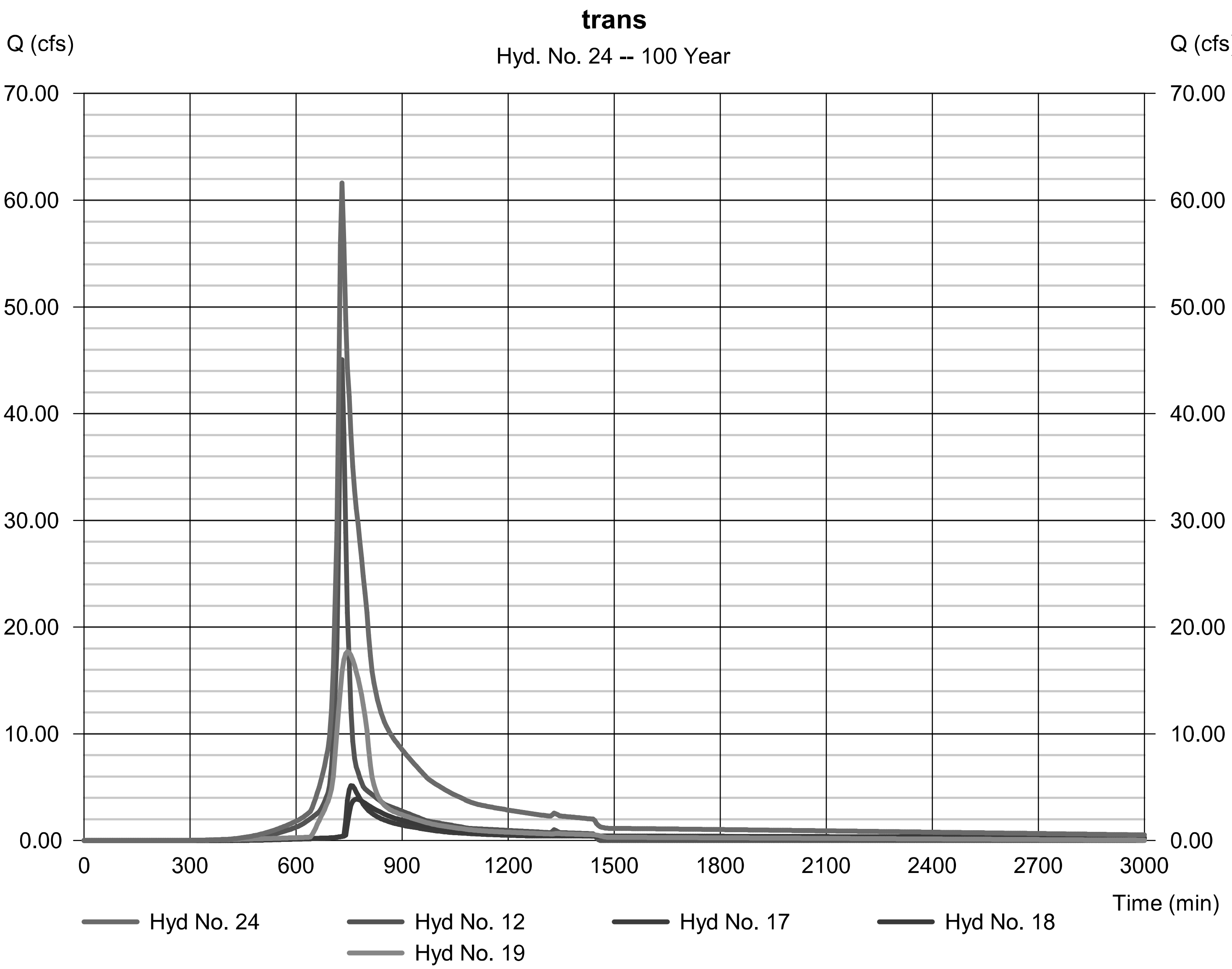
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 24

trans

Hydrograph type	= Combine	Peak discharge	= 61.62 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 555,472 cuft
Inflow hyds.	= 12, 17, 18, 19	Contrib. drain. area	= 10.980 ac



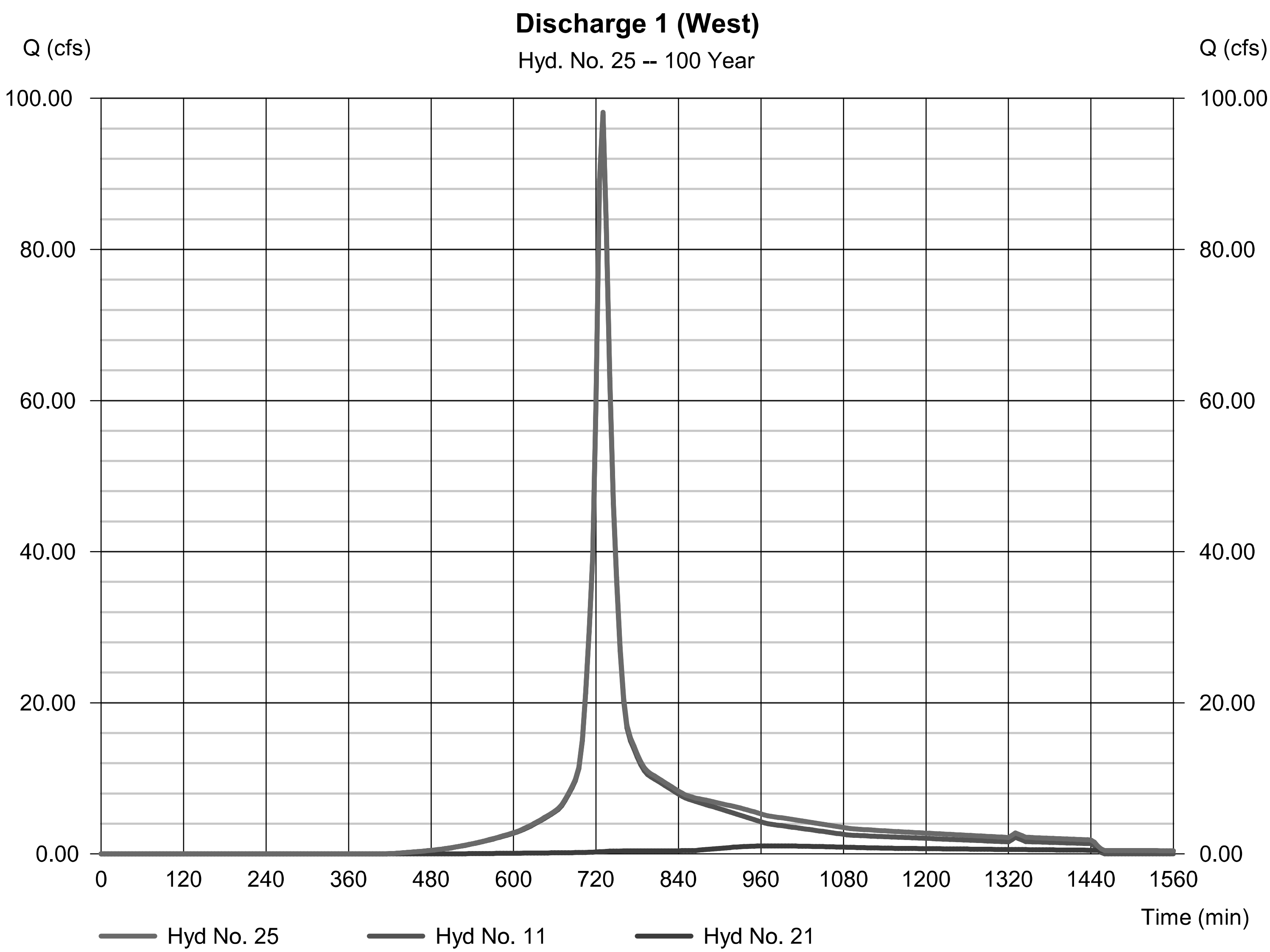
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 25

Discharge 1 (West)

Hydrograph type	= Combine	Peak discharge	= 98.15 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 504,611 cuft
Inflow hyds.	= 11, 21	Contrib. drain. area	= 23.840 ac



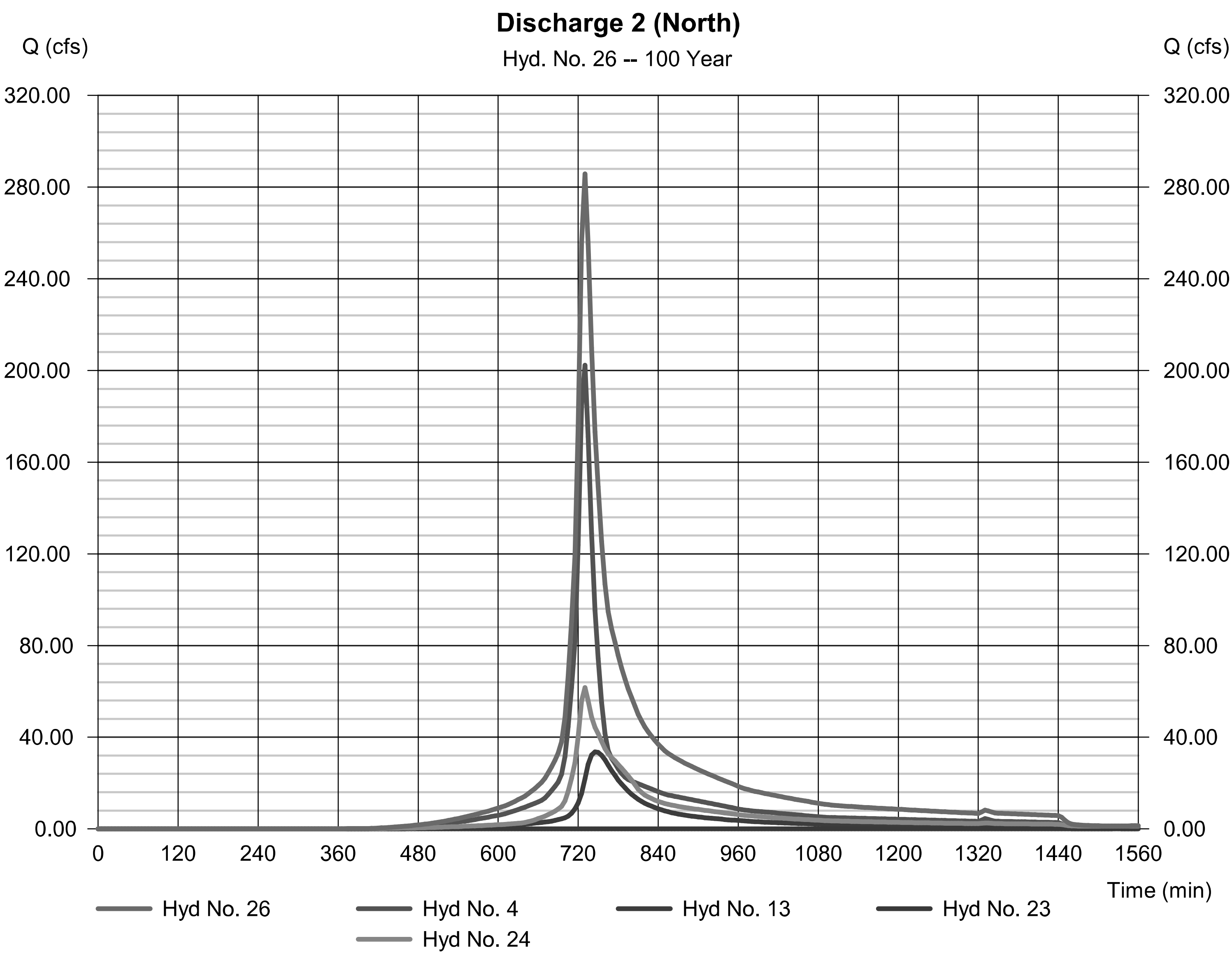
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Friday, 12 / 4 / 2015

