STORMWATER MANAGEMENT REPORT

for

Hudson Logistic Center
43 Lowell Road
Hudson, New Hampshire

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EXECUTIVE SUMMARY

This stormwater management report has been prepared in support of the proposed development of approximately 367 acre site located at 43 Steele Road in the Town of Hudson New Hampshire. The existing two parcel site is currently developed as a 39 hole golf course known as Green Meadow Golf Club and is accessed from Steele Road. The existing topography on the site exhibits significant grade changes of up to 90 feet in elevation change. Many high and low points, and rolling topography can be found on site.

The proposed development is the construction and operation of three distribution warehousing facilities known collectively as the Hudson Logistics Center. Three Lots A, B, and C and a subdivision road way will be create from the existing two parcel site. Lot A will include the construction of a ±1,079,700 sf building with a finished floor elevation ±142.75 feet, Lot B will include the construction of a ±923,600 sf building with a finished floor elevation of ±146.5 ft, and Lot C will include the construction of a ±522,000 sf building with a finished floor elevation ±147.50 feet. The current access from Steel road is unable to support the facilities as the main access road. A right of way will be created and new access road constructed for the development. A secondary access is also proposed in the north east section of Lot A. Upgraded utility service lines will be brought to the site within the proposed right of way.

Hydrologically, the site is located in the Merrimack River watershed, which is approximately 5,014 square miles, of which the project site encompasses a nominal amount of approximately 0.075%. The site is part of the Limit Brook – Merrimack River sub-watershed which encompasses approximately the southern three quarters of the Town of Hudson. Under the proposed conditions, the majority of the developed site will drain through closed pipe networks to the stormwater treatment systems before discharging off site at a controlled rate. Existing drainage patterns are being maintained to the greatest extent possible.

The proposed stormwater management system has been designed in accordance with the Town of Hudson current, and soon to be adopted, requirements, the New Hampshire Stormwater Manual, and the New Hampshire Department of Environmental Services. The system incorporates elevated levels of stormwater quality, maintains or decreases the existing peak rate of runoff for all storm events analyzed, and provides above the required groundwater recharge volumes.

1.0 PROJECT OVERVIEW

1.1 Owner

The current owner of the site is as follows:

Green Meadow Golf Club, Inc.—Friel (lots 239/1 & 234/34)
55 Marsh Road
Hudson, New Hampshire

1.2 Address of Development

The site address is a follows:

43 Steele Road
Hudson New Hampshire

&

11 Steele Road
Hudson New Hampshire

1.3 Location of Site

The two parcel site is currently known as the Green Meadow Golf Club located off of Steele Road in the Town of Hudson, New Hampshire on roughly 367acres. The property is bounded to the northeast by multiple commercial sites including Sam's Club and Mercury Systems; to the southeast by an undeveloped lot along Lowell Road and residential properties; along the southern property line by residential properties; along the western property line by the Merrimack River; and along the northern property line by the Circumferential Highway (See Figure 1).

1.4 Description of the Receiving Waters

Hydrologically, the site is located in the Merrimack River watershed, which is approximately 5,014 square miles, of which the project site encompasses a nominal amount of approximately 0.075%. The site is part of the Limit Brook – Merrimack River sub-watershed which encompasses approximately the southern three quarters of the Town of Hudson. Under the proposed conditions, the majority of the developed site will drain through closed pipe networks to the stormwater treatment systems before

discharging off site at a controlled rate. Existing drainage patterns are being maintained to the greatest extent possible.

1.5 Nature and Purpose of Land Disturbing Activity

The project proposes the development of three distribution facilities on the current Green Meadows Golf Course. The project is being called the Hudson Logistics Center The existing Green Meadows site consists of a 39 hole golf course and under existing conditions, has a single access location through a residential neighborhood and limited utility infrastructure as is typical of a development of the this nature.

The proposed develop will subdivide the property into tree Lots A, B, and C as well as a public right of way. Lot A will include the construction of a ±1,079,700 sf building with a finished floor elevation ±142.75 feet, Lot B will include the construction of a ±923,600 sf building with a finished floor elevation of ±146.5 ft, and Lot C will include the construction of a ±522,000 sf building with a finished floor elevation ±147.50 feet. In addition to the buildings described above, to support the individual operations of each facility each lot will include vehicular parking for employees, loading bays truck courts with trailer parking, circulation drives, pedestrian designated walkways, and landscaped areas. Each facility will require a secure, fenced truck court area, some with guard houses at access points and partially separated truck driveways to reduce passenger vehicle/truck conflicts and ensure the safety of both. The number of employee parking stalls is based on the number employees required to operate the facility under peak season conditions. The loading bays and trailer parking stalls allows for the most efficient and effective operation of the facility in the smallest footprint possible. The facility on Lot A will incorporate a bus shelter and we are working with the local transit authority to incorporate bus stops to reduce potential traffic volumes.

A right of way, road and cul-de-sac is proposed at an existing signal on Lowell Road, which currently services the Mercury Systems building, to allow access to the site. A second, private access will make use of an existing easement and connect to the rear of the existing Sam's Club loading area along Walmart Boulevard.

Utilities infrastructure will be brought into the site within the proposed right of way to service all three facilities.

1.6 Limits of Disturbance

The limits of disturbance have been kept to a practical minimum. The large foot prints of these buildings requires flat floor at the same elevation and constrains grading within paved areas to allow for safe truck maneuvering. The existing topography on site includes large elevation changes. Flattening these areas to accommodate the building pads and surrounding paved areas will require cut and fill slopes that extend horizontally from the limits of the site improvements to meet existing grades. A relative flat tie-in slope of 4 feet horizontal to 1 foot vertical has been designed to ensure slope stability.

The required site access roads create necessary disturbance for reasons discussed above. The access roadways extend into the site and across several wetland features to allow for the development to avoid the high quality wetland systems. All disturbance to sensitive buffer areas and wetlands have been kept as low as practical through the use of steeper tie-in grades and retaining walls. The specific layout for the development, associate site features and stormwater treatment systems were designed in a manner to encourage the most compact development footprint practical. For further site layout design details refer to the Low Impact Design (LID) discussion of Minimize Disturbance Areas in section 3.6 Stormwater Management.

During construction, the designed limits of disturbance will include soil erosion and sediment control features such as fiber rolls and silt fencing to ensure no unnecessary disturbance to natural areas will occur.

1.7 Construction Schedule

Due to the complexities of construction sequencing on a project of this magnitude, a general contractor would need to outline specific details based on their individual approach. As a general contractor has not yet been selected for the project a rough three phased construction sequence identifying major construction actives has been outlined below. The schedule below is subject to change based on input from the general contractor, availability of materials and final permitting approval.

<u>Phase 1</u>

Quarter 3 2020

- Install phase 1 Soil Erosion and Sediment control Measures
- Install construction and demolition staging areas
- Utility and services disconnect

- Establish temporary services
- Site demolition, clearing and grubbing

Quarter 4 2020

- Install and construction Northeastern stream crossing

Phase 2

Quarter 4 2020

- Install phase 2 Soil Erosion and Sediment control Measures
- Mass earthwork and rough grading
- Retaining wall construction
- Building pad construction

Quarter 4 2020 / Quarter Q1 2021

- Begin construction on proposed Right of Way

Phase 3

Quarter 2 2021

- Install phase 3 Soil Erosion and Sediment control Measures
- Stormwater conveyance system and utility installation
- Building construction
- Paving and landscaping installation
- Final site stabilization

Quarter 3 2021

- Certificate of Occupancy
- Removal of Soil Erosion and Sediment Control features

2.0 EXISTING CONDITIONS SUMMARY

2.1 Existing Site Conditions

Under existing conditions, Green Meadow Golf Course consists of a 39 hole golf course with associated cart paths, water and sand hazards, rolling topography, and supporting infrastructure. The site has two building on the property with access from Steele Road; a roughly 5,300 sf club house at elevation 158 feet in the center of the property with a small refreshment service and a roughly 11,000 sf maintenance facility with detached garage at elevation 138 feet in the south west corner of the property. The club house includes a several acre, paved parking lot and cart storage/staging area. Paved and gravel access roads service the club house and maintenance facility. The maintenance facility has dirt and gravel storage and service areas surrounding the building.

The existing topography on the site has significant grade changes with elevatins varying up to 90 feet. Grades along Lowell Road from the northern intersection at Lowell Road and Walmart Boulevard to the southern intersection of Lowell Road and the Mercury System drive entrance are roughly elevation 160 to 170 feet respectively. Heading in a westerly direction into the subject site, elevation drops to varying low points ranging between elevation 120 and 125 feet in the main wetland systems which runs from the north property line, along the rear of the Mercury Systems property line to the southern border. Further west into the site, elevations rise amongst rolling golf course topography to the top of a shallow ridge line which splits the major site watersheds. This ridge line begins at the northern extent of the property at roughly elevation 155 feet and continues south, approximately two thirds the length of the property where it reaches its highest elevation of ±170 feet. The ridge continues to the south where it meets the existing property line at elevation ±160 feet. To the west of the ridge, elevation drops over rolling golf course topography to the top of a steep slope about 60 feet from the edge of the Merrimack River. Elevations along the top of this steep slope vary from a north to south direction from approximately 120 to 100 feet in elevation. The edge of the Merrimack River from a north to south direction along the property limits is roughly elevation 88 to 87 feet.

2.2 Wetlands and Streams

Four main categories of wetlands exist on the site today; isolated ponds, the northeast wetlands, the southeast wetlands, and the Merrimack River. The isolated ponds, northeast and southeast wetlands on site have a long history of alteration predating the regulation of freshwater wetlands. The site was cleared and use for the agricultural purposes prior to the construction of the golf course in the 1950s. Between 1952 and 1965 large earthwork manipulation took place to construct the existing golf course. On-site wetlands were manipulated over this time period through clearing, filling, channelization, and excavation. Areas were also excavated outside of existing wetland areas to place water hazards, creating multiple isolated wetlands and some hydrologically connected wetlands through the use of pipes. The result is the complex wetland system on site today with varying levels of quality and function.

The northeastern wetland system is a mostly wooded area containing excavated ditched to provide a drainage path for stormwater discharge from an upstream detention pond located off the subject site. These excavated ditches flow to an unnamed perennial stream that discharges to the Merrimack River approximately 1,600 feet to the northeast.

The southeasterly wetland system contains wooded areas, scrub-shrub, emergent and open water wetlands; some of which are directly associate with Limit Brook. Limit Brook is a perennial tributary to the Merrimack River. Limit Brook enters the property to the southeast corner of the site, curves to the west and exists the site to the south. The portion of the curve located on site was modified to create water hazards during the construction of the golf course.

More detailed descriptions of the wetland area functionalities and proposed impacts can be found in the NH DES Wetland Bureau Major Impact Dredge & Fill Application as an Appendix to this report under separate cover.

2.3 Soil Conditions

According to the USDA Natural Resources Conservation Service (NRCS) Web Soil Survey, the hydrologic soil type on site is predominantly group A and B (see Figure 3). However, upon further investigation out lined in "Site-specific Soil Survey Report, Hudson Logistics Center, Lowell and Steel Roads Hudson, NH, GES #2019216" performed by Gove Environmental Services, Inc. dated May 4th, 2020, found as an Appendix to this report, the following soils have been identified on site. The boundaries and locations of these soils can be found on the Site Specific Soil Survey Map Series.

Table 1: Soil Identification Chart

Map Unit Symbol	Map Unit Name	Rating
4	Pootatuck Very Fine Sandy Loam	B
24	Agawam Fine Sandy Loam	B
115	Scarboro Muck	D
400	Udorthents, Sandy	A
513	Ninigret Fine Sandy Loam	B
540	Raypol Loamy Fine Sand	D
699	Urban land	IMPERVIOUS
917	Ninigret Variant (Somewhat Poorly Drained)	C
Ponds	Open Water	N/A

A summary of the basic characteristics of the soil series present on-site are outlined below:

Pootatuck Very Fine Sandy Soil – Pootatuck Very Fine Sandy Soil occurs on flood plains that flood sporadically. These are fine textured soils that are moderately well drained. In this case, the Pootatuck series is found adjacent the Merrimac River.

Agawam Fine Sandy Loam – occurs on glacial outwash plains and alluvial deposits. The Agawam series has a fine sandy loam topsoil and subsoil, then becomes loamy sand in the substratum. This is a well-drained soil with estimated seasonal high water tables deeper than 40 inches. While this soil map unit is in a golf course that has undergone significant grading, the essential soil characteristics are present to identify the soil series. Common inclusions in depressions and swales is the soil series Ninigret.

Scarboro Muck – Scarboro Muck occurs in the wetlands on the site. Scarboro is very poorly drained and has an organic topsoil. Common inclusions are the poorly drained Raypol series and the Borohemists that have deeper organic deposits.

Udorthents, Sandy – Udorthents, Sandy represent areas on the site where excavation and filling have occurred to the extent that no soil characteristics remain to classify as a soil series. These are typically sandy or gravelly areas that are well to excessively drained.

Ninigret Fine Sandy Loam – Ninigret Fine Sandy Loam is the moderately well drained analog of the Agawam soil series. This is a moderately well drained soil that has an estimated seasonal high water table 20 to 30 inches below the soil surface. Like Agawam, the topsoil is fine sandy loam, the subsoil is fine sandy loam, and the substratum becomes coarser such as loamy sand or fine sand. It occurs on the same glacial outwash

landforms as Agawam, but is found more in the flat areas, drainage ways and swales. Inclusions are Deerfield loamy sand and the Ninigret Variant.

Raypol Loamy Fine Sand – Raypol Loamy Fine Sand is a hydric soil that is found on glacial outwash plains. It is found in conjunction with Agawam, Ninigret and Ninigret variant. It is found between the upland moderately well drained and somewhat poorly drained soils and the very poorly drained Scarboro muck. It is typically identified as wetlands.

Urban Land – Urban Land is a map unit that represents impervious areas of buildings, pavement and packed gravel parking areas.

Ninigret Variant (Somewhat Poorly Drained) – Ninigret Variant (Somewhat Poorly Drained) is the wetter analog of the Ninigret series. This is a somewhat poorly drained soil that has a seasonal high water table from 0 to 15 inches below the soil surface, but has high chroma matrices that do not make the soil hydric. This most occurs on this site as an inclusion to the Ninigret map unit.

Soils are classified into hydrologic soil groups (HSG) to indicate the minimum rate of infiltration obtained for bare soil after prolonged wetting. The HSGs, which are A, B, C and D, are one element used to determine runoff curve numbers and analyzing stormwater characteristics of a site.

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

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

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

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

2.4 FEMA

According to the Flood Insurance Rate Map of Hillsborough County, New Hampshire conducted by the Federal Emergency Management Agency (FEMA) map number 33011C0656D and map number 33011C0658D with effective dates of September 25, 2009 the site is located within the following zones:

- FEMA Flood Zone X (Unshaded)
- FEMA Flood Zone X (Shaded),
- and FEMA Flood Zone AE with a base flood elevation (BFE) of 111 (see Figure 2).
- Floodway Areas in Zone AE

The FEMA figure does not accurately reflect the limits of the Zone AE flood plain based on more accurate topographic information provided by the topographical survey used for this development. The Zone AE limits follow elevation 111 contour and is reflected accurately in the CG series of the design documents. The survey files and other sheets in the design set reflect the FEMA delineated line.

A small area of the proposed development would create a fill condition in the 100 year flood plain Zone AE if the FEMA delineation were to be used. However, adjusting the flood Zone AE limit to the cross section BFE of 111 feet, there will be no fill condition with in the 100 year flood plain.

3.0 PROPOSSED STORMWATER TREATMENT SUMMARY

The purpose of the Stormwater Management Plan is to provide long-term protection of natural resources in and around the site. This is achieved by implementing stormwater quality and quantity control measures designed to reduce pollutant discharge from the site, maintain a level of stormwater recharge and control discharge rates.

3.1 Design Criteria

Peak flow rates at all points of discharge from the site were analyzed to compare proposed discharge rates with the existing condition.

The storms analyzed include the following:

- A 2-year, 24-hour storm consisting of 3.11 inches of rainfall
- A 10-year, 24-hour storm consisting of 4.80 inches of rainfall
- A 25-year, 24-hour storm consisting of 5.85 inches of rainfall
- A 50-year, 24-hour storm consisting of 6.62 inches of rainfall

These events are based on the National Weather Service (NOAA) Precipitation Frequency Data Server (PFDS) and the Northeast Regional Climate Center (NRCC) "Atlas of Precipitation Extremes for the Northeastern United States and Southeast Canada" Type III, 24-hour storm event for Hudson New Hampshire. NOAA Atlas Volume 10 Version 3.

3.2 Design Methodology

The peak runoff discharges for the existing and proposed conditions were analyzed using Soil Conservation Service (SCS) methodology, which outlines procedures for calculating peak rates of runoff resulting from precipitation events, and procedures for developing runoff hydrographs. Values for area, curve number, and time of concentration were calculated for the existing and proposed conditions.

The curve number "CN" is a land-sensitive coefficient that dictates the relationship between total rainfall depth and direct storm runoff. The soils within the watershed are divided into hydrologic soil groups (A, B, C and D) as previously described.

The time of concentration, Tc, is defined as the time for runoff to travel from the hydraulically most distant point in the watershed to a point of interest. Values of time of

concentration were determined for existing and proposed conditions based on land cover and slope of the flow path, using methods outlined in the SCS methodology.

For this study, a 24-hour SCS Type III standard rainfall distribution was used to determine the peak flow rate to all points of discharge from the site.

3.3 Existing Runoff Discharges (See Appendix A for Calculations)

The project site directs stormwater run-off to two analysis locations under the existing conditions. Watershed A discharges run off directly to the Merrimack River along the western Property line via sheet flow or pipe discharge. Watershed B discharges run off, to wetland systems running north to south through the eastern region of the property west of Lowell Road. This wetlands system includes portions of an unnamed stream to the north and portions of Limit Brook to the south. Both of which ultimately discharge to the Merrimack River.

The watershed analysis includes surrounding areas beyond the property line that contribute flow to the project site's watersheds and drainage analysis. The existing watersheds A and B analyzed in this report were further delineated into Watersheds A-1, A-2, A-3, A-4, A-5, A-6, A-7, A-8, A-9, A-10, A-11, A-12 and Watersheds B-1, B-2, B-3, B-4, B-5, B-6, B-7, B-8, B-9, B-10, B-11, B-12, B-13 to more accurately model the existing flow patterns. These watersheds are described below:

Watershed A

Watershed A-1, ±32.78 acres, is located along the western region of the project site. The watershed consists of areas of the golf course including fairways, paths, trees and sand traps as well some more heavily wooded regions. Run off sheet flows over land in a south westerly direction where majority of the run off is directed through an existing 48 inch RCP culvert and discharged directly into the Merrimack River. A small area in the southern section of the watershed sheet flows directly over land to the watershed analysis point A, the Merrimack River.

Watershed A-2, ±2.84 acres, is located along the northern property line. The watershed consists of some fairway areas, paths, and lightly wooded regions. Run off sheet flows over land in a north easterly direction where it enters an offsite drainage channel that discharges to the Watershed analysis point A, the Merrimack River.

Watershed A-3, ±25.56 acres, is located along the southern property line. The watershed consists of areas of the golf course including fairways, paths, trees and sand traps as well some more heavily wooded regions. Run off sheet flows over land in a westerly direction to the watershed analysis point A, the Merrimack River.

Watershed A-4, ±32.41 acres, is located in the southerly region of the site. The watershed consists of areas of the golf course areas including fairways, paths, trees, sand traps and a small pond feature that functions as a golf water hazard. More heavily wooded areas exist on steep slopes in the watershed. A maintenance facility including a main building and a smaller accessory structure, gravel parking / staging areas and roadway exist in this watershed. Run off sheet flows over land in a westerly direction to the water hazard pond. Overflow volumes are directed through watershed A-11 to watershed analysis point A, the Merrimack River.

Watershed A-5, ±18.17 acres, is located in the south west region of the site. The watershed consists of areas of the golf course areas including fairways, paths, trees, sand traps and a shallow, wooded wetland depression. Run off sheet flows over land in a westerly direction to the wetland depression where it captured. Overflow volumes are directed through watershed A-11 to watershed analysis point A, the Merrimack River.

Watershed A-6, ±9.80 acres, is located in the norther east corner of the site, along the northern property line. The watershed consists of areas of the golf course areas including fairways, paths, trees, and sand traps. Run off sheet flows over land in a westerly direction to shallow channel directing flows to watershed A-8 where run off ultimately discharges to Watershed analysis point A, the Merrimack River.

Watershed A-7, ±12.15 acres, is located in the northern region of the site. The watershed consists of areas of the golf course areas including fairways, paths, trees, sand traps, and more minor areas of more densely wooded sections. Run off sheet flows over land and is partially captured in shallow depressions created by the golf course topography where shallow pools are infiltrated. By passing flows are directed to watershed A-12.

Watershed A-8, ±1.75 acres, is located in the north western property line and runs along the Merrimack River. This watershed consists of mainly wooded areas and steep slopes along the river bank. Some grassy areas associated with the golf course are included along the eastern watershed extent. Run off from this watershed sheet flows directly over land to Watershed analysis point A, the Merrimack River.

Watershed A-9, ±9.69 acres, is located in the central, western region of the site. The majority of watershed consists of the main club house building and patio, paved parking lot, cart storage staging area, paths, drives and walkways. Areas of the golf course including fairways, trees, and sand traps make up the remained or the watershed. Run off sheet flows over land in a westerly direction to a rip rap channel with a pipe inlet. Water is captured and conveyed via closed pipe network to a direct discharge location in watershed A-1 along the bank of the Merrimack River, watershed analysis point A.

Watershed A-10, ±9.46 acres, is located in the central region of the site. The majority of watershed consists of the golf course areas including fairways, paths, trees, and sand traps with a more densely wooded area toward the middle of the watershed. Run off sheet flows over land in a westerly direction to a shallow depression with a catch basin inlet. Linked pipe information is available, however flows appear to be conveyed via closed pipe network and daylight in watershed A-4 and ultimately, watershed analysis point A, the Merrimack River.

Watershed A-11, ±6.18 acres, is located along the western property line and runs along the Merrimack River. This watershed consists of mainly wooded areas and steep slopes along the river bank. Some grassy areas and sand traps associated with the golf course are included along the eastern watershed extent. Run off from this watershed sheet flows directly over land to Watershed analysis point A, the Merrimack River

Watershed A-12, ±26.56 acres, is located in the northern central area of the site. The watershed consists of areas of the golf course areas including fairways, paths, trees and sand traps. Run off sheet flows over land and is partially captured in shallow depressions created by the golf course topography where shallow pools are infiltrated. By passing flows are directed to watershed A-1 where run off ultimate discharges to watershed analysis point A, the Merrimack River.

Watershed B

Watershed B-1, ±31.17 acres, is located in the north eastern area of the project site. A small portion of watershed B-1 is located to the northern side of the existing Mercury System drive entrance. The northern half of the crowned access drive sheetflows to a wetland system discharging to the unnamed stream located in the main portion of watershed B-1. The eastern two thirds of the main watershed consists of woods, wetlands and an unnamed stream. The western third includes portions of the golf course

including fairways, paths, trees and sand traps. Run off sheet flows directly to the main wetland system of Watershed analysis point B.

Watershed B-2, ±12.77 acres, is located in the central northern section of the site. The area includes portions of the golf course including fairways, paths, trees, sand traps and a water hazard pond. Run off sheet flows over land to the water hazard pond and subsequently to the main wetland system of Watershed analysis point B within watershed B-3.

Watershed B-3, ±18.52 acres, is located in the central, eastern region of the project site. The eastern half of the watershed consists of wooded and wetland areas. The western half includes areas of the golf course including fairways, paths, trees and sand traps. Run off sheet flows directly to the main wetland system of watershed analysis point B.

Watershed B-4, ±29.73 acres, is located along the eastern property line within the existing property lines. The watershed consists of woods and wetland areas to the north and portions of the golf course including fairways, paths, trees sand traps, wetlands and a portion of Limit Brook to the south. Run off sheet flows in a southerly direction over land to wetlands connected to Limit Brook and to the main wetland system of Watershed analysis point B.

Watershed B-5, ±34.44 acres, is located in the central eastern region of the project site. The eastern region of the watershed consists of wetland areas, a section of Limit Brook and a wooded portion of the property. The western half consists of sections of the golf course including fairways, paths, trees, sand traps and sections of the main access drive. Run off sheet flows in an easterly direction over land to the main wetland system of watershed analysis point B.

Watershed B-6, ±27.95 acres, is located in the south eastern region of the project site. The watershed consists of sections of the golf course including fairways, paths, trees, sand traps and sections of the main access drive as well a region of Limit Brook and wetland systems containing minimal trees. Run off sheet flows in an easterly direction over land to the main wetland system of watershed analysis point B.

Watershed B-7, ±7.76 acres, is the south eastern extent of the project site. The watershed consists mainly of woods, wetlands and region of Limit Brook. A section of the golf course fairways, paths, and trees occupy the western extent of the watershed.

Run off sheet flows in an easterly direction over land to the main wetland system of watershed analysis point B.

Watershed B-8, ±10.50 acres, is located along the southern property line near the eastern corner. The watershed consists or golf course fairways, paths, sand traps, trees and a pond. Run off sheet flows in an easterly direction over land to the pond. The pond discharges over flow volumes easterly to combine with watershed B-7 and ultimately discharge to the main wetland system of watershed analysis point B.

Watershed B-9, ±10.50 acres, is located centrally to the project area. The watershed consists of portions of the golf course including fairways, paths, trees and sand traps. Run off sheet flows over land and is partially captured in shallow depressions created by the golf course topography where shallow pools are infiltrated. By passing flows are directed into the main wetland system of watershed analysis point B through watershed B-5.

Watershed B-10, ±1.01 acres, is located along the northern property line. This area consists of mainly woods. Run off sheet flows over land and is partially captured in shallow depressions created by the golf course topography where shallow pools are infiltrated. By passing flows are directed into the main wetland system of Watershed analysis point B through watershed B-1.

Watershed B-11, ±1.28 acres, is located along the northern property line. This area consists of mainly woods. Run off sheet flows over land and is partially captured in shallow depressions created by the golf course topography where shallow pools are infiltrated. By passing flows are directed into the main wetland system of watershed analysis point B through watershed B-1.

Watershed B-12, ±5.24 acres, is located in the south east region of the site. The watershed consists or golf course fairways, paths, sand traps, trees and a pond. Run off sheet flows in an easterly direction over land to the pond. The pond discharges over flow volumes easterly to combine with watershed B-5 and ultimately discharge to the main wetland system of watershed analysis point B

Watershed B-13, ±14.40 acres, is located along the western extent of Lowell road and extends to the eastern existing property line of the subject property. The majority of this watershed consists of woods and wetland areas. Portions of the northern abutter's access driveway and roadway shoulders along Lowell Road are also included in the

watershed. Run off sheet flows in a south westerly direction over land to wetlands connected to Limit Brook and to the main wetland system of watershed analysis point B.

3.4 Proposed Runoff Discharges (See Appendix B for Calculations)

The proposed watershed analysis utilizes the same two discharge locations under the existing conditions, A and B. The outer limits and overall area analyzed under the proposed conditions is consistent with the existing conditions. Having consistent analysis of overall areas and discharge locations between the existing and proposed conditions ensures the model represents an accurate pre and post construction run off comparison.

In order to accurately model and route the various stormwater features the proposed watersheds have been further delineated. Several of the existing watershed no longer exist. The elimination of these watersheds is a result of the areas being significantly altered requiring them to be combine with other watersheds. The proposed watersheds area have been identified as follows;

- Watershed A
  - A1-1, A1-2, A1-3, A1-4, A1-5, and A1-6.
  - A-2
  - A-3
  - A-4
  - A-5
  - A6-1 and A6-2
  - A-8
  - A11-1, A11-2 and A11-3
- Watershed B
  - B1-1 and B1-2
  - B-2
  - B-3
  - B-4
  - B-5
  - B6-1, B6-2, B6-3, and B6-4
  - B-7
  - B-8
  - B-10
  - B-11
  - B-13

Watershed A

Watershed A1-1, ±21.31 acres, includes the remaining area of existing watershed A. The eastern most potion of the watershed was reduced and a seeded fill slope now occupies a section of the area. Flows patterns in this watershed have been substantially maintained as under existing conditions.

Watershed A1-2, ±22.71 acres, is located nearly entirely in the southern region of Lot A. The watershed includes the south western section of Lot B building's roof area, the southern half of the western loading bay and truck court area, the secondary truck entrance and guard shack, pedestrian walks, planted slopes and landscaped areas. Run off from this watershed is collected by catchbasins or roof leaders and conveyed in a four foot deep sumped catchbasin, closed pipe network. Water is discharged from the collection network to a sediment forebay located in Infiltration basin A1-2. The stormwater quality volume is treated, groundwater recharge provided, and flows attenuated before discharging at a controlled rate through an outlet control structure. Flows discharge to an existing 24 inch RCP pipe which outfalls directly to the Merrimack River through watershed A1-1.

Watershed A1-3, ±15.25 acres, is located entirely in the south easterly region of Lot A. The watershed includes a south eastern region of the Lot A building's roof area, the southern half of the vehicular parking lot and main roadway, pedestrian walks, and landscaped areas. Run off from this watershed is collected by catchbasins or roof leaders and conveyed in a four foot deep sumped catchbasin, closed pipe network. Water is discharged from the collection network to a sediment forebay located dry extended detention basin with micro pool A1-3. The stormwater quality volume is treated, and flows attenuated before discharging at a controlled rate through an outlet control structure. Flows discharge to a closed pipe network and combine with controlled discharge flow from infiltration basin A1-5. Further downstream, flows discharge over a preformed scour hole into infiltration basin A1-2 where groundwater recharge is provided for the watershed.

Watershed A1-4, ±40.57 acres, is located on the property line shared by Lot B and Lot C. On Lot C, the watershed includes roughly the western half of Lot C building's roof area, the western loading area and truck court, water tower, a section of the emergency access road, planted slopes, pedestrian walk ways and landscaping. On Lot B, the watershed includes roughly the eastern third of Lot B building's roof area, the eastern loading area and truck court, the secondary truck entrance and drive, a section of the main circulation drive, a section of the emergency access road, planted slopes, pedestrian walk ways and landscaping. Run of from the watershed is conveyed using two methods. The first is by catchbasins or roof leaders and conveyed in a four foot deep sumped catchbasin, closed pipe network where it is discharged to sediment forebay A1-4. The second is by direct sheet flow from the both truck court areas. Run off is directed over shortened stone and vegetative filter strips to a shallow sloped conveyance channel between the two truck

courts. The channel conveys run off to sediment fore bay A1-4. Sediment forebay A1-4 is sized to accommodate the 25% WQV pretreatment requirement and flow attenuation for the watershed before discharging flows through an outlet control structure, over a preformed scour pad to Infiltration Basin A1-2. Water Quality treatment, groundwater recharge, and flow attenuation is provided in Infiltration basin A1-2.

Watershed A1-5, ±13.12 acres, is located mostly in the norther region of Lot C. The watershed includes roughly the northern half of Lot C building's roof area, the northern vehicular parking area, the northern car and truck access drive, pedestrian walk ways, and landscaped areas. A portion of Lot B's main entrance drive and Lot A's secondary truck access drive are also included in this watershed. Run off from this watershed is collected by catchbasins or roof leaders and conveyed in a four foot deep sumped catchbasin, closed pipe network. Water is discharged from the collection network to a sediment forebays located in Infiltration basin A1-5. The stormwater quality volume is treated, groundwater recharge provided, and flows attenuated before discharging at a controlled rate through and outlet control structure. Flows discharge to a closed pipe network and combine with controlled discharge flow from dry extended detention basin with micro pool A1-3. Further downstream, flows discharge over a preformed scour hole into infiltration basin A1-2.

Watershed A1-6, ±7.21 acres, encompasses the entire right of way and portions of the curb cuts to each lot along the cul-de-sac. The watershed includes Run off from this watershed is collected by catchbasins and conveyed in a four foot deep sumped catchbasin, closed pipe network. Conveyed water passes through a hydrodynamic unit sized to treat the entirety of the water quality flow rate before continuing through a closed pipe network below the entrance drive of Lot B and the to the rear of the western truck court on Lot A. Having far exceed the minimum 25% pretreatment criteria for infiltration basins, flows are discharge over a preformed scour pad into the bottom of Infiltration basin A1-2 where groundwater recharge is provided for the watershed.

Watershed A-2, ±0.43 acres, includes the remaining area of existing watershed A-2. The southernmost area of the watershed has been reduced. Flows patterns in this watershed have been substantially maintained as compared to the existing conditions.

Watershed A-3, ±10.34 acres, includes the remaining area of existing watershed A-3. The northernmost area of the watershed has been reduced. A large section of the planted berm is included in this watershed. Flows patterns in this watershed have been substantially maintained as compared to the existing conditions.

Watershed A-4, ±6.37 acres, includes the remaining area of existing watershed A-4. The easternmost area of the watershed has been reduced and now contain a seeded fill slope. Flows patterns in this watershed have been substantially maintained as compared to the r existing conditions.

Watershed A-5, ±3.30 acres, includes the remaining area of existing watershed A-5. The easternmost area of the watershed has been reduced and now contain a seeded fill slope. Flows patterns in this watershed have been substantially maintained as compared to the existing conditions.

Watershed A6-1, ±4.32 acres, includes the remaining area of existing watershed A-6. The north eastern area of the watershed has been reduced and now contains the seeded fill slope of Infiltration basin A6-2. Flows patterns in this watershed have been substantially maintained as compared to the existing conditions.

Watershed A6-2, ±29.90 acres, is located entirely in the north western region of Lot A. The watershed includes the north western third of Lot A building's roof area, the northern loading bay and truck court areas, the northern half of the south truck court and loading bays, main truck entrance an guard shack, truck turn around area, water tower, a portion of the main truck entrance roadway, pedestrian paths, and landscaped areas. Run off from this watershed is collected by catchbasins or roof leaders and conveyed in a four foot deep sumped catchbasin, closed pipe network. Water is discharged from the collection network to a sediment forebay located in Infiltration basin A6-2. The stormwater quality volume is treated, groundwater recharge provided, and flows attenuated before discharging at a controlled rate through and outlet control structure. Flows discharge over a preformed scour hole and combine with watershed A6-1.

Watershed A-8, ±1.75 acres, remains unaltered in the proposed condition with the exception of planted meadow mix. Flows patterns in this watershed have been substantially maintained as compared to the existing conditions.

Watershed A11-1, ±5.66 acres, includes the remaining area of existing watershed A-11. The eastern area of the watershed has been reduced and now contains the seeded fill slope of Infiltration basin A11-2. Flows patterns in this watershed have been substantially maintained as compared to the existing conditions.

Watershed A11-2, ±41.65 acres, is located entirely in the western region of Lot B. The watershed includes the south western two thirds of Lot B building's roof area, the

southern truck circulation road, a portion of the planted screening berm and emergency access road, the western loading bays and truck court areas, main truck entrance an guard shack, water tower, a portion of the main truck entrance roadway, The northern vehicular parking lot, pedestrian paths, and landscaped areas. Run off from the berm and emergency road way are conveyed through country drainage to catch basin inlets. The majority of run off from this watershed is collected by catchbasins or roof leaders and conveyed in a four foot deep sumped catchbasin, closed pipe network. Water is discharged from the collection network to a sediment forebay located in Infiltration basin A11-2. The stormwater quality volume is treated, groundwater recharge provided, and flows attenuated before discharging at a controlled rate through and outlet control structure. Flows discharge over a preformed scour hole and combine with watershed A11-1.

Watershed A11-3, ±3.46 acres, is located entirely in the south western region of Lot A. The watershed includes portions of the emergency access road, planted slopes and section of the planted berm. Run off from this watershed is collected in catchbasins and conveyed in a four foot deep sumped catchbasin, closed pipe network. Water is discharged from the collection network to a sediment forebay located in Infiltration basin A11-3. The stormwater quality volume is treated, groundwater recharge provided, and flows attenuated before discharging at a controlled rate through and outlet control structure. Flows discharge over a preformed scour hole and combine with watershed A11-1.

Watershed B

Watershed B1-1, ±24.66 acres, includes the remaining area of existing watershed B-1. The western most potion of the watershed was reduced. The secondary Lot A site access road way spilt the main watershed in an east to west direction. All proposed impervious run off is removed from the watershed. Where the roadway crosses the wetland and unnamed stream, a 60 inch culvert crossing has been proposed to maintain ecological and hydrologic connective as under existing conditions. The small portion to the north of the Mercury Systems drive has also been reduced, removing impervious areas and incorporating planted slopes. Flows patterns in this watershed have been substantially maintained as under existing conditions.

Watershed B1-2, ±15.90 acres, is located entirely in the northern region of Lot A. The watershed includes a section of Lot A building's roof area, the northern half of the vehicular parking lot, the north half of the main circulation road, majority of the secondary

access roadway and truck entrance, pedestrian walkways, and landscaped areas. Run off from this watershed is collected by catchbasins or roof leaders and conveyed in a four foot deep sumped catchbasin, closed pipe network. Water is discharged from the collection network to a sediment forebay located in Infiltration basin B1-2. The stormwater quality volume is treated, groundwater recharge provided, and flows attenuated before discharging at a controlled rate through and outlet control structure. Flows discharge over a preformed scour hole and combine with watershed B1-1.

Watershed B-2, ±6.05 acres, includes the remaining area of existing watershed B-2. The western most potion of the watershed was reduced and a seeded fill slope now occupies a section of the area. Flow patterns in this watershed have been substantially maintained as compared to the existing conditions.

Watershed B-3, ±13.76 acres, includes the remaining area of existing watershed B-3. The western and southern most potion of the watershed has been reduced and a seeded fill slope and retaining wall now occupy a section of the area. Flow patterns in this watershed have been substantially maintained as compared to the existing conditions.

Watershed B-4, ±28.16 acres, includes the remaining area of existing watershed B-4. The watershed has been split by the main access drive. All proposed impervious run off is removed from the watershed. Seeded side slopes and drainage features are now included in the watershed. Flow patterns in this watershed have been substantially maintained as compared to the existing conditions.

Watershed B-5, ±17.53 acres, includes the remaining area of existing watershed B-5. The watershed has been split by the main access drive. All proposed impervious run off is removed from the watershed. Seeded side slopes and drainage features are now included in the watershed. Where the main access road crossed the wetland, an 18 inch diameter pipe has been installed to maintain ecological and hydrologic connectivity as under existing conditions. Flow patterns in this watershed have been substantially maintained as compared to the existing conditions.

Watershed B6-1, ±9.19 acres, includes the remaining area of existing watershed B-6. The western region of the watershed has been reduced and now includes planted slopes and a portion of the emergency access road. Flow patterns in this watershed have been substantially maintained as compared to the existing conditions.

Watershed B6-2, ±6.19 acres, is located entirely in the central region of Lot C. The watershed includes majority of the Lot C main roadway, a segment of the emergency access road, a conveyance swale, planted slopes and landscaped areas. Run off from the emergency road and southern portion of the Lot C main road way is collected through curb leak off to a grass swale. The swale discharges to a sediment foreboay located in infiltration basin B6-2. Run off is also collected by catchbasins and conveyed in a four foot deep sumped catchbasin, closed pipe network before being discharged from the collection network to a sediment forebay located in Infiltration basin B6-2. The stormwater quality volume is treated, groundwater recharge provided, and flows attenuated before discharging at a controlled rate through and outlet control structure. Flows discharge over a preformed scour hole and combine with watershed B6-1.

Watershed B6-3, ±3.93 acres, is located entirely in the central region of Lot C. The watershed includes the northern half of eastern loading area, truck court and truck entrance drive. Run off from this watershed is collected by catchbasins and conveyed in a four foot deep sumped catchbasin, closed pipe network. Water is discharged from the collection network to sediment forebay B6-3. Sediment forebay B6-3 is sized to accommodate the 25% WQV pretreatment requirement and flow attenuation for the watershed before discharging flows through an outlet control structure, combining with flows from sediment forebay B6-4, and passes over a preformed scour pad to Infiltration Basin B6-2. Water Quality treatment, groundwater recharge, and flow attenuation is provided in Infiltration basin B6-2.

Watershed B6-4, ±9.56 acres, is located entirely in the central region of Lot C. The watershed includes the southern half of eastern loading area, truck court and truck entrance drive, a small portion of Lot C building's roof area, the southern vehicular parking lot, southern section of the main roadway, pedestrian walk ways, a segment of the emergency access road, seeded slopes and landscaped areas. Run off from this watershed is collected by catchbasins or roof leaders and conveyed in a four foot deep sumped catchbasin, closed pipe network. Water is discharged from the collection network to sediment forebay B6-4. Sediment forebay B6-3 is sized to accommodate the 25% WQV pretreatment requirement and flow attenuation for the watershed before discharging flows through an outlet control structure, combining with flows from sediment forebay B6-3, and passes over a preformed scour pad to Infiltration Basin B6-2. Water Quality treatment, groundwater recharge, and flow attenuation is provided in Infiltration basin B6-2.

Watershed B-7, ±7.77 acres, includes the remaining area of existing watershed B-7. The western most potion of the watershed was reduced and a seeded fill slope now occupies a section of the area. Flow patterns in this watershed have been substantially maintained as compared to the existing conditions.

Watershed B-8, ±2.42 acres, includes the remaining area of existing watershed B-8. The western most potion of the watershed was reduced and a seeded fill slope now occupies a section of the area. The existing pond was left majority in tacked. Flow patterns in this watershed have been substantially maintained as compared to the existing conditions.

Watershed B-10, ±0.83 acres, includes the remaining area of existing watershed B-10. The southernmost potion of the watershed was reduced. Flow patterns in this watershed have been substantially maintained as compared to the existing conditions.

Watershed B-11, ±0.95 acres, includes the remaining area of existing watershed B-11. The southernmost potion of the watershed was reduced. Flow patterns in this watershed have been substantially maintained as compared to the existing conditions.

Watershed B-13, ±13.39 acres, includes the remaining area of existing watershed B-13. The southernmost potion of the watershed was reduced. Flow patterns in this watershed have been substantially maintained as compared to the existing conditions.

In the above described watershed, the impervious areas have increased from the existing to the proposed condition. Impervious area were strategically place as far from sensitive areas as discussed under the LID practices section. The vast majority of proposed impervious area will be captured and treated at a very high level as described in the section below. The existing impervious area is roughly ±11.59 aces (±504,860 sf). In the proposed condition, the impervious coverage is ±147.14 aces (±6,409,418 sf). The development will result in a net increase of ±135.55aces (±5,904,558 sf) of impervious area.

3.5 Existing vs. Proposed Discharge Comparison

The proposed stormwater management plan, discussed in this report, results in a net reduction of peak offsite flows from watershed A and B. While the impervious area on site will increase, stormwater BMPs have been sized to not only meet but exceed the current regulations for stormwater treatment, flow attenuation and groundwater recharge requirements. Stormwater treatment will be discussed later on in this report.

Table 2 provides a comparison of the peak run off rates from the pre development state to the post development state. Flow comparison is provided for the 2, 10, 25, and 50 year storm events and the percentage reduction in flow is listed for each instance.

Table 2: Peak Flow Runoff Rate Comparison (cubic-feet per second)

		2-year	10-year	25-year	50-year
A	Pre	29.03	121.42	206.34	297.64
	Post	10.70	68.90	120.91	159.03
	Delta	**-63.14%**	**-43.25%**	**-41.40%**	**-46.57%**
B	Pre	55.48	228.29	363.62	471.49
	Post	42.54	153.89	238.11	305.32
	Delta	**-23.32%**	**-32.59%**	**-34.52%**	**-35.24%**

Table 3 provides a comparison of the volume run off conditions in the same manner as the peak run off Table 2 above. While it is an accepted practice for volume run off to increase while matching or reducing peak flow attenuation, the 2 year storm volume is a critical measure to ensure appropriate channel protection (CP). As seen in Table 3 below, the post development 2 year storm event volumes do not exceed pre development volume. Therefore, the downstream channel protection criteria has been met for the site discharge.

Table 3: Runoff Volume Comparison (cubic-feet)

		2-year	10-year	25-year	50-year
A	Pre	206,897	671,093	1,032,534	1,321,637
	Post	191,280	1,023,531	1,660,156	2,174,718
	Delta	**-7.55%**	**52.52%**	**60.78%**	**64.55%**
B	Pre	347,795	1,014,200	1,524,585	1,931,473
	Post	230,040	747,601	1,157,504	1,494,637
	Delta	**-33.86%**	**-26.29%**	**-24.08%**	**-22.62%**

3.6 Stormwater Management

The stormwater management system described in this reports meets or exceeds the applicable regulatory criteria. Site layout, stormwater management features, BMPs and watershed layout and LID practices have been carefully designed to provide an

environmentally sensitive and sustainable stormwater treatment train. The major aspects of these design will be discussed in this section.

The Low impact development (LID) practices used to in this design include minimized disturbance areas, minimized impervious areas, flow path practices, preservation of infiltratable soils, preservation of natural depression areas, and natural vegetation preservation.

Minimize Disturbance Areas

The site layout was chosen to incorporate multiple, large foot print developments while avoiding sensitive areas and limiting over all disturbance to areas such as wetlands and the shoreline protection buffer. Roadways, building pads, parking lots, truck courts, circulation routes and other impervious areas have been placed entirely out side of the shoreline protection buffer. Rather than place impervious aspects of the site layout with in sensitive areas the layouts were condensed. Shared, pervious treatment BMPs where designed and located in the buffer zone. Creating shared BMPs for the development allowed the removal of large foot print, lot specific BMPs in none sensitive areas, condensing the limits of disturbance and negative impacts to sensitive zones. Combined, shared treatment features allow for a larger volume to be treated over a smaller footprint and provided the opportunity to condense impervious surfaces to the center of the site and outside of the sensitive areas to a greater degree.

The improvements that have been incorporated in to the shore line buffer are pervious, seeded, stormwater treatment BMPs and shallow sloping embankments. This will allow any direct run off in the buffer to filter through large swaths of vegetation before entering the Merrimack River and for natural habitat growth within the buffer zone, including within the proposed treatment BMPs. Disturbance with in the buffer is located in areas that limit effects on natural vegetation growth close the river such as wooded areas and vegetation not previously maintained for the existing golf course.

Impervious placement of site features and disturbance to wetland buffers were avoided as much as practical. Direct wetland impacts are necessary to construct the development. Roadway layout and wetland crossings were located in the least intrusive locations while maintaining ecological and hydrologic connectivity, allowing for flows for designed storms to operate as under existing conditions. The direct wetland impacts were reduced as much as possible through the use of several retaining walls and steeper tie-in slopes.

Wetlands that have been filled in the location of the main building are considered of a lesser quality, all high quality wetlands were a priority in the site layout design.

Minimize Impervious Areas

Impervious areas were minimized as much as possible through reduced roadway width and pedestrian areas while incorporating many landscaped island and grassy areas to break up large impervious surfaces. Disconnected impervious areas do not lend themselves well to a development of this magnitude and its location in close proximity to wetlands and buffer areas. To ensure high levels of treatment, as much run off from impervious areas as practical is being captured and treated beyond the required volume. In many situations, run off will receive double the required treatment, passing through multiple BMPs. To further provided elevated treatment, roof run off will be treated the same as other impervious areas receiving full pretreatment before entering BMPs.

Flow Path Practices

Flow paths are ultimately directed to the same discharge locations as under the existing conditions. Run off from impervious areas are mainly captured by closed pipe, 4 foot deep sump networks before discharging to the treatment BMPs for the watershed. The western loading area and truck court of Lot C and the eastern loading area and truck court of Lot B sheet flow over a reduced width stone and vegetated filter strip to a channelized forebay rather than utilizing a traditional closed pipe network. This allows for some sediment and pollutant removal as it flows over the filter strips and down the channel.

Between the south easterly access drive and the emergency access road on Lot C, a grass swale will provide country drainage, via curb leak off, to a sediment forebay. To the south of Lot B between the proposed security fence and the bottom of the berm, a second grass channel is proposed to provide country drainage to catch basin locations. These swales will allow for filtration of flows that otherwise would not be provided.

While these site features do provide some level of water quality improvement and pollutant removal, they have not been fully designed per the NHDES Stormwater Manual and therefore, no treatment credit has been taken in the stormwater design calculations. The swales have been sized to convey the appropriate drainage flows for the design storm but will not be designed to provide WQV.

Preservation of Infiltrative Soils

Based on previously collected data, the soils on site have a relatively low capacity for infiltration. While the infiltration rate is low, measures were taken to provide protection to existing areas of infiltration. As previously discussed, the main impervious portions of the proposed condition are located in the center of the site, away from setback areas and wetlands. The center of the site is also the highest topographical location on the site under existing conditions. Currently, this directs run off to the east and west. Along the eastern side, wetlands occupy the low lying areas. To the west, many shallow ponding areas and depressions exist due to the rolling topography of the existing golf course. In the proposed condition, those topographic features will be left as is and a meadow mix planted. This will maintain the infiltrative capacity of undisturbed areas while locating majority of the site on the existing high points that currently deflect run off rather than infiltrate.

Areas that are proposed as infiltration basins have been call out in the soil erosion and sediment control phasing plans to be protected. They will be protected from construction activities and compaction. If construction run off is directed towards the basins, the temporary bottoms are to be constructed feet above the finished proposed infiltration basin floors so that all fines and potentially infiltration limiting materials that have accumulated will be dug out and clean soils exposed before planting and final stabilization.

Preservation of Naturally Depressed Areas,

Existing low points and depressions have been preserved in much the same manner as discussed above in the preservation of infiltrative soils sections. In addition to maintaining depressed topography in undisturbed locations, proposed BMP locations were sited to utilize natural depression and depression created from proposed roadway and site feature layouts. Infiltration basins A6-2 and A11-2 are placed in existing depressions where run off natural flows to. Exterior berms are proposed to be shaped and raised minimally to create a much deeper internal ponding areas without creating massive, newly formed outer embankments. Infiltration basin A1-2 is in a full cut condition and will utilize natural embankments of untouched soils and vegetation on the exterior. Infiltration basins B1-2 and B6-2 incorporate the tie in slopes of adjacent roadways and are located in current topographically depressed areas. Discharge locations from ponds where sited to daylight in low depressed areas with shallow slopes to provide as much over land, low flow before reaching the final discharge locations.

Where possible, existing ponds or golf course water hazards were maintained. Specifically, the water hazard pond to the north east corner of the site in watershed B-2, the pond in the south east corner of Lot C to the rear of the emergency access road in watershed B-8 and the depressed area to the south west corner of the site in watershed A-5.

Natural Vegetation Preservation

Throughout the site layout and grading feature design, natural vegetation was avoid as much as possible. As discussed in the Minimize Disturbance Areas sections, the wetlands and buffer areas, including associate vegetation in those areas were avoid as much as possible. Beyond that, all screening vegetation along the southern boarder will be maintained rather than impacted by the berm materials. Roughly a 50 foot wide strip of wooded areas will be maintained in this area. Where disturbance for the development is not necessary, natural vegetation such as trees and underlying growth will remain. Fairways and maintained grasses for golf course use will be replaced with a specifically designed meadow mix.

While the "Draft Chapter 290 of the Town of Hudson Zoning Ordinance" has not yet been adapted, the applicant has chosen to meet to the increased stormwater management standards outlined in that document.

3.7 Stormwater Treatment Measures

The proposed development includes many forms of stormwater treatment. This section will discuss how the proposed stormwater management system satisfies the treatment and groundwater recharge requirements of the governing authorities.

The Town of Hudson is currently in the processes of adopting more stringent stormwater treatment and management regulation to be in line with the New Hampshire Department of Environmental Services. While the revised regulations have not yet been adopted, the applicant has chosen to meet or exceed these more stringent regulations to ensure the proposed development will be consistent with the future growth and planning of the Town of Hudson. The applicant has received a Draft copy of the newly proposed Chapter 290 of the Town of Hudson Zoning Ordinance which states the following for new developments:

(1) ***New Development****: In addition to the Basic Stormwater Management Standards in Part A of this section, new development projects that will disturb 40,000 square feet or more shall also meet one of the following enhanced stormwater management requirements in accordance with EPA's MS4 Stormwater Permit requirements:*

(a) Incorporate stormwater treatment BMPs into the project design that are designed to retain the Water Quality Volume generated from the ***total post-construction impervious area to the maximum extent practicable and*** *calculated in accordance with N.H. Code Admin. R. Part Env-Wq 1504.10.,*

OR

(b) Incorporate stormwater treatment BMPs designed to remove 80% of the average annual Total Suspended Solids (TSS) load and 50%[1] of the average annual Total Phosphorus (TP) load generated from ***the total post-construction impervious area to the maximum extent practicable****.*

The proposed design will not only satisfy criteria 1(a) by sizing BMPs to treat water quality volumes from the total post-construction impervious areas to the maximum extent practicable calculated using the NHDES BMP worksheets but incorporates specific BMPs to remove in excess of 80% TSS removal and target phosphorous and nutrient removal.

<u>In-ground Infiltration Basins</u>

The main water quality, pollutant removal and groundwater recharge treatment is provided through several infiltration basin BMPs. All Infiltration basins conform to the New Hampshire Stormwater Manual criteria. Each basin has been designed to contain the 50 year storm with a minim of 1 foot of free board, maintain a minimum of 3 feet of separation from the bottom of the pond to the seasonal high groundwater table, provide a minimum of 25% pretreatment of the full water quality volume, a maximum of 4:1 side slopes, and incorporates access locations for maintenance. These basins are equipped with outlet control structures designed to retain, at a minimum, the required WQV below the lowest orifice. As a back-up measure, either a dry well or an underdrain system is incorporated to ensure the basins will not remain wet if infiltration rates fail in the distance future. Sediment forebays within the Infiltration basin have been excluded from the total retention capacity, infiltration rates, drawdown time, groundwater recharge and total water quality calculations. The forebays have also been sized to accommodate a minimum of 25% of the total WQV including the roof areas which are allowed to bypass forebays according to the New Hampshire Stormwater Manual.

The design infiltration rate of these basins in 1.5 inches per hour. Field measured rates from historic information ranged between 3 and 29 inches per hour. The applied factor of safety allows for a conservative approach to the basin sizing.

Dry Extended Detention Basin with Micropool

Watershed A1-3 is limited by a high ground water table. To accommodate this, dry extended detention basin with micro pool A1-3 was designed roughly 1 foot above groundwater. The pond is designed to accommodate the 50 year storm volume with a minimum of 1 foot of freeboard. The sediment forebay far exceeds the required 10% capacity of the BMP and includes roof area that is allowed to bypass the forebay. The forebay is excluded form WQv and storage capacity calculations. The micro pool has been designed to accommodate roughly 10% of the total WQV and 5% of the larger pool. A low flow, 4 inch outlet orifice with trash rack is placed at the same elevation of the larger pool bottom to ensure the basin fully drains. Sediment Forebays

Designated sediment forebays A1-4, B6-3 and B6-4 have been sized to accommodate a minimum of 25% of the calculated WQv, for the respective watershed, below the lowest orifice in the outlet control structure. A minimum of 1 foot of free board has been provided above the 50 year storm ponding elevation. Each of these features are proposed above the water table. While some benefit is expected, no WQv, GRv, or pollutant removal credit has been taken for these features. All water treatment for these watersheds are accounted for in oversized Infiltration basins that they directly discharge pretreated run off to.

Hydrodynamic Separator (Proprietary Flow-through Structure)

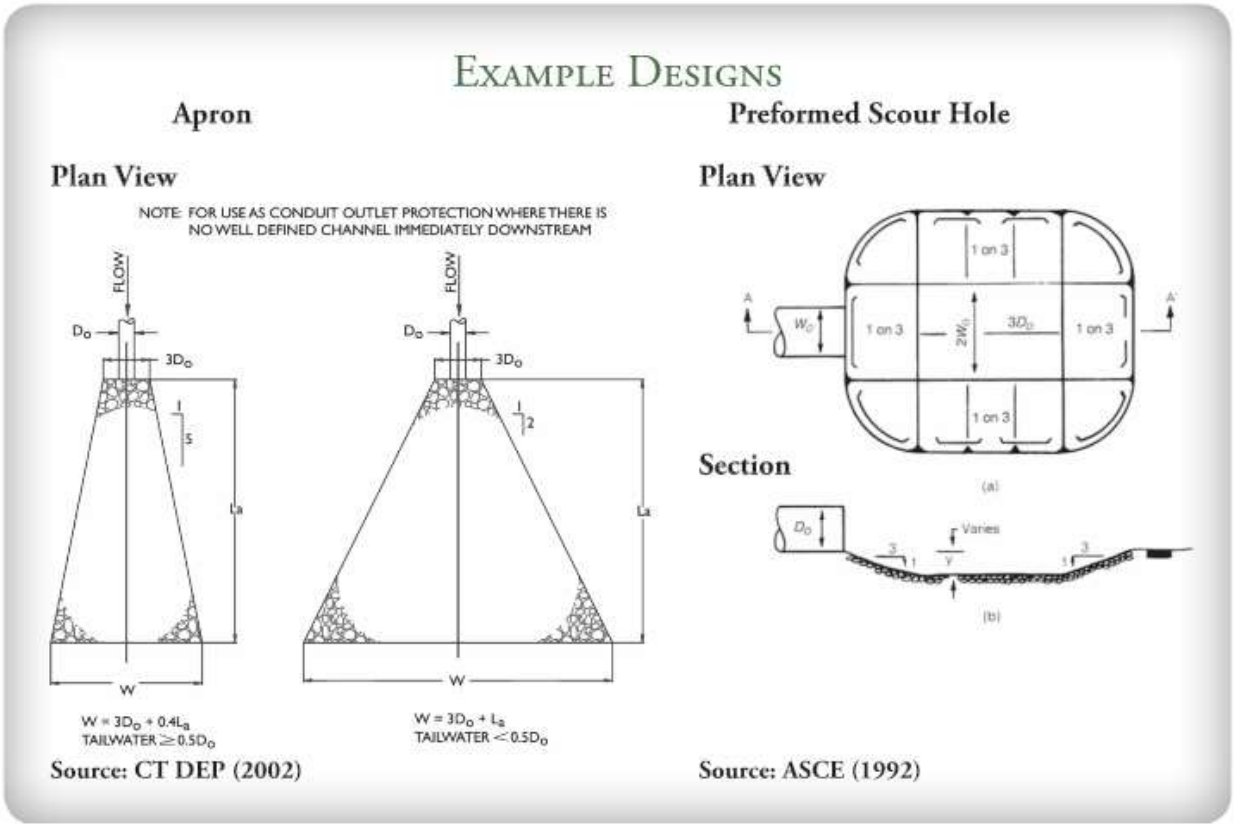
The hydro dynamic unit placed to treat the entire WQF for the right of way watershed A1-6 will achieve a TSS removal rate of 80% to OK-110 particle size. This far exceed the minimum pretreatment rate of 25% before discharging to a downstream, shared, infiltration basin to provide additional water quality treatment, flow attenuation, pollutant removal, and groundwater recharge.

Filter Strips and Grass Swales (Conveyance Swale)

While some filtering and treatment is expected, the filter strips and grass swales located on Lots B and C are not designed in full compliance with the New Hampshire stormwater manual and will not be included in calculations for stormwater treatment. These features have been designed to safely convey the design storm.

Preformed Scour Holes (Permanente Outlet Protection)

Rip Rap lined, preformed sour holes will be placed at all proposed pipe outfall locations on site, including outlet locations to treatment features and final site discharge locations with the exception of pipes installed within wetland system which provide ecological and hydrological connectivity. The preformed scour holes are sized based on pipe diameter and to the specifications outlined in the detail shown below taken from Volume 2 of the New Hampshire Stormwater Manual.



4 Foot Deep Sump Catch Basin

All catch basin structures will include a 4 foot deep sump. This allows for the sediment of suspended particulates has the run off flows to the discharge locations. Captured materials in the sump locations can be removed by vacuuming, avoiding degradation of downstream treatment features. While the conveyance systems do not meet all the criteria set forth in the New Hampshire Stormwater Manual for true deep sump catch basins, some treatment is expect. No water treatment has been taken credit for in the calculations.

Street Sweeping

A street sweeping schedule has been developed, in line with the New Hampshire Stormwater Manual design criteria, as part of the long term maintenance and operations plans for the site.

Snow and Ice Management

A snow and ice management plan has been developed, in line with the New Hampshire Stormwater Manual design criteria, as part of the long term maintenance and operations plans for the site.

Table 4 shown below, depicts each treatment feature in the proposed condition. The table displays the type of feature, TSS removal rate, associated watershed, the required and provided water quality volume associated with the watershed, the required and provided pretreatment volume of the feature and the groundwater recharge volume provided by the feature. Some features do not provide water quality volume or groundwater recharge. Other features on site have been oversized to accommodate the required volumes for the site as a whole.

Table 5 depicts a condensed summary of the water quality volume and groundwater recharge volumes required and provided for the site as a whole. The water quality volume has been separated into different tiers of TSS removal treatment. The proposed management system treats a substantially larger volume than required at the higher TSS removal rate of 90% then required under the soon to be adopted stormwater ordinance.

While the proposed design meets and exceeds the required treatment rates for the project as a whole and does not need to target nutrient and phosphorous removal, infiltration basins have a removal rate of 60% for nutrients and 65% for phosphorous.

Groundwater recharge volume for the site as a whole has been provided several times over the minimum requirement.

Table 4: BMP Sizing Summary

BMP Sizing Summary Chart
(CF Unless otherwise noted)

Stormwater Feature	TSS Removal	Watershed	WQv (Required)	WQv (Provided)	Pre-treatment (Required)	Pre-treatment (Provided)	GRv (Provided)
Infiltration Basin	90%	**A1-2**	46,593	251,423	11,648	12,114	251,423
Dry Ext. Det. Pond w/ Micro Pool	TBD	**A1-3**	38,607	143,256	3,861	11,500	-
Sediment Forebay	TBD	**A1-4**	99,918	-	24,980	31,389	-
Infiltration Basin	90%	**A1-5**	32,144	57,995	8,036	11,544	57,995
Sediment Forebay		A1-5A	-	-	545	3,480	-
Sediment Forebay		A1-5B	-	-	7,493	8,064	-
Hydrodynamic Unit	80%	**A1-6**	4.697 CFS	8.82 CFS	-	-	-
			or	or			
			16,533	30,000			-
Infiltration Basin	90%	**A6-2**	82,103	161,989	20,526	21,812	161,989
Infiltration Basin	90%	**A11-2**	109,751	151,585	27,438	29,250	151,585
Infiltration Basin	90%	**A11-3**	2,098	12,205	525	886	12,205
Infiltration Basin	90%	**B1-2**	40,685	97,159	10,171	13,380	97,159
Sediment Forebay	TBD	B1-2A	-	-	1,381	3,480	-
Sediment Forebay	TBD	B1-2B	-	-	8,842	9,900	-
Infiltration Basin	90%	**B6-2**	9,520	63,409	2,380	4,694	63,409
Sediment Forebay	TBD	B6-2A	-	-	818	3,222	-
Sediment Forebay	TBD	B6-2B	-	-	1,562	1,472	-
Sediment Forebay	TBD	**B6-3**	11,560	-	2,890	2,991	-
Sediment Forebay	TBD	**B6-4**	24,245	-	6,061	6,779	-

Table 5: Water Quality Volume and Groundwater Recharge Volume Summary

Water Quality Volume &
Groundwater Recharge Compliance (CF)

	WQv	In Excess of Required
Required	**513,757**	
90% TSS Provided	795,765	282,008
80% TSS Provided	30,000	30,000
TBD% TSS Dry Ext. Det.	143,256	143,256

	GRv	
Required	**130,733**	
Total Provided	795,765	665,032

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Groundwater elevation, depth to bedrock, and infiltration rates are based on the report titled "Preliminary Geotechnical Engineering Study, River Place, Hudson, New Hampshire" dated May 2006 and performed by GZA GeoEnviromental, Inc. This document can be found as an appendix to this report. Finding are based off of approximately 20 boring and 22 test pit locations spread throughout the entire property.

Groundwater was found to vary greatly with shallow seasonal high water elevations in the eastern region of the site near the major wetland systems and at relatively deep elevations along the western property line next to the Merrimack River.

Bedrock was encountered in 9 of the total boring and test pit locations. It was found to be relatively deep. It is not expected to have major impacts on the stormwater management design.

Infiltration rates were acquired from three boring location converted into monitoring wells. The three borings were space over the site to estimate levels of soil permeability for the site as a whole. Permeability rates were found to be 3.4, 3.4, and 29.8 inches per hour. To remain conservative in the design, the lowest observed rate was reduced by approximately half. A design infiltration rate of 1.5 inches per hours was used in all infiltration basins.

While this preliminary geotechnical engineering report does provide enough data to begin major site design and the permitting process, additional information is required to ensure the expected operation and compliance with design criteria set forth in this report. An additional geotechnical investigation will be underway in the near further to confirm the findings of this report and to collect more detailed information of the site characteristics. In addition to a more robust and complete geotechnical study, infiltration feasibility reports, in line with the New Hampshire Stormwater Manual, will be developed during construction. Many of the infiltration basins are located relatively deep below existing grade. Mass earthwork efforts during construction will allow access to the appropriate elevation for testing. Based on the preliminary geotechnical data and the conservative approach take toward the design of the stormwater management system, this office is confident the current design will be closely maintained with the additional data to be collected.

The receiving waters of run off from this site are not classified as impaired waterways. Limit Brook in the southeastern region of the site and the unnamed stream to the north eastern, Assessment Unit ID NHRIV700061206-23 and NHRIV700061206-13 respectively

of the New Hampshire's watershed report cards, are not classified as impaired waterways and convey water over a short distance directly to the Merrimack River. The Merrimack River, Assessment Unit ID NHRIV700061206-24 of the New Hampshire's watershed report cards, is listed under the Surface Water Impairments 2016 with 1 Mile Buffer" layer of the New Hampshire GIS database. Impairments listed as related to stormwater are Aluminum, Chlorophyll-a, and Escherichia coli. The specific BMPs chosen for this site include nutrient removal benefits and will help to protect against downstream receiving water pollutants.

4.0 STORM DRAINAGE COLLECTION SYSTEM DESIGN (SEE APPENDIX D FOR CALCULATIONS)

4.1 Design Criteria

The proposed subsurface storm drainage collection system is designed to convey the 25 -year design storm event to the discharge locations while maintaining an HGL below the proposed grade. This is in accordance with the Town of Hudson Engineering Department Engineering Guidelines & Typical Details.

4.2 Design Methodology

The storm drainage system was analyzed using the Rational Method for estimating runoff for a 25-year design storm event. The site was divided into subareas, each contributing runoff to an individual catch basin, inlet or roof drain. A value for area, time of concentration, and runoff coefficient was calculated for each contributing subarea.

Values of time of concentration were chosen based on land cover and flow path slope from the hydraulically most distant point in the subarea to the appropriate inlet. The average runoff coefficient, which is the ratio of peak runoff rate to the average rainfall rate for the period known as the time of concentration, was chosen using the following values:

CONDITION	C
Grass/Landscaping	0.30
Paved/Impervious	0.90

Rainfall intensities were taken from the intensity-duration-frequency curve for Hudson, New Hampshire as presented in National Weather Service (NOAA) Precipitation Frequency Data Server (PFDS). Storm drainage pipes were then sized based on calculated flows using Manning's Equation and were verified by solving for the hydraulic

grade line. Starting hydraulic grade lines for the pipe networks were set to the calculated maximum water elevations in the respective ponds for the 25-year-design storm event creating a conservative tail water condition.

4.3 Storm Drainage Collection Summary

The runoff from the development will be collected using a conventional roof drain, 4 foot deep sump catch basin, and manhole system. In cases of large storm events where overtopping occurs along the collection system, all flooding is directed away from buildings and critical areas to designated stormwater attenuation features or safely conveyed offsite via overland flow.

Run off from the right of way has been analysis in a similar fashion. Calculations for pipe runs and sixing can be found at end of Appendix D for the right of way. Please refer to the subdivision design set entitled "Hudson Logistic Center prepared for Langan" dated 21 April, 202 by Hayner and Swanson, Inc.

5.0 OFF-SITE ANALYSIS

As discussed above, the site is located in the sub-watershed Limit Brook – Merrimack River. After treatment and attenuation, analysis point B enters either the unnamed stream or Limit Brook and is conveyed over a short distance before discharging directly to the Merrimack River. After treatment and attenuation, analysis point A discharges directly to the Merrimack River. The Merrimack River continues in a southerly direction for roughly three quarters of a mile before crossing the New Hampshire Massachusetts boarder.

Run off will be treated from the vast majority of proposed imperious surfaces before reaching the final discharge locations. Through the above described treatment method, downstream receiving waters are well protected. Sedimentation and erosion are mitigated through TSS removal in BMPs and attenuated flows matching or reducing peak flows from the existing condition. All discharge locations are directed over preformed scour holes to further dissipate flow velocities. Shallow slopes have been designed to ensure that erodible soils on site will not run off of planted slopes. The water quality provided by the proposed system is well in excess of the soon to be adopted Town of Hudson stormwater ordinance and BMPs have been specifically selected to target nutrient and phosphorus removal.

Should a spill occur on site at one of the facilities, the operations and maintenance manual addresses the method to safely clean and disposes of any harmful materials. If a spill

occurs within the right of way and goes unnoticed, the runoff will pass through a hydrodynamic unit rated for separation and storage of oils and other floatable debris. The hydrodynamic unit will be cleaned out according to the manufacture's operation and maintenance procedure and materials disposed of in a proper manner at that point.

The receiving waters will have the capacity to handle run off for the post development condition. All post construction peak flow rate have been reduced which will lessen the needed capacity of the receiving waters during high run off periods. Analysis point B reduces volume for all design storm which will reduce the need for capacity of the receiving water at all times. Increased volumes discharge directly to the Merrimack River are insignificant to the overall capacity of the river and will not affect the current state.

6.0 CONCLUSION

The proposed stormwater management system has been designed in accordance with the Town of Hudson current and soon to be adopted requirements, the New Hampshire Stormwater Manual, and the New Hampshire Department of Environmental Services. The system incorporates elevated levels of stormwater quality, maintains or decreases the existing peak rate of runoff for all storm events analyzed, and provides above the required groundwater recharge volumes.

It is the opinion of this office and the findings of this report that the proposed stormwater management system, as designed, will effectively manage quality and quantity of stormwater runoff for the proposed development.

7.0 REFERENCES

1. Town of Hudson Zoning Ordinance Adopted 3-8-1994

2. Town of Hudson Stormwater Management Program, June 2019

3. Town of Hudson Engineering Department Engineering Technical Guidelines and Typical Details, August 2001 Revised February 2020

4. *DRAFT* Chapter 290 Stormwater Management, Town of Hudson Zoning Ordinance, 02-03-2020

5. New Hampshire Stormwater Manual, Vol1, 2, 3, December 2020.

6. New Hampshire Code of Administrative Rules; Env-Wq 1500

7. New Hampshire Manual on Drainage Design for Highways

8. Precipitation Frequency Data Server (PFDS) National Weather Service (NOAA)

9. USGS Web Soil Survey, United States National Resources Conservation Service, 2016

10. Urban Hydrology for Small Watersheds, Technical Release 55, United States Department of Agriculture, Soil Conservation Service, June 1986.

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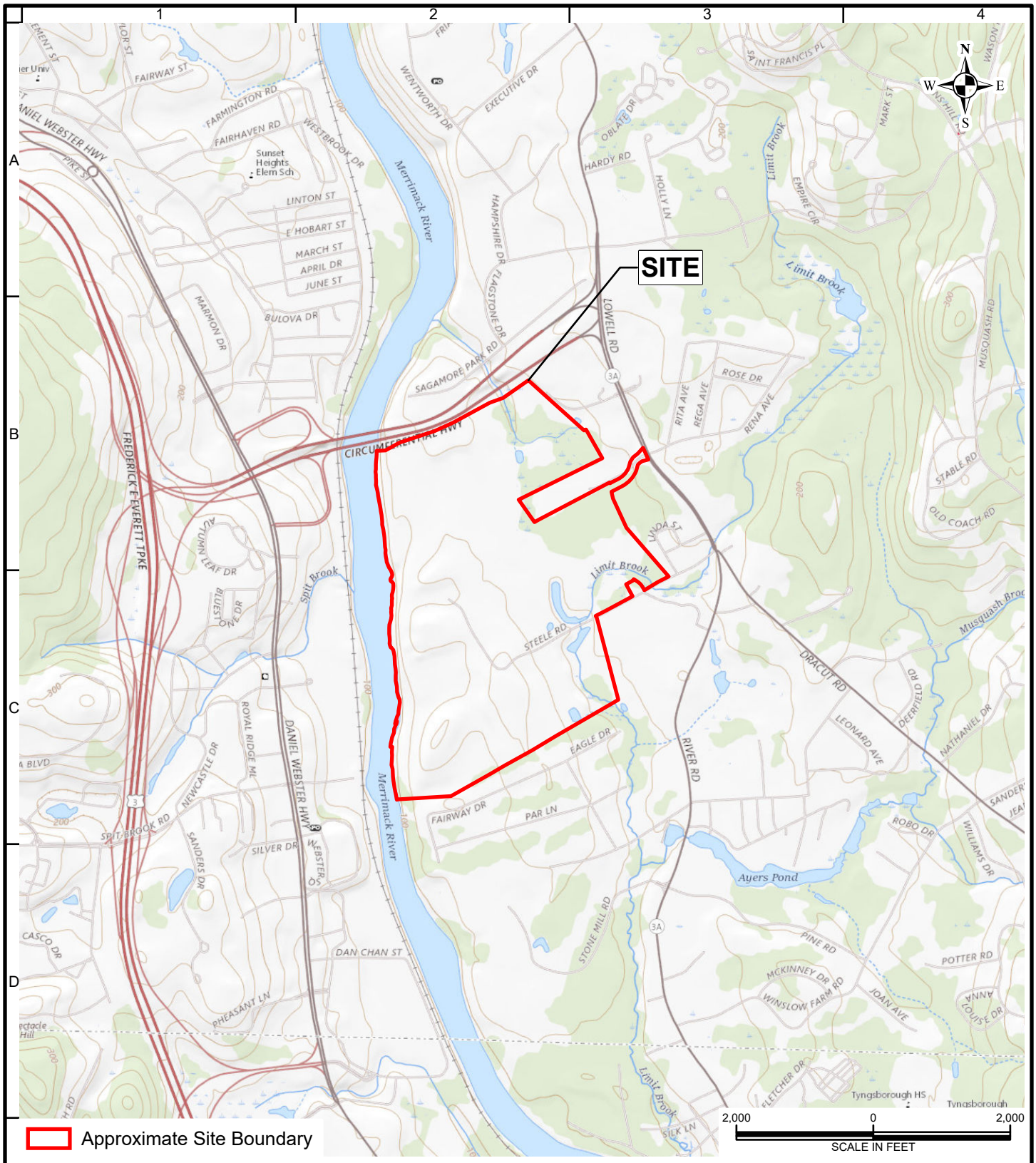

Notes:
Basemap provided by United States Geological Survey. Quadrangle: Nashua South, NH, dated: 2018.

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Notes:
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HILLWOOD HUDSON HILLSBOROUGH COUNTY NEW HAMPSHIRE	**AERIAL MAP**	151010101	2
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		Scale 1" = 1,000'	
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		Submission Date	Sheet 2 of 5

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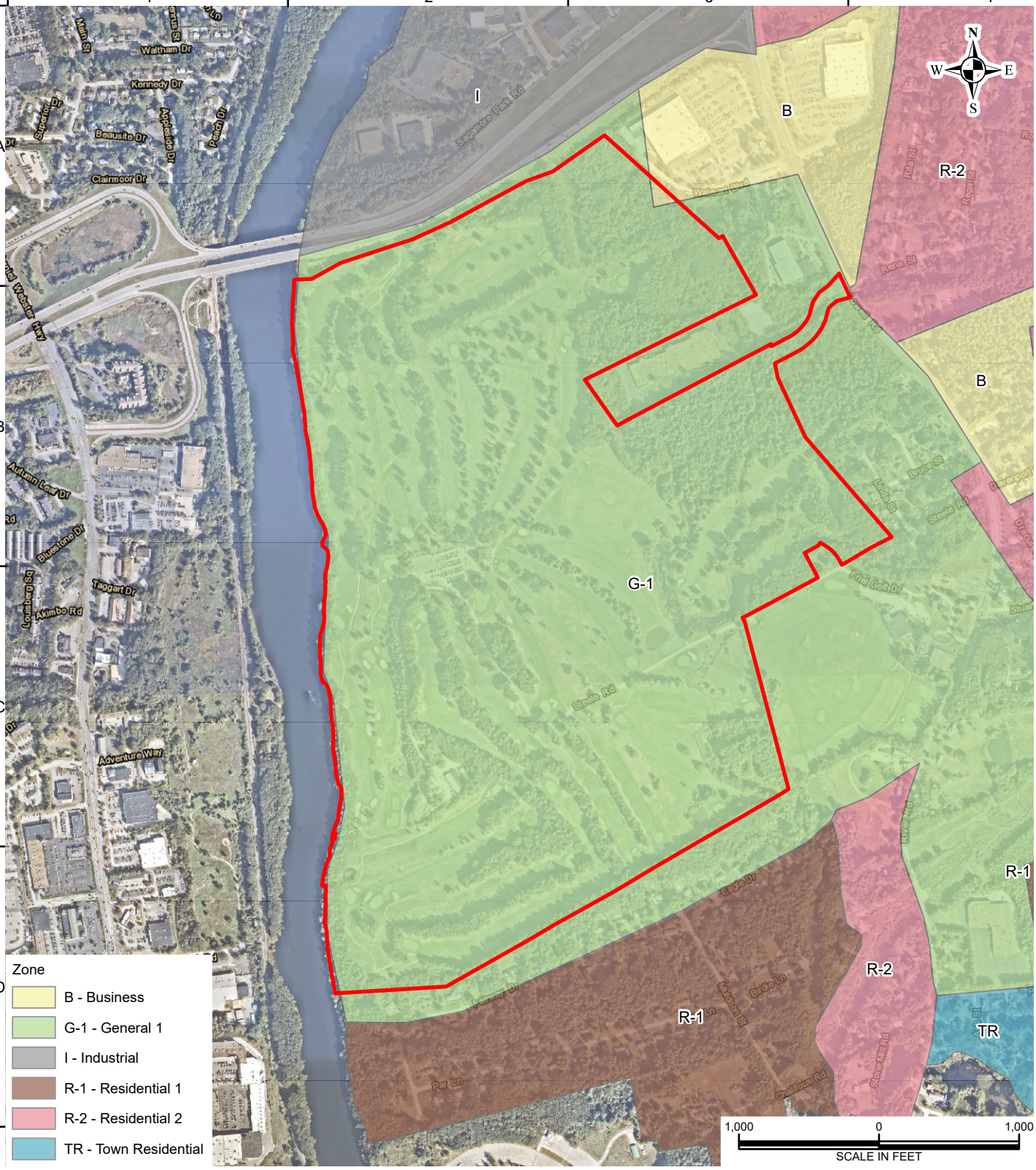

Notes:
Zoning data provided by the Town of Hudson.

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Drawing Title
ZONING MAP

Project No. 151010101	Figure 3
Date 05/18/2020	
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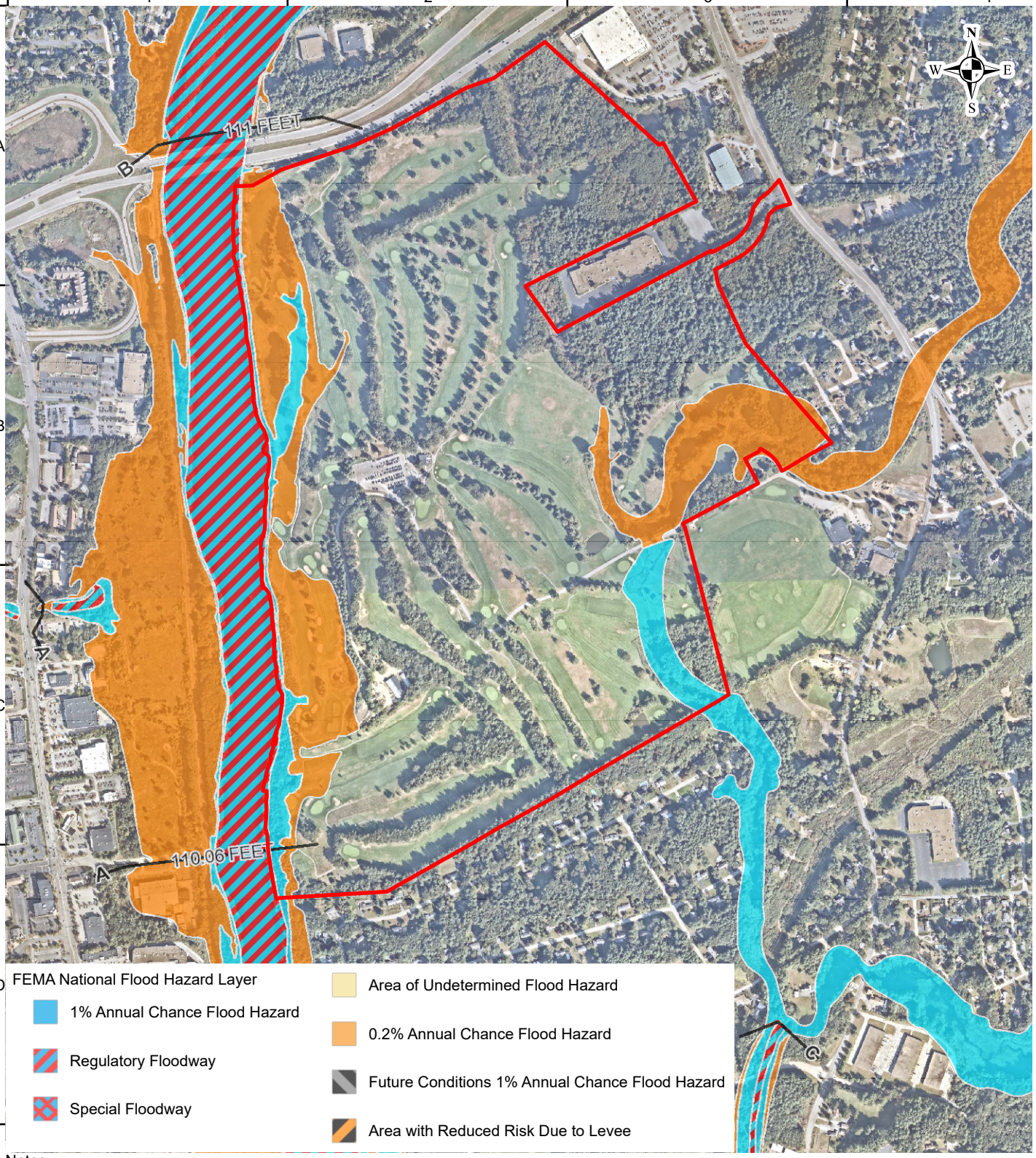

Notes:
Basemap provided by FEMA, Panels 33011C0656D and 25017C0108E,
Dated September 25, 2009 and June 4, 2010.

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EFFECTIVE FEMA FLOOD MAP

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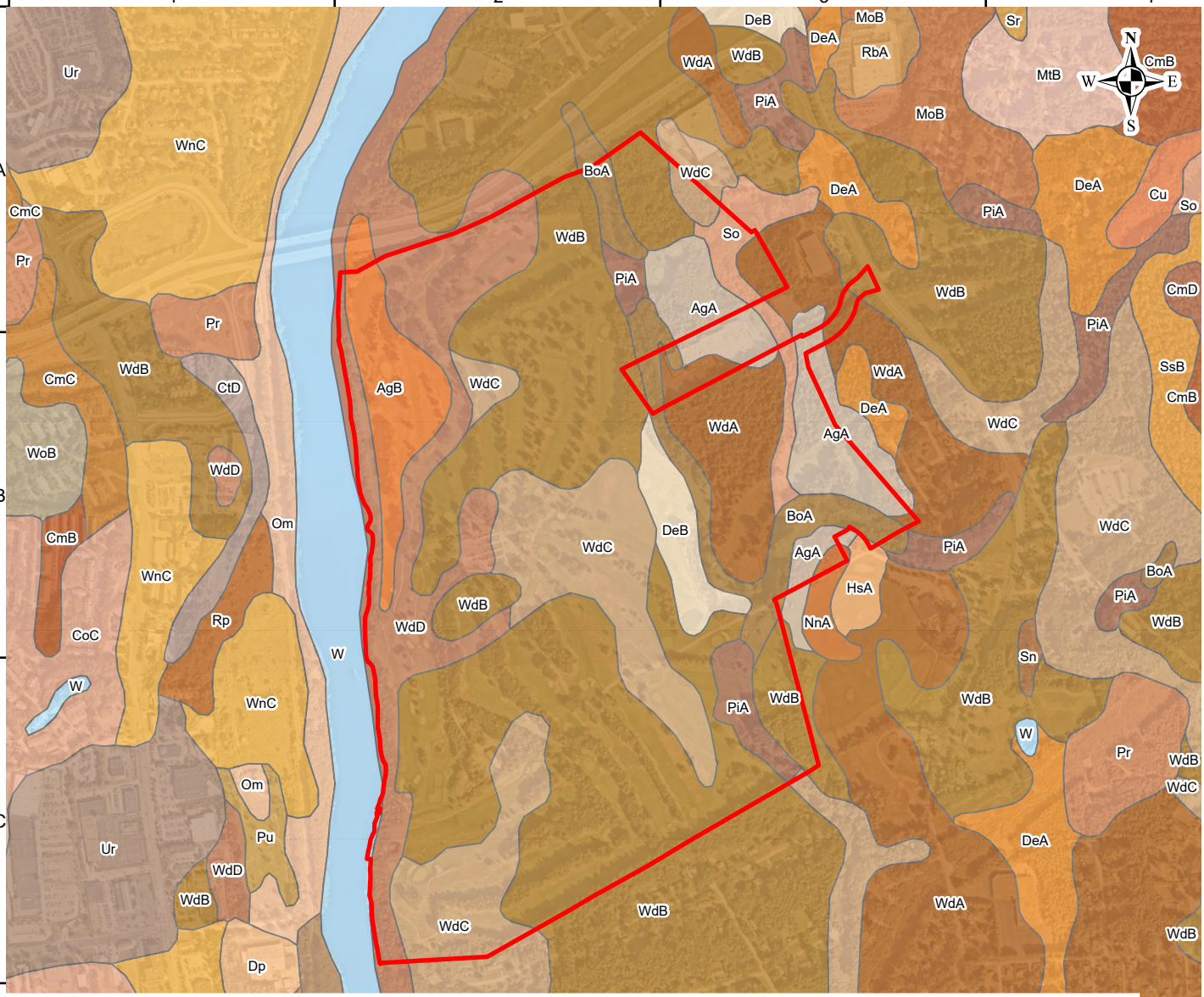

Soil Type

- AgA - Agawam fine sandy loam, 0 to 3 percent slopes
- AgB - Agawam fine sandy loam, 3 to 8 percent slopes
- BoA - Borohemists, nearly level
- CaB - Canton fine sandy loam, 0 to 8 percent slopes
- CmB - Canton fine sandy loam, 0 to 8 percent slopes, very stony
- CmC - Canton fine sandy loam, 8 to 15 percent slopes, very stony
- CmD - Canton fine sandy loam, 15 to 25 percent slopes, very stony
- CoC - Canton-Urban land complex, 3 to 15 percent slopes
- CtD - Chatfield-Hollis-Rock outcrop complex, 15 to 35 percent slopes
- Cu - Swansea mucky peat, 0 to 2 percent slopes
- DeA - Deerfield loamy fine sand, 0 to 3 percent slopes
- DeB - Deerfield loamy fine sand, 3 to 8 percent slopes
- Dp - Dumps
- HsA - Hinckley loamy sand, 0 to 3 percent slopes
- MoB - Montauk fine sandy loam, 3 to 8 percent slopes
- MtB - Montauk fine sandy loam, 0 to 8 percent slopes, very stony
- NnA - Ninigret fine sandy loam, 0 to 3 percent slopes
- Om - Occum fine sandy loam, high bottom
- PiA - Pipestone loamy sand, 0 to 3 percent slopes
- Pr - Pits, gravel
- Pu - Pootatuck fine sandy loam
- RbA - Ridgebury fine sandy loam, 0 to 3 percent slopes
- Rp - Rippowam fine sandy loam
- Sn - Saugatuck loamy sand
- So - Scarboro mucky fine sandy loam, 0 to 3 percent slopes
- Sr - Scarboro stony mucky loamy sand
- SsB - Scituate fine sandy loam, 3 to 8 percent slopes
- Su - Suncook loamy fine sand
- UdA - Udipsamments, nearly level
- Ur - Urban land
- W - Water (less than 40 acres)
- WdA - Windsor loamy sand, 0 to 3 percent slopes
- WdB - Windsor loamy sand, 3 to 8 percent slopes
- WdC - Windsor loamy sand, 8 to 15 percent slopes
- WdD - Windsor loamy sand, 15 to 35 percent slopes
- WnC - Windsor-Urban land complex, 3 to 15 percent slopes
- WoB - Woodbridge fine sandy loam, 3 to 8 percent slopes

Notes:
Soils data downloaded from the USDA Soil Survey Geographic (SSURGO) database on 3/25/2020.