Hyd. No. 26

Discharge 2 (North)

Hydrograph type	= Combine	Peak discharge	= 285.75 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 1,649,788 cuft
Inflow hyds.	= 4, 13, 23, 24	Contrib. drain. area	= 48.250 ac



APPENDIX I

STORM SEWER PIPE CALCULATIONS

Storm Sewer Design Report
Active Scenario: 25 Year
Conduit FlexTable: Pipe Report

Label	-Node- Upstream Downstream	System CA (acres)	System Intensity (in/h)	Length (Unified) (ft)	Manning's n	Slope (%)	Flow (ft³/s)	Capacity (Full Flow) (ft³/s)	-Ground- Upstream Downstream (ft)	Invert Upstream (ft)	Invert Downstream (ft)	-HGL- Upstream Downstream (ft)	-EGL- Upstream Downstream (ft)	Cover (Start) (ft)	Cover (Stop) (ft)
B09	A111 A110	1.862	6.089	119.0	0.013	0.840	11.43	20.74	1,455.30 1,448.20	1,445.20	1,444.20	1,446.41 1,445.26	1,446.92 1,439.85	8.10	2.00
B10	A110 A109	1.898	6.015	126.0	0.013	1.032	11.51	22.98	1,448.20 1,441.30	1,438.60	1,437.30	1,439.82 1,438.30	1,440.33 1,435.58	7.60	2.00
B11	A109 A108	2.004	5.966	73.0	0.013	1.370	12.05	26.48	1,441.30 1,440.30	1,433.50	1,432.50	1,434.75 1,433.46	1,435.28 1,431.68	5.80	5.80
B01	A118 A117	0.165	6.500	59.0	0.013	1.017	1.08	10.59	1,499.50 1,498.70	1,495.50	1,494.90	1,495.89 1,495.22	1,496.03 1,491.27	2.50	2.30
B02	A117 A116	0.317	6.436	50.0	0.013	1.000	2.05	10.50	1,498.70 1,494.00	1,490.50	1,490.00	1,491.04 1,490.45	1,491.24 1,485.15	6.70	2.50
B03	A116 A115	0.715	6.391	180.0	0.013	3.611	4.60	19.96	1,494.00 1,481.00	1,484.00	1,477.50	1,484.82 1,477.99	1,485.16 1,475.39	8.50	2.00
B11a	A108a A108	0.078	6.500	66.0	0.013	1.515	0.51	12.93	1,437.50 1,440.30	1,433.50	1,432.50	1,433.77 1,432.70	1,433.86 1,431.68	2.50	6.30
B19	A111b A111a	0.121	6.500	58.0	0.013	1.034	0.79	6.57	1,457.90 1,458.30	1,453.90	1,453.30	1,454.25 1,453.59	1,454.37 1,449.97	2.75	3.75
B10a	A110a A110	0.003	6.500	60.0	0.013	1.333	0.02	7.46	1,448.20 1,448.20	1,445.00	1,444.20	1,445.06 1,444.25	1,445.08 1,439.85	1.95	2.75
C-04	B117 B116	0.250	6.147	183.0	0.013	1.858	1.55	14.32	1,473.40 1,466.50	1,463.40	1,460.00	1,463.87 1,460.33	1,464.04 1,459.31	8.50	5.00
C-10	B202 B201	0.925	5.975	169.0	0.013	1.302	5.57	11.98	1,440.70 1,436.50	1,433.20	1,431.00	1,434.11 1,431.72	1,434.49 1,432.15	6.00	4.00
C-13	B109 B108	3.010	5.754	68.0	0.013	1.765	17.46	30.05	1,431.70 1,424.00	1,421.20	1,420.00	1,422.71 1,421.13	1,423.44 1,416.92	8.50	2.00
C-40	B206 B205	0.236	6.301	36.0	0.013	1.667	1.50	8.34	1,453.10 1,452.70	1,449.60	1,449.00	1,450.08 1,449.36	1,450.27 1,446.05	2.25	2.45
C-42	B204 B203	0.556	6.123	219.0	0.013	2.420	3.43	16.34	1,447.50 1,440.70	1,442.00	1,436.70	1,442.71 1,437.53	1,442.98 1,437.71	4.00	2.50
C-25	B303 B302	0.408	6.500	112.0	0.013	0.670	2.67	5.29	1,432.00 1,430.70	1,428.00	1,427.25	1,428.66 1,427.88	1,428.92 1,428.07	2.75	2.20
C-26	B302 B301	0.638	6.392	60.0	0.013	0.833	4.11	9.59	1,430.70 1,430.70	1,427.00	1,426.50	1,427.78 1,427.63	1,428.08 1,427.76	2.20	2.70
C-27	B301 B109	0.970	6.344	76.0	0.013	0.395	6.20	6.60	1,430.70 1,431.70	1,426.50	1,426.20	1,427.63 1,427.16	1,427.92 1,423.79	2.70	4.00
C-31	B602 B601	0.278	6.500	153.0	0.013	3.464	1.82	19.55	1,447.70 1,435.90	1,437.70	1,432.40	1,438.21 1,432.71	1,438.39 1,433.15	8.50	2.00
C-32	B601 B600	0.278	6.408	130.0	0.013	1.462	1.80	12.70	1,435.90 1,432.00	1,431.90	1,430.00	1,432.40 1,430.38	1,432.59 (N/A)	2.50	0.50
C-41	B205 B204	0.293	6.272	162.0	0.013	0.988	1.85	6.42	1,452.70 1,447.50	1,445.10	1,443.50	1,445.64 1,443.96	1,445.85 1,442.86	6.35	2.75
C-26	B404 B403	4.330	6.363	81.0	0.013	0.494	27.77	28.82	1,433.90 1,432.50	1,422.35	1,421.95	1,424.30 1,423.75	1,425.01 1,424.58	9.05	8.05
D-30	X411	1.984	5.550	68.0	0.013	2.941	11.10	38.79	1,453.00	1,450.00	1,448.00	1,451.19	1,451.69	1.00	0.00

Storm Sewer Design Report
Active Scenario: 25 Year
Conduit FlexTable: Pipe Report

Label	-Node- Upstream Downstream	System CA (acres)	System Intensity (in/h)	Length (Unified) (ft)	Manning's n	Slope (%)	Flow (ft³/s)	Capacity (Full Flow) (ft³/s)	-Ground- Upstream Downstream (ft)	Invert Upstream (ft)	Invert Downstream (ft)	-HGL- Upstream Downstream (ft)	-EGL- Upstream Downstream (ft)	Cover (Start) (ft)	Cover (Stop) (ft)
	X410								1,450.00			1,448.75	(N/A)		
E-01	C304	0.631	6.366	112.0	0.013	1.339	4.05	7.48	1,622.20	1,612.50	1,611.00	1,613.31	1,613.67	8.45	4.25
	C303								1,616.50			1,611.66	1,609.96		
E-02	C303	0.779	6.291	118.0	0.013	2.034	4.94	14.98	1,616.50	1,608.50	1,606.10	1,609.35	1,609.71	6.50	2.50
	C302								1,610.10			1,606.69	1,602.97		
E-03	C302	0.878	6.226	62.0	0.013	0.484	5.51	7.31	1,610.10	1,601.10	1,600.80	1,602.07	1,602.39	7.50	3.70
	C301								1,606.00			1,601.71	1,600.58		
E-04	C301	0.976	6.169	46.0	0.013	0.978	6.07	10.39	1,606.00	1,599.25	1,598.80	1,600.20	1,600.61	5.25	2.50
	C123								1,602.80			1,599.63	1,593.02		
E-05	C123	3.413	6.106	86.0	0.013	3.023	21.01	39.33	1,602.80	1,590.80	1,588.20	1,592.44	1,593.34	10.00	2.00
	C122								1,592.20			1,589.86	1,590.74		
E-10	C116	4.645	5.957	56.0	0.013	2.321	27.89	34.47	1,558.00	1,552.00	1,550.70	1,553.83	1,555.16	4.00	2.00
	C115								1,554.70			1,552.53	1,553.86		
E-11	C115	4.798	5.946	40.0	0.013	1.000	28.76	41.01	1,554.70	1,550.70	1,550.30	1,552.53	1,553.40	1.50	2.00
	C114								1,554.80			1,551.90	1,547.82		
E-14	C113	5.105	5.880	136.0	0.013	0.882	30.26	38.53	1,547.50	1,537.50	1,536.30	1,539.38	1,540.29	7.50	2.00
	C112								1,540.80			1,538.18	1,539.09		
E-15	C112	5.152	5.841	24.0	0.013	1.250	30.33	45.86	1,540.80	1,536.30	1,536.00	1,538.18	1,539.09	2.00	2.30
	C111								1,540.80			1,537.62	1,533.95		
E-19	C107	5.478	5.758	62.0	0.013	1.935	31.79	57.06	1,521.50	1,515.10	1,513.90	1,517.02	1,517.98	3.90	1.50
	C106								1,517.90			1,515.33	1,512.56		
E-20	C106	5.562	5.745	124.0	0.013	1.008	32.21	41.18	1,517.90	1,508.75	1,507.50	1,510.68	1,511.66	6.65	1.50
	C105								1,511.50			1,509.17	1,506.27		
E-21	C105	5.943	5.711	60.0	0.013	1.667	34.21	52.95	1,511.50	1,504.00	1,503.00	1,505.99	1,507.03	5.00	7.00
	C104								1,512.50			1,504.55	1,506.40		
E-30	C105b	0.035	6.500	24.0	0.013	1.250	0.23	7.22	1,510.50	1,507.00	1,506.70	1,507.19	1,507.25	2.25	2.75
	C105a								1,510.70			1,507.12	1,507.13		
E-25	C104a	0.179	6.500	84.0	0.013	0.893	1.17	6.10	1,508.50	1,504.50	1,503.75	1,504.93	1,505.08	2.75	7.50
	C104								1,512.50			1,504.62	1,506.40		
E-40	C125b	0.343	6.500	25.0	0.013	1.200	2.25	7.08	1,625.50	1,621.50	1,621.20	1,622.10	1,622.33	2.75	2.75
	C125a								1,625.20			1,621.69	1,619.43		
E-45	C127a	0.114	6.500	34.0	0.013	0.882	0.74	6.07	1,620.80	1,616.80	1,616.50	1,617.14	1,617.26	2.75	3.05
	C127								1,620.80			1,616.80	1,612.92		
E-46	C127	0.942	6.262	50.0	0.013	1.600	5.94	13.29	1,620.80	1,611.80	1,611.00	1,612.74	1,613.14	7.50	4.80
	C126								1,617.30			1,611.96	1,612.34		
E-47	C126	0.979	6.234	28.0	0.013	1.071	6.15	10.87	1,617.30	1,611.00	1,610.70	1,611.96	1,612.37	4.80	4.50
	C125								1,616.70			1,611.52	1,609.69		
E05a	C122	3.531	6.077	41.0	0.013	1.707	21.63	29.56	1,592.20	1,588.20	1,587.50	1,589.86	1,590.80	2.00	2.50
	C121								1,592.00			1,588.85	1,586.11		
C-40	A403	0.129	6.500	141.0	0.013	0.993	0.84	6.44	1,634.80	1,630.80	1,629.40	1,631.16	1,631.29	2.75	2.85
	A402								1,633.50			1,629.85	1,629.92		
H-37	E603	0.241	6.363	74.0	0.013	0.405	1.54	6.69	1,631.50	1,628.50	1,628.20	1,628.99	1,629.14	1.50	1.80
	E602								1,631.50			1,628.85	1,628.92		

Storm Sewer Design Report
Active Scenario: 25 Year
Conduit FlexTable: Pipe Report

Label	-Node- Upstream Downstream	System CA (acres)	System Intensity (in/h)	Length (Unified) (ft)	Manning's n	Slope (%)	Flow (ft³/s)	Capacity (Full Flow) (ft³/s)	-Ground- Upstream Downstream (ft)	Invert Upstream (ft)	Invert Downstream (ft)	-HGL- Upstream Downstream (ft)	-EGL- Upstream Downstream (ft)	Cover (Start) (ft)	Cover (Stop) (ft)
H-38	E602 E601	0.453	6.263	84.0	0.013	0.476	2.86	7.25	1,631.50 1,638.00	1,628.20	1,627.80	1,628.85 1,628.55	1,629.09 1,628.71	1.80	8.70
H-39	E601 E600	0.622	6.173	216.0	0.013	0.602	3.87	8.15	1,638.00 1,630.00	1,627.80	1,626.50	1,628.55 1,627.23	1,628.85 (N/A)	8.70	2.00
H-20	E127 E126	0.160	6.500	28.0	0.013	1.429	1.05	7.72	1,636.00 1,635.70	1,631.90	1,631.50	1,632.30 1,632.17	1,632.45 1,632.20	2.85	2.95
H-21	E126 E125	0.422	6.473	170.0	0.013	2.353	2.76	9.91	1,635.70 1,631.50	1,631.50	1,627.50	1,632.17 1,628.35	1,632.43 1,628.50	2.95	2.75
H-24	E124 E123	0.809	6.272	91.0	0.013	0.879	5.12	6.06	1,627.70 1,626.60	1,623.70	1,622.90	1,624.62 1,623.85	1,625.05 1,624.00	2.75	2.45
H-17	E401 E400	0.687	6.386	127.0	0.013	1.024	4.42	6.54	1,630.50 1,622.00	1,621.30	1,620.00	1,622.15 1,620.75	1,622.54 (N/A)	7.95	0.75
H-26a	E203 E202	0.156	6.500	29.0	0.013	0.345	1.02	3.79	1,632.50 1,632.40	1,627.80	1,627.70	1,628.26 1,628.20	1,628.36 1,628.28	3.45	3.45
CO-402	B204a B204	0.094	6.500	58.0	0.013	0.862	0.62	6.00	1,447.00 1,447.50	1,444.00	1,443.50	1,444.31 1,443.77	1,444.41 1,442.86	1.75	2.75
CO-405	B116a B116	0.151	6.500	56.0	0.013	0.893	0.99	6.10	1,466.50 1,466.50	1,462.50	1,462.00	1,462.89 1,462.34	1,463.03 1,459.31	2.75	3.25
CO-406	B116 B115	0.515	6.004	175.0	0.013	0.743	3.11	9.05	1,466.50 1,461.20	1,458.20	1,456.90	1,458.87 1,457.64	1,459.13 1,457.84	6.80	2.80
CO-407	B115 B114	0.630	5.908	58.0	0.013	0.862	3.75	9.75	1,461.20 1,461.10	1,456.90	1,456.40	1,457.64 1,457.05	1,457.93 1,451.95	2.80	3.20
CO-409	B111 B110	0.752	5.826	152.0	0.013	2.303	4.41	34.33	1,437.50 1,432.50	1,432.00	1,428.50	1,432.74 1,428.98	1,433.01 1,429.24	3.50	2.00
CO-410	B110 B109	1.014	5.776	74.0	0.013	2.432	5.90	35.28	1,432.50 1,431.70	1,427.50	1,425.70	1,428.36 1,426.25	1,428.68 1,423.79	3.00	4.00
CO-411	B201 B109	1.027	5.912	185.0	0.013	2.324	6.12	16.01	1,436.50 1,431.70	1,430.50	1,426.20	1,431.46 1,426.84	1,431.87 1,423.79	4.50	4.00
CO-412	B203 B202	0.767	5.999	56.0	0.013	1.071	4.64	10.87	1,440.70 1,440.70	1,436.70	1,436.10	1,437.53 1,436.78	1,437.86 1,434.65	2.50	3.10
CO-413	B118 B117	0.183	6.236	83.0	0.013	0.964	1.15	6.34	1,474.50 1,473.40	1,468.10	1,467.30	1,468.52 1,467.66	1,468.68 1,464.11	5.15	4.85
CO-417	A111a A111	0.242	6.433	226.0	0.013	0.575	1.57	7.97	1,458.30 1,455.30	1,449.30	1,448.00	1,449.77 1,448.45	1,449.94 1,446.60	7.50	5.80
CO-419	A113 A112	1.266	6.227	180.0	0.013	2.111	7.94	15.26	1,468.00 1,458.20	1,458.00	1,454.20	1,459.09 1,454.97	1,459.61 1,453.09	8.50	2.50
CO-422	C113a C113	0.091	6.500	35.0	0.013	0.714	0.60	5.46	1,547.50 1,547.50	1,544.25	1,544.00	1,544.55 1,544.28	1,544.66 1,539.51	2.00	2.25
CO-423	C204 C203	0.084	6.500	65.0	0.013	4.462	0.55	13.64	1,532.80 1,530.90	1,528.00	1,525.10	1,528.29 1,525.46	1,528.39 1,525.52	3.55	4.55
CO-424	C203 C202	0.210	6.450	85.0	0.013	1.176	1.36	7.01	1,530.90 1,528.50	1,525.00	1,524.00	1,525.46 1,524.37	1,525.63 1,520.85	4.65	3.25
CO-425	C202	0.289	6.370	167.0	0.013	2.335	1.86	9.87	1,528.50	1,520.00	1,516.10	1,520.54	1,520.75	7.25	3.45

Storm Sewer Design Report
Active Scenario: 25 Year
Conduit FlexTable: Pipe Report

Label	-Node- Upstream Downstream	System CA (acres)	System Intensity (in/h)	Length (Unified) (ft)	Manning's n	Slope (%)	Flow (ft³/s)	Capacity (Full Flow) (ft³/s)	-Ground- Upstream Downstream (ft)	Invert Upstream (ft)	Invert Downstream (ft)	-HGL- Upstream Downstream (ft)	-EGL- Upstream Downstream (ft)	Cover (Start) (ft)	Cover (Stop) (ft)
	C201								1,520.80			1,516.47	1,514.14		
CO-430	C201a	0.222	6.500	60.0	0.013	1.000	1.45	6.46	1,521.20	1,516.70	1,516.10	1,517.18	1,517.35	3.25	3.45
	C201								1,520.80			1,516.50	1,514.14		
CO-431	C111	5.198	5.835	147.0	0.013	2.245	30.57	61.45	1,540.80	1,530.80	1,527.50	1,532.68	1,533.61	7.50	2.00
	C110								1,532.00			1,529.39	1,530.31		
CO-432	C110	5.238	5.806	24.0	0.013	1.042	30.65	41.86	1,532.00	1,527.50	1,527.25	1,529.39	1,530.31	2.00	2.25
	C109								1,532.00			1,528.93	1,525.08		
CO-435	C117	4.511	5.979	95.0	0.013	1.789	27.18	30.26	1,565.70	1,555.70	1,554.00	1,557.51	1,558.79	8.00	2.00
	C116								1,558.00			1,555.50	1,553.95		
CO-436	C116a	0.045	6.500	41.0	0.013	1.220	0.30	7.13	1,558.50	1,555.25	1,554.75	1,555.46	1,555.53	2.00	2.00
	C116								1,558.00			1,554.92	1,553.95		
CO-437	C117a	0.414	6.500	42.0	0.013	2.976	2.71	11.14	1,567.20	1,563.70	1,562.45	1,564.36	1,564.62	2.25	2.00
	C117								1,565.70			1,562.87	1,558.37		
CO-438	C119a	0.336	6.500	40.0	0.013	1.250	2.20	7.22	1,579.50	1,576.25	1,575.75	1,576.84	1,577.07	2.00	2.00
	C119								1,579.00			1,576.22	1,571.16		
CO-439	C303a	0.073	6.500	24.0	0.013	0.833	0.48	5.90	1,616.70	1,612.70	1,612.50	1,612.97	1,613.06	2.75	2.75
	C303								1,616.50			1,612.74	1,609.96		
CO-441	C307	0.134	6.500	27.0	0.013	1.852	0.88	8.79	1,629.50	1,626.00	1,625.50	1,626.37	1,626.50	2.25	2.75
	C306								1,629.50			1,626.03	1,626.08		
CO-443	C304a	0.113	6.500	26.0	0.013	0.769	0.74	5.67	1,622.20	1,618.70	1,618.50	1,619.04	1,619.16	2.25	2.45
	C304								1,622.20			1,618.80	1,613.76		
CO-444	C130	0.253	6.500	24.0	0.013	1.250	1.66	7.22	1,631.60	1,627.60	1,627.30	1,628.11	1,628.30	2.75	3.05
	C129								1,631.60			1,627.96	1,628.06		
CO-445	C129	0.410	6.479	173.0	0.013	1.792	2.68	8.65	1,631.60	1,627.30	1,624.20	1,627.96	1,628.22	3.05	3.05
	C128								1,628.50			1,624.68	1,621.24		
CO-446	C128	0.711	6.363	180.0	0.013	2.000	4.56	9.14	1,628.50	1,620.10	1,616.50	1,620.97	1,621.36	7.15	3.05
	C127								1,620.80			1,617.12	1,612.92		
CO-447	C125a	0.647	6.480	175.0	0.013	2.714	4.23	10.64	1,625.20	1,618.20	1,613.45	1,619.03	1,619.40	5.75	2.00
	C125								1,616.70			1,614.00	1,609.69		
CO-448	C125	1.834	6.215	127.0	0.013	1.417	11.49	12.50	1,616.70	1,607.80	1,606.00	1,609.09	1,609.87	7.40	3.00
	C124								1,610.50			1,607.13	1,602.85		
CO-449	C124	2.061	6.150	95.0	0.013	1.789	12.78	14.05	1,610.50	1,600.50	1,598.80	1,601.84	1,602.75	8.50	2.50
	C123								1,602.80			1,599.92	1,593.02		
CO-450	C124a	0.126	6.500	33.0	0.013	1.667	0.83	8.34	1,611.30	1,607.80	1,607.25	1,608.16	1,608.28	2.25	2.00
	C124								1,610.50			1,607.52	1,602.85		
CO-451	C128a	0.165	6.500	24.0	0.013	1.250	1.08	7.22	1,628.50	1,624.50	1,624.20	1,624.91	1,625.06	2.75	3.05
	C128								1,628.50			1,624.53	1,621.24		
CO-453	E125a	0.138	6.500	30.0	0.013	1.333	0.91	7.46	1,631.90	1,627.90	1,627.50	1,628.27	1,628.41	2.75	2.75
	E125								1,631.50			1,628.35	1,628.50		
CO-454	E125	0.684	6.371	179.0	0.013	2.123	4.39	9.41	1,631.50	1,627.50	1,623.70	1,628.35	1,628.73	2.75	2.75
	E124								1,627.70			1,624.62	1,624.94		
CO-455	E123a	0.475	6.500	24.0	0.013	0.417	3.11	4.17	1,626.60	1,623.00	1,622.90	1,623.90	1,624.07	2.35	2.45
	E123								1,626.60			1,623.85	1,624.00		