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NRCS SOILS MAP

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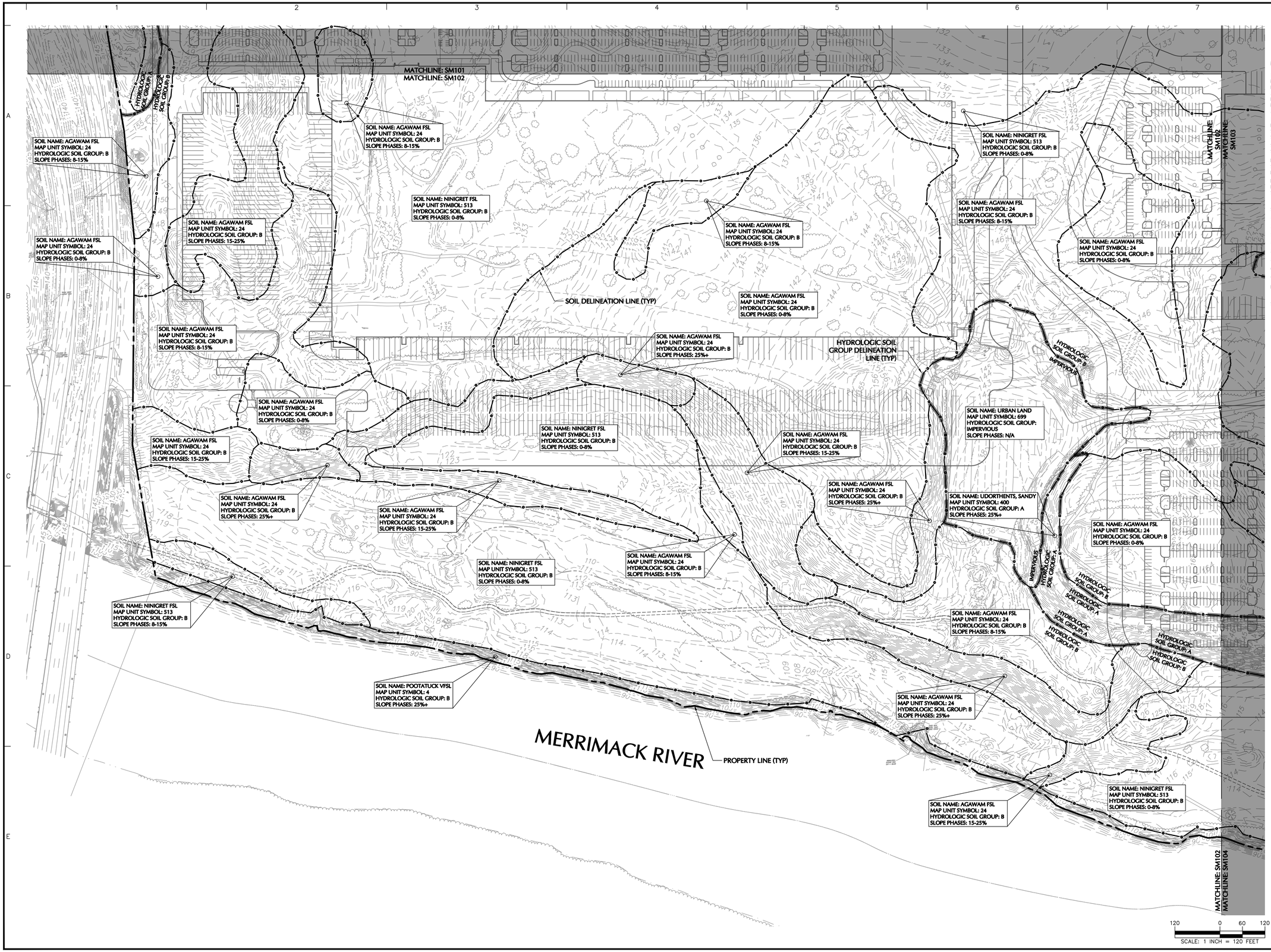

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SOILS WERE IDENTIFIED WITH THE NEW HAMPSHIRE STATE-WIDE NUMERICAL SOILS LEGEND, USDA NRCS, DURHAM, NH. ISSUE # 10, JANUARY 2011.

HIGH INTENSITY SOIL SURVEY (HISS) CONVERSION IS DETERMINED BY THE SOIL PROPERTIES IDENTIFIED IN "HIGH INTENSITY SOIL MAPPING STANDARD FOR NH", SSSNNE SPECIAL PUBLICATION NUMBER 1, DECEMBER, 2017.

HYDROLOGIC SOIL GROUPS ARE DETERMINED FROM SSSNNE SPECIAL PUBLICATION NUMBER 5, "KSAT VALUES FOR NEW HAMPSHIRE SOILS", SEPTEMBER, 2009.

SOIL MAP SYMBOL	SOIL MAP UNIT NAME	HISS CONVERSION	HSG
4	POOTATUCK VFSL	371	B
24	AGAWAM FSL	211	B
115	SCARBORO MUCK	611	D
400	UDORTHENTS, SANDY	211	A
513	NINIGRET FSL	311	B
540	RAYPOL LFS	511	D
699	URBAN LAND	N/A	IMPERVIOUS
917	NINIGRET VARIANT (SWPD)	411	C
PONDS	OPEN WATER	N/A	N/A

SLOPE PHASES: 0-8% = B 8-15% = C 15-25% = D 25%+ = E

LEGEND	
PROPERTY LINE	
SOIL DELINEATION LINE	
HYDROLOGIC SOIL GROUP DELINEATION LINE	

Date	Description	No.
Revisions		

STATE OF NEW HAMPSHIRE BRENDAN N. QUIGLEY 5-15-20 No. 249 CERTIFIED WETLAND SCIENTIST

Signature Date

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MAP No. 239, LOT No. 1

HUDSON NEW HAMPSHIRE

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SITE SPECIFIC SOIL MAP PLAN II

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Date: 05-12-2020	
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THE SITE SPECIFIC SOIL SURVEY WAS PRODUCED MAY 4, 2020, AND WAS PREPARED BY JAMES P. GOVE, CSS # 004, GOVE ENVIRONMENTAL SERVICES, INC. THE LOCATION OF THE SOIL SURVEY IS AT LOWELL AND STEELE ROADS IN HUDSON, NH.

SOILS WERE IDENTIFIED WITH THE NEW HAMPSHIRE STATE-WIDE NUMERICAL SOILS LEGEND, USDA NRCS, DURHAM, NH. ISSUE # 10, JANUARY 2011.

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540	RAYPOL LFS	511	D
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917	NINIGRET VARIANT (SWPD)	411	C
PONDS	OPEN WATER	N/A	N/A

SLOPE PHASES: 0-8% = B 8-15% = C 15-25% = D 25%+ = E

LEGEND	
PROPERTY LINE	
SOIL DELINEATION LINE	
HYDROLOGIC SOIL GROUP DELINEATION LINE	

Date	Description	No.
Revisions		

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MAP No. 239, LOT No. 1

HUDSON NEW HAMPSHIRE

Drawing Title

SITE SPECIFIC SOIL MAP PLAN III

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151010101	SSSM103
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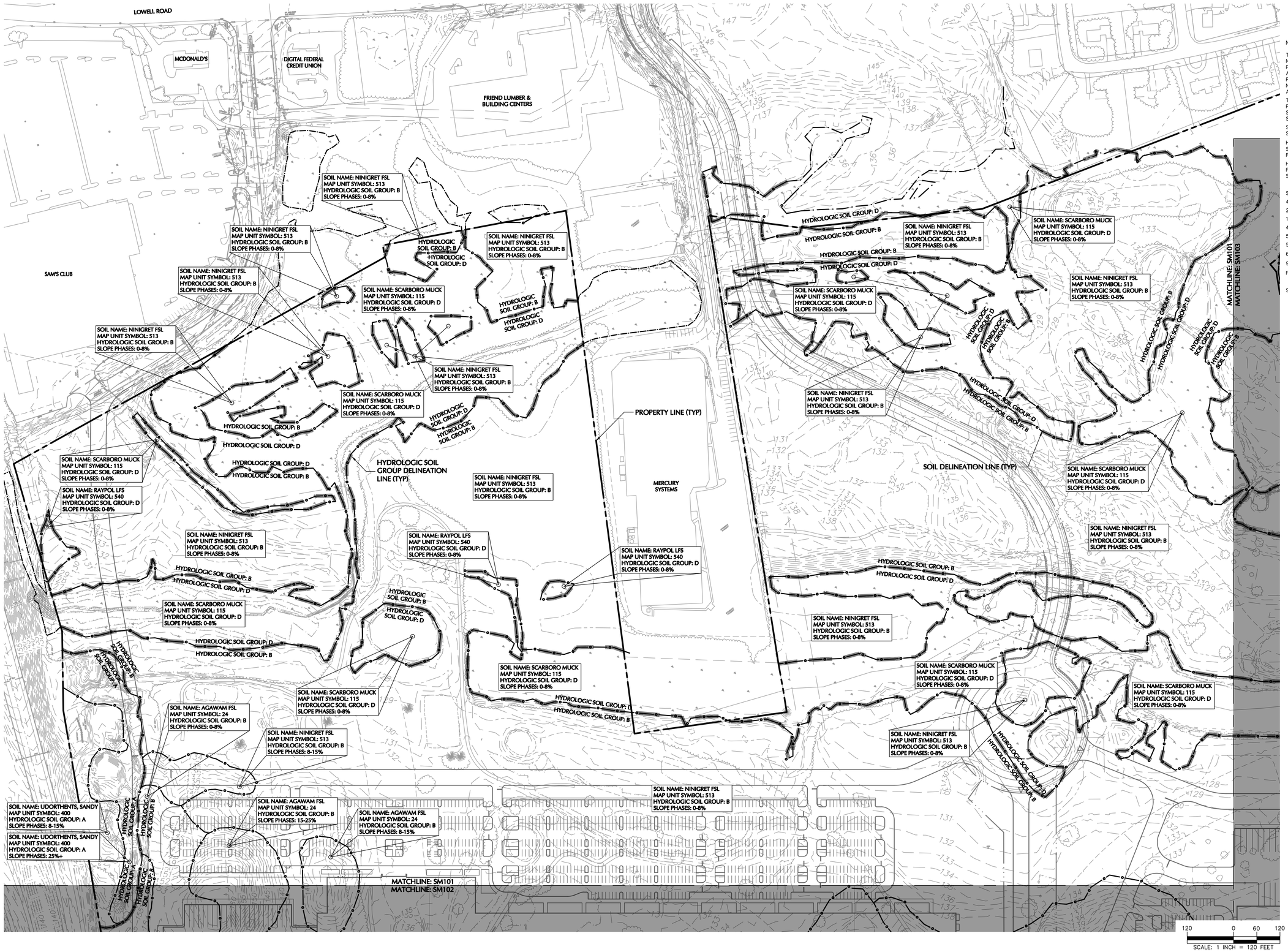

NOTE:

THIS MAP PRODUCT IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOIL SURVEY. IT IS A SPECIAL PURPOSE PRODUCT, INTENDED FOR INFILTRATION REQUIREMENTS BY THE NH DES ALTERATION OF TERRAIN BUREAU. IT WAS PRODUCED BY A PROFESSIONAL SOIL SCIENTIST, AND IS NOT A PRODUCT OF THE USDA NATURAL RESOURCES CONSERVATION SERVICE. THERE IS A REPORT THAT ACCOMPANIES THIS MAP.

THE SITE SPECIFIC SOIL SURVEY WAS PRODUCED MAY 4, 2020, AND WAS PREPARED BY JAMES P. GOVE, CSS # 004, GOVE ENVIRONMENTAL SERVICES, INC. THE LOCATION OF THE SOIL SURVEY IS AT LOWELL AND STEELE ROADS IN HUDSON, NH.

SOILS WERE IDENTIFIED WITH THE NEW HAMPSHIRE STATE-WIDE NUMERICAL SOILS LEGEND, USDA NRCS, DURHAM, NH. ISSUE # 10, JANUARY 2011.

HIGH INTENSITY SOIL SURVEY (HISS) CONVERSION IS DETERMINED BY THE SOIL PROPERTIES IDENTIFIED IN "HIGH INTENSITY SOIL MAPPING STANDARD FOR NH", SSSNNE SPECIAL PUBLICATION NUMBER 1, DECEMBER, 2017.

HYDROLOGIC SOIL GROUPS ARE DETERMINED FROM SSSNNE SPECIAL PUBLICATION NUMBER 5, "KSAT VALUES FOR NEW HAMPSHIRE SOILS", SEPTEMBER, 2009.

SOIL MAP SYMBOL	SOIL MAP UNIT NAME	HISS CONVERSION	HSG
4	POOTATUCK VFSL	371	B
24	AGAWAM FSL	211	B
115	SCARBORO MUCK	611	D
400	UDORTHENTS, SANDY	211	A
513	NINIGRET FSL	311	B
540	RAYPOL LFS	511	D
699	URBAN LAND	N/A	IMPERVIOUS
917	NINIGRET VARIANT (SWPD)	411	C
PONDS	OPEN WATER	N/A	N/A

SLOPE PHASES: 0-8% = B 8-15% = C 15-25% = D 25%+ = E

LEGEND	
PROPERTY LINE	
SOIL DELINEATION LINE	
HYDROLOGIC SOIL GROUP DELINEATION LINE	

Date	Description	No.
Revisions		

STATE OF NEW HAMPSHIRE
BRENDAN N. QUIGLEY
No. 249
CERTIFIED WETLAND SCIENTIST
5-15-20

Signature Date

LANGAN

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Boston, MA 02199

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Project

PROJECT HUDSON

MAP No. 239, LOT No. 1

HUDSON NEW HAMPSHIRE

Drawing Title

SITE SPECIFIC SOIL MAP PLAN I

Project No.	Drawing No.
151010101	SSSM101
Date: 05-12-2020	
Drawn By: CLR	
Checked By: NLK	

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Project No. 151010101

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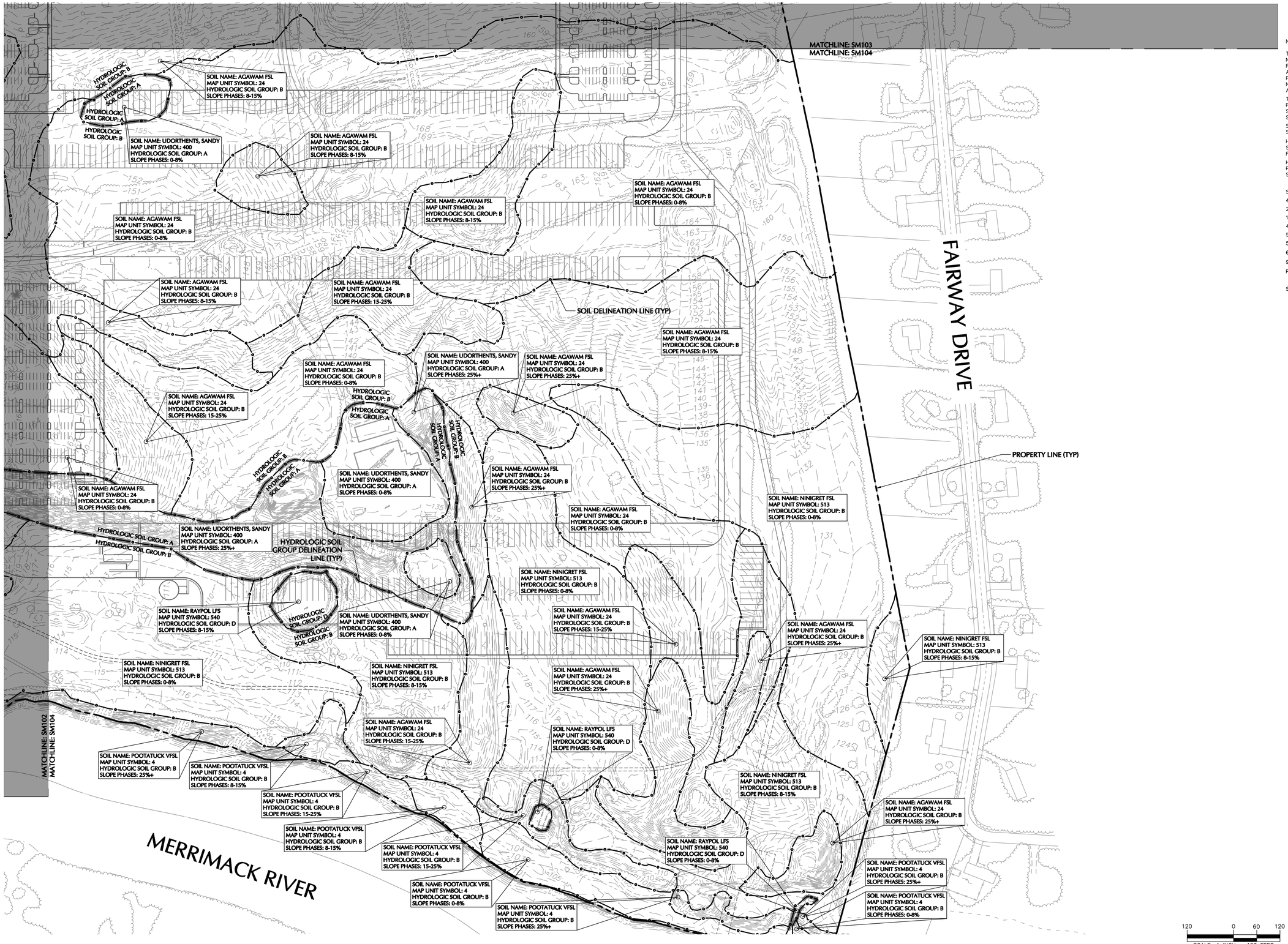

NOTE:

THIS MAP PRODUCT IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOIL SURVEY. IT IS A SPECIAL PURPOSE PRODUCT, INTENDED FOR INFILTRATION REQUIREMENTS BY THE NH DES ALTERATION OF TERRAIN BUREAU. IT WAS PRODUCED BY A PROFESSIONAL SOIL SCIENTIST, AND IS NOT A PRODUCT OF THE USDA NATURAL RESOURCES CONSERVATION SERVICE. THERE IS A REPORT THAT ACCOMPANIES THIS MAP.

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540	RAYPOL LFS	511	D
699	URBAN LAND	N/A	IMPERVIOUS
917	NINIGRET VARIANT (SWPD)	411	C
PONDS	OPEN WATER	N/A	N/A

SLOPE PHASES: 0-8% = B 8-15% = C 15-25% = D 25%+ = E

LEGEND	
PROPERTY LINE	
SOIL DELINEATION LINE	
HYDROLOGIC SOIL GROUP DELINEATION LINE	

Date	Description	No.
Revisions		

STATE OF NEW HAMPSHIRE BRENDAN J. QUIGLEY No. 249 CERTIFIED WETLAND SCIENTIST 5-15-20

Signature Date

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Project

PROJECT HUDSON

MAP No. 239, LOT No. 1

HUDSON NEW HAMPSHIRE

Drawing Title

SITE SPECIFIC SOIL MAP PLAN IV

Project No.	Drawing No.
151010101	SSSM104
Date: 05-12-2020	
Drawn By: CLR	
Checked By: NLK	

120 0 60 120
SCALE: 1 INCH = 120 FEET

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Project No. 151010101

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LEGEND	
PROPERTY LINE	
HYDROLOGIC SOIL GROUP DELINEATION LINE	
ON-SITE WETLAND LIMITS	
WATERSHED BOUNDARY	
TIME OF CONCENTRATION LINE	
50' WETLAND ZONE OF NONINTERFERENCE	

Date	Description	No.
Revisions		

Signature Date

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Project

PROJECT HUDSON

MAP No. 239, LOT No. 1

HUDSON NEW HAMPSHIRE

Drawing Title

EXISTING WATERSHED MAP OVERALL PLAN

Project No. 151010101

Date 05/21/2020

Drawn By RJS

Checked By NLK

Drawing No. EXWS 100

Project No. 151010101

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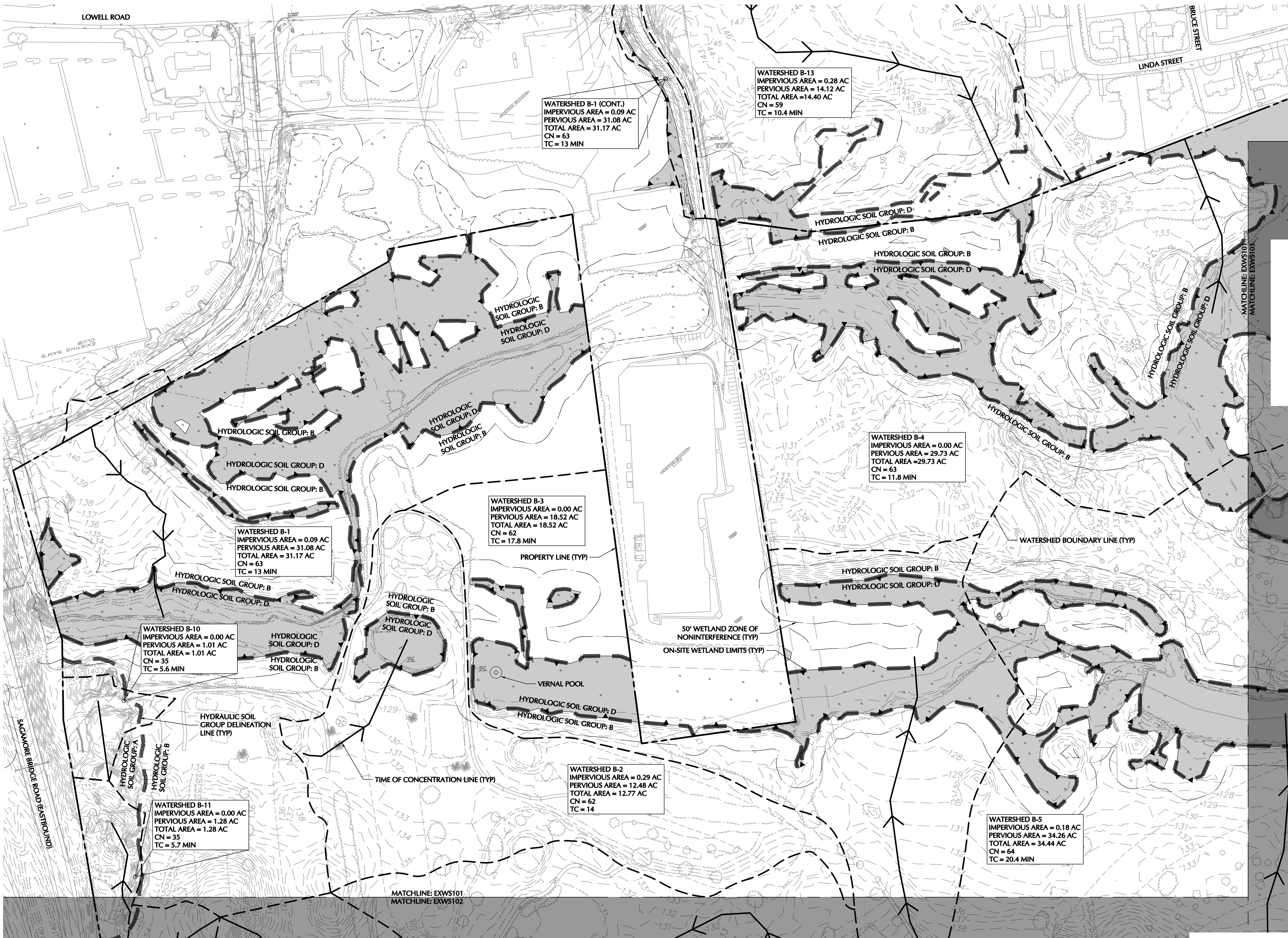

LEGEND	
PROPERTY LINE	
HYDROLOGIC SOIL GROUP DELINEATION LINE	
ON-SITE WETLAND LIMITS	
WATERSHED BOUNDARY	
TIME OF CONCENTRATION LINE	
50' WETLAND ZONE OF NONINTERFERENCE	

Date	Description	No.

Revisions

Signature Date

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Project

PROJECT HUDSON

MAP No. 239, LOT No. 1

HUDSON NEW HAMPSHIRE

Drawing Title

EXISTING WATERSHED MAP PLAN I

Project No. 151010101

Date 05/21/2020

Drawn By RJS

Checked By NLK

Drawing No. EXWS 101

LANGAN

Project No. 151010101

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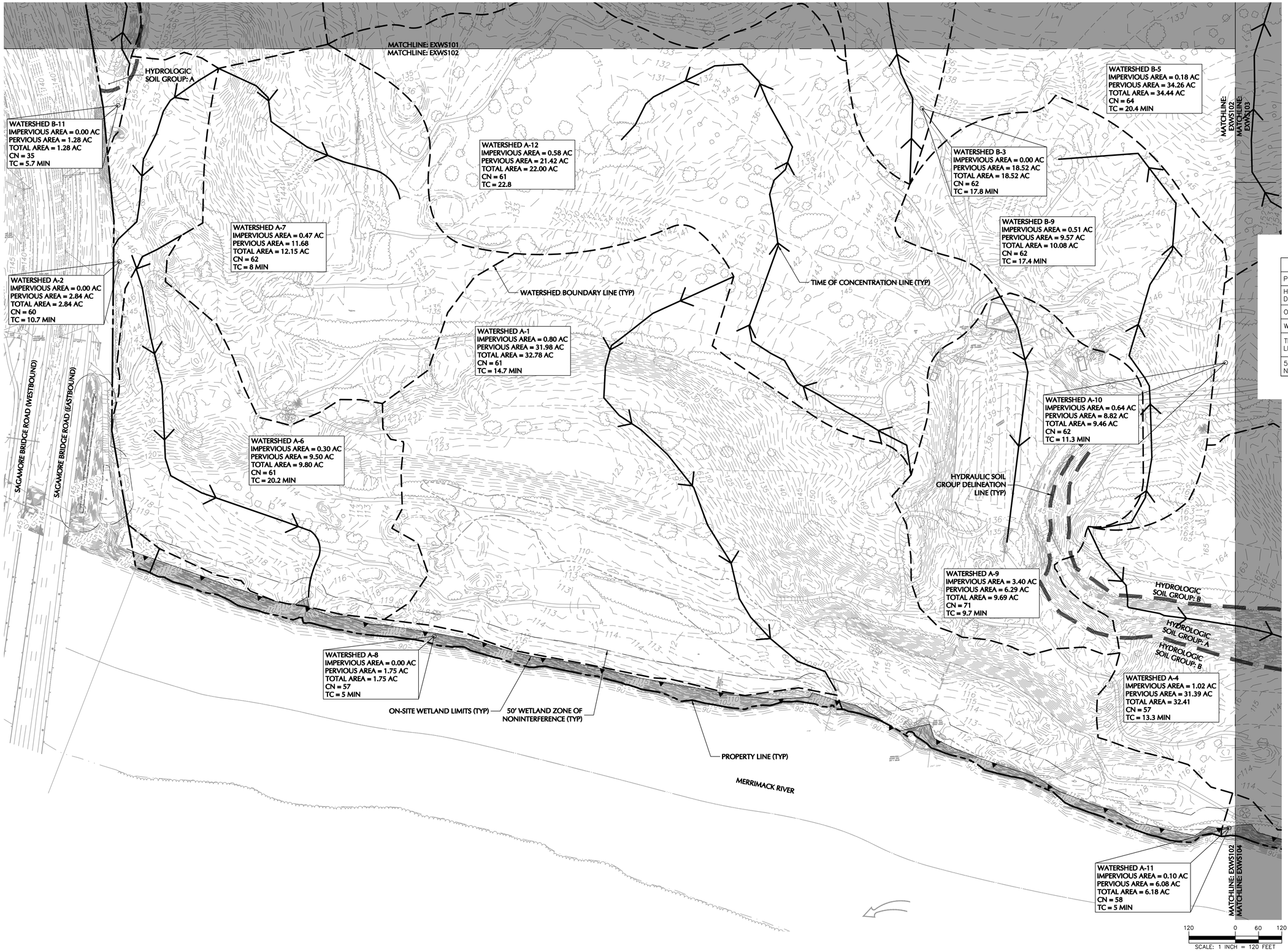
Date: 5/18/2020 Time: 10:07 User: rschlichting Style Table: Langan.stb Layout: EXWS 101 Document Code: 151010101-0203-CG103-0107



LEGEND	
PROPERTY LINE	
HYDROLOGIC SOIL GROUP DELINEATION LINE	
ON-SITE WETLAND LIMITS	
WATERSHED BOUNDARY	
TIME OF CONCENTRATION LINE	
50' WETLAND ZONE OF NONINTERFERENCE	

Date	Description	No.
Revisions		

Signature Date

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Project

PROJECT HUDSON

MAP No. 239, LOT No. 1

HUDSON NEW HAMPSHIRE

Drawing Title

EXISTING WATERSHED MAP PLAN II

Project No.	Drawing No.
151010101	EXWS102
Date: 05/21/2020	
Drawn By: RJS	
Checked By: NLK	

LANGAN

Project No. 151010101

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LEGEND	
PROPERTY LINE	
HYDROLOGIC SOIL GROUP DELINEATION LINE	
ON-SITE WETLAND LIMITS	
WATERSHED BOUNDARY	
TIME OF CONCENTRATION LINE	
50' WETLAND ZONE OF NONINTERFERENCE	

Date	Description	No.
Revisions		

Signature Date

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Project

PROJECT HUDSON

MAP No. 239, LOT No. 1

HUDSON NEW HAMPSHIRE

Drawing Title

EXISTING WATERSHED MAP PLAN III

Project No.	Drawing No.
151010101	EXWS103
Date 05/21/2020	
Drawn By RJS	
Checked By NLK	

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Project No. 151010101

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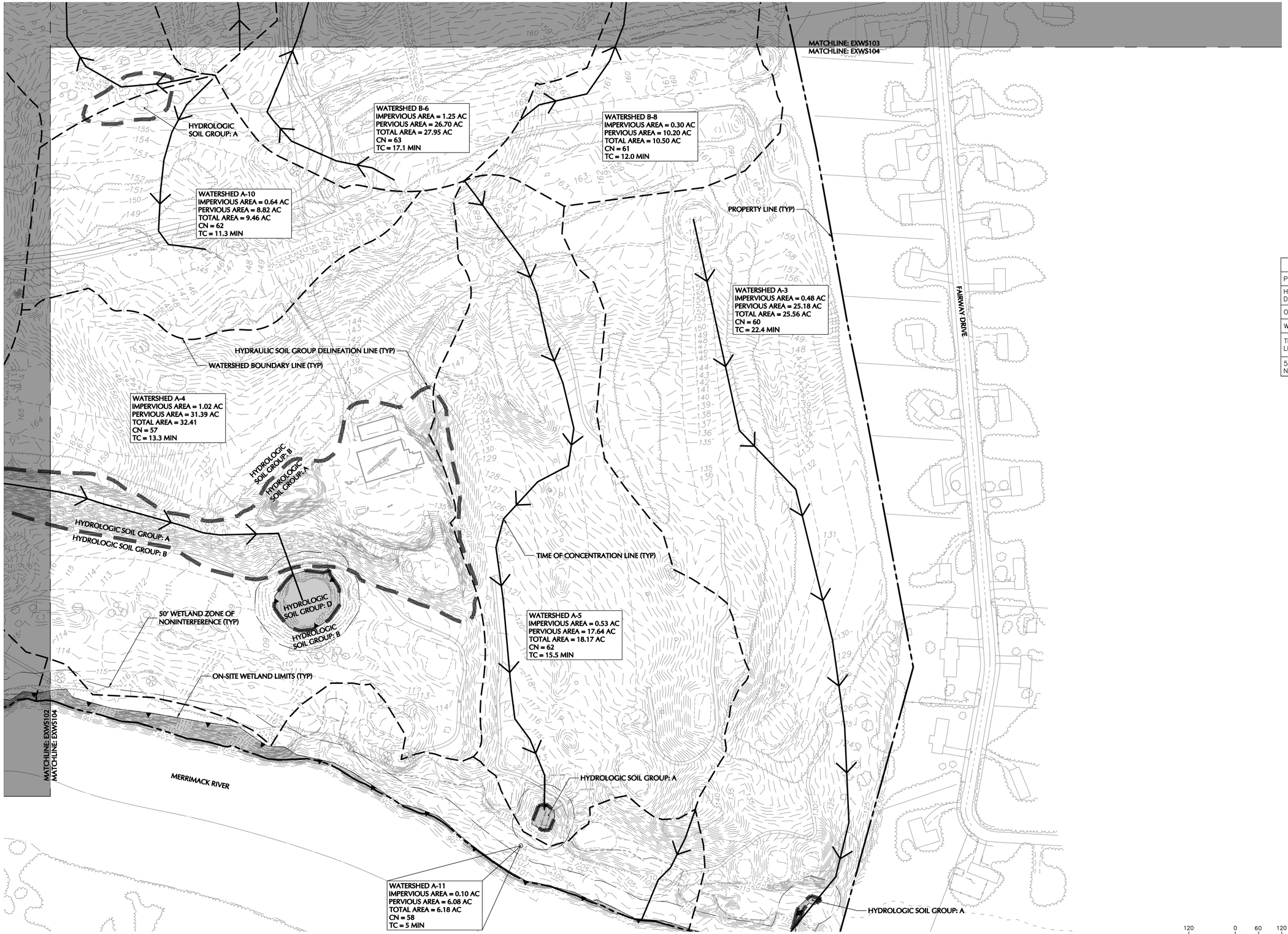
Date: 5/18/2020 Time: 10:08 User: rschlichting Style Table: Langan.stb Layout: EXWS 103 Document Code: 151010101-0203-CG103-0110



LEGEND	
PROPERTY LINE	
HYDROLOGIC SOIL GROUP DELINEATION LINE	
ON-SITE WETLAND LIMITS	
WATERSHED BOUNDARY	
TIME OF CONCENTRATION LINE	
50' WETLAND ZONE OF NONINTERFERENCE	

Date	Description	No.
Revisions		

Signature Date

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Project

PROJECT HUDSON

MAP No. 239, LOT No. 1

HUDSON NEW HAMPSHIRE

Drawing Title

EXISTING WATERSHED MAP PLAN IV

Project No.	Drawing No.
151010101	EXWS104
Date 05/21/2020	
Drawn By RJS	
Checked By NLK	

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Project No. 151010101

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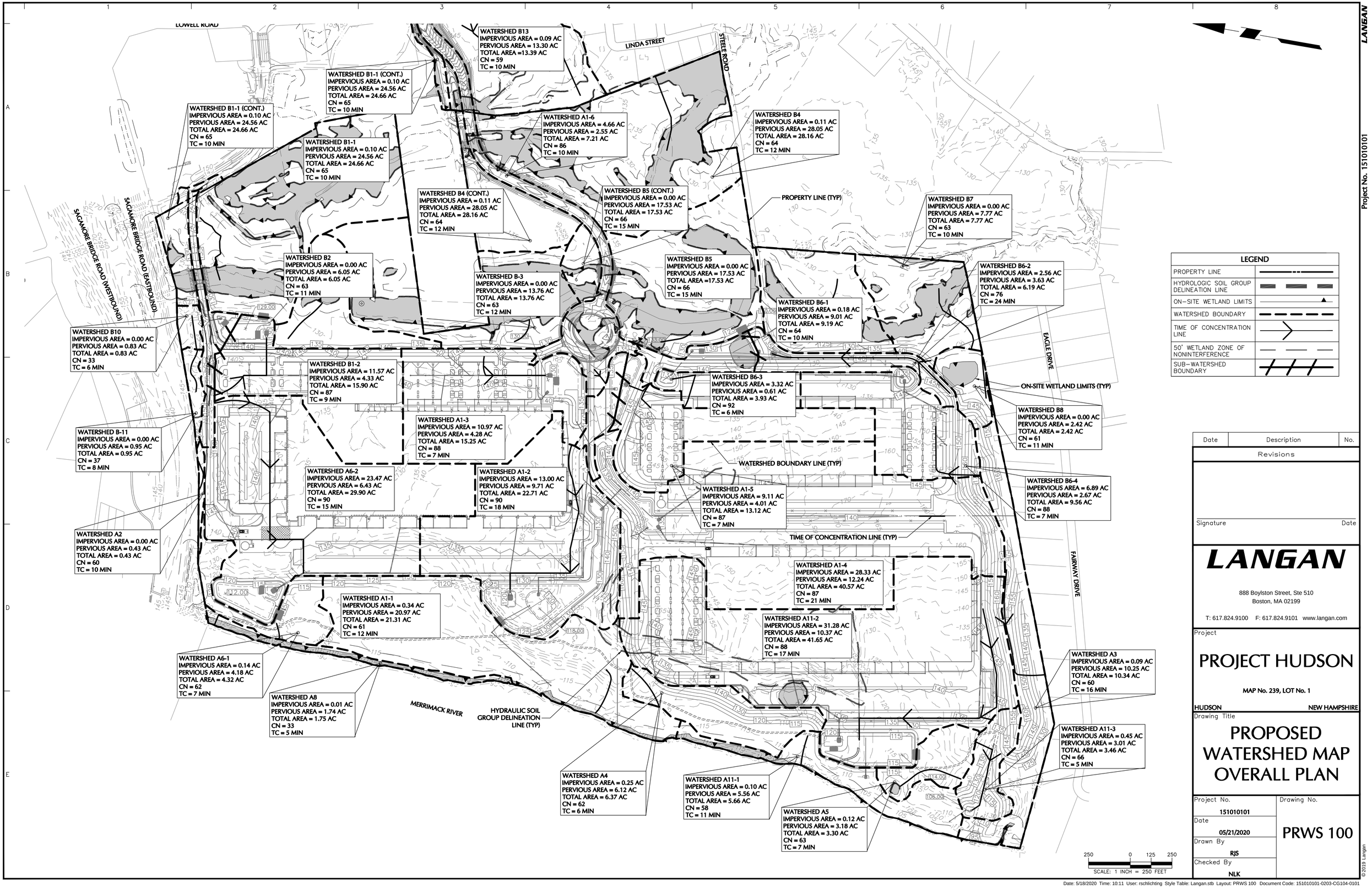
Date: 5/18/2020 Time: 10:09 User: rschlichting Style Table: Langan.stb Layout: EXWS 104 Document Code: 151010101-0203-CG103-0111



LEGEND	
PROPERTY LINE	
HYDROLOGIC SOIL GROUP DELINEATION LINE	
ON-SITE WETLAND LIMITS	
WATERSHED BOUNDARY	
TIME OF CONCENTRATION LINE	
50' WETLAND ZONE OF NONINTERFERENCE	
SUB-WATERSHED BOUNDARY	

Date	Description	No.
Revisions		

Signature Date

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Project

PROJECT HUDSON

MAP No. 239, LOT No. 1

HUDSON NEW HAMPSHIRE

Drawing Title

PROPOSED WATERSHED MAP OVERALL PLAN

Project No.	Drawing No.
151010101	PRWS 100
Date: 05/21/2020	
Drawn By: RJS	
Checked By: NLK	

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Project No. 151010101

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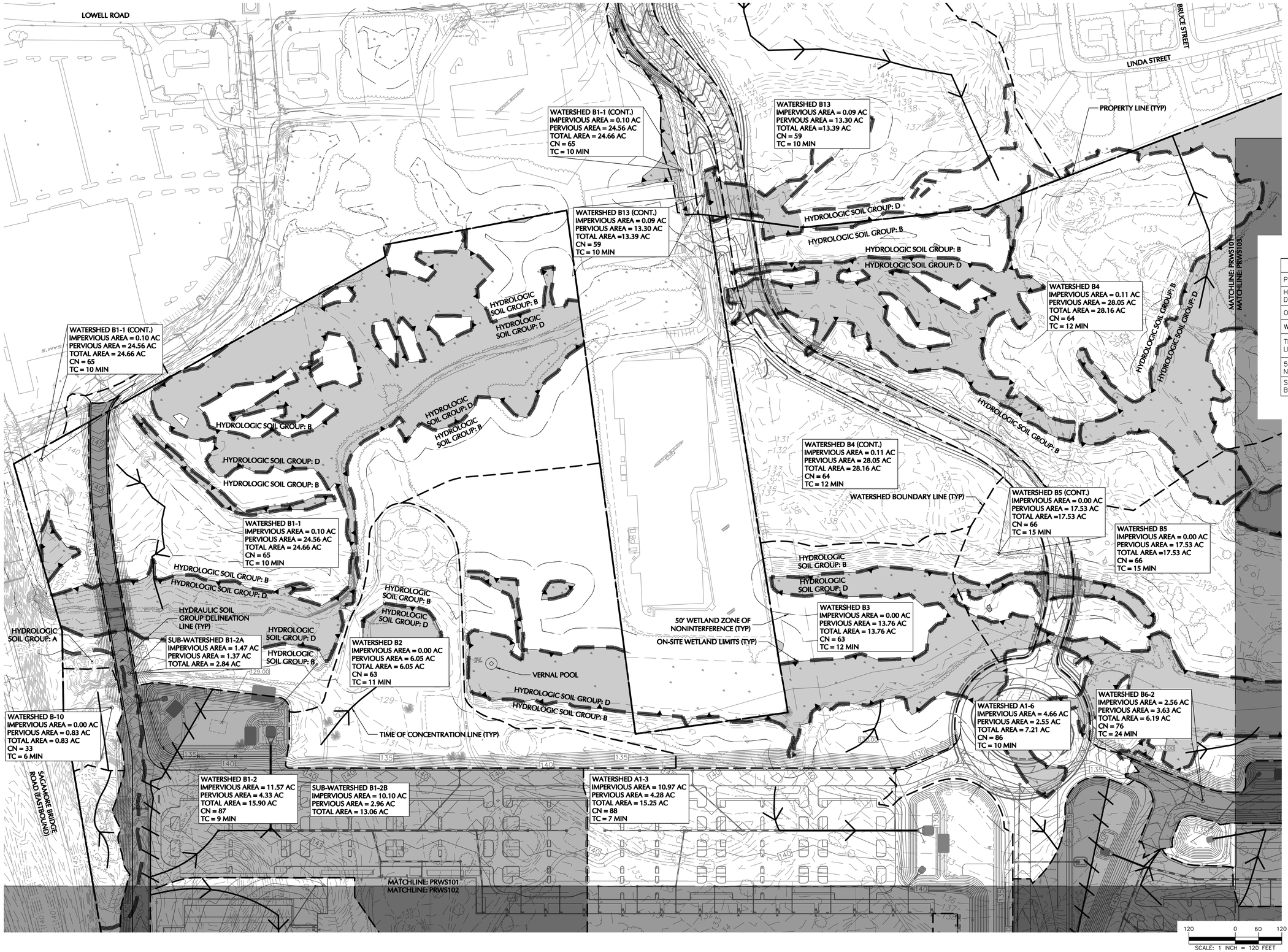
Date: 5/18/2020 Time: 10:11 User: rschlichting Style Table: Langan.stb Layout: PRWS 100 Document Code: 151010101-0203-CG104-0101



LEGEND	
PROPERTY LINE	
HYDROLOGIC SOIL GROUP DELINEATION LINE	
ON-SITE WETLAND LIMITS	
WATERSHED BOUNDARY	
TIME OF CONCENTRATION LINE	
50' WETLAND ZONE OF NONINTERFERENCE	
SUB-WATERSHED BOUNDARY	

Date	Description	No.
Revisions		

Signature Date

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Project

PROJECT HUDSON

MAP No. 239, LOT No. 1

HUDSON NEW HAMPSHIRE

Drawing Title

PROPOSED WATERSHED MAP PLAN I

Project No.	Drawing No.
151010101	PRWS101
Date: 05/21/2020	
Drawn By: RJS	
Checked By: NLK	

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Project No. 151010101

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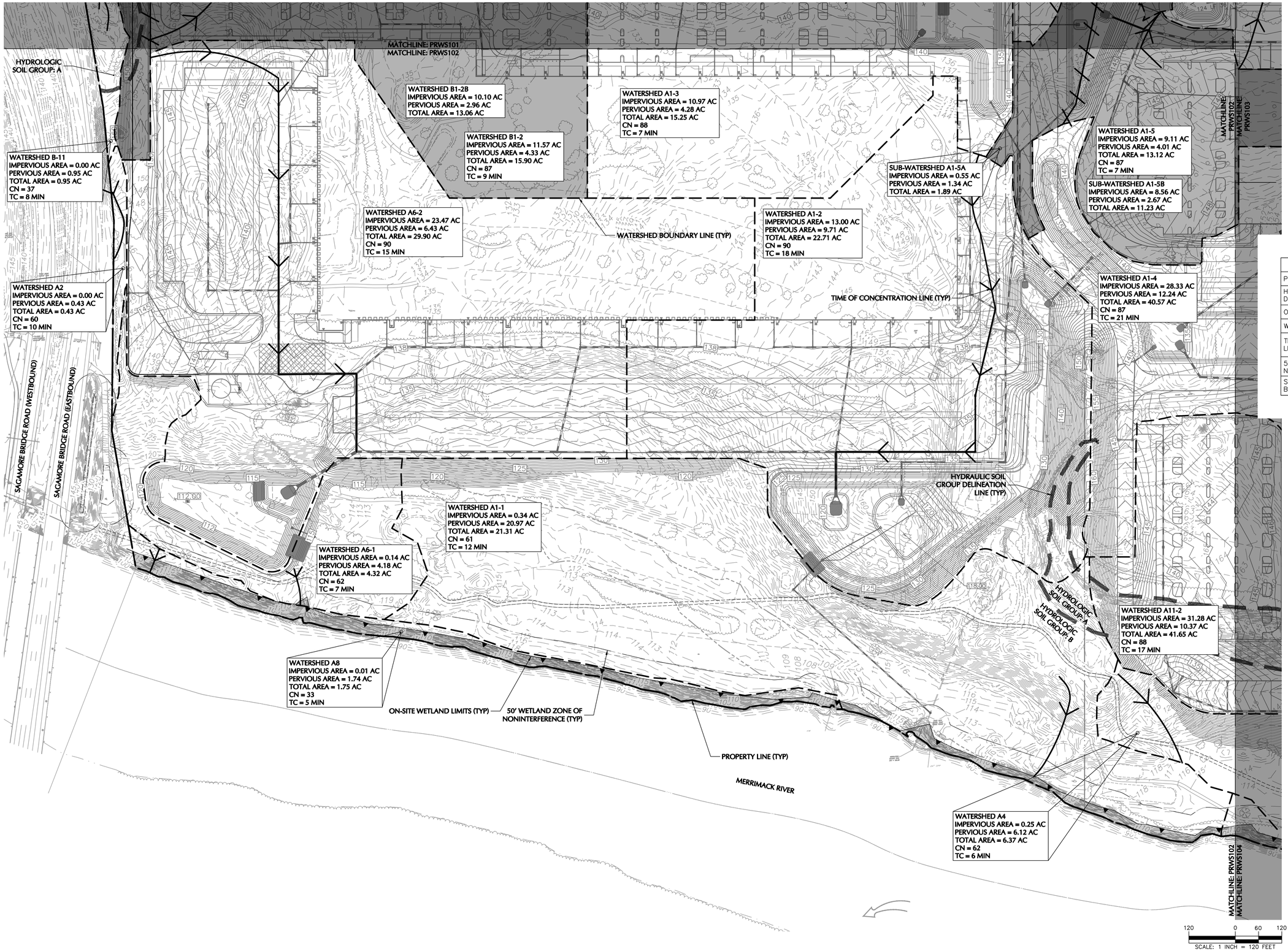

LEGEND

PROPERTY LINE	
HYDROLOGIC SOIL GROUP DELINEATION LINE	
ON-SITE WETLAND LIMITS	
WATERSHED BOUNDARY	
TIME OF CONCENTRATION LINE	
50' WETLAND ZONE OF NONINTERFERENCE	
SUB-WATERSHED BOUNDARY	

Date	Description	No.

Revisions

Signature Date

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Project

PROJECT HUDSON

MAP No. 239, LOT No. 1

HUDSON NEW HAMPSHIRE

Drawing Title

PROPOSED WATERSHED MAP PLAN II

Project No.	Drawing No.
151010101	PRWS102
Date 05/21/2020	
Drawn By RJS	
Checked By NLK	

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Project No. 151010101

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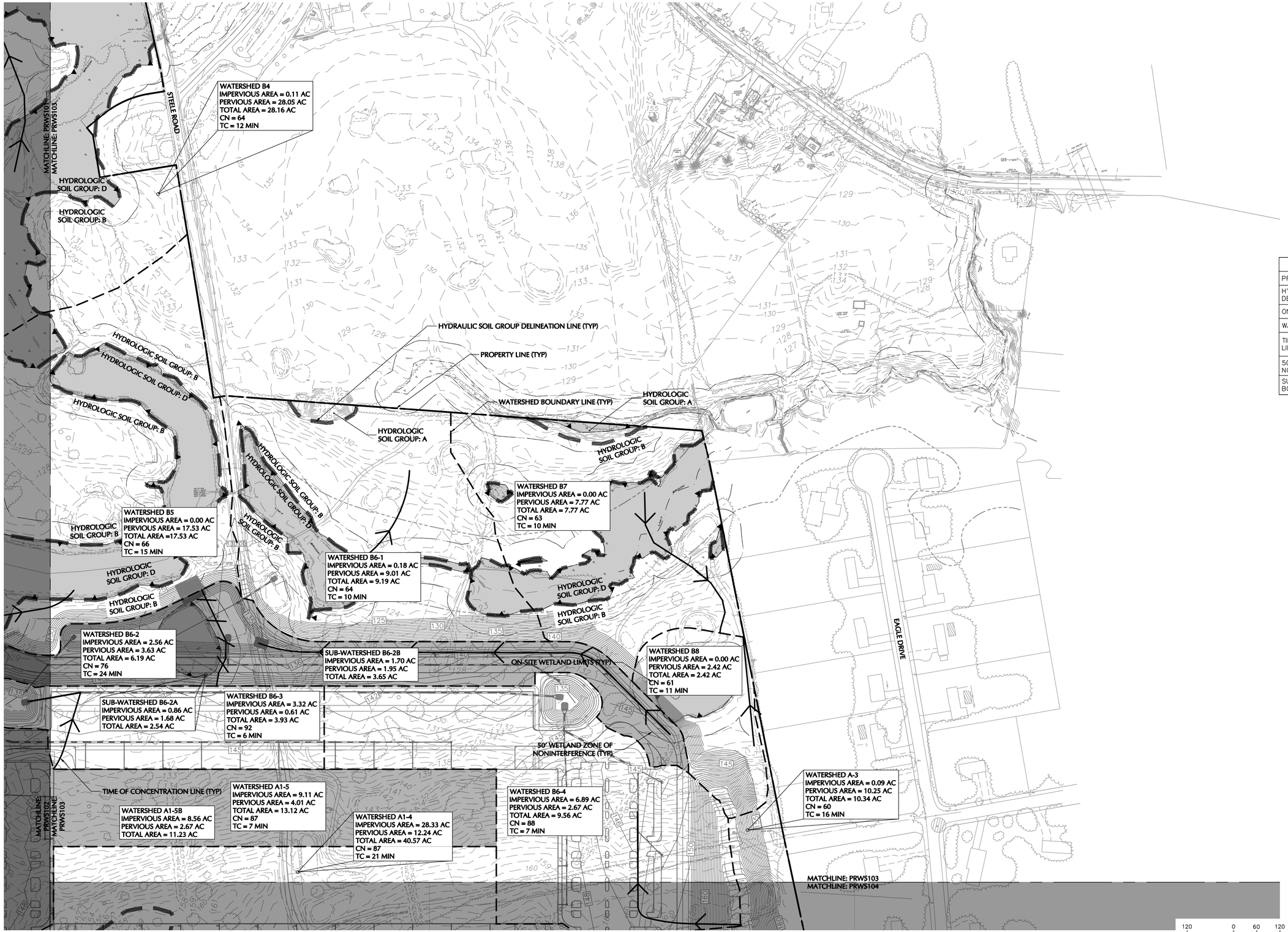

LEGEND	
PROPERTY LINE	
HYDROLOGIC SOIL GROUP DELINEATION LINE	
ON-SITE WETLAND LIMITS	
WATERSHED BOUNDARY	
TIME OF CONCENTRATION LINE	
50' WETLAND ZONE OF NONINTERFERENCE	
SUB-WATERSHED BOUNDARY	

Date	Description	No.
Revisions		

Signature Date

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Project

PROJECT HUDSON

MAP No. 239, LOT No. 1

HUDSON NEW HAMPSHIRE

Drawing Title

PROPOSED WATERSHED MAP PLAN III

Project No.	Drawing No.
151010101	PRWS103
Date 05/21/2020	
Drawn By RJS	
Checked By NLK	

LANGAN

Project No. 151010101

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MATCHLINE: PRWS103
MATCHLINE: PRWS104

HYDROLOGIC SOIL GROUP: A

WATERSHED B6-4
IMPERVIOUS AREA = 6.89 AC
PERVIOUS AREA = 2.67 AC
TOTAL AREA = 9.56 AC
CN = 88
TC = 7 MIN

PROPERTY LINE (TYP)

FAIRWAY DRIVE

WATERSHED A1-4
IMPERVIOUS AREA = 28.33 AC
PERVIOUS AREA = 12.24 AC
TOTAL AREA = 40.57 AC
CN = 87
TC = 21 MIN

HYDRAULIC SOIL GROUP DELINEATION LINE (TYP)

WATERSHED BOUNDARY LINE (TYP)

WATERSHED A11-2
IMPERVIOUS AREA = 31.28 AC
PERVIOUS AREA = 10.37 AC
TOTAL AREA = 41.65 AC
CN = 88
TC = 17 MIN

HYDROLOGIC SOIL GROUP: B

HYDROLOGIC SOIL GROUP: A

TIME OF CONCENTRATION LINE (TYP)

WATERSHED A-3
IMPERVIOUS AREA = 0.09 AC
PERVIOUS AREA = 10.25 AC
TOTAL AREA = 10.34 AC
CN = 60
TC = 16 MIN

HYDROLOGIC SOIL GROUP: A

HYDROLOGIC SOIL GROUP: B

HYDROLOGIC SOIL GROUP: D

WATERSHED A4
IMPERVIOUS AREA = 0.25 AC
PERVIOUS AREA = 6.12 AC
TOTAL AREA = 6.37 AC
CN = 62
TC = 6 MIN

ON-SITE WETLAND LIMITS (TYP)

WATERSHED A-5
IMPERVIOUS AREA = 0.12 AC
PERVIOUS AREA = 3.18 AC
TOTAL AREA = 3.30 AC
CN = 63
TC = 7 MIN

50' WETLAND ZONE OF NONINTERFERENCE (TYP)

MERRIMACK RIVER

MATCHLINE: PRWS102
MATCHLINE: PRWS104

WATERSHED A11-3
IMPERVIOUS AREA = 0.45 AC
PERVIOUS AREA = 3.01 AC
TOTAL AREA = 3.46 AC
CN = 66
TC = 5 MIN

WATERSHED A11-1
IMPERVIOUS AREA = 0.10 AC
PERVIOUS AREA = 5.56 AC
TOTAL AREA = 5.66 AC
CN = 58
TC = 11 MIN

HYDROLOGIC SOIL GROUP: A

HYDROLOGIC SOIL GROUP: A

LEGEND	
PROPERTY LINE	
HYDROLOGIC SOIL GROUP DELINEATION LINE	
ON-SITE WETLAND LIMITS	
WATERSHED BOUNDARY	
TIME OF CONCENTRATION LINE	
50' WETLAND ZONE OF NONINTERFERENCE	
SUB-WATERSHED BOUNDARY	

120 0 60 120
SCALE: 1 INCH = 120 FEET

Date	Description	No.
Revisions		

Signature Date

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Project

PROJECT HUDSON

MAP No. 239, LOT No. 1

HUDSON NEW HAMPSHIRE

Drawing Title

PROPOSED WATERSHED MAP PLAN IV

Project No.	Drawing No.
151010101	PRWS104
Date: 05/21/2020	
Drawn By: RJS	
Checked By: NLK	

LANGAN

Project No. 151010101

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Date: 5/18/2020 Time: 10:21 User: rschlichting Style Table: Langan.stb Layout: PRWS 104 Document Code: 151010101-0203-CG104-0105

LOWELL ROAD

BRUCE STREET

LINDA STREET

SAGAMORE BRIDGE ROAD (EASTBOUND)

HYDROLOGIC SOIL GROUP: B

HYDROLOGIC SOIL GROUP: D

50' WETLAND ZONE OF NONINTERFERENCE (TYP)

PROPERTY LINE (TYP)

ON-SITE WETLAND LIMITS (TYP)

HYDRAULIC SOIL GROUP DELINEATION LINE (TYP)

VERNAL POOL

DRAINAGE AREA DELINEATION LINE (TYP)

CCB-15 (B1-2)

CCB-14 (B1-2)

CCB-16 (B1-2)

CCB-13 (B1-2)

CCB-12 (B1-2)

CCB-11 (B1-2)

CCB-9 (B1-2)

CCB-8 (B1-2)

CCB-8 (A1-3)

CCB-7 (A1-3)

CCB-10 (A1-3)

CCB-9 (A1-3)

CCB-3 (B6-2)

CCB-2 (B6-2)

CCB-4 (B6-2)

CCB-5 (B6-2)

CCB-9 (A1-5)

CCB-8 (A1-5)

CCB-18 (B1-2)

CCB-17 (B1-2)

CLCB-10 (B1-2)

CLCB-1 (B1-2)

CLCB-2 (B1-2)

CLCB-3 (B1-2)

CLCB-4 (B1-2)

CLCB-5 (B1-2)

CLCB-6 (B1-2)

CLCB-7 (B1-2)

CLCB-6 (A1-3)

CLCB-5 (A1-3)

CLCB-4 (A1-3)

CLCB-3 (A1-3)

CLCB-2 (A1-3)

CCB-1 (A1-3)

MATCHLINE: DACB101
MATCHLINE: DACB102

MATCHLINE: DACB101
MATCHLINE: DACB103

SCALE: 1 INCH = 120 FEET

LEGEND	
PROPERTY LINE	
HYDROLOGIC SOIL GROUP DELINEATION LINE	
ON-SITE WETLAND LIMITS	
WATERSHED BOUNDARY	
50' WETLAND ZONE OF NONINTERFERENCE	
DRAINAGE AREA DELINEATION LINE	

Date	Description	No.
Revisions		

Signature Date

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Project

PROJECT HUDSON

MAP No. 239, LOT No. 1

HUDSON NEW HAMPSHIRE

Drawing Title

DRAINAGE AREA MAP I

Project No.	Drawing No.
151010101	DACB101
Date 05/21/2020	
Drawn By CDR	
Checked By NLK	

Project No. 151010101

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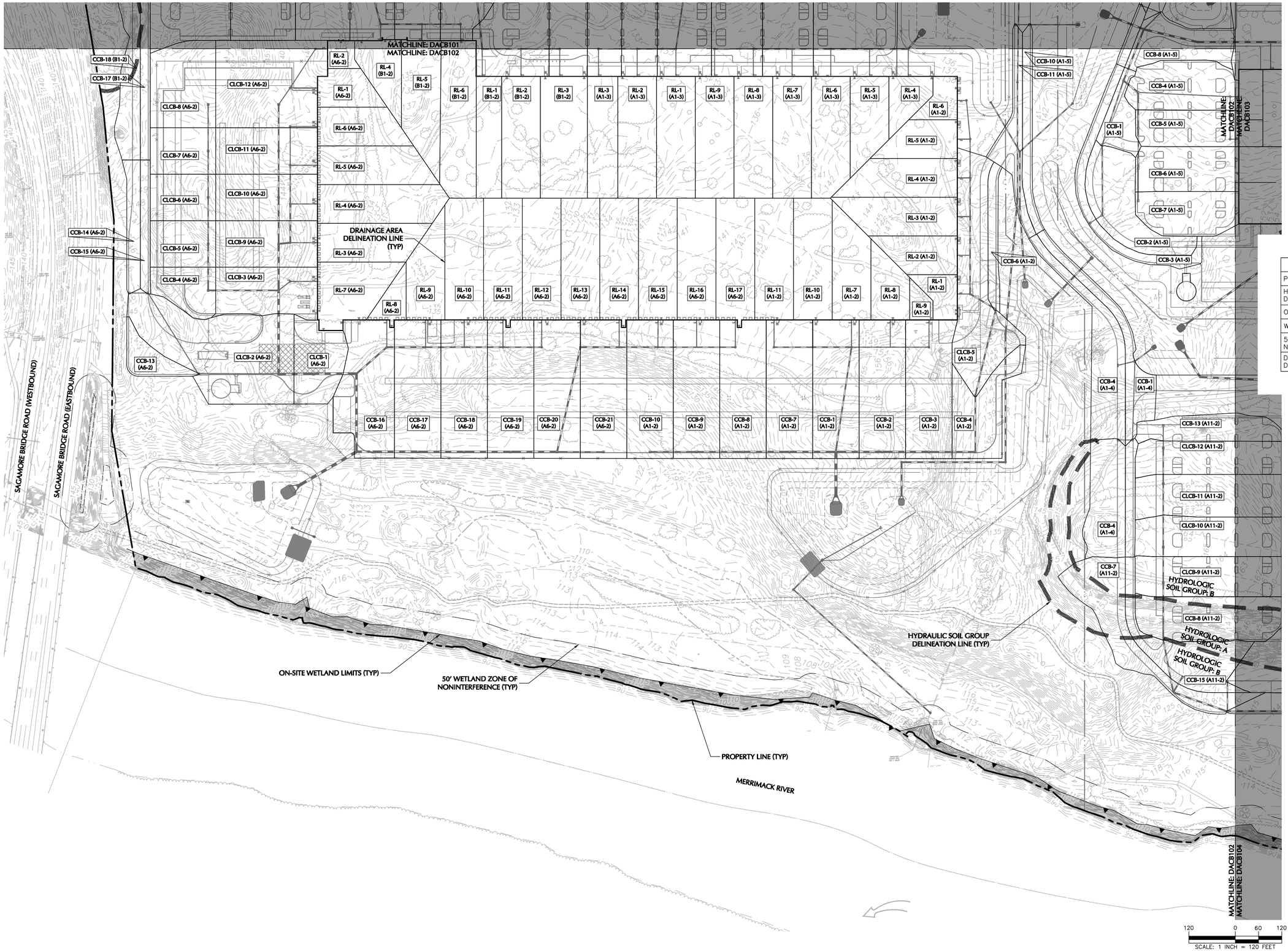

LEGEND	
PROPERTY LINE	
HYDROLOGIC SOIL GROUP DELINEATION LINE	
ON-SITE WETLAND LIMITS	
WATERSHED BOUNDARY	
50' WETLAND ZONE OF NONINTERFERENCE	
DRAINAGE AREA DELINEATION LINE	

Date	Description	No.
Revisions		

Signature Date

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Project

PROJECT HUDSON

MAP No. 239, LOT No. 1

HUDSON NEW HAMPSHIRE

Drawing Title

DRAINAGE AREA MAP II

Project No.	Drawing No.
151010101	DACB102
Date 05/21/2020	
Drawn By CDR	
Checked By NLK	

LANGAN

Project No. 151010101

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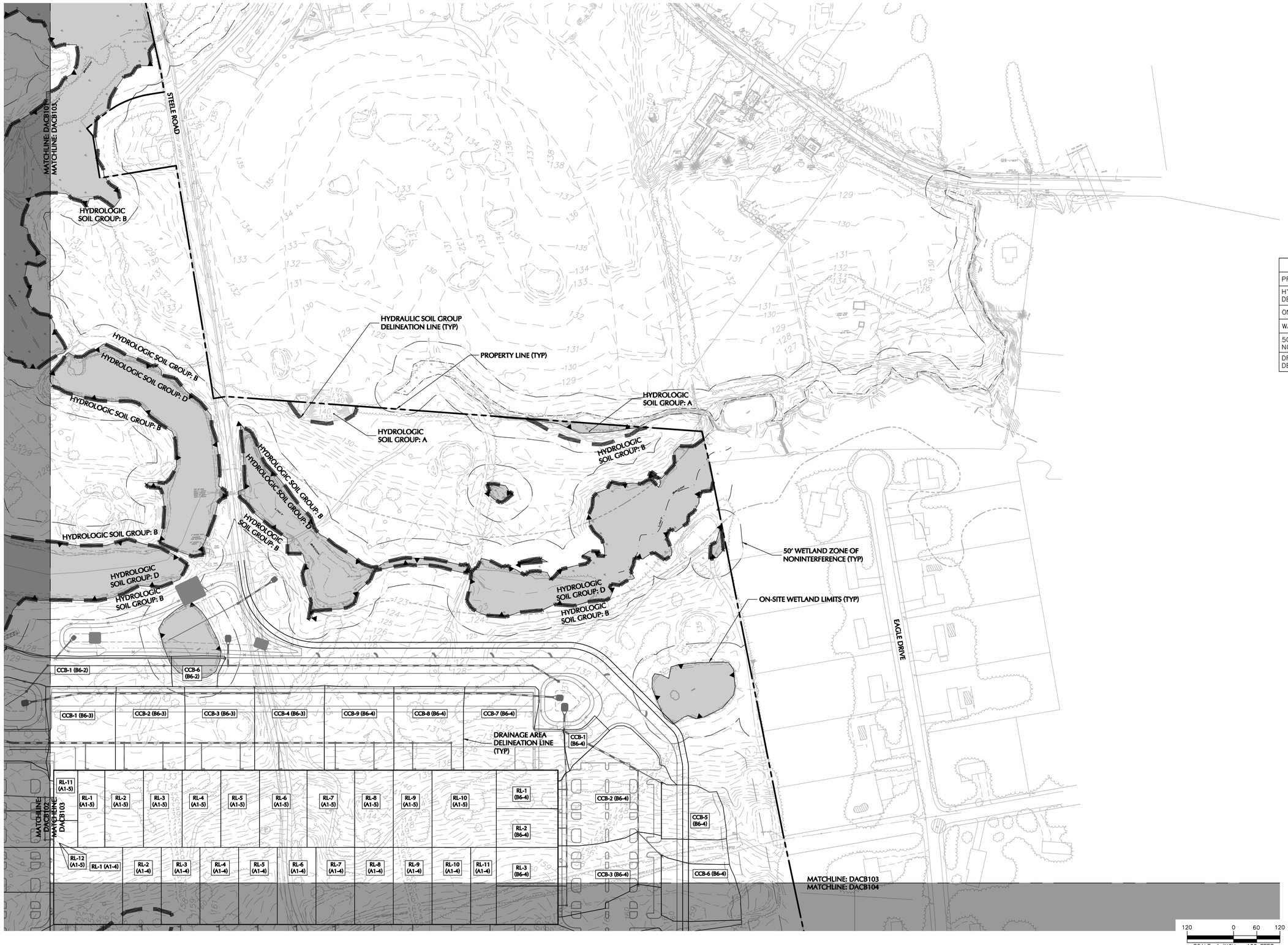
Date: 5/18/2020 Time: 12:29 User: rschlichting Style Table: Langan.stb Layout: DACB102 Document Code: 151010101-0502-CG104-0101



LEGEND	
PROPERTY LINE	
HYDROLOGIC SOIL GROUP DELINEATION LINE	
ON-SITE WETLAND LIMITS	
WATERSHED BOUNDARY	
50' WETLAND ZONE OF NONINTERFERENCE	
DRAINAGE AREA DELINEATION LINE	

Date	Description	No.
Revisions		

Signature Date

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Project

PROJECT HUDSON

MAP No. 239, LOT No. 1

HUDSON NEW HAMPSHIRE

Drawing Title

DRAINAGE AREA MAP III

Project No.	Drawing No.
151010101	DACB103
Date 05/21/2020	
Drawn By CDR	
Checked By NLK	

LANGAN

Project No. 151010101

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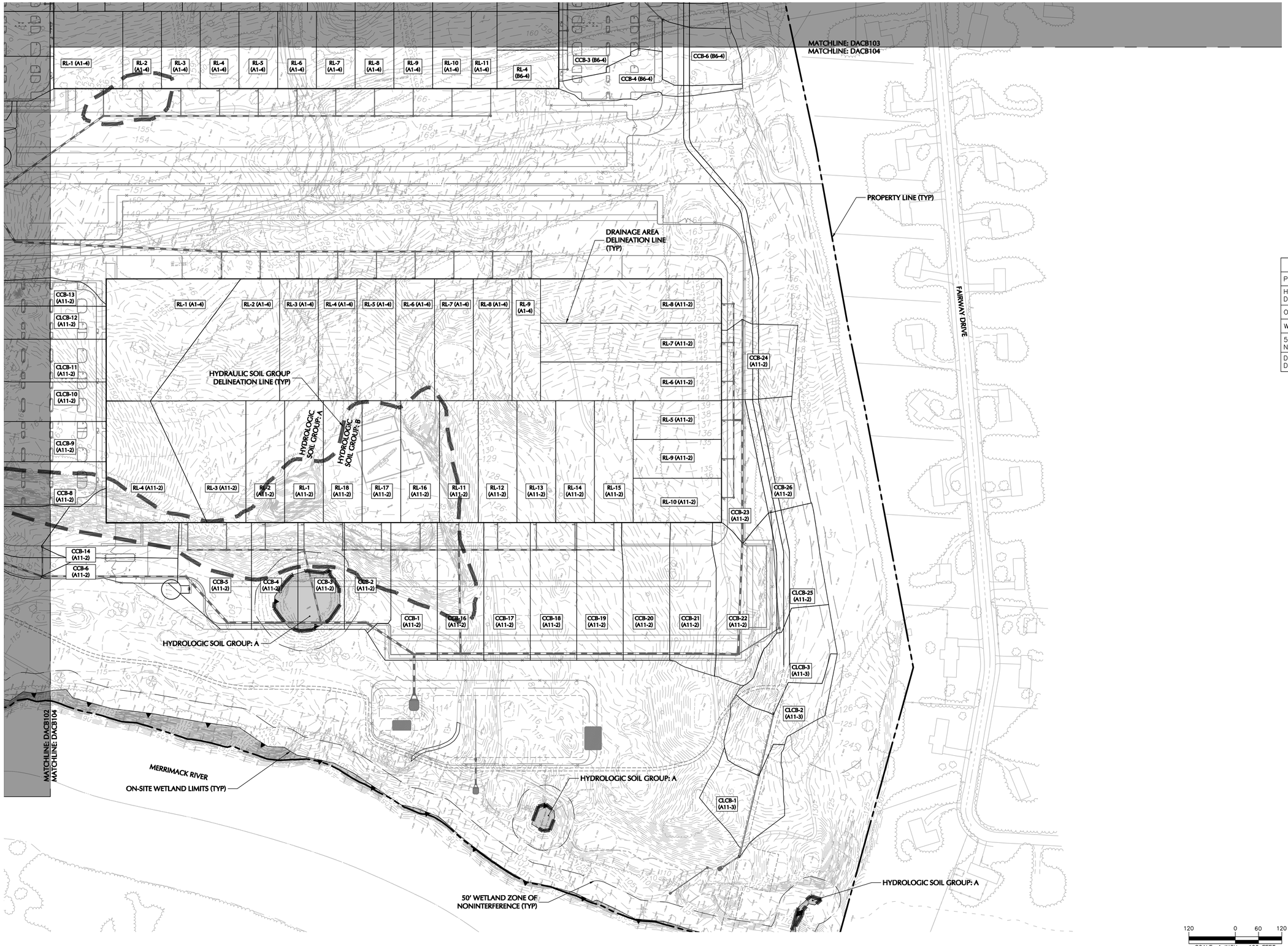
Date: 5/18/2020 Time: 12:31 User: rschlichting Style Table: Langan.stb Layout: DA103 Document Code: 151010101-0203-CG104-0106



LEGEND	
PROPERTY LINE	
HYDROLOGIC SOIL GROUP DELINEATION LINE	
ON-SITE WETLAND LIMITS	
WATERSHED BOUNDARY	
50' WETLAND ZONE OF NONINTERFERENCE	
DRAINAGE AREA DELINEATION LINE	

SCALE: 1 INCH = 120 FEET

Date	Description	No.

Revisions

Signature Date

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Project

PROJECT HUDSON

MAP No. 239, LOT No. 1

HUDSON NEW HAMPSHIRE

Drawing Title

DRAINAGE AREA MAP IV

Project No.	Drawing No.
151010101	DACB104
Date 05/21/2020	
Drawn By CDR	
Checked By NLK	

LANGAN

Project No. 151010101

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APPENDIX A

Existing Stormwater Discharge Calculations

LANGAN

Project **Project Hudson** By **RJS** Date **5/21/2020**

Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: (Present) Developed **Existing Watershed A-1**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**0.80**	**78.44**
B	**Open Space, Good Cond.**	**61**			**28.27**	**1724.32**
B	**Woods, Good Cond.**	**55**			**3.71**	**204.23**
				Totals =	**32.78**	**2006.98**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{2006.98}{32.78} = 61.22 \quad \text{Use CN} = \mathbf{61}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Project **Project Hudson** By **RJS** Date **5/21/2020**

Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: Present Developed **Existing Watershed A-2**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Open Space, Good Cond.**	**39**			**0.01**	**0.56**
A	**Woods, Good Cond.**	**30**			**0.01**	**0.15**
B	**Open Space, Good Cond.**	**61**			**2.47**	**150.72**
B	**Woods, Good Cond.**	**55**			**0.35**	**19.14**
				Totals =	**2.84**	**170.58**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{170.58}{2.84} = 60.10 \quad \text{Use CN} = \mathbf{60}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Project **Project Hudson** By **RJS** Date **5/21/2020**

Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: Present Developed **Existing Watershed A-3**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**0.48**	**46.97**
B	**Open Space, Good Cond.**	**61**			**16.73**	**1020.67**
B	**Woods, Good Cond.**	**55**			**8.30**	**456.44**
D	**Woods, Good Cond.**	**77**			**0.05**	**3.70**
				Totals =	**25.56**	**1527.78**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{1527.78}{25.56} = 59.78 \qquad \text{Use CN} = \boxed{60}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Project **Project Hudson** By **RJS** Date **5/21/2020**

Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: Present Developed **Existing Watershed A-4**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**1.02**	**99.89**
A	**Open Space, Good Cond.**	**39**			**3.12**	**121.60**
A	**Woods, Good Cond.**	**30**			**3.71**	**111.37**
B	**Open Space, Good Cond.**	**61**			**22.82**	**1392.22**
B	**Woods, Good Cond.**	**55**			**1.28**	**70.38**
D	**Open Space, Good Cond.**	**80**			**0.46**	**36.96**
				Totals =	**32.41**	**1832.41**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{1832.41}{32.41} = 56.53 \quad \text{Use CN} = \boxed{57}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Project **Project Hudson** By **RJS** Date **5/21/2020**

Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: Present Developed **Existing Watershed A-5**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**0.53**	**51.78**
B	**Open Space, Good Cond.**	**61**			**16.50**	**1006.22**
B	**Woods, Good Cond.**	**55**			**1.08**	**59.36**
D	**Open Space, Good Cond.**	**80**			**0.06**	**5.18**
				Totals =	**18.17**	**1122.55**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{1122.55}{18.17} = 61.79 \quad \text{Use CN} = \mathbf{62}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

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Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: Present Developed **Existing Watershed A-6**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**0.30**	**29.11**
B	**Open Space, Good Cond.**	**61**			**8.15**	**497.26**
B	**Woods, Good Cond.**	**55**			**1.35**	**74.43**
				Totals =	**9.80**	**600.79**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{600.79}{9.80} = 61.29 \quad \text{Use CN} = \mathbf{61}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Project **Project Hudson** By **RJS** Date **5/21/2020**

Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: Present Developed **Existing Watershed A-7**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**0.47**	**46.25**
B	**Open Space, Good Cond.**	**61**			**9.79**	**596.96**
B	**Woods, Good Cond.**	**55**			**1.89**	**104.03**
				Totals =	**12.15**	**747.23**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{747.23}{12.15} = 61.50 \quad \text{Use CN} = \mathbf{62}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Project **Project Hudson** By **RJS** Date **5/21/2020**

Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: Present Developed **Existing Watershed A-8**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
B	**Open Space, Good Cond.**	**61**			**0.44**	**26.97**
B	**Woods, Good Cond.**	**55**			**1.31**	**72.19**
				Totals =	**1.75**	**99.16**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{99.16}{1.75} = 56.51 \quad \text{Use CN} = \mathbf{57}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

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Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: Present Developed **Existing Watershed A-9**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**3.40**	**333.20**
A	**Open Space, Good Cond.**	**39**			**0.34**	**13.13**
A	**Woods, Good Cond.**	**30**			**0.26**	**7.75**
B	**Open Space, Good Cond.**	**61**			**4.08**	**249.18**
B	**Woods, Good Cond.**	**55**			**1.61**	**88.71**
				Totals =	**9.69**	**691.96**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{691.96}{9.69} = 71.39 \quad \text{Use CN} = \mathbf{71}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

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Circle one: Present Developed **Existing Watershed A-10**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**0.64**	**62.64**
A	**Open Space, Good Cond.**	**39**			**0.23**	**8.81**
A	**Woods, Good Cond.**	**30**			**0.02**	**0.65**
B	**Open Space, Good Cond.**	**61**			**6.87**	**419.04**
B	**Woods, Good Cond.**	**55**			**1.70**	**93.76**
				Totals =	**9.46**	**584.90**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{584.90}{9.46} = 61.82 \quad \text{Use CN} = \boxed{62}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Project **Project Hudson** By **RJS** Date **5/21/2020**

Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: Present Developed **Existing Watershed A-11**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**0.10**	**10.16**
B	**Open Space, Good Cond.**	**61**			**2.49**	**151.61**
B	**Woods, Good Cond.**	**55**			**3.59**	**197.40**
				Totals =	**6.18**	**359.17**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{359.17}{6.18} = 58.14 \quad \text{Use CN} = \mathbf{58}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Project **Project Hudson** By **RJS** Date **5/21/2020**

Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: (Present) Developed **Existing Watershed A-12**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**0.58**	**57.11**
B	**Open Space, Good Cond.**	**61**			**18.29**	**1115.51**
B	**Woods, Good Cond.**	**55**			**3.13**	**172.29**
				Totals =	**22.00**	**1344.90**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{1344.90}{22.00} = 61.13 \quad \text{Use CN} = \boxed{61}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Project **Project Hudson** By **RJS** Date **5/21/2020**

Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: Present Developed **Existing Watershed B-1**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**0.09**	**9.07**
A	**Open Space, Good Cond.**	**39**			**0.30**	**11.70**
A	**Woods, Good Cond.**	**30**			**0.16**	**4.74**
B	**Open Space, Good Cond.**	**61**			**6.72**	**409.74**
B	**Woods, Good Cond.**	**55**			**13.76**	**756.72**
D	**Open Space, Good Cond.**	**80**			**0.80**	**63.94**
D	**Woods, Good Cond.**	**77**			**9.34**	**719.52**
				Totals =	**31.17**	**1975.42**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{1975.42}{31.17} = 63.38 \quad \text{Use CN} = \boxed{63}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Project **Project Hudson** By **RJS** Date **5/21/2020**

Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: Present Developed **Existing Watershed B-2**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**0.29**	**28.46**
B	**Open Space, Good Cond.**	**61**			**11.04**	**673.41**
B	**Woods, Good Cond.**	**55**			**0.80**	**44.04**
D	**Open Space, Good Cond.**	**80**			**0.63**	**50.49**
D	**Woods, Good Cond.**	**77**			**0.01**	**0.40**
				Totals =	**12.77**	**796.81**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{796.81}{12.77} = 62.41 \quad \text{Use CN} = \mathbf{62}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Project **Project Hudson** By **RJS** Date **5/21/2020**

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Circle one: Present Developed **Existing Watershed B-3**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
B	**Open Space, Good Cond.**	**61**			**6.28**	**382.82**
B	**Woods, Good Cond.**	**55**			**7.88**	**433.58**
D	**Open Space, Good Cond.**	**80**			**0.52**	**41.89**
D	**Woods, Good Cond.**	**77**			**3.84**	**295.69**
				Totals =	**18.52**	**1153.97**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{1153.97}{18.52} = 62.30 \quad \text{Use CN} = \mathbf{62}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

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Circle one: Present Developed **Existing Watershed B-4**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
B	**Open Space, Good Cond.**	**61**			**6.86**	**418.51**
B	**Woods, Good Cond.**	**55**			**14.27**	**784.77**
D	**Open Space, Good Cond.**	**80**			**1.39**	**111.49**
D	**Woods, Good Cond.**	**77**			**7.21**	**555.26**
				Totals =	**29.73**	**1870.03**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{1870.03}{29.73} = 62.89 \quad \text{Use CN} = \boxed{63}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Project **Project Hudson** By **RJS** Date **5/21/2020**

Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: Present Developed **Existing Watershed B-5**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**0.18**	**17.90**
B	**Open Space, Good Cond.**	**61**			**22.89**	**1396.59**
B	**Woods, Good Cond.**	**55**			**4.24**	**233.07**
D	**Open Space, Good Cond.**	**80**			**6.33**	**506.38**
D	**Woods, Good Cond.**	**77**			**0.80**	**61.31**
				Totals =	**34.44**	**2215.25**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{2215.25}{34.44} = 64.32 \qquad \text{Use CN} = \mathbf{64}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Project **Project Hudson** By **RJS** Date **5/21/2020**

Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: Present Developed **Existing Watershed B-6**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**1.25**	**122.76**
A	**Open Space, Good Cond.**	**39**			**0.16**	**6.24**
B	**Open Space, Good Cond.**	**61**			**21.28**	**1297.86**
B	**Woods, Good Cond.**	**55**			**3.64**	**200.06**
D	**Open Space, Good Cond.**	**80**			**1.60**	**128.24**
D	**Woods, Good Cond.**	**77**			**0.02**	**1.63**
				Totals =	**27.95**	**1756.80**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{1756.80}{27.95} = 62.85 \quad \text{Use CN} = \boxed{63}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Project **Project Hudson** By **RJS** Date **5/21/2020**

Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: Present Developed **Existing Watershed B-7**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**0.18**	**17.21**
B	**Open Space, Good Cond.**	**61**			**2.08**	**126.82**
B	**Woods, Good Cond.**	**55**			**3.29**	**180.78**
D	**Open Space, Good Cond.**	**80**			**0.43**	**34.73**
D	**Woods, Good Cond.**	**77**			**1.78**	**137.15**
				Totals =	**7.76**	**496.68**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{496.68}{7.76} = 64.03 \quad \text{Use CN} = \mathbf{64}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Project **Project Hudson** By **RJS** Date **5/21/2020**

Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: Present Developed **Existing Watershed B-8**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
A	**Impervious**	**98**			**0.30**	**29.09**
B	**Open Space, Good Cond.**	**61**			**8.36**	**510.10**
B	**Woods, Good Cond.**	**55**			**1.84**	**101.20**
				Totals =	**10.50**	**640.39**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{640.39}{10.50} = 60.99 \quad \text{Use CN} = \mathbf{61}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Project **Project Hudson** By **RJS** Date **5/21/2020**

Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: Present Developed **Existing Watershed B-9**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**0.51**	**49.88**
B	**Open Space, Good Cond.**	**61**			**8.40**	**512.47**
B	**Woods, Good Cond.**	**55**			**1.17**	**64.32**
				Totals =	**10.08**	**626.67**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{626.67}{10.08} = 62.17 \quad \text{Use CN} = \mathbf{62}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Project **Project Hudson** By **RJS** Date **5/21/2020**

Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: Present Developed **Existing Watershed B-10**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
A	**Open Space, Good Cond.**	**39**			**0.25**	**9.71**
A	**Woods, Good Cond.**	**30**			**0.64**	**19.17**
B	**Open Space, Good Cond.**	**61**			**0.03**	**2.12**
B	**Woods, Good Cond.**	**55**			**0.09**	**4.87**
				Totals =	**1.01**	**35.88**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{35.88}{1.01} = 35.47 \quad \text{Use CN} = \boxed{35}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Project **Project Hudson** By **RJS** Date **5/21/2020**

Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: Present Developed **Existing Watershed B-11**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Open Space, Good Cond.**	**39**			**0.18**	**7.06**
A	**Woods, Good Cond.**	**30**			**0.92**	**27.71**
B	**Open Space, Good Cond.**	**61**			**0.15**	**8.90**
B	**Woods, Good Cond.**	**55**			**0.03**	**1.52**
				Totals =	**1.28**	**45.19**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{45.19}{1.28} = 35.35 \qquad \text{Use CN} = \mathbf{35}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Project **Project Hudson** By **RJS** Date **5/21/2020**

Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: Present Developed **Existing Watershed B-12**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**0.19**	**18.42**
B	**Open Space, Good Cond.**	**61**			**4.59**	**280.13**
B	**Woods, Good Cond.**	**55**			**0.46**	**25.55**
				Totals =	**5.24**	**324.11**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{324.11}{5.24} = 61.79 \quad \text{Use CN} = \mathbf{62}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Project **Project Hudson** By **RJS** Date **5/21/2020**

Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: Present Developed **Existing Watershed B-13**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**0.28**	**27.53**
B	**Open Space, Good Cond.**	**61**			**1.34**	**81.71**
B	**Woods, Good Cond.**	**55**			**10.86**	**597.37**
D	**Open Space, Good Cond.**	**80**			**0.31**	**24.70**
D	**Woods, Good Cond.**	**77**			**1.61**	**123.65**
				Totals =	**14.40**	**854.96**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{854.96}{14.40} = 59.39 \quad \text{Use CN} = \mathbf{59}$$

2. Runoff

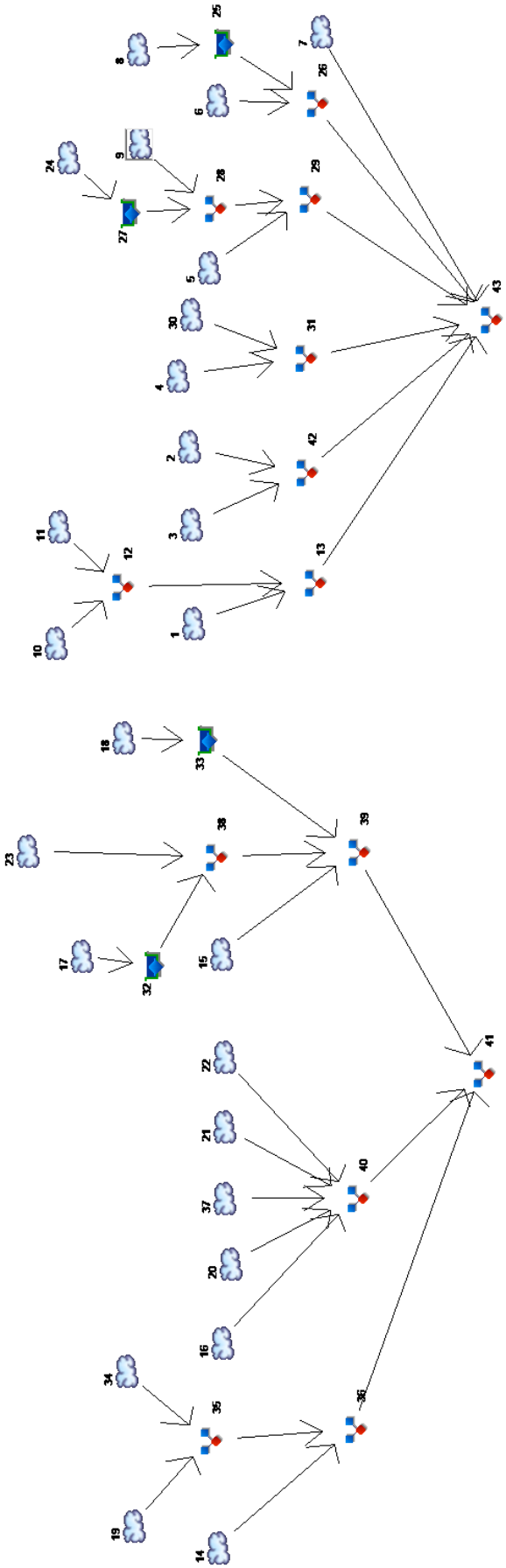
		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Watershed	Sheet Flow Length (ft)	Sheet Flow Slope %	Sheet Flow Mannings n	Shallow Concentrated Flow Length L1 (ft)	Shallow Concentrated Flow Slope % (L1)	Shallow Concentrated Flow Length L2 (ft)	Shallow Concentrated Flow Slope % (L2)	Shallow Concentrated Flow Length L3 (ft)	Shallow Concentrated Flow Slope % (L3)	Total Flow Length (ft)	Tc
A1	100	13	0.15	800	4	700	1				14.7
A2	100	3	0.15	370	3						10.7
A3	100	5	0.15	400	6	600	0.5	870	2	1970	22.4
A4	100	4	0.15	1010	4	200	14			1310	13.3
A5	100	5	0.15	600	7	260	4	840	1	1800	15.5
A6	100	2	0.15	400	7	840	1			1340	20.2
A7	100	15	0.15	480	2					580	8.0
A8	70	30	0.15								2.4
A9	100	8	0.15	550	2					650	9.7
A10	100	3	0.15	470	3					570	11.3
A11	100	30	0.15	220	5						4.4
A12	100	4	0.15	320	4	1320	1			1740	22.8
B1	100	2	0.15	484	3.7					584	13
B2	100	1.5	0.15	329	2					429	14
B3	100	1	0.15	880	3					980	17.8
B4	100	2	0.15	360	4					460	11.8
B5	100	1	0.15	300	7	830	2			1230	20.4
B6	100	4	0.15	400	1	150	5	820	2	1470	17.1
B7	100	4	0.15	460	3					560	10.3
B8	100	4	0.15	860	4					960	12.0
B9	100	2	0.15	500	5	360	1	370	5	1330	17.4
B10	100	10	0.15	100	10					200	5.6
B11	100	10	0.15	150	10					250	5.7
B12	100	11	0.15	200	11	380	3			680	7.8
B13	100	12	0.15	200	1	560	8	200	2	1060	10.4

Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020



Legend

Hyd.	Origin	Description
1	SCS Runoff	B1
2	SCS Runoff	B2
3	SCS Runoff	B3
4	SCS Runoff	B4
5	SCS Runoff	B5
6	SCS Runoff	B6
7	SCS Runoff	B7
8	SCS Runoff	B8
9	SCS Runoff	B9
10	SCS Runoff	B10
11	SCS Runoff	B11
12	Combine	Combine B10&11
13	Combine	Combine B10&11 with B1
14	SCS Runoff	A1
15	SCS Runoff	A11
16	SCS Runoff	A3
17	SCS Runoff	A4
18	SCS Runoff	A5
19	SCS Runoff	A12
20	SCS Runoff	A6
21	SCS Runoff	A8
22	SCS Runoff	A9
23	SCS Runoff	A10
24	SCS Runoff	B12
25	Reservoir	Pond B8
26	Combine	Combine B6&8
27	Reservoir	Pond B12
28	Combine	Combine B9&12
29	Combine	Combine B9&12 with B5
30	SCS Runoff	B13
31	Combine	Combine B4&13
32	Reservoir	A4 Pond
33	Reservoir	A5 Pond
34	SCS Runoff	A7
35	Combine	Combine A7&12
36	Combine	Combine A7&12 with A-1
37	SCS Runoff	A2
38	Combine	Combine A10&4
39	Combine	Combine A10&4 and A5 with A11
40	Combine	Combine A2,6,8,9 and A3
41	Combine	Watershed A
42	Combine	Comebnie B2&3
43	Combine	Watershed B

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	------	4.123	10.20	-------	-------	38.89	60.67	77.82	-------	B1
2	SCS Runoff	------	1.306	3.326	-------	-------	13.33	21.12	27.28	-------	B2
3	SCS Runoff	------	2.304	6.416	-------	-------	25.96	40.93	52.76	-------	B3
4	SCS Runoff	------	6.135	15.53	-------	-------	56.62	87.13	111.06	-------	B4
5	SCS Runoff	------	4.703	10.55	-------	-------	36.36	55.96	71.57	-------	B5
6	SCS Runoff	------	4.328	11.03	-------	-------	41.67	64.76	82.93	-------	B6
7	SCS Runoff	------	1.937	4.584	-------	-------	15.63	23.75	30.10	-------	B7
8	SCS Runoff	------	1.356	4.171	-------	-------	17.71	28.04	36.21	-------	B8
9	SCS Runoff	------	1.008	2.539	-------	-------	9.921	15.74	20.37	-------	B9
10	SCS Runoff	------	0.000	0.000	-------	-------	0.009	0.035	0.124	-------	B10
11	SCS Runoff	------	0.000	0.000	-------	-------	0.011	0.044	0.157	-------	B11
12	Combine	10, 11	0.000	0.000	-------	-------	0.020	0.079	0.280	-------	Combine B10&11
13	Combine	1, 12	4.123	10.20	-------	-------	38.89	60.67	77.94	-------	Combine B10&11 with B1
14	SCS Runoff	------	2.757	7.454	-------	-------	32.01	51.55	67.09	-------	A1
15	SCS Runoff	------	0.269	0.936	-------	-------	6.272	10.77	14.40	-------	A11
16	SCS Runoff	------	1.625	4.711	-------	-------	20.87	34.11	44.69	-------	A3
17	SCS Runoff	------	1.050	4.182	-------	-------	26.05	45.58	61.41	-------	A4
18	SCS Runoff	------	1.858	4.733	-------	-------	18.96	30.05	38.82	-------	A5
19	SCS Runoff	------	1.744	4.671	-------	-------	19.25	30.94	40.26	-------	A12
20	SCS Runoff	------	0.777	2.081	-------	-------	8.576	13.78	17.94	-------	A6
21	SCS Runoff	------	0.056	0.209	-------	-------	1.627	2.866	3.871	-------	A8
22	SCS Runoff	------	4.335	7.617	-------	-------	19.84	28.45	35.03	-------	A9
23	SCS Runoff	------	1.044	2.716	-------	-------	11.08	17.55	22.67	-------	A10
24	SCS Runoff	------	0.567	1.600	-------	-------	6.634	10.51	13.64	-------	B12
25	Reservoir	8	0.685	2.024	-------	-------	12.23	21.32	28.94	-------	Pond B8
26	Combine	6, 25	4.870	12.85	-------	-------	53.60	86.08	111.87	-------	Combine B6&8
27	Reservoir	24	0.547	1.450	-------	-------	5.964	9.495	12.84	-------	Pond B12
28	Combine	9, 27	1.536	3.835	-------	-------	15.50	24.70	32.02	-------	Combine B9&12
29	Combine	5, 28	6.221	14.32	-------	-------	51.20	79.53	101.36	-------	Combine B9&12 with B5
30	SCS Runoff	------	0.843	2.632	-------	-------	13.66	22.82	30.16	-------	B13
31	Combine	4, 30	6.140	16.01	-------	-------	63.88	100.66	129.72	-------	Combine B4&13
32	Reservoir	17	0.000	0.000	-------	-------	0.000	0.000	0.000	-------	A4 Pond
33	Reservoir	18	0.000	0.000	-------	-------	9.082	30.51	46.17	-------	A5 Pond
34	SCS Runoff	------	1.314	3.711	-------	-------	15.38	24.38	31.62	-------	A7

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
35	Combine	19, 34	2.774	7.177	-------	-------	29.70	47.89	62.60	-------	Combine A7&12
36	Combine	14, 35	5.525	14.53	-------	-------	61.71	99.39	129.34	-------	Combine A7&12 with A-1
37	SCS Runoff	------	0.209	0.608	-------	-------	2.903	4.755	6.234	-------	A2
38	Combine	23, 32,	1.044	2.716	-------	-------	11.08	17.55	22.67	-------	Combine A10&4
39	Combine	15, 33, 38	1.309	3.577	-------	-------	16.04	48.81	75.81	-------	Combine A10&4 and A5 with A11
40	Combine	16, 20, 21, 22, 37,	4.603	11.22	-------	-------	45.05	71.51	92.49	-------	Combine A2,6,8,9 and A3
41	Combine	36, 39, 40	11.37	29.03	-------	-------	121.42	206.34	297.64	-------	Watershed A
42	Combine	2, 3,	3.100	8.884	-------	-------	36.97	58.52	75.57	-------	Comebnie B2&3
43	Combine	7, 13, 26, 29, 31, 42	20.02	55.48	-------	-------	228.29	363.62	471.49	-------	Watershed B

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	4.123	2	738	30,451	------	------	------	B1
2	SCS Runoff	1.306	2	744	10,619	------	------	------	B2
3	SCS Runoff	2.304	2	728	15,807	------	------	------	B3
4	SCS Runoff	6.135	2	724	29,037	------	------	------	B4
5	SCS Runoff	4.703	2	748	36,648	------	------	------	B5
6	SCS Runoff	4.328	2	728	26,471	------	------	------	B6
7	SCS Runoff	1.937	2	724	8,363	------	------	------	B7
8	SCS Runoff	1.356	2	724	8,281	------	------	------	B8
9	SCS Runoff	1.008	2	748	8,597	------	------	------	B9
10	SCS Runoff	0.000	2	n/a	0	------	------	------	B10
11	SCS Runoff	0.000	2	n/a	0	------	------	------	B11
12	Combine	0.000	2	n/a	0	10, 11	------	------	Combine B10&11
13	Combine	4.123	2	738	30,451	1, 12	------	------	Combine B10&11 with B1
14	SCS Runoff	2.757	2	744	24,464	------	------	------	A1
15	SCS Runoff	0.269	2	742	3,059	------	------	------	A11
16	SCS Runoff	1.625	2	754	17,717	------	------	------	A3
17	SCS Runoff	1.050	2	750	15,315	------	------	------	A4
18	SCS Runoff	1.858	2	744	15,110	------	------	------	A5
19	SCS Runoff	1.744	2	752	17,140	------	------	------	A12
20	SCS Runoff	0.777	2	752	7,635	------	------	------	A6
21	SCS Runoff	0.056	2	744	752	------	------	------	A8
22	SCS Runoff	4.335	2	728	18,161	------	------	------	A9
23	SCS Runoff	1.044	2	740	8,321	------	------	------	A10
24	SCS Runoff	0.567	2	736	4,469	------	------	------	B12
25	Reservoir	0.685	2	736	8,280	8	132.03	757	Pond B8
26	Combine	4.870	2	730	34,751	6, 25	------	------	Combine B6&8
27	Reservoir	0.547	2	742	4,469	24	126.01	121	Pond B12
28	Combine	1.536	2	746	13,066	9, 27	------	------	Combine B9&12
29	Combine	6.221	2	748	49,714	5, 28	------	------	Combine B9&12 with B5
30	SCS Runoff	0.843	2	746	8,943	------	------	------	B13
31	Combine	6.140	2	724	37,980	4, 30	------	------	Combine B4&13
32	Reservoir	0.000	2	n/a	0	17	100.88	15,315	A4 Pond
33	Reservoir	0.000	2	n/a	0	18	105.73	15,110	A5 Pond
34	SCS Runoff	1.314	2	736	10,363	------	------	------	A7

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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
35	Combine	2.774	2	746	27,503	19, 34	------	------	Combine A7&12
36	Combine	5.525	2	746	51,967	14, 35	------	------	Combine A7&12 with A-1
37	SCS Runoff	0.209	2	744	1,994	------	------	------	A2
38	Combine	1.044	2	740	8,321	23, 32,	------	------	Combine A10&4
39	Combine	1.309	2	740	11,380	15, 33, 38	------	------	Combine A10&4 and A5 with A11
40	Combine	4.603	2	744	46,259	16, 20, 21, 22, 37,	------	------	Combine A2,6,8,9 and A3
41	Combine	11.37	2	744	109,606	36, 39, 40	------	------	Watershed A
42	Combine	3.100	2	736	26,426	2, 3,	------	------	Comebnie B2&3
43	Combine	20.02	2	738	187,686	7, 13, 26, 29, 31, 42	------	------	Watershed B

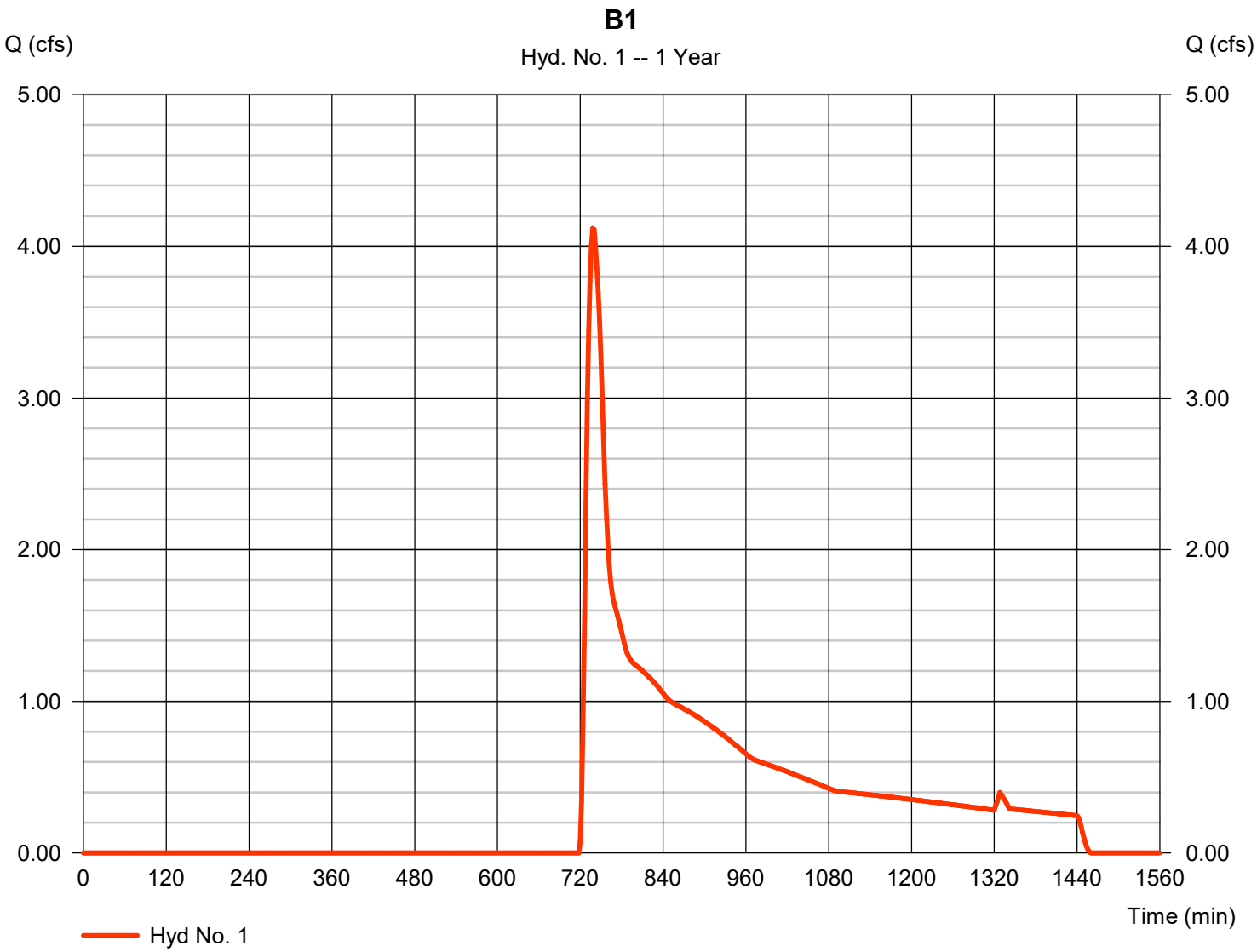
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 1

B1

Hydrograph type	= SCS Runoff	Peak discharge	= 4.123 cfs
Storm frequency	= 1 yrs	Time to peak	= 738 min
Time interval	= 2 min	Hyd. volume	= 30,451 cuft
Drainage area	= 31.170 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.00 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



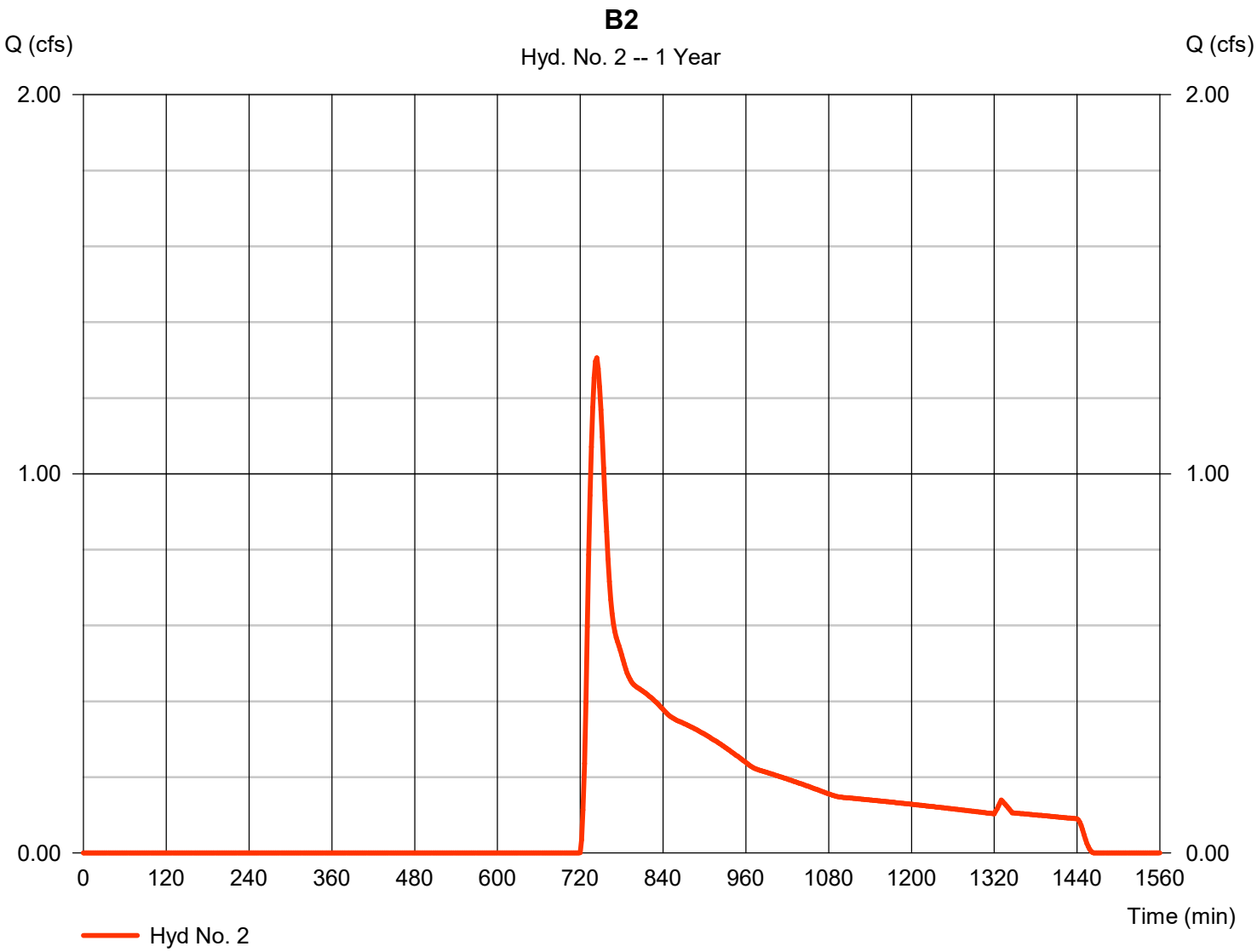
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 2

B2

Hydrograph type	= SCS Runoff	Peak discharge	= 1.306 cfs
Storm frequency	= 1 yrs	Time to peak	= 744 min
Time interval	= 2 min	Hyd. volume	= 10,619 cuft
Drainage area	= 12.770 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 14.00 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



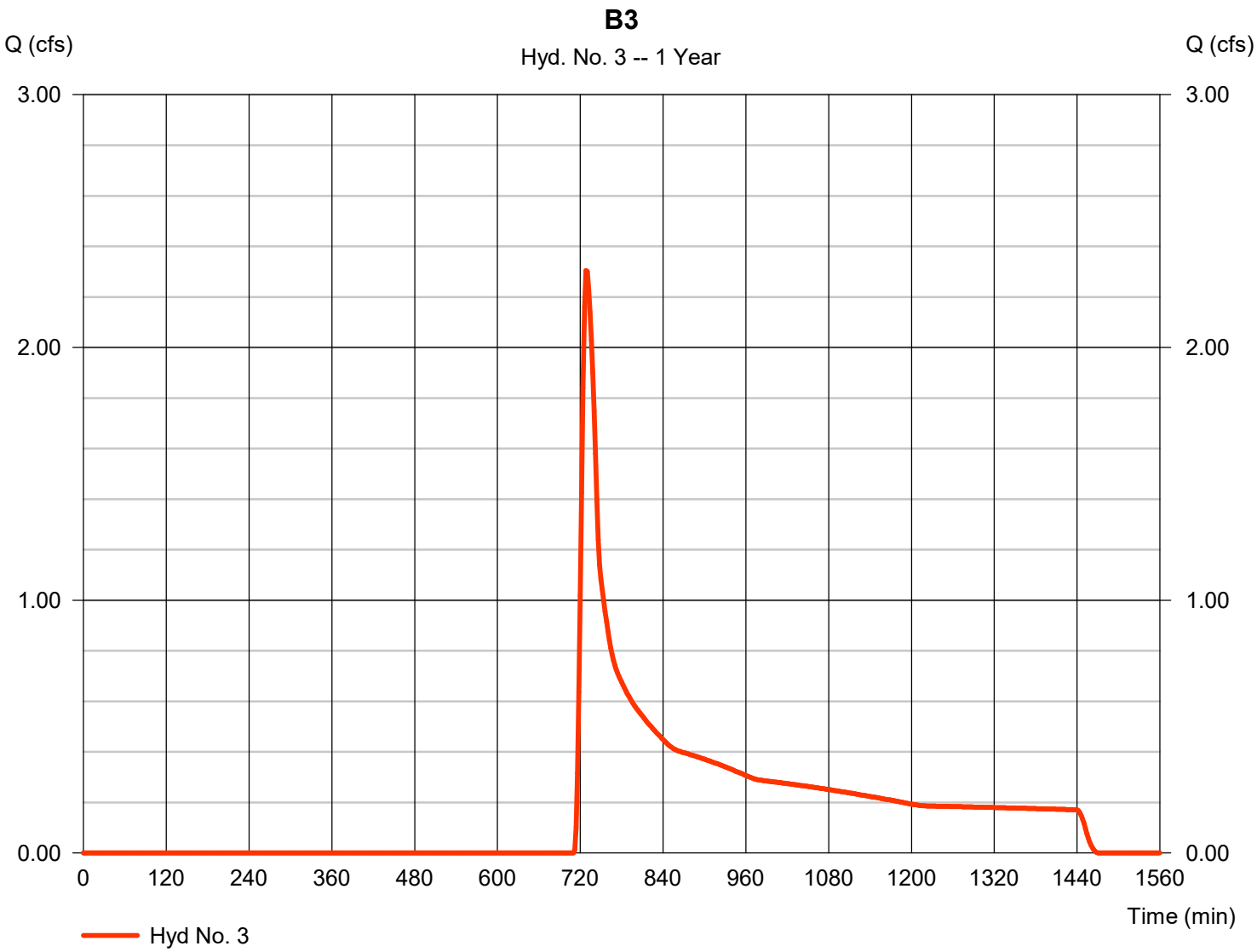
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 3

B3

Hydrograph type	= SCS Runoff	Peak discharge	= 2.304 cfs
Storm frequency	= 1 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 15,807 cuft
Drainage area	= 18.520 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.80 min
Total precip.	= 2.55 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



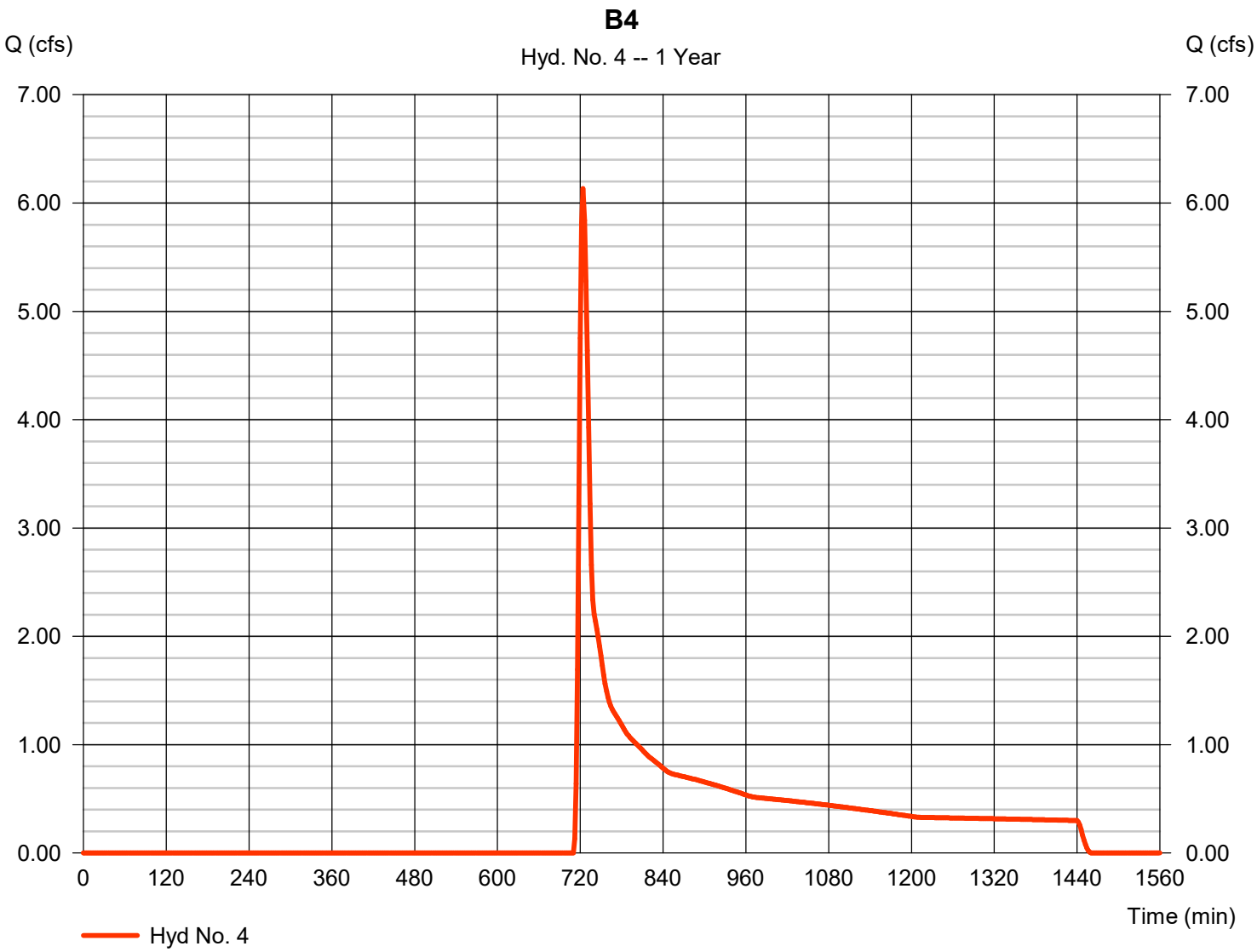
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 4

B4

Hydrograph type	= SCS Runoff	Peak discharge	= 6.135 cfs
Storm frequency	= 1 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 29,037 cuft
Drainage area	= 29.730 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.80 min
Total precip.	= 2.55 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



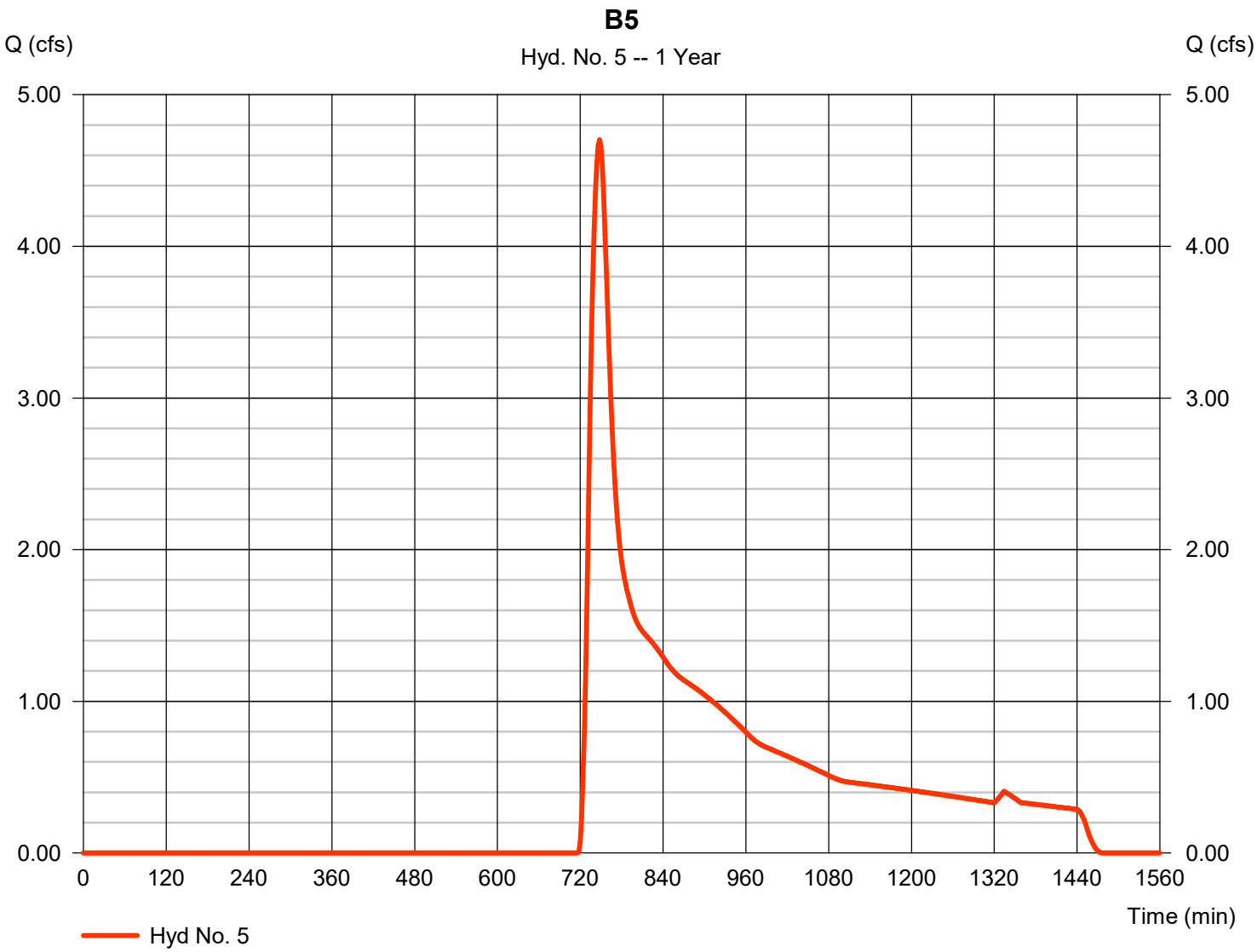
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 5

B5

Hydrograph type	= SCS Runoff	Peak discharge	= 4.703 cfs
Storm frequency	= 1 yrs	Time to peak	= 748 min
Time interval	= 2 min	Hyd. volume	= 36,648 cuft
Drainage area	= 34.440 ac	Curve number	= 64
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 20.40 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



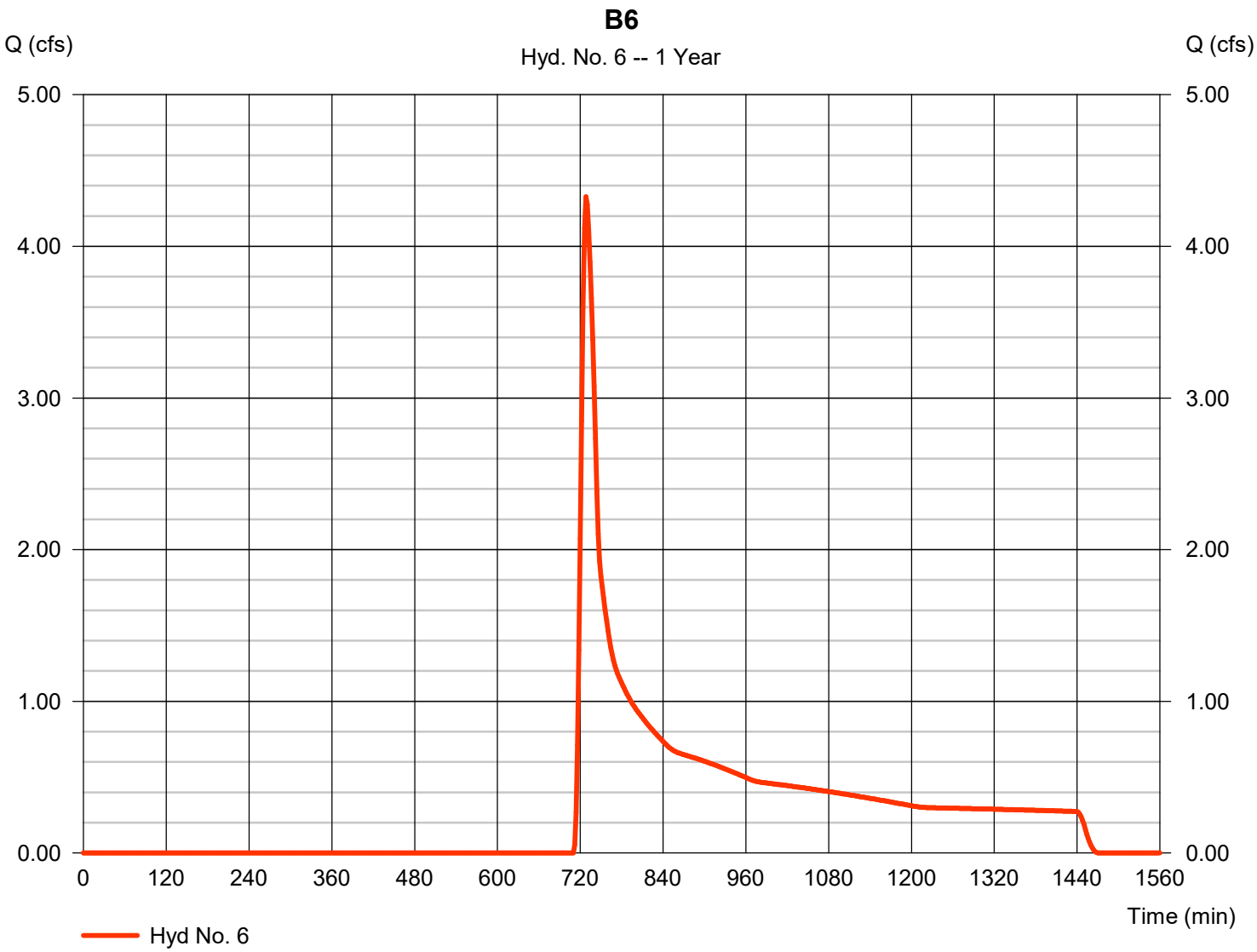
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 6

B6

Hydrograph type	= SCS Runoff	Peak discharge	= 4.328 cfs
Storm frequency	= 1 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 26,471 cuft
Drainage area	= 27.950 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.10 min
Total precip.	= 2.55 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



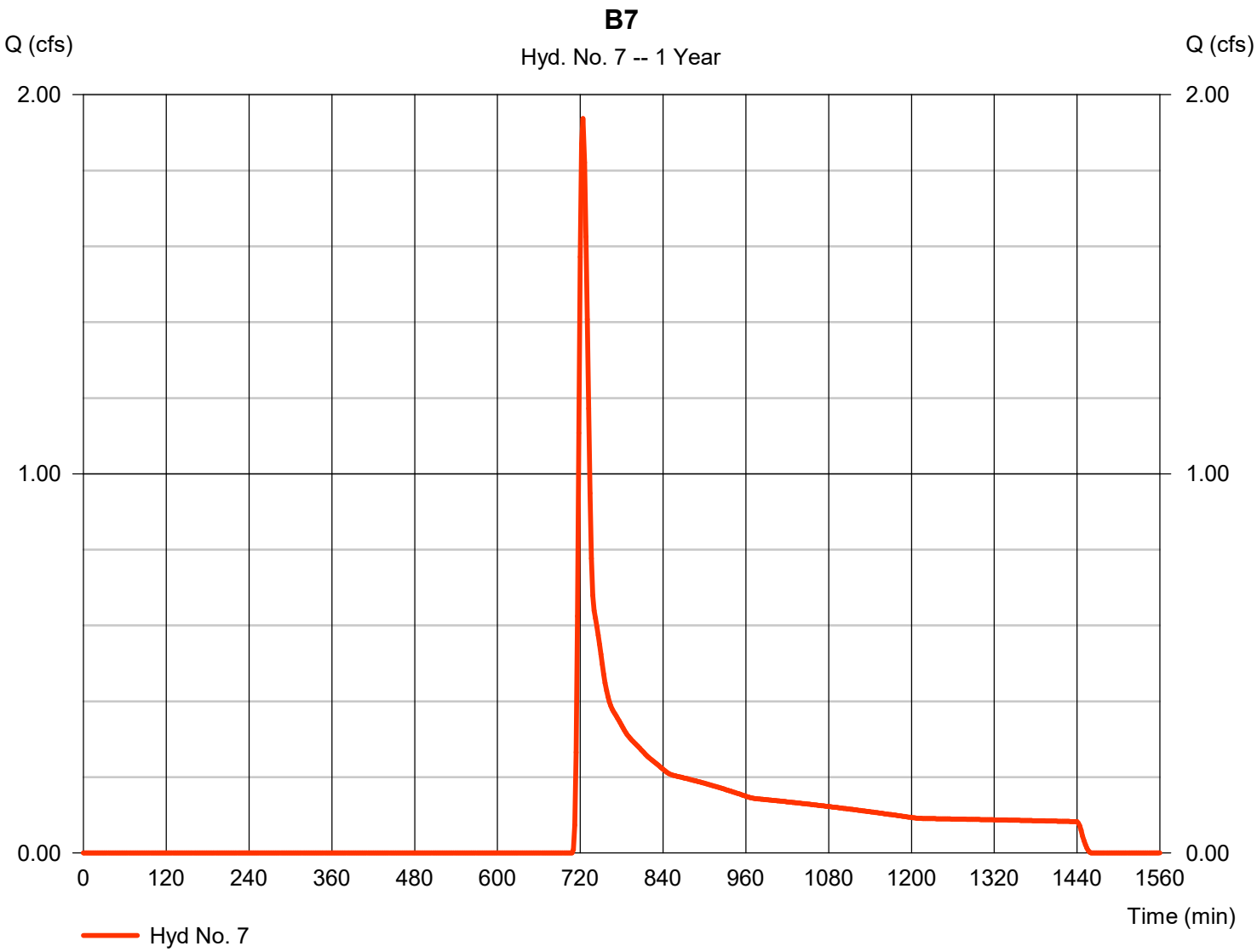
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 7

B7

Hydrograph type	= SCS Runoff	Peak discharge	= 1.937 cfs
Storm frequency	= 1 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 8,363 cuft
Drainage area	= 7.760 ac	Curve number	= 64
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.30 min
Total precip.	= 2.55 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



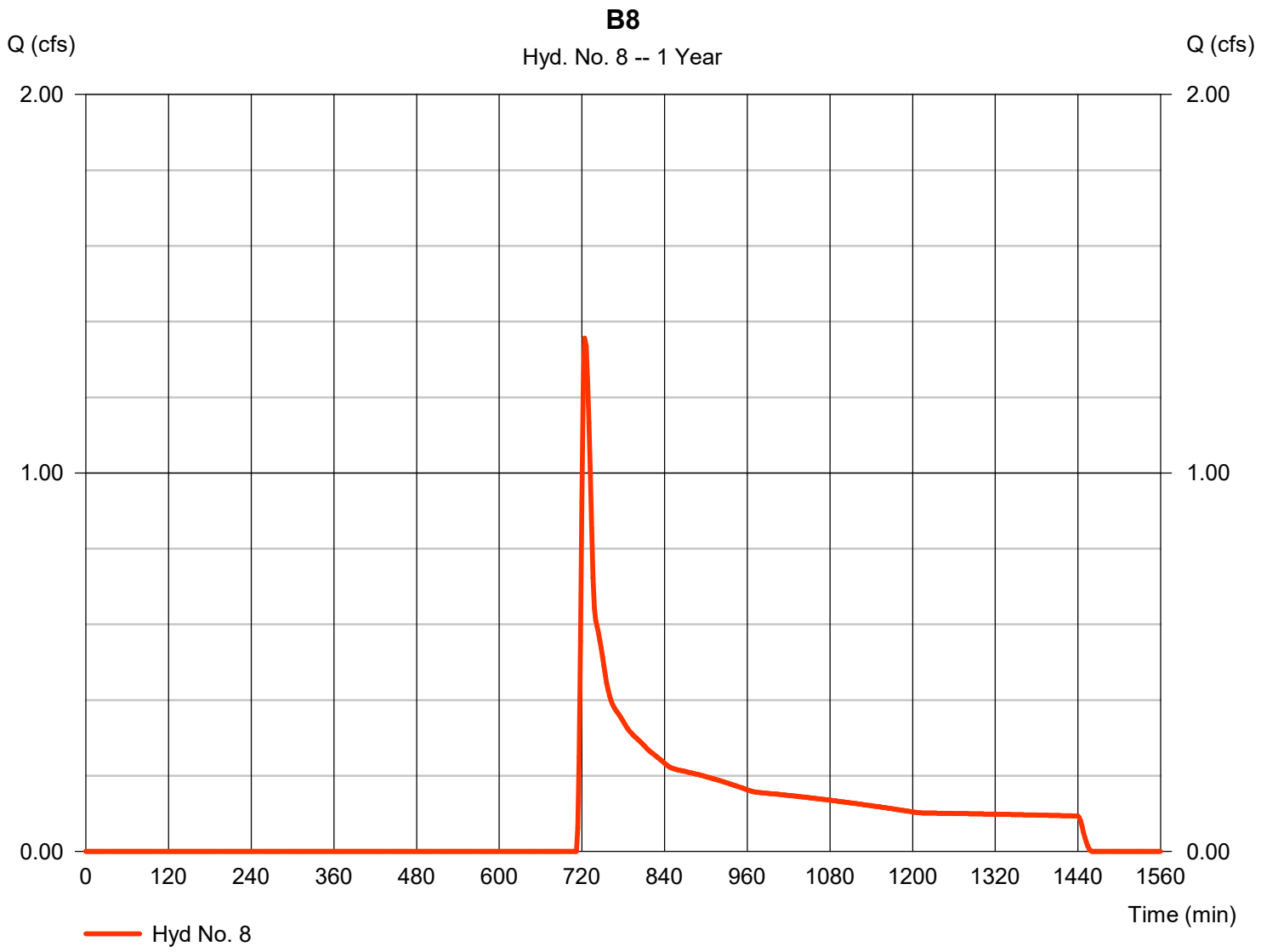
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 8

B8

Hydrograph type	= SCS Runoff	Peak discharge	= 1.356 cfs
Storm frequency	= 1 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 8,281 cuft
Drainage area	= 10.500 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.00 min
Total precip.	= 2.55 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



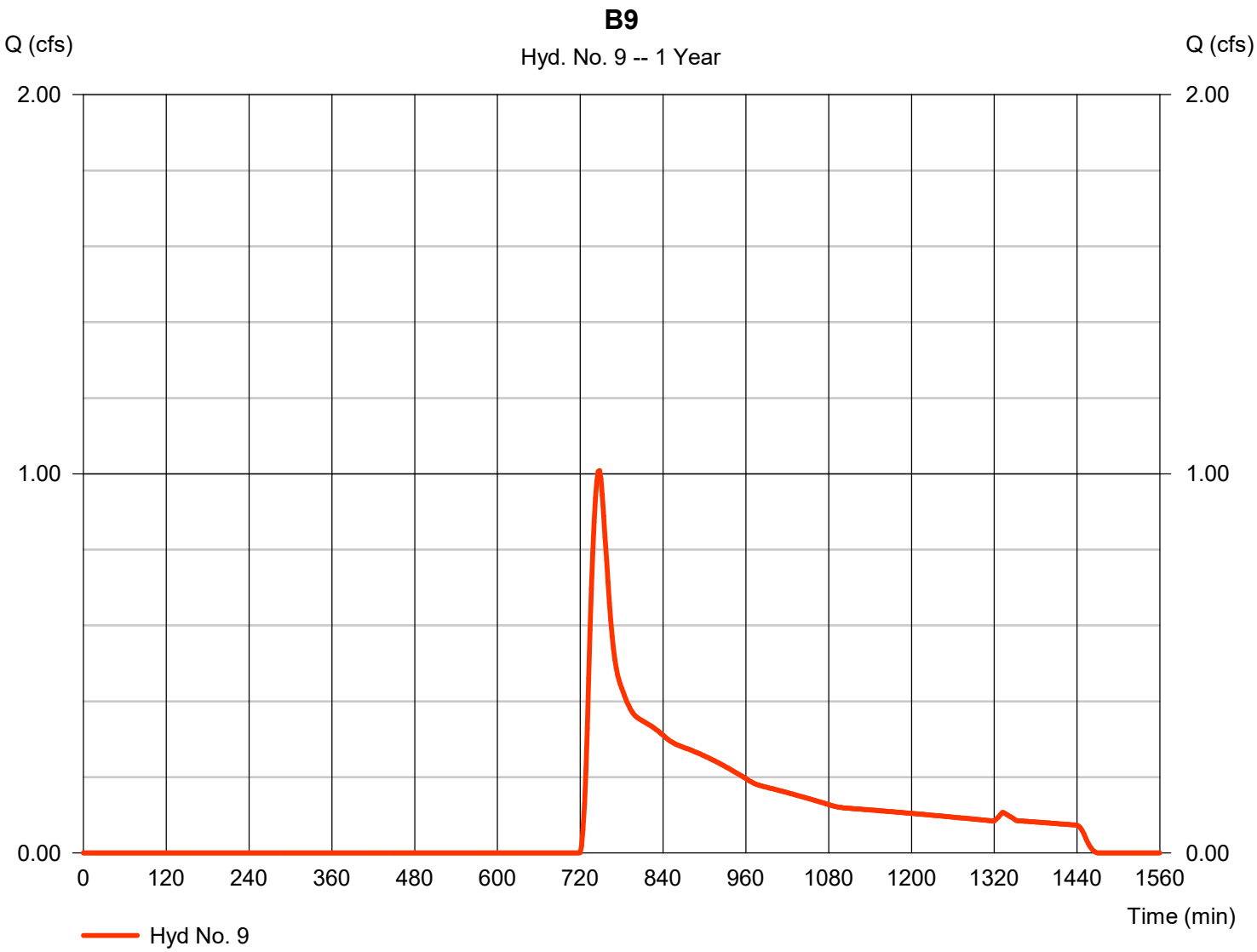
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 9

B9

Hydrograph type	= SCS Runoff	Peak discharge	= 1.008 cfs
Storm frequency	= 1 yrs	Time to peak	= 748 min
Time interval	= 2 min	Hyd. volume	= 8,597 cuft
Drainage area	= 10.080 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.40 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



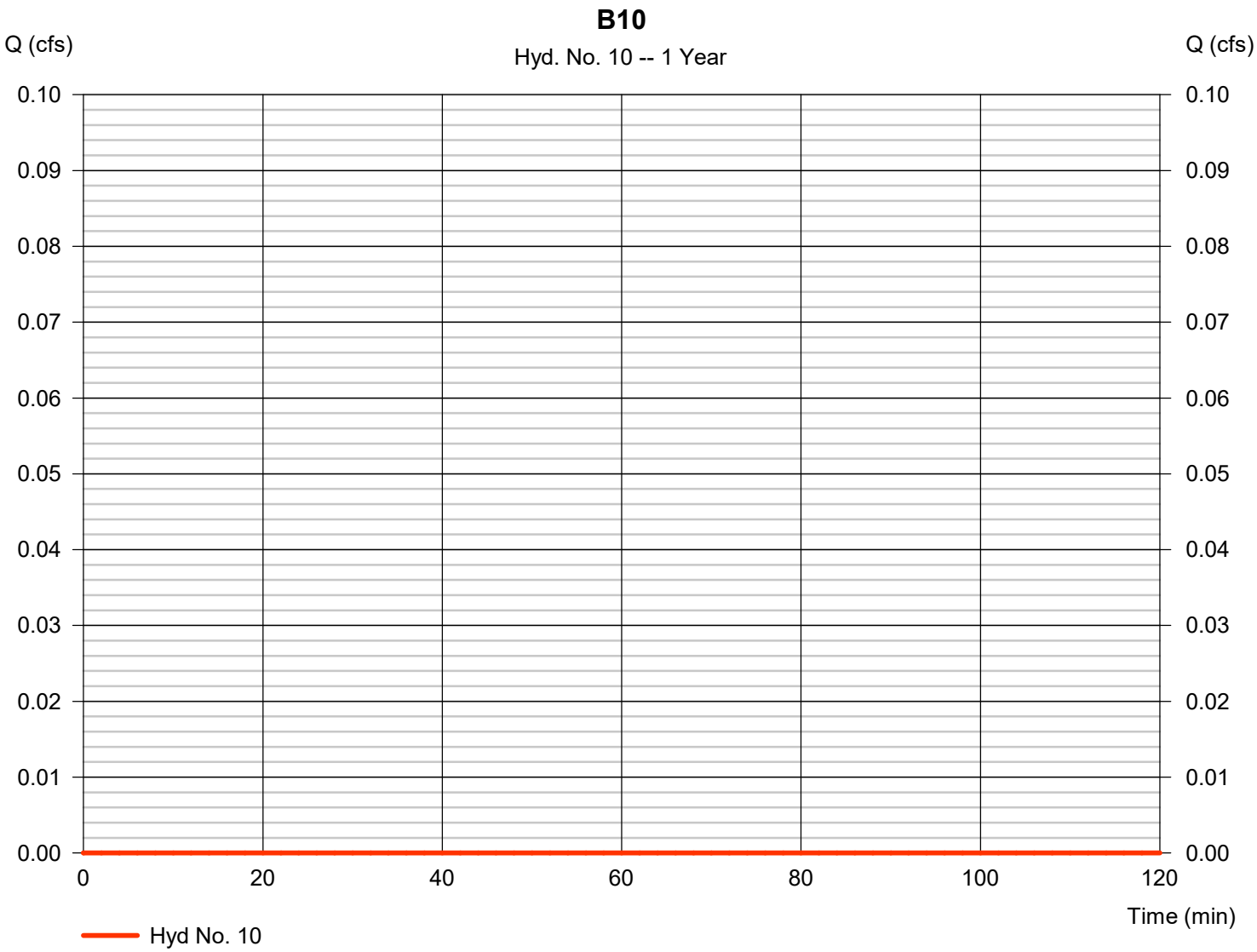
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 10

B10

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Drainage area	= 1.010 ac	Curve number	= 35
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.60 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



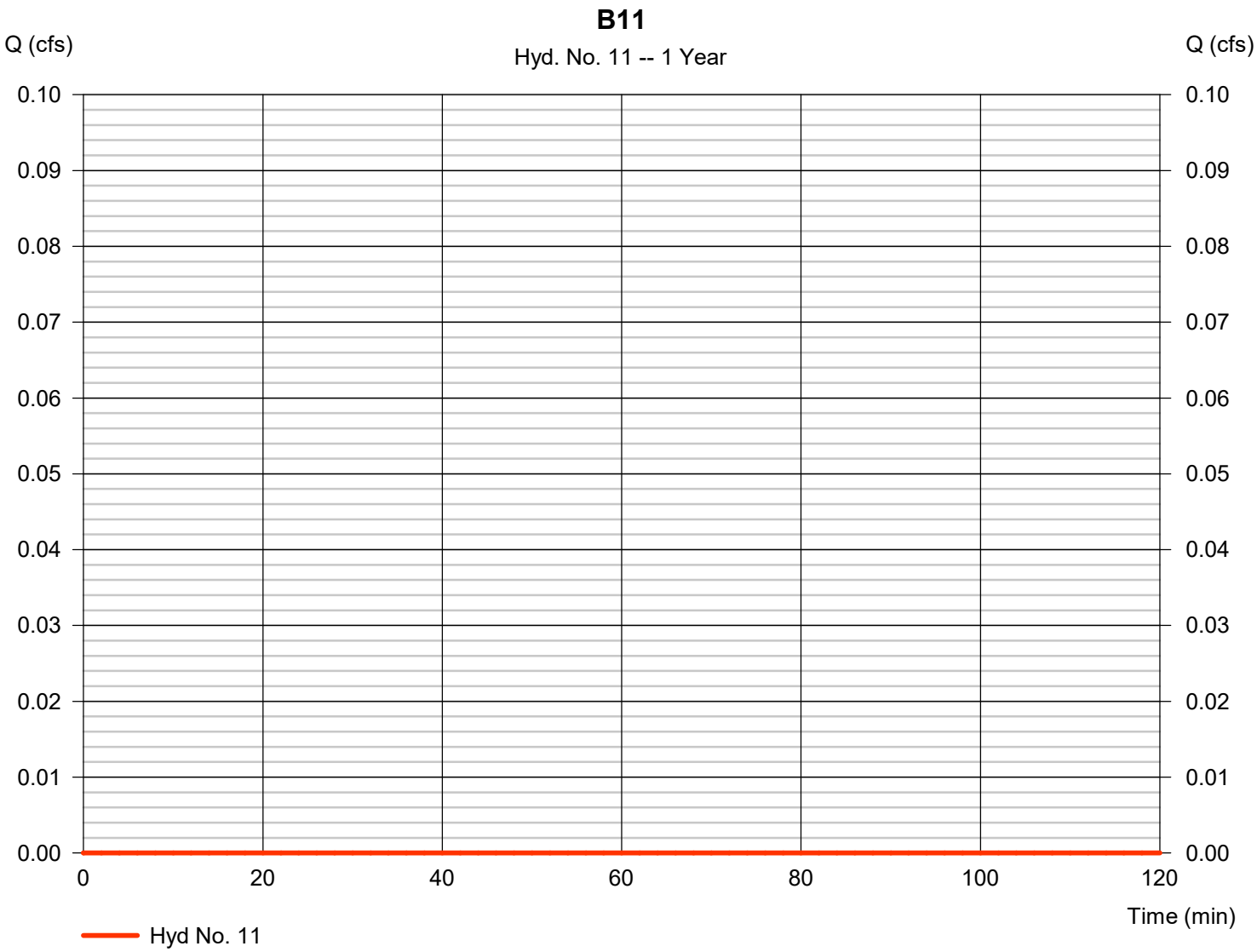
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 11

B11

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Drainage area	= 1.280 ac	Curve number	= 35
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.70 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



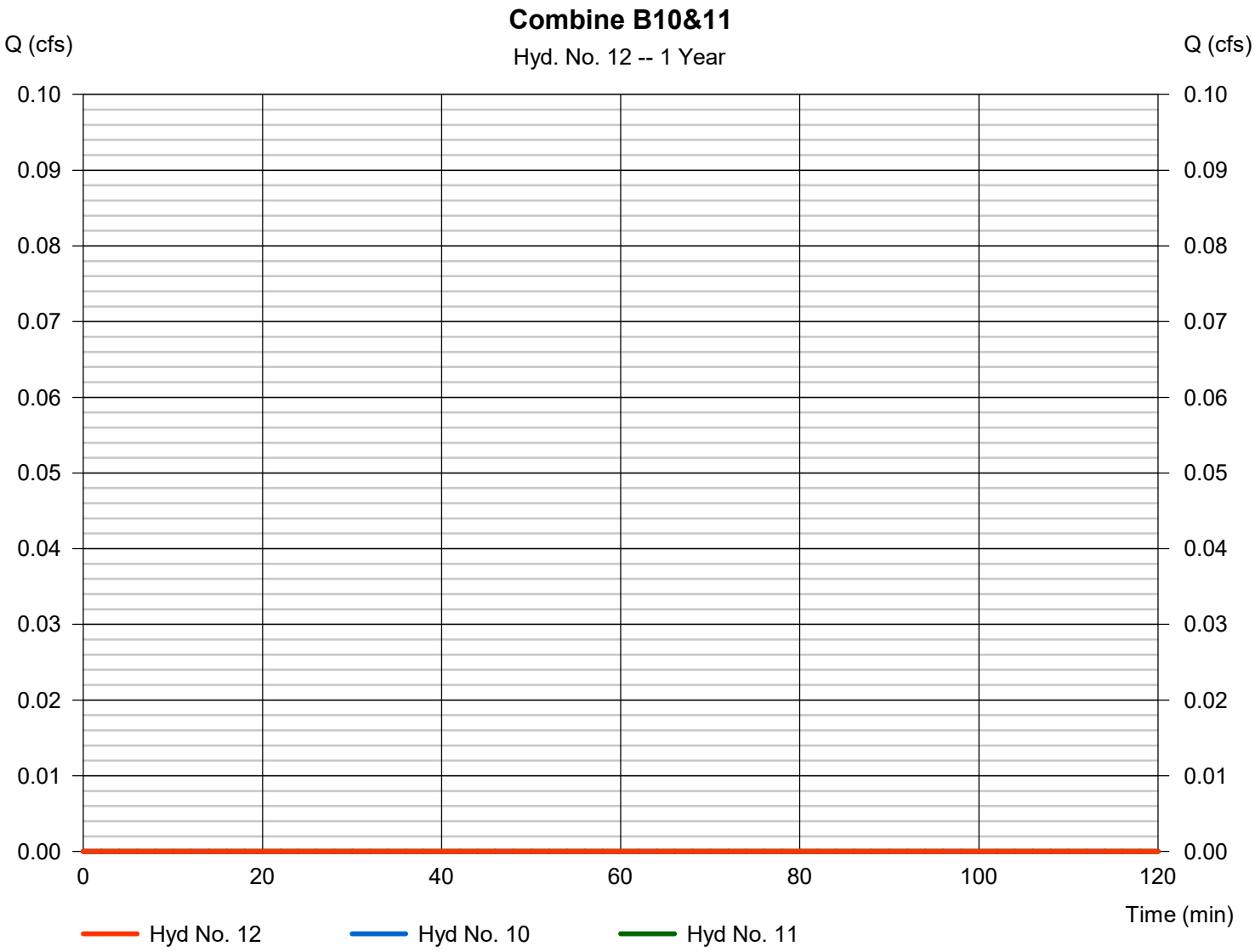
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 12

Combine B10&11

Hydrograph type	= Combine	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Inflow hyds.	= 10, 11	Contrib. drain. area	= 2.290 ac



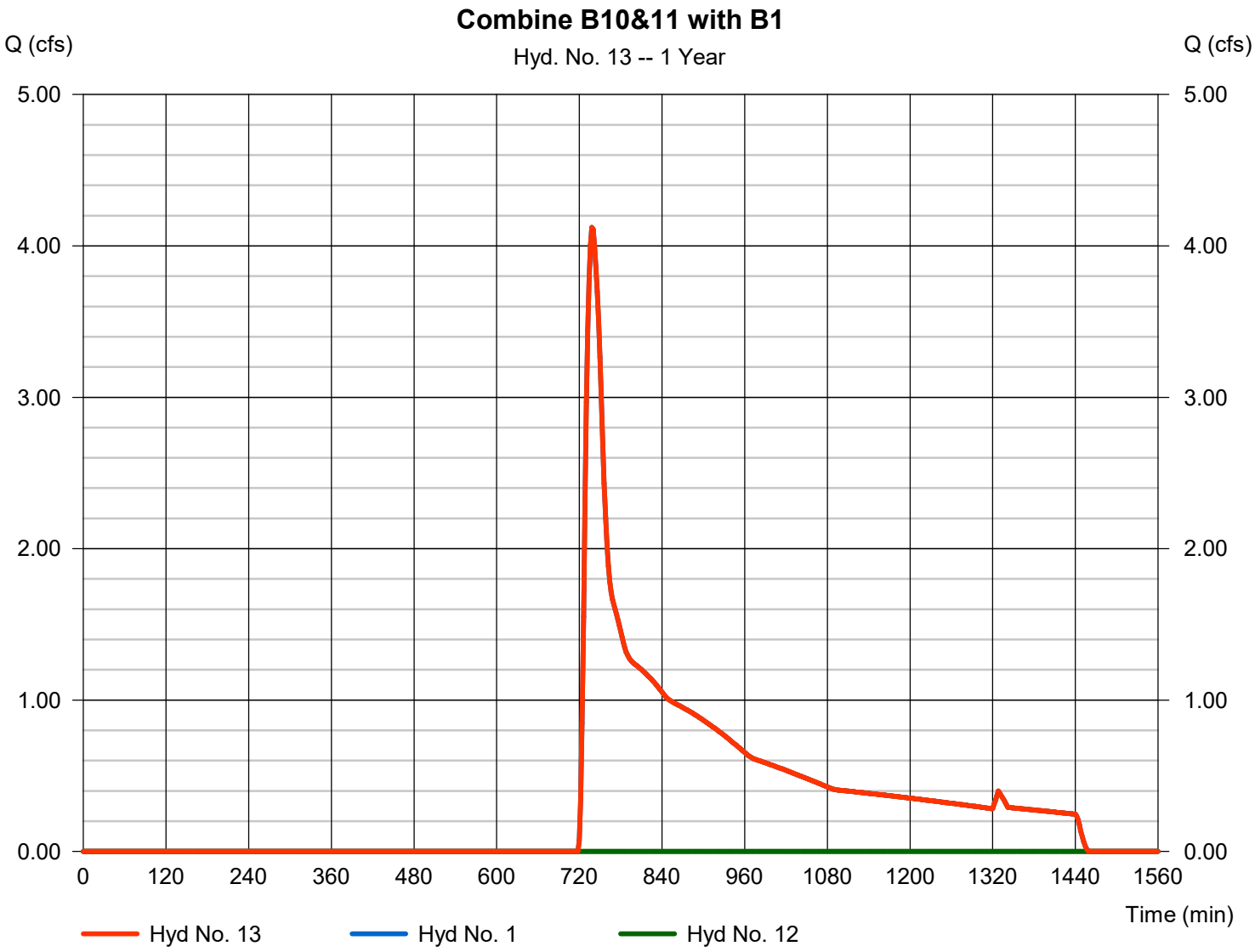
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 13

Combine B10&11 with B1

Hydrograph type	= Combine	Peak discharge	= 4.123 cfs
Storm frequency	= 1 yrs	Time to peak	= 738 min
Time interval	= 2 min	Hyd. volume	= 30,451 cuft
Inflow hyds.	= 1, 12	Contrib. drain. area	= 31.170 ac



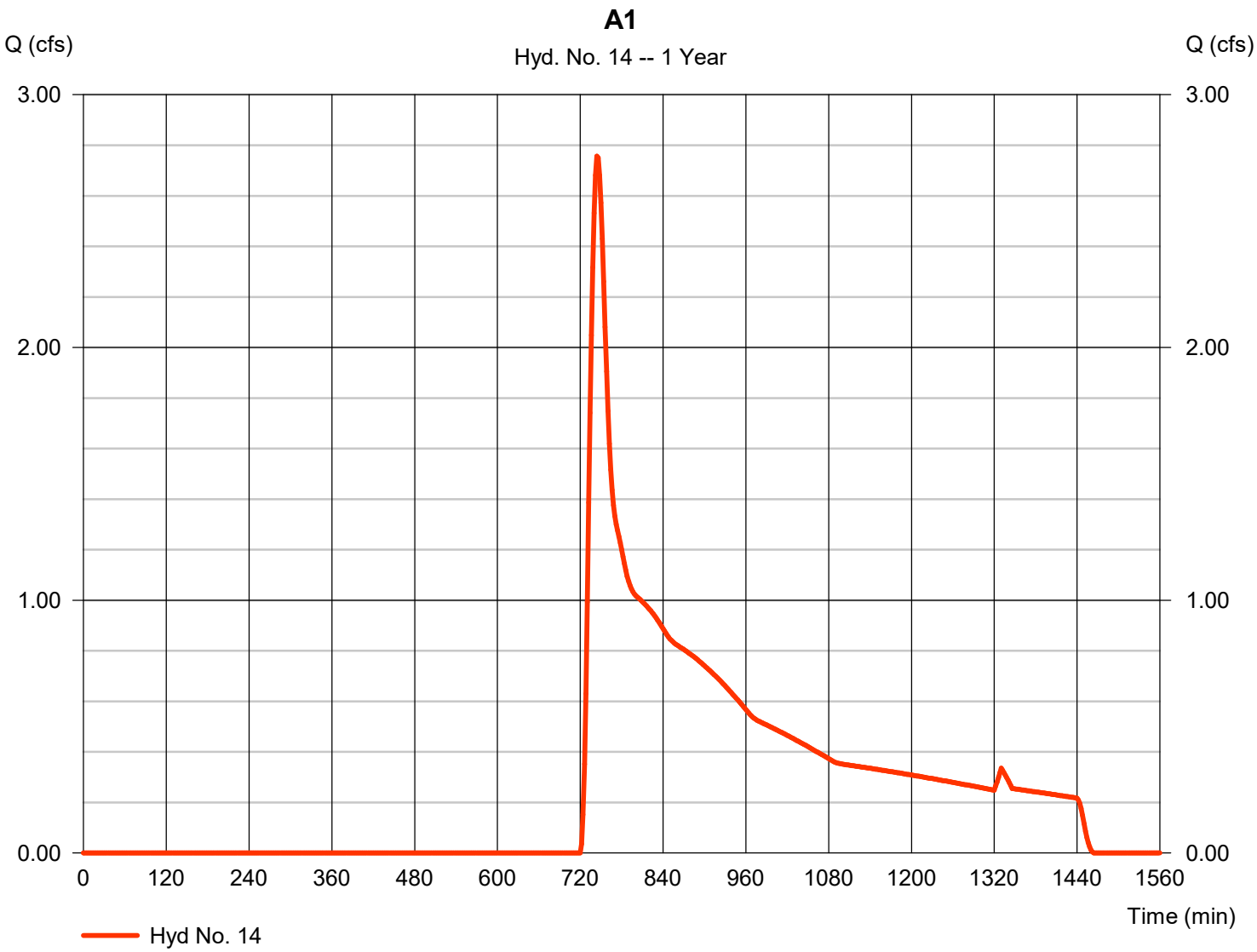
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 14

A1

Hydrograph type	= SCS Runoff	Peak discharge	= 2.757 cfs
Storm frequency	= 1 yrs	Time to peak	= 744 min
Time interval	= 2 min	Hyd. volume	= 24,464 cuft
Drainage area	= 32.780 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 14.70 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



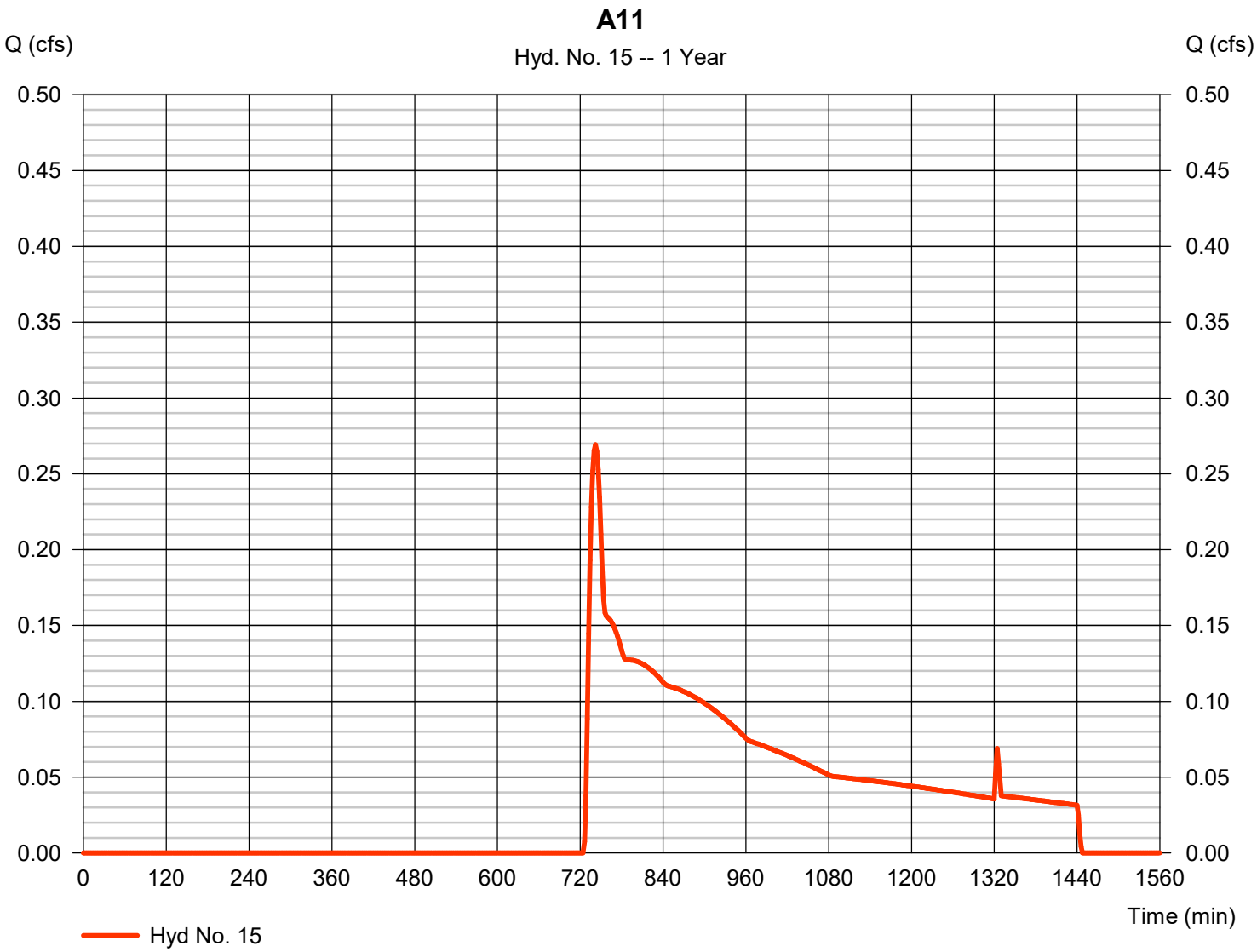
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 15

A11

Hydrograph type	= SCS Runoff	Peak discharge	= 0.269 cfs
Storm frequency	= 1 yrs	Time to peak	= 742 min
Time interval	= 2 min	Hyd. volume	= 3,059 cuft
Drainage area	= 6.180 ac	Curve number	= 58
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



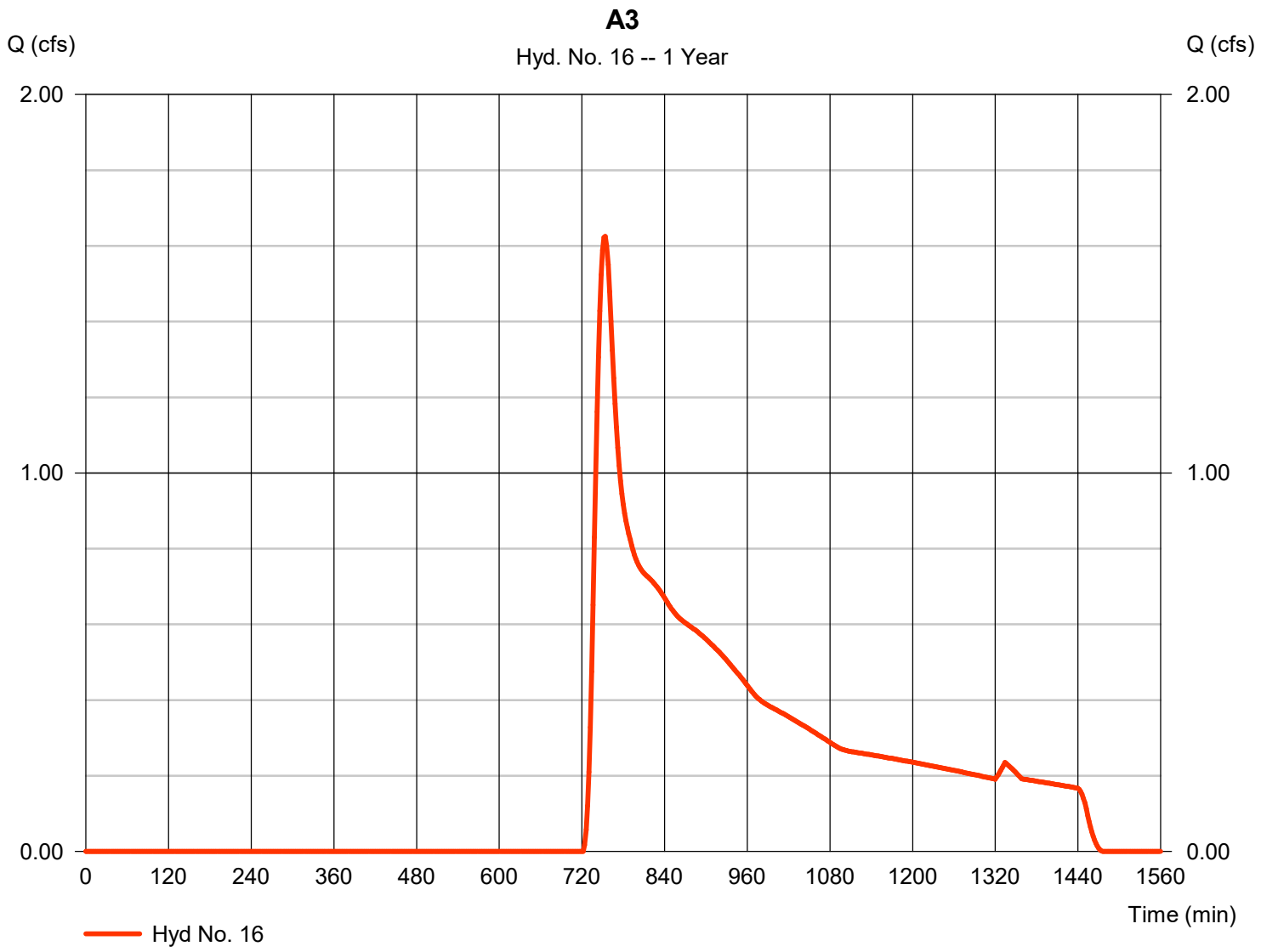
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 16

A3

Hydrograph type	= SCS Runoff	Peak discharge	= 1.625 cfs
Storm frequency	= 1 yrs	Time to peak	= 754 min
Time interval	= 2 min	Hyd. volume	= 17,717 cuft
Drainage area	= 25.560 ac	Curve number	= 60
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 22.40 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



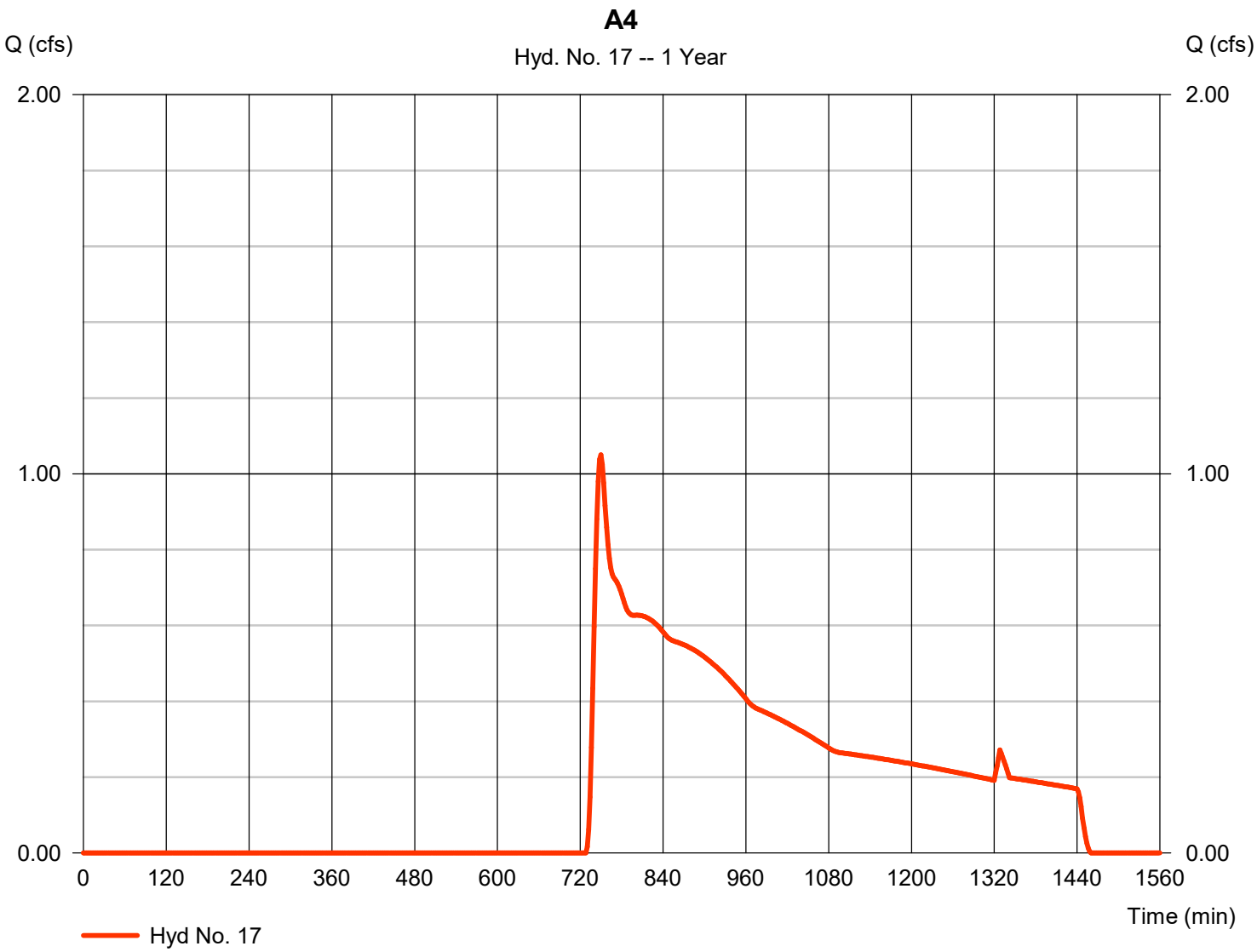
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 17

A4

Hydrograph type	= SCS Runoff	Peak discharge	= 1.050 cfs
Storm frequency	= 1 yrs	Time to peak	= 750 min
Time interval	= 2 min	Hyd. volume	= 15,315 cuft
Drainage area	= 32.410 ac	Curve number	= 57
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.30 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



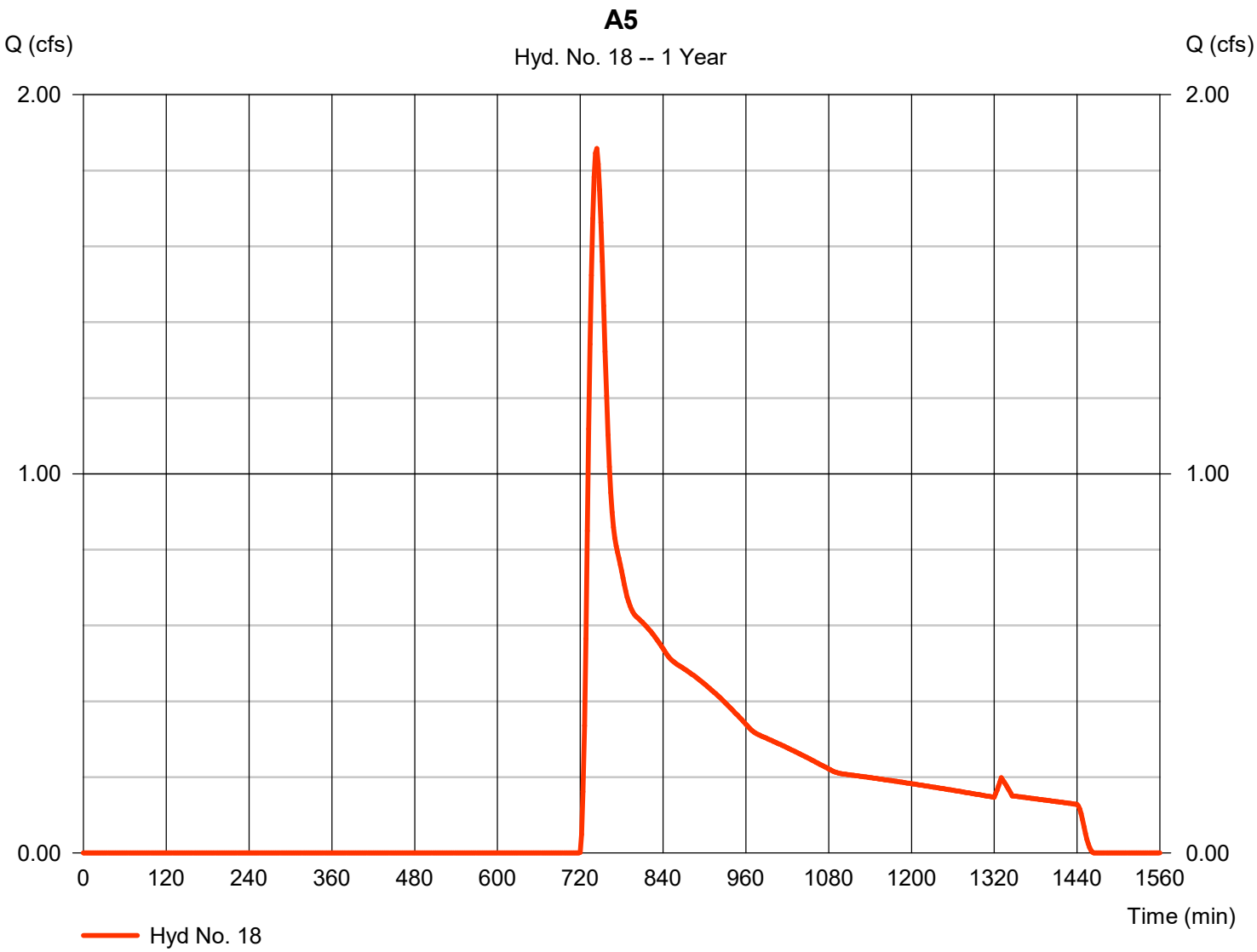
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 18

A5

Hydrograph type	= SCS Runoff	Peak discharge	= 1.858 cfs
Storm frequency	= 1 yrs	Time to peak	= 744 min
Time interval	= 2 min	Hyd. volume	= 15,110 cuft
Drainage area	= 18.170 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.50 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



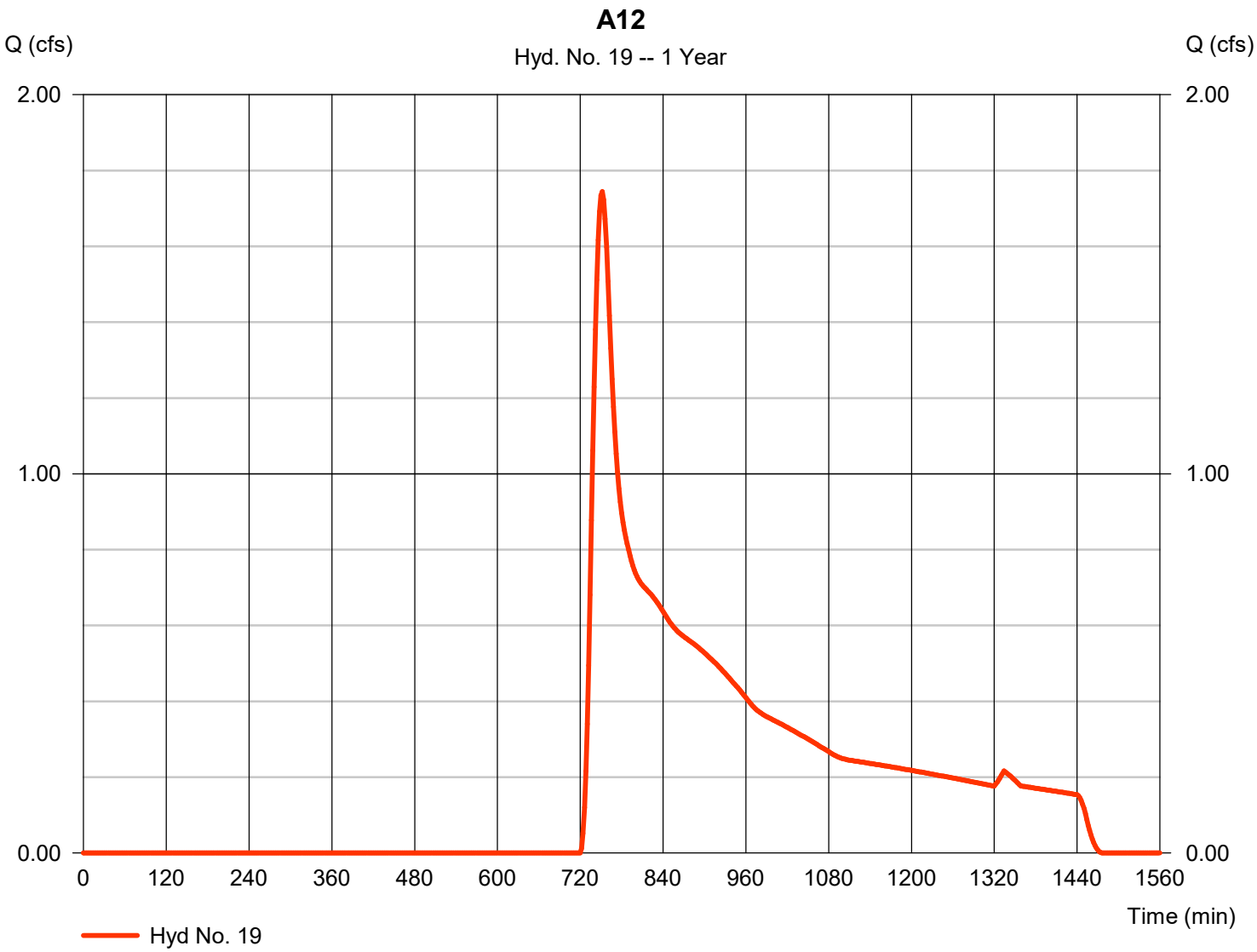
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 19

A12

Hydrograph type	= SCS Runoff	Peak discharge	= 1.744 cfs
Storm frequency	= 1 yrs	Time to peak	= 752 min
Time interval	= 2 min	Hyd. volume	= 17,140 cuft
Drainage area	= 22.000 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 22.80 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



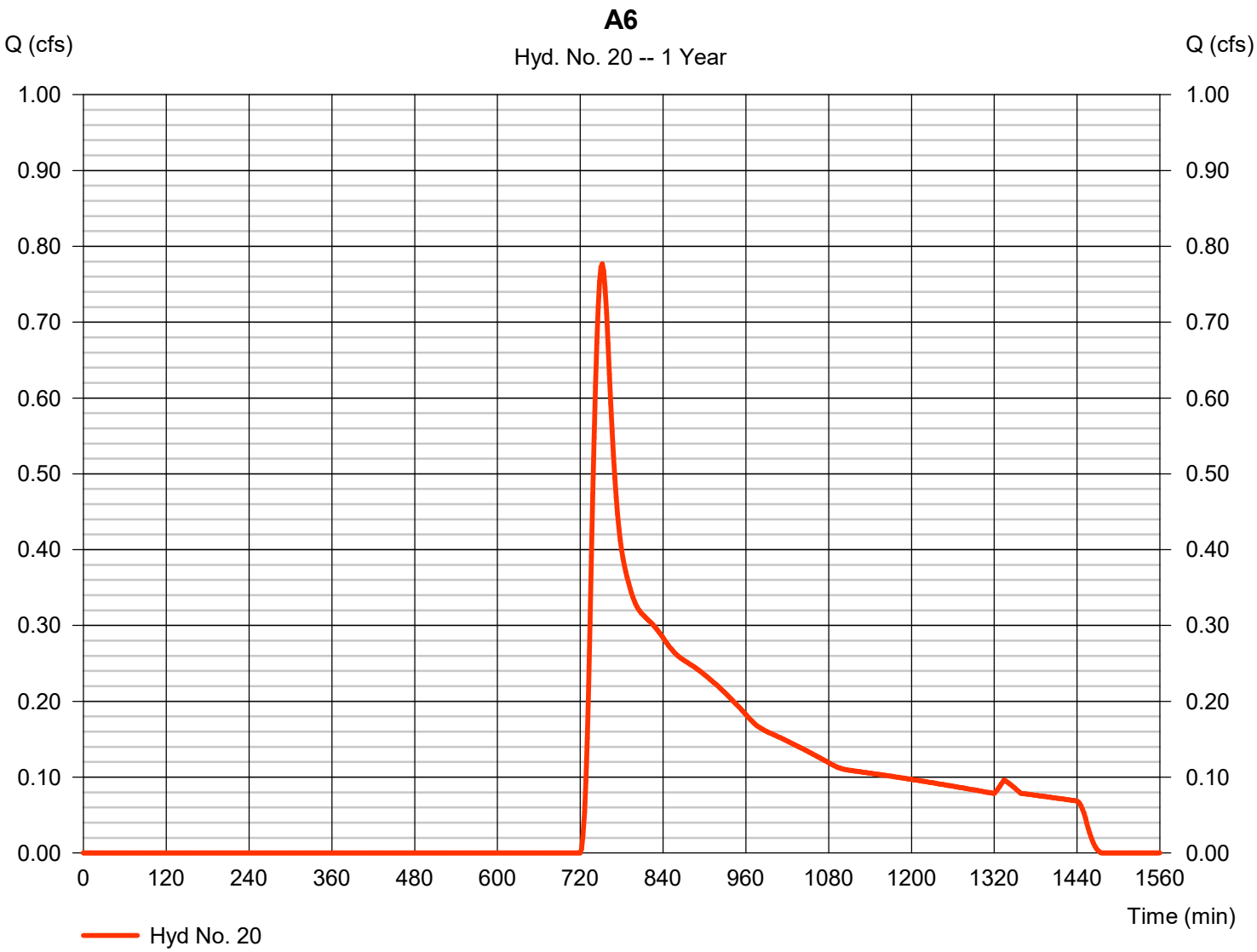
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 20