Storm Sewer Design Report
Active Scenario: 25 Year
Conduit FlexTable: Pipe Report

Label	-Node- Upstream Downstream	System CA (acres)	System Intensity (in/h)	Length (Unified) (ft)	Manning's n	Slope (%)	Flow (ft^3/s)	Capacity (Full Flow) (ft^3/s)	-Ground- Upstream Downstream (ft)	Invert Upstream (ft)	Invert Downstream (ft)	-HGL- Upstream Downstream (ft)	-EGL- Upstream Downstream (ft)	Cover (Start) (ft)	Cover (Stop) (ft)
CO-456	E123	1.544	6.204	68.0	0.013	1.029	9.66	10.66	1,626.60	1,622.65	1,621.95	1,623.85	1,624.48	2.45	3.75
	E122								1,627.20			1,623.23	1,623.79		
CO-457	E202	0.249	6.454	136.0	0.013	1.176	1.62	7.01	1,632.40	1,627.70	1,626.10	1,628.20	1,628.39	3.45	2.75
	E201								1,630.10			1,626.51	1,624.73		
CO-458	E201	0.249	6.332	73.0	0.013	0.959	1.59	6.33	1,630.10	1,623.90	1,623.20	1,624.40	1,624.59	4.95	2.75
	E122								1,627.20			1,623.63	1,623.79		
CO-459	E122	1.793	6.162	69.0	0.013	1.377	11.14	12.32	1,627.20	1,621.95	1,621.00	1,623.23	1,623.98	3.75	2.50
	E121								1,625.00			1,622.12	1,617.24		
CO-463	E105	1.793	5.862	33.0	0.013	1.515	10.60	12.93	1,517.00	1,507.00	1,506.50	1,508.25	1,508.95	8.50	2.00
	E104								1,510.00			1,507.56	1,502.92		
CO-464	E104	1.793	5.852	84.0	0.013	2.024	10.58	14.94	1,510.00	1,500.70	1,499.00	1,501.95	1,502.65	7.80	1.50
	E103								1,502.00			1,499.94	1,500.95		
CO-465	E103	1.793	5.829	190.0	0.013	0.789	10.54	20.10	1,502.00	1,498.50	1,497.00	1,499.66	1,500.14	1.50	4.40
	E102								1,503.40			1,498.03	1,498.81		
CO-466	E102	1.793	5.756	170.0	0.013	1.059	10.40	23.28	1,503.40	1,497.00	1,495.20	1,498.16	1,498.63	4.40	2.80
	E101								1,500.00			1,496.14	1,497.16		
CO-467	E101	1.793	5.697	16.0	0.013	1.250	10.30	25.29	1,500.00	1,495.20	1,495.00	1,496.35	1,496.82	2.80	1.00
	E100								1,498.00			1,495.97	(N/A)		
CO-468	C105a	0.175	6.463	79.0	0.013	1.203	1.14	7.08	1,510.70	1,506.70	1,505.75	1,507.12	1,507.27	2.75	4.50
	C105								1,511.50			1,506.09	1,506.27		
CO-469	C107a	0.040	6.500	24.0	0.013	1.042	0.26	6.59	1,521.50	1,518.50	1,518.25	1,518.70	1,518.77	1.75	2.00
	C107								1,521.50			1,518.42	1,517.13		
CO-470	B702	0.483	6.500	73.0	0.013	1.781	3.17	14.02	1,450.80	1,448.80	1,447.50	1,449.48	1,449.74	0.50	2.00
	B701								1,451.00			1,447.98	1,448.81		
CO-471	B701	0.483	6.453	59.0	0.013	0.847	3.14	9.67	1,451.00	1,447.50	1,447.00	1,448.17	1,448.43	2.00	0.50
	B700								1,449.00			1,447.59	(N/A)		
CO-472	X402	0.196	6.500	32.0	0.013	0.781	1.28	5.71	1,450.50	1,447.50	1,447.25	1,447.95	1,448.11	1.75	2.00
	X401								1,450.50			1,447.65	1,447.82		
CO-473	A112	1.315	6.141	82.0	0.013	0.976	8.14	10.37	1,458.20	1,450.80	1,450.00	1,451.91	1,452.43	5.90	3.80
	A111								1,455.30			1,451.00	1,446.60		
CO-474	C201	0.614	6.257	189.0	0.013	2.275	3.87	15.84	1,520.80	1,512.80	1,508.50	1,513.55	1,513.85	6.50	2.50
	C104								1,512.50			1,509.01	1,506.40		
CO-475	E402	0.317	6.500	182.0	0.013	2.637	2.08	10.49	1,635.30	1,631.30	1,626.50	1,631.87	1,632.10	2.75	2.75
	E401								1,630.50			1,626.88	1,622.84		
CO-476	E301	0.427	6.500	138.0	0.013	0.725	2.80	5.50	1,628.20	1,621.00	1,620.00	1,621.67	1,621.94	5.95	0.75
	E300								1,622.00			1,620.63	(N/A)		
CO-477	A202	0.364	6.500	88.0	0.013	2.500	2.39	10.21	1,631.70	1,626.70	1,624.50	1,627.32	1,627.56	3.75	2.75
	A201								1,628.50			1,624.91	1,623.99		
CO-478	A201	0.565	6.446	134.0	0.013	1.866	3.67	8.82	1,628.50	1,622.50	1,620.00	1,623.27	1,623.60	4.75	0.75
	A200								1,622.00			1,620.56	(N/A)		
CO-479	C305	0.442	6.433	87.0	0.013	1.149	2.87	6.93	1,628.50	1,619.00	1,618.00	1,619.68	1,619.95	8.25	2.95
	C304								1,622.20			1,618.56	1,613.76		
CO-481	A502	0.162	6.500	66.0	0.013	2.652	1.06	10.52	1,625.50	1,622.50	1,620.75	1,622.91	1,623.05	1.75	6.50

Storm Sewer Design Report

Active Scenario: 25 Year

Conduit FlexTable: Pipe Report

Label	-Node- Upstream Downstream	System CA (acres)	System Intensity (in/h)	Length (Unified) (ft)	Manning's n	Slope (%)	Flow (ft³/s)	Capacity (Full Flow) (ft³/s)	-Ground- Upstream Downstream (ft)	Invert Upstream (ft)	Invert Downstream (ft)	-HGL- Upstream Downstream (ft)	-EGL- Upstream Downstream (ft)	Cover (Start) (ft)	Cover (Stop) (ft)
	A501								1,628.50			1,621.02	1,621.62		
CO-482	A501	0.162	6.450	89.0	0.013	0.843	1.05	5.93	1,628.50	1,620.75	1,620.00	1,621.15	1,621.30	6.50	0.75
	A500								1,622.00			1,620.36	(N/A)		
CO-483	A602	0.400	6.500	77.0	0.013	0.714	2.62	5.46	1,618.50	1,615.25	1,614.70	1,615.90	1,616.16	2.00	4.55
	A601								1,620.50			1,615.31	1,615.65		
CO-484	A601	0.400	6.427	104.0	0.013	0.673	2.59	5.30	1,620.50	1,614.70	1,614.00	1,615.35	1,615.60	4.55	2.75
	A600								1,618.00			1,614.62	(N/A)		
CO-487	B502	0.390	6.500	84.0	0.013	2.024	2.56	14.94	1,439.80	1,435.80	1,434.10	1,436.41	1,436.63	2.50	4.20
	B501								1,439.80			1,434.52	1,431.02		
CO-489	E502	0.172	6.500	91.0	0.013	0.769	1.13	5.67	1,638.70	1,633.70	1,633.00	1,634.12	1,634.27	3.75	3.75
	E501								1,638.00			1,633.38	1,633.62		
CO-490	E501	0.172	6.395	88.0	0.013	4.545	1.11	13.77	1,638.00	1,633.00	1,629.00	1,633.41	1,633.57	3.75	0.75
	E500								1,631.00			1,629.24	(N/A)		
CO-491	A304	0.269	6.500	152.0	0.013	0.987	1.77	6.42	1,633.70	1,629.70	1,628.20	1,630.23	1,630.43	2.75	5.35
	A303								1,634.80			1,628.81	1,628.95		
CO-492	A303	0.363	6.358	109.0	0.013	1.009	2.33	6.49	1,634.80	1,628.20	1,627.10	1,628.81	1,629.05	5.35	5.65
	A302								1,634.00			1,627.62	1,625.03		
CO-493	C114	4.925	5.935	200.0	0.013	1.025	29.46	41.52	1,554.80	1,544.80	1,542.75	1,546.65	1,547.54	7.50	2.25
	C113								1,547.50			1,544.30	1,539.51		
CO-494	C405	0.333	6.500	151.0	0.013	1.656	2.18	8.31	1,633.00	1,629.00	1,626.50	1,629.59	1,629.82	2.75	2.75
	C404								1,630.50			1,626.94	1,625.86		
CO-495	C404	0.686	6.390	154.0	0.013	1.299	4.42	7.36	1,630.50	1,624.50	1,622.50	1,625.35	1,625.73	4.75	2.75
	C403								1,626.50			1,623.20	1,618.00		
CO-496	C403	0.837	6.287	131.0	0.013	2.290	5.31	15.90	1,626.50	1,616.50	1,613.50	1,617.39	1,617.76	8.50	2.00
	C402								1,617.00			1,614.10	1,615.01		
CO-497	C402	1.684	6.186	123.0	0.013	1.220	10.50	11.60	1,617.00	1,613.00	1,611.50	1,614.25	1,614.94	2.50	8.00
	C401								1,621.00			1,612.62	1,613.01		
CO-498	C401	1.684	6.117	90.0	0.013	0.556	10.38	16.86	1,621.00	1,611.00	1,610.50	1,612.15	1,612.63	8.00	2.00
	C400								1,614.50			1,611.63	(N/A)		
CO-499	C503	0.246	6.500	179.0	0.013	1.620	1.61	8.22	1,632.20	1,628.20	1,625.30	1,628.70	1,628.89	2.75	2.75
	C502								1,629.30			1,625.68	1,620.47		
CO-500	C502	0.536	6.357	220.0	0.013	1.977	3.43	9.08	1,629.30	1,619.30	1,614.95	1,620.05	1,620.36	8.75	2.00
	C501								1,618.20			1,615.48	1,616.21		
CO-501	C501	0.655	6.224	64.0	0.013	1.875	4.11	14.38	1,618.20	1,614.70	1,613.50	1,615.48	1,615.78	2.00	2.00
	C402								1,617.00			1,614.05	1,615.01		
CO-504	E605	0.152	6.500	85.0	0.013	1.176	1.00	7.01	1,635.50	1,631.50	1,630.50	1,631.89	1,632.04	2.75	7.75
	E604								1,639.50			1,630.82	1,631.14		
CO-505	E604	0.152	6.412	64.0	0.013	2.734	0.99	10.68	1,639.50	1,630.50	1,628.75	1,630.89	1,631.03	7.75	1.50
	E603								1,631.50			1,629.01	1,629.45		
CO-506	A402	0.207	6.338	61.0	0.013	8.361	1.32	18.68	1,633.50	1,629.40	1,624.30	1,629.85	1,630.02	2.85	8.75
	A401								1,634.30			1,624.53	1,625.95		
CO-507	A401	0.207	6.309	156.0	0.013	2.756	1.31	10.72	1,634.30	1,624.30	1,620.00	1,624.75	1,624.92	8.75	0.75
	A400								1,622.00			1,620.30	(N/A)		

Storm Sewer Design Report
Active Scenario: 25 Year
Conduit FlexTable: Pipe Report

Label	-Node- Upstream Downstream	System CA (acres)	System Intensity (in/h)	Length (Unified) (ft)	Manning's n	Slope (%)	Flow (ft³/s)	Capacity (Full Flow) (ft³/s)	-Ground- Upstream Downstream (ft)	Invert Upstream (ft)	Invert Downstream (ft)	-HGL- Upstream Downstream (ft)	-EGL- Upstream Downstream (ft)	Cover (Start) (ft)	Cover (Stop) (ft)
CO-508	X401 X400	0.392	6.464	44.0	0.013	1.023	2.55	10.62	1,450.50 1,452.00	1,447.00	1,446.55	1,447.61 1,447.05	1,447.83 (N/A)	2.00	3.95
CO-509	C306 C305	0.269	6.475	56.0	0.013	1.786	1.76	8.63	1,629.50 1,628.50	1,625.50	1,624.50	1,626.03 1,624.88	1,626.23 1,620.15	2.75	2.75
CO-510	D103 D102	0.000	7.550	79.0	0.013	1.013	16.44	22.76	1,515.00 1,512.00	1,505.30	1,504.50	1,506.76 1,505.76	1,507.46 1,506.42	7.70	5.50
CO-512	E121 E120	1.793	6.126	100.0	0.013	2.000	11.07	14.85	1,625.00 1,617.00	1,615.00	1,613.00	1,616.27 1,613.97	1,617.02 1,610.09	8.50	2.50
CO-513	E120 E119	1.793	6.080	101.0	0.013	1.485	10.99	12.80	1,617.00 1,612.00	1,607.50	1,606.00	1,608.77 1,607.07	1,609.51 1,604.30	8.00	4.50
CO-519	E109 E108	1.793	5.906	25.0	0.013	2.000	10.67	14.85	1,546.00 1,539.00	1,536.00	1,535.50	1,537.25 1,536.51	1,537.97 1,531.36	8.50	2.00
CO-520	E112 E111	1.793	5.926	20.0	0.013	2.000	10.71	14.85	1,566.00 1,560.00	1,556.00	1,555.60	1,557.26 1,556.63	1,557.97 1,551.32	8.50	2.90
CO-523	E106 E105	1.793	5.875	38.0	0.013	1.316	10.62	12.05	1,524.00 1,517.00	1,514.00	1,513.50	1,515.25 1,514.61	1,515.96 1,509.14	8.50	2.00
CO-524	C121 C120	3.603	6.061	61.0	0.013	1.639	22.01	28.96	1,592.00 1,586.00	1,583.00	1,582.00	1,584.68 1,583.35	1,585.63 1,579.15	7.00	2.00
CO-525	C120 C119	3.603	6.036	65.0	0.013	1.538	21.92	28.06	1,586.00 1,579.00	1,576.00	1,575.00	1,577.67 1,576.37	1,578.62 1,571.16	8.00	2.00
CO-526	C119 C118	3.997	6.008	54.0	0.013	1.667	24.21	29.20	1,579.00 1,572.10	1,569.00	1,568.10	1,570.74 1,569.54	1,571.82 1,565.88	8.00	2.00
CO-527	C118 C117	3.997	5.992	54.0	0.013	1.667	24.14	29.20	1,572.10 1,565.70	1,562.60	1,561.70	1,564.34 1,563.14	1,565.42 1,558.37	7.50	2.00
CO-528	E111 E110	1.793	5.921	28.0	0.013	1.786	10.70	14.04	1,560.00 1,552.00	1,549.00	1,548.50	1,550.26 1,549.53	1,550.97 1,544.31	9.50	2.00
CO-529	E110 E109	1.793	5.913	25.0	0.013	2.000	10.69	14.85	1,552.00 1,546.00	1,542.00	1,541.50	1,543.25 1,542.51	1,543.97 1,538.36	8.50	3.00
CO-530	E108 E107	1.793	5.899	30.0	0.013	2.000	10.66	14.85	1,539.00 1,532.00	1,529.00	1,528.40	1,530.25 1,529.40	1,530.96 1,524.38	8.50	2.10
CO-531	E107 E106	1.793	5.891	63.0	0.013	2.381	10.65	16.21	1,532.00 1,524.00	1,522.00	1,520.50	1,523.25 1,521.41	1,523.96 1,516.65	8.50	2.00
CO-532	X201 X200	3.533	6.500	331.0	0.013	2.719	23.15	37.30	1,460.00 1,450.00	1,456.00	1,447.00	1,457.71 1,448.14	1,458.73 (N/A)	2.00	1.00
CO-533	A105 A104	2.082	5.877	18.0	0.013	1.944	12.34	57.19	1,427.50 1,421.50	1,417.50	1,417.15	1,418.68 1,418.06	1,419.14 1,413.60	7.50	1.85
CO-535	A104 A103	2.082	5.872	17.0	0.013	2.059	12.33	58.85	1,421.50 1,416.00	1,411.50	1,411.15	1,412.68 1,412.05	1,413.13 1,408.11	7.50	2.35
CO-538	A101 A100	2.082	5.849	27.0	0.013	1.852	12.28	55.81	1,396.50 1,390.00	1,386.50	1,386.00	1,387.68 1,386.88	1,388.13 (N/A)	7.50	1.50
CO-540	A106 A105	2.082	5.891	48.0	0.013	1.667	12.36	52.95	1,433.30 1,427.50	1,423.30	1,422.50	1,424.48 1,423.36	1,424.94 1,419.74	7.50	2.50
CO-545	B106	3.010	5.711	15.0	0.013	1.000	17.33	22.62	1,415.00	1,408.50	1,408.35	1,410.00	1,410.73	4.50	2.15

Storm Sewer Design Report
Active Scenario: 25 Year
Conduit FlexTable: Pipe Report

Label	-Node- Upstream Downstream	System CA (acres)	System Intensity (in/h)	Length (Unified) (ft)	Manning's n	Slope (%)	Flow (ft³/s)	Capacity (Full Flow) (ft³/s)	-Ground- Upstream Downstream (ft)	Invert Upstream (ft)	Invert Downstream (ft)	-HGL- Upstream Downstream (ft)	-EGL- Upstream Downstream (ft)	Cover (Start) (ft)	Cover (Stop) (ft)
	B105								1,412.50			1,409.72	1,407.38		
CO-546	B105	3.010	5.706	15.0	0.013	1.000	17.31	22.62	1,412.50	1,405.00	1,404.85	1,406.50	1,407.23	5.50	2.15
	B104								1,409.00			1,406.22	1,401.38		
CO-548	B100a	3.010	5.618	61.0	0.013	1.639	17.05	28.96	1,382.00	1,378.00	1,377.00	1,379.49	1,380.21	2.00	2.00
	B100								1,381.00			1,378.14	(N/A)		
CO-549	A302	0.430	6.264	58.0	0.013	2.931	2.71	11.06	1,634.00	1,624.00	1,622.30	1,624.66	1,624.92	8.75	10.75
	A301								1,634.30			1,622.72	1,623.82		
CO-550	A301	0.430	6.232	99.0	0.013	2.323	2.70	9.85	1,634.30	1,622.30	1,620.00	1,622.96	1,623.22	10.75	0.75
	A300								1,622.00			1,620.45	(N/A)		
CO-551	B114	0.752	5.880	92.0	0.013	3.152	4.46	40.16	1,461.10	1,450.80	1,447.90	1,451.54	1,451.82	8.30	2.00
	B113								1,451.90			1,448.35	1,443.74		
CO-554	B401	4.330	6.270	25.0	0.013	2.000	27.37	58.00	1,421.20	1,416.50	1,416.00	1,418.28	1,419.11	2.20	0.50
	B400								1,419.00			1,417.40	(N/A)		
CO-555	E119	1.793	6.029	98.0	0.013	1.531	10.90	13.00	1,612.00	1,602.00	1,600.50	1,603.27	1,603.99	8.50	6.00
	E118								1,608.00			1,601.55	1,600.32		
CO-557	E118	1.793	5.988	75.0	0.013	2.000	10.82	14.85	1,608.00	1,598.00	1,596.50	1,599.26	1,599.98	8.50	2.00
	E117								1,600.00			1,597.46	1,592.53		
CO-559	E117	1.793	5.967	50.0	0.013	2.000	10.79	14.85	1,600.00	1,590.00	1,589.00	1,591.26	1,591.98	8.50	2.00
	E116								1,592.50			1,589.98	1,584.97		
CO-561	E116	1.793	5.953	25.0	0.013	2.000	10.76	14.85	1,592.50	1,582.50	1,582.00	1,583.76	1,584.48	8.50	2.00
	E115								1,585.50			1,583.02	1,577.87		
CO-563	E115	1.793	5.947	25.0	0.013	2.000	10.75	14.85	1,585.50	1,575.50	1,575.00	1,576.76	1,577.47	8.50	2.00
	E114								1,578.50			1,576.02	1,570.86		
CO-565	E114	1.793	5.940	25.0	0.013	2.000	10.74	14.85	1,578.50	1,568.50	1,568.00	1,569.76	1,570.47	8.50	2.00
	E113								1,571.50			1,569.02	1,564.36		
CO-566	E113	1.793	5.933	25.0	0.013	2.000	10.72	14.85	1,571.50	1,562.00	1,561.50	1,563.26	1,563.97	8.00	3.00
	E112								1,566.00			1,562.51	1,558.36		
CO-567	D102	0.000	7.550	22.0	0.013	2.273	16.44	34.10	1,512.00	1,504.00	1,503.50	1,505.46	1,506.16	6.00	2.00
	D101								1,507.50			1,504.62	1,500.24		
CO-568	D101	0.000	7.550	22.0	0.013	2.273	16.44	34.10	1,507.50	1,497.50	1,497.00	1,498.96	1,499.66	8.00	2.00
	D100								1,501.00			1,498.12	(N/A)		
CO-569	D104	0.000	7.550	14.0	0.013	1.429	8.78	12.55	1,515.20	1,511.20	1,511.00	1,512.35	1,512.92	2.50	2.50
	D103								1,515.00			1,511.99	1,507.54		
CO-570	A108	2.082	5.944	102.0	0.013	0.784	12.48	36.32	1,440.30	1,430.30	1,429.50	1,431.49	1,431.95	7.50	1.50
	A107								1,433.50			1,430.51	1,429.38		
CO-571	A107	2.082	5.906	45.0	0.013	1.000	12.40	41.01	1,433.50	1,427.50	1,427.05	1,428.68	1,429.14	3.50	3.75
	A106								1,433.30			1,428.02	1,425.25		
CO-574	A115	1.215	6.309	87.0	0.013	2.299	7.72	15.93	1,481.00	1,473.00	1,471.00	1,474.08	1,474.58	6.50	2.50
	A114								1,475.00			1,471.74	1,469.32		
CO-575	A114	1.215	6.269	94.0	0.013	2.660	7.67	17.13	1,475.00	1,467.00	1,464.50	1,468.07	1,468.57	6.50	2.00
	A113								1,468.00			1,465.20	1,460.47		
CO-576	B501	0.390	6.445	48.0	0.013	2.708	2.53	17.29	1,439.80	1,429.80	1,428.50	1,430.40	1,430.63	8.50	4.50
	MH-116								1,434.50			1,428.89	1,428.86		