A6

Hydrograph type	= SCS Runoff	Peak discharge	= 0.777 cfs
Storm frequency	= 1 yrs	Time to peak	= 752 min
Time interval	= 2 min	Hyd. volume	= 7,635 cuft
Drainage area	= 9.800 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 20.20 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



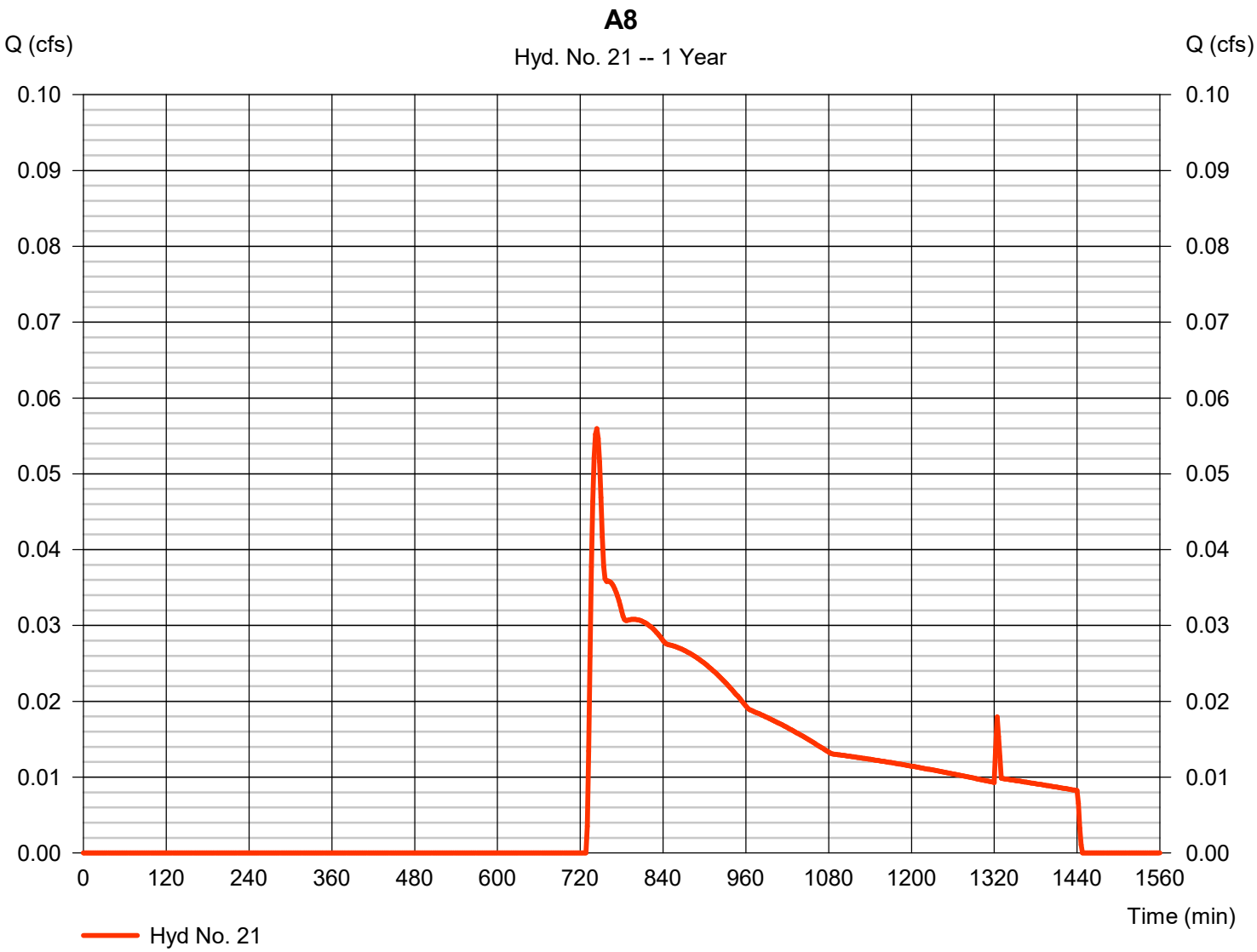
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 21

A8

Hydrograph type	= SCS Runoff	Peak discharge	= 0.056 cfs
Storm frequency	= 1 yrs	Time to peak	= 744 min
Time interval	= 2 min	Hyd. volume	= 752 cuft
Drainage area	= 1.750 ac	Curve number	= 57
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



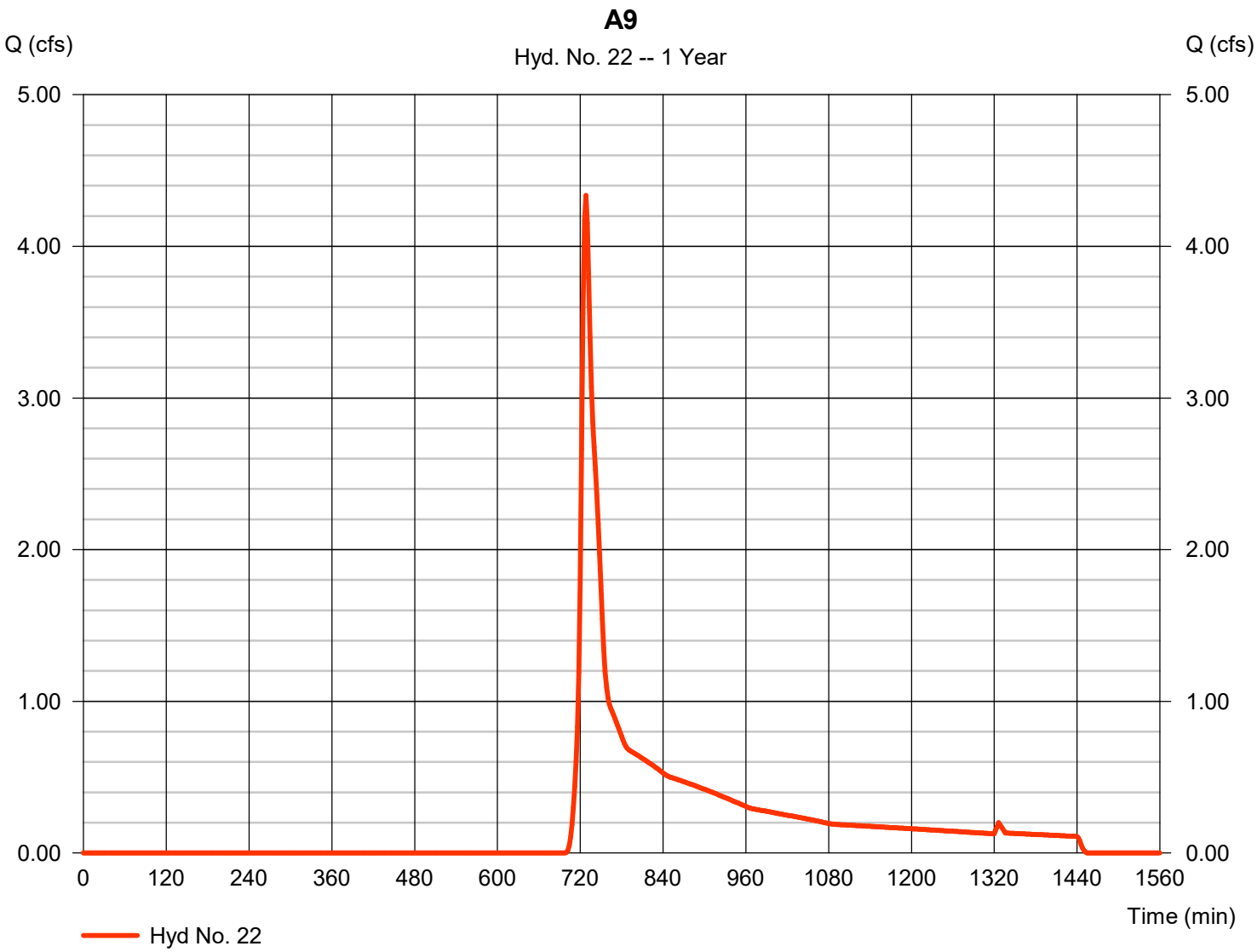
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 22

A9

Hydrograph type	= SCS Runoff	Peak discharge	= 4.335 cfs
Storm frequency	= 1 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 18,161 cuft
Drainage area	= 9.690 ac	Curve number	= 71
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.70 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



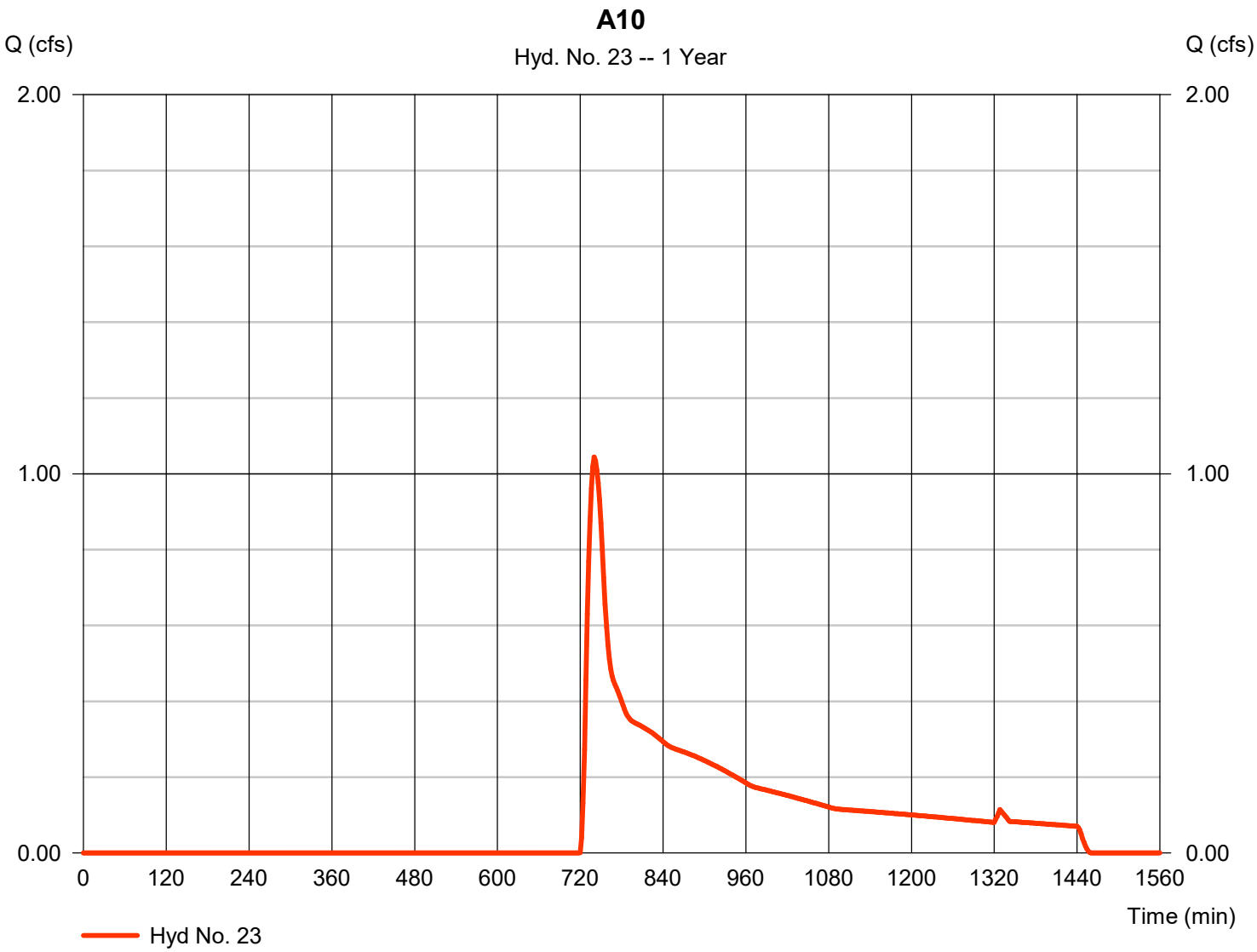
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 23

A10

Hydrograph type	= SCS Runoff	Peak discharge	= 1.044 cfs
Storm frequency	= 1 yrs	Time to peak	= 740 min
Time interval	= 2 min	Hyd. volume	= 8,321 cuft
Drainage area	= 9.460 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.30 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



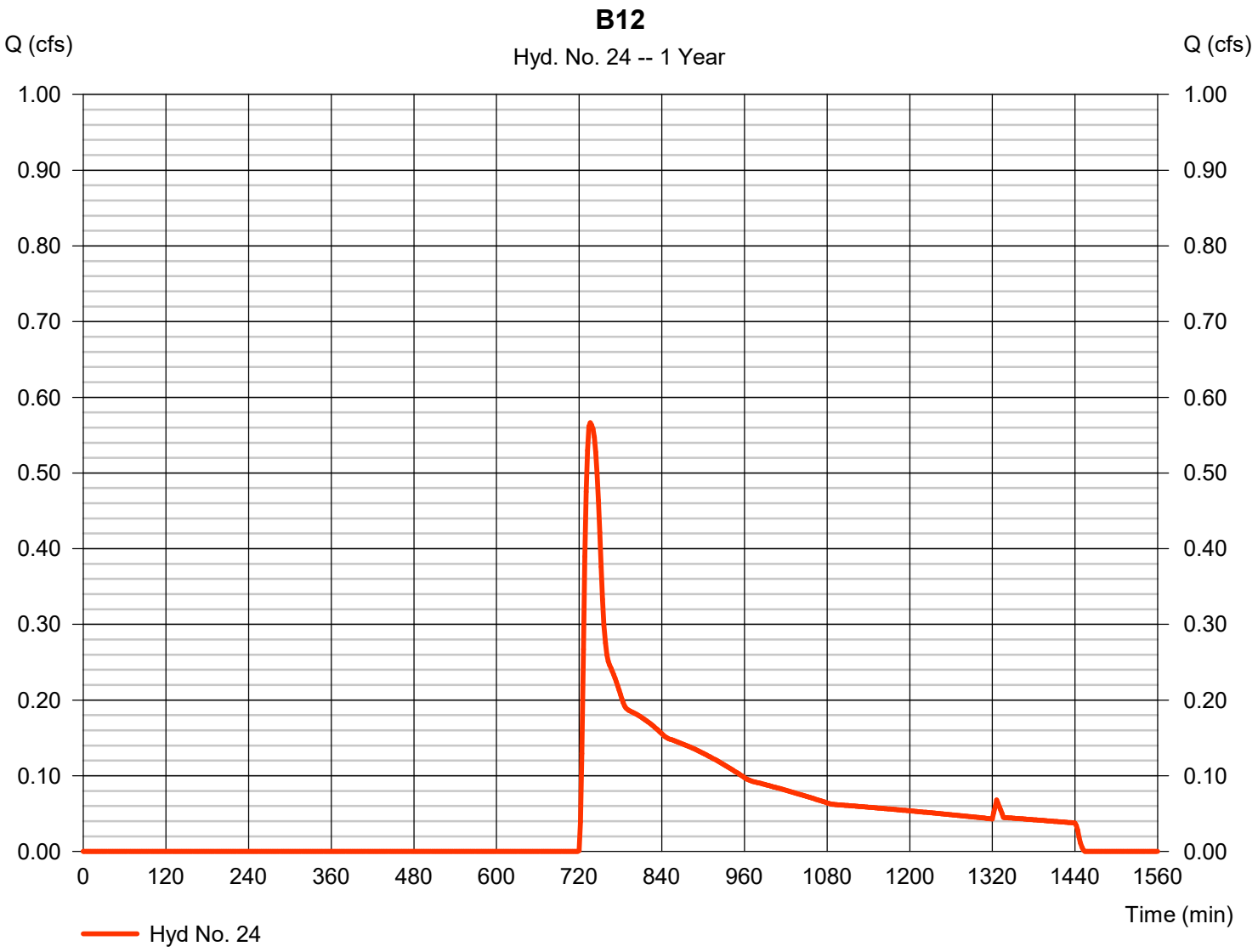
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 24

B12

Hydrograph type	= SCS Runoff	Peak discharge	= 0.567 cfs
Storm frequency	= 1 yrs	Time to peak	= 736 min
Time interval	= 2 min	Hyd. volume	= 4,469 cuft
Drainage area	= 5.240 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.80 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

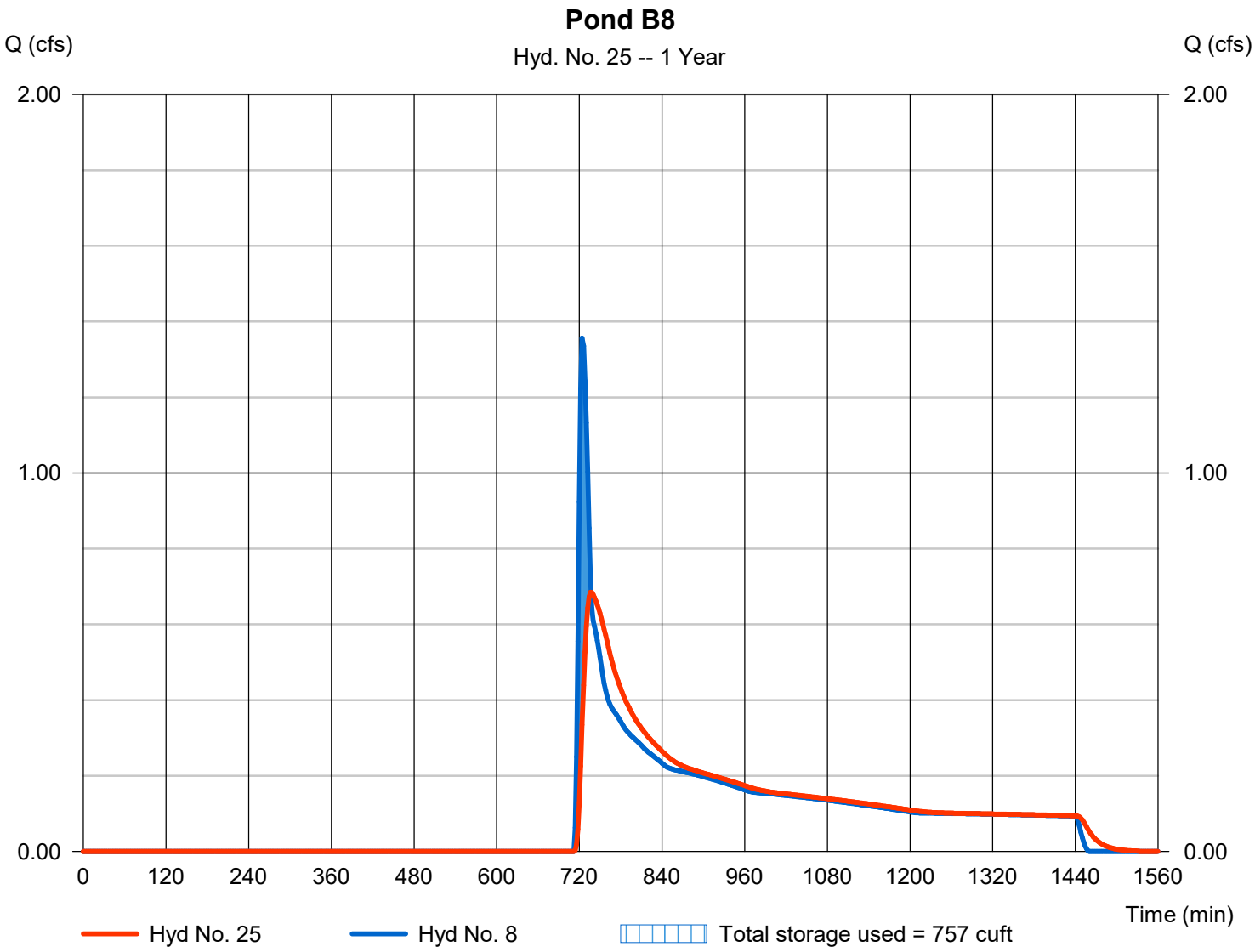
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 25

Pond B8

Hydrograph type	= Reservoir	Peak discharge	= 0.685 cfs
Storm frequency	= 1 yrs	Time to peak	= 736 min
Time interval	= 2 min	Hyd. volume	= 8,280 cuft
Inflow hyd. No.	= 8 - B8	Max. Elevation	= 132.03 ft
Reservoir name	= B8 Pond	Max. Storage	= 757 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Pond No. 2 - B8 Pond

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 132.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	132.00	29,700	0	0
1.00	133.00	29,750	29,722	29,722
2.00	134.00	29,800	29,772	59,494

Culvert / Orifice Structures

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

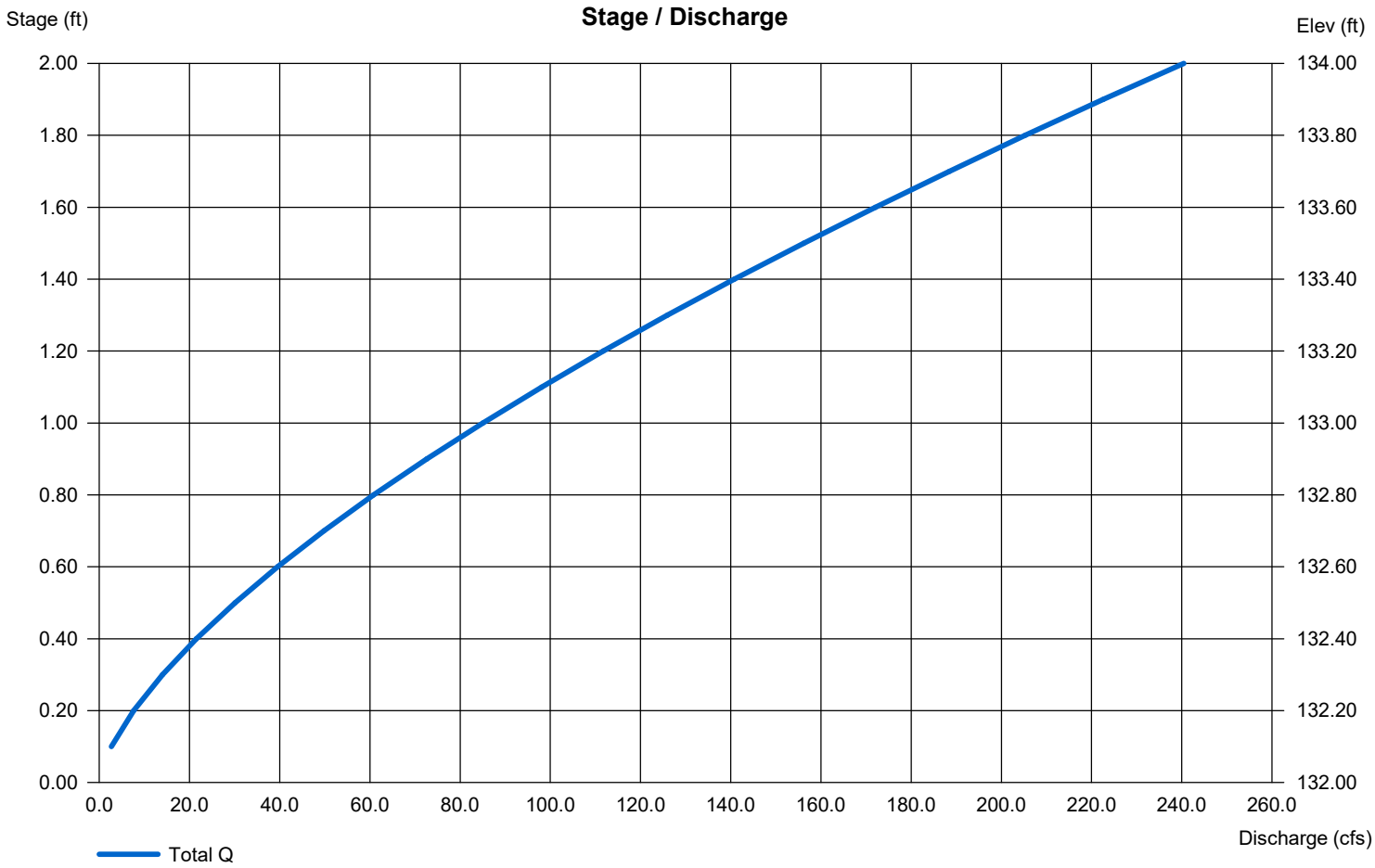
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 170.00	0.00	0.00	0.00
Crest El. (ft)	= 132.00	0.00	0.00	0.00
Weir Coeff.	= 0.50	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

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



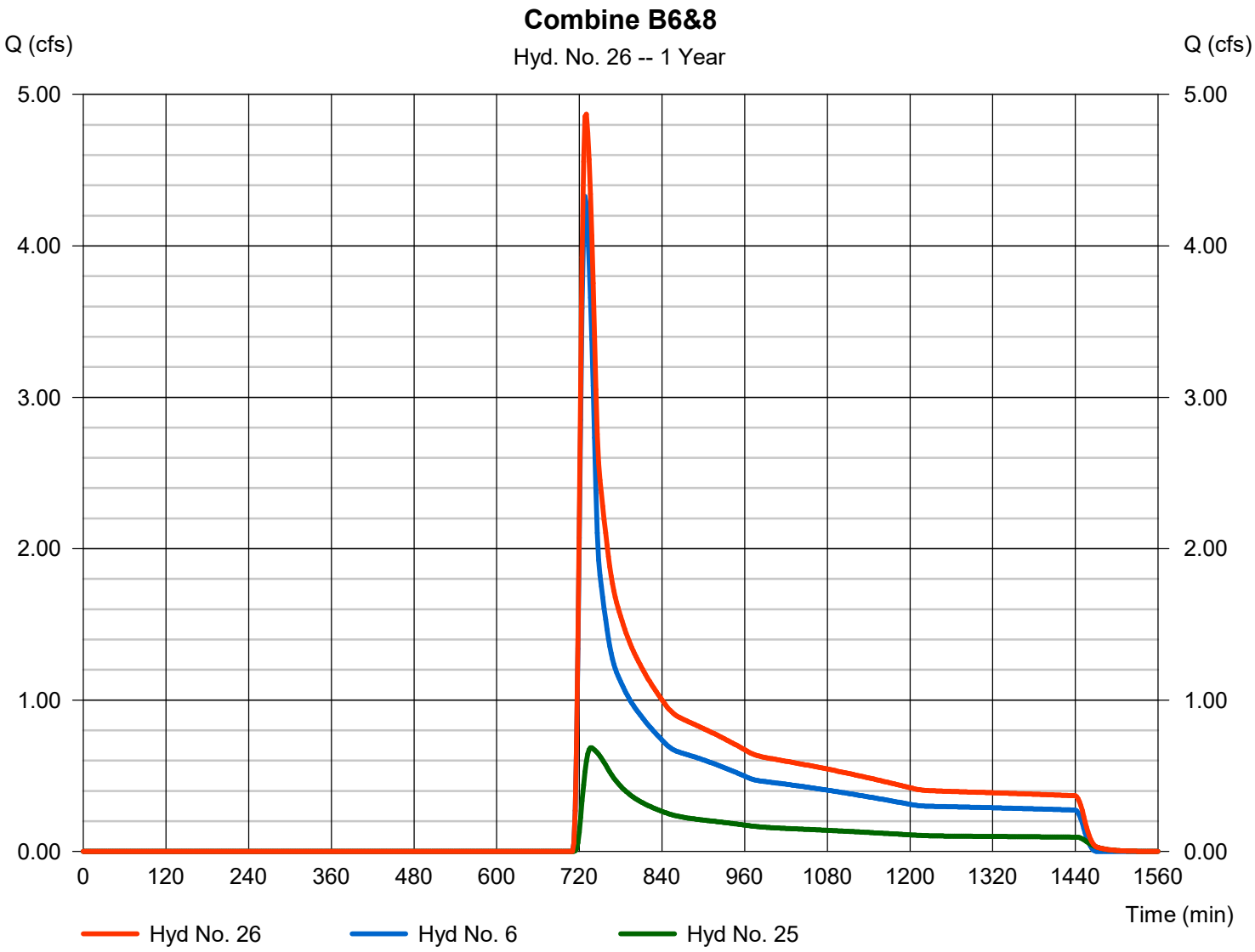
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 26

Combine B6&8

Hydrograph type	= Combine	Peak discharge	= 4.870 cfs
Storm frequency	= 1 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 34,751 cuft
Inflow hyds.	= 6, 25	Contrib. drain. area	= 27.950 ac



Hydrograph Report

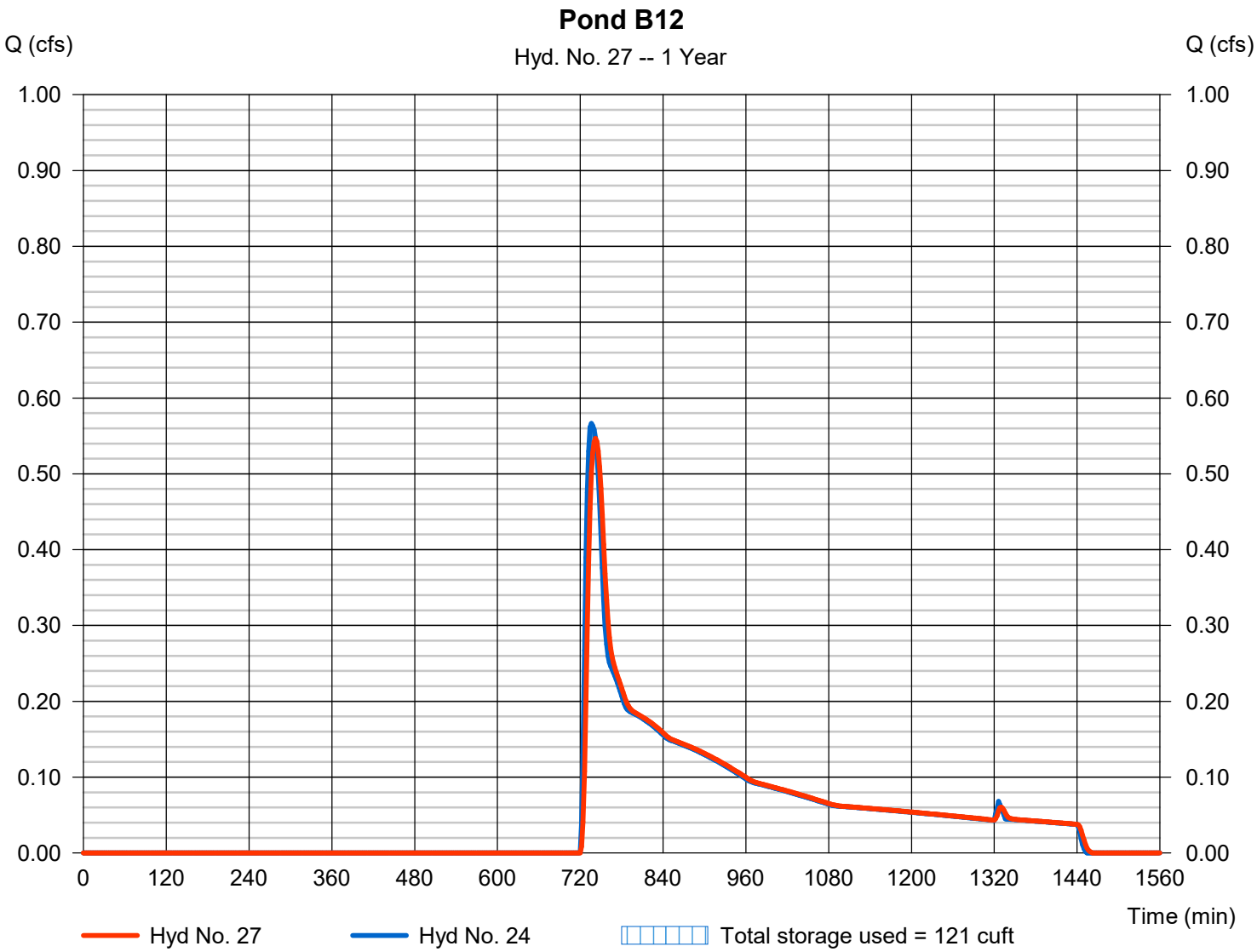
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 27

Pond B12

Hydrograph type	= Reservoir	Peak discharge	= 0.547 cfs
Storm frequency	= 1 yrs	Time to peak	= 742 min
Time interval	= 2 min	Hyd. volume	= 4,469 cuft
Inflow hyd. No.	= 24 - B12	Max. Elevation	= 126.01 ft
Reservoir name	= B12 Pond	Max. Storage	= 121 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Pond No. 1 - B12 Pond

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 126.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	126.00	21,100	0	0
1.00	127.00	21,200	21,148	21,148
2.00	128.00	21,210	21,203	42,351
3.00	129.00	21,230	21,218	63,569

Culvert / Orifice Structures

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

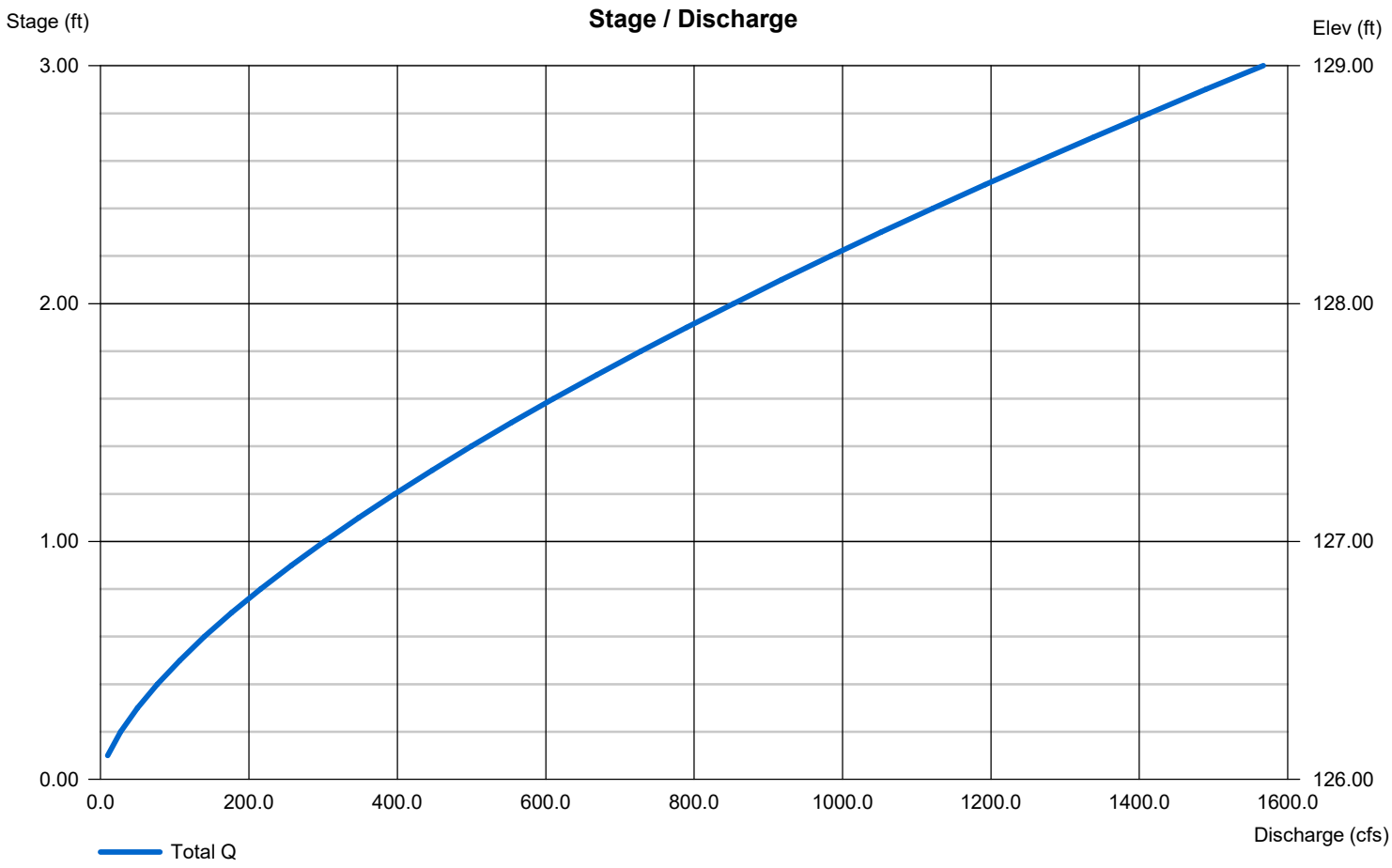
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 116.00	0.00	0.00	0.00
Crest El. (ft)	= 126.00	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

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



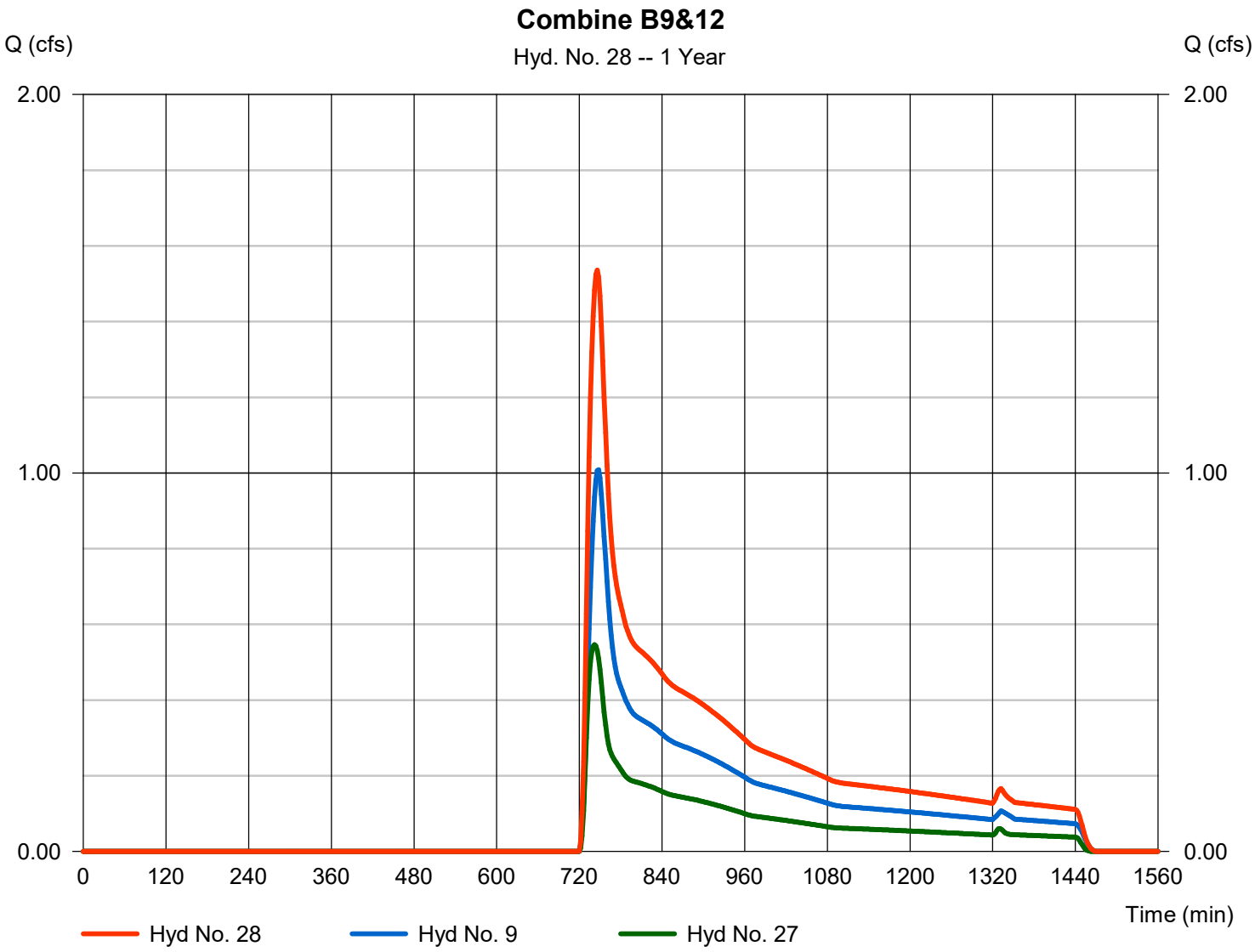
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 28

Combine B9&12

Hydrograph type	= Combine	Peak discharge	= 1.536 cfs
Storm frequency	= 1 yrs	Time to peak	= 746 min
Time interval	= 2 min	Hyd. volume	= 13,066 cuft
Inflow hyds.	= 9, 27	Contrib. drain. area	= 10.080 ac



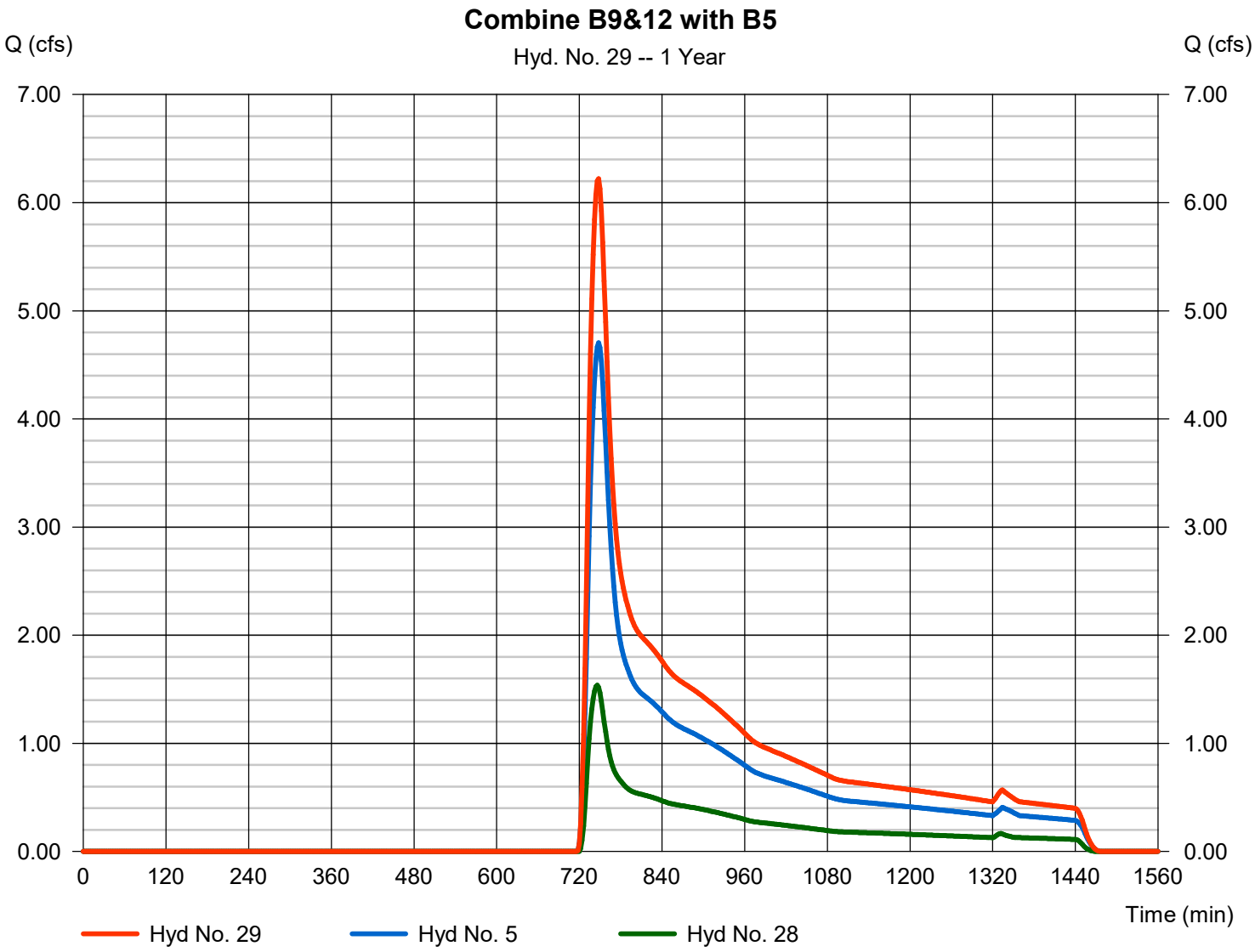
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 29

Combine B9&12 with B5

Hydrograph type	= Combine	Peak discharge	= 6.221 cfs
Storm frequency	= 1 yrs	Time to peak	= 748 min
Time interval	= 2 min	Hyd. volume	= 49,714 cuft
Inflow hyds.	= 5, 28	Contrib. drain. area	= 34.440 ac



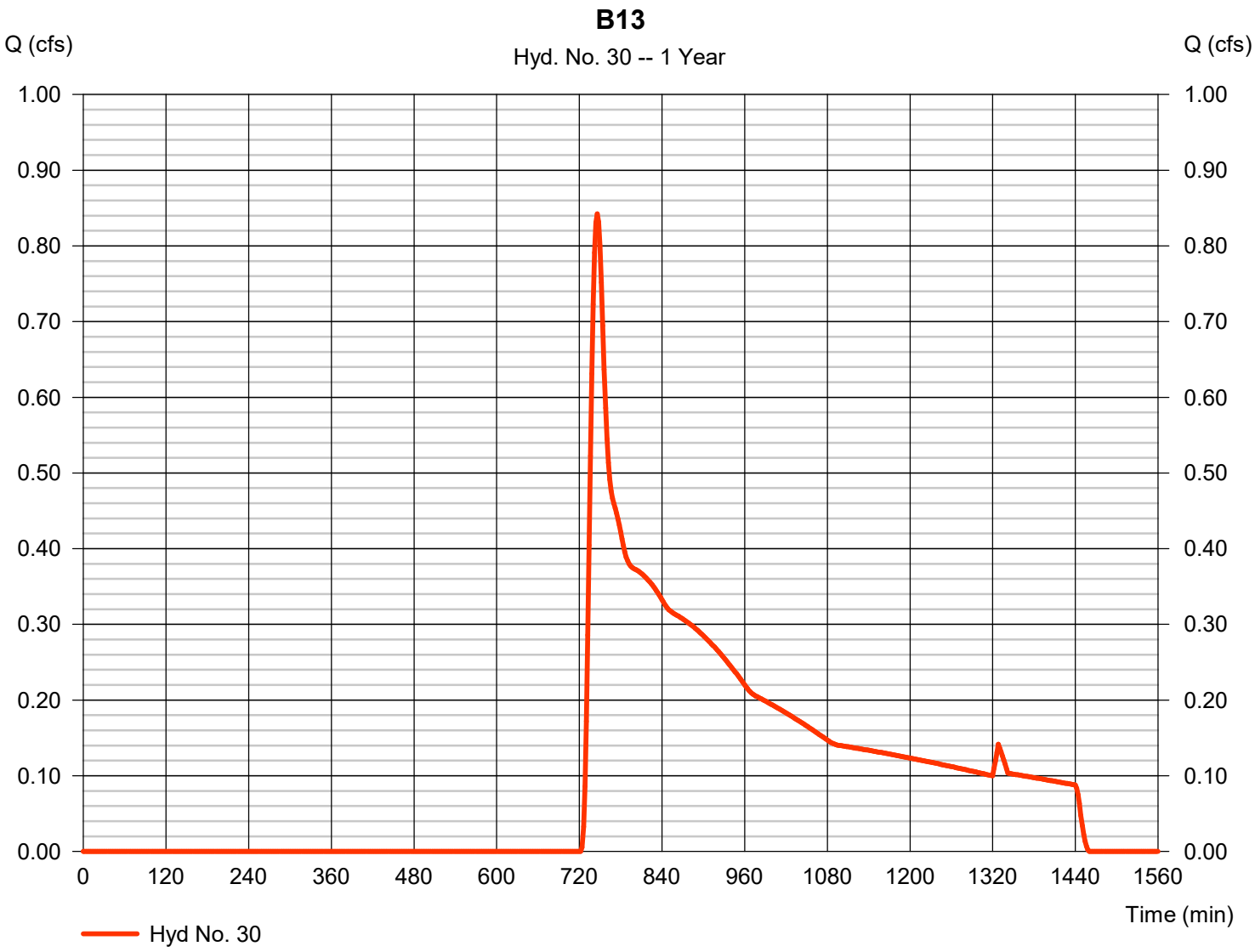
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 30

B13

Hydrograph type	= SCS Runoff	Peak discharge	= 0.843 cfs
Storm frequency	= 1 yrs	Time to peak	= 746 min
Time interval	= 2 min	Hyd. volume	= 8,943 cuft
Drainage area	= 14.400 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 10.40 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



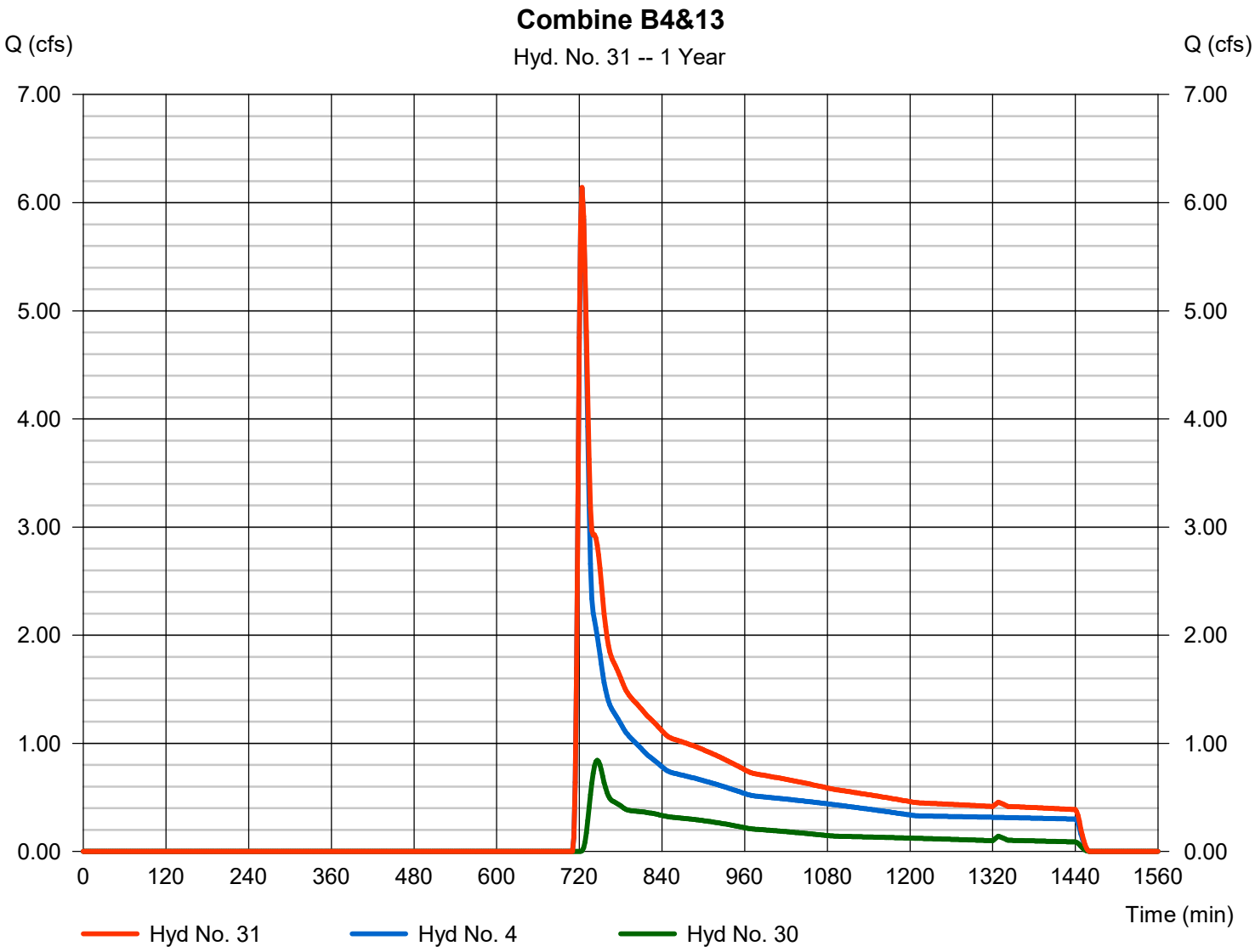
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 31

Combine B4&13

Hydrograph type	= Combine	Peak discharge	= 6.140 cfs
Storm frequency	= 1 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 37,980 cuft
Inflow hyds.	= 4, 30	Contrib. drain. area	= 44.130 ac



Hydrograph Report

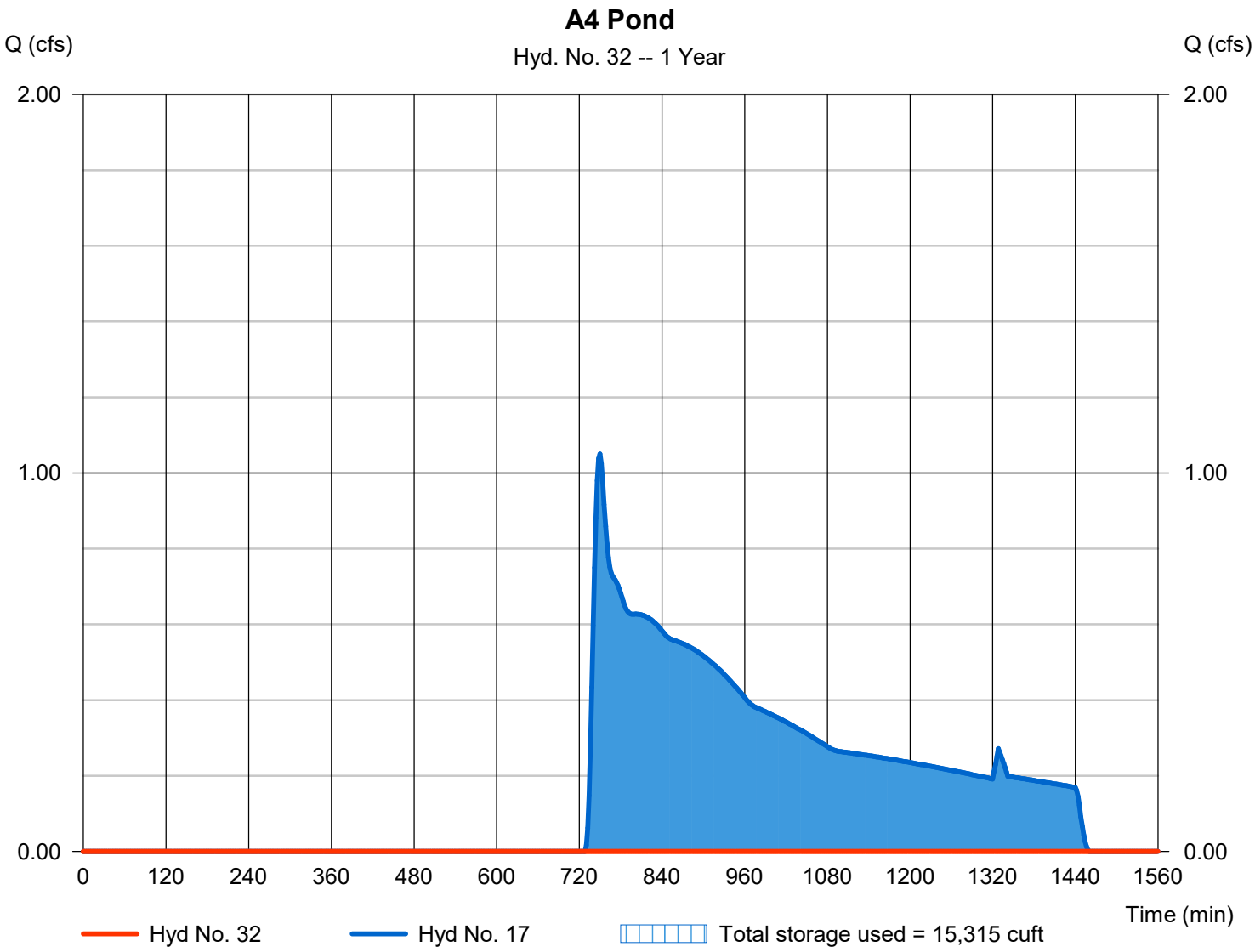
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 32

A4 Pond

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 17 - A4	Max. Elevation	= 100.88 ft
Reservoir name	= A4 Pond	Max. Storage	= 15,315 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Pond No. 3 - A4 Pond

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 100.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	11,028	0	0
5.00	105.00	24,470	86,533	86,533
10.00	110.00	57,955	200,119	286,653
15.00	115.00	57,955	289,746	576,399

Culvert / Orifice Structures

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

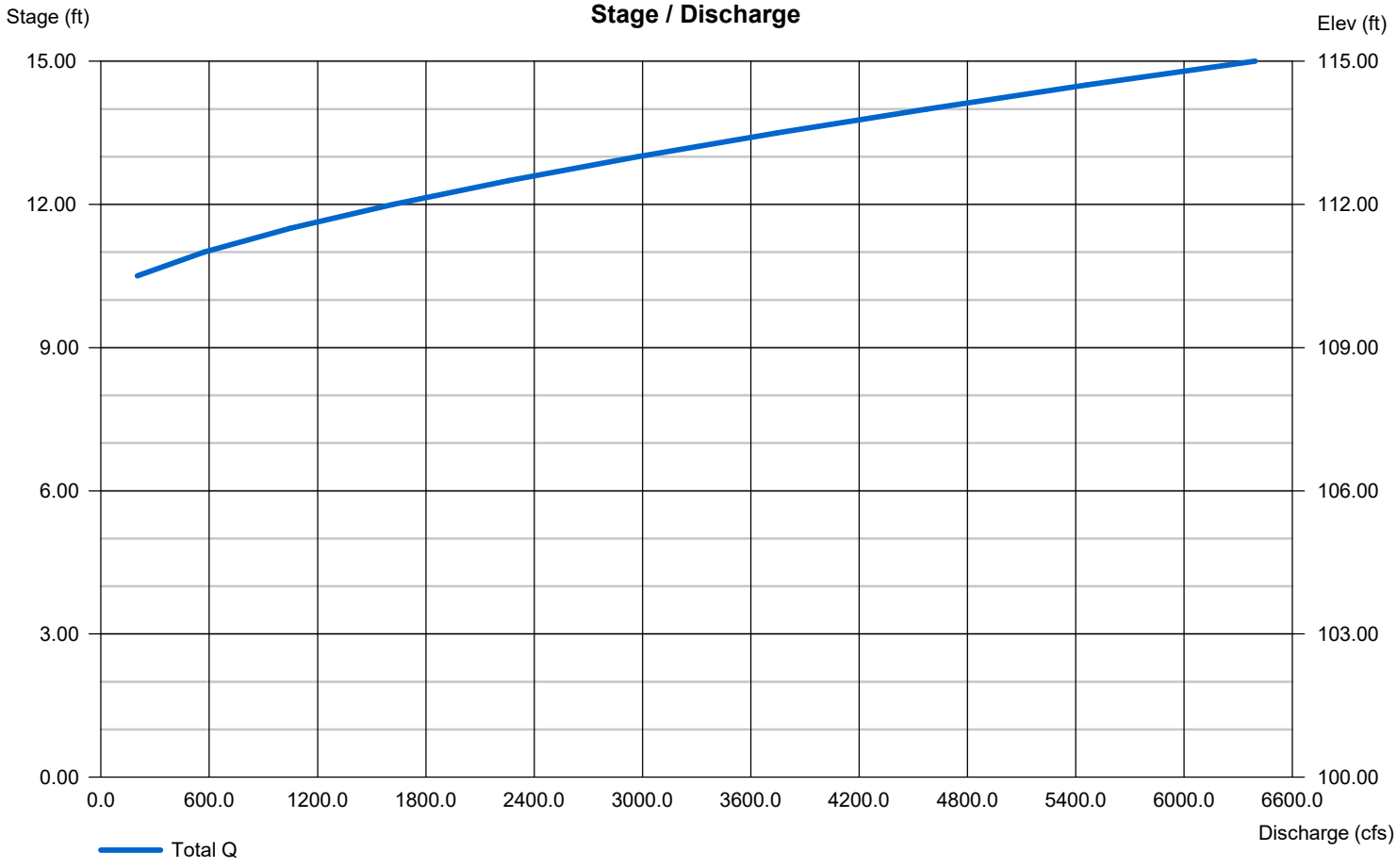
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 220.00	0.00	0.00	0.00
Crest El. (ft)	= 110.00	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

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



Hydrograph Report

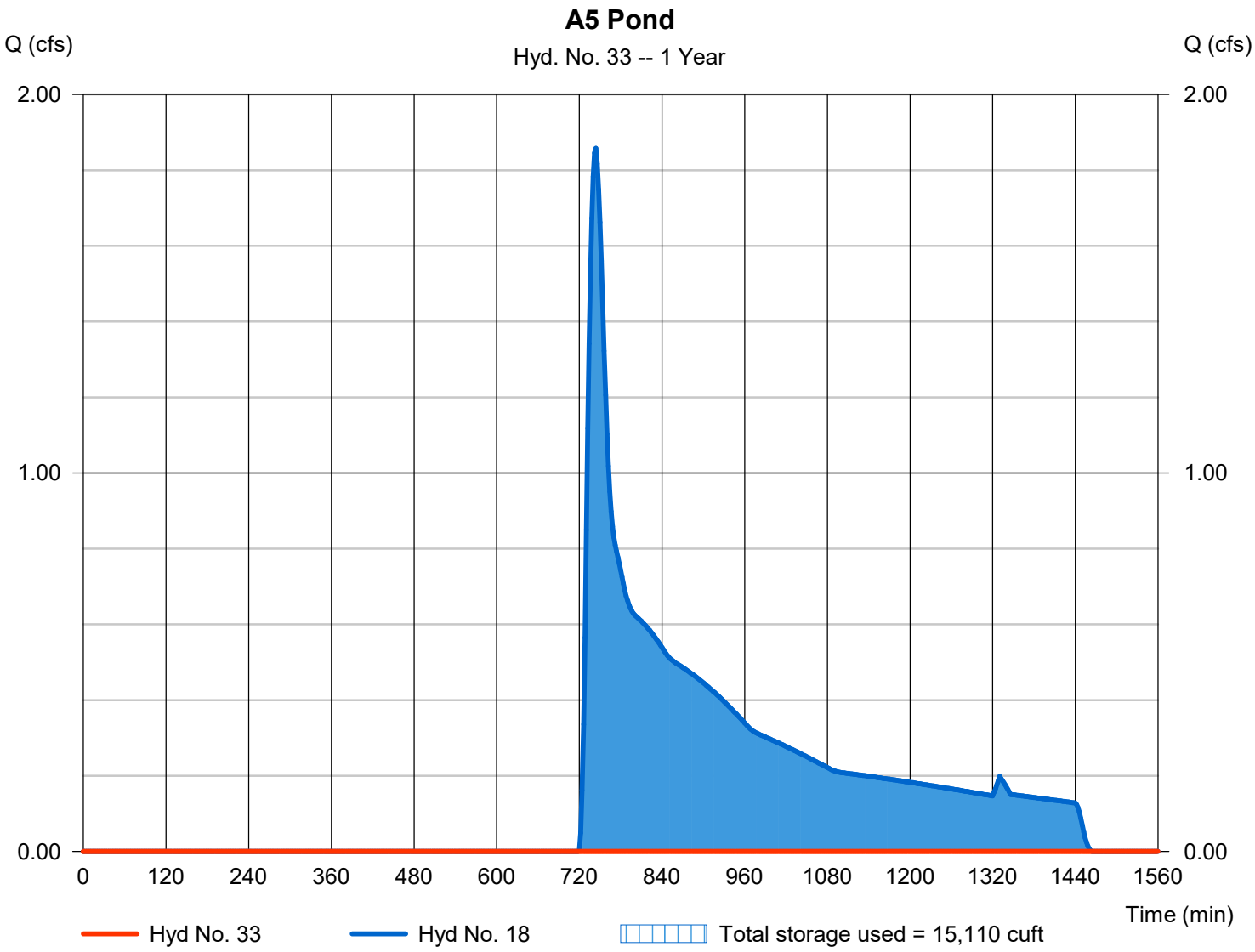
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 33

A5 Pond

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 18 - A5	Max. Elevation	= 105.73 ft
Reservoir name	= A5 Pond	Max. Storage	= 15,110 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Pond No. 4 - A5 Pond

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 102.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	102.00	1,460	0	0
1.00	103.00	2,550	1,980	1,980
2.00	104.00	3,800	3,154	5,134
3.00	105.00	5,110	4,438	9,572
8.00	110.00	10,375	37,940	47,512

Culvert / Orifice Structures

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

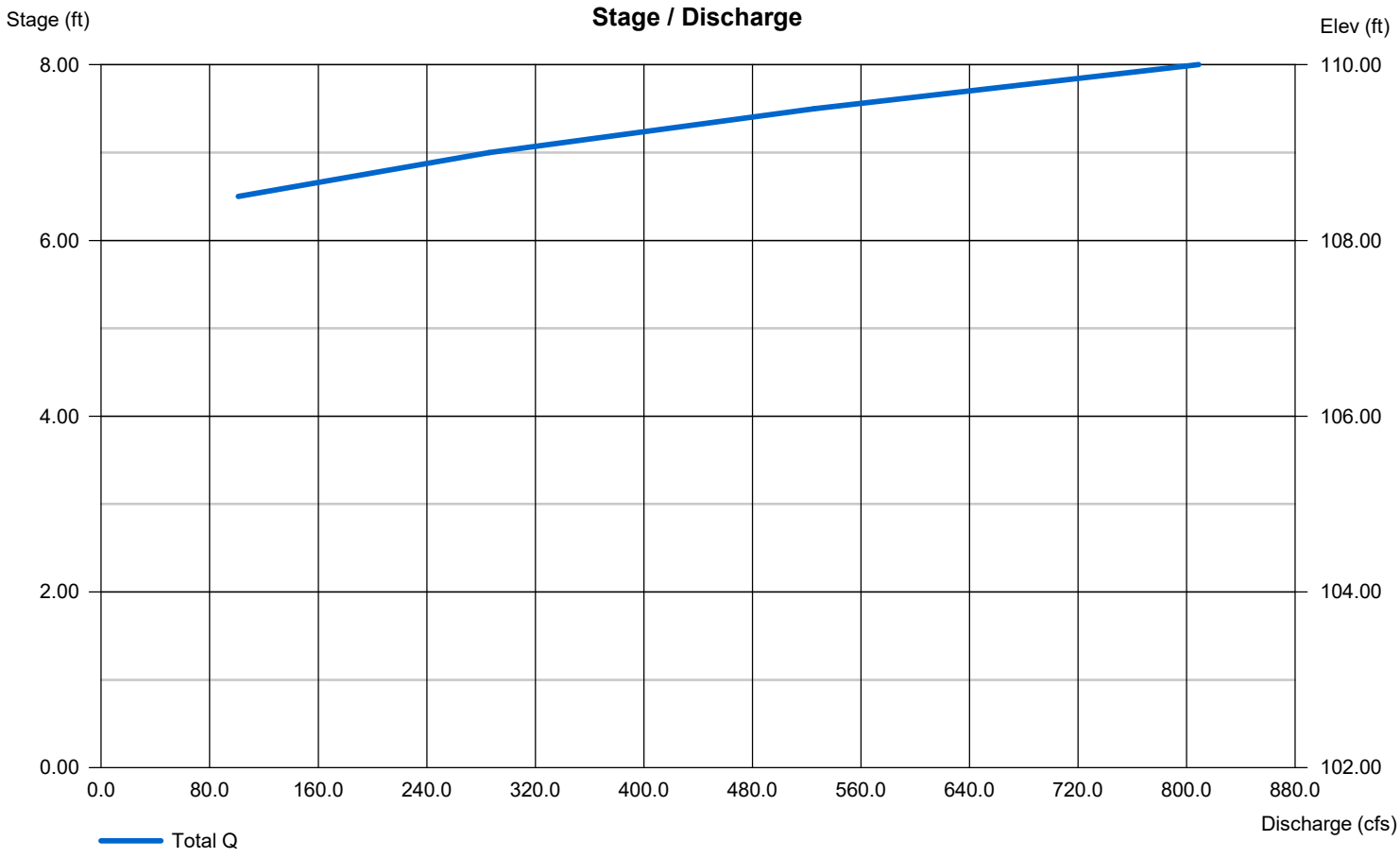
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 110.00	0.00	0.00	0.00
Crest El. (ft)	= 108.00	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

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



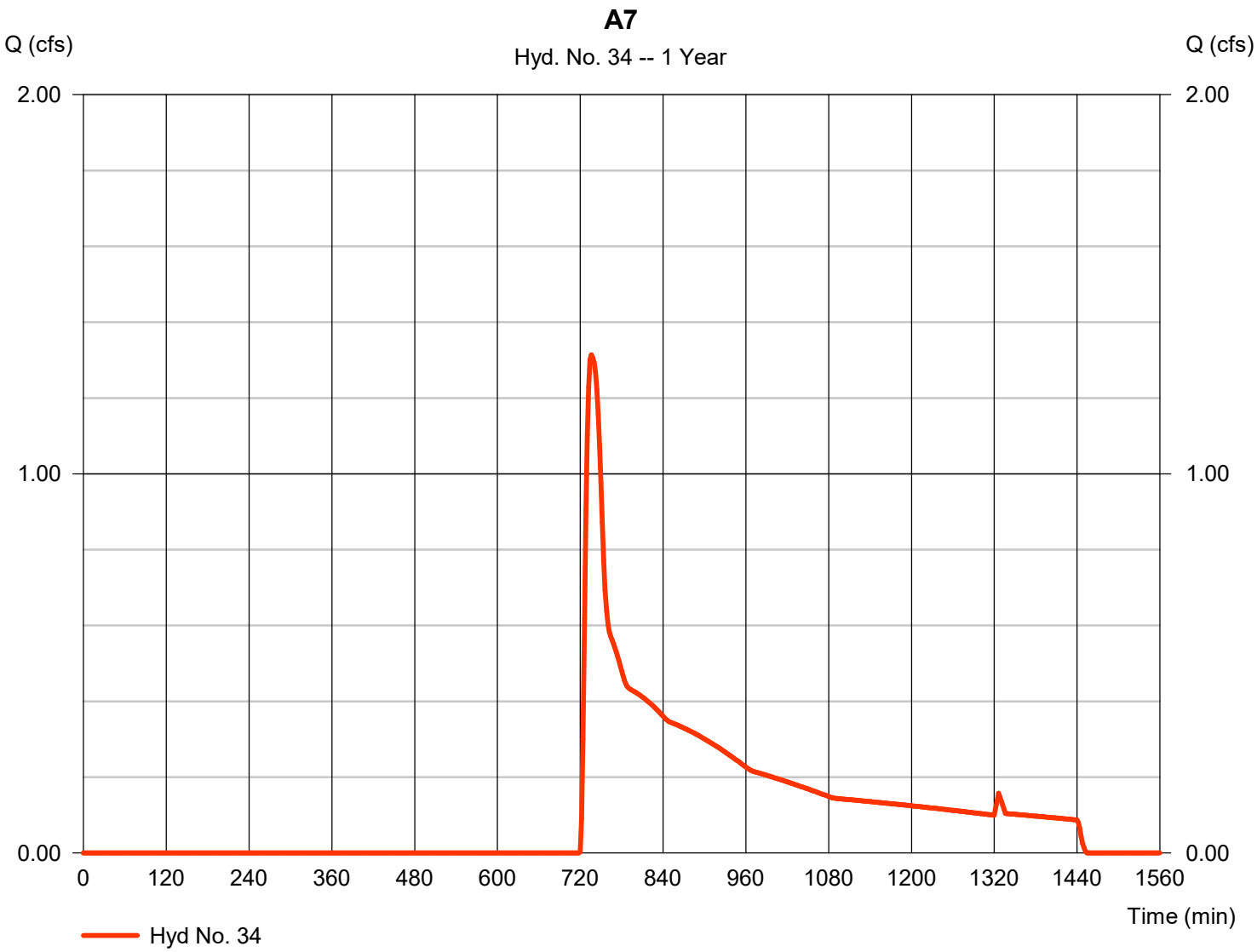
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 34

A7

Hydrograph type	= SCS Runoff	Peak discharge	= 1.314 cfs
Storm frequency	= 1 yrs	Time to peak	= 736 min
Time interval	= 2 min	Hyd. volume	= 10,363 cuft
Drainage area	= 12.150 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.00 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



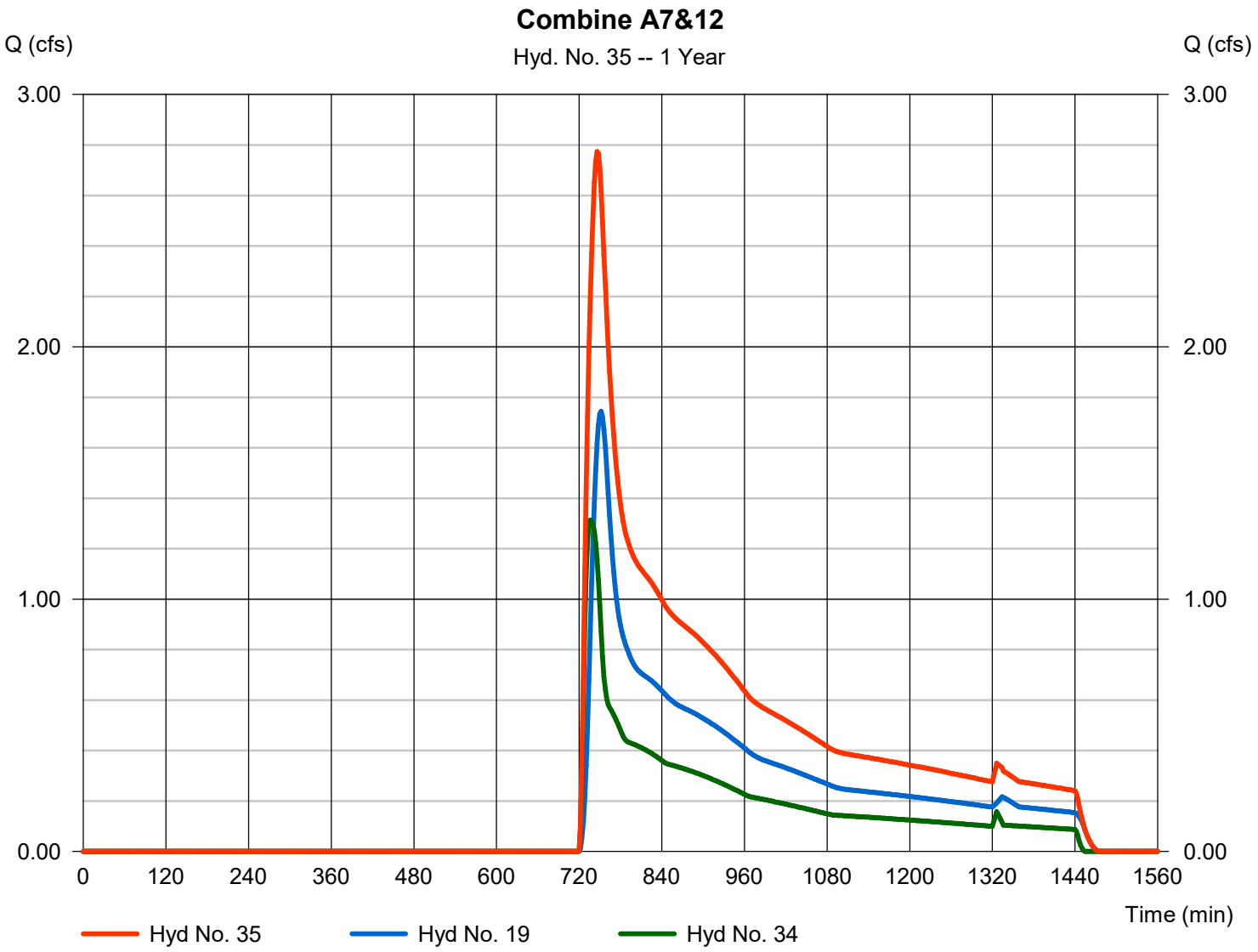
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 35

Combine A7&12

Hydrograph type	= Combine	Peak discharge	= 2.774 cfs
Storm frequency	= 1 yrs	Time to peak	= 746 min
Time interval	= 2 min	Hyd. volume	= 27,503 cuft
Inflow hyds.	= 19, 34	Contrib. drain. area	= 34.150 ac



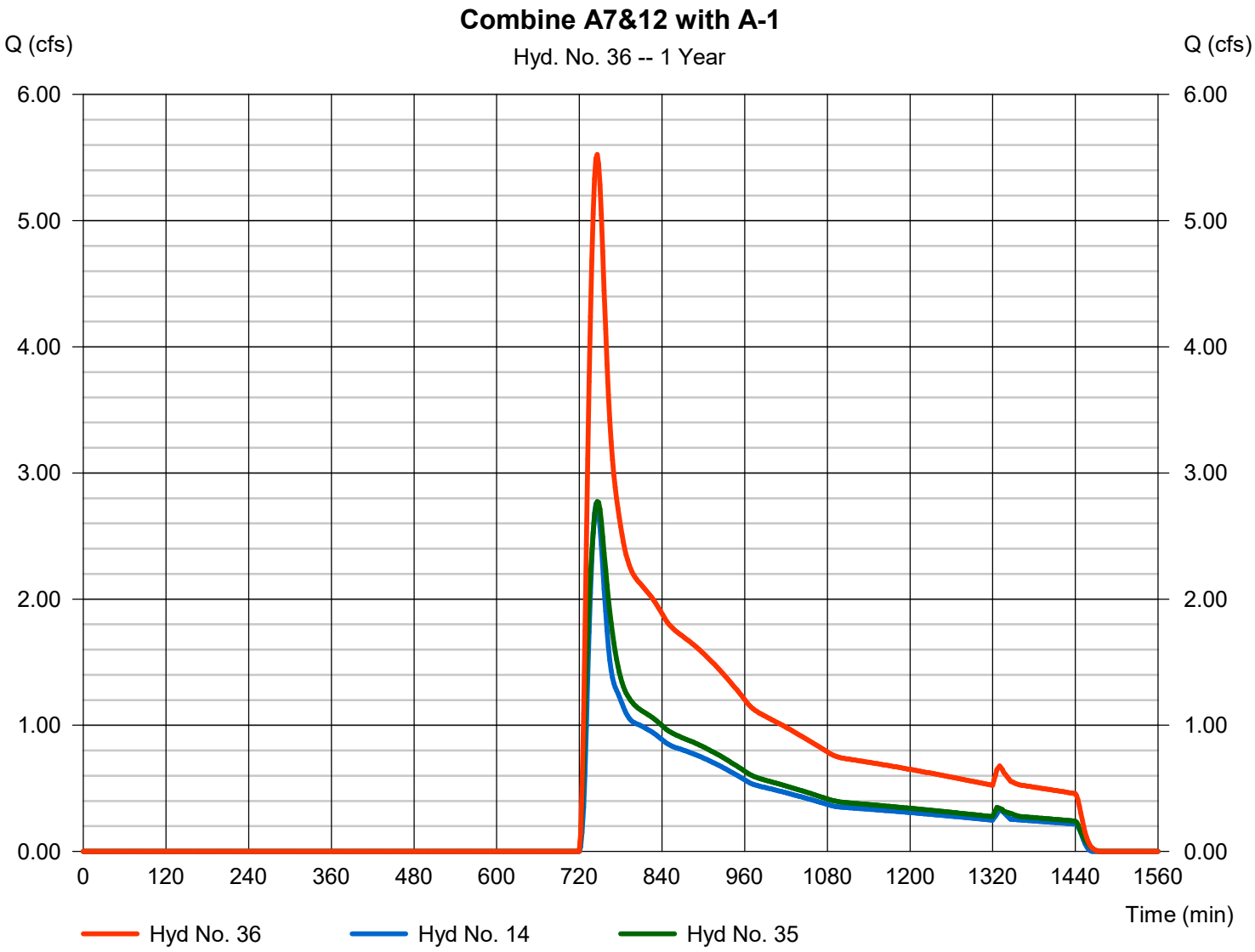
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 36

Combine A7&12 with A-1

Hydrograph type	= Combine	Peak discharge	= 5.525 cfs
Storm frequency	= 1 yrs	Time to peak	= 746 min
Time interval	= 2 min	Hyd. volume	= 51,967 cuft
Inflow hyds.	= 14, 35	Contrib. drain. area	= 32.780 ac



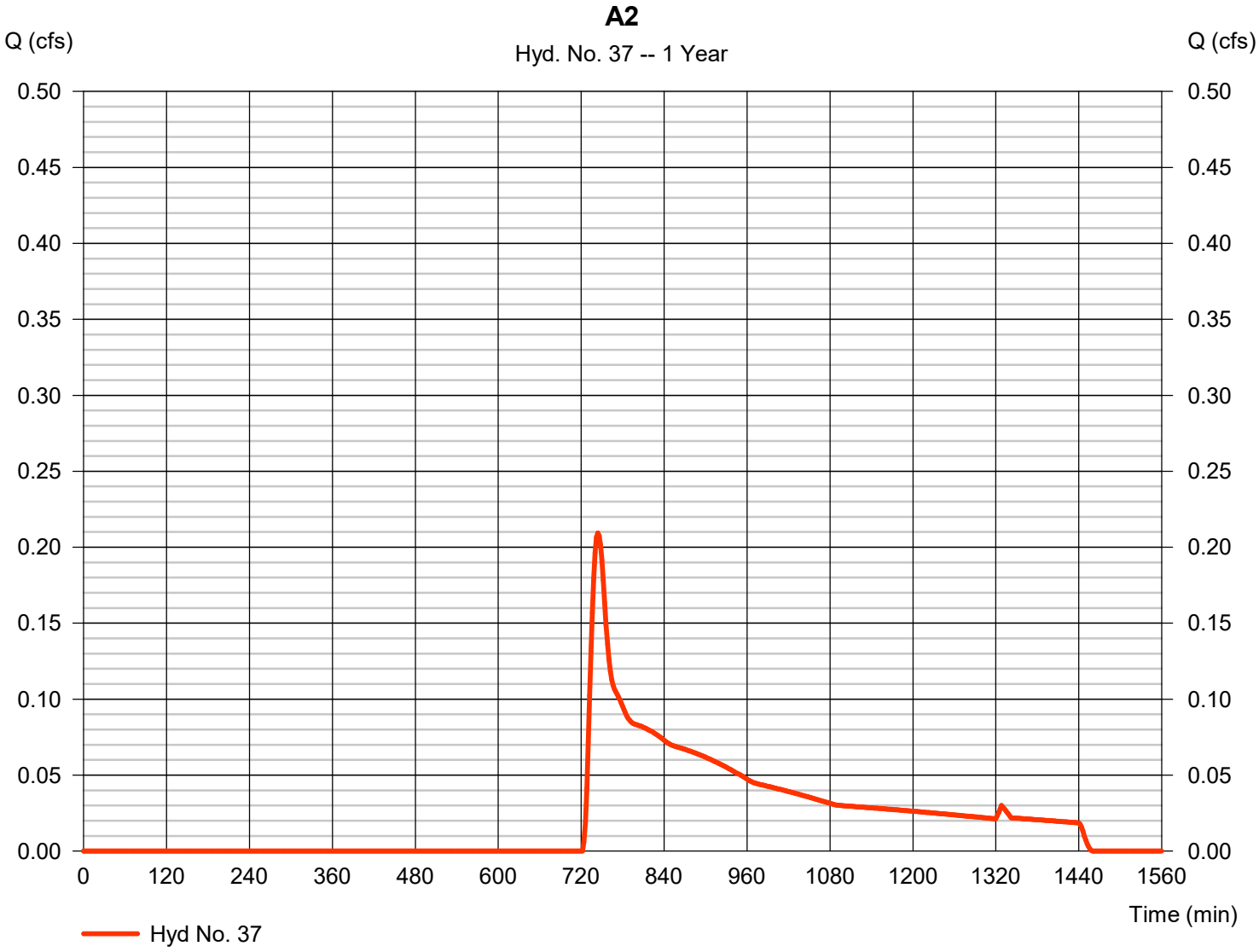
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 37

A2

Hydrograph type	= SCS Runoff	Peak discharge	= 0.209 cfs
Storm frequency	= 1 yrs	Time to peak	= 744 min
Time interval	= 2 min	Hyd. volume	= 1,994 cuft
Drainage area	= 2.840 ac	Curve number	= 60
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.70 min
Total precip.	= 2.55 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



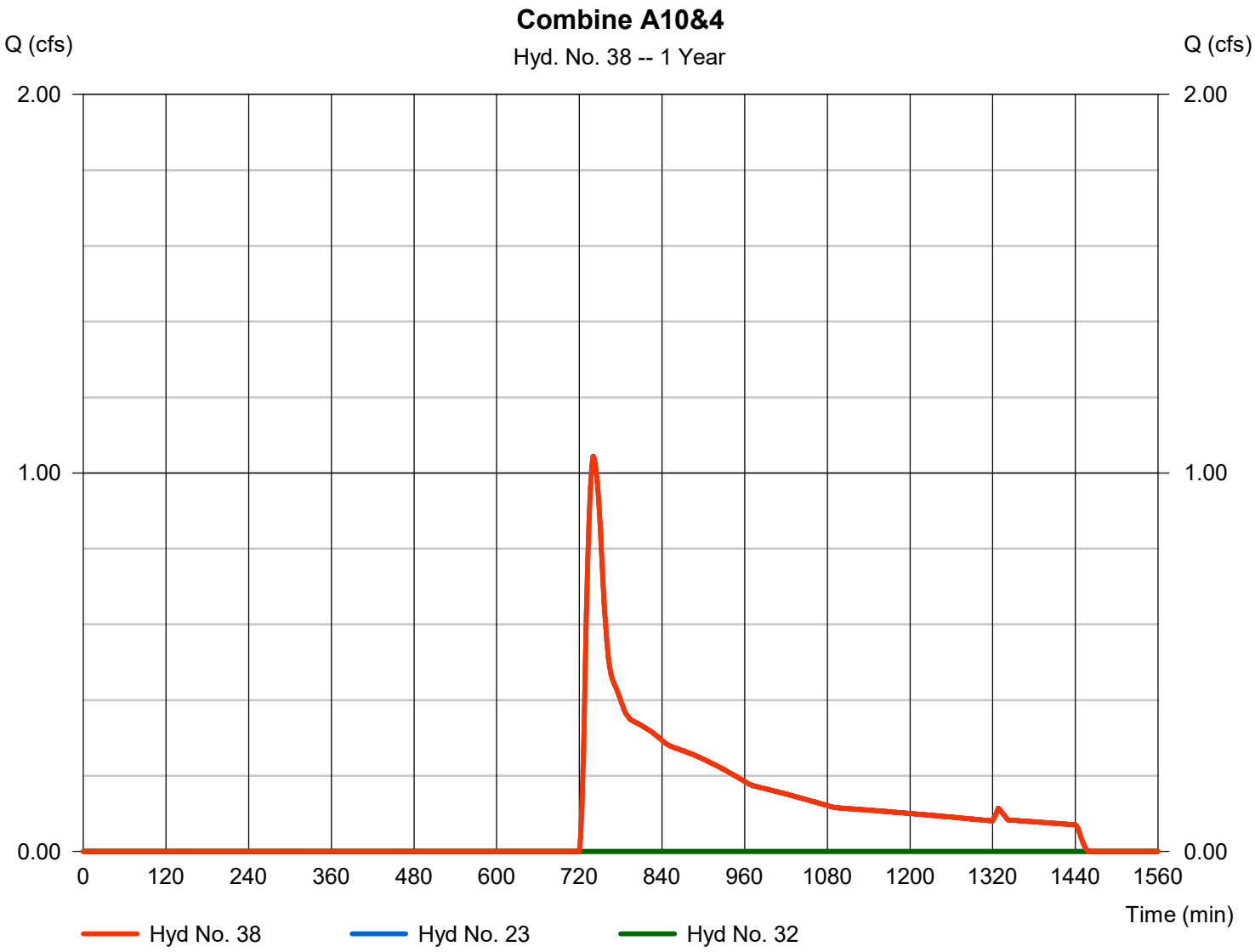
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 38

Combine A10&4

Hydrograph type	= Combine	Peak discharge	= 1.044 cfs
Storm frequency	= 1 yrs	Time to peak	= 740 min
Time interval	= 2 min	Hyd. volume	= 8,321 cuft
Inflow hyds.	= 23, 32	Contrib. drain. area	= 9.460 ac



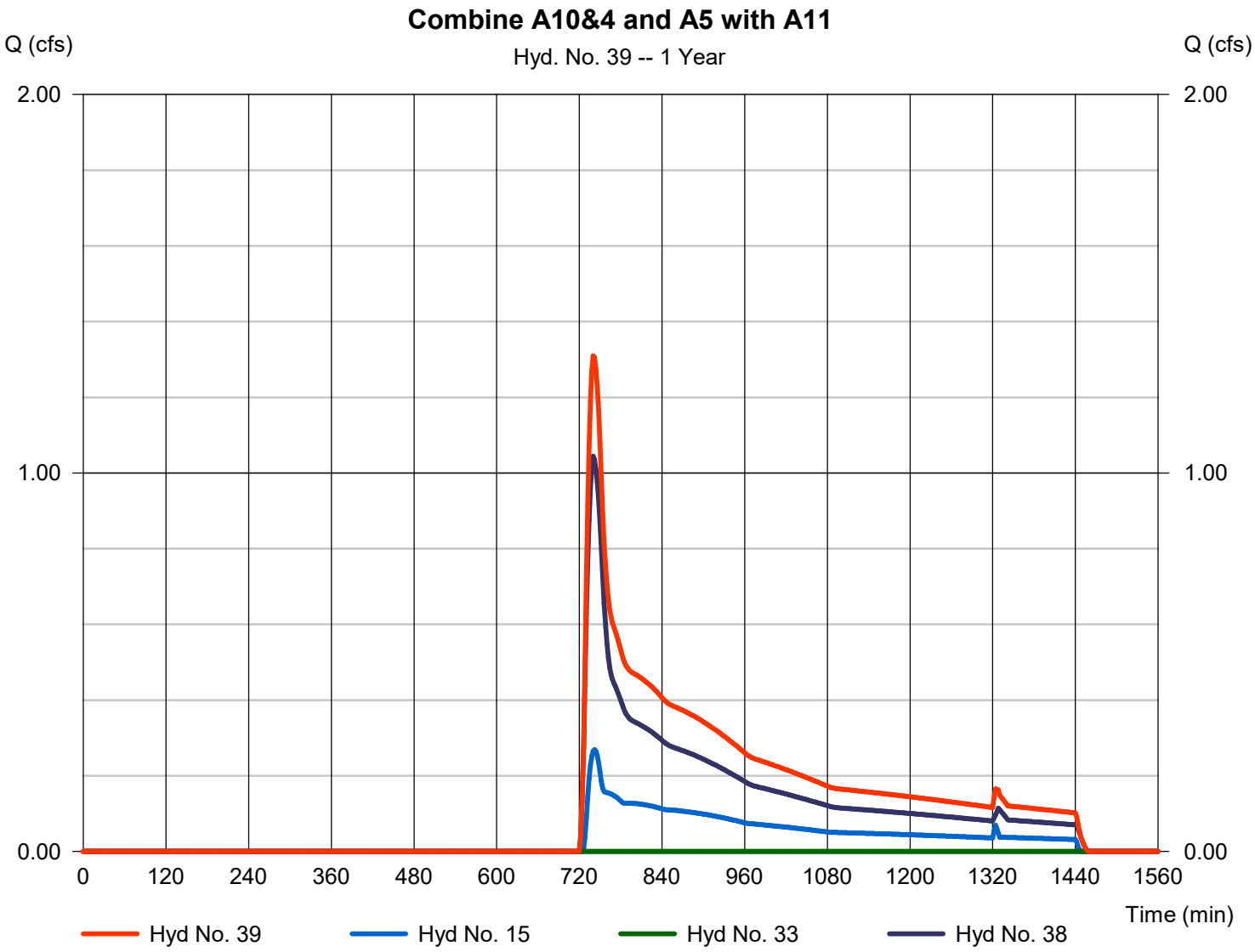
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 39

Combine A10&4 and A5 with A11

Hydrograph type	= Combine	Peak discharge	= 1.309 cfs
Storm frequency	= 1 yrs	Time to peak	= 740 min
Time interval	= 2 min	Hyd. volume	= 11,380 cuft
Inflow hyds.	= 15, 33, 38	Contrib. drain. area	= 6.180 ac



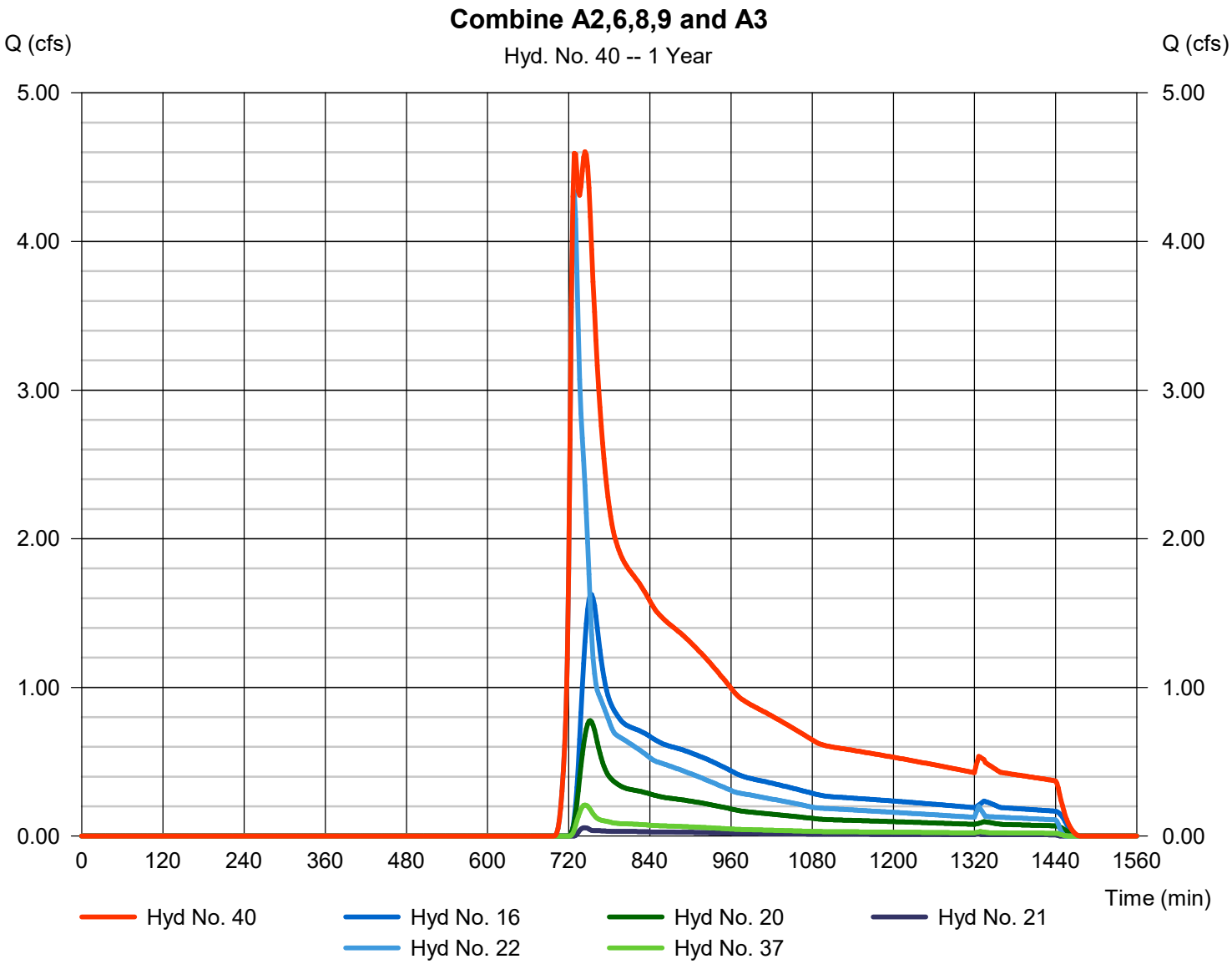
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 40

Combine A2,6,8,9 and A3

Hydrograph type	= Combine	Peak discharge	= 4.603 cfs
Storm frequency	= 1 yrs	Time to peak	= 744 min
Time interval	= 2 min	Hyd. volume	= 46,259 cuft
Inflow hyds.	= 16, 20, 21, 22, 37	Contrib. drain. area	= 49.640 ac



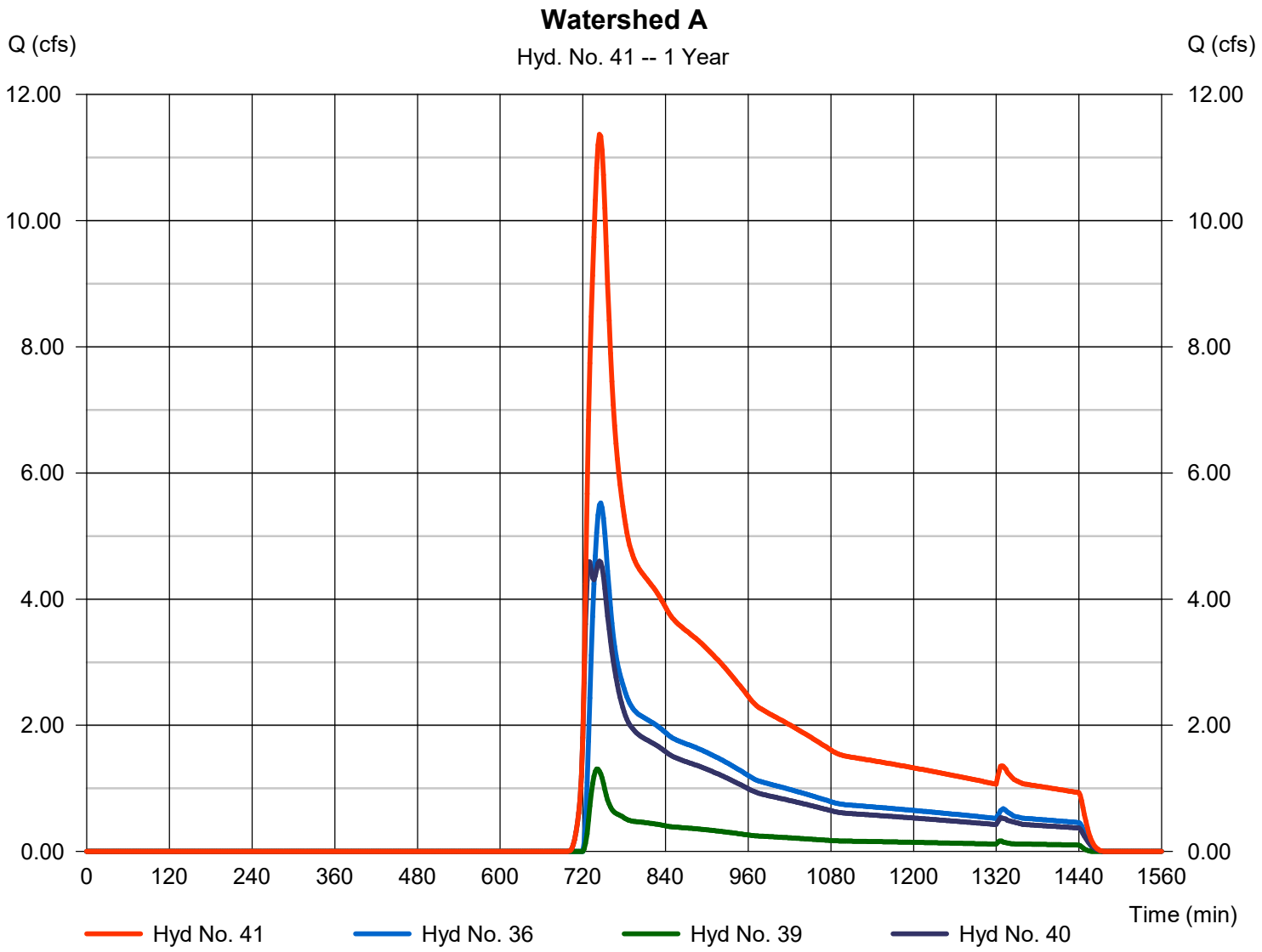
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 41

Watershed A

Hydrograph type	= Combine	Peak discharge	= 11.37 cfs
Storm frequency	= 1 yrs	Time to peak	= 744 min
Time interval	= 2 min	Hyd. volume	= 109,606 cuft
Inflow hyds.	= 36, 39, 40	Contrib. drain. area	= 0.000 ac



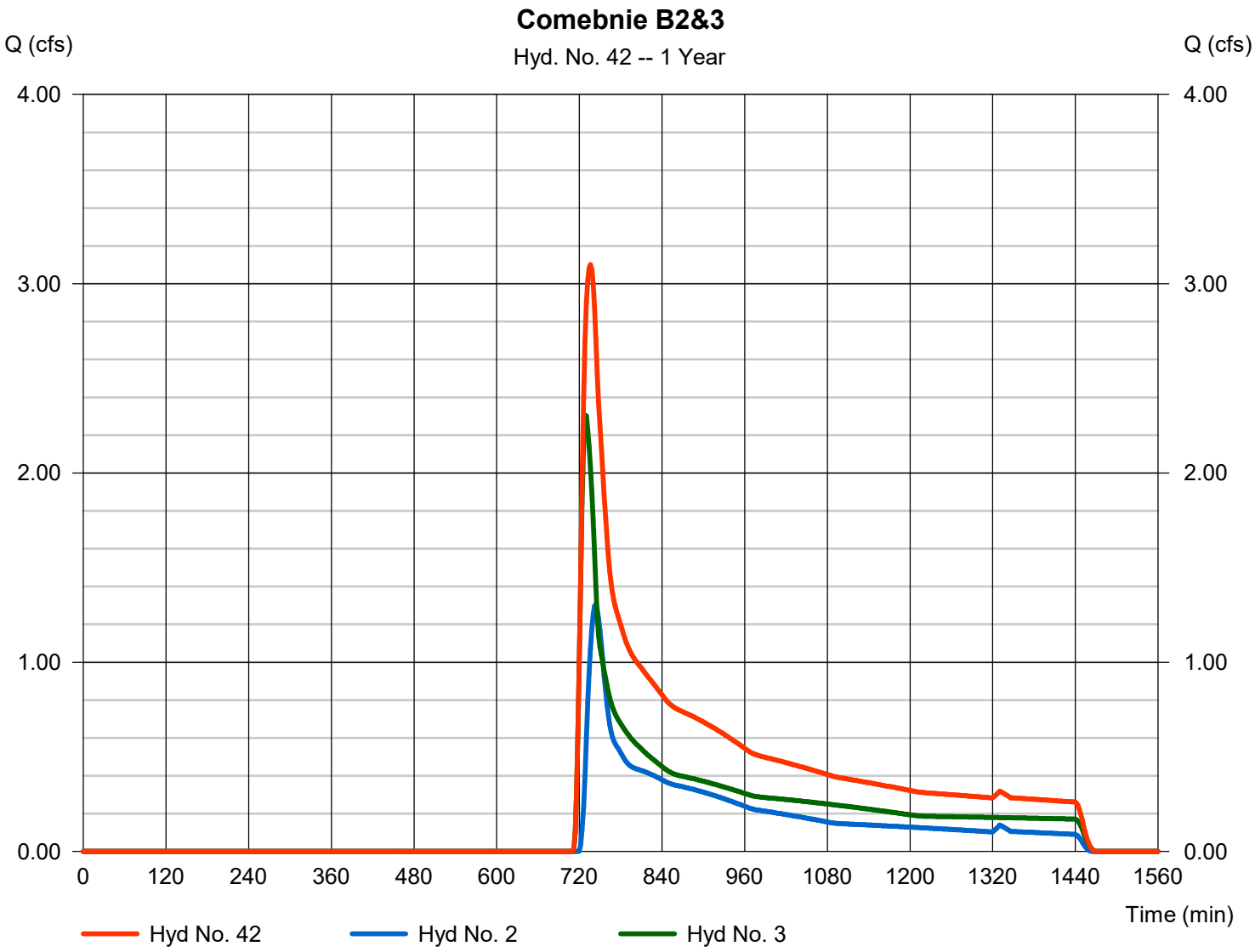
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 42

Comebnie B2&3

Hydrograph type	= Combine	Peak discharge	= 3.100 cfs
Storm frequency	= 1 yrs	Time to peak	= 736 min
Time interval	= 2 min	Hyd. volume	= 26,426 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 31.290 ac



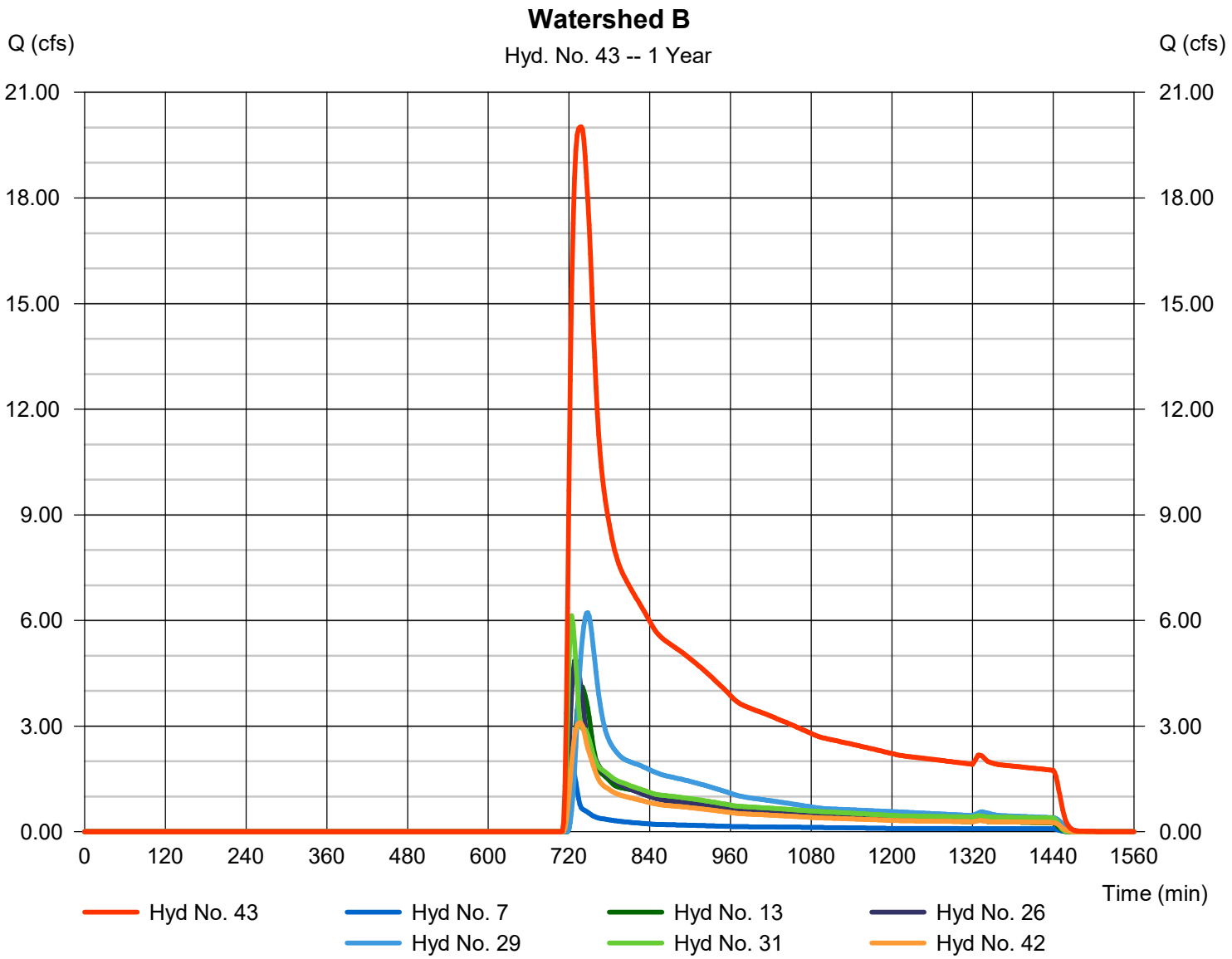
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 43

Watershed B

Hydrograph type	= Combine	Peak discharge	= 20.02 cfs
Storm frequency	= 1 yrs	Time to peak	= 738 min
Time interval	= 2 min	Hyd. volume	= 187,686 cuft
Inflow hyds.	= 7, 13, 26, 29, 31, 42	Contrib. drain. area	= 7.760 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	10.20	2	732	55,970	------	------	------	B1
2	SCS Runoff	3.326	2	738	20,021	------	------	------	B2
3	SCS Runoff	6.416	2	728	29,781	------	------	------	B3
4	SCS Runoff	15.53	2	722	53,387	------	------	------	B4
5	SCS Runoff	10.55	2	744	65,886	------	------	------	B5
6	SCS Runoff	11.03	2	728	48,670	------	------	------	B6
7	SCS Runoff	4.584	2	722	15,038	------	------	------	B7
8	SCS Runoff	4.171	2	724	16,019	------	------	------	B8
9	SCS Runoff	2.539	2	742	16,208	------	------	------	B9
10	SCS Runoff	0.000	2	n/a	0	------	------	------	B10
11	SCS Runoff	0.000	2	n/a	0	------	------	------	B11
12	Combine	0.000	2	n/a	0	10, 11	------	------	Combine B10&11
13	Combine	10.20	2	732	55,970	1, 12	------	------	Combine B10&11 with B1
14	SCS Runoff	7.454	2	738	47,303	------	------	------	A1
15	SCS Runoff	0.936	2	728	6,523	------	------	------	A11
16	SCS Runoff	4.711	2	748	35,299	------	------	------	A3
17	SCS Runoff	4.182	2	740	33,980	------	------	------	A4
18	SCS Runoff	4.733	2	738	28,487	------	------	------	A5
19	SCS Runoff	4.671	2	746	33,142	------	------	------	A12
20	SCS Runoff	2.081	2	746	14,763	------	------	------	A6
21	SCS Runoff	0.209	2	736	1,668	------	------	------	A8
22	SCS Runoff	7.617	2	728	29,001	------	------	------	A9
23	SCS Runoff	2.716	2	734	15,687	------	------	------	A10
24	SCS Runoff	1.600	2	730	8,426	------	------	------	B12
25	Reservoir	2.024	2	734	16,018	8	132.08	2,238	Pond B8
26	Combine	12.85	2	728	64,688	6, 25	------	------	Combine B6&8
27	Reservoir	1.450	2	734	8,426	24	126.02	322	Pond B12
28	Combine	3.835	2	740	24,634	9, 27	------	------	Combine B9&12
29	Combine	14.32	2	742	90,520	5, 28	------	------	Combine B9&12 with B5
30	SCS Runoff	2.632	2	738	18,390	------	------	------	B13
31	Combine	16.01	2	724	71,777	4, 30	------	------	Combine B4&13
32	Reservoir	0.000	2	n/a	0	17	101.96	33,980	A4 Pond
33	Reservoir	0.000	2	n/a	0	18	107.49	28,487	A5 Pond
34	SCS Runoff	3.711	2	730	19,537	------	------	------	A7

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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
35	Combine	7.177	2	742	52,679	19, 34	------	------	Combine A7&12
36	Combine	14.53	2	740	99,982	14, 35	------	------	Combine A7&12 with A-1
37	SCS Runoff	0.608	2	736	3,974	------	------	------	A2
38	Combine	2.716	2	734	15,687	23, 32,	------	------	Combine A10&4
39	Combine	3.577	2	734	22,210	15, 33, 38	------	------	Combine A10&4 and A5 with A11
40	Combine	11.22	2	742	84,706	16, 20, 21, 22, 37,	------	------	Combine A2,6,8,9 and A3
41	Combine	29.03	2	738	206,897	36, 39, 40	------	------	Watershed A
42	Combine	8.884	2	730	49,802	2, 3,	------	------	Comebnie B2&3
43	Combine	55.48	2	730	347,795	7, 13, 26, 29, 31, 42	------	------	Watershed B

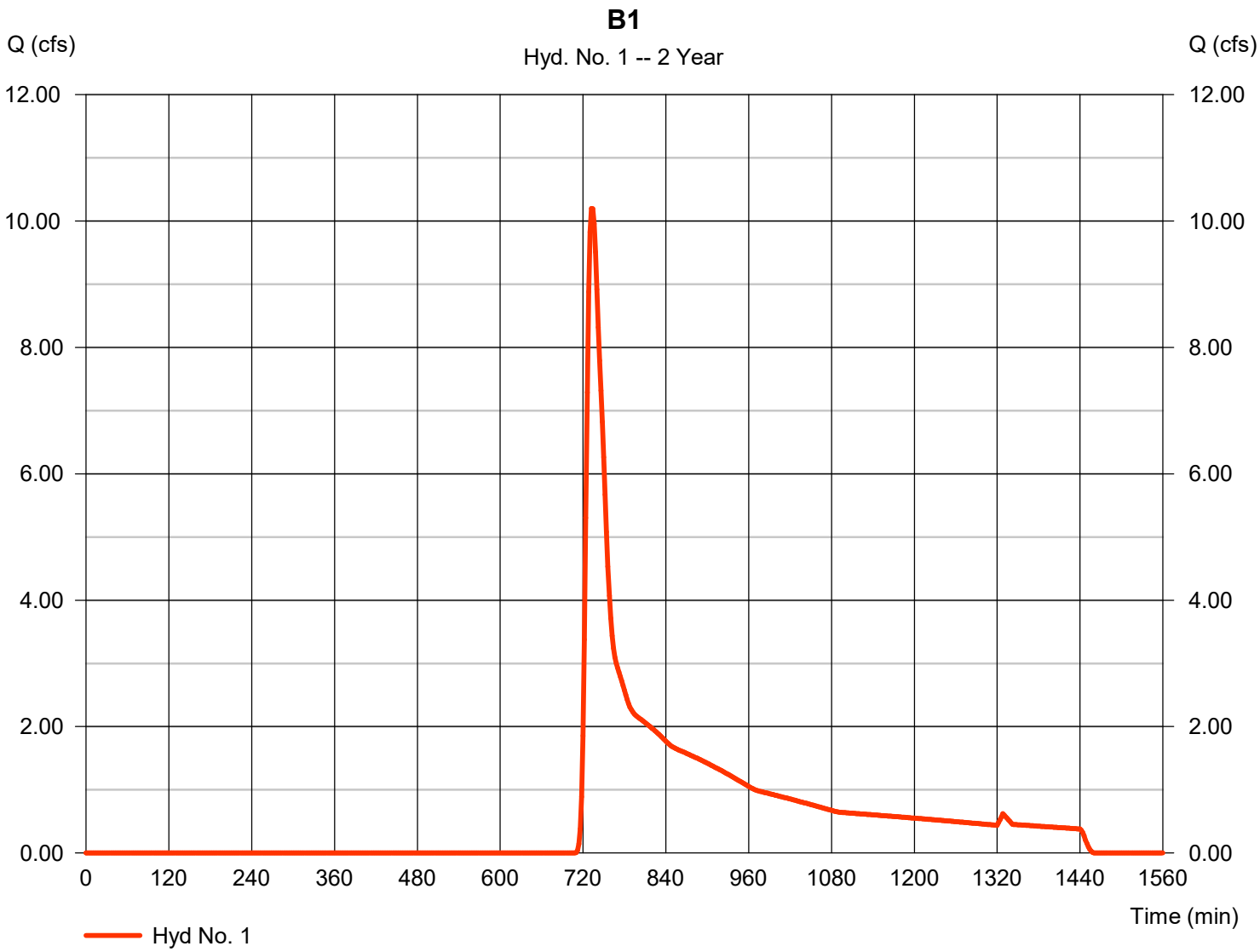
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 1

B1

Hydrograph type	= SCS Runoff	Peak discharge	= 10.20 cfs
Storm frequency	= 2 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 55,970 cuft
Drainage area	= 31.170 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.00 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



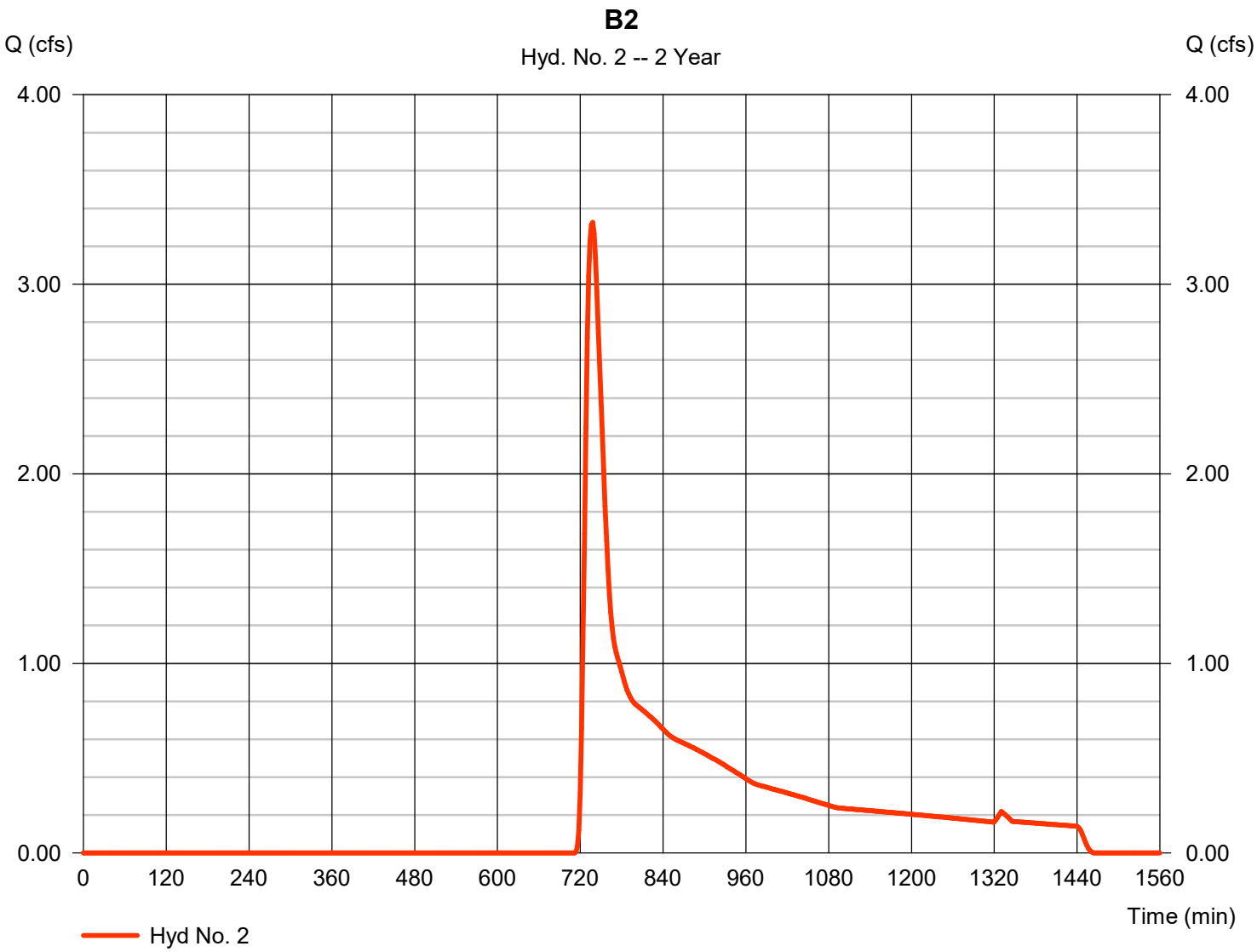
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 2

B2

Hydrograph type	= SCS Runoff	Peak discharge	= 3.326 cfs
Storm frequency	= 2 yrs	Time to peak	= 738 min
Time interval	= 2 min	Hyd. volume	= 20,021 cuft
Drainage area	= 12.770 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 14.00 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



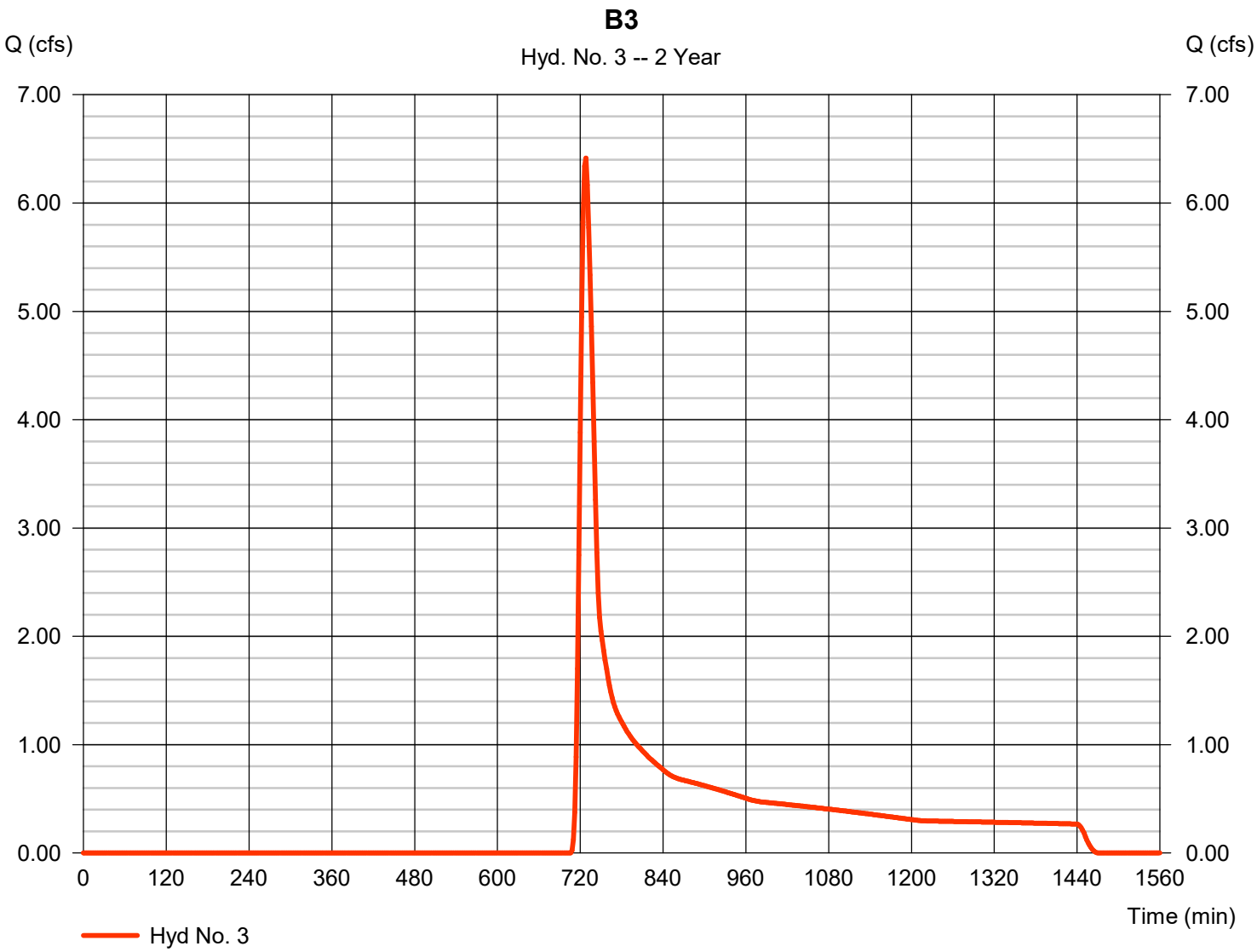
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 3

B3

Hydrograph type	= SCS Runoff	Peak discharge	= 6.416 cfs
Storm frequency	= 2 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 29,781 cuft
Drainage area	= 18.520 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.80 min
Total precip.	= 3.11 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



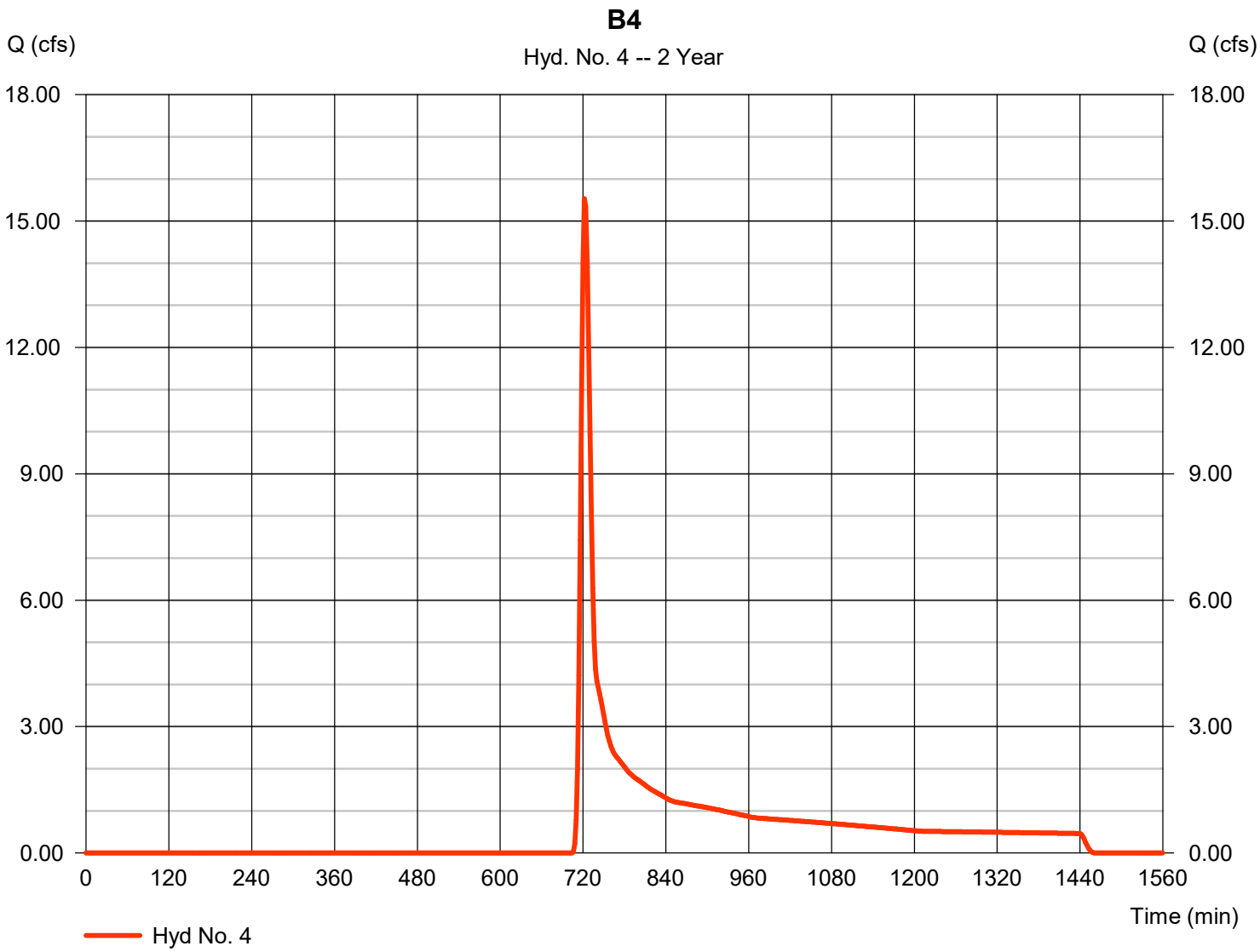
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 4

B4

Hydrograph type	= SCS Runoff	Peak discharge	= 15.53 cfs
Storm frequency	= 2 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 53,387 cuft
Drainage area	= 29.730 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.80 min
Total precip.	= 3.11 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



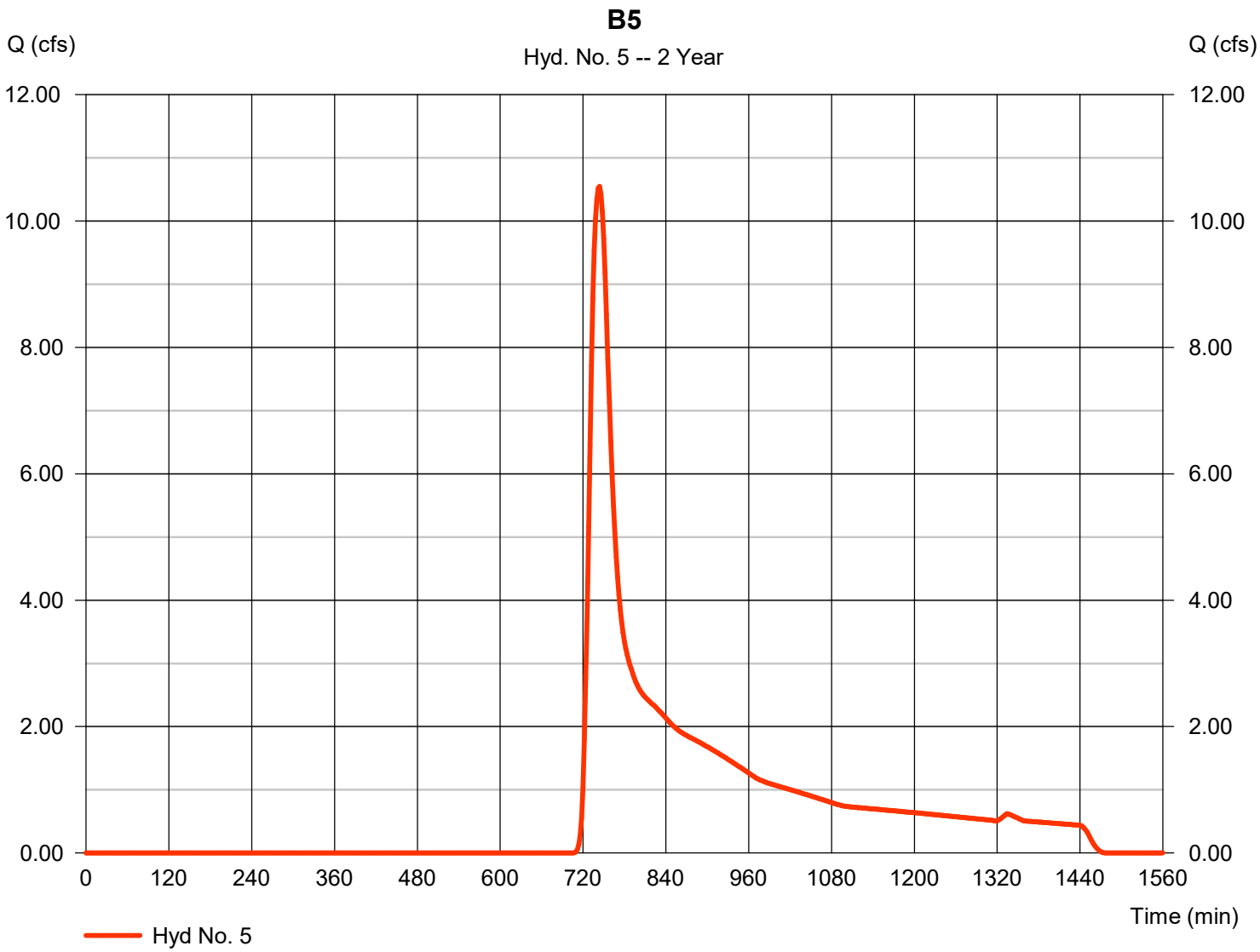
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 5

B5

Hydrograph type	= SCS Runoff	Peak discharge	= 10.55 cfs
Storm frequency	= 2 yrs	Time to peak	= 744 min
Time interval	= 2 min	Hyd. volume	= 65,886 cuft
Drainage area	= 34.440 ac	Curve number	= 64
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 20.40 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



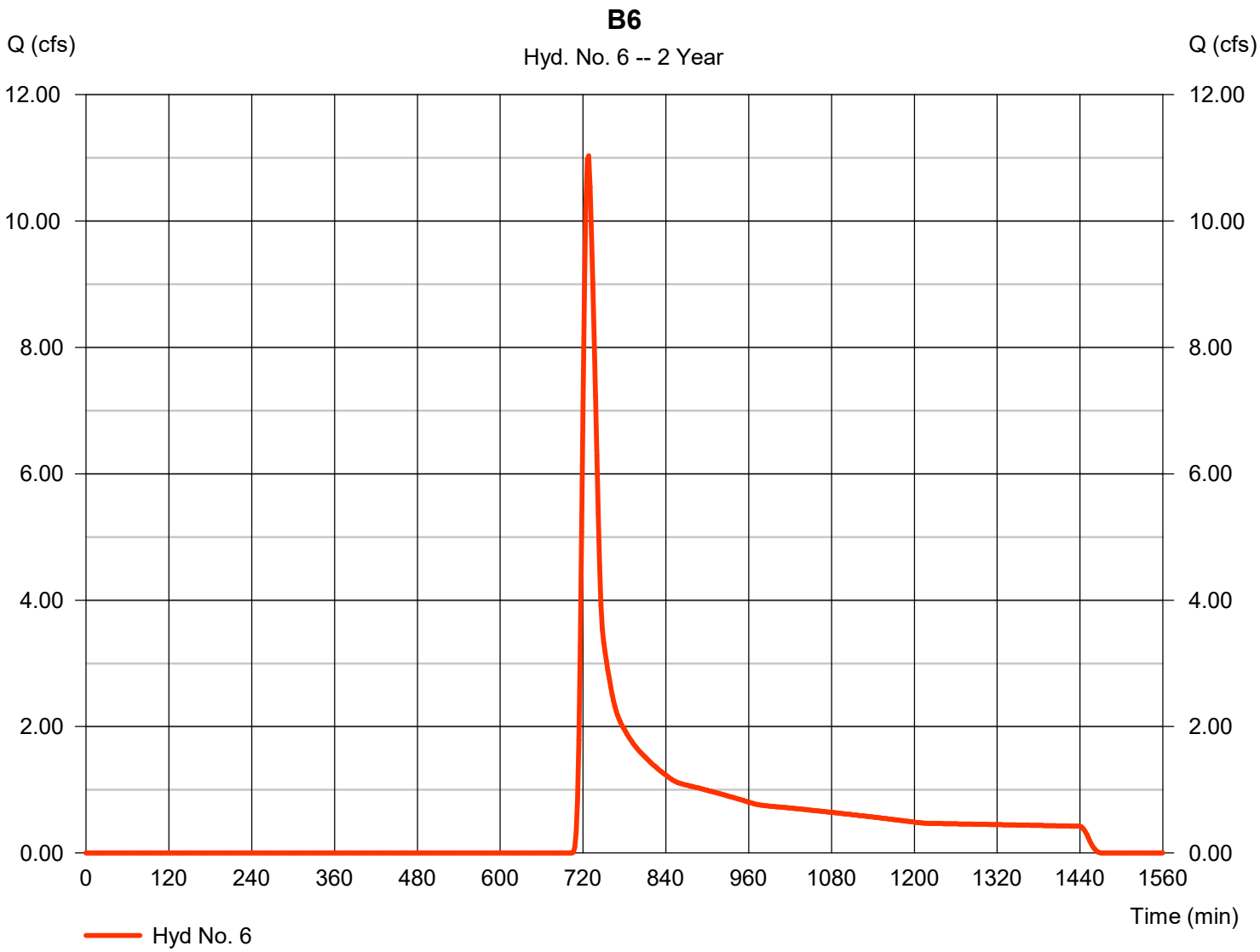
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 6

B6

Hydrograph type	= SCS Runoff	Peak discharge	= 11.03 cfs
Storm frequency	= 2 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 48,670 cuft
Drainage area	= 27.950 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.10 min
Total precip.	= 3.11 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



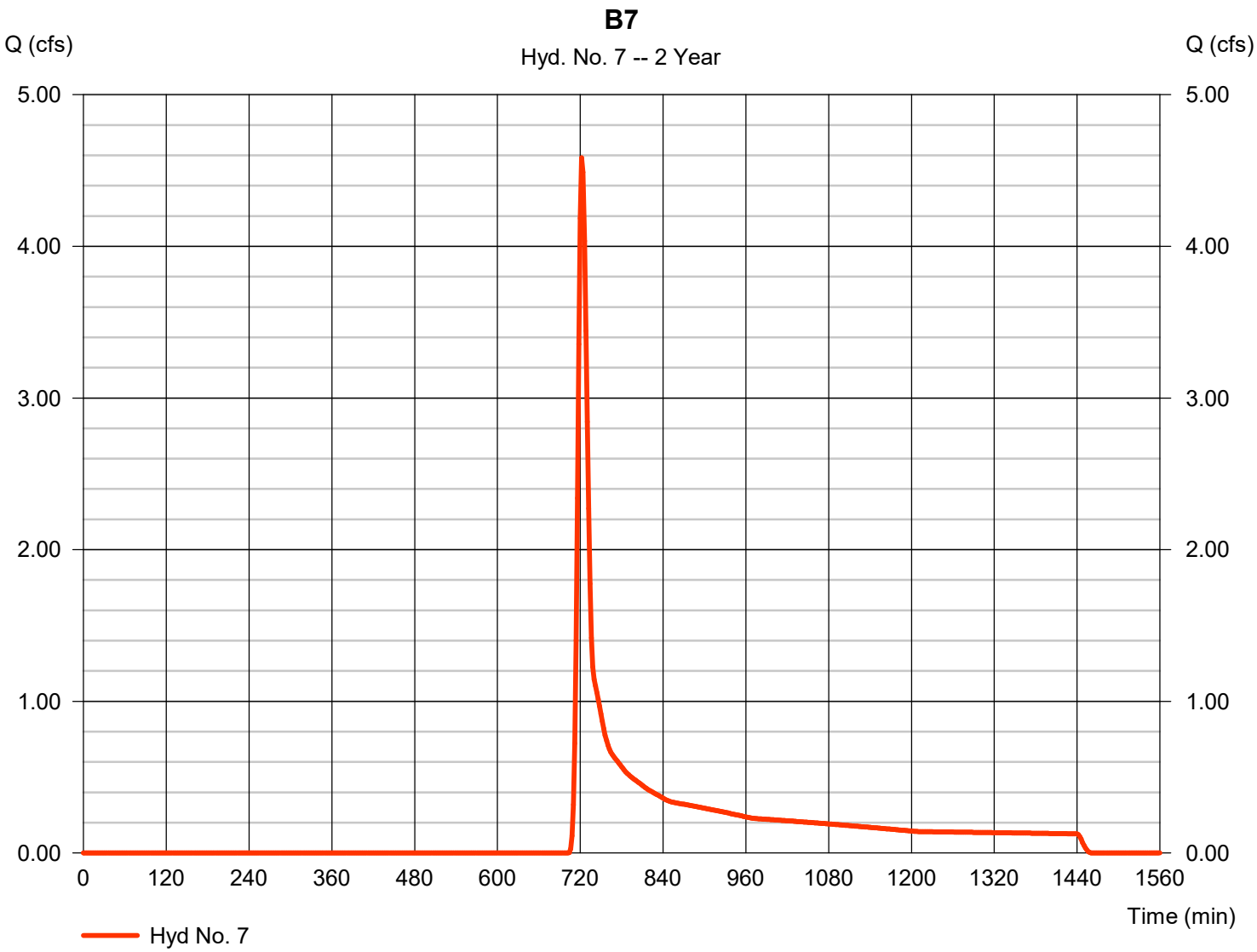
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 7

B7

Hydrograph type	= SCS Runoff	Peak discharge	= 4.584 cfs
Storm frequency	= 2 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 15,038 cuft
Drainage area	= 7.760 ac	Curve number	= 64
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.30 min
Total precip.	= 3.11 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



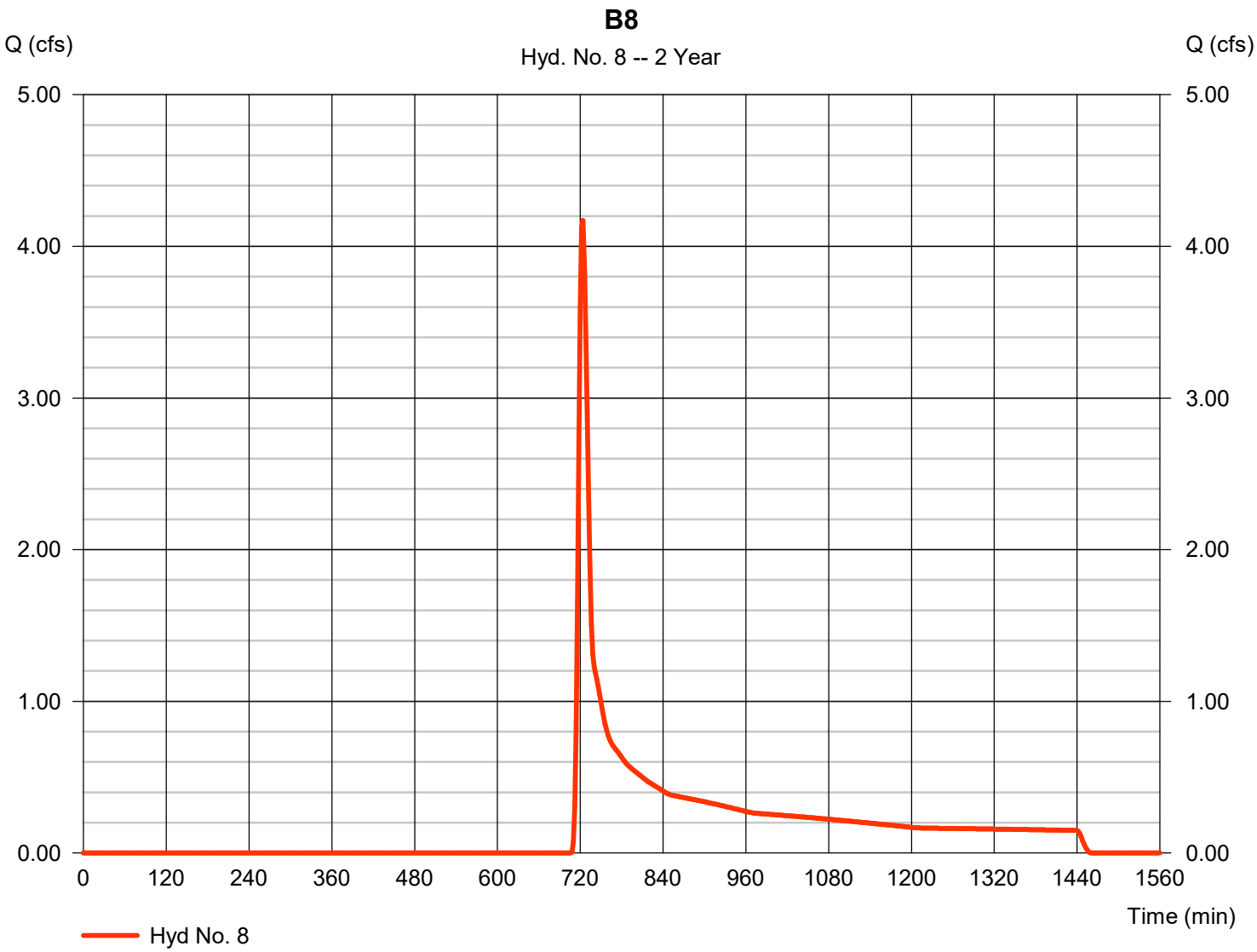
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 8

B8

Hydrograph type	= SCS Runoff	Peak discharge	= 4.171 cfs
Storm frequency	= 2 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 16,019 cuft
Drainage area	= 10.500 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.00 min
Total precip.	= 3.11 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



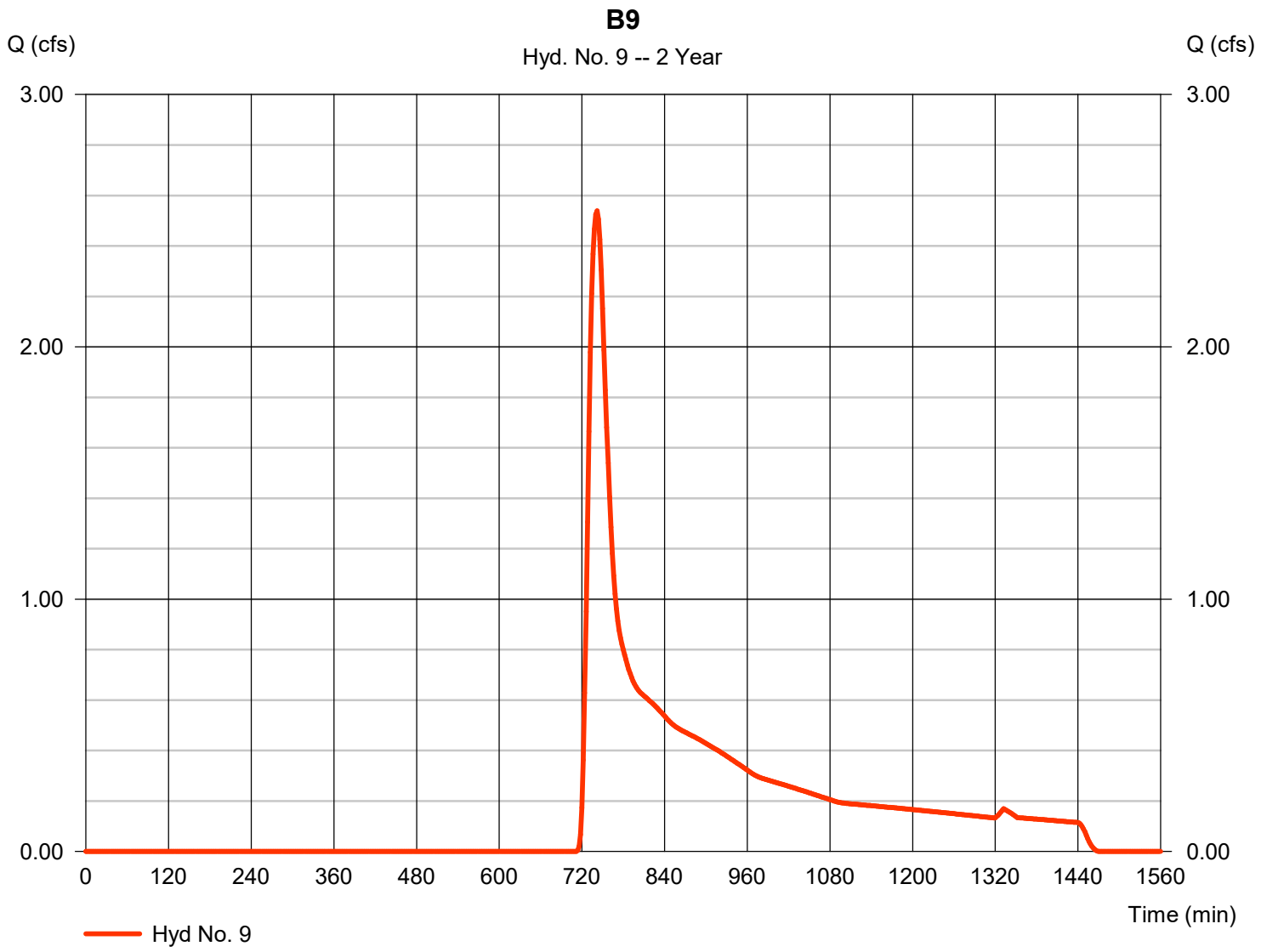
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 9

B9

Hydrograph type	= SCS Runoff	Peak discharge	= 2.539 cfs
Storm frequency	= 2 yrs	Time to peak	= 742 min
Time interval	= 2 min	Hyd. volume	= 16,208 cuft
Drainage area	= 10.080 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.40 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



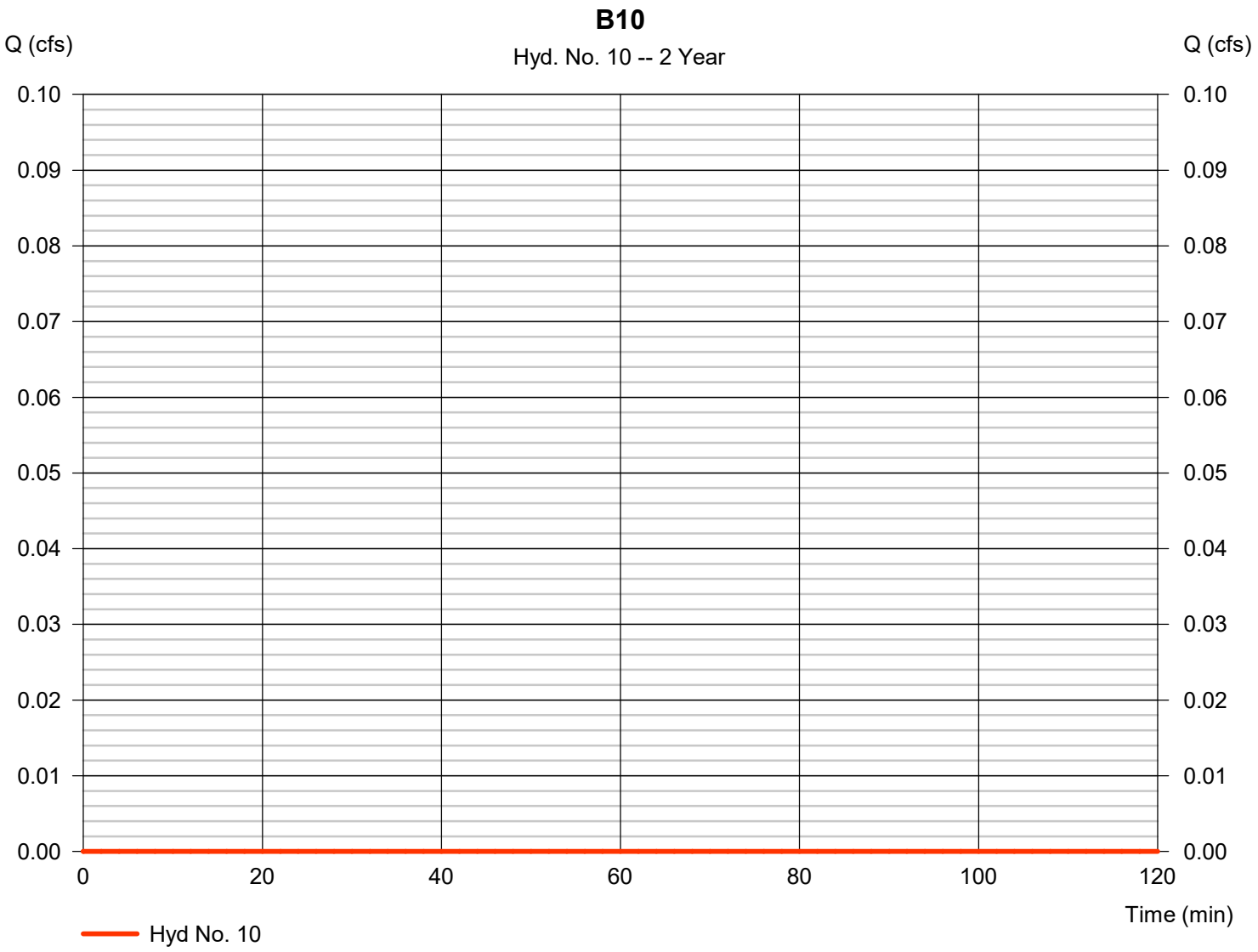
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 10

B10

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Drainage area	= 1.010 ac	Curve number	= 35
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.60 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



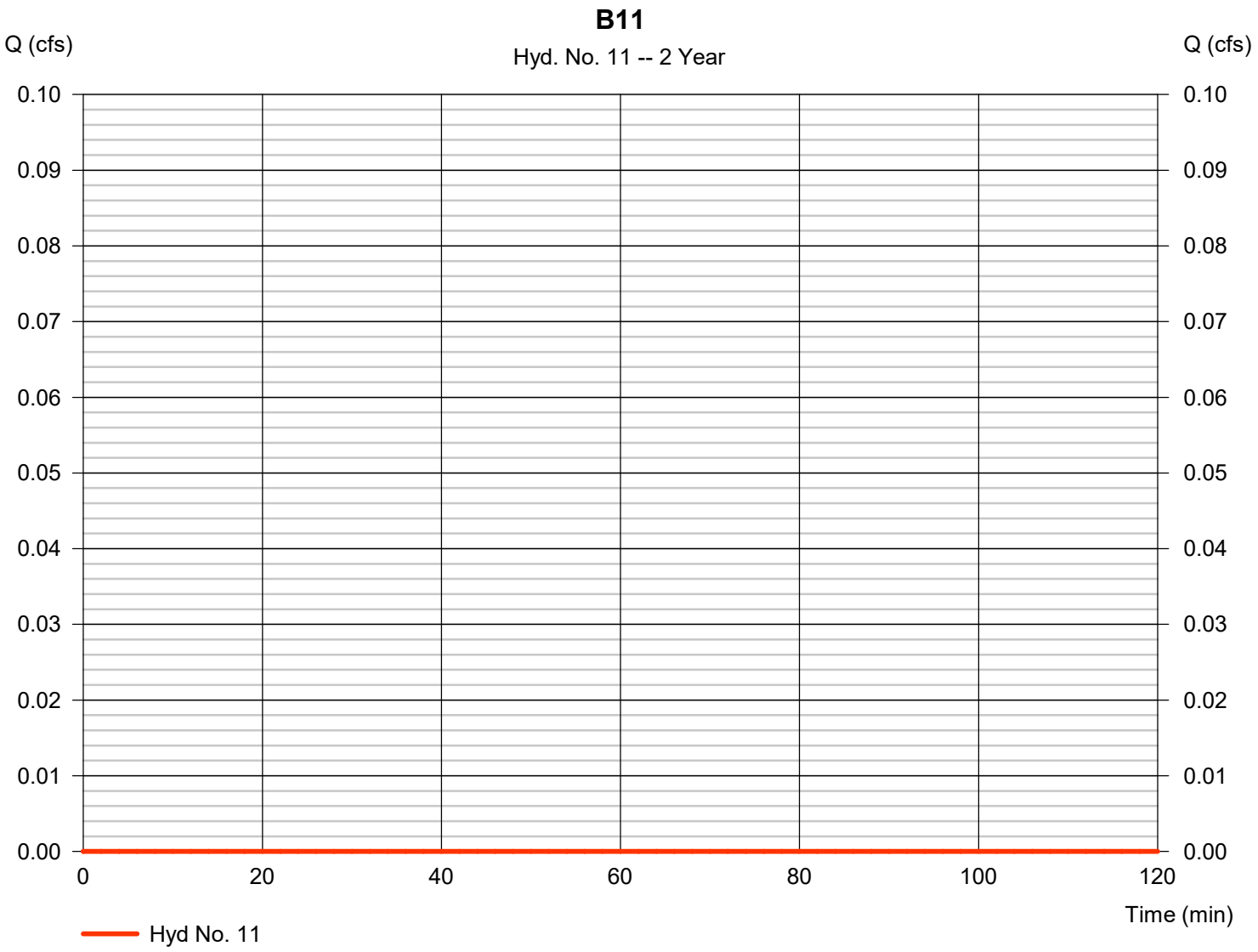
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 11

B11

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Drainage area	= 1.280 ac	Curve number	= 35
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.70 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



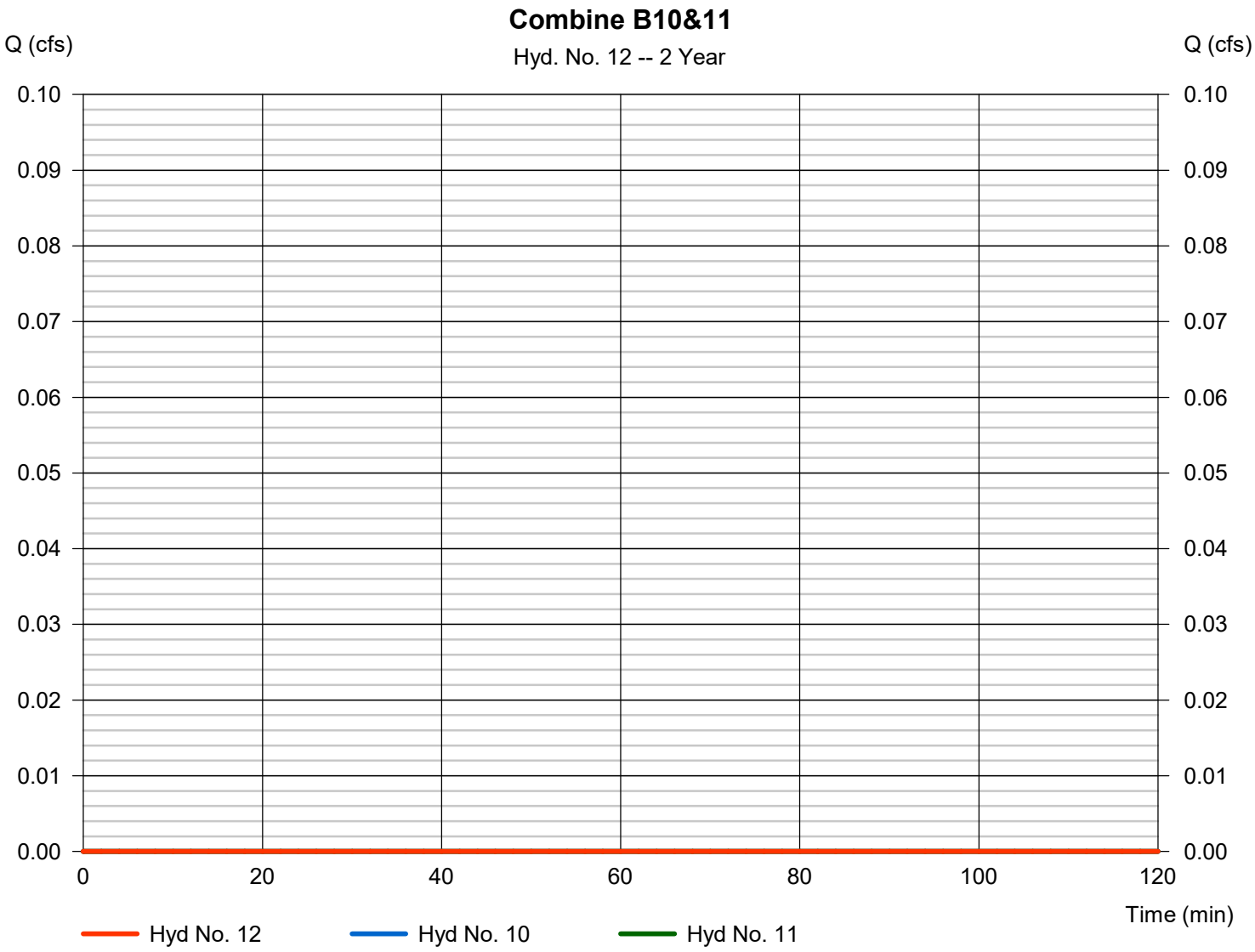
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 12

Combine B10&11

Hydrograph type	= Combine	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Inflow hyds.	= 10, 11	Contrib. drain. area	= 2.290 ac



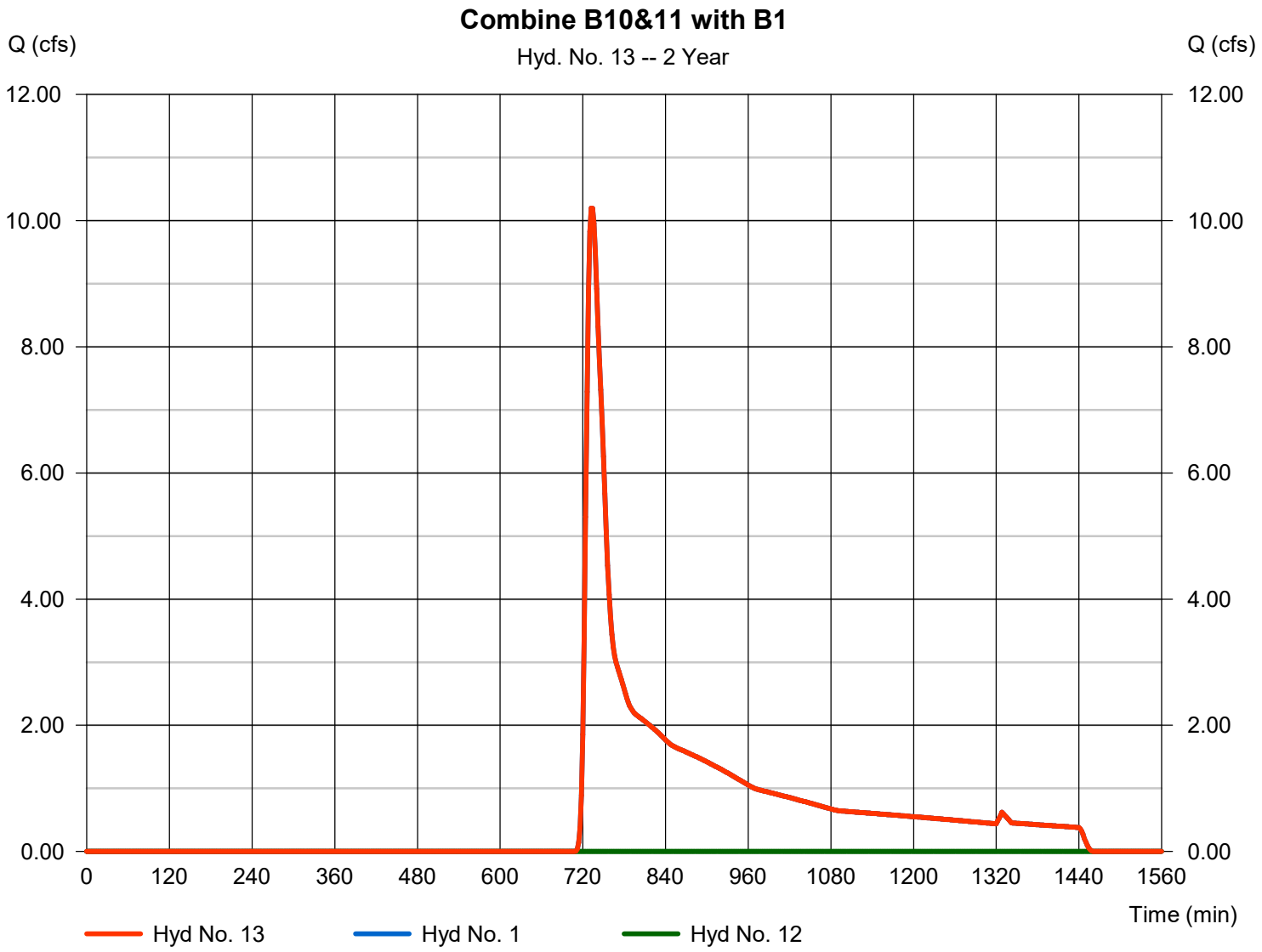
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 13

Combine B10&11 with B1

Hydrograph type	= Combine	Peak discharge	= 10.20 cfs
Storm frequency	= 2 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 55,970 cuft
Inflow hyds.	= 1, 12	Contrib. drain. area	= 31.170 ac



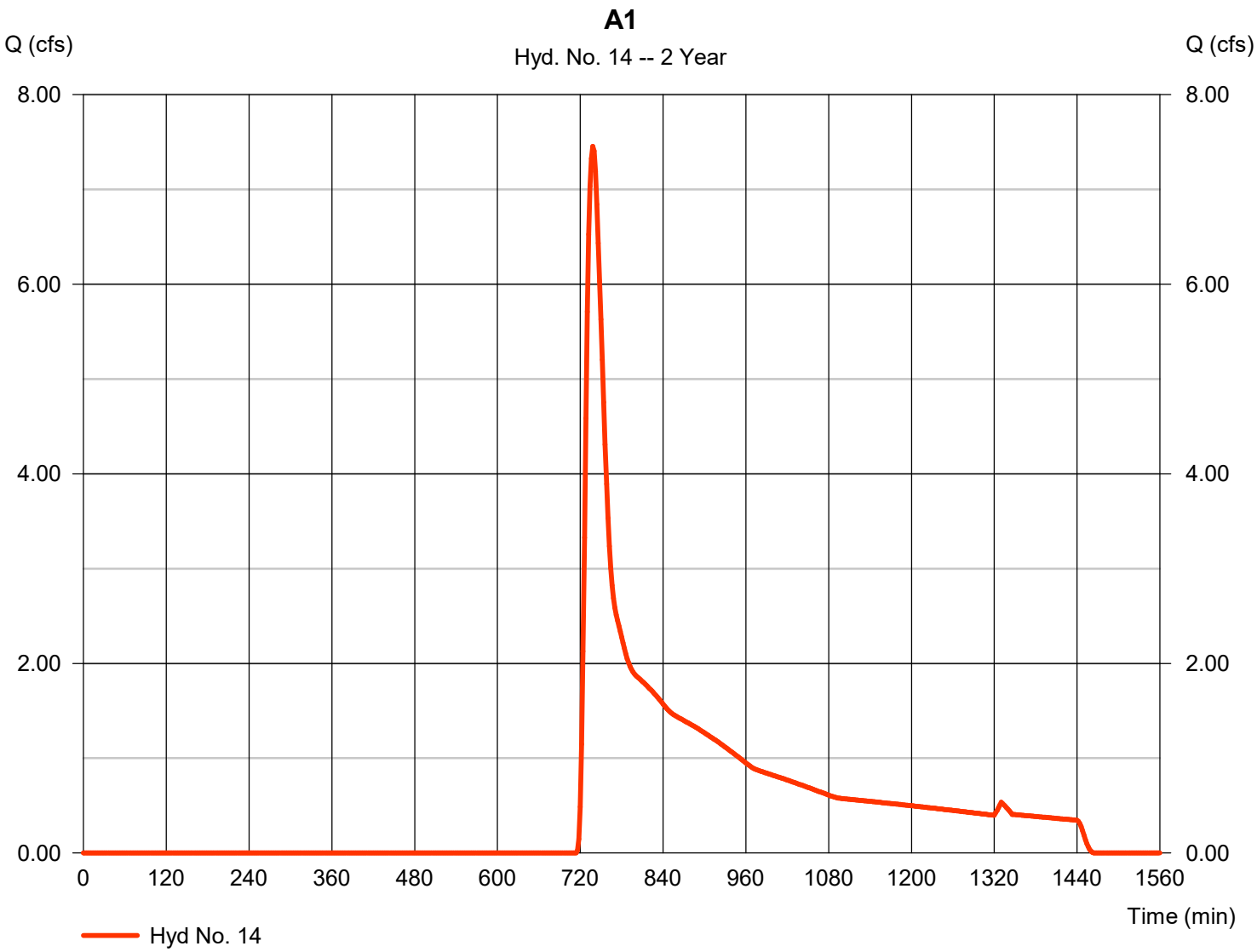
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 14

A1

Hydrograph type	= SCS Runoff	Peak discharge	= 7.454 cfs
Storm frequency	= 2 yrs	Time to peak	= 738 min
Time interval	= 2 min	Hyd. volume	= 47,303 cuft
Drainage area	= 32.780 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 14.70 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



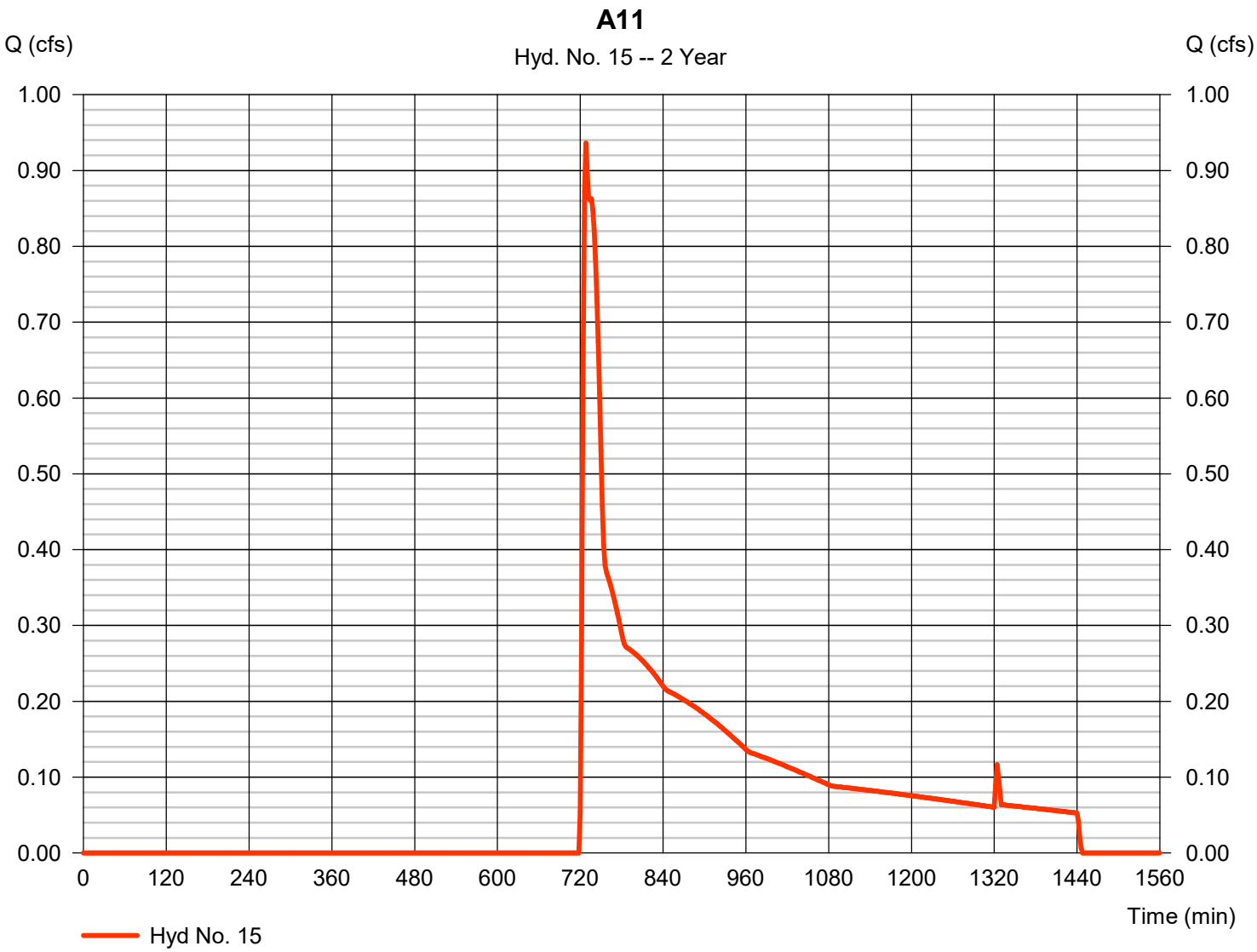
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 15

A11

Hydrograph type	= SCS Runoff	Peak discharge	= 0.936 cfs
Storm frequency	= 2 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 6,523 cuft
Drainage area	= 6.180 ac	Curve number	= 58
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



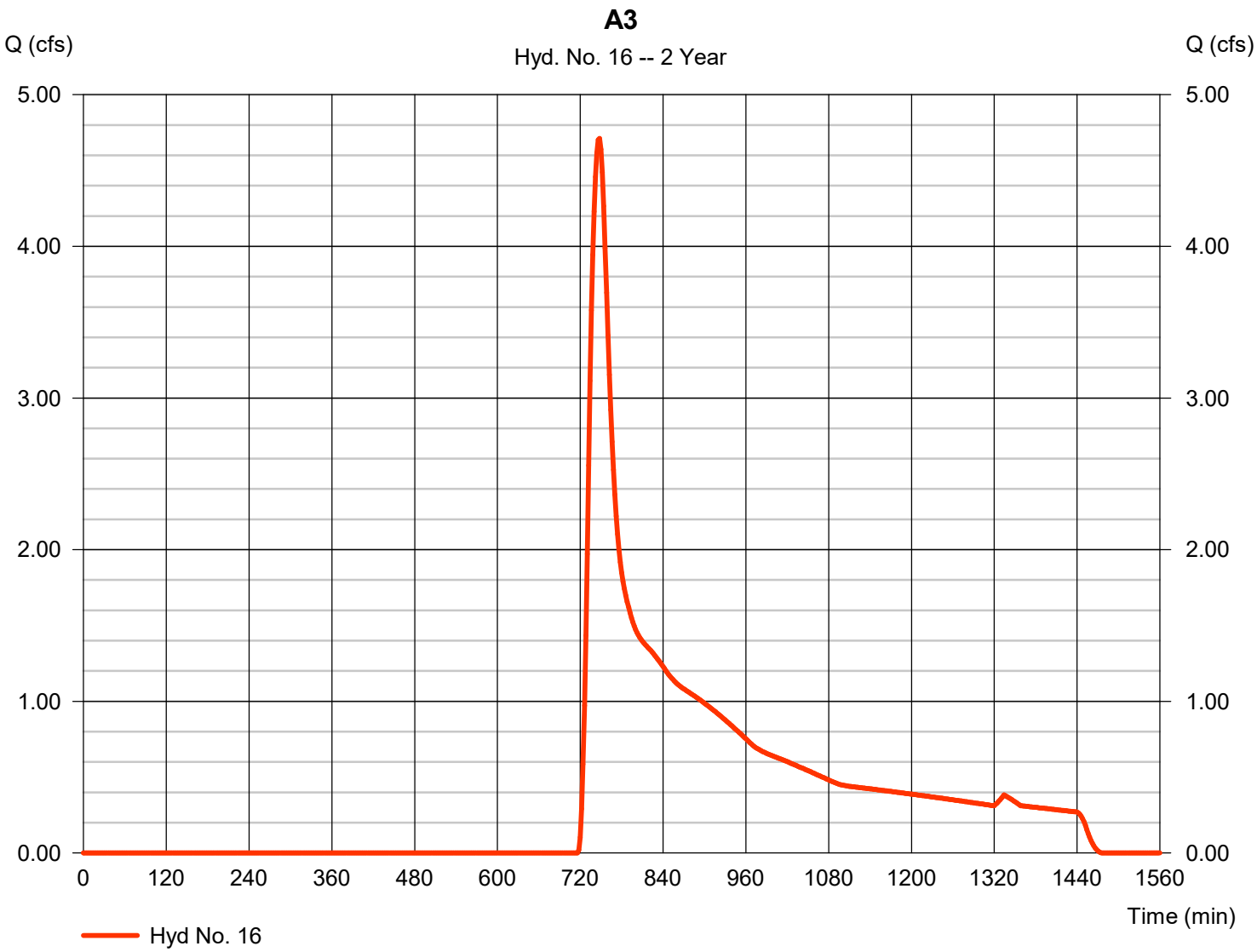
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 16

A3

Hydrograph type	= SCS Runoff	Peak discharge	= 4.711 cfs
Storm frequency	= 2 yrs	Time to peak	= 748 min
Time interval	= 2 min	Hyd. volume	= 35,299 cuft
Drainage area	= 25.560 ac	Curve number	= 60
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 22.40 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



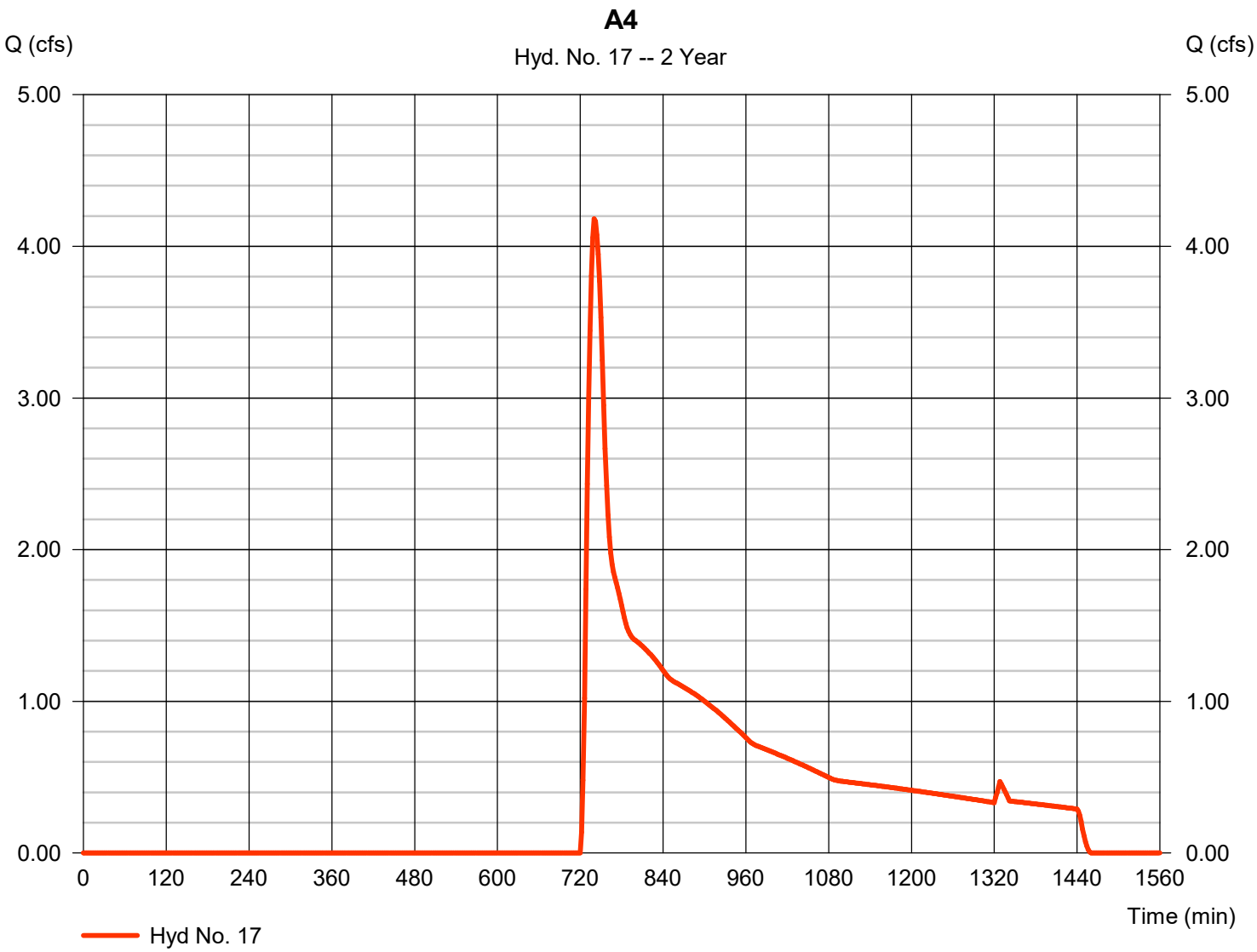
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 17