Storm Sewer Design Report

Active Scenario: 25 Year

Conduit FlexTable: Pipe Report

Label	-Node- Upstream Downstream	System CA (acres)	System Intensity (in/h)	Length (Unified) (ft)	Manning's n	Slope (%)	Flow (ft³/s)	Capacity (Full Flow) (ft³/s)	-Ground- Upstream Downstream (ft)	Invert Upstream (ft)	Invert Downstream (ft)	-HGL- Upstream Downstream (ft)	-EGL- Upstream Downstream (ft)	Cover (Start) (ft)	Cover (Stop) (ft)
CO-578	MH-116	0.390	6.416	25.0	0.013	2.000	2.52	14.85	1,434.50	1,427.50	1,427.00	1,428.10	1,428.33	5.50	2.00
	MH-117								1,430.50			1,427.43	1,421.66		
CO-580	MH-117	0.390	6.399	33.0	0.013	1.515	2.52	12.93	1,430.50	1,420.50	1,420.00	1,421.10	1,421.33	8.50	2.00
	MH-118								1,423.50			1,420.45	1,414.58		
CO-581	MH-118	0.390	6.375	26.0	0.013	1.923	2.51	14.57	1,423.50	1,413.50	1,413.00	1,414.10	1,414.32	8.50	2.00
	B500								1,416.50			1,413.43	(N/A)		
CO-585	B100b	3.010	5.630	49.0	0.013	2.041	17.08	32.32	1,387.00	1,379.00	1,378.00	1,380.49	1,381.21	6.00	2.00
	B100a								1,382.00			1,379.10	1,380.94		
CO-586	B104	3.010	5.701	73.0	0.013	2.055	17.30	32.43	1,409.00	1,399.00	1,397.50	1,400.50	1,401.23	8.00	2.00
	B103								1,401.50			1,398.57	1,394.57		
CO-588	B108	3.010	5.736	44.0	0.013	4.545	17.41	48.23	1,424.00	1,414.00	1,412.00	1,415.50	1,416.24	8.00	3.00
	B107								1,417.00			1,412.92	1,415.86		
CO-589	B107	3.010	5.729	67.0	0.013	1.493	17.38	27.64	1,417.00	1,412.00	1,411.00	1,413.50	1,414.24	3.00	2.00
	B106								1,415.00			1,412.18	1,411.26		
CO-590	B113	0.752	5.853	54.0	0.013	2.593	4.43	36.42	1,451.90	1,441.90	1,440.50	1,442.64	1,442.91	8.00	2.00
	B112								1,444.50			1,440.97	1,436.18		
CO-591	B112	0.752	5.835	31.0	0.013	3.226	4.42	40.63	1,444.50	1,434.50	1,433.50	1,435.24	1,435.51	8.00	2.00
	B111								1,437.50			1,433.97	1,433.71		
CO-592	B120	0.087	6.500	56.0	0.013	0.893	0.57	6.10	1,472.50	1,469.25	1,468.75	1,469.54	1,469.65	2.00	2.50
	B119								1,472.50			1,469.16	1,469.20		
CO-593	B119	0.159	6.425	135.0	0.013	0.481	1.03	4.48	1,472.50	1,468.75	1,468.10	1,469.16	1,469.29	2.50	5.15
	B118								1,474.50			1,468.52	1,468.65		
CO-594	B208	0.071	6.500	71.0	0.013	1.056	0.46	6.64	1,465.50	1,461.00	1,460.25	1,461.26	1,461.36	3.25	2.00
	B207								1,463.50			1,460.47	1,459.09		
CO-595	B207	0.189	6.405	178.0	0.013	5.000	1.22	14.44	1,463.50	1,458.50	1,449.60	1,458.94	1,459.10	3.75	2.25
	B206								1,453.10			1,450.08	1,450.20		
CO-596	C102	6.926	5.670	16.0	0.013	1.250	39.58	45.86	1,502.20	1,492.20	1,492.00	1,494.32	1,495.56	7.50	2.00
	C101								1,496.50			1,493.94	1,490.08		
CO-597	C101	6.926	5.666	33.0	0.013	1.515	39.56	50.49	1,496.50	1,486.50	1,486.00	1,488.62	1,489.85	7.50	1.50
	C100								1,490.00			1,487.81	(N/A)		
CO-598	C104	6.926	5.698	61.0	0.013	1.148	39.78	43.94	1,512.50	1,502.50	1,501.80	1,504.62	1,505.87	7.50	3.70
	C103								1,508.00			1,503.70	1,501.66		
CO-599	C103	6.926	5.683	54.0	0.013	1.111	39.68	43.23	1,508.00	1,498.00	1,497.40	1,500.12	1,501.36	7.50	2.30
	C102								1,502.20			1,499.32	1,495.81		
CO-600	C109	5.315	5.799	99.0	0.013	1.010	31.07	41.22	1,532.00	1,522.00	1,521.00	1,523.90	1,524.84	7.50	2.00
	C108								1,525.50			1,522.63	1,520.70		
CO-601	C108	5.315	5.772	53.0	0.013	0.943	30.93	39.84	1,525.50	1,517.50	1,517.00	1,519.40	1,520.33	5.50	2.00
	C107								1,521.50			1,518.68	1,517.13		
CO-602	B408	2.444	6.500	165.0	0.013	0.970	16.01	22.28	1,430.20	1,426.20	1,424.60	1,427.64	1,428.32	2.00	5.40
	B407								1,432.00			1,425.86	1,426.96		
CO-603	B407	2.444	6.411	28.0	0.013	1.071	15.79	23.42	1,432.00	1,424.60	1,424.30	1,426.03	1,426.70	5.40	3.90
	B406								1,430.20			1,426.13	1,426.55		
CO-604	B406	4.330	6.396	50.0	0.013	1.600	27.92	28.61	1,430.20	1,424.30	1,423.50	1,426.13	1,427.46	3.90	7.80

Storm Sewer Design Report
Active Scenario: 25 Year
Conduit FlexTable: Pipe Report