A4

Hydrograph type	= SCS Runoff	Peak discharge	= 4.182 cfs
Storm frequency	= 2 yrs	Time to peak	= 740 min
Time interval	= 2 min	Hyd. volume	= 33,980 cuft
Drainage area	= 32.410 ac	Curve number	= 57
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.30 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



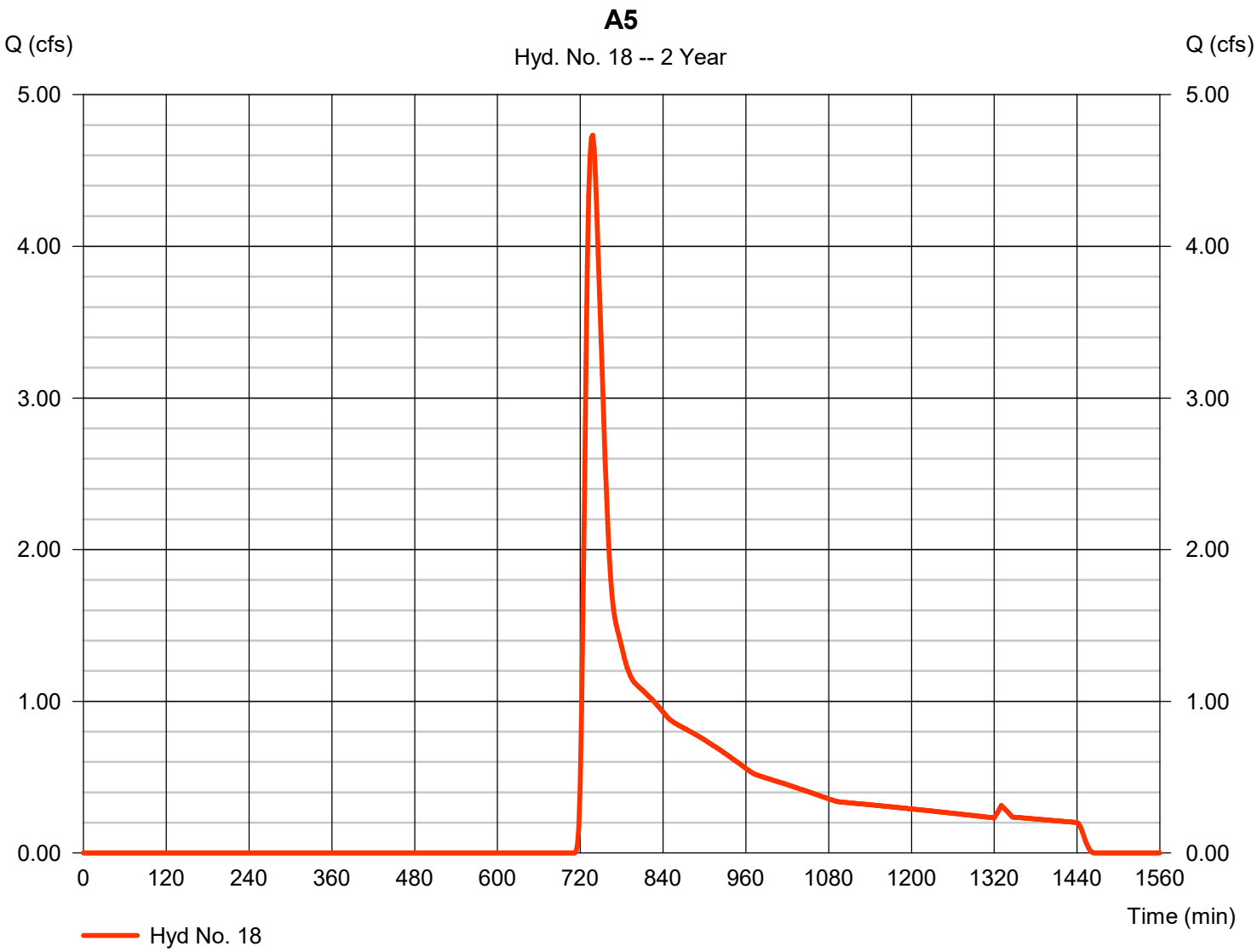
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 18

A5

Hydrograph type	= SCS Runoff	Peak discharge	= 4.733 cfs
Storm frequency	= 2 yrs	Time to peak	= 738 min
Time interval	= 2 min	Hyd. volume	= 28,487 cuft
Drainage area	= 18.170 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.50 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



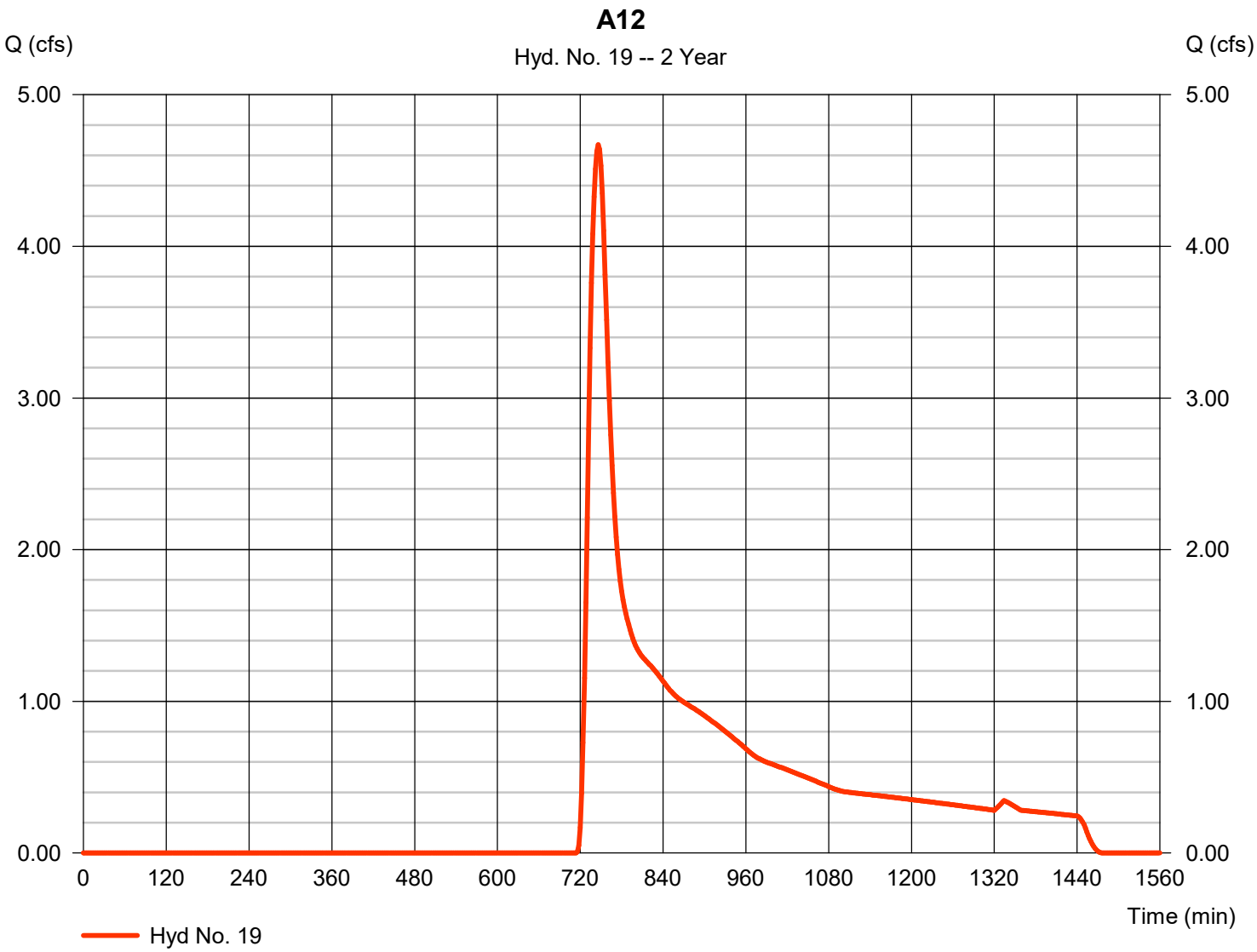
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 19

A12

Hydrograph type	= SCS Runoff	Peak discharge	= 4.671 cfs
Storm frequency	= 2 yrs	Time to peak	= 746 min
Time interval	= 2 min	Hyd. volume	= 33,142 cuft
Drainage area	= 22.000 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 22.80 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



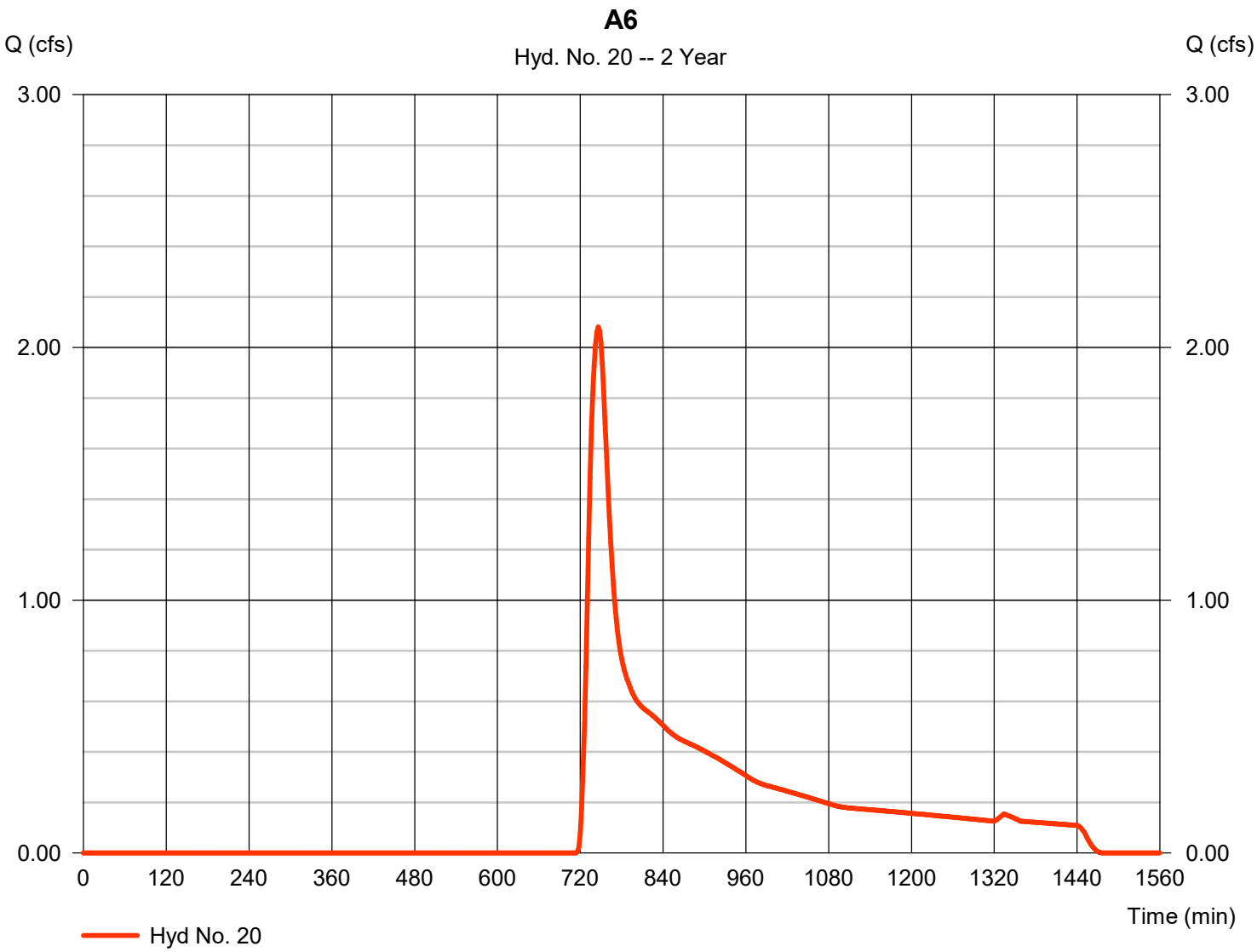
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 20

A6

Hydrograph type	= SCS Runoff	Peak discharge	= 2.081 cfs
Storm frequency	= 2 yrs	Time to peak	= 746 min
Time interval	= 2 min	Hyd. volume	= 14,763 cuft
Drainage area	= 9.800 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 20.20 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



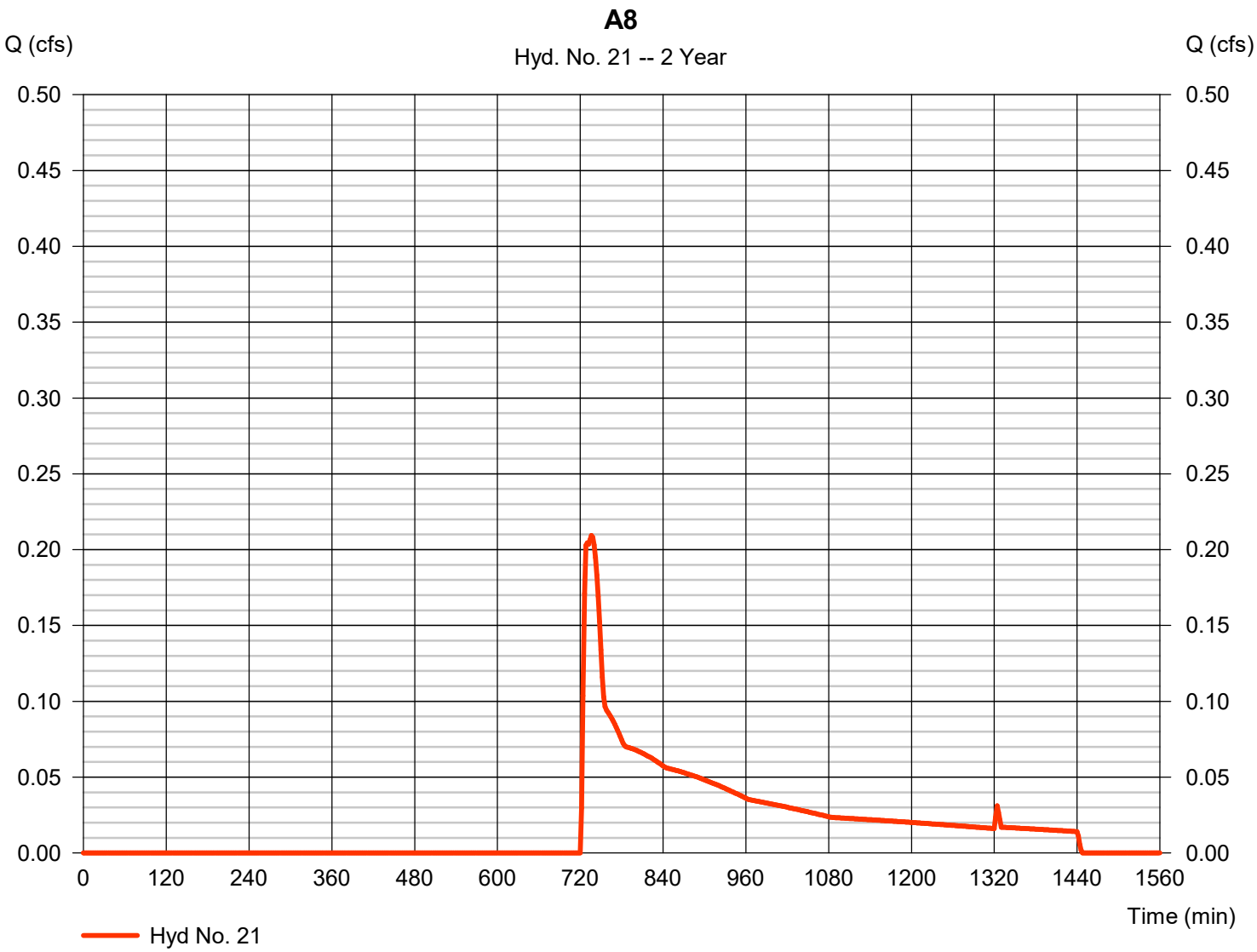
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 21

A8

Hydrograph type	= SCS Runoff	Peak discharge	= 0.209 cfs
Storm frequency	= 2 yrs	Time to peak	= 736 min
Time interval	= 2 min	Hyd. volume	= 1,668 cuft
Drainage area	= 1.750 ac	Curve number	= 57
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



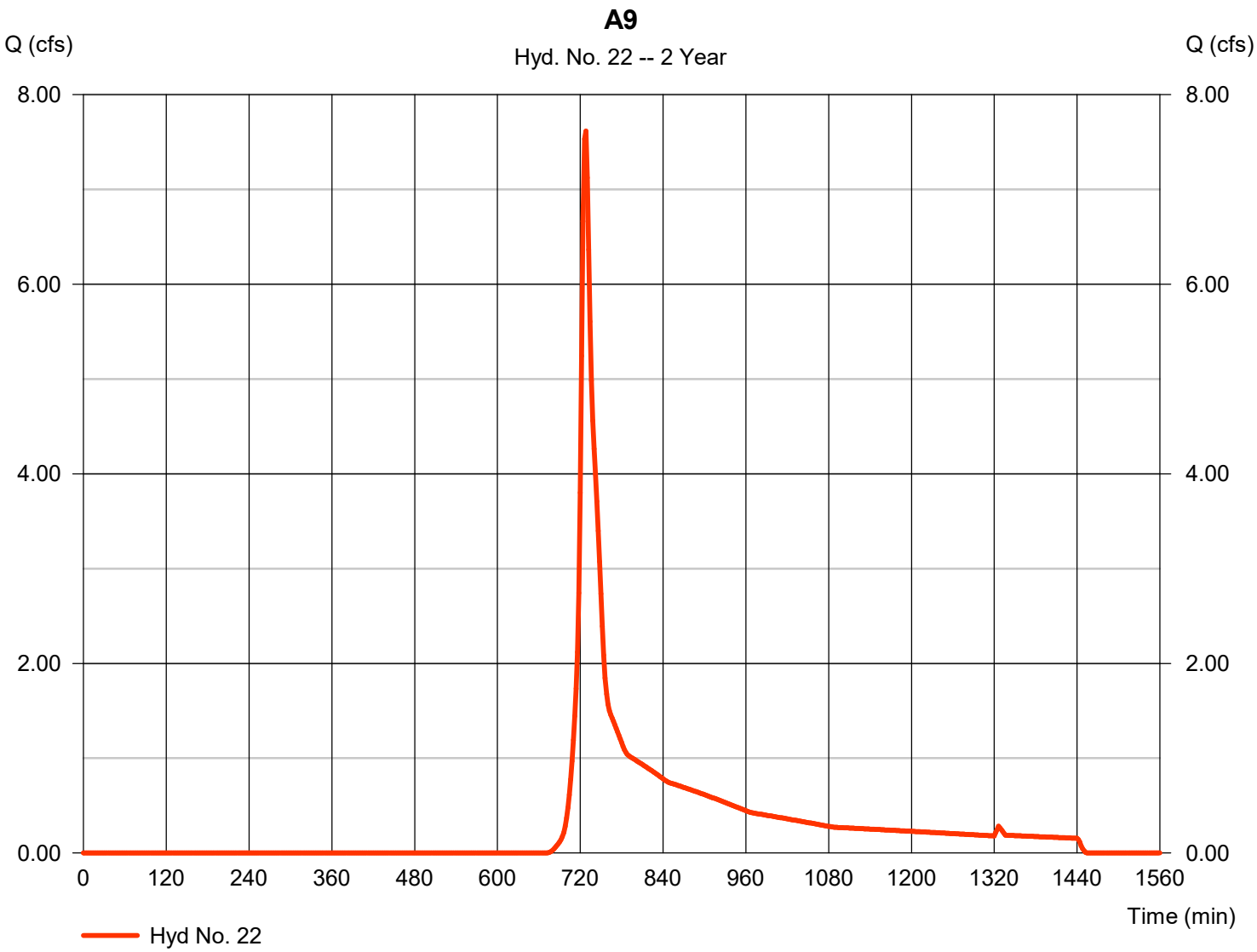
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 22

A9

Hydrograph type	= SCS Runoff	Peak discharge	= 7.617 cfs
Storm frequency	= 2 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 29,001 cuft
Drainage area	= 9.690 ac	Curve number	= 71
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.70 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



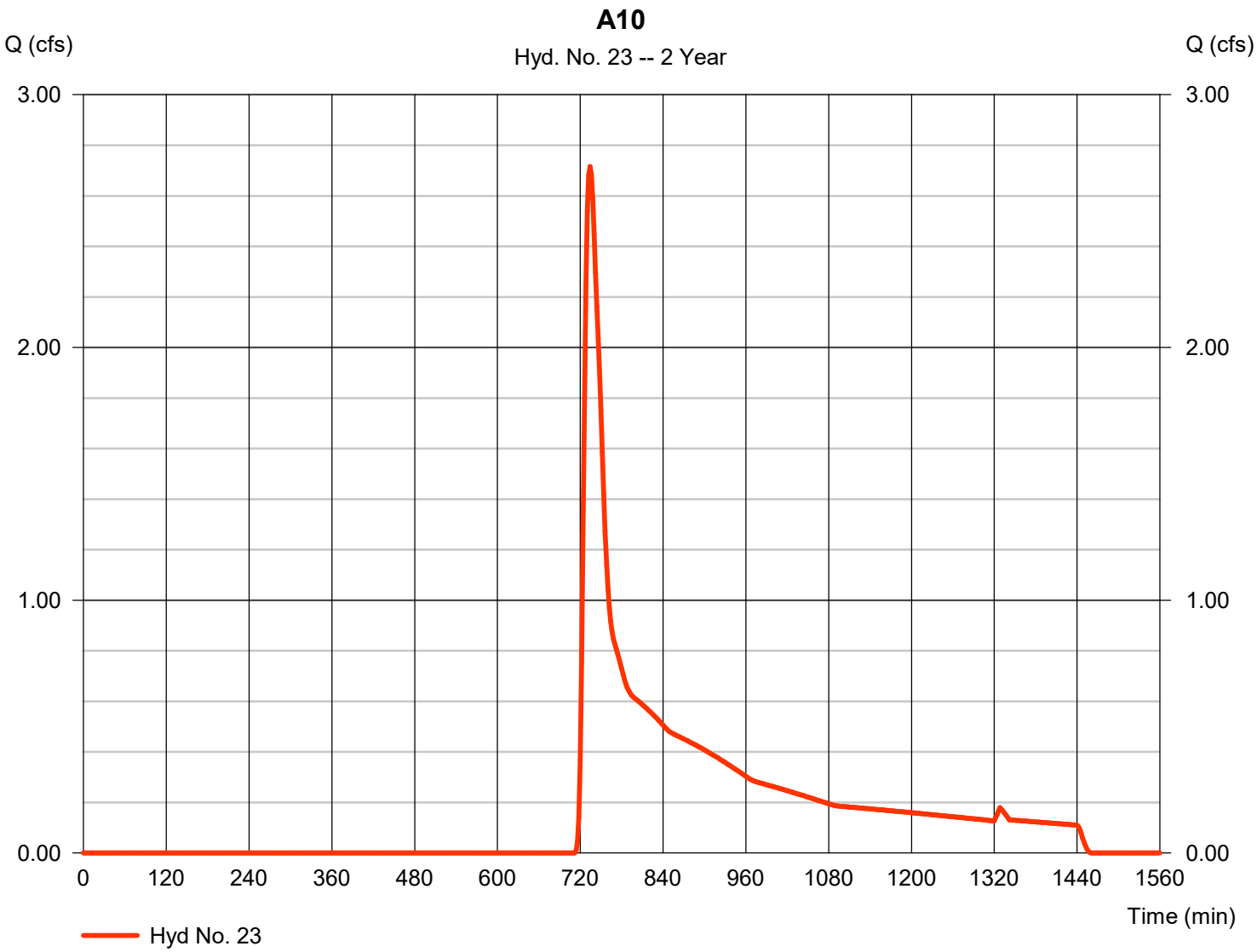
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 23

A10

Hydrograph type	= SCS Runoff	Peak discharge	= 2.716 cfs
Storm frequency	= 2 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 15,687 cuft
Drainage area	= 9.460 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.30 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



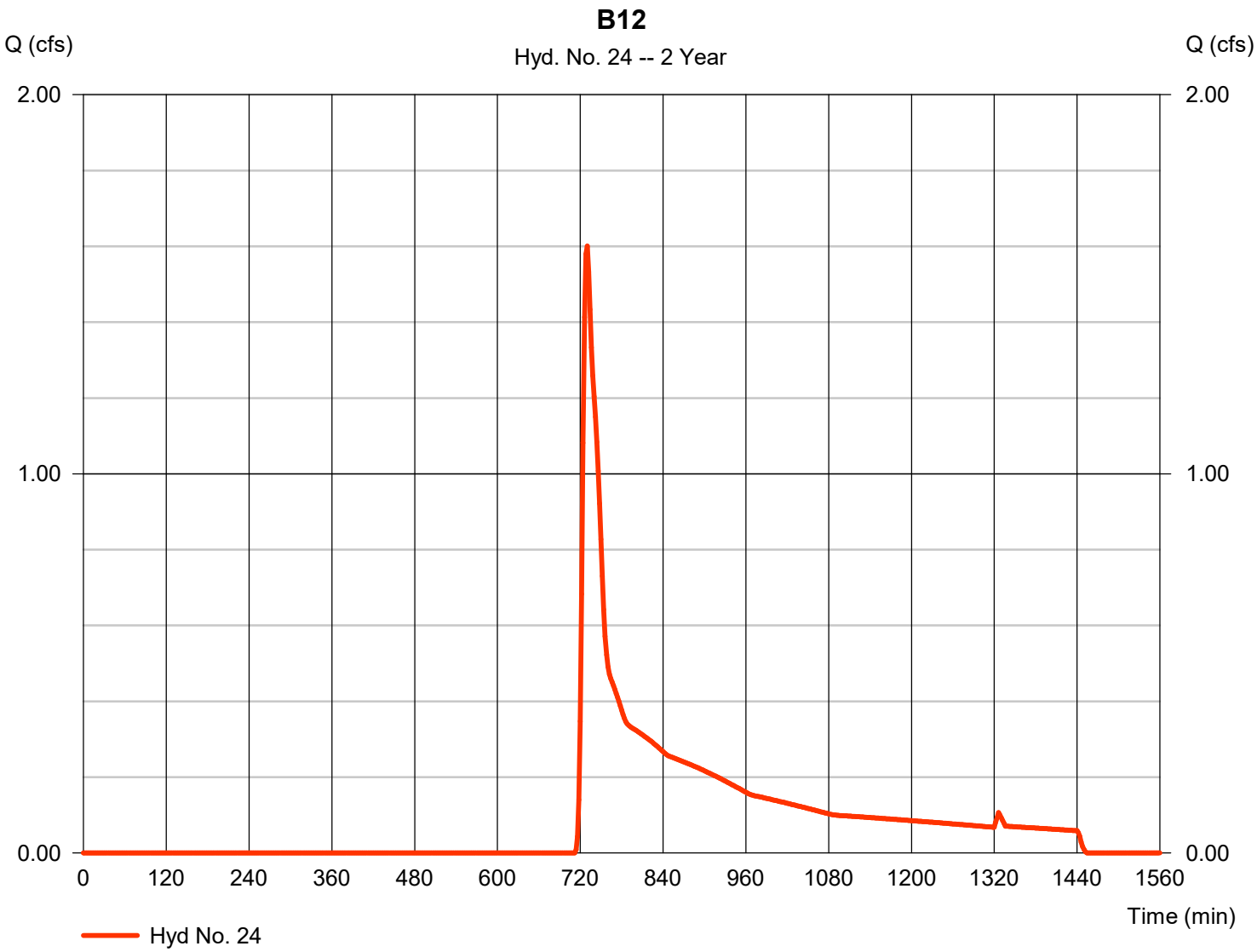
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 24

B12

Hydrograph type	= SCS Runoff	Peak discharge	= 1.600 cfs
Storm frequency	= 2 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 8,426 cuft
Drainage area	= 5.240 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.80 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

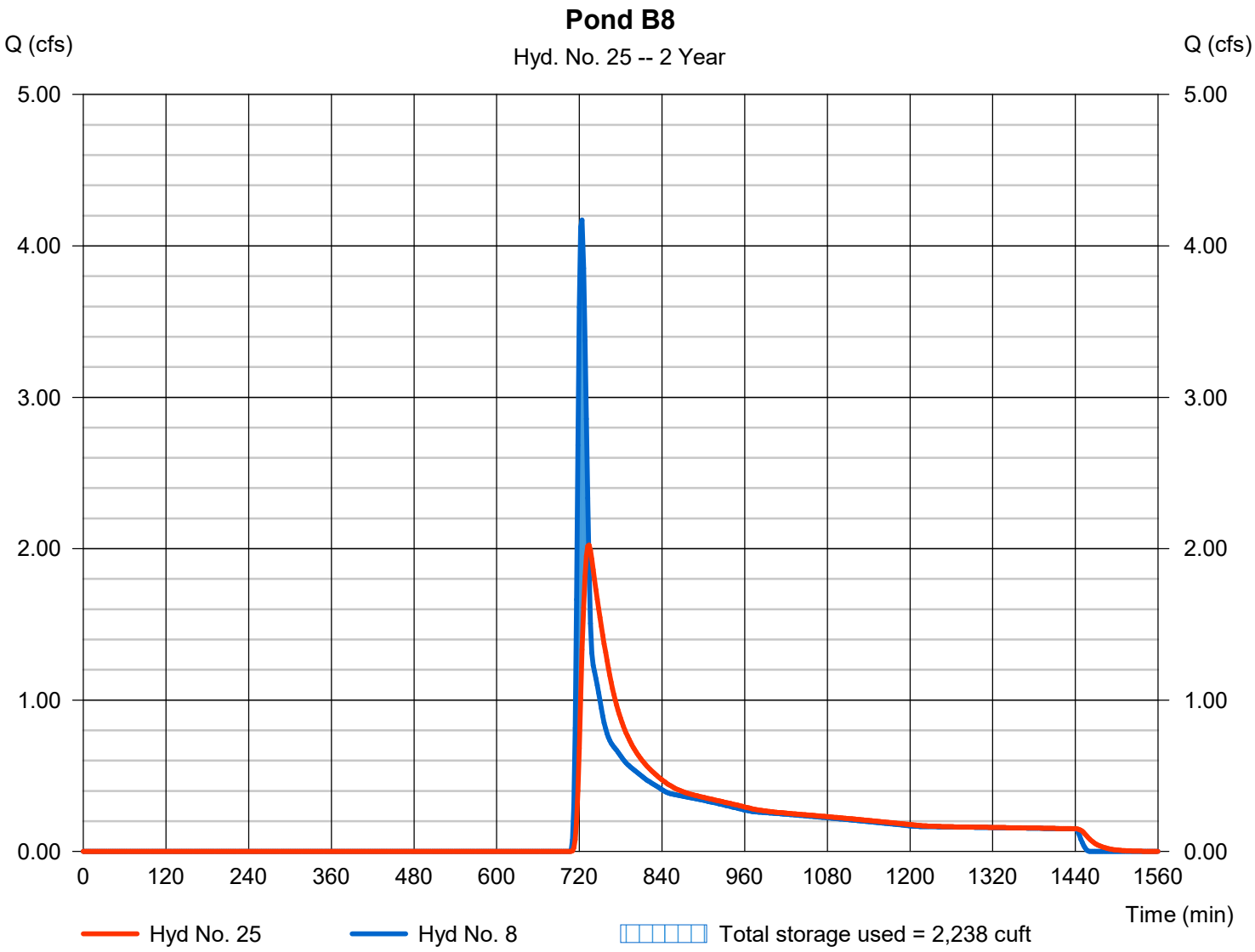
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 25

Pond B8

Hydrograph type	= Reservoir	Peak discharge	= 2.024 cfs
Storm frequency	= 2 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 16,018 cuft
Inflow hyd. No.	= 8 - B8	Max. Elevation	= 132.08 ft
Reservoir name	= B8 Pond	Max. Storage	= 2,238 cuft

Storage Indication method used.



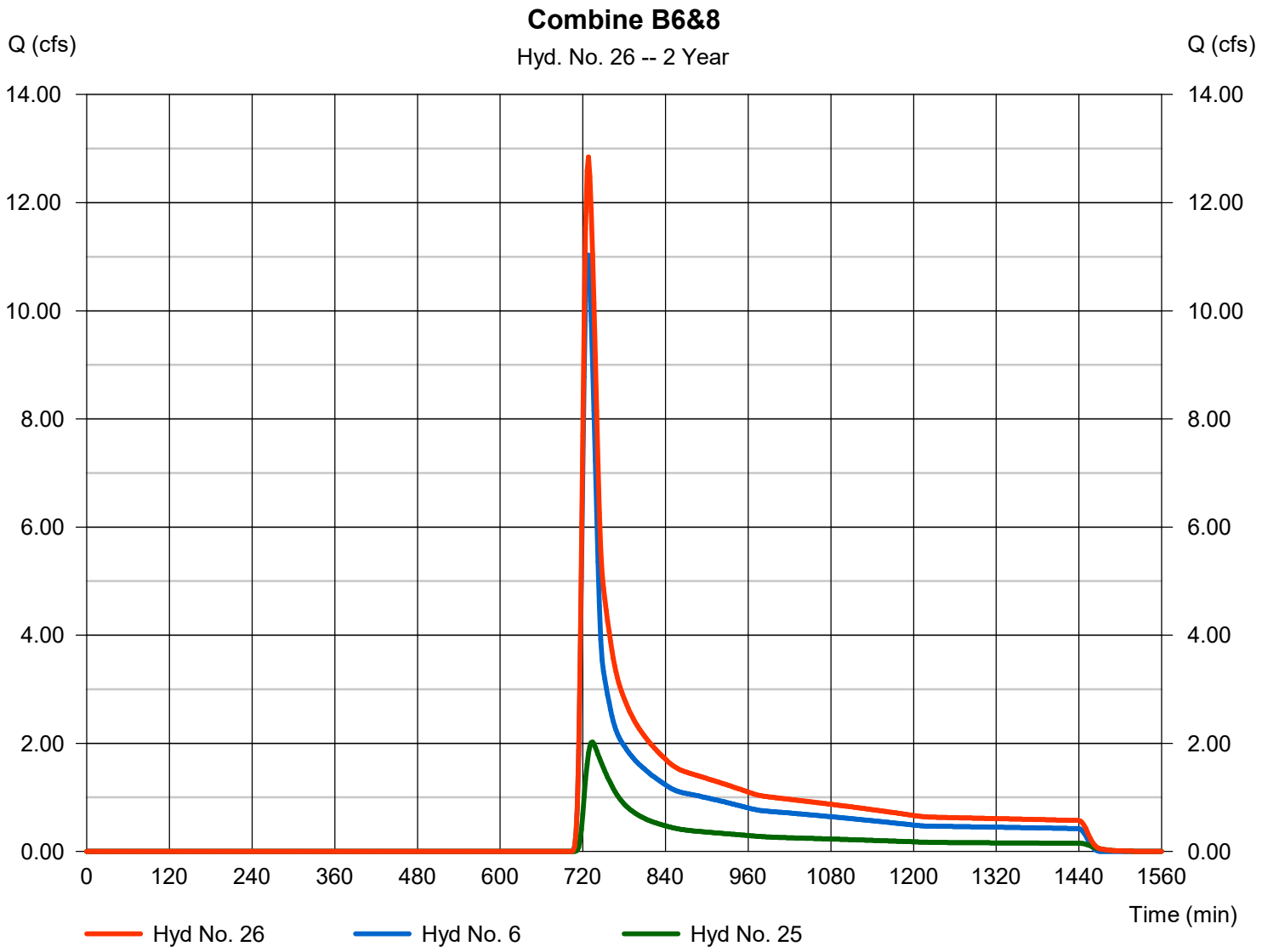
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 26

Combine B6&8

Hydrograph type	= Combine	Peak discharge	= 12.85 cfs
Storm frequency	= 2 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 64,688 cuft
Inflow hyds.	= 6, 25	Contrib. drain. area	= 27.950 ac



Hydrograph Report

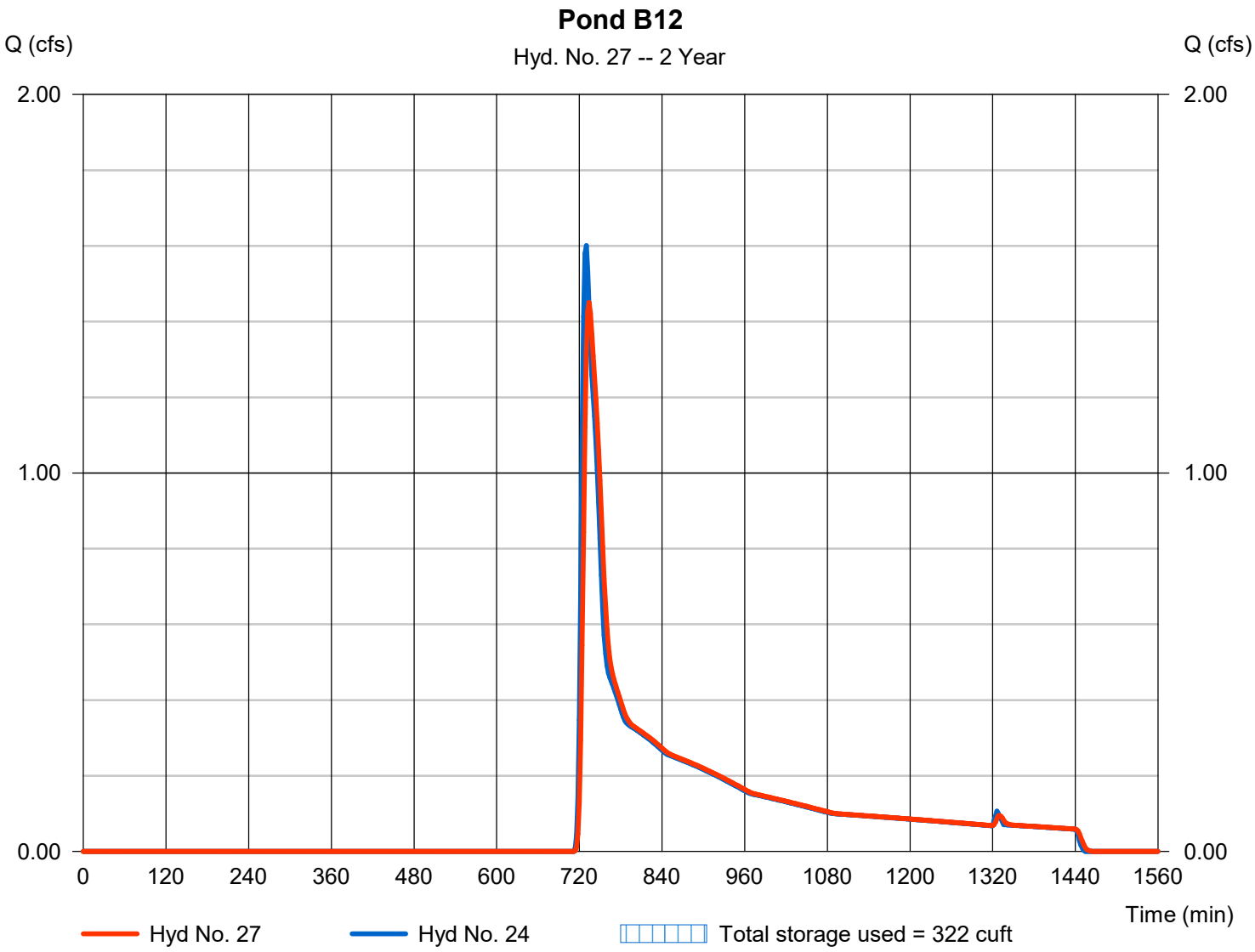
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 27

Pond B12

Hydrograph type	= Reservoir	Peak discharge	= 1.450 cfs
Storm frequency	= 2 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 8,426 cuft
Inflow hyd. No.	= 24 - B12	Max. Elevation	= 126.02 ft
Reservoir name	= B12 Pond	Max. Storage	= 322 cuft

Storage Indication method used.



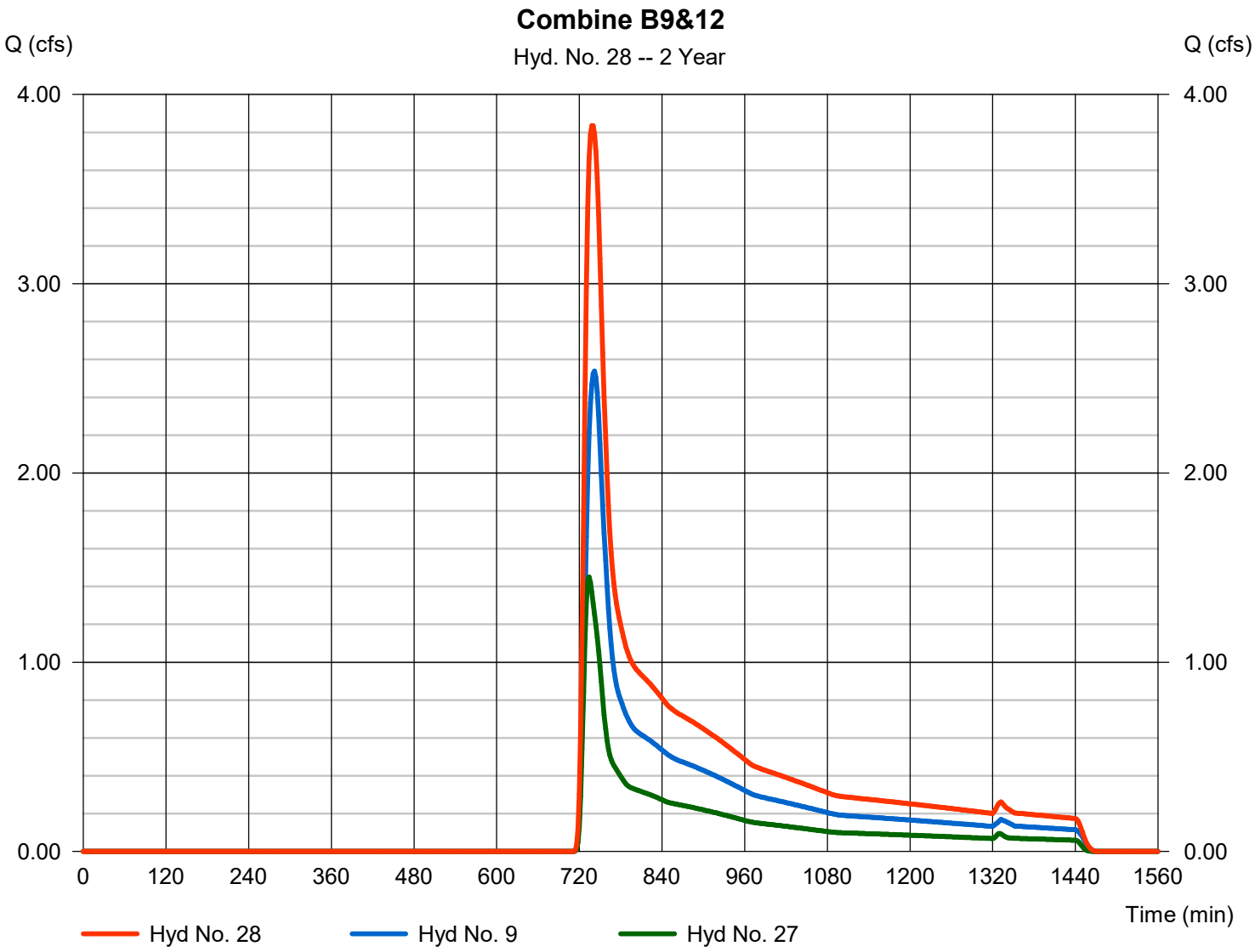
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 28

Combine B9&12

Hydrograph type	= Combine	Peak discharge	= 3.835 cfs
Storm frequency	= 2 yrs	Time to peak	= 740 min
Time interval	= 2 min	Hyd. volume	= 24,634 cuft
Inflow hyds.	= 9, 27	Contrib. drain. area	= 10.080 ac



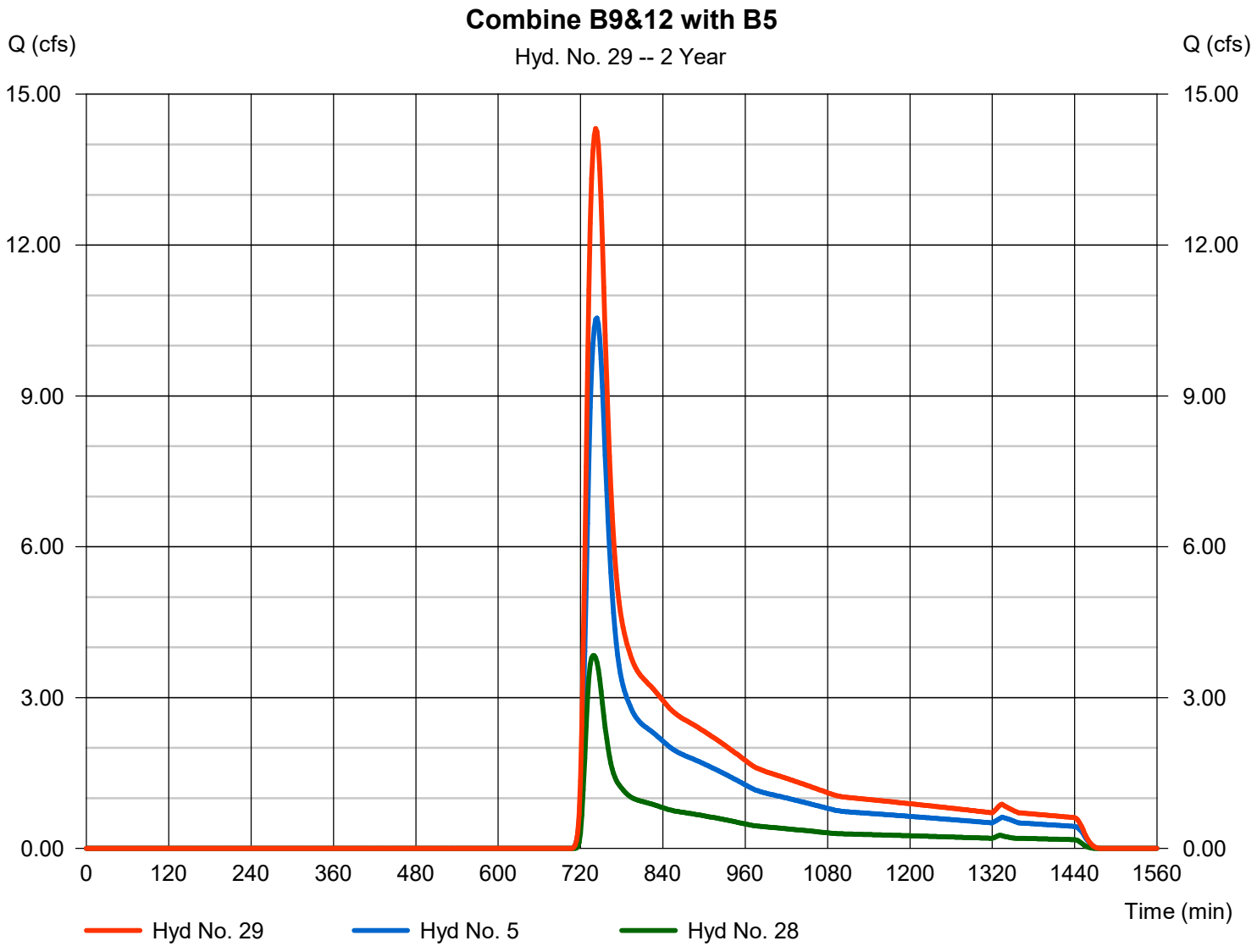
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 29

Combine B9&12 with B5

Hydrograph type	= Combine	Peak discharge	= 14.32 cfs
Storm frequency	= 2 yrs	Time to peak	= 742 min
Time interval	= 2 min	Hyd. volume	= 90,520 cuft
Inflow hyds.	= 5, 28	Contrib. drain. area	= 34.440 ac



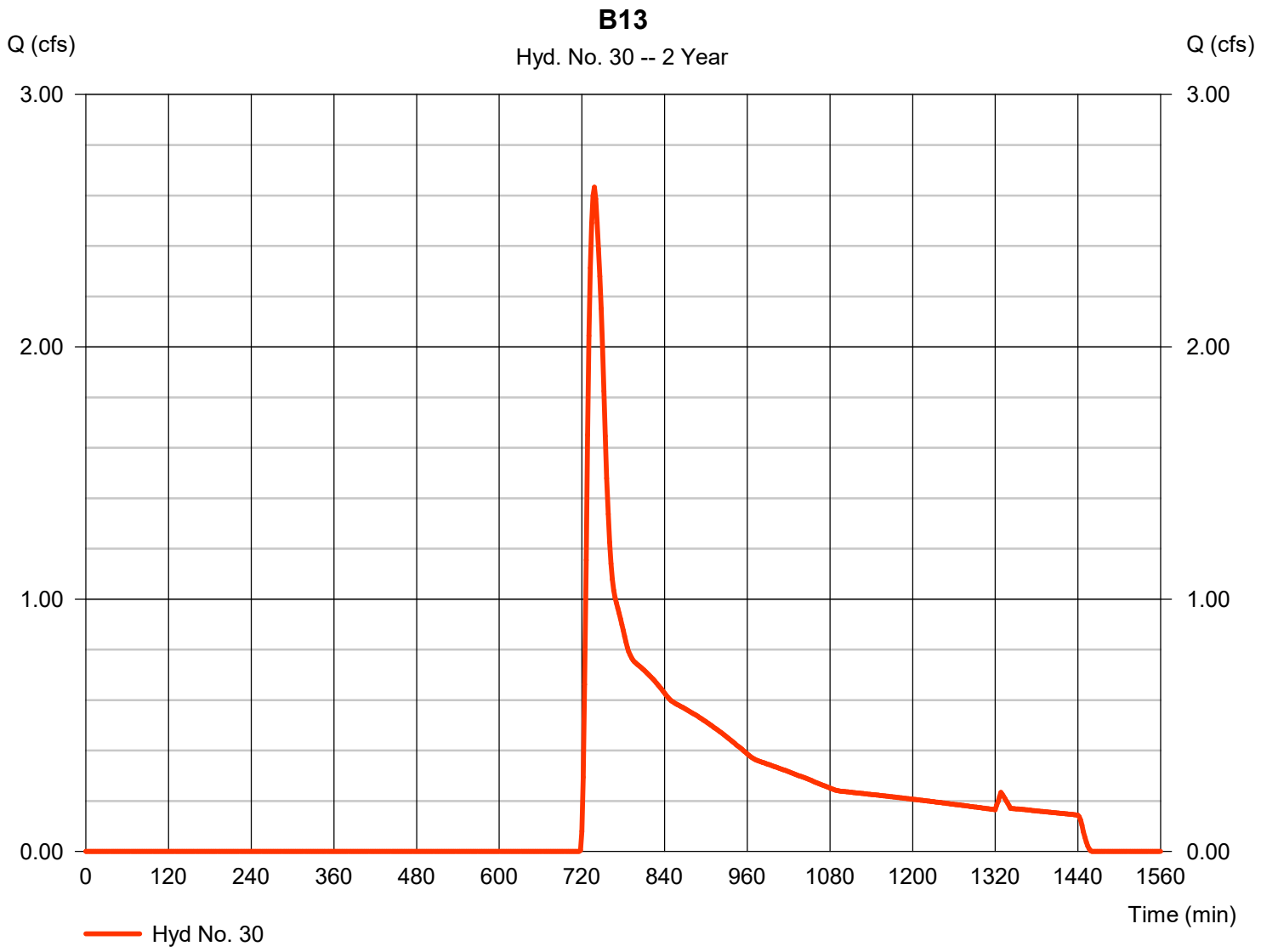
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 30

B13

Hydrograph type	= SCS Runoff	Peak discharge	= 2.632 cfs
Storm frequency	= 2 yrs	Time to peak	= 738 min
Time interval	= 2 min	Hyd. volume	= 18,390 cuft
Drainage area	= 14.400 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 10.40 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



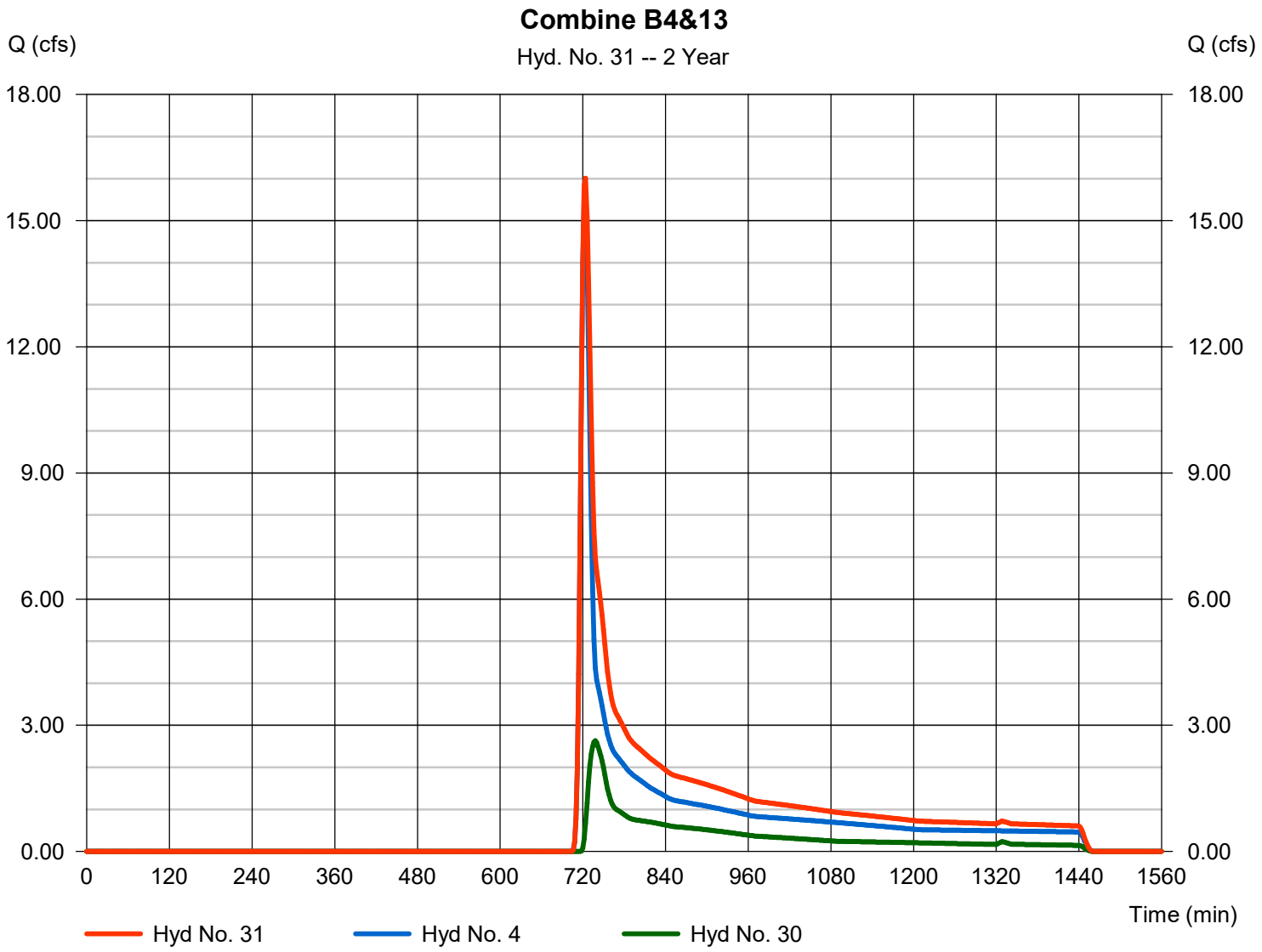
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 31

Combine B4&13

Hydrograph type	= Combine	Peak discharge	= 16.01 cfs
Storm frequency	= 2 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 71,777 cuft
Inflow hyds.	= 4, 30	Contrib. drain. area	= 44.130 ac



Hydrograph Report

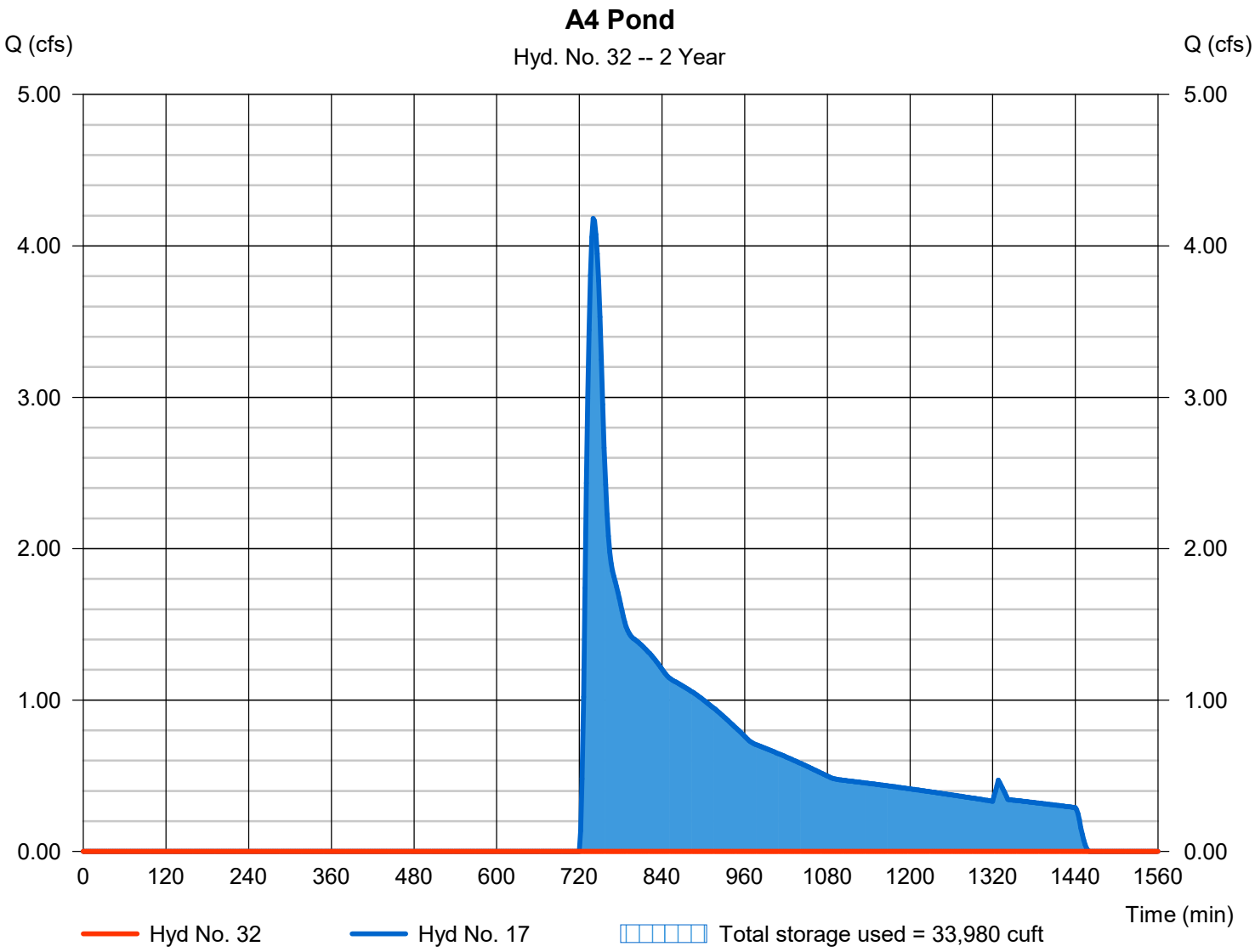
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 32

A4 Pond

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 17 - A4	Max. Elevation	= 101.96 ft
Reservoir name	= A4 Pond	Max. Storage	= 33,980 cuft

Storage Indication method used.



Hydrograph Report

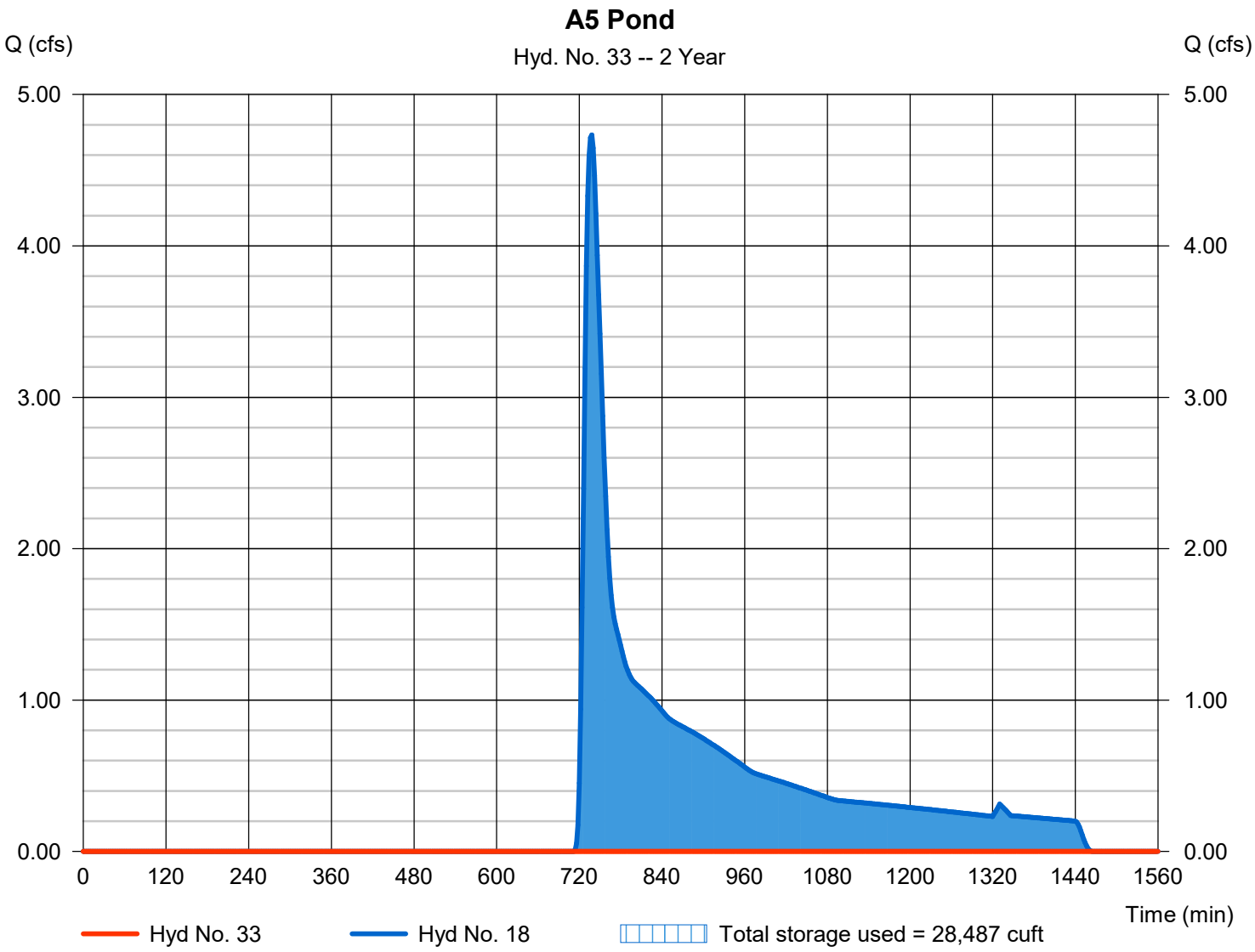
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 33

A5 Pond

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 18 - A5	Max. Elevation	= 107.49 ft
Reservoir name	= A5 Pond	Max. Storage	= 28,487 cuft

Storage Indication method used.



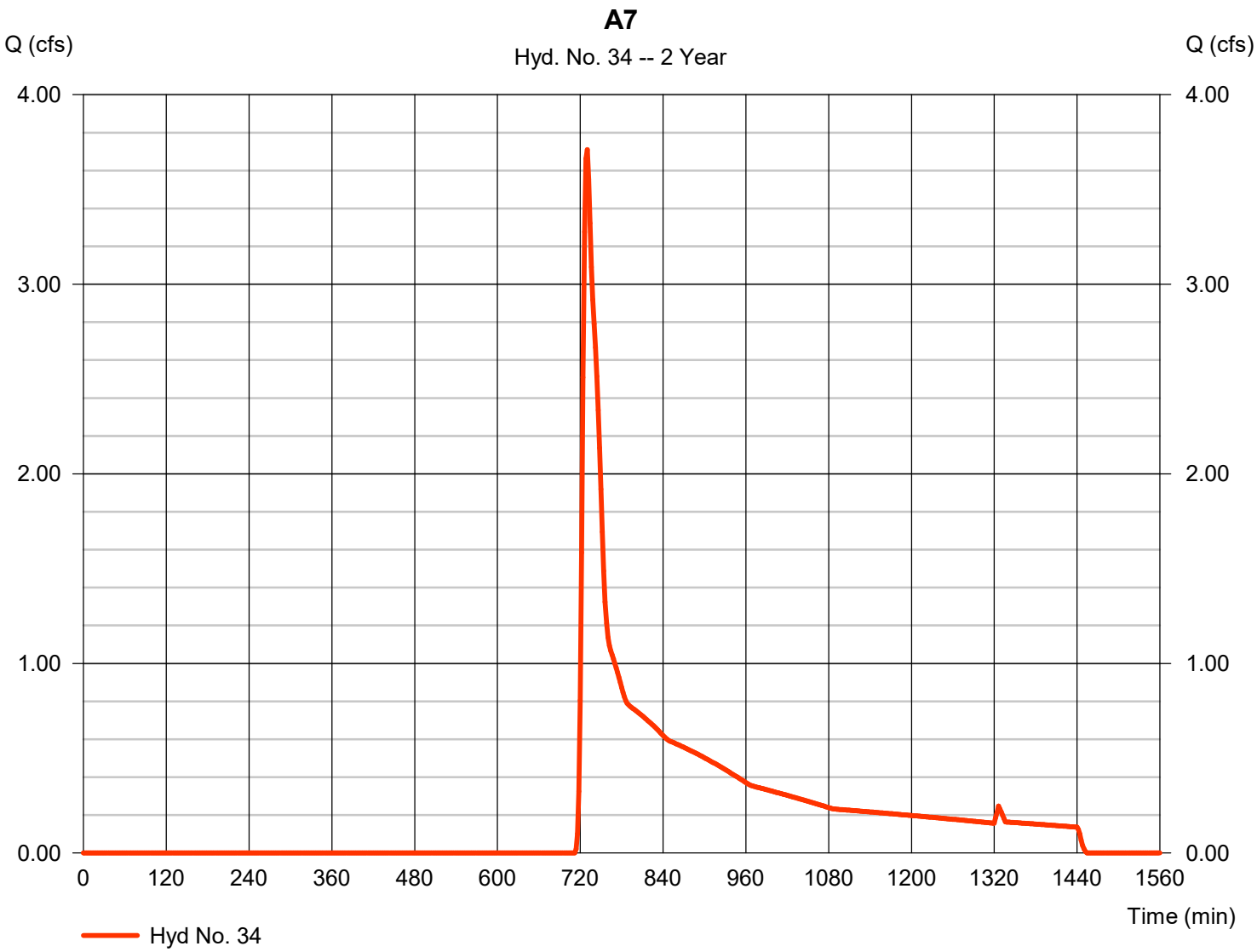
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 34

A7

Hydrograph type	= SCS Runoff	Peak discharge	= 3.711 cfs
Storm frequency	= 2 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 19,537 cuft
Drainage area	= 12.150 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.00 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



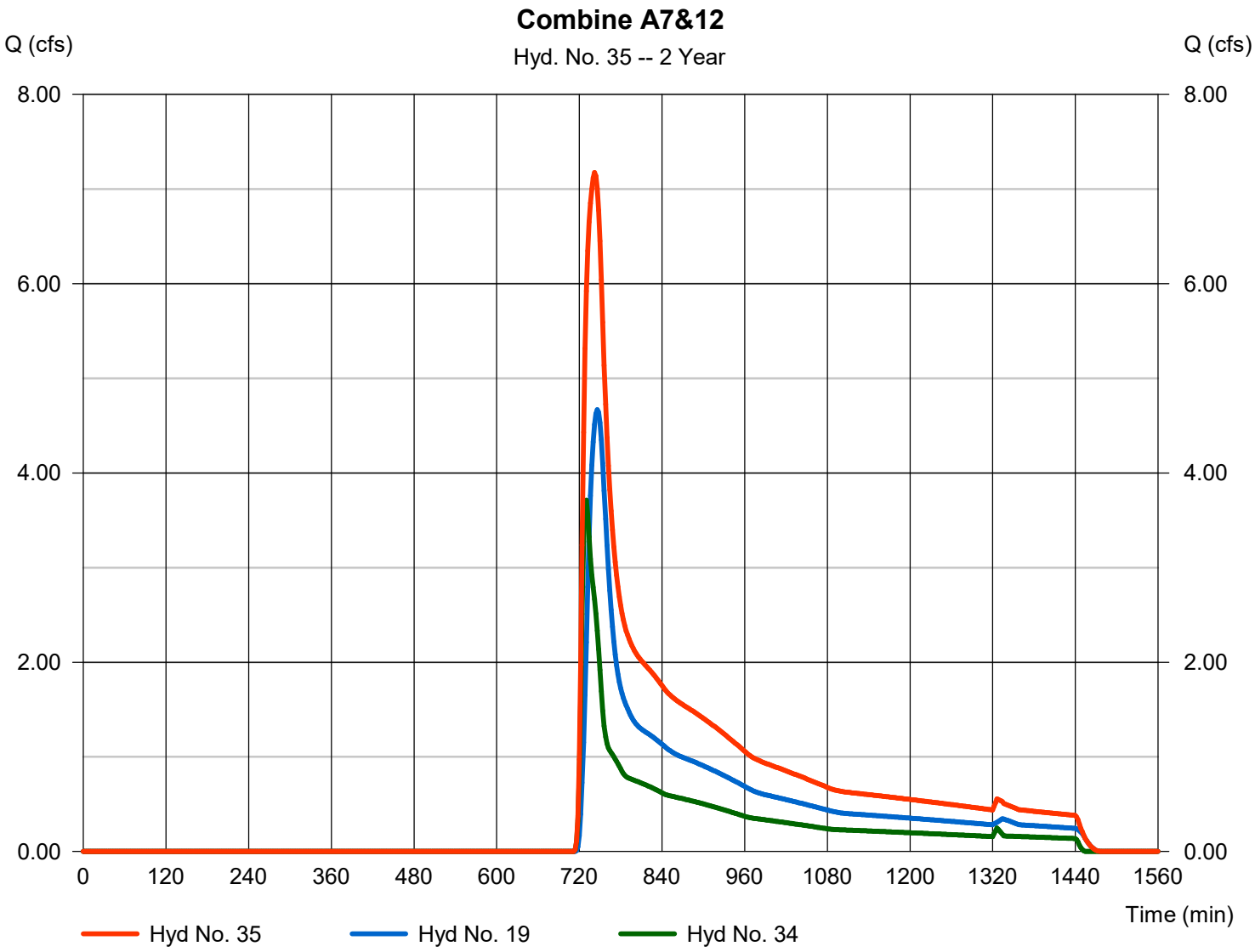
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 35

Combine A7&12

Hydrograph type	= Combine	Peak discharge	= 7.177 cfs
Storm frequency	= 2 yrs	Time to peak	= 742 min
Time interval	= 2 min	Hyd. volume	= 52,679 cuft
Inflow hyds.	= 19, 34	Contrib. drain. area	= 34.150 ac



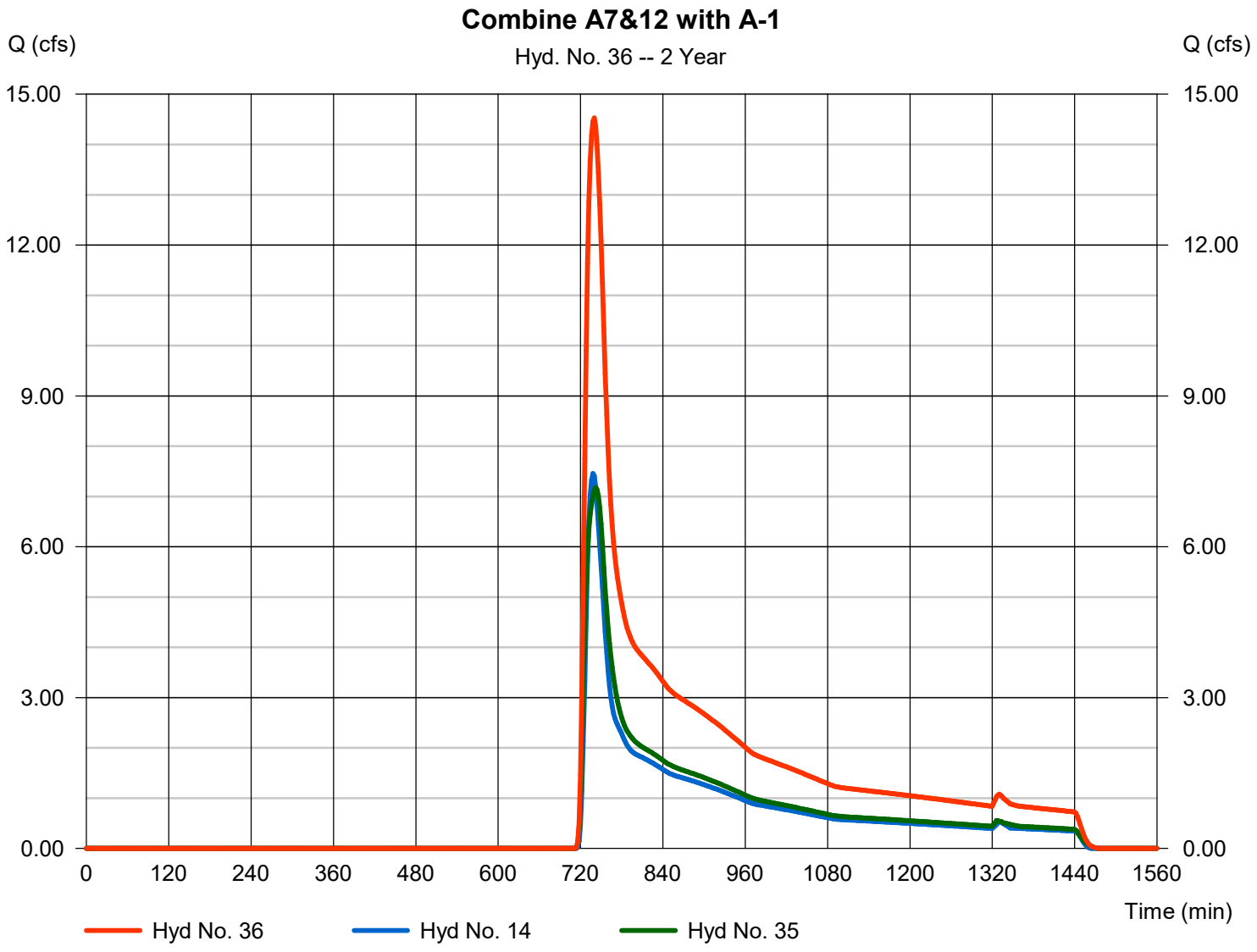
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 36

Combine A7&12 with A-1

Hydrograph type	= Combine	Peak discharge	= 14.53 cfs
Storm frequency	= 2 yrs	Time to peak	= 740 min
Time interval	= 2 min	Hyd. volume	= 99,982 cuft
Inflow hyds.	= 14, 35	Contrib. drain. area	= 32.780 ac



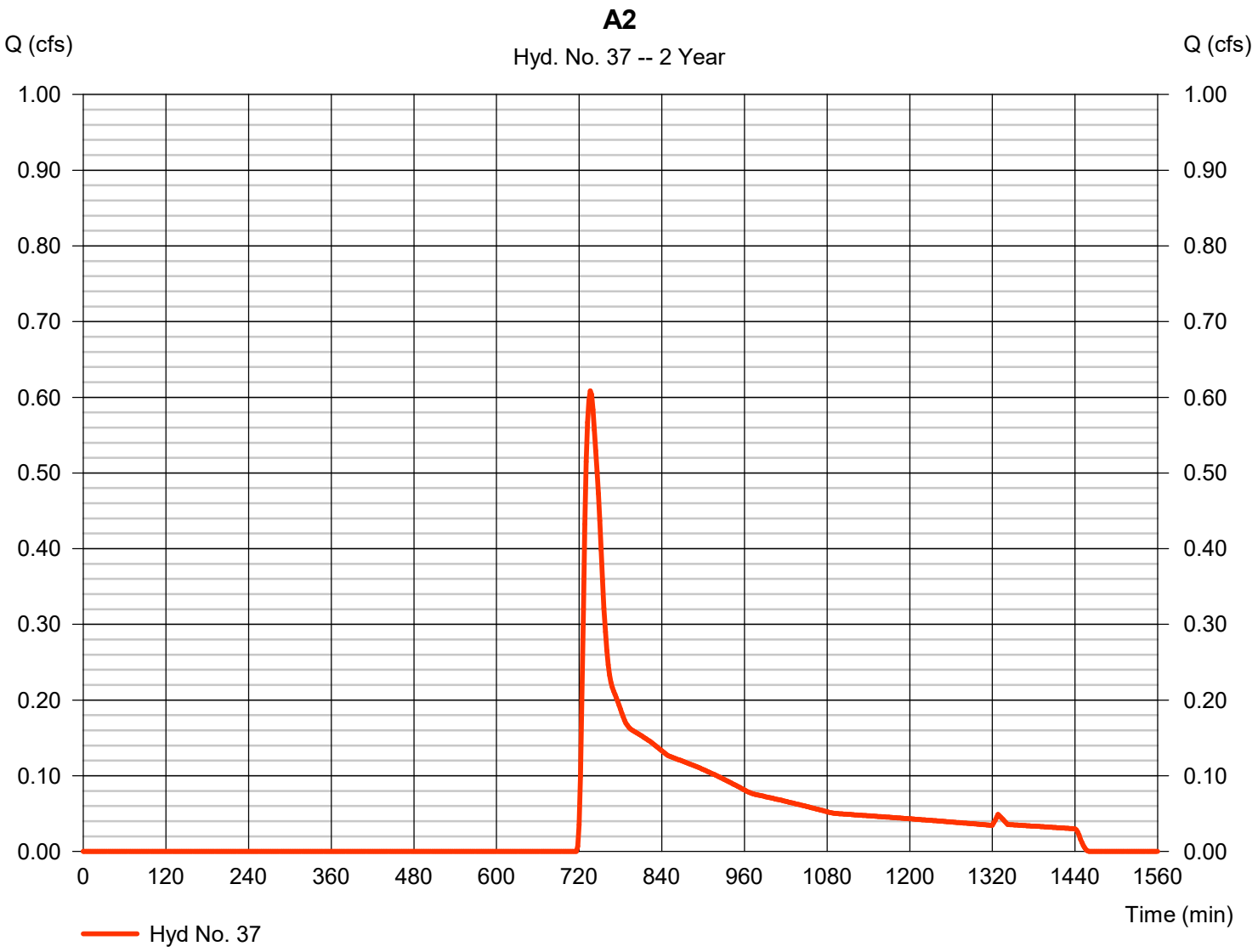
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 37

A2

Hydrograph type	= SCS Runoff	Peak discharge	= 0.608 cfs
Storm frequency	= 2 yrs	Time to peak	= 736 min
Time interval	= 2 min	Hyd. volume	= 3,974 cuft
Drainage area	= 2.840 ac	Curve number	= 60
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.70 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



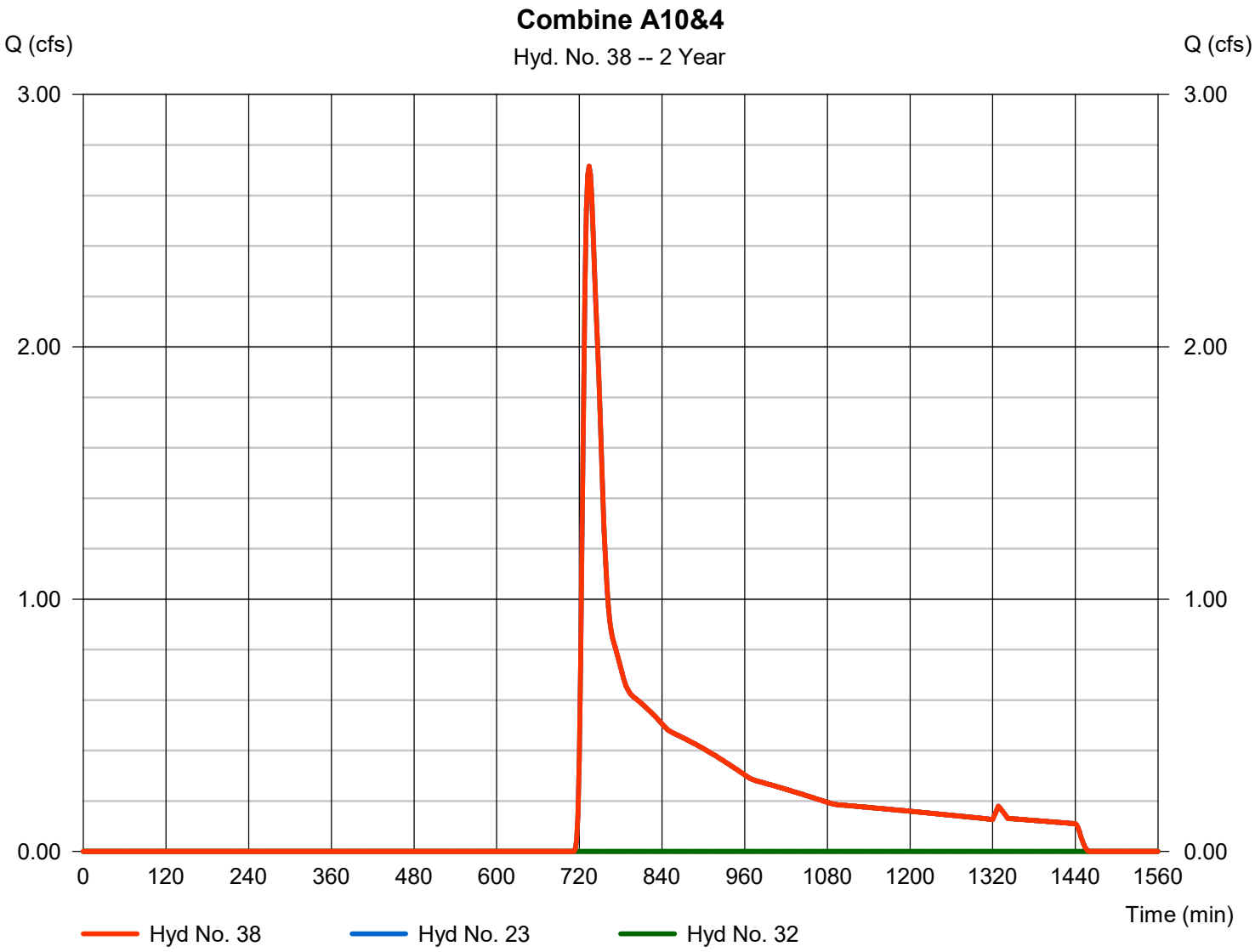
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 38

Combine A10&4

Hydrograph type	= Combine	Peak discharge	= 2.716 cfs
Storm frequency	= 2 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 15,687 cuft
Inflow hyds.	= 23, 32	Contrib. drain. area	= 9.460 ac



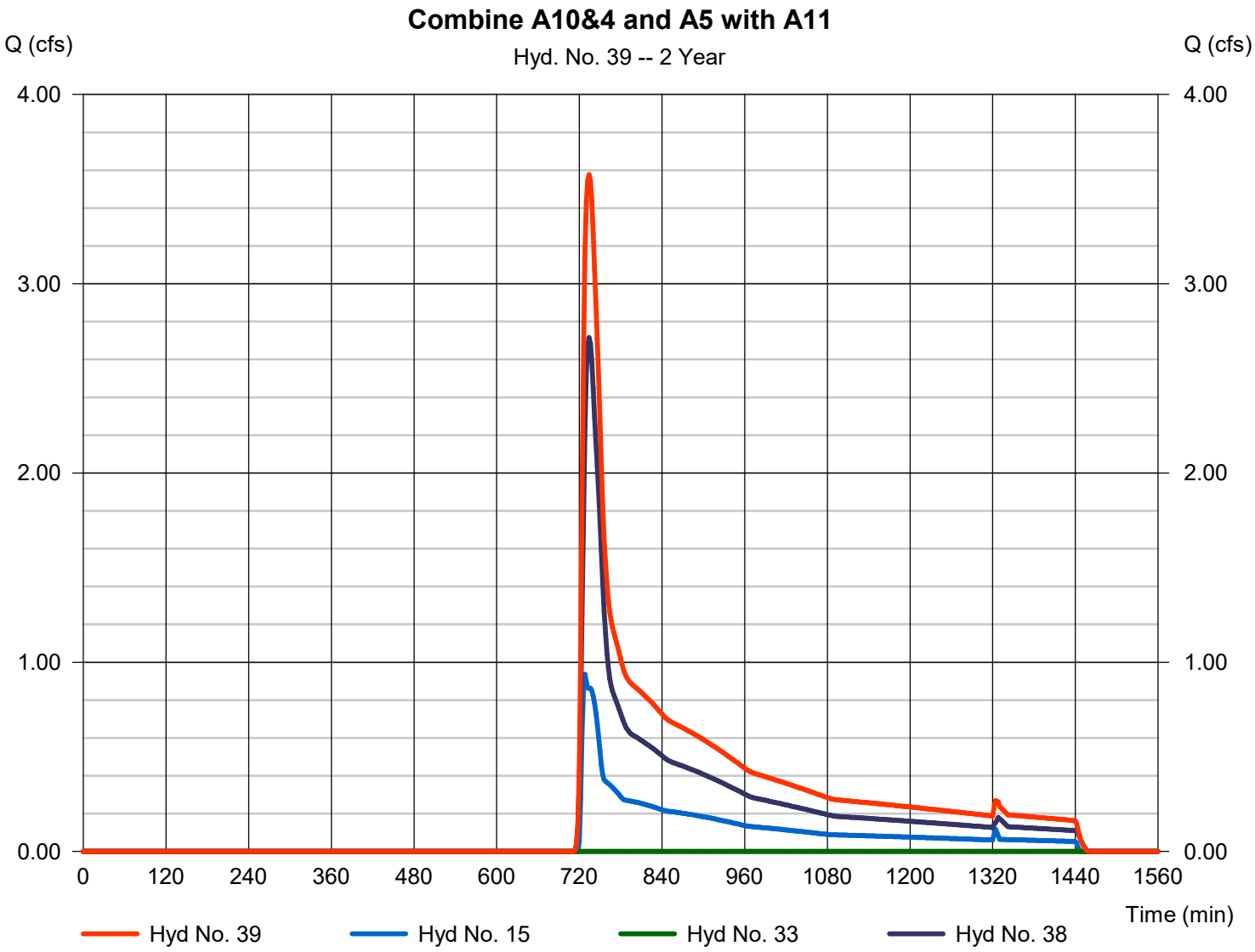
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 39

Combine A10&4 and A5 with A11

Hydrograph type	= Combine	Peak discharge	= 3.577 cfs
Storm frequency	= 2 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 22,210 cuft
Inflow hyds.	= 15, 33, 38	Contrib. drain. area	= 6.180 ac



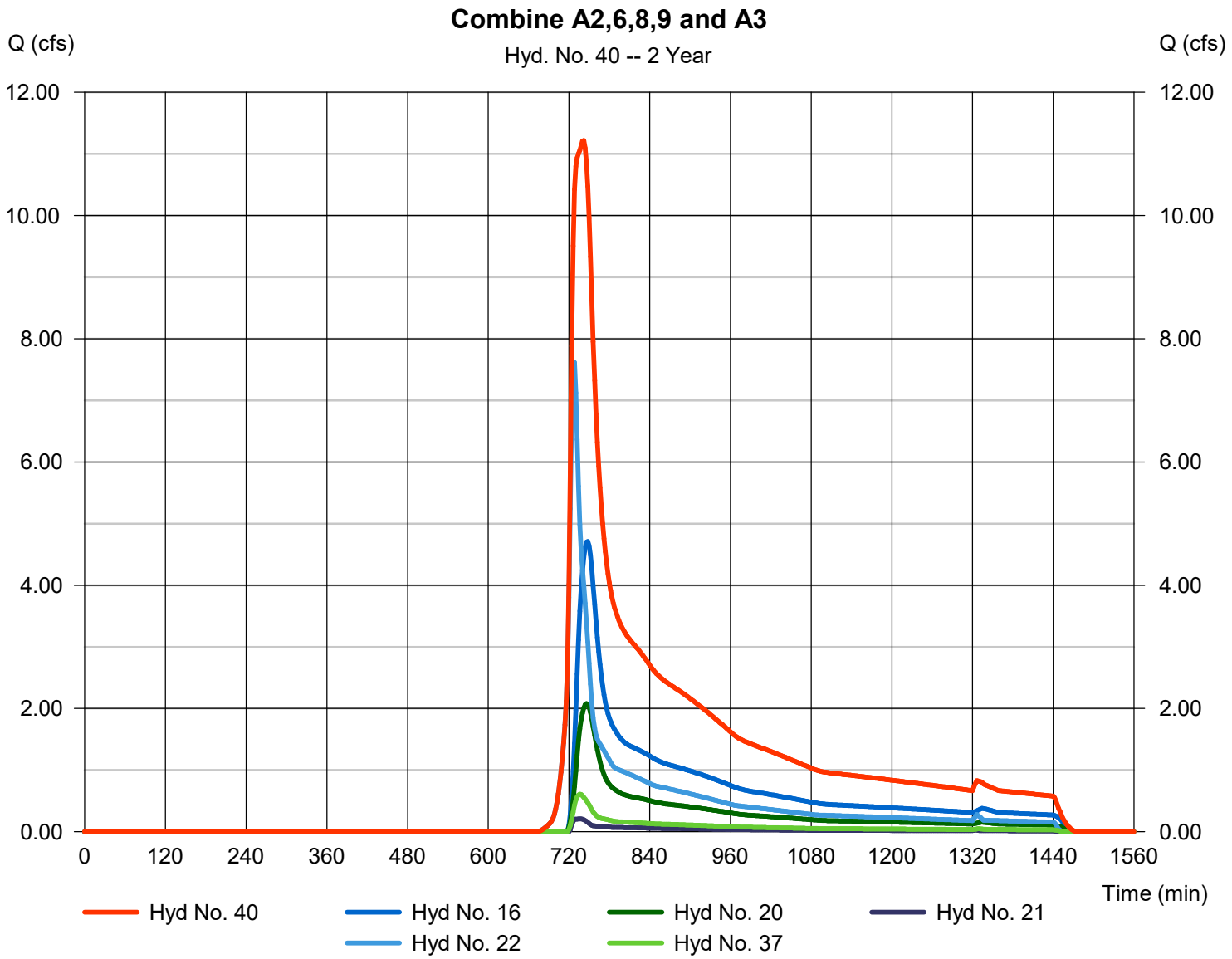
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 40

Combine A2,6,8,9 and A3

Hydrograph type	= Combine	Peak discharge	= 11.22 cfs
Storm frequency	= 2 yrs	Time to peak	= 742 min
Time interval	= 2 min	Hyd. volume	= 84,706 cuft
Inflow hyds.	= 16, 20, 21, 22, 37	Contrib. drain. area	= 49.640 ac



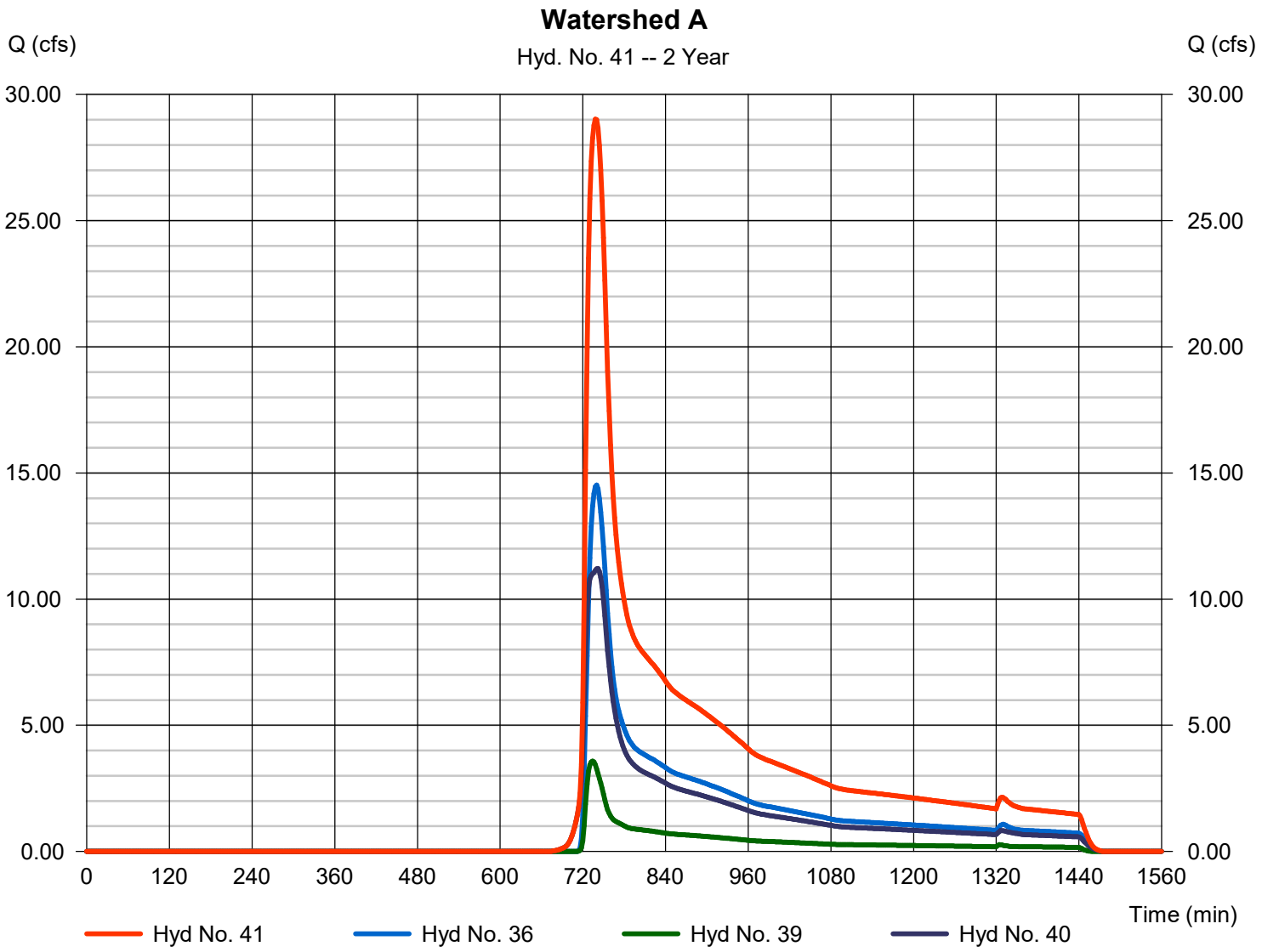
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 41

Watershed A

Hydrograph type	= Combine	Peak discharge	= 29.03 cfs
Storm frequency	= 2 yrs	Time to peak	= 738 min
Time interval	= 2 min	Hyd. volume	= 206,897 cuft
Inflow hyds.	= 36, 39, 40	Contrib. drain. area	= 0.000 ac



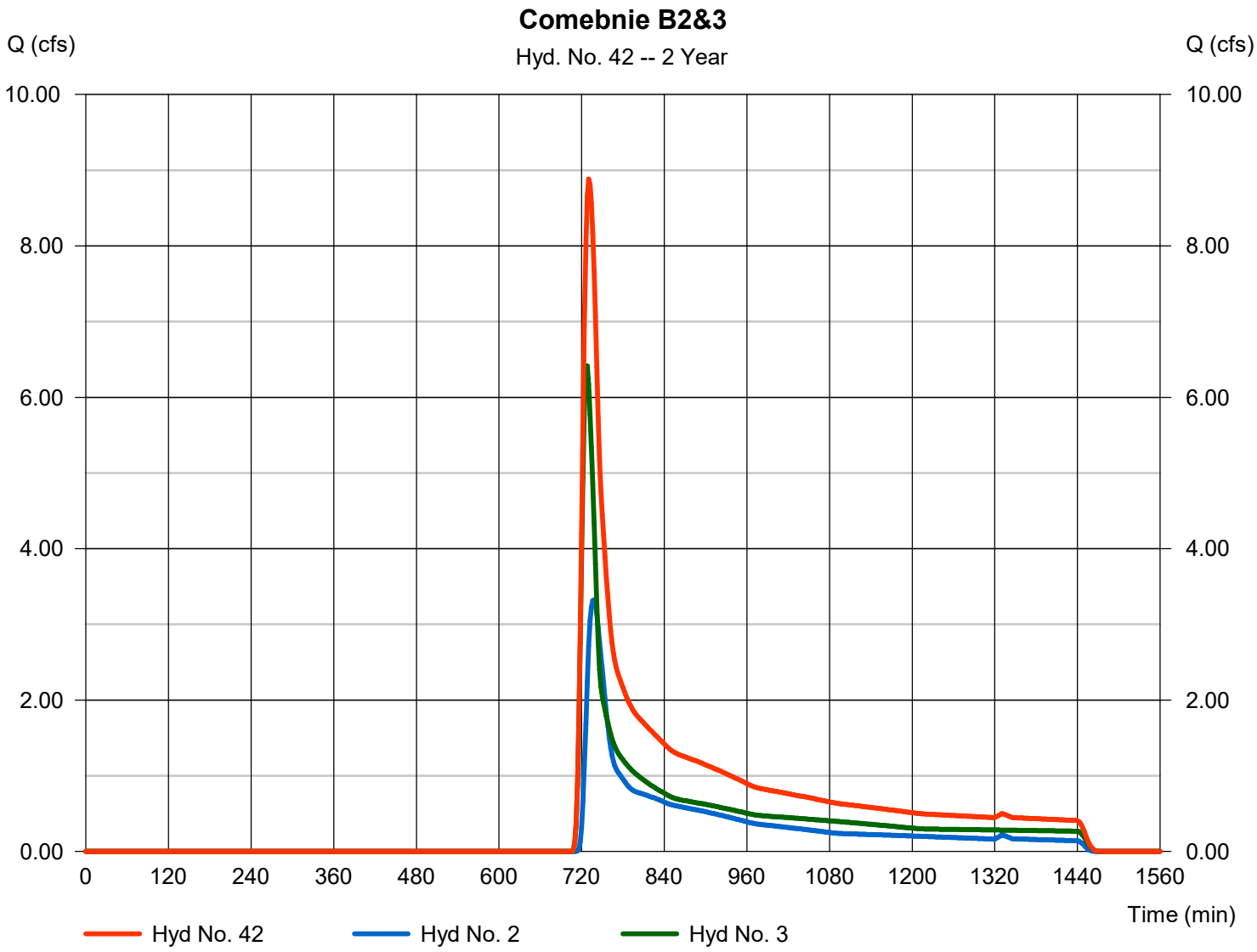
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 42

Comebnie B2&3

Hydrograph type	= Combine	Peak discharge	= 8.884 cfs
Storm frequency	= 2 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 49,802 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 31.290 ac



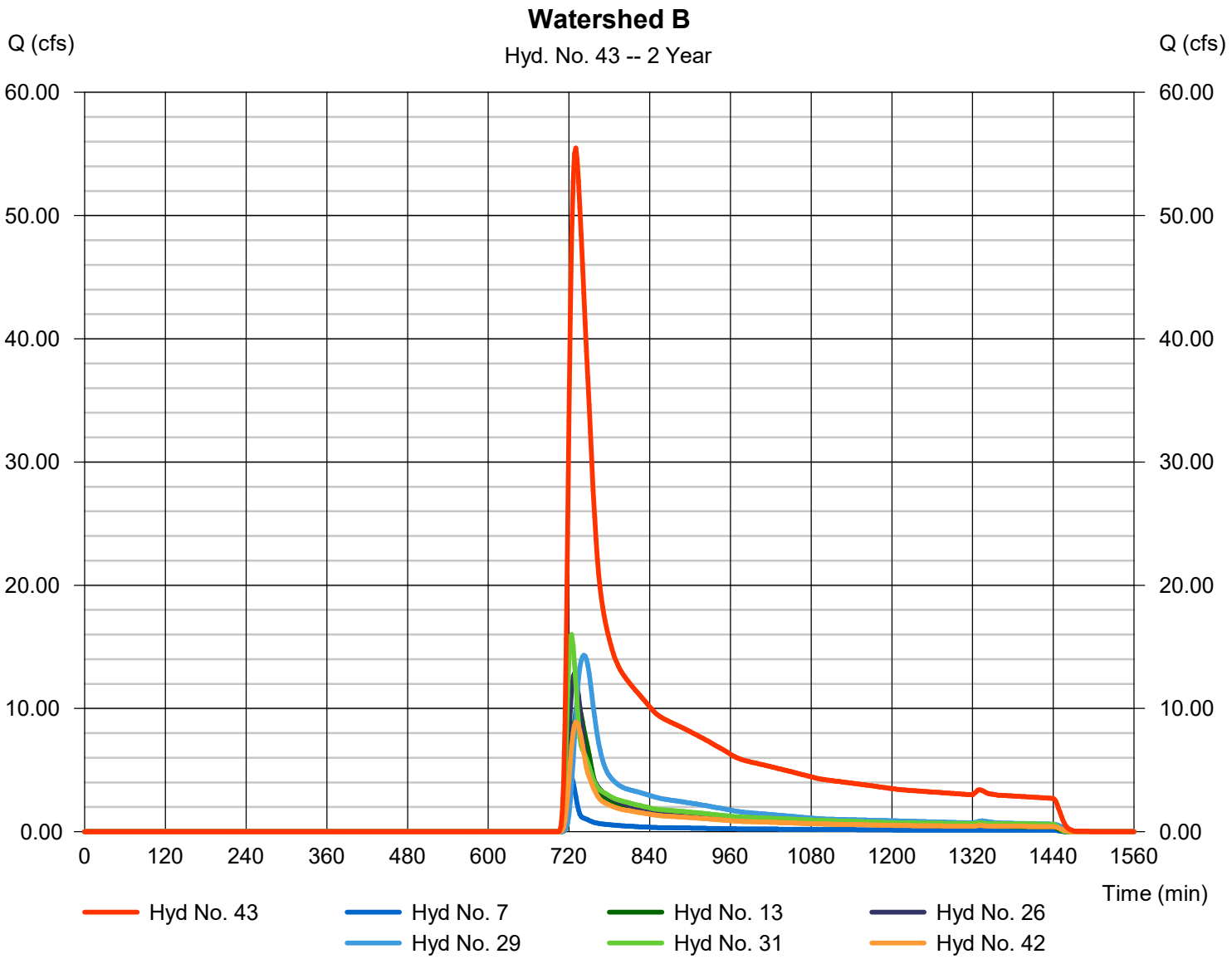
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 43

Watershed B

Hydrograph type	= Combine	Peak discharge	= 55.48 cfs
Storm frequency	= 2 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 347,795 cuft
Inflow hyds.	= 7, 13, 26, 29, 31, 42	Contrib. drain. area	= 7.760 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	38.89	2	730	161,461	------	------	------	B1
2	SCS Runoff	13.33	2	732	59,503	------	------	------	B2
3	SCS Runoff	25.96	2	726	88,509	------	------	------	B3
4	SCS Runoff	56.62	2	722	154,001	------	------	------	B4
5	SCS Runoff	36.36	2	738	184,794	------	------	------	B5
6	SCS Runoff	41.67	2	726	140,394	------	------	------	B6
7	SCS Runoff	15.63	2	722	42,186	------	------	------	B7
8	SCS Runoff	17.71	2	722	49,157	------	------	------	B8
9	SCS Runoff	9.921	2	736	48,173	------	------	------	B9
10	SCS Runoff	0.009	2	1324	206	------	------	------	B10
11	SCS Runoff	0.011	2	1324	261	------	------	------	B11
12	Combine	0.020	2	1324	467	10, 11	------	------	Combine B10&11
13	Combine	38.89	2	730	161,928	1, 12	------	------	Combine B10&11 with B1
14	SCS Runoff	32.01	2	732	145,093	------	------	------	A1
15	SCS Runoff	6.272	2	724	22,304	------	------	------	A11
16	SCS Runoff	20.87	2	740	112,001	------	------	------	A3
17	SCS Runoff	26.05	2	730	121,292	------	------	------	A4
18	SCS Runoff	18.96	2	732	84,665	------	------	------	A5
19	SCS Runoff	19.25	2	738	101,658	------	------	------	A12
20	SCS Runoff	8.576	2	738	45,284	------	------	------	A6
21	SCS Runoff	1.627	2	724	5,954	------	------	------	A8
22	SCS Runoff	19.84	2	726	69,172	------	------	------	A9
23	SCS Runoff	11.08	2	730	46,623	------	------	------	A10
24	SCS Runoff	6.634	2	728	25,043	------	------	------	B12
25	Reservoir	12.23	2	728	49,156	8	132.27	8,106	Pond B8
26	Combine	53.60	2	726	189,550	6, 25	------	------	Combine B6&8
27	Reservoir	5.964	2	730	25,042	24	126.06	1,322	Pond B12
28	Combine	15.50	2	734	73,216	9, 27	------	------	Combine B9&12
29	Combine	51.20	2	736	258,010	5, 28	------	------	Combine B9&12 with B5
30	SCS Runoff	13.66	2	730	60,514	------	------	------	B13
31	Combine	63.88	2	722	214,515	4, 30	------	------	Combine B4&13
32	Reservoir	0.000	2	n/a	0	17	105.87	121,292	A4 Pond
33	Reservoir	9.082	2	756	52,329	18	108.06	32,677	A5 Pond
34	SCS Runoff	15.38	2	728	58,066	------	------	------	A7

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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
35	Combine	29.70	2	732	159,725	19, 34	------	------	Combine A7&12
36	Combine	61.71	2	732	304,818	14, 35	------	------	Combine A7&12 with A-1
37	SCS Runoff	2.903	2	730	12,608	------	------	------	A2
38	Combine	11.08	2	730	46,623	23, 32,	------	------	Combine A10&4
39	Combine	16.04	2	728	121,256	15, 33, 38	------	------	Combine A10&4 and A5 with A11
40	Combine	45.05	2	732	245,019	16, 20, 21, 22, 37,	------	------	Combine A2,6,8,9 and A3
41	Combine	121.42	2	732	671,093	36, 39, 40	------	------	Watershed A
42	Combine	36.97	2	728	148,012	2, 3,	------	------	Comebnie B2&3
43	Combine	228.29	2	726	1,014,200	7, 13, 26, 29, 31, 42	------	------	Watershed B

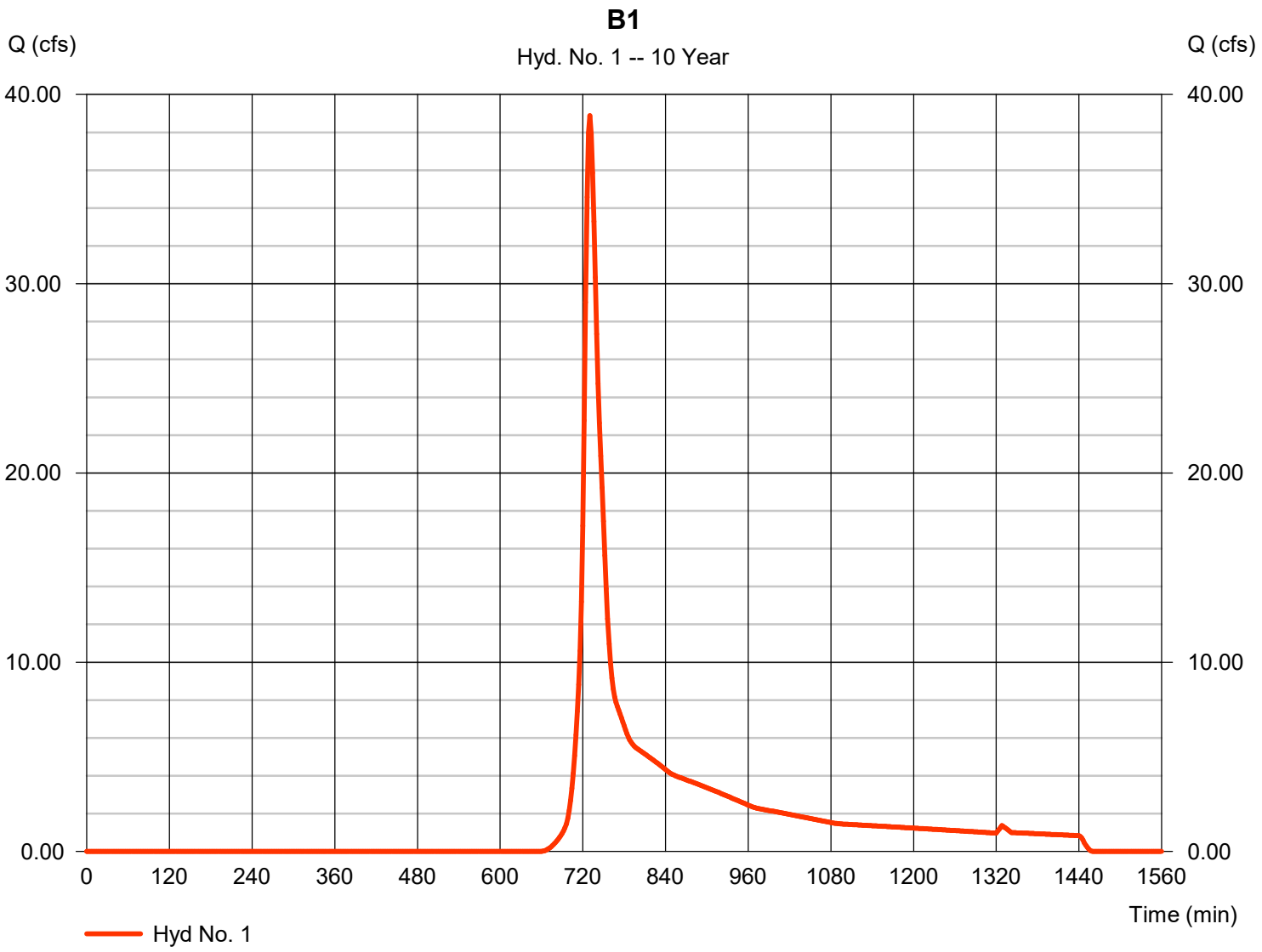
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 1

B1

Hydrograph type	= SCS Runoff	Peak discharge	= 38.89 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 161,461 cuft
Drainage area	= 31.170 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.00 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



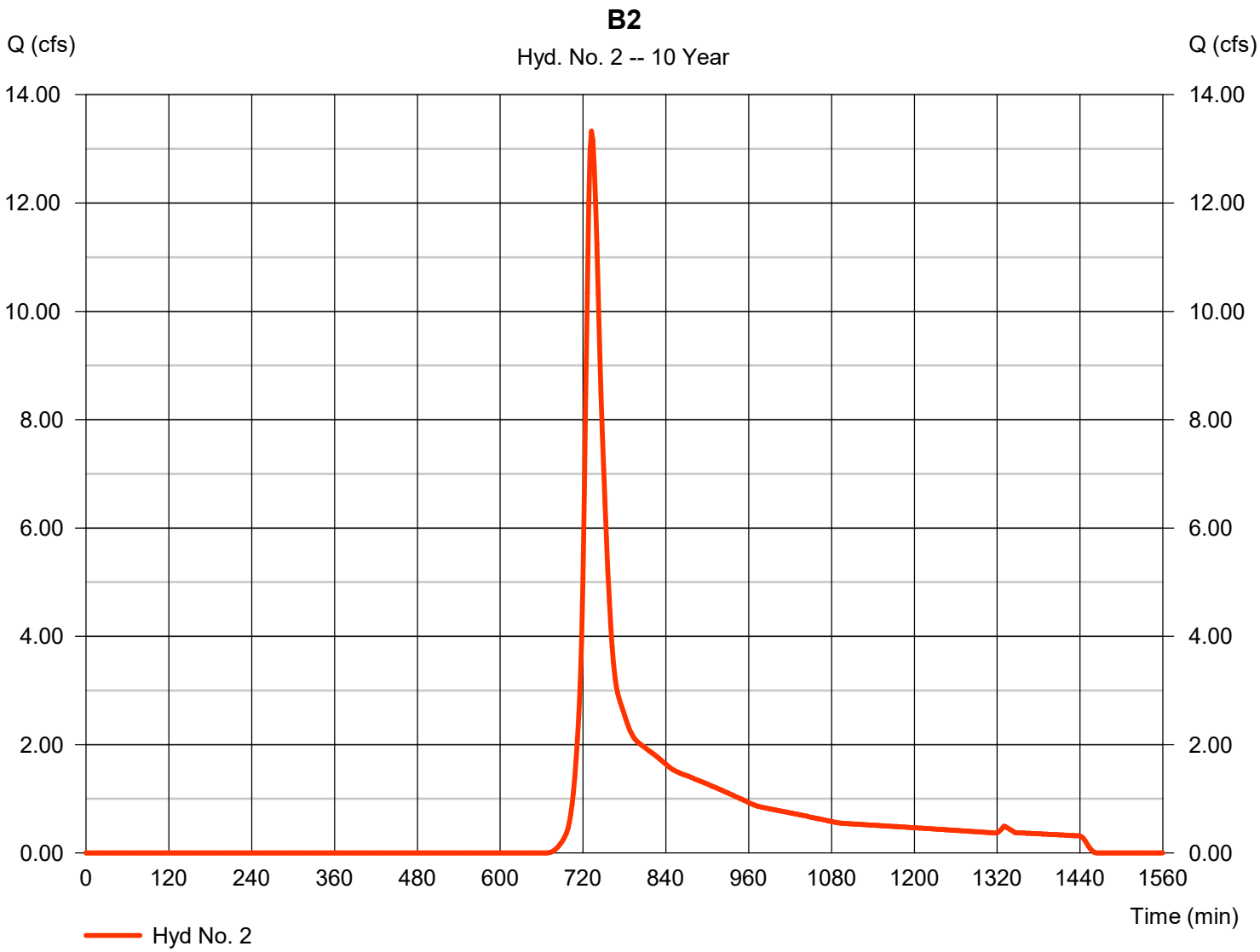
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 2

B2

Hydrograph type	= SCS Runoff	Peak discharge	= 13.33 cfs
Storm frequency	= 10 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 59,503 cuft
Drainage area	= 12.770 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 14.00 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



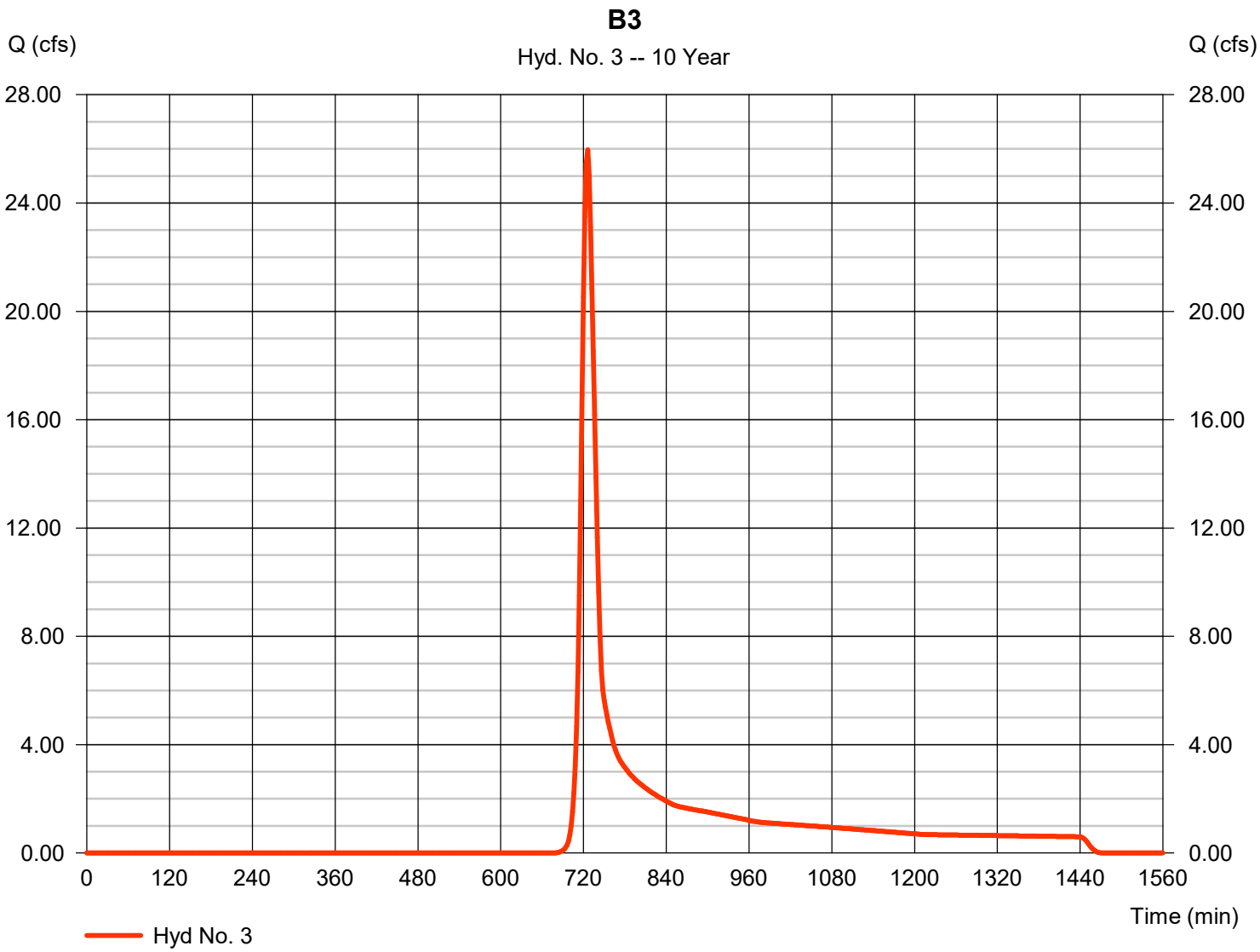
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 3

B3

Hydrograph type	= SCS Runoff	Peak discharge	= 25.96 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 88,509 cuft
Drainage area	= 18.520 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.80 min
Total precip.	= 4.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



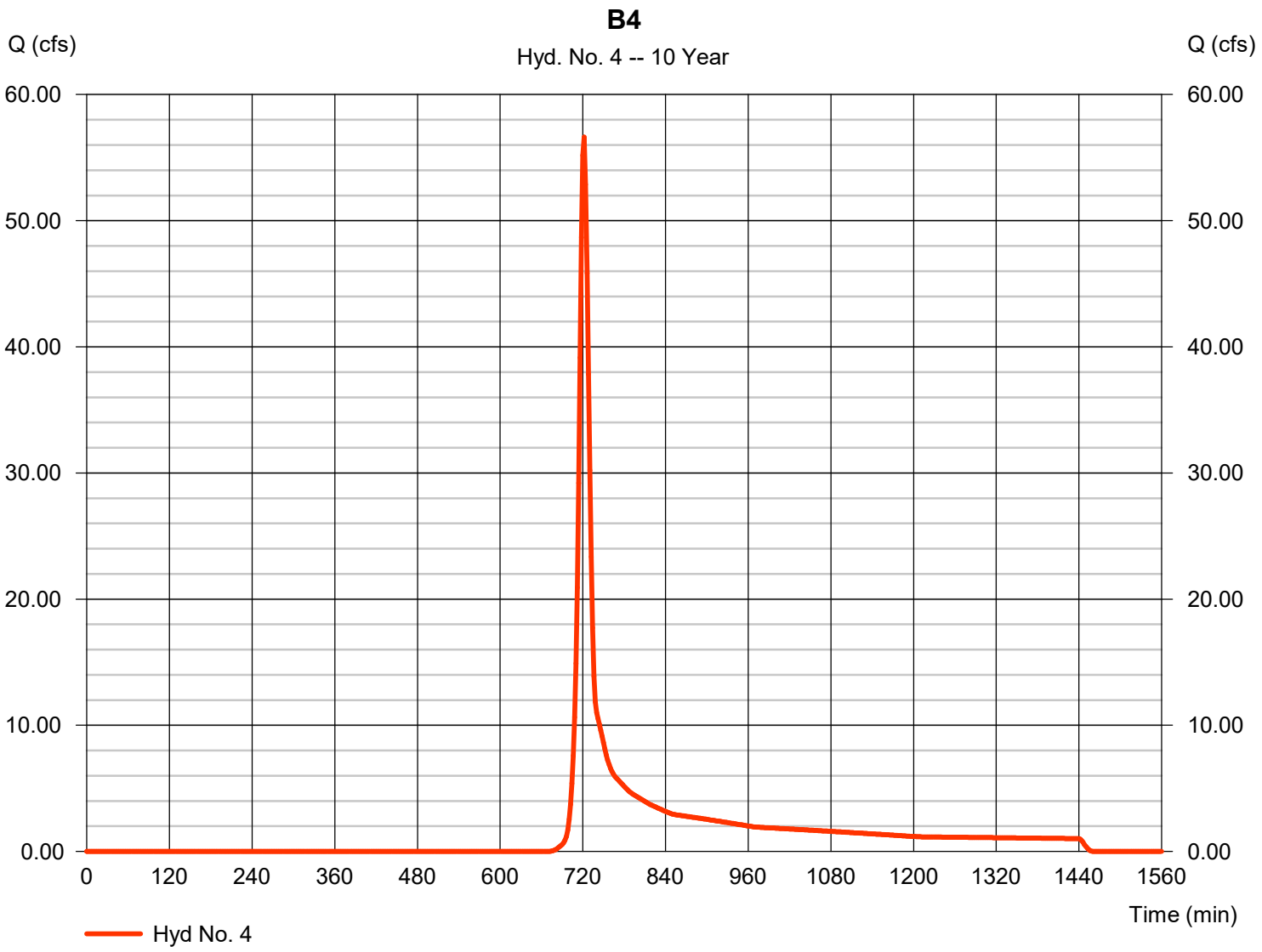
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 4

B4

Hydrograph type	= SCS Runoff	Peak discharge	= 56.62 cfs
Storm frequency	= 10 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 154,001 cuft
Drainage area	= 29.730 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.80 min
Total precip.	= 4.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



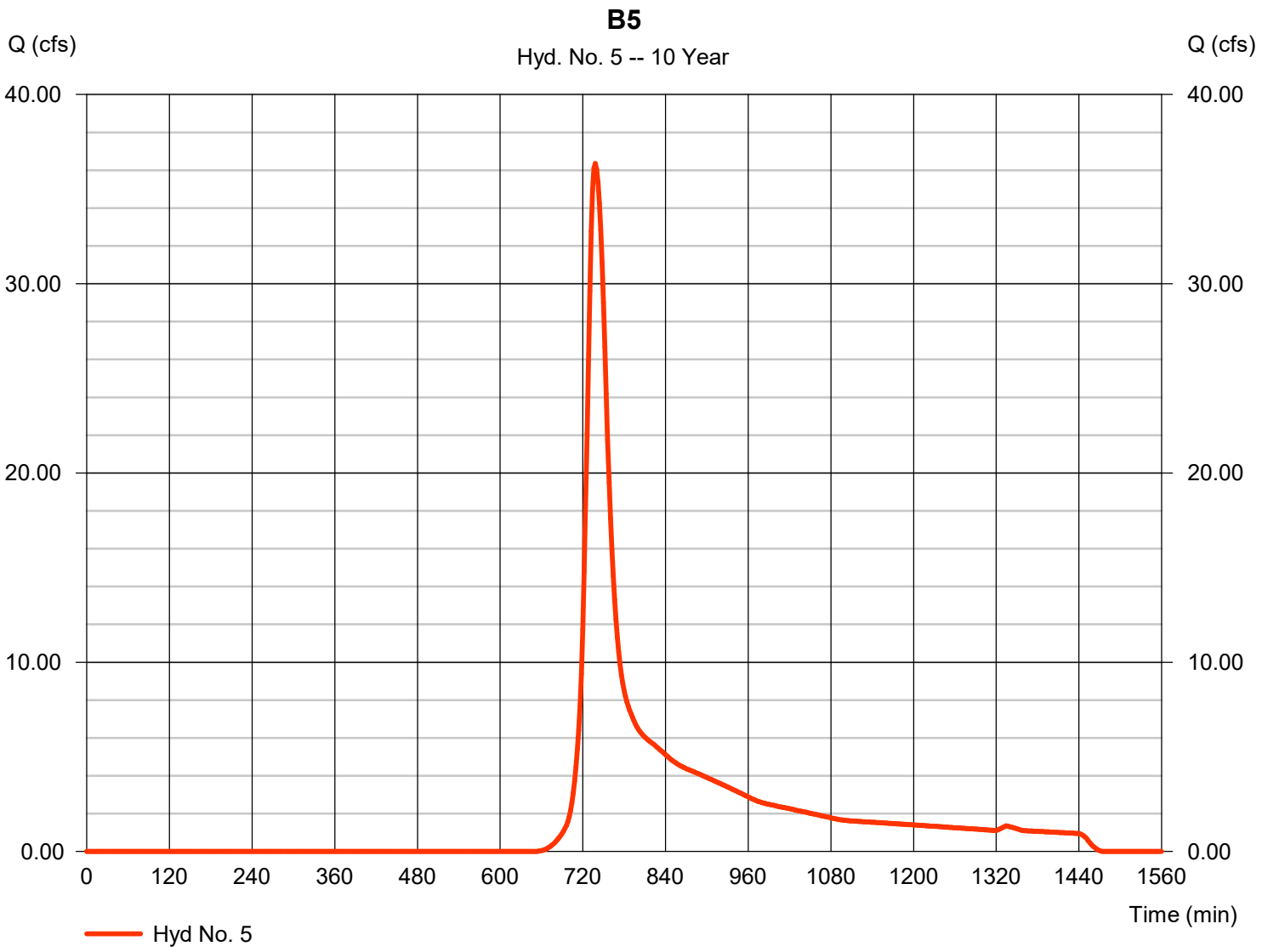
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 5

B5

Hydrograph type	= SCS Runoff	Peak discharge	= 36.36 cfs
Storm frequency	= 10 yrs	Time to peak	= 738 min
Time interval	= 2 min	Hyd. volume	= 184,794 cuft
Drainage area	= 34.440 ac	Curve number	= 64
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 20.40 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



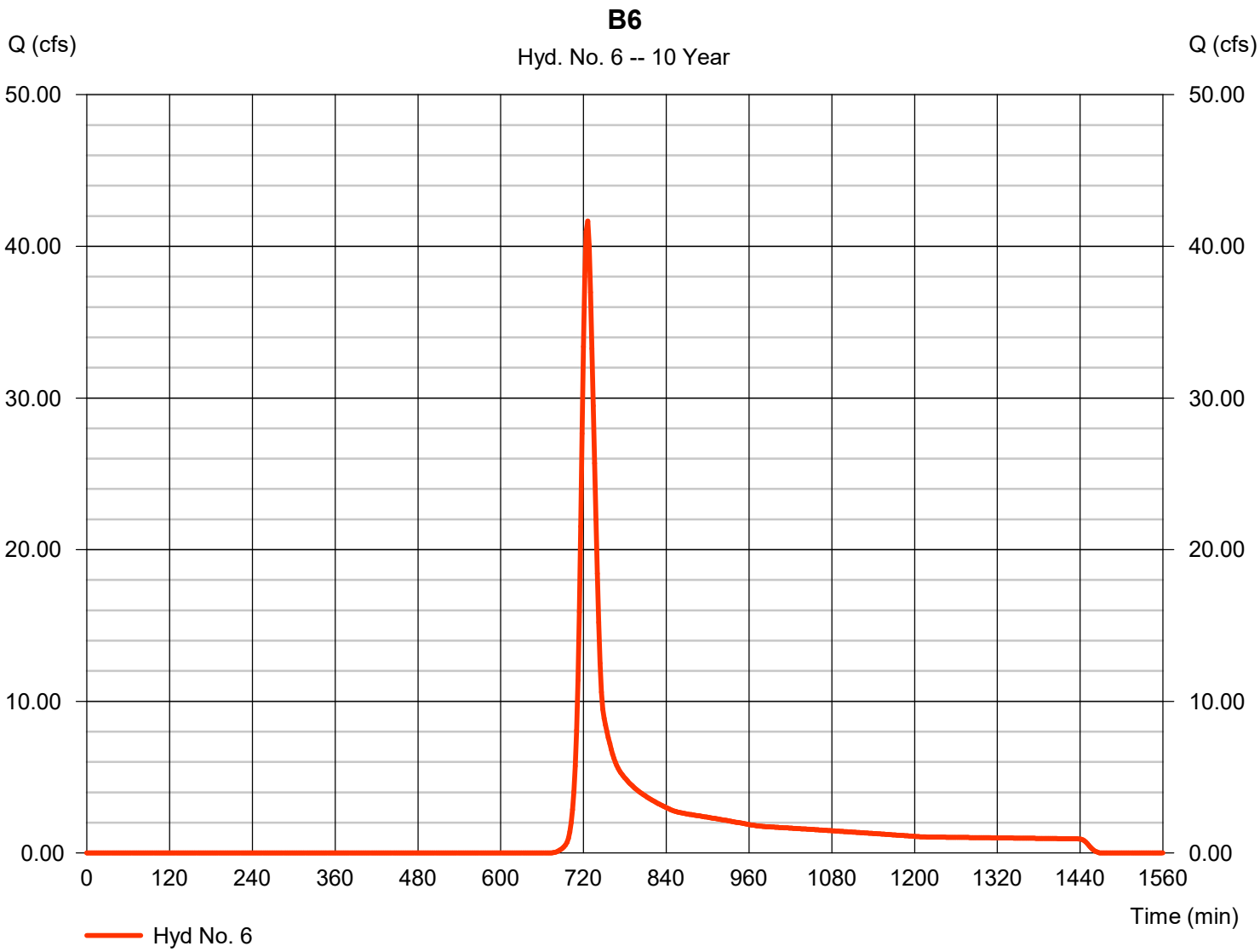
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 6

B6

Hydrograph type	= SCS Runoff	Peak discharge	= 41.67 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 140,394 cuft
Drainage area	= 27.950 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.10 min
Total precip.	= 4.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



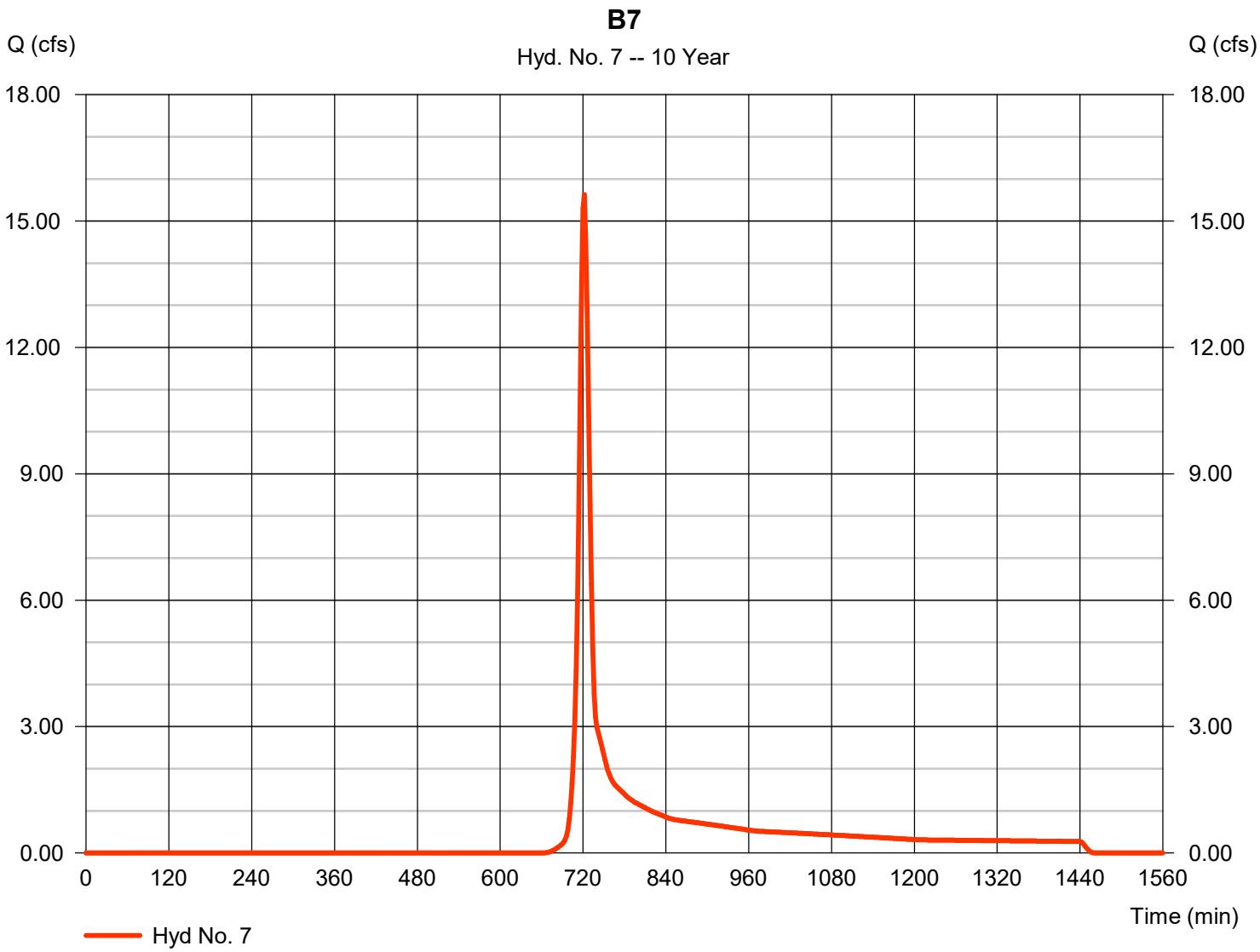
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 7

B7

Hydrograph type	= SCS Runoff	Peak discharge	= 15.63 cfs
Storm frequency	= 10 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 42,186 cuft
Drainage area	= 7.760 ac	Curve number	= 64
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.30 min
Total precip.	= 4.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



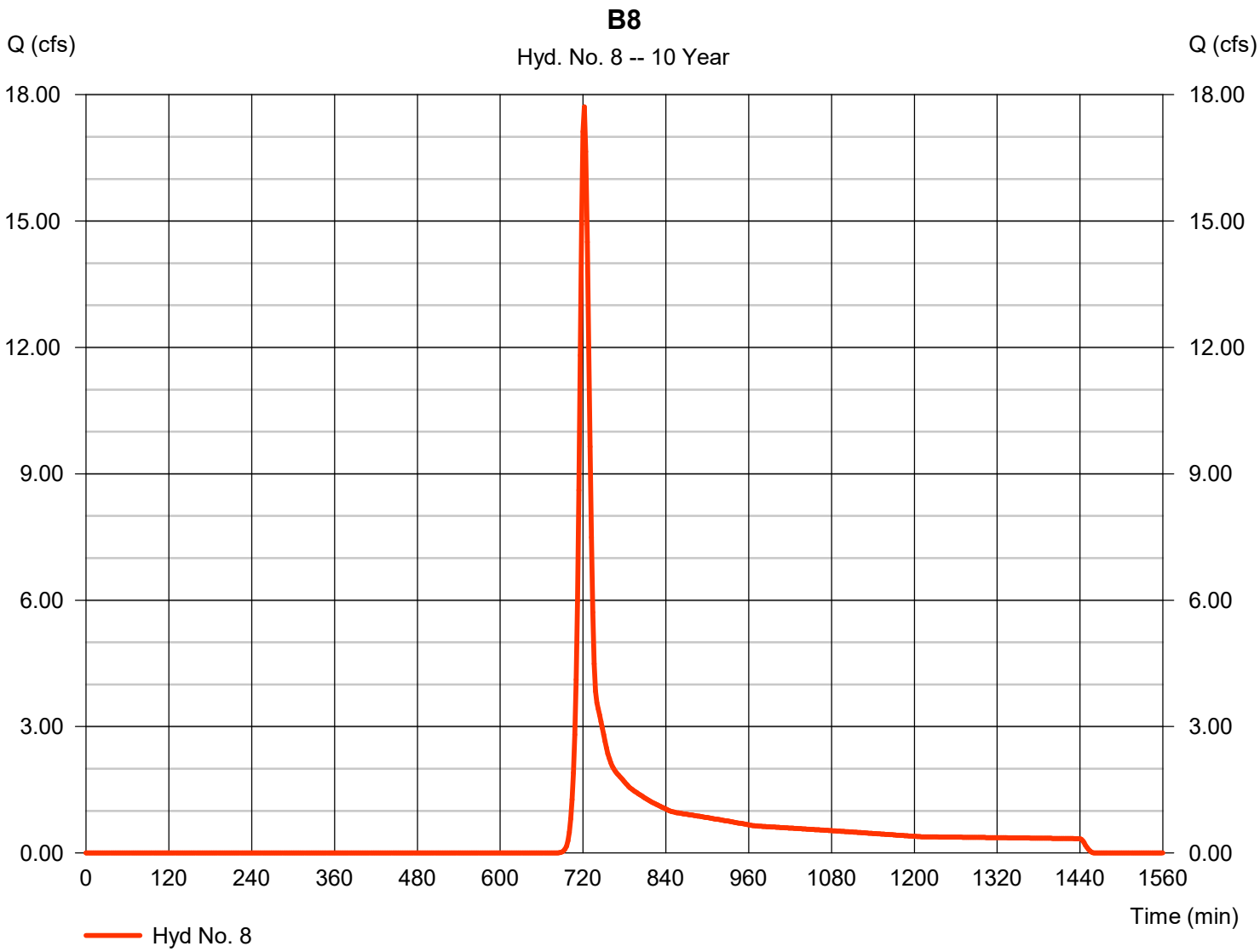
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 8

B8

Hydrograph type	= SCS Runoff	Peak discharge	= 17.71 cfs
Storm frequency	= 10 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 49,157 cuft
Drainage area	= 10.500 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.00 min
Total precip.	= 4.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



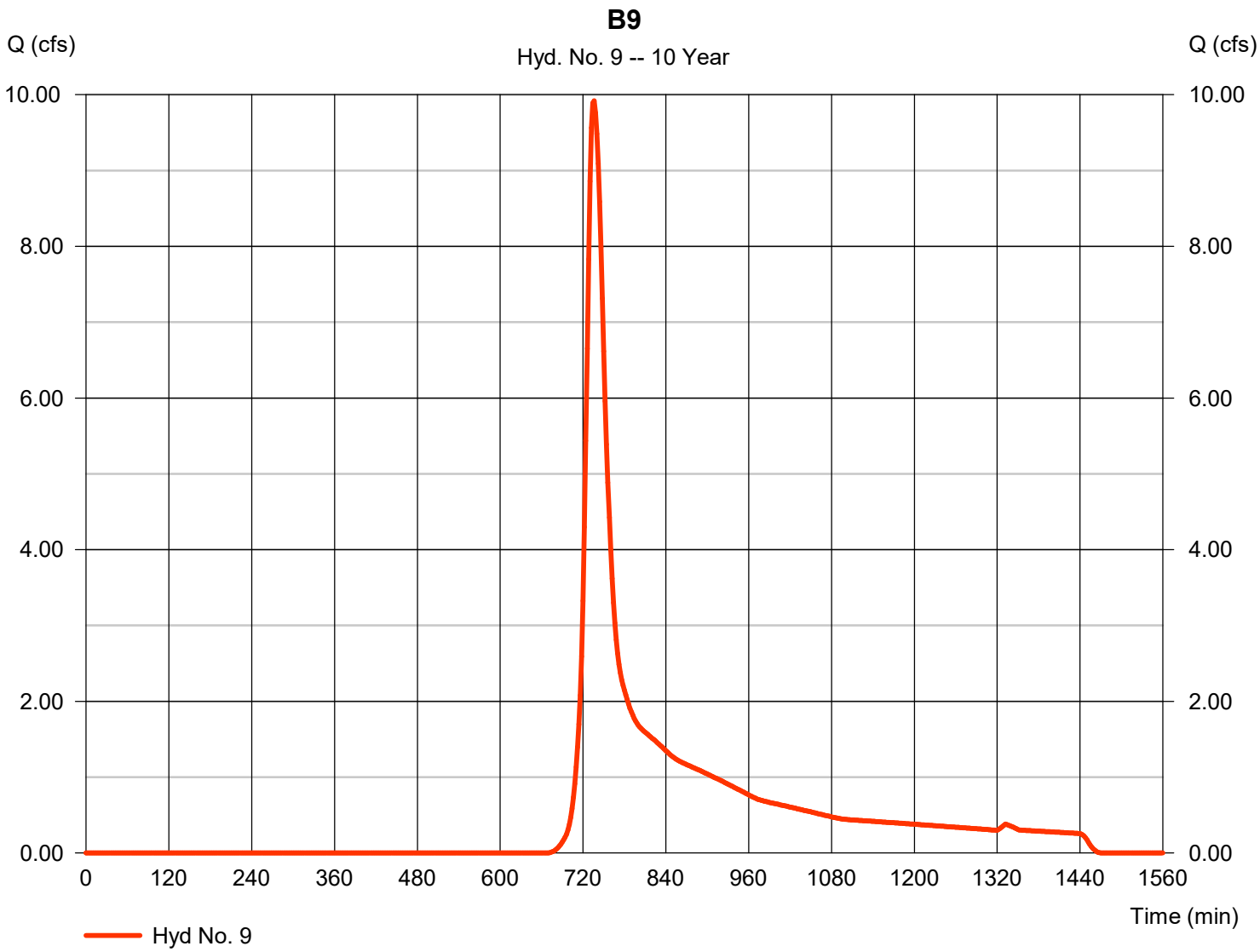
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 9

B9

Hydrograph type	= SCS Runoff	Peak discharge	= 9.921 cfs
Storm frequency	= 10 yrs	Time to peak	= 736 min
Time interval	= 2 min	Hyd. volume	= 48,173 cuft
Drainage area	= 10.080 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.40 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



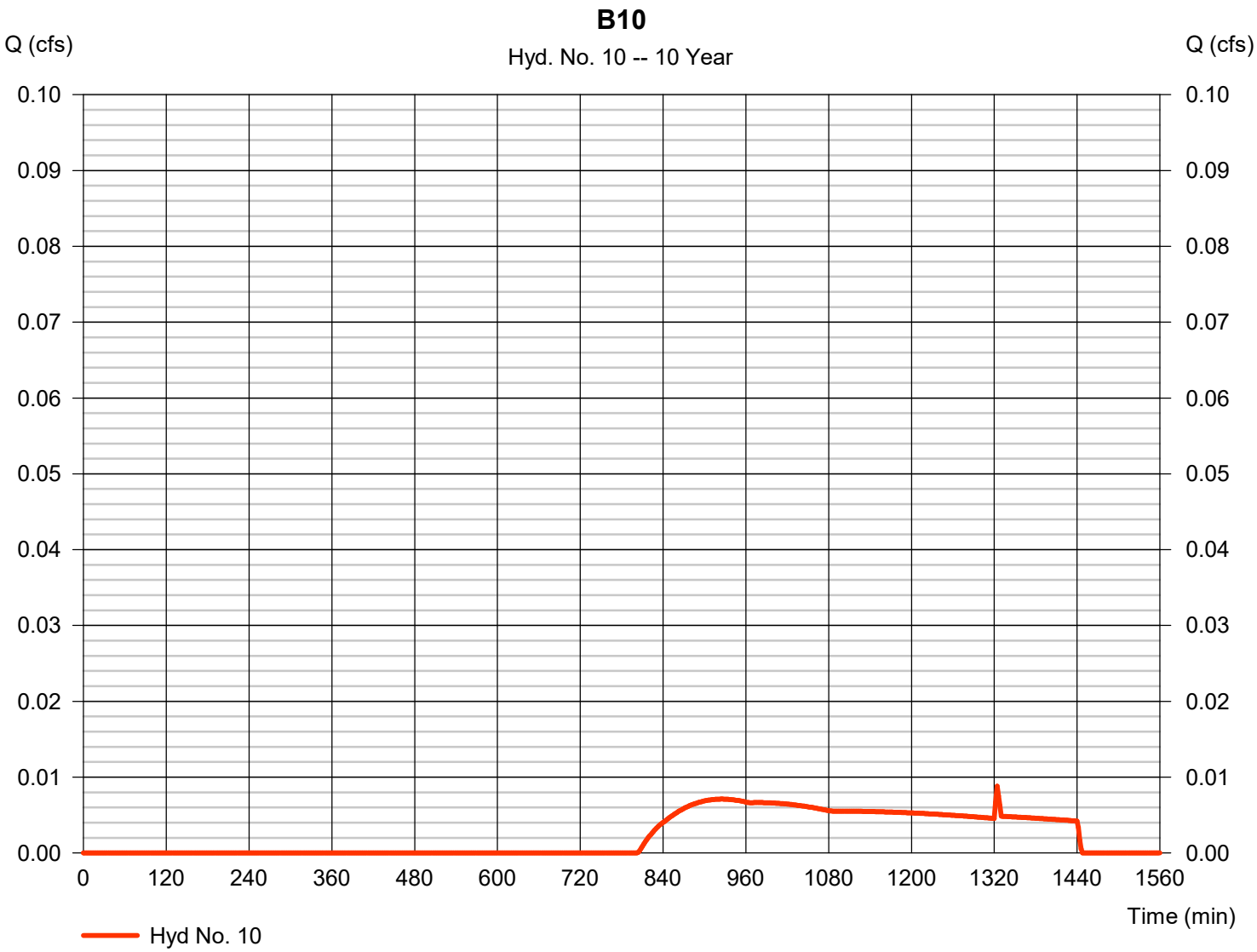
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 10

B10

Hydrograph type	= SCS Runoff	Peak discharge	= 0.009 cfs
Storm frequency	= 10 yrs	Time to peak	= 1324 min
Time interval	= 2 min	Hyd. volume	= 206 cuft
Drainage area	= 1.010 ac	Curve number	= 35
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.60 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



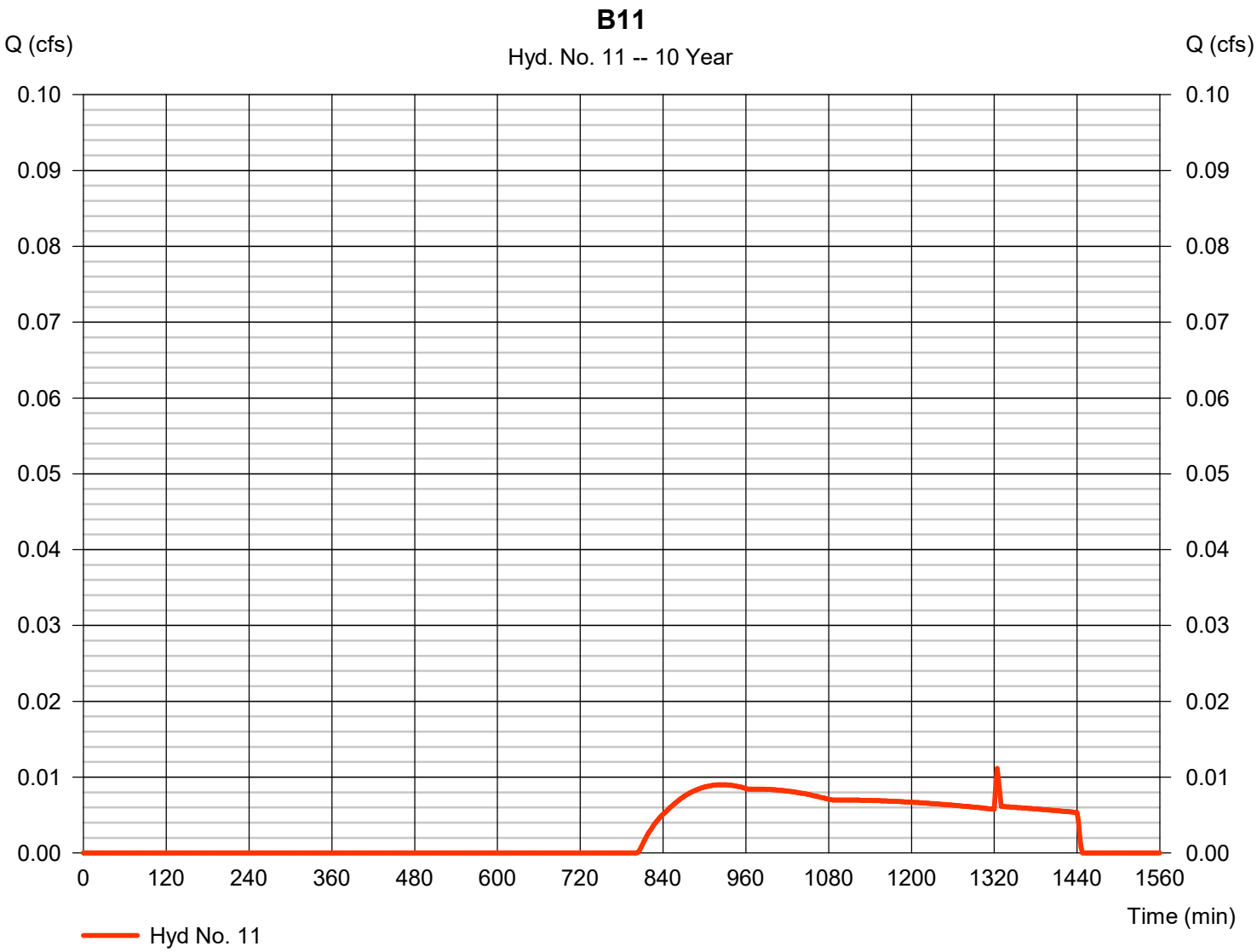
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 11

B11

Hydrograph type	= SCS Runoff	Peak discharge	= 0.011 cfs
Storm frequency	= 10 yrs	Time to peak	= 1324 min
Time interval	= 2 min	Hyd. volume	= 261 cuft
Drainage area	= 1.280 ac	Curve number	= 35
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.70 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



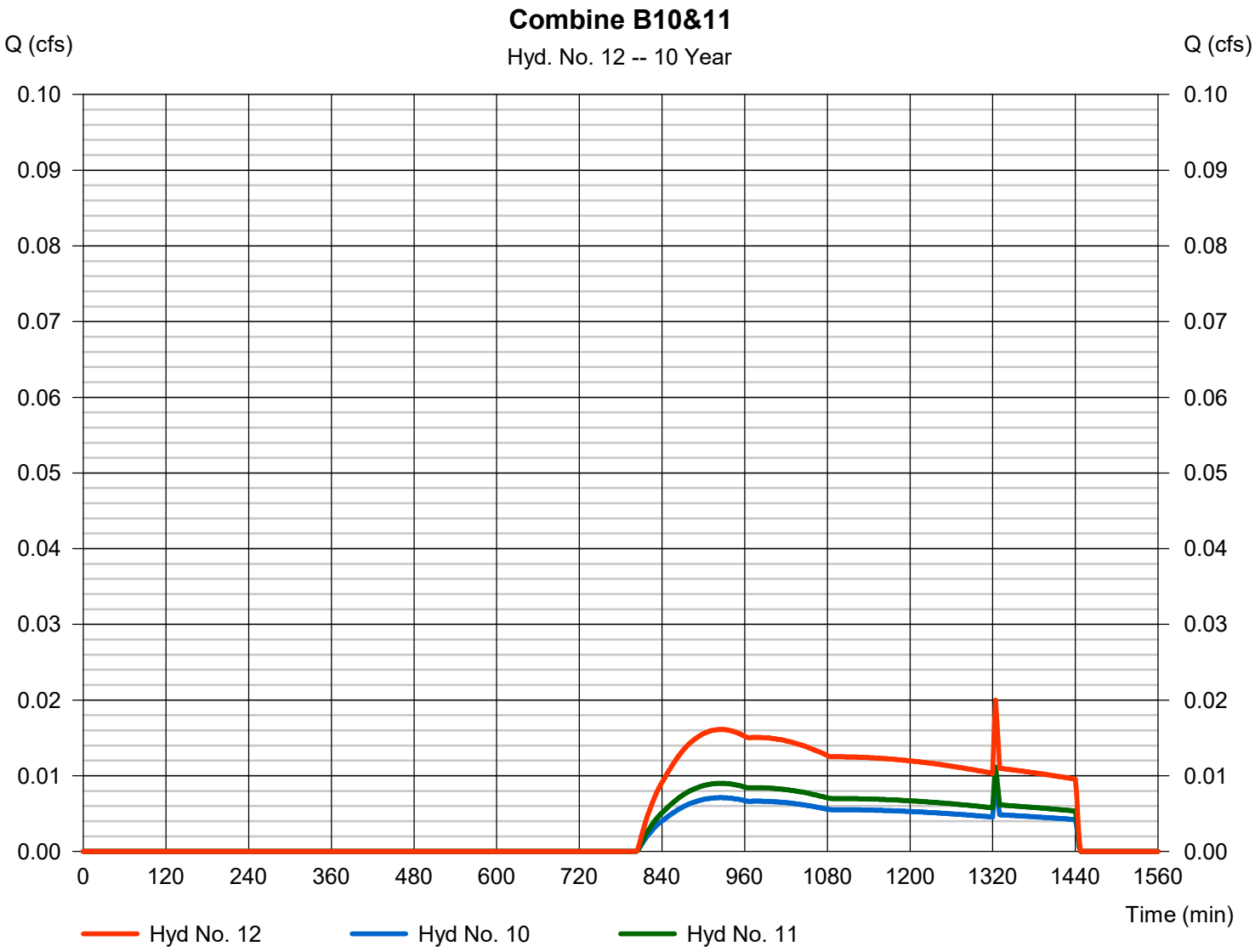
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 12

Combine B10&11

Hydrograph type	= Combine	Peak discharge	= 0.020 cfs
Storm frequency	= 10 yrs	Time to peak	= 1324 min
Time interval	= 2 min	Hyd. volume	= 467 cuft
Inflow hyds.	= 10, 11	Contrib. drain. area	= 2.290 ac



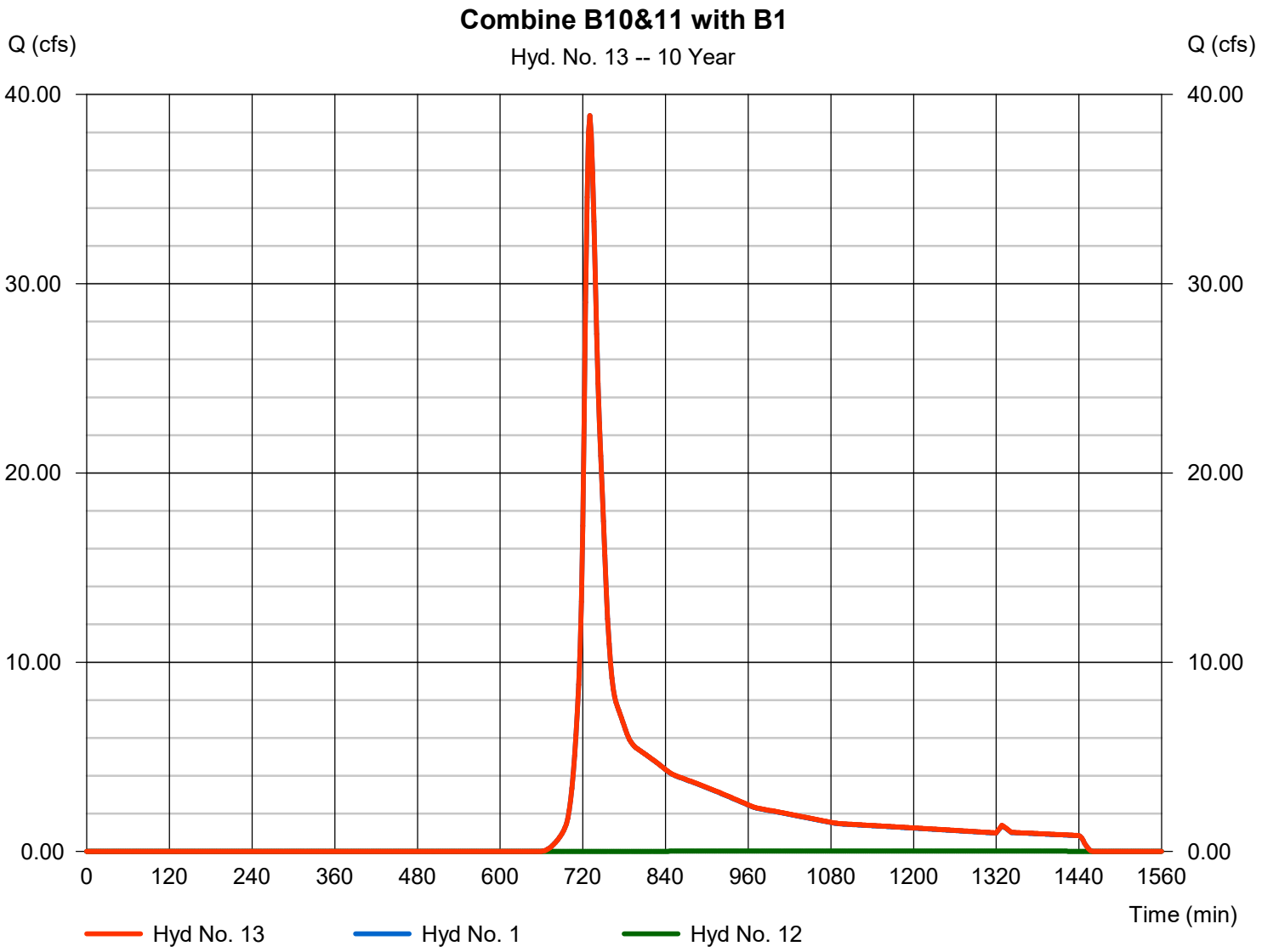
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 13

Combine B10&11 with B1

Hydrograph type	= Combine	Peak discharge	= 38.89 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 161,928 cuft
Inflow hyds.	= 1, 12	Contrib. drain. area	= 31.170 ac



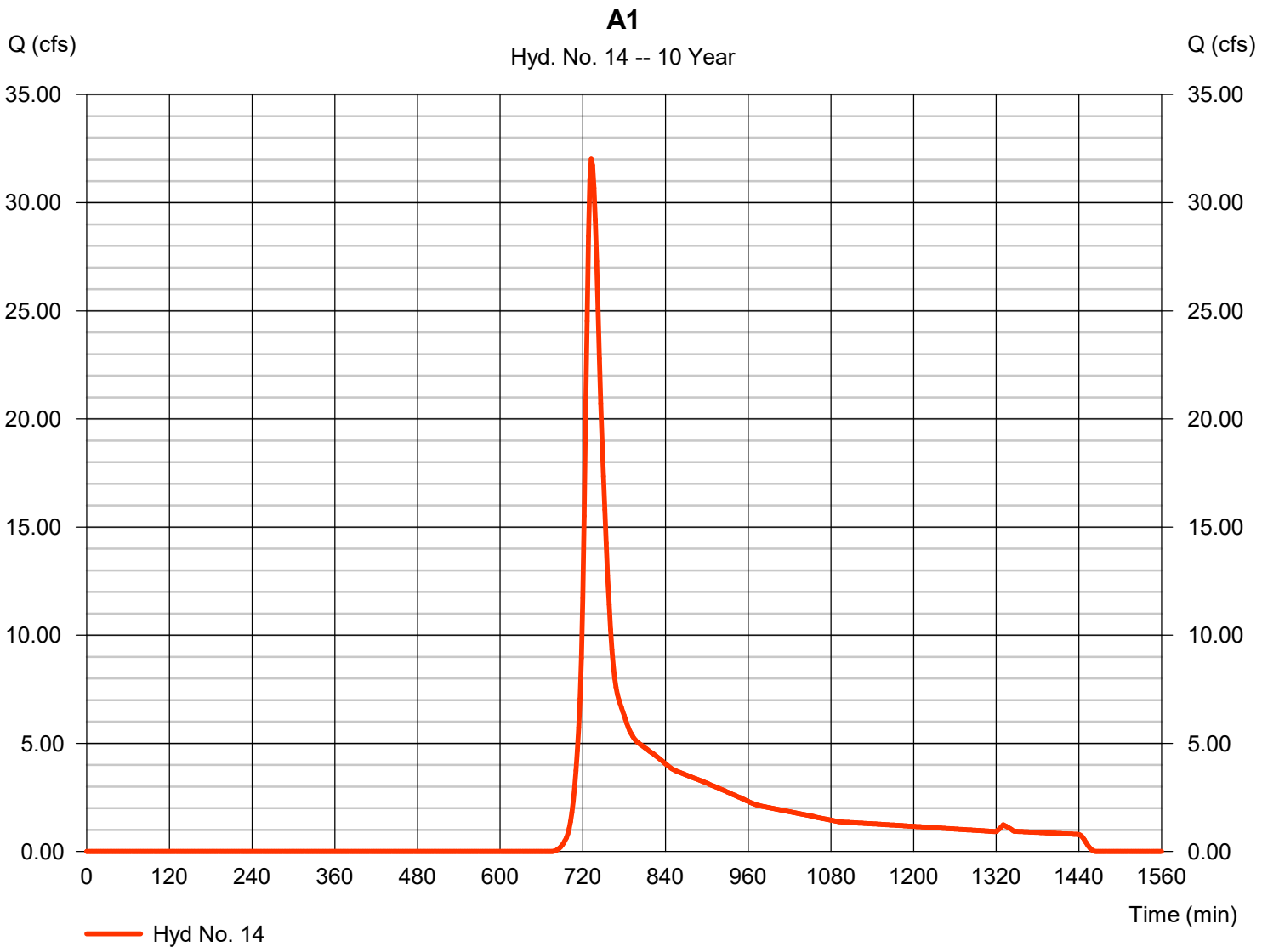
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 14

A1

Hydrograph type	= SCS Runoff	Peak discharge	= 32.01 cfs
Storm frequency	= 10 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 145,093 cuft
Drainage area	= 32.780 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 14.70 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



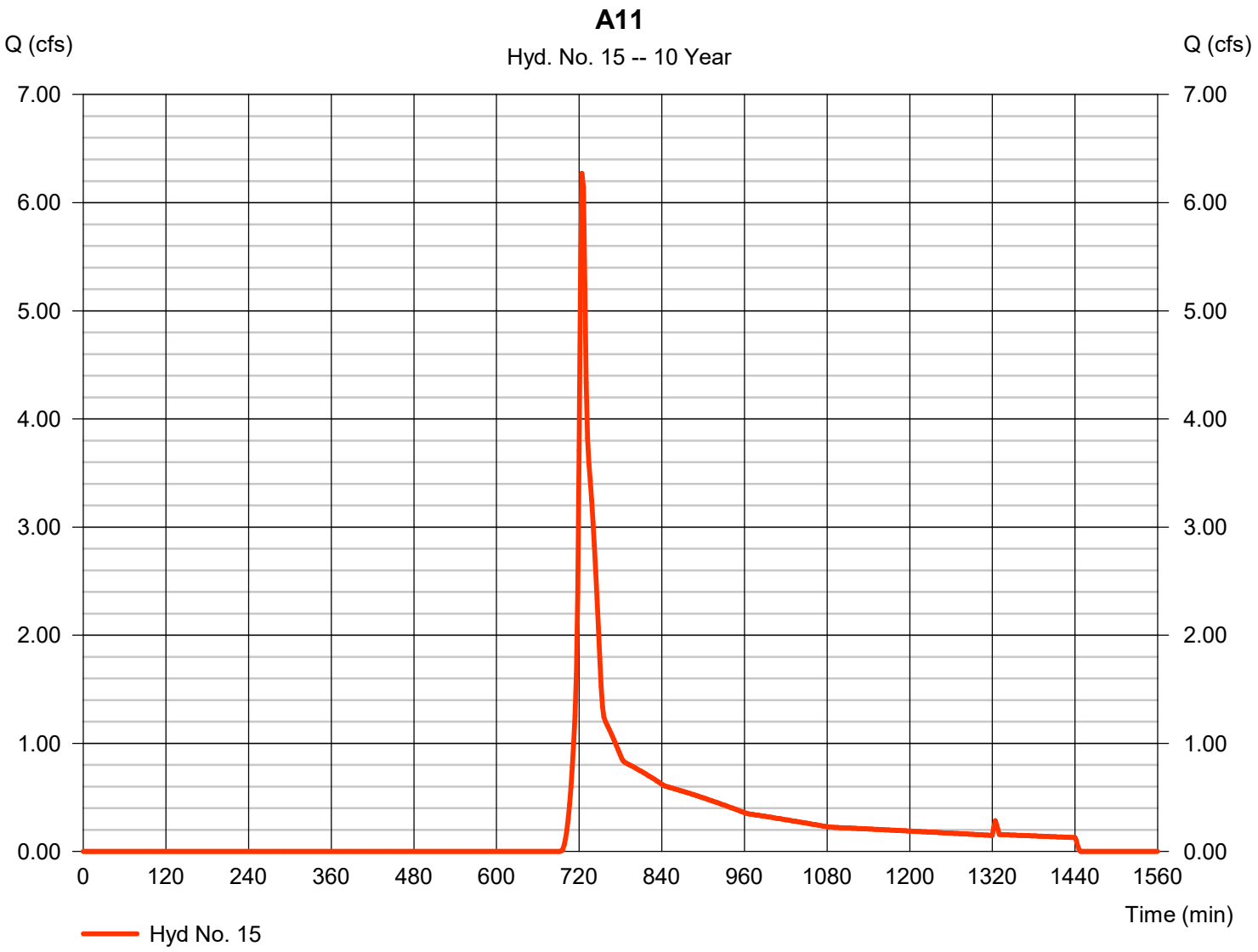
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 15

A11

Hydrograph type	= SCS Runoff	Peak discharge	= 6.272 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 22,304 cuft
Drainage area	= 6.180 ac	Curve number	= 58
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



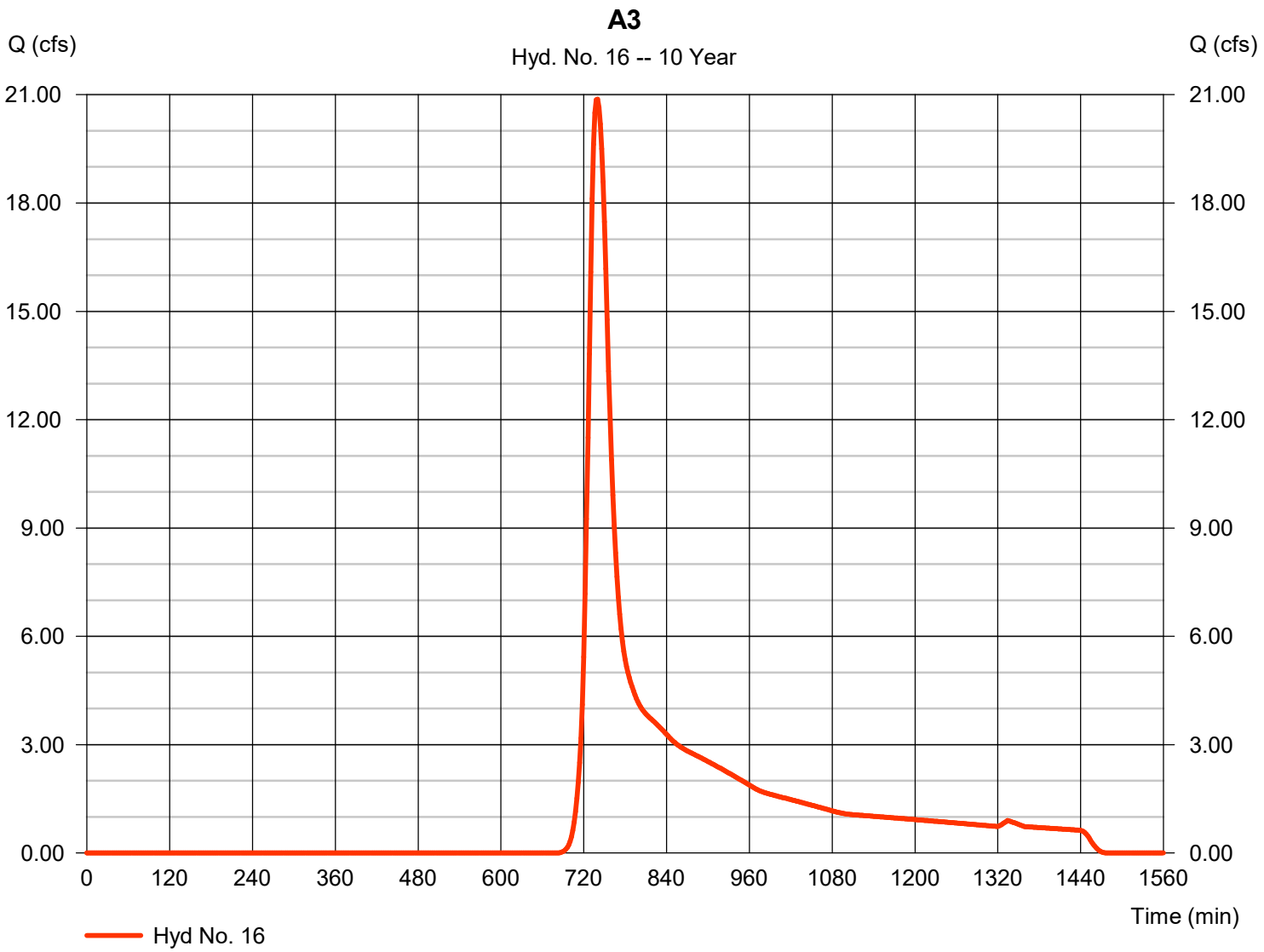
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 16

A3

Hydrograph type	= SCS Runoff	Peak discharge	= 20.87 cfs
Storm frequency	= 10 yrs	Time to peak	= 740 min
Time interval	= 2 min	Hyd. volume	= 112,001 cuft
Drainage area	= 25.560 ac	Curve number	= 60
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 22.40 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



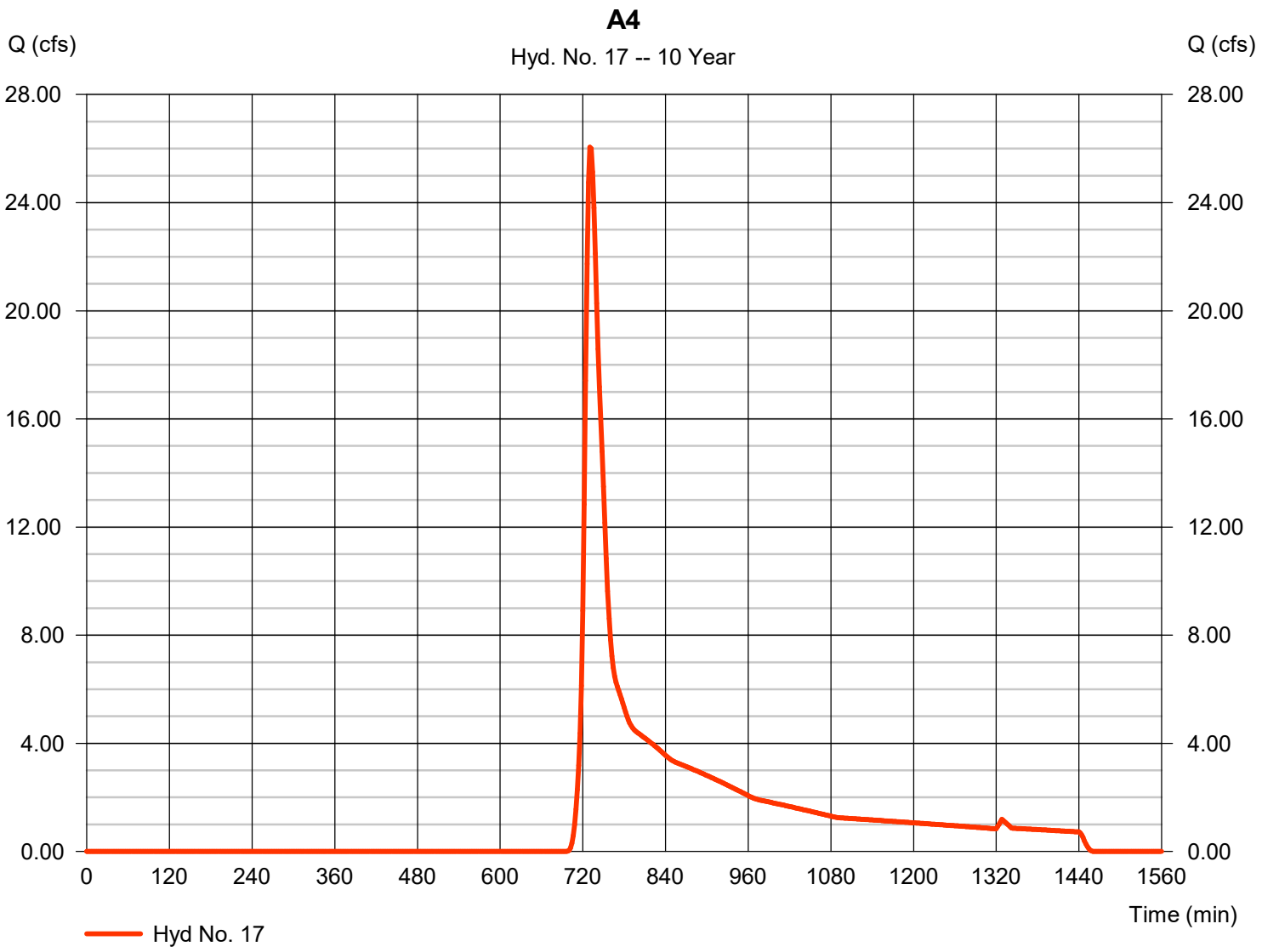
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 17

A4

Hydrograph type	= SCS Runoff	Peak discharge	= 26.05 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 121,292 cuft
Drainage area	= 32.410 ac	Curve number	= 57
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.30 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



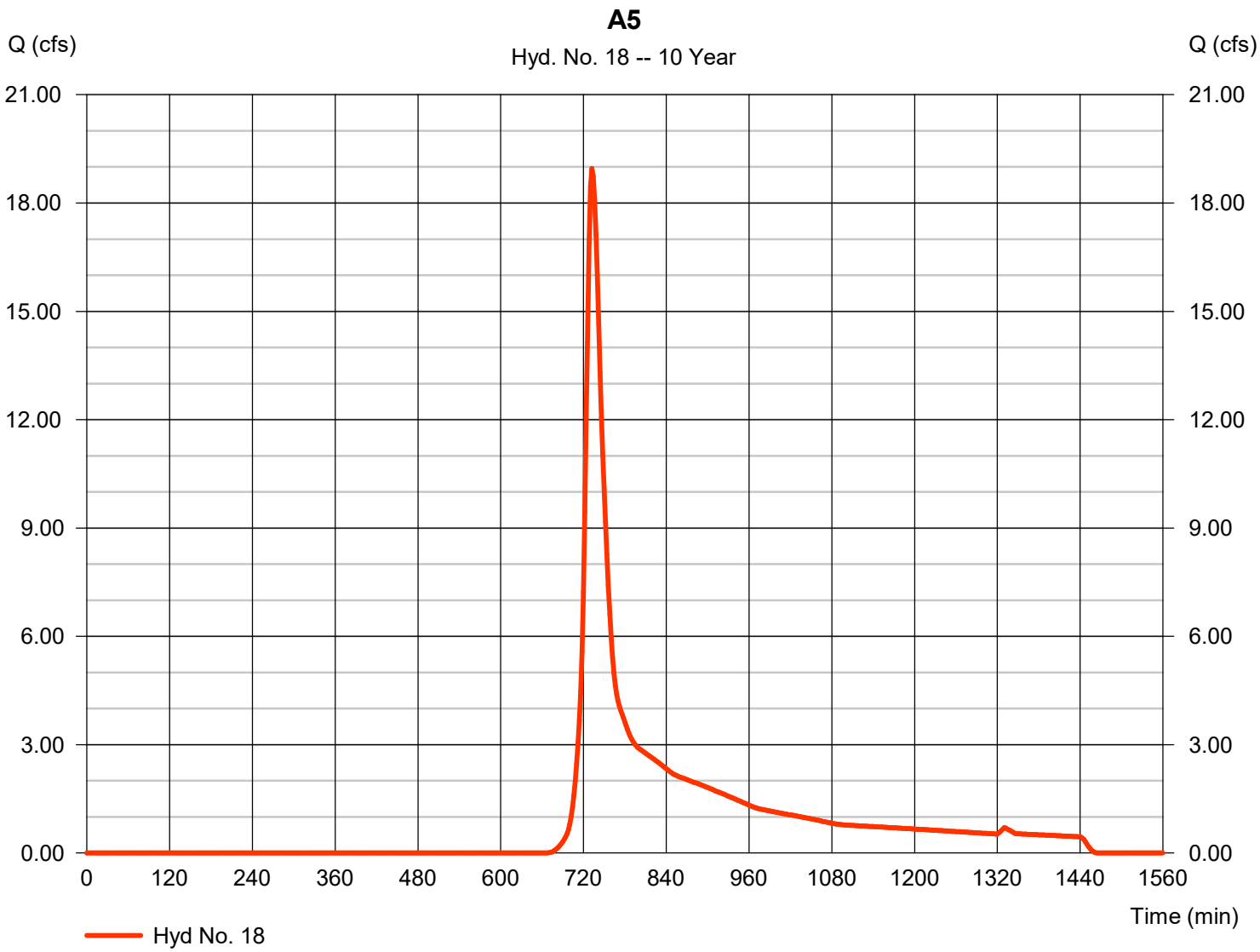
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 18