Label	-Node- Upstream Downstream	System CA (acres)	System Intensity (in/h)	Length (Unified) (ft)	Manning's n	Slope (%)	Flow (ft³/s)	Capacity (Full Flow) (ft³/s)	-Ground- Upstream Downstream (ft)	Invert Upstream (ft)	Invert Downstream (ft)	-HGL- Upstream Downstream (ft)	-EGL- Upstream Downstream (ft)	Cover (Start) (ft)	Cover (Stop) (ft)
	B405								1,433.30			1,425.14	1,426.92		
CO-605	B405	4.330	6.376	35.0	0.013	1.857	27.83	30.83	1,433.30	1,423.50	1,422.85	1,425.33	1,426.66	7.80	9.05
	B404								1,433.90			1,424.43	1,426.00		
CO-606	B403	4.330	6.313	45.0	0.013	1.000	27.55	41.01	1,432.50	1,421.95	1,421.50	1,423.74	1,424.57	8.05	3.00
	B402								1,427.00			1,423.05	1,419.94		
CO-607	B402	4.330	6.292	41.0	0.013	0.732	27.46	35.08	1,427.00	1,417.00	1,416.70	1,418.79	1,419.62	7.50	2.00
	B401								1,421.20			1,418.37	1,419.24		
CO-608	E-OS	0.000	7.550	172.0	0.013	0.581	1.05	8.01	1,500.00	1,491.00	1,490.00	1,491.38	1,491.52	7.50	4.63
	E-HW								1,496.13			1,490.37	(N/A)		
CO-609	D-OS	0.000	7.550	85.0	0.013	1.176	8.66	11.39	1,498.00	1,491.00	1,490.00	1,492.14	1,492.70	5.50	4.63
	D-HW								1,496.13			1,490.98	(N/A)		
CO-610	A-OS	0.000	7.550	129.0	0.013	0.775	5.14	9.25	1,390.00	1,381.00	1,380.00	1,381.87	1,382.23	7.50	5.50
	A-HW								1,387.00			1,380.80	(N/A)		
CO-611	B-OS	0.000	7.550	65.0	0.013	1.538	3.87	13.03	1,380.00	1,371.00	1,370.00	1,371.75	1,372.05	7.50	4.50
	B-HW								1,376.00			1,370.56	(N/A)		
CO-612	C-OS	0.000	7.550	40.0	0.013	0.750	17.68	19.59	1,490.00	1,380.00	1,379.70	1,381.52	1,382.26	108.00	5.30
	Cc-MH								1,387.00			1,381.27	1,381.96		
CO-613	Cc-MH	0.000	7.550	121.0	0.013	0.661	17.68	18.39	1,387.00	1,379.70	1,378.90	1,381.27	1,381.96	5.30	3.95
	Cb-MH								1,384.85			1,380.45	1,381.16		
CO-614	Cb-MH	0.000	7.550	204.0	0.013	0.686	17.68	18.74	1,384.85	1,378.90	1,377.50	1,380.45	1,381.16	3.95	3.25
	Ca-MH								1,382.75			1,379.03	1,379.76		
CO-615	Ca-MH	0.000	7.550	71.0	0.013	0.704	17.68	18.98	1,382.75	1,377.50	1,377.00	1,379.03	1,379.76	3.25	3.00
	C-HW								1,382.00			1,378.52	(N/A)		
CO-617	B101	3.010	5.635	20.0	0.013	2.000	17.10	31.99	1,389.50	1,383.40	1,383.00	1,384.89	1,385.61	4.10	2.00
	B100b								1,387.00			1,384.19	1,381.70		
CO-618	B103	3.010	5.684	173.0	0.013	2.023	17.25	32.18	1,401.50	1,391.50	1,388.00	1,393.00	1,393.72	8.00	2.00
	B102								1,392.00			1,389.04	1,389.18		
CO-619	B102	3.010	5.642	30.0	0.013	2.000	17.12	31.99	1,392.00	1,386.00	1,385.40	1,387.49	1,388.21	4.00	2.10
	B101								1,389.50			1,386.55	1,386.20		
CO-620	A103	2.082	5.868	15.0	0.013	2.000	12.32	58.00	1,416.00	1,406.00	1,405.70	1,407.18	1,407.63	7.50	2.00
	A102								1,410.20			1,406.61	1,402.27		
CO-621	A102	2.082	5.864	11.0	0.013	1.818	12.31	55.30	1,410.20	1,400.20	1,400.00	1,401.38	1,401.83	7.50	2.00
	A101b								1,404.50			1,400.95	1,396.47		
CO-622	A101b	2.082	5.861	25.0	0.013	2.000	12.30	58.00	1,404.50	1,394.50	1,394.00	1,395.68	1,396.13	7.50	2.50
	A101a								1,399.00			1,394.87	1,394.59		
CO-623	A101a	2.082	5.854	20.0	0.013	2.000	12.29	58.00	1,399.00	1,392.40	1,392.00	1,393.58	1,394.03	4.10	2.00
	A101								1,396.50			1,392.89	1,388.63		

APPENDIX J

STORMWATER BASIN SPILLWAY CALCULATIONS

EMERGENCY SPILLWAY CALCULATION SHEET

$$L = Q / (C^* H^{1.5})$$

L: Weir Length
C: coefficient, C=3.33 for rectangular weir
H: differential of top of berm (H_1) and weir crest(H_2)

SWM Facility	100 Yr. Water Surface	100 Yr. INFLOW Q (cfs)	Top of Berm (H_1)	Spillway Crest (H_2)	Free Board (ft.)	Cal.Weir length L (ft.)	Design Weir length (ft.)
Basin A	1389.11	21.54	1390.00	1389.11	0.89	7.70	10
Basin B	1378.99	27.71	1380.00	1378.99	1.01	8.20	10
Basin C	1489.18	40.18	1490.00	1489.18	0.82	16.25	20
Basin D	1498.89	11.84	1500.00	1498.89	1.11	3.04	10
Basin E	1498.65	28.05	1500.00	1498.65	1.35	5.37	10

APPENDIX J

APPENDIX K

SOIL EROSION AND SEDIMENT CONTROL CONDUIT OUTLET PROTECTION

OUTLET PROTECTION DESIGN (GAN-EDEN)

Structure Symbol	Structure Type	Q (cfs)	Pipe Diam. D_0 (in.)	Tailwater (ft.)	d_{50} (in.)	d_{max} (in.)	Apron Lengh La (ft.)	Apron Width W (ft.)*	Blanket Thickness (In.)	NYS-ESC Reference
A-HW	Conc. Headwall	1.09	18	0.00	6	9	9	11	14	Fig. 5B12
A100-HW	Conc. Headwall	12.38	30	1.25	6	9	10	7	14	**Fig. 5B13**
A200-HW	Conc. Headwall	6.32	15	0.50	6	9	8	9	14	Fig. 5B12
A300-HW	Conc. Headwall	2.67	15	0.50	6	9	8	9	14	Fig. 5B12
A400-HW	Conc. Headwall	1.28	15	0.50	6	9	8	9	14	Fig. 5B12
A500-HW	Conc. Headwall	1.03	15	0.50	6	9	8	9	14	Fig. 5B12
A600-HW	Conc. Headwall	2.56	15	0.50	6	9	8	9	14	Fig. 5B12
B-HW	Conc. Headwall	0.94	18	0.00	6	9	9	11	14	Fig. 5B12
B100-HW	Conc. Headwall	17.85	24	1.00	8	12	10	5	17	**Fig. 5B13**
B400-HW	Conc. Headwall	27.51	24	0.75	6	9	16	18	14	Fig. 5B12
B500-HW	Conc. Headwall	2.51	18	0.50	6	9	9	11	14	Fig. 5B12
B600-HW	Conc. Headwall	1.77	18	0.50	6	9	9	11	14	Fig. 5B12
B700-HW	Conc. Headwall	3.11	18	0.50	6	9	9	11	14	Fig. 5B12
C-HW	Conc. Headwall	15.35	18	0.50	6	9	9	11	14	Fig. 5B12
C100-HW	Conc. Headwall	39.55	30	1.50	6	9	18	10	14	**Fig. 5B13**
C400-HW	Conc. Headwall	10.25	24	0.75	6	9	12	14	14	Fig. 5B12
D-HW	Conc. Headwall	4.61	18	0.50	6	9	9	11	14	Fig. 5B12
D100-HW	Conc. Headwall	17.31	24	1.00	6	9	9	6	14	**Fig. 5B13**
E-HW	Conc. Headwall	0.38	18	0.00	6	9	9	11	14	Fig. 5B12
E100-HW	Conc. Headwall	10.31	24	1.00	6	9	8	5	14	**Fig. 5B13**
E300-HW	Conc. Headwall	2.76	15	0.50	6	9	8	9	14	Fig. 5B12
E400-HW	Conc. Headwall	4.38	18	0.50	6	9	9	11	14	Fig. 5B12
E500-HW	Conc. Headwall	1.10	15	0.50	6	9	8	9	14	Fig. 5B12
E600-HW	Conc. Headwall	3.75	18	0.50	6	9	9	11	14	Fig. 5B12

***Apron Width W=La+D_0 (Fig. 5b12, Minimum Tailwater Condition, Tw<0.5Do)**
****Apron Width : W=0.4XLa+D_0 (Fig. 5b13-Maximum Tailwater Condition), Tw>=0.5Do)**

APPENDIX-K

APPENDIX L

CONSTRUCTION SITE STORMWATER LOGBOOK

APPENDIX H

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM FOR CONSTRUCTION ACTIVITIES

CONSTRUCTION SITE LOG BOOK

Table of Contents

Properly completing forms such as those contained in Appendix H meet the inspection requirement of NYS-DEC SPDES GP for Construction Activities. Completed forms shall be kept on site at all times and made available to authorities upon request.

I. PRE-CONSTRUCTION MEETING DOCUMENTS

Project Name ____

Permit No. ______________________ **Date of Authorization** __________

Name of Operator ____

Prime Contractor ____

a. Preamble to Site Assessment and Inspections

The Following Information To Be Read By All Person's Involved in The Construction of Stormwater Related Activities:

The Operator agrees to have a qualified professional[1] conduct an assessment of the site prior to the commencement of construction[2] and certify in this inspection report that the appropriate erosion and sediment controls described in the SWPPP have been adequately installed or implemented to ensure overall preparedness of the site for the commencement of construction.

Prior to the commencement of construction, the Operator shall certify in this site logbook that the SWPPP has been prepared in accordance with the State's standards and meets all Federal, State and local erosion and sediment control requirements.

When construction starts, site inspections shall be conducted by the qualified professional at least every 7 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater (Construction Duration Inspections). The Operator shall maintain a record of all inspection reports in this site logbook. The site logbook shall be maintained on site and be made available to the permitting authorities upon request. The Operator shall post at the site, in a publicly accessible location, a summary of the site inspection activities on a monthly basis (Monthly Summary Report).

The operator shall also prepare a written summary of compliance with this general permit at a minimum frequency of every three months (Operator's Compliance Response Form), while coverage exists. The summary should address the status of achieving each component of the SWPPP.

Prior to filing the Notice of Termination or the end of permit term, the Operator shall have a qualified professional perform a final site inspection. The qualified professional shall certify that the site has undergone final stabilization[3] using either vegetative or structural stabilization methods and that all temporary erosion and sediment controls (such as silt fencing) not needed for long-term erosion control have been removed. In addition, the Operator must identify and certify that all permanent structures described in the SWPPP have been constructed and provide the owner(s) with an operation and maintenance plan that ensures the structure(s) continuously functions as designed.

1 "Qualified Professional means a person knowledgeable in the principles and practice of erosion and sediment controls, such as a Certified Professional in Erosion and Sediment Control (CPESC), soil scientist, licensed engineer or someone working under the direction and supervision of a licensed engineer (person must have experience in the principles and practices of erosion and sediment control).

2 "Commencement of construction" means the initial removal of vegetation and disturbance of soils associated with clearing, grading or excavating activities or other construction activities.

3 "Final stabilization" means that all soil-disturbing activities at the site have been completed and a uniform, perennial vegetative cover with a density of eighty (80) percent has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structures.

b. Operators Certification

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. Further, I hereby certify that the SWPPP meets all Federal, State, and local erosion and sediment control requirements. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law.

Name (please print): ____________________

Title ____________________ **Date:** ____________________

Address: ____________________

Phone: ____________________ **Email:** ____________________

Signature: ____________________

c. Qualified Professional's Credentials & Certification

"I hereby certify that I meet the criteria set forth in the General Permit to conduct site inspections for this project and that the appropriate erosion and sediment controls described in the SWPPP and as described in the following Pre-construction Site Assessment Checklist have been adequately installed or implemented, ensuring the overall preparedness of this site for the commencement of construction."

Name (please print): ____________________

Title ____________________ **Date:**____________________

Address: ____________________

Phone: ____________________ **Email:** ____________________

Signature: ____________________

d. Pre-construction Site Assessment Checklist
(NOTE: Provide comments below as necessary)

1. Notice of Intent, SWPPP, and Contractors Certification:

Yes No NA

[ ] [ ] [ ] Has a Notice of Intent been filed with the NYS Department of Conservation?
[ ] [ ] [ ] Is the SWPPP on-site? Where?______________________________
[ ] [ ] [ ] Is the Plan current? What is the latest revision date?______________
[ ] [ ] [ ] Is a copy of the NOI (with brief description) onsite? Where?______________
[ ] [ ] [ ] Have all contractors involved with stormwater related activities signed a contractor's certification?

2. Resource Protection

Yes No NA

[ ] [ ] [ ] Are construction limits clearly flagged or fenced?
[ ] [ ] [ ] Important trees and associated rooting zones, on-site septic system absorption fields, existing vegetated areas suitable for filter strips, especially in perimeter areas, have been flagged for protection.
[ ] [ ] [ ] Creek crossings installed prior to land-disturbing activity, including clearing and blasting.

3. Surface Water Protection

Yes No NA

[ ] [ ] [ ] Clean stormwater runoff has been diverted from areas to be disturbed.
[ ] [ ] [ ] Bodies of water located either on site or in the vicinity of the site have been identified and protected.
[ ] [ ] [ ] Appropriate practices to protect on-site or downstream surface water are installed.
[ ] [ ] [ ] Are clearing and grading operations divided into areas <5 acres?

4. Stabilized Construction Entrance

Yes No NA

[ ] [ ] [ ] A temporary construction entrance to capture mud and debris from construction vehicles before they enter the public highway has been installed.
[ ] [ ] [ ] Other access areas (entrances, construction routes, equipment parking areas) are stabilized immediately as work takes place with gravel or other cover.
[ ] [ ] [ ] Sediment tracked onto public streets is removed or cleaned on a regular basis.

5. Perimeter Sediment Controls

Yes No NA

[ ] [ ] [ ] Silt fence material and installation comply with the standard drawing and specifications.
[ ] [ ] [ ] Silt fences are installed at appropriate spacing intervals
[ ] [ ] [ ] Sediment/detention basin was installed as first land disturbing activity.
[ ] [ ] [ ] Sediment traps and barriers are installed.

6. Pollution Prevention for Waste and Hazardous Materials

Yes No NA

[ ] [ ] [ ] The Operator or designated representative has been assigned to implement the spill prevention avoidance and response plan.
[ ] [ ] [ ] The plan is contained in the SWPPP on page ______
[ ] [ ] [ ] Appropriate materials to control spills are onsite. Where? __________________

II. CONSTRUCTION DURATION INSPECTIONS

a. Directions:
Inspection Forms will be filled out during the entire construction phase of the project.
Required Elements:

(1) On a site map, indicate the extent of all disturbed site areas and drainage pathways. Indicate site areas that are expected to undergo initial disturbance or significant site work within the next 14-day period;

(2) Indicate on a site map all areas of the site that have undergone temporary or permanent stabilization;

(3) Indicate all disturbed site areas that have not undergone active site work during the previous 14-day period;

(4) Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of sediment storage volume (for example, 10 percent, 20 percent, 50 percent);

(5) Inspect all erosion and sediment control practices and record all maintenance requirements such as verifying the integrity of barrier or diversion systems (earthen berms or silt fencing) and containment systems (sediment basins and sediment traps). Identify any evidence of rill or gully erosion occurring on slopes and any loss of stabilizing vegetation or seeding/mulching. Document any excessive deposition of sediment or ponding water along barrier or diversion systems. Record the depth of sediment within containment structures, any erosion near outlet and overflow structures, and verify the ability of rock filters around perforated riser pipes to pass water; and

(6) Immediately report to the Operator any deficiencies that are identified with the implementation of the SWPPP.

SITE PLAN/SKETCH

______________________________ ______________________________
Inspector (print name) **Date of Inspection**

______________________________ ______________________________
Qualified Professional (print name) **Qualified Professional Signature**

The above signed acknowledges that, to the best of his/her knowledge, all information provided on the forms is accurate and complete.

Maintaining Water Quality

Yes No NA
[ ] [ ] [ ] Is there an increase in turbidity causing a substantial visible contrast to natural conditions?
[ ] [ ] [ ] Is there residue from oil and floating substances, visible oil film, or globules or grease?
[ ] [ ] [ ] All disturbance is within the limits of the approved plans.
[ ] [ ] [ ] Have receiving lake/bay, stream, and/or wetland been impacted by silt from project?

Housekeeping

1. General Site Conditions
Yes No NA
[ ] [ ] [ ] Is construction site litter and debris appropriately managed?
[ ] [ ] [ ] Are facilities and equipment necessary for implementation of erosion and sediment control in working order and/or properly maintained?
[ ] [ ] [ ] Is construction impacting the adjacent property?
[ ] [ ] [ ] Is dust adequately controlled?

2. Temporary Stream Crossing
Yes No NA
[ ] [ ] [ ] Maximum diameter pipes necessary to span creek without dredging are installed.
[ ] [ ] [ ] Installed non-woven geotextile fabric beneath approaches.
[ ] [ ] [ ] Is fill composed of aggregate (no earth or soil)?
[ ] [ ] [ ] Rock on approaches is clean enough to remove mud from vehicles & prevent sediment from entering stream during high flow.

Runoff Control Practices

1. Excavation Dewatering
Yes No NA
[ ] [ ] [ ] Upstream and downstream berms (sandbags, inflatable dams, etc.) are installed per plan.
[ ] [ ] [ ] Clean water from upstream pool is being pumped to the downstream pool.
[ ] [ ] [ ] Sediment laden water from work area is being discharged to a silt-trapping device.
[ ] [ ] [ ] Constructed upstream berm with one-foot minimum freeboard.

2. Level Spreader
Yes No NA
[ ] [ ] [ ] Installed per plan.
[ ] [ ] [ ] Constructed on undisturbed soil, not on fill, receiving only clear, non-sediment laden flow.
[ ] [ ] [ ] Flow sheets out of level spreader without erosion on downstream edge.

3. Interceptor Dikes and Swales
Yes No NA
[ ] [ ] [ ] Installed per plan with minimum side slopes 2H:1V or flatter.
[ ] [ ] [ ] Stabilized by geotextile fabric, seed, or mulch with no erosion occurring.
[ ] [ ] [ ] Sediment-laden runoff directed to sediment trapping structure

Runoff Control Practices (continued)

4. Stone Check Dam
Yes No NA
[ ] [ ] [ ] Is channel stable? (flow is not eroding soil underneath or around the structure).
[ ] [ ] [ ] Check is in good condition (rocks in place and no permanent pools behind the structure).
[ ] [ ] [ ] Has accumulated sediment been removed?.

5. Rock Outlet Protection
Yes No NA
[ ] [ ] [ ] Installed per plan.
[ ] [ ] [ ] Installed concurrently with pipe installation.

Soil Stabilization

1. Topsoil and Spoil Stockpiles
Yes No NA
[ ] [ ] [ ] Stockpiles are stabilized with vegetation and/or mulch.
[ ] [ ] [ ] Sediment control is installed at the toe of the slope.

2. Revegetation
Yes No NA
[ ] [ ] [ ] Temporary seedings and mulch have been applied to idle areas.
[ ] [ ] [ ] 4 inches minimum of topsoil has been applied under permanent seedings

Sediment Control Practices

1. Stabilized Construction Entrance
Yes No NA
[ ] [ ] [ ] Stone is clean enough to effectively remove mud from vehicles.
[ ] [ ] [ ] Installed per standards and specifications?
[ ] [ ] [ ] Does all traffic use the stabilized entrance to enter and leave site?
[ ] [ ] [ ] Is adequate drainage provided to prevent ponding at entrance?

2. Silt Fence
Yes No NA
[ ] [ ] [ ] Installed on Contour, 10 feet from toe of slope (not across conveyance channels).
[ ] [ ] [ ] Joints constructed by wrapping the two ends together for continuous support.
[ ] [ ] [ ] Fabric buried 6 inches minimum.
[ ] [ ] [ ] Posts are stable, fabric is tight and without rips or frayed areas.
Sediment accumulation is ___% of design capacity.

Sediment Control Practices (continued)

3. Storm Drain Inlet Protection (Use for Stone & Block; Filter Fabric; Curb; or, Excavated practices)
Yes No NA
[ ] [ ] [ ] Installed concrete blocks lengthwise so open ends face outward, not upward.
[ ] [ ] [ ] Placed wire screen between No. 3 crushed stone and concrete blocks.
[ ] [ ] [ ] Drainage area is 1acre or less.
[ ] [ ] [ ] Excavated area is 900 cubic feet.
[ ] [ ] [ ] Excavated side slopes should be 2:1.
[ ] [ ] [ ] 2” x 4” frame is constructed and structurally sound.
[ ] [ ] [ ] Posts 3-foot maximum spacing between posts.
[ ] [ ] [ ] Fabric is embedded 1 to 1.5 feet below ground and secured to frame/posts with staples at max 8-inch spacing.
[ ] [ ] [ ] Posts are stable, fabric is tight and without rips or frayed areas.
Sediment accumulation ___% of design capacity.

4. Temporary Sediment Trap
Yes No NA
[ ] [ ] [ ] Outlet structure is constructed per the approved plan or drawing.
[ ] [ ] [ ] Geotextile fabric has been placed beneath rock fill.
Sediment accumulation is ___% of design capacity.

5. Temporary Sediment Basin
Yes No NA
[ ] [ ] [ ] Basin and outlet structure constructed per the approved plan.
[ ] [ ] [ ] Basin side slopes are stabilized with seed/mulch.
[ ] [ ] [ ] Drainage structure flushed and basin surface restored upon removal of sediment basin facility.
Sediment accumulation is ___% of design capacity.

Note: Not all erosion and sediment control practices are included in this listing. Add additional pages to this list as required by site specific design.
Construction inspection checklists for post-development stormwater management practices can be found in Appendix F of the New York Stormwater Management Design Manual.

CONSTRUCTION DURATION INSPECTIONS

b. Modifications to the SWPPP (To be completed as described below)

The Operator shall amend the SWPPP whenever:

1. There is a significant change in design, construction, operation, or maintenance which may have a significant effect on the potential for the discharge of pollutants to the waters of the United States and which has not otherwise been addressed in the SWPPP; or
2. The SWPPP proves to be ineffective in:
   a. Eliminating or significantly minimizing pollutants from sources identified in the SWPPP and as required by this permit; or
   b. Achieving the general objectives of controlling pollutants in stormwater discharges from permitted construction activity; and
3. Additionally, the SWPPP shall be amended to identify any new contractor or subcontractor that will implement any measure of the SWPPP.

Modification & Reason:

III. Monthly Summary of Site Inspection Activities

Name of Permitted Facility:	Today's Date:	Reporting Month:
Location:	Permit Identification #:	
Name and Telephone Number of Site Inspector:		

Date of Inspection	Regular / Rainfall based Inspection	Name of Inspector	Items of Concern

Owner/Operator Certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law."

____ ____

Signature of Permittee or Duly Authorized Representative Name of Permittee or Duly Authorized Representative Date

Duly authorized representatives must have written authorization, submitted to DEC, to sign any permit documents.