A5

Hydrograph type	= SCS Runoff	Peak discharge	= 18.96 cfs
Storm frequency	= 10 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 84,665 cuft
Drainage area	= 18.170 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.50 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



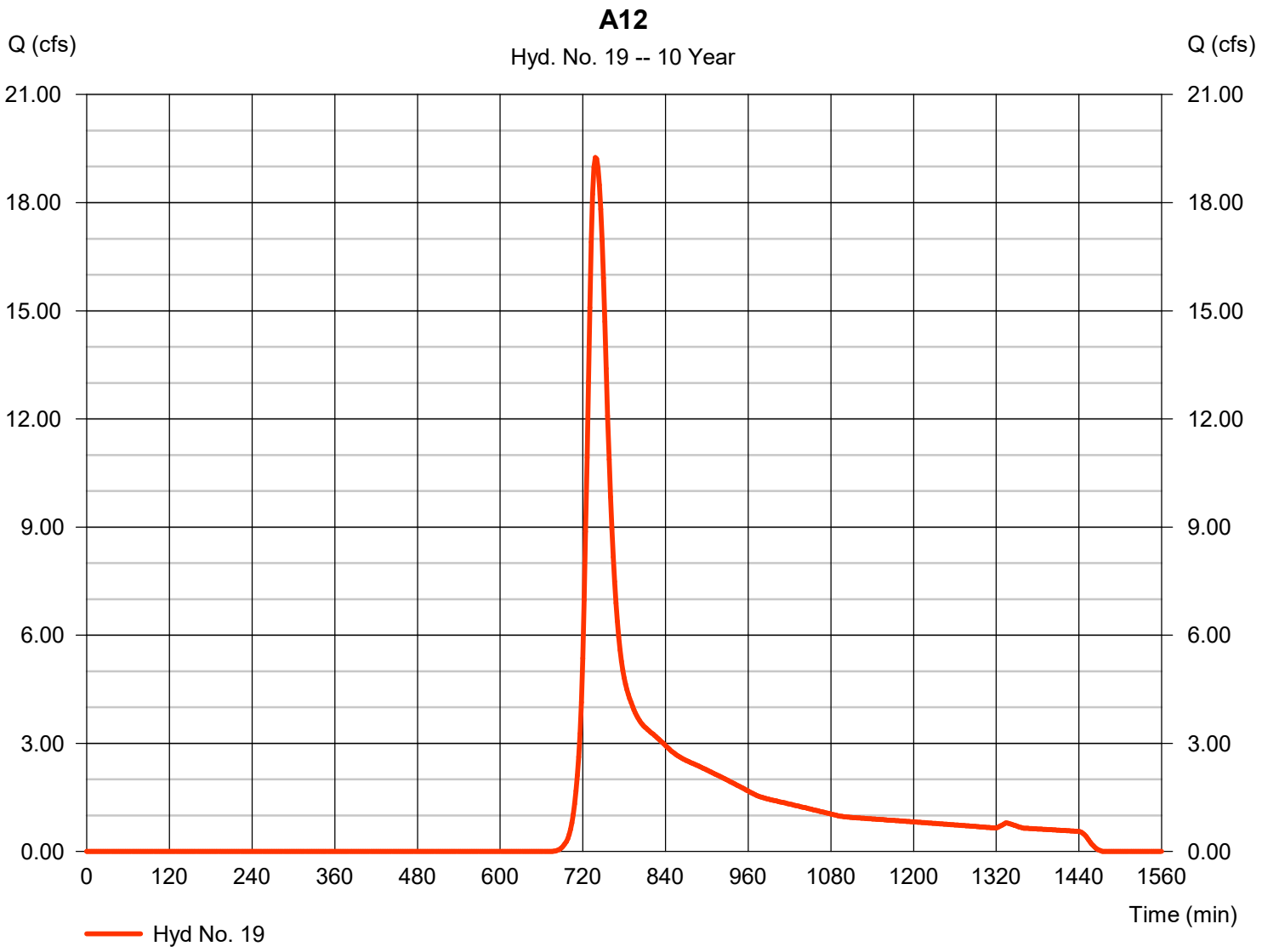
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 19

A12

Hydrograph type	= SCS Runoff	Peak discharge	= 19.25 cfs
Storm frequency	= 10 yrs	Time to peak	= 738 min
Time interval	= 2 min	Hyd. volume	= 101,658 cuft
Drainage area	= 22.000 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 22.80 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



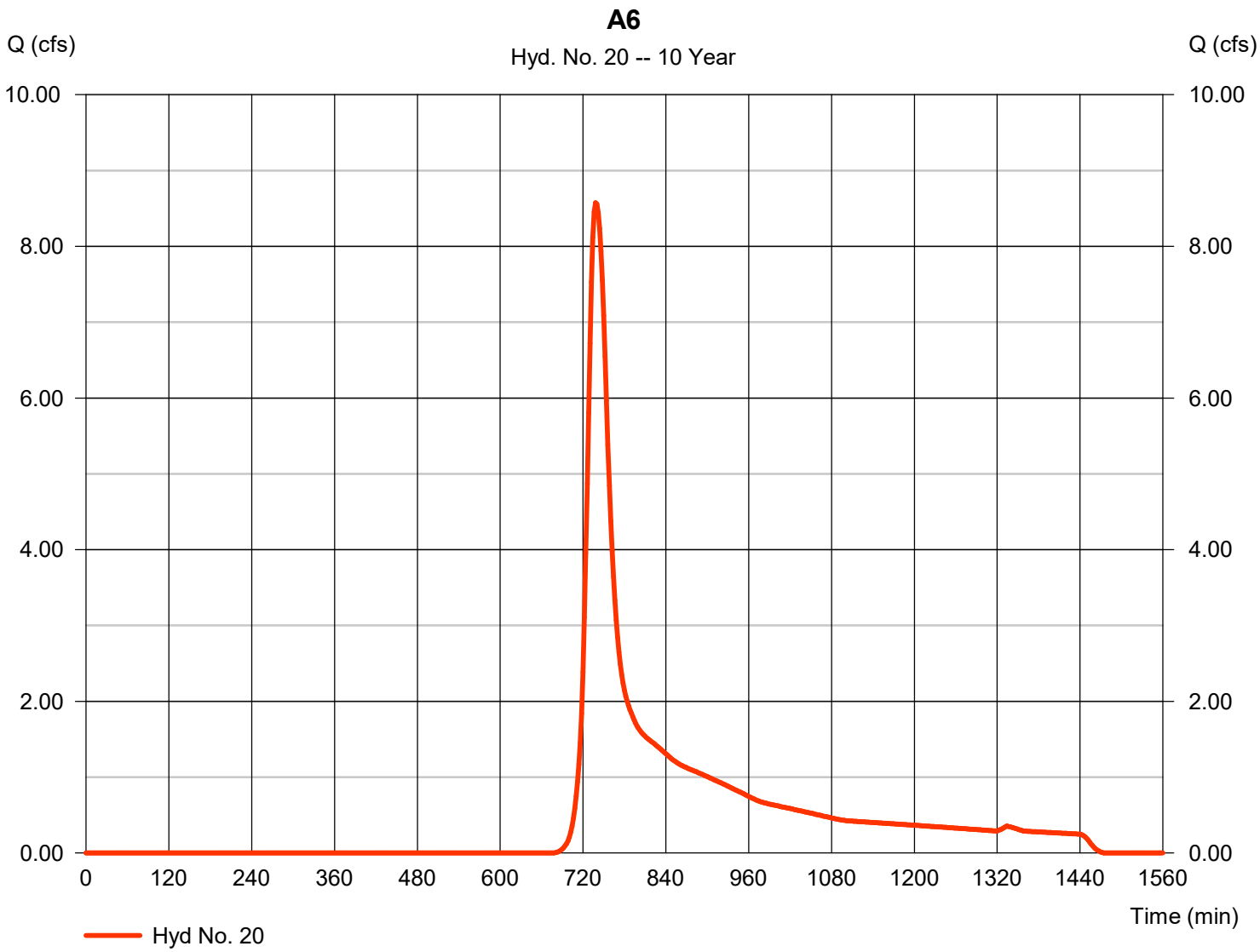
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 20

A6

Hydrograph type	= SCS Runoff	Peak discharge	= 8.576 cfs
Storm frequency	= 10 yrs	Time to peak	= 738 min
Time interval	= 2 min	Hyd. volume	= 45,284 cuft
Drainage area	= 9.800 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 20.20 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



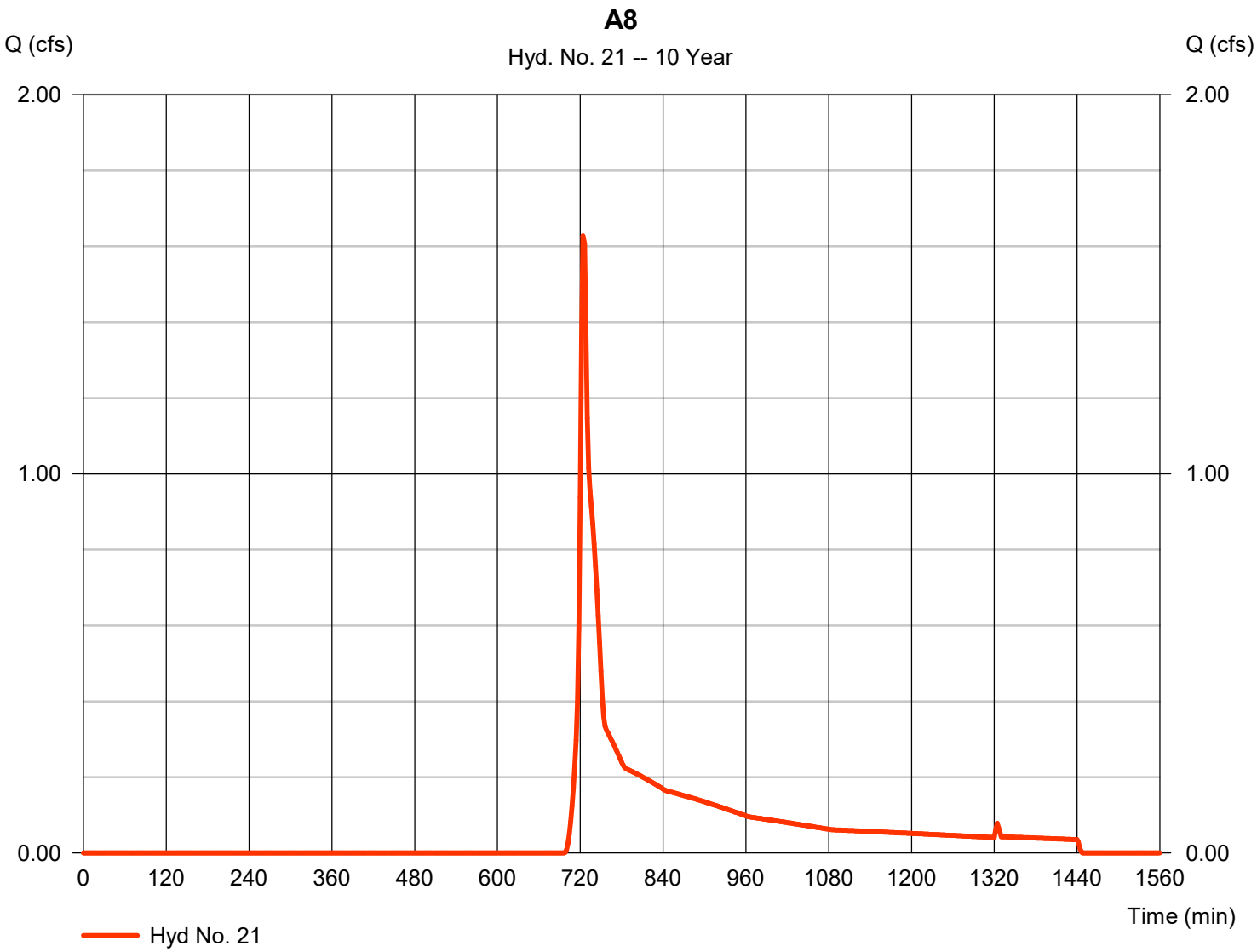
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 21

A8

Hydrograph type	= SCS Runoff	Peak discharge	= 1.627 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 5,954 cuft
Drainage area	= 1.750 ac	Curve number	= 57
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



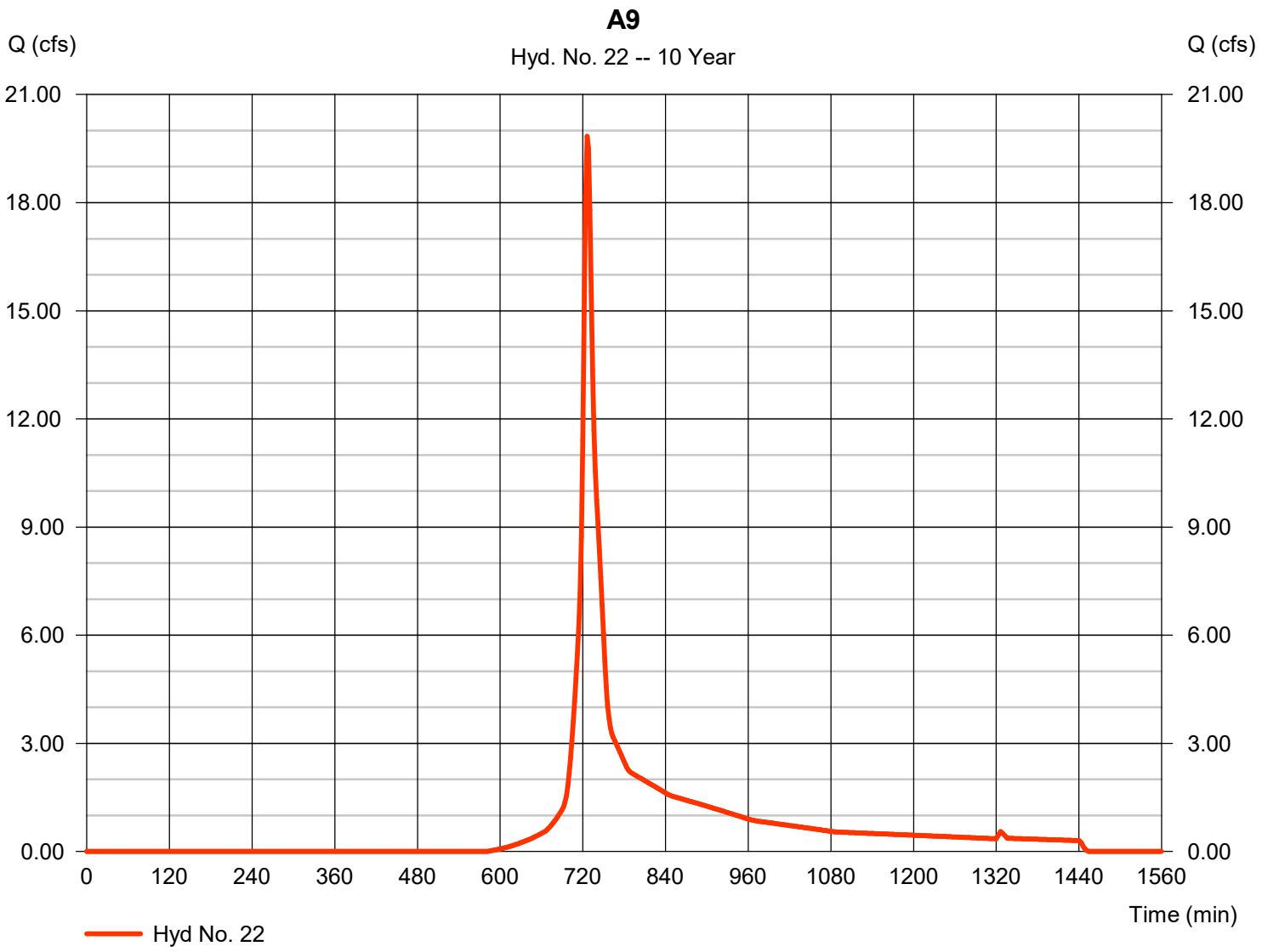
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 22

A9

Hydrograph type	= SCS Runoff	Peak discharge	= 19.84 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 69,172 cuft
Drainage area	= 9.690 ac	Curve number	= 71
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.70 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



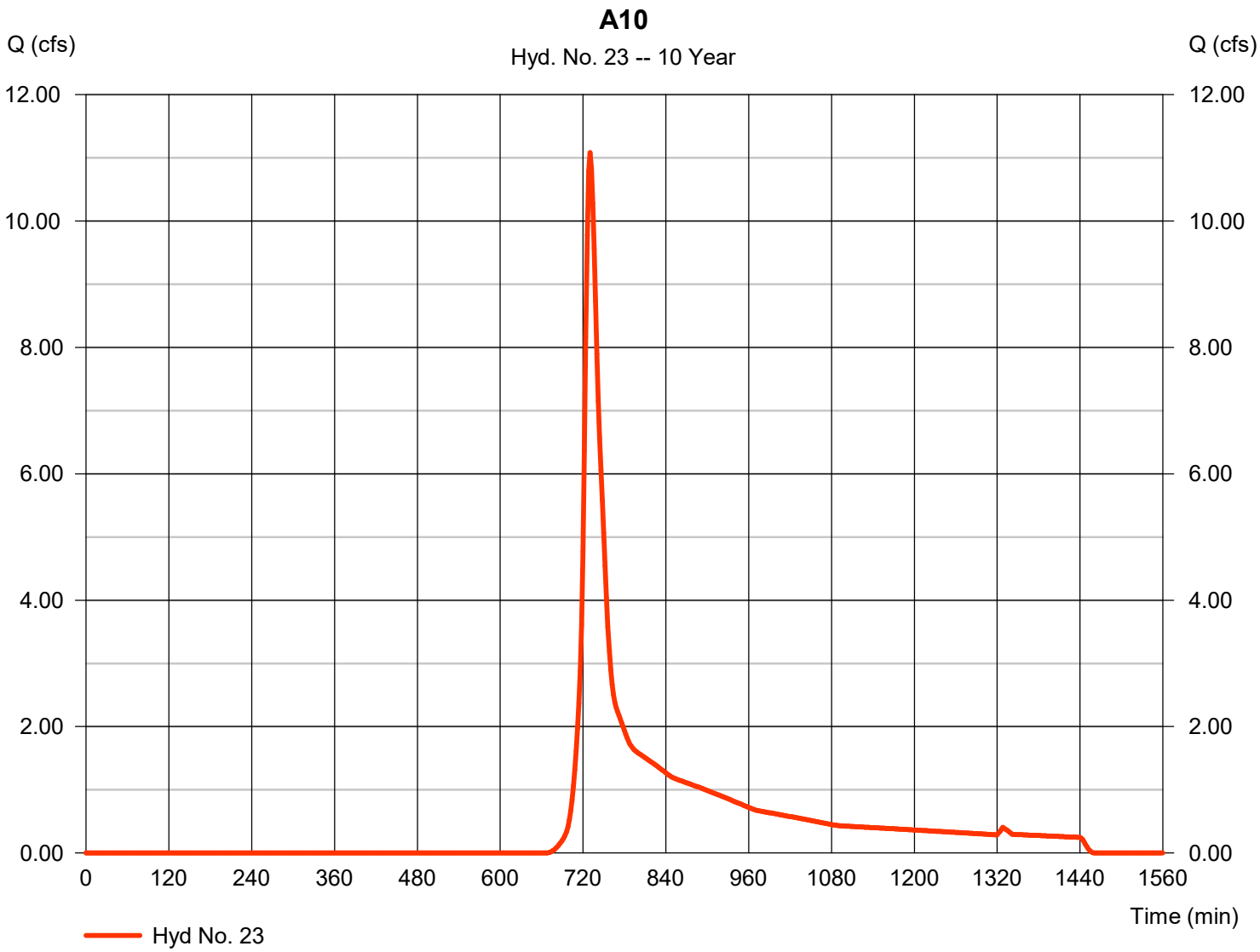
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 23

A10

Hydrograph type	= SCS Runoff	Peak discharge	= 11.08 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 46,623 cuft
Drainage area	= 9.460 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.30 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



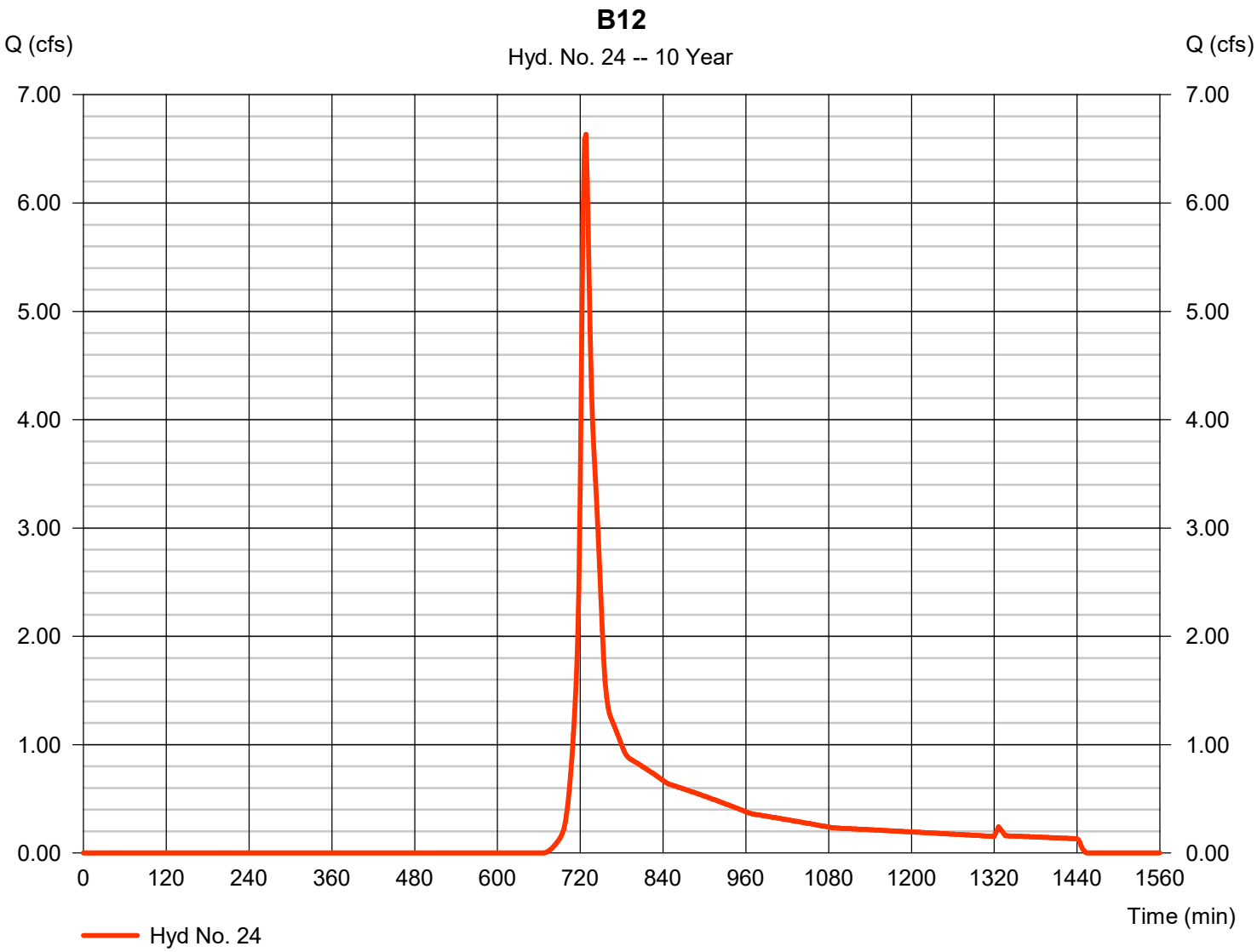
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 24

B12

Hydrograph type	= SCS Runoff	Peak discharge	= 6.634 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 25,043 cuft
Drainage area	= 5.240 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.80 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

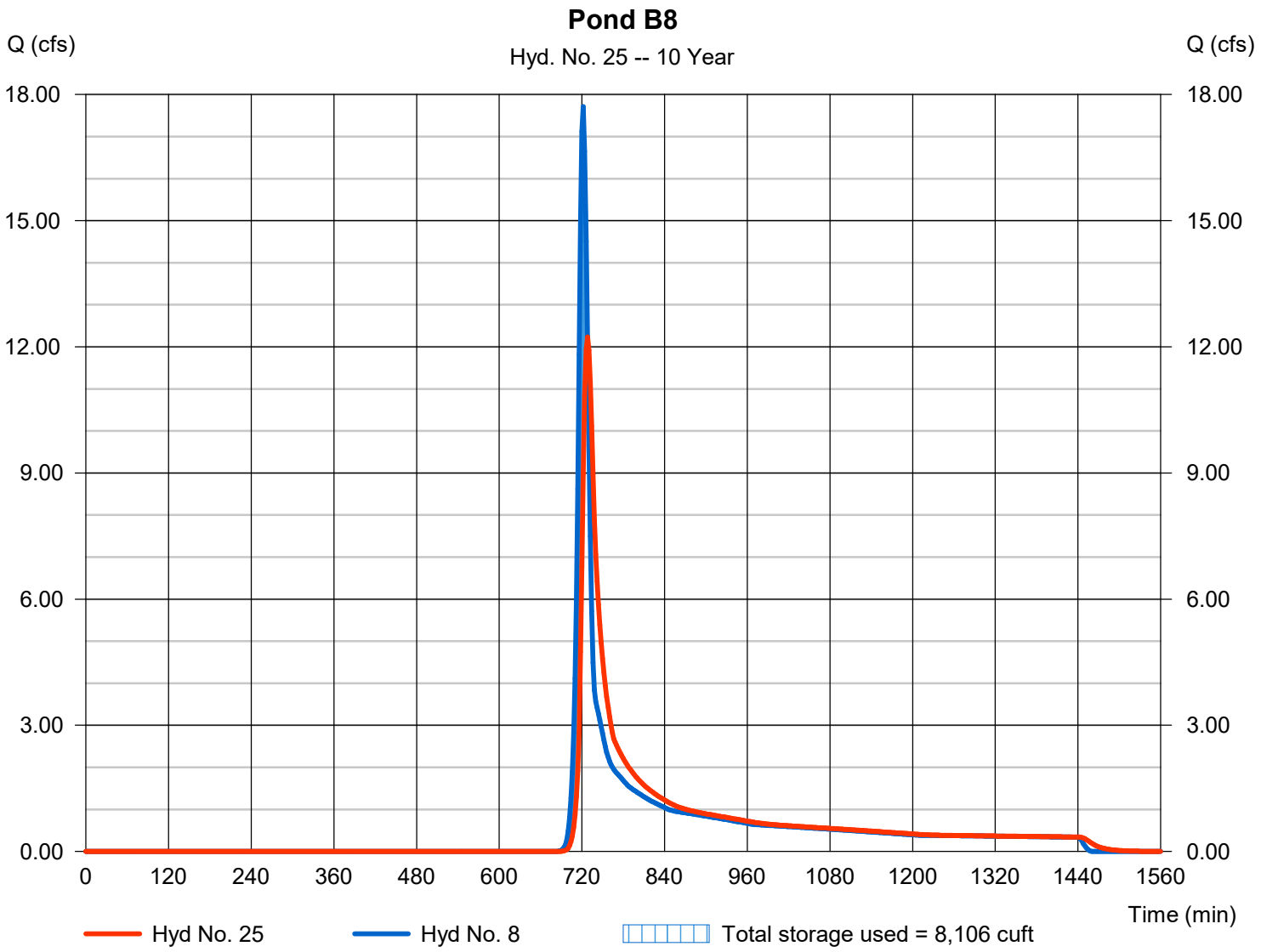
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 25

Pond B8

Hydrograph type	= Reservoir	Peak discharge	= 12.23 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 49,156 cuft
Inflow hyd. No.	= 8 - B8	Max. Elevation	= 132.27 ft
Reservoir name	= B8 Pond	Max. Storage	= 8,106 cuft

Storage Indication method used.



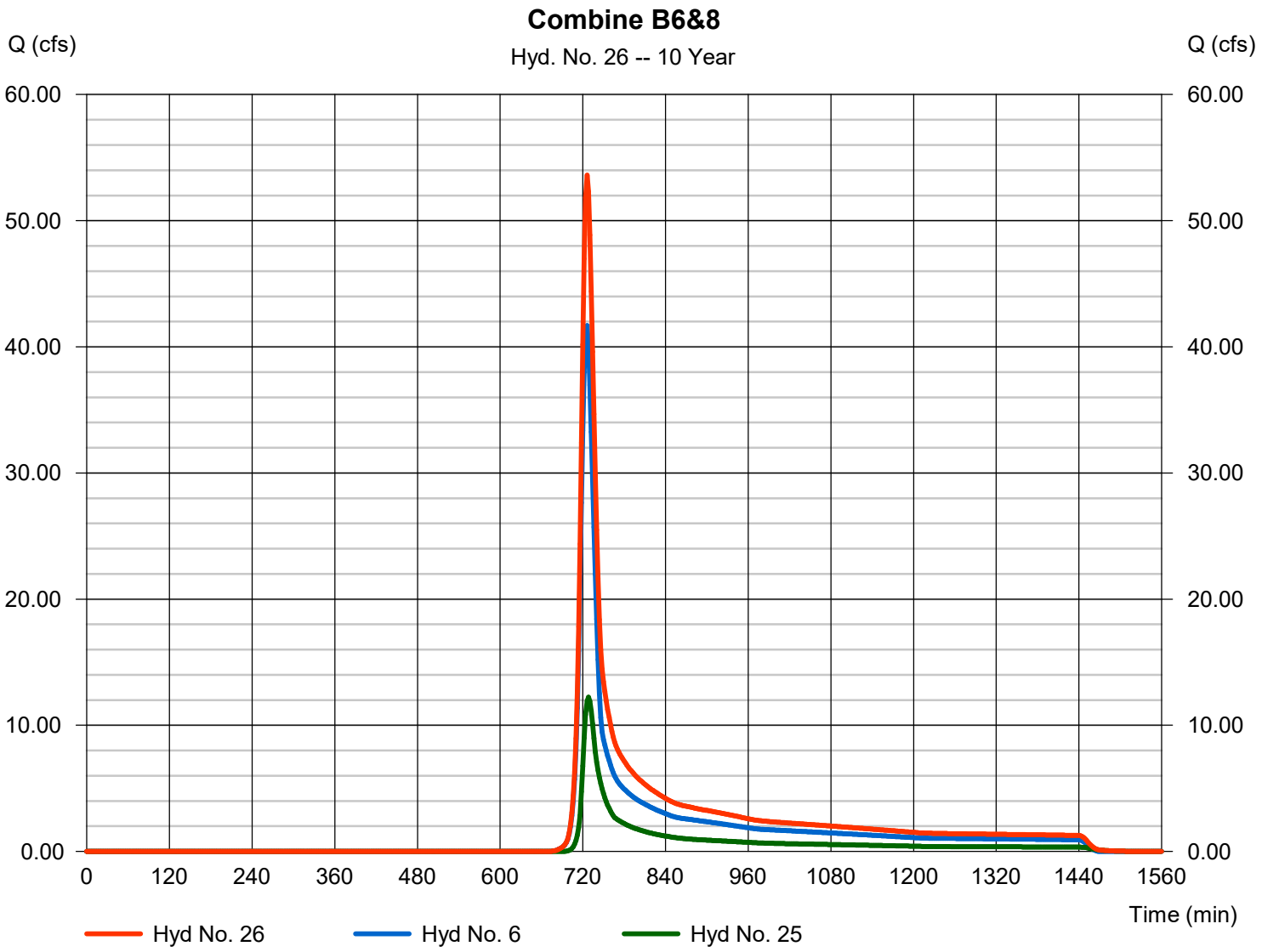
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 26

Combine B6&8

Hydrograph type	= Combine	Peak discharge	= 53.60 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 189,550 cuft
Inflow hyds.	= 6, 25	Contrib. drain. area	= 27.950 ac



Hydrograph Report

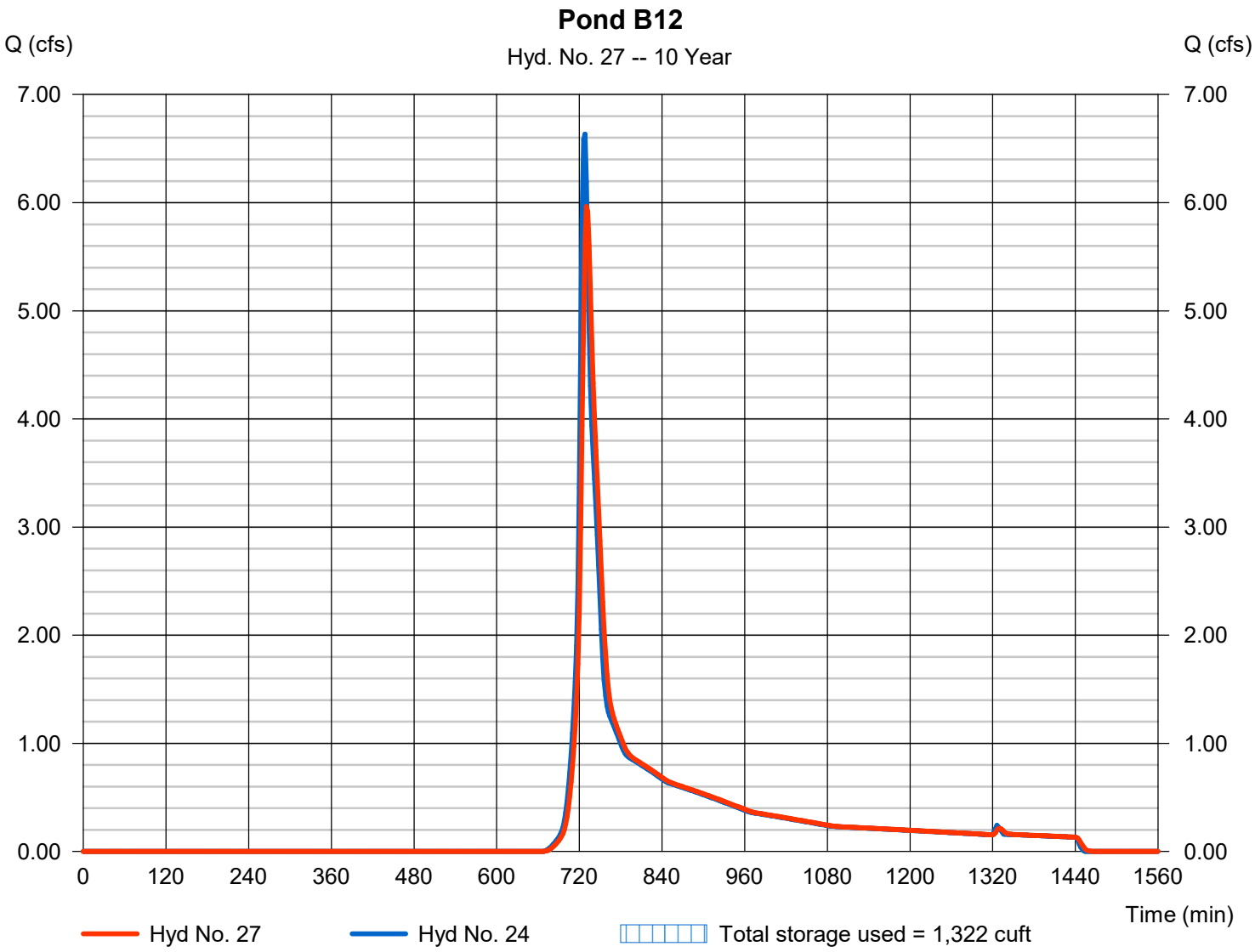
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 27

Pond B12

Hydrograph type	= Reservoir	Peak discharge	= 5.964 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 25,042 cuft
Inflow hyd. No.	= 24 - B12	Max. Elevation	= 126.06 ft
Reservoir name	= B12 Pond	Max. Storage	= 1,322 cuft

Storage Indication method used.



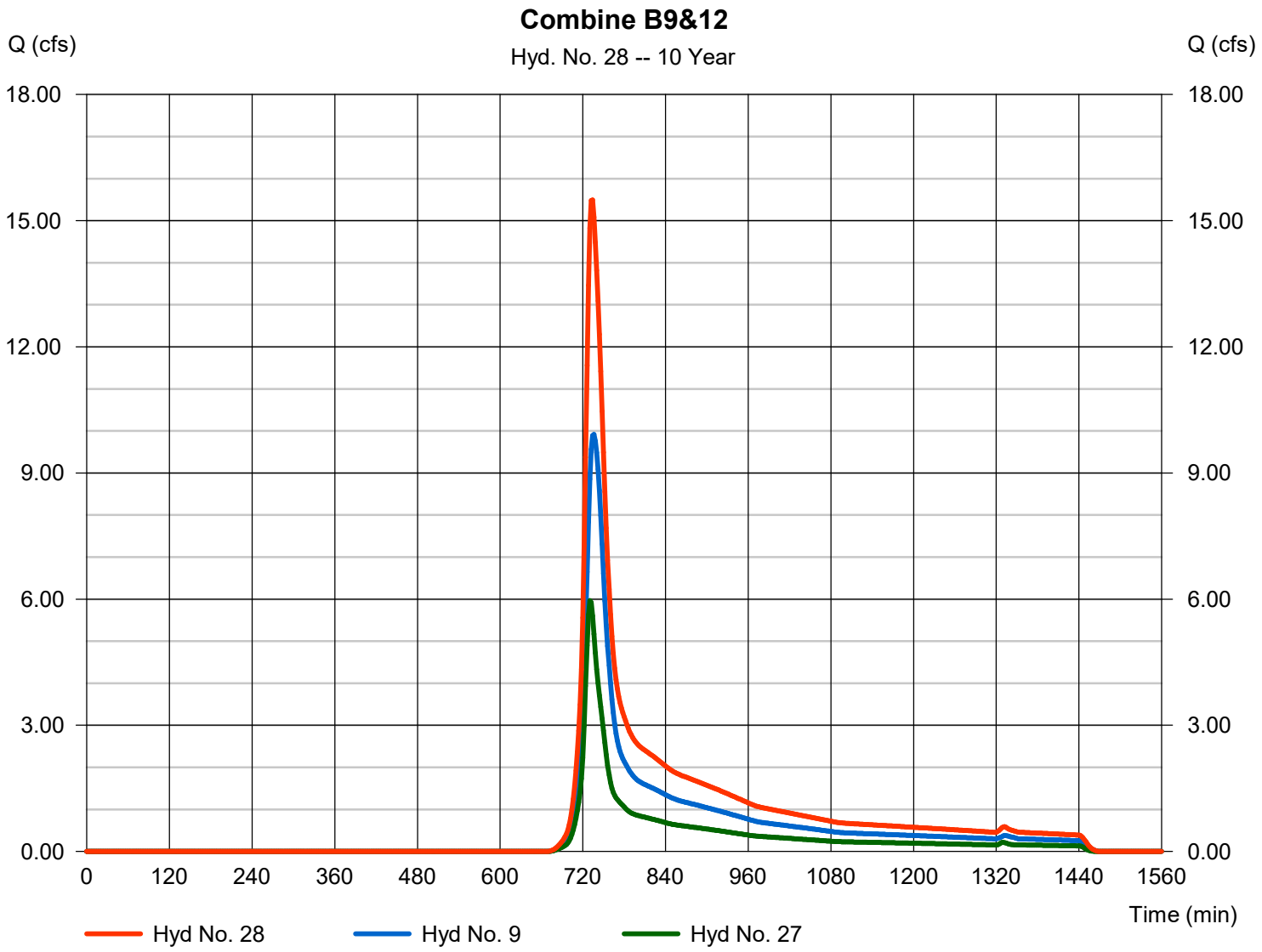
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 28

Combine B9&12

Hydrograph type	= Combine	Peak discharge	= 15.50 cfs
Storm frequency	= 10 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 73,216 cuft
Inflow hyds.	= 9, 27	Contrib. drain. area	= 10.080 ac



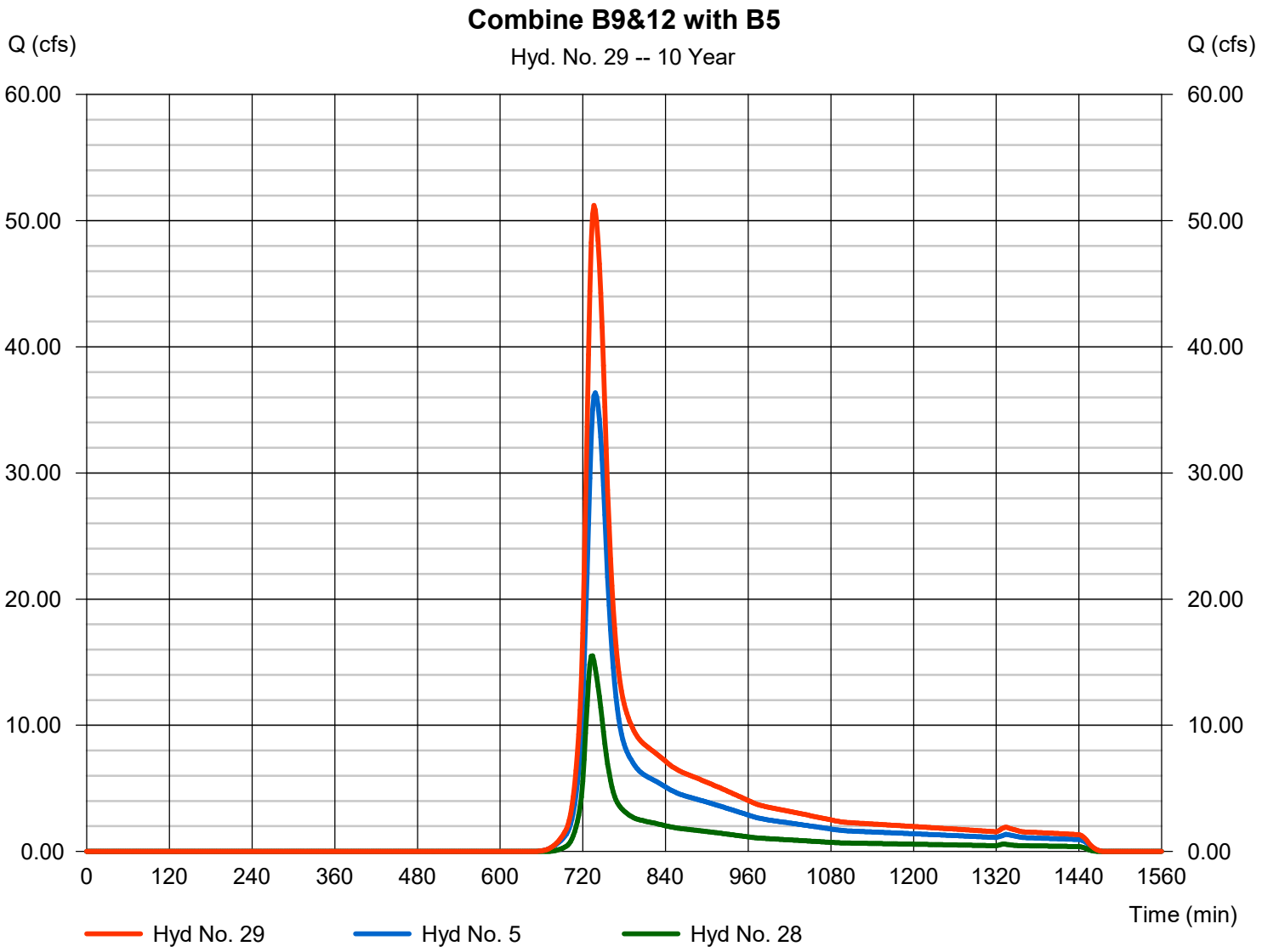
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 29

Combine B9&12 with B5

Hydrograph type	= Combine	Peak discharge	= 51.20 cfs
Storm frequency	= 10 yrs	Time to peak	= 736 min
Time interval	= 2 min	Hyd. volume	= 258,010 cuft
Inflow hyds.	= 5, 28	Contrib. drain. area	= 34.440 ac



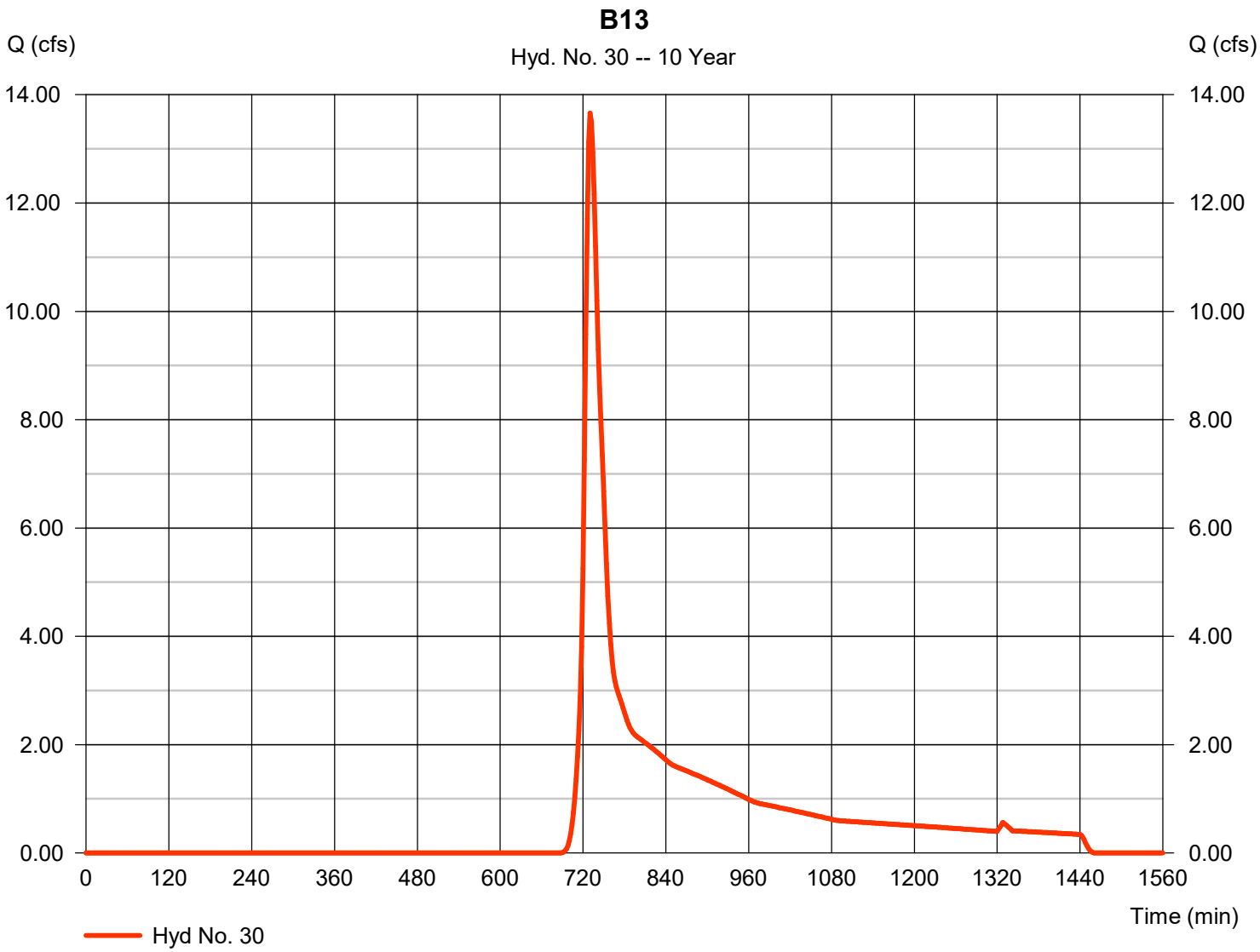
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 30

B13

Hydrograph type	= SCS Runoff	Peak discharge	= 13.66 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 60,514 cuft
Drainage area	= 14.400 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 10.40 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



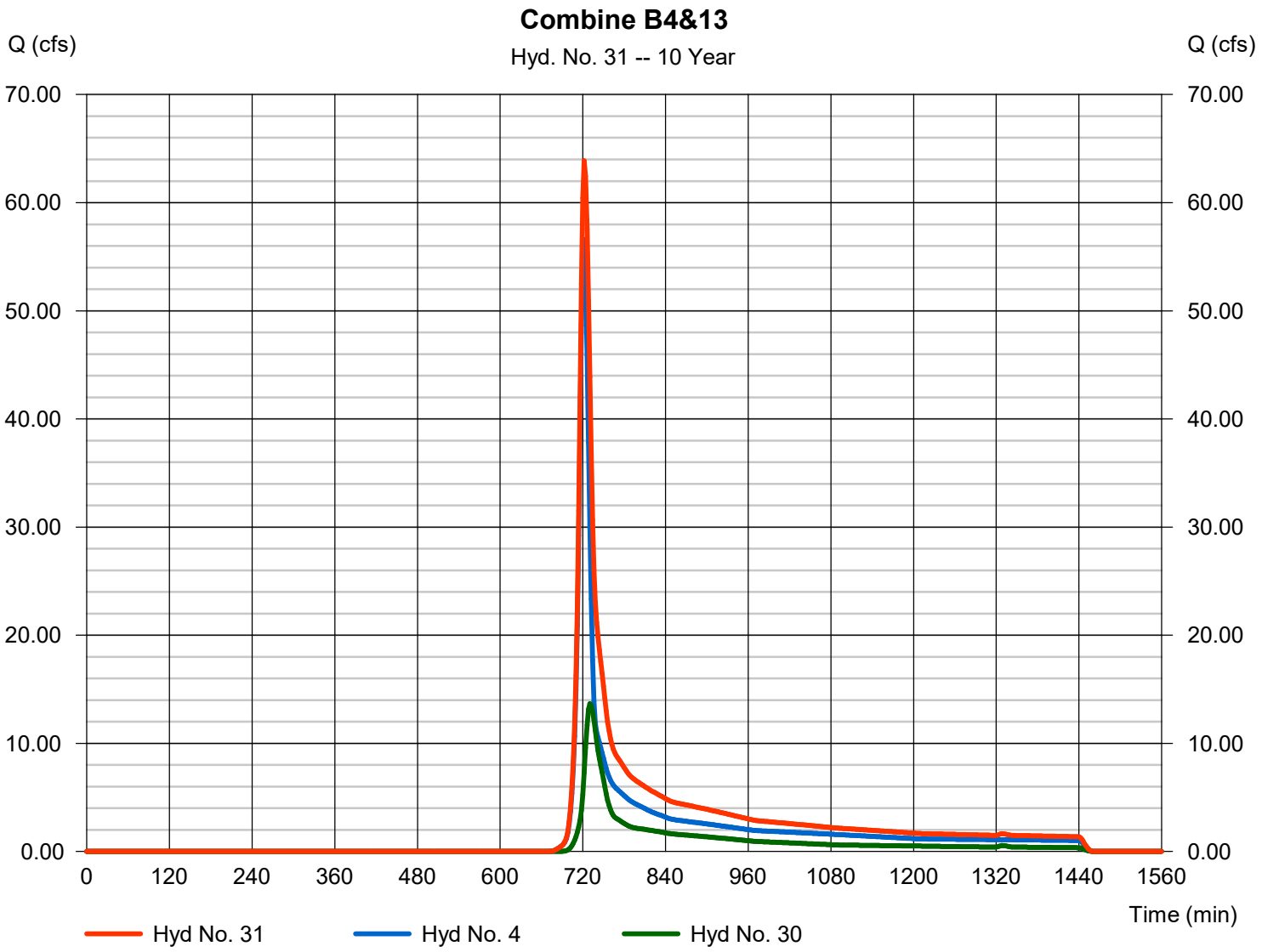
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 31

Combine B4&13

Hydrograph type	= Combine	Peak discharge	= 63.88 cfs
Storm frequency	= 10 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 214,515 cuft
Inflow hyds.	= 4, 30	Contrib. drain. area	= 44.130 ac



Hydrograph Report

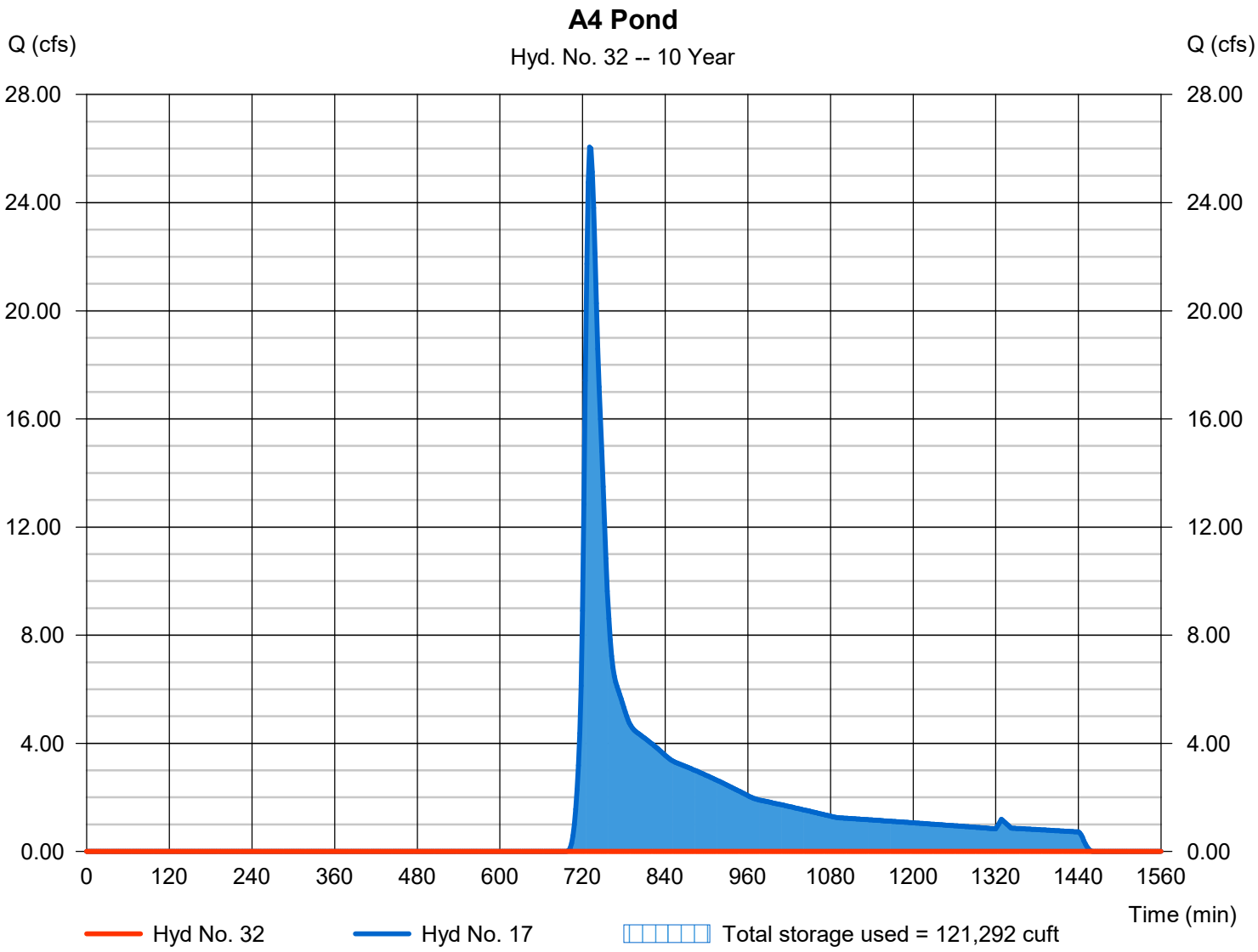
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 32

A4 Pond

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 10 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 17 - A4	Max. Elevation	= 105.87 ft
Reservoir name	= A4 Pond	Max. Storage	= 121,292 cuft

Storage Indication method used.



Hydrograph Report

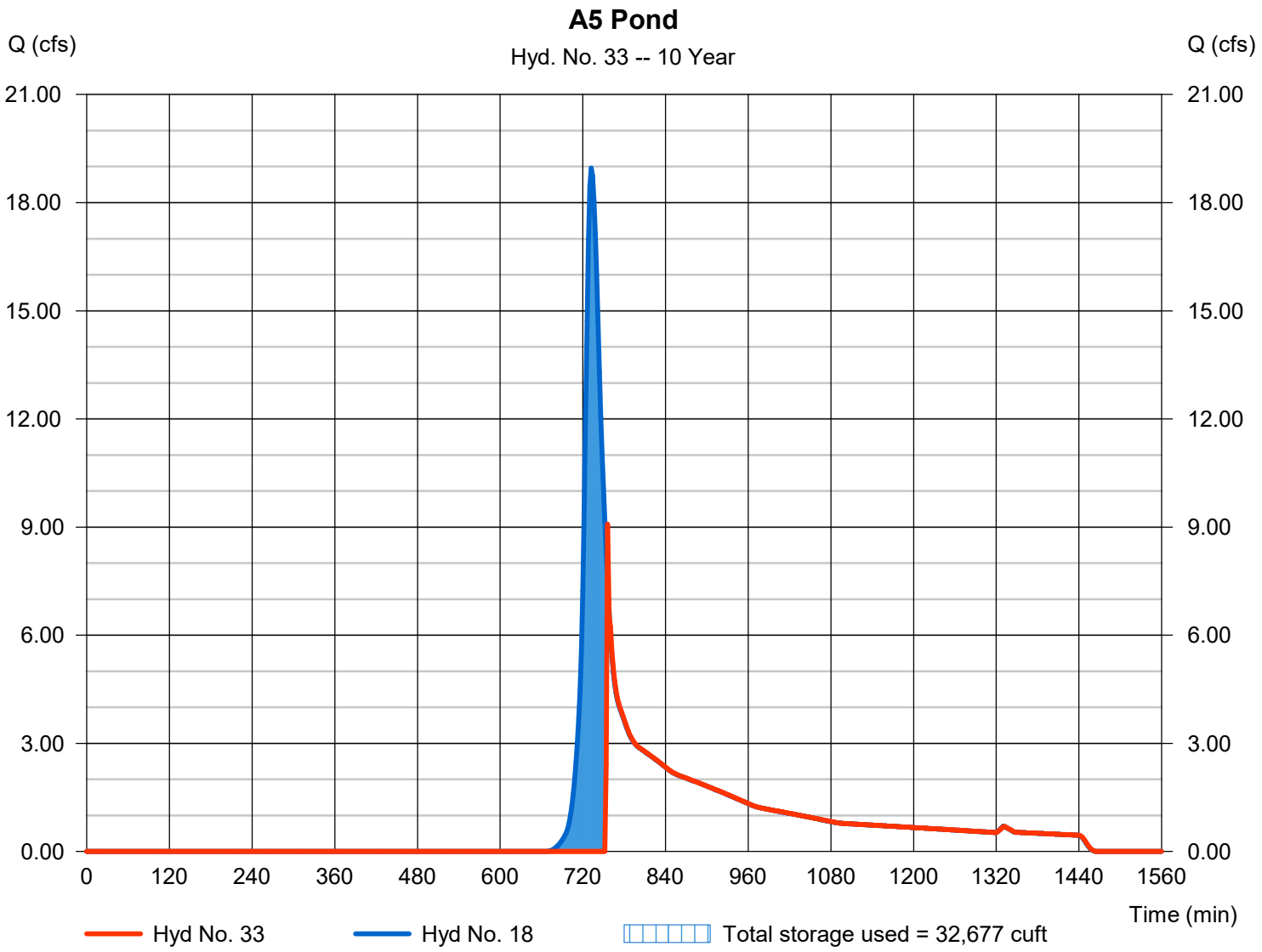
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 33

A5 Pond

Hydrograph type	= Reservoir	Peak discharge	= 9.082 cfs
Storm frequency	= 10 yrs	Time to peak	= 756 min
Time interval	= 2 min	Hyd. volume	= 52,329 cuft
Inflow hyd. No.	= 18 - A5	Max. Elevation	= 108.06 ft
Reservoir name	= A5 Pond	Max. Storage	= 32,677 cuft

Storage Indication method used.



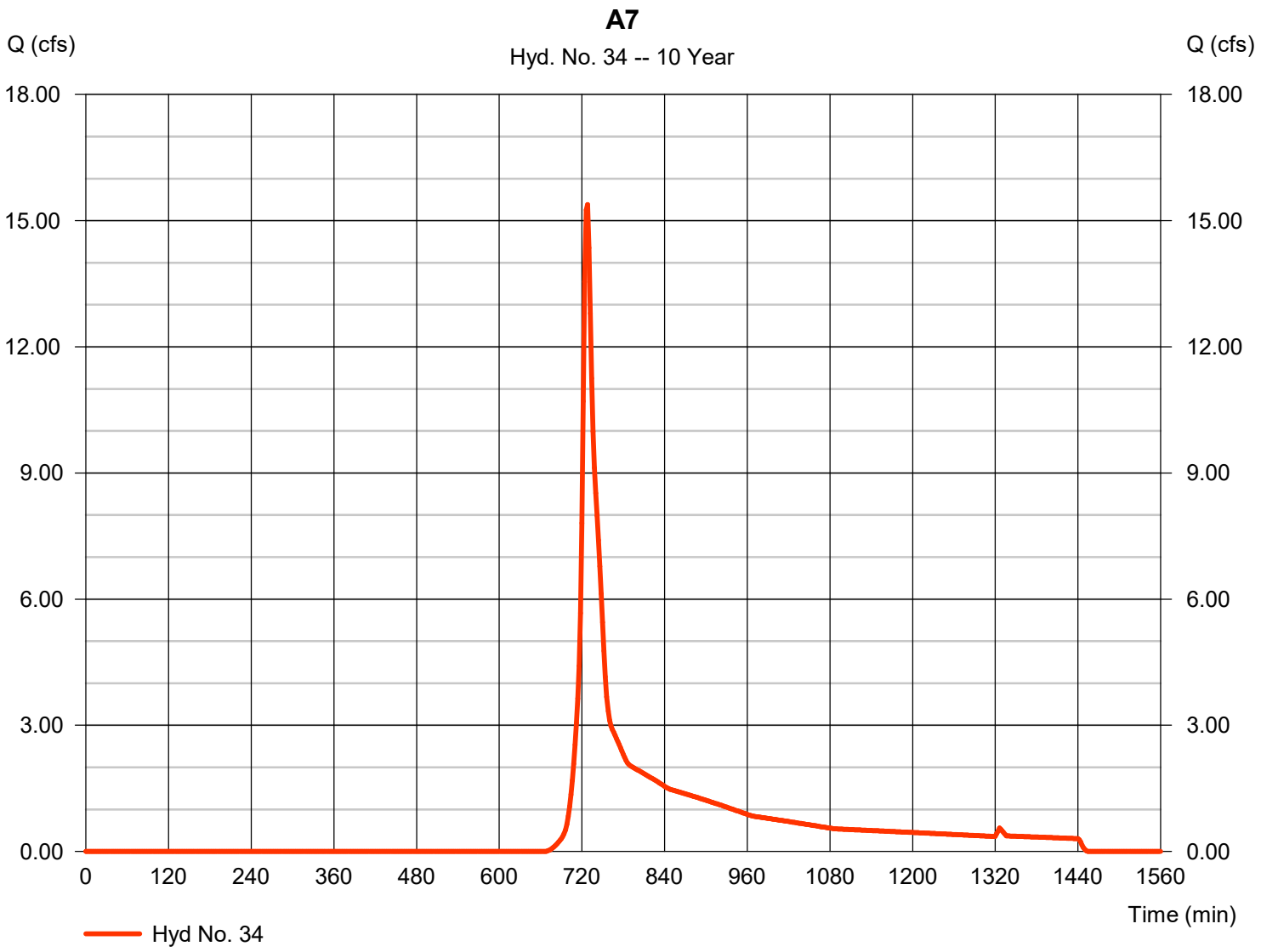
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 34

A7

Hydrograph type	= SCS Runoff	Peak discharge	= 15.38 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 58,066 cuft
Drainage area	= 12.150 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.00 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



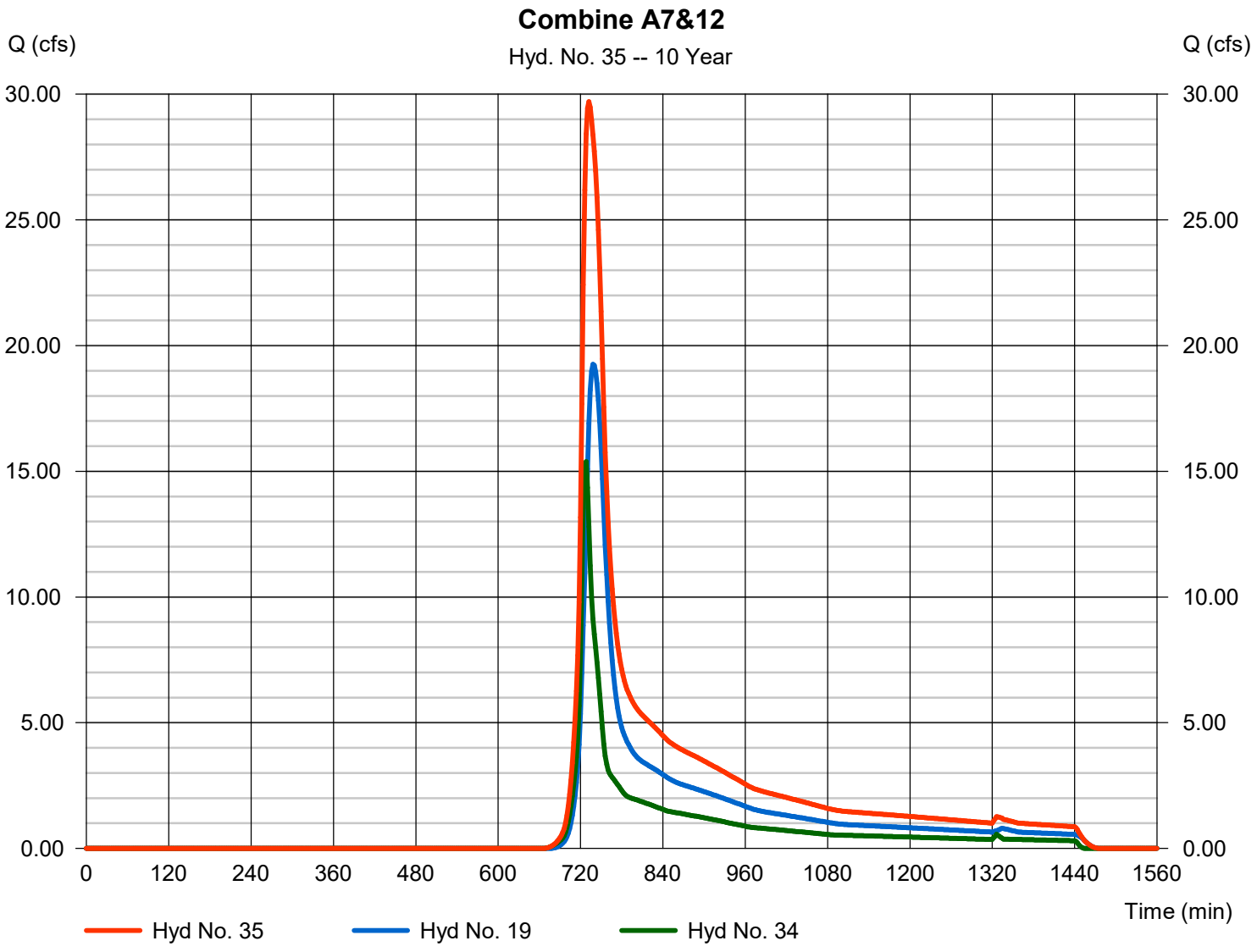
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 35

Combine A7&12

Hydrograph type	= Combine	Peak discharge	= 29.70 cfs
Storm frequency	= 10 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 159,725 cuft
Inflow hyds.	= 19, 34	Contrib. drain. area	= 34.150 ac



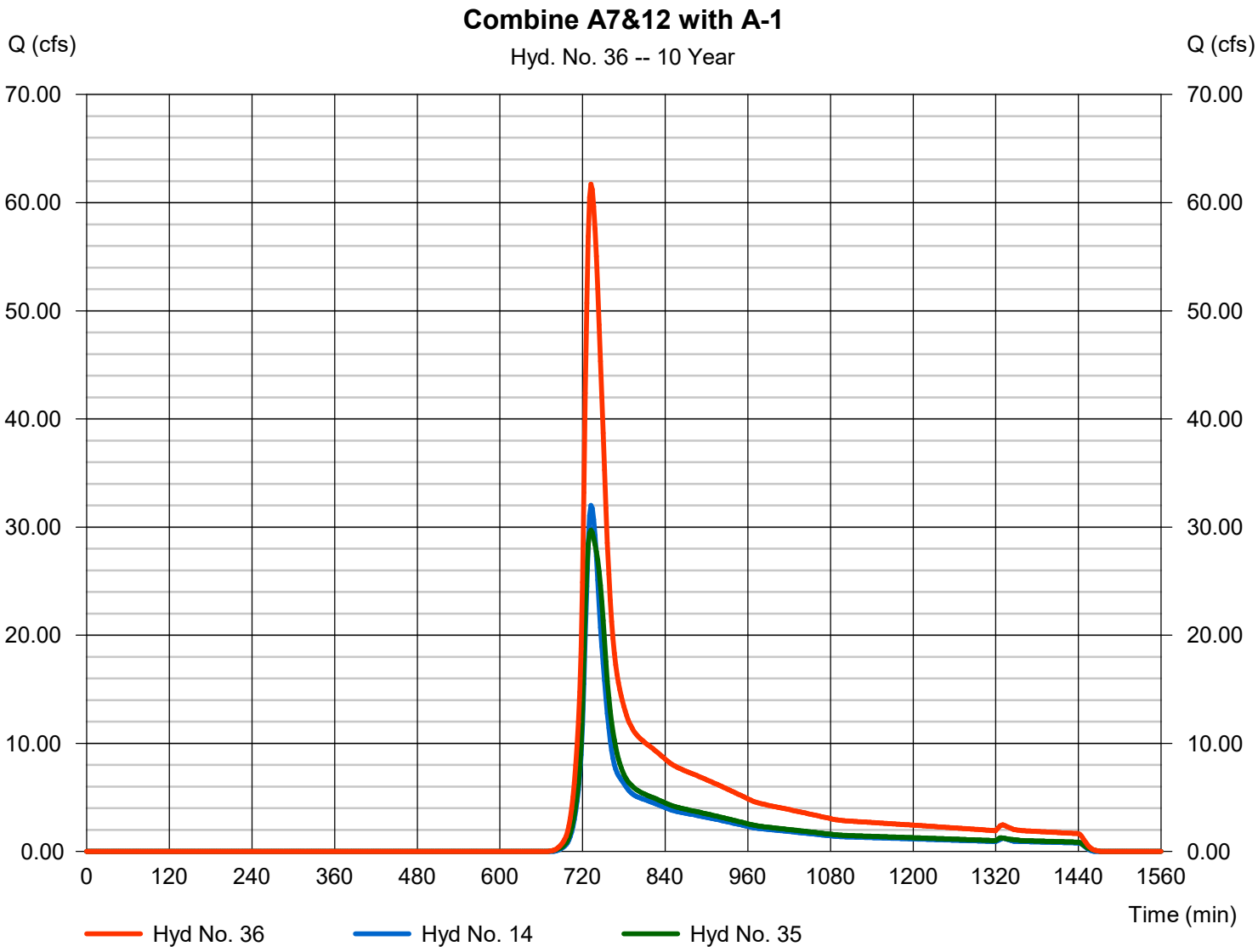
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 36

Combine A7&12 with A-1

Hydrograph type	= Combine	Peak discharge	= 61.71 cfs
Storm frequency	= 10 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 304,818 cuft
Inflow hyds.	= 14, 35	Contrib. drain. area	= 32.780 ac



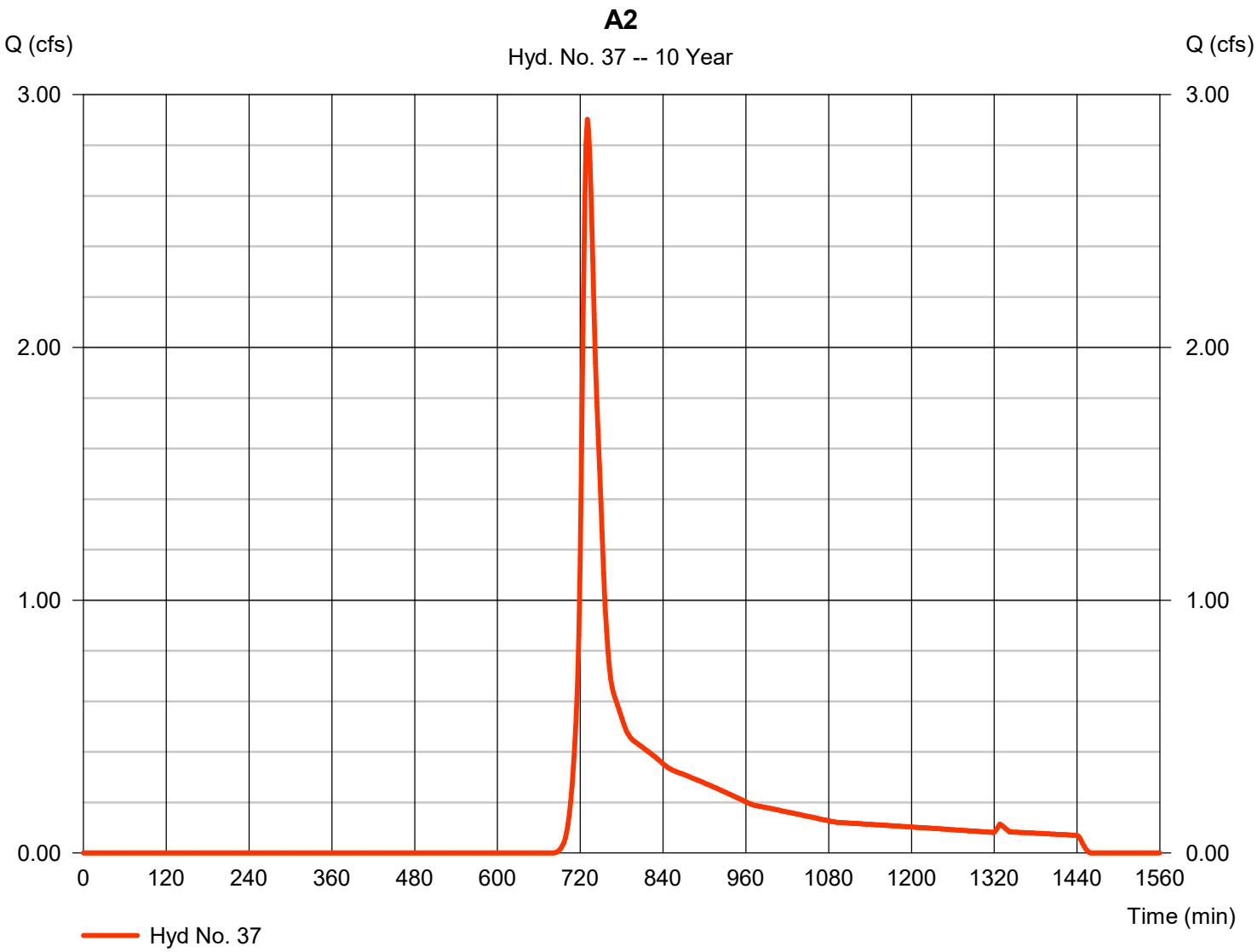
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 37

A2

Hydrograph type	= SCS Runoff	Peak discharge	= 2.903 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 12,608 cuft
Drainage area	= 2.840 ac	Curve number	= 60
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.70 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



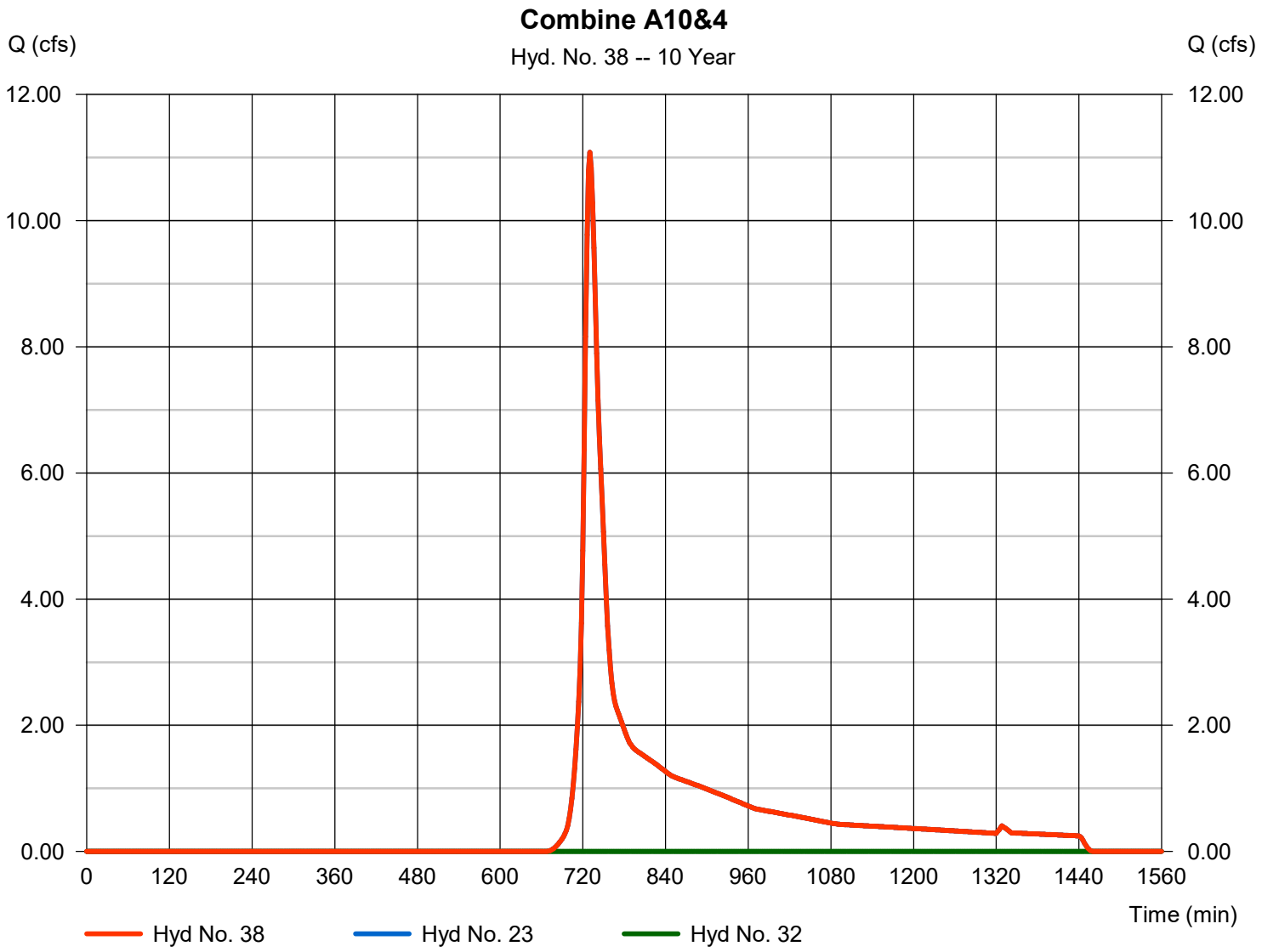
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 38

Combine A10&4

Hydrograph type	= Combine	Peak discharge	= 11.08 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 46,623 cuft
Inflow hyds.	= 23, 32	Contrib. drain. area	= 9.460 ac



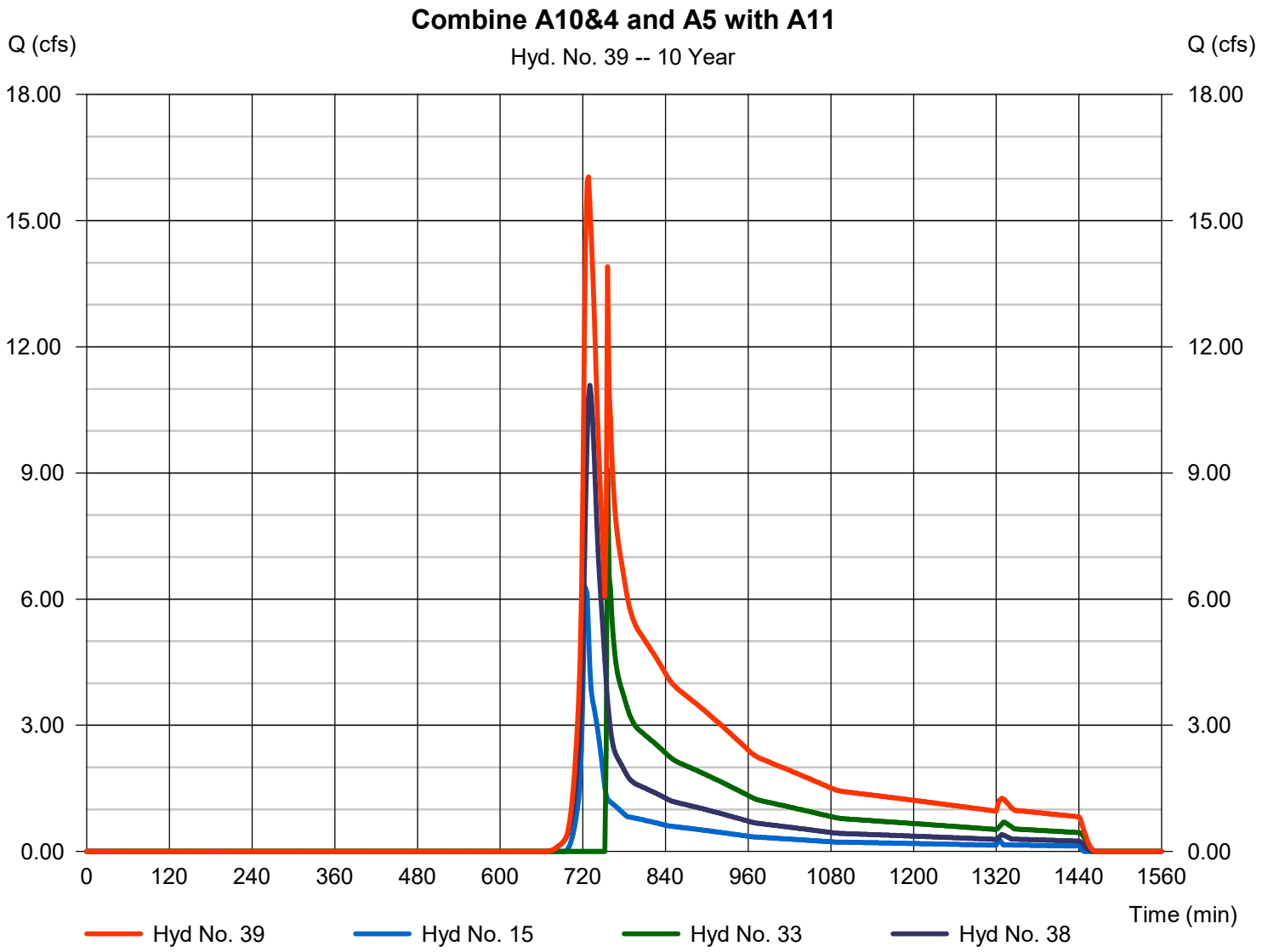
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 39

Combine A10&4 and A5 with A11

Hydrograph type	= Combine	Peak discharge	= 16.04 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 121,256 cuft
Inflow hyds.	= 15, 33, 38	Contrib. drain. area	= 6.180 ac



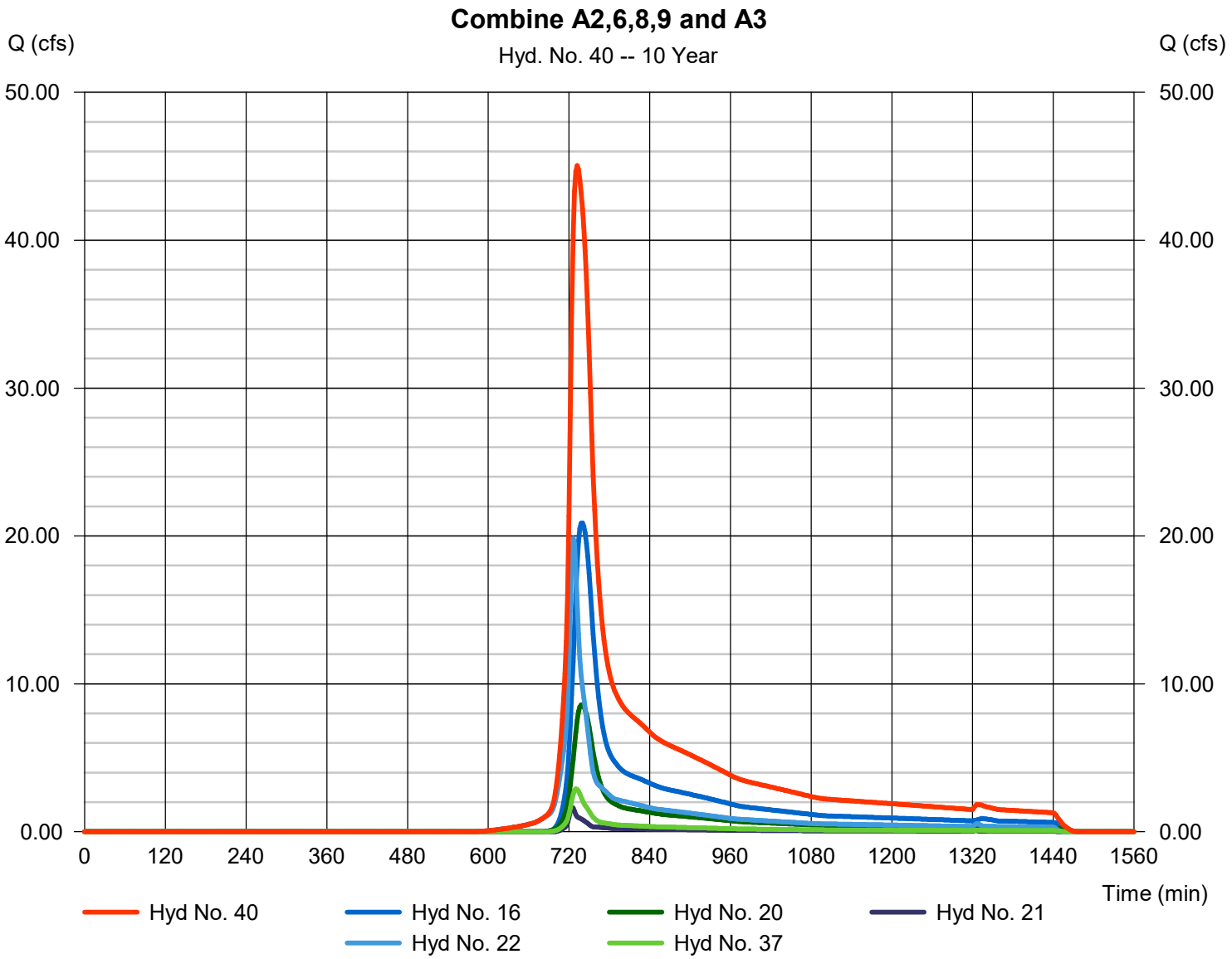
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 40

Combine A2,6,8,9 and A3

Hydrograph type	= Combine	Peak discharge	= 45.05 cfs
Storm frequency	= 10 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 245,019 cuft
Inflow hyds.	= 16, 20, 21, 22, 37	Contrib. drain. area	= 49.640 ac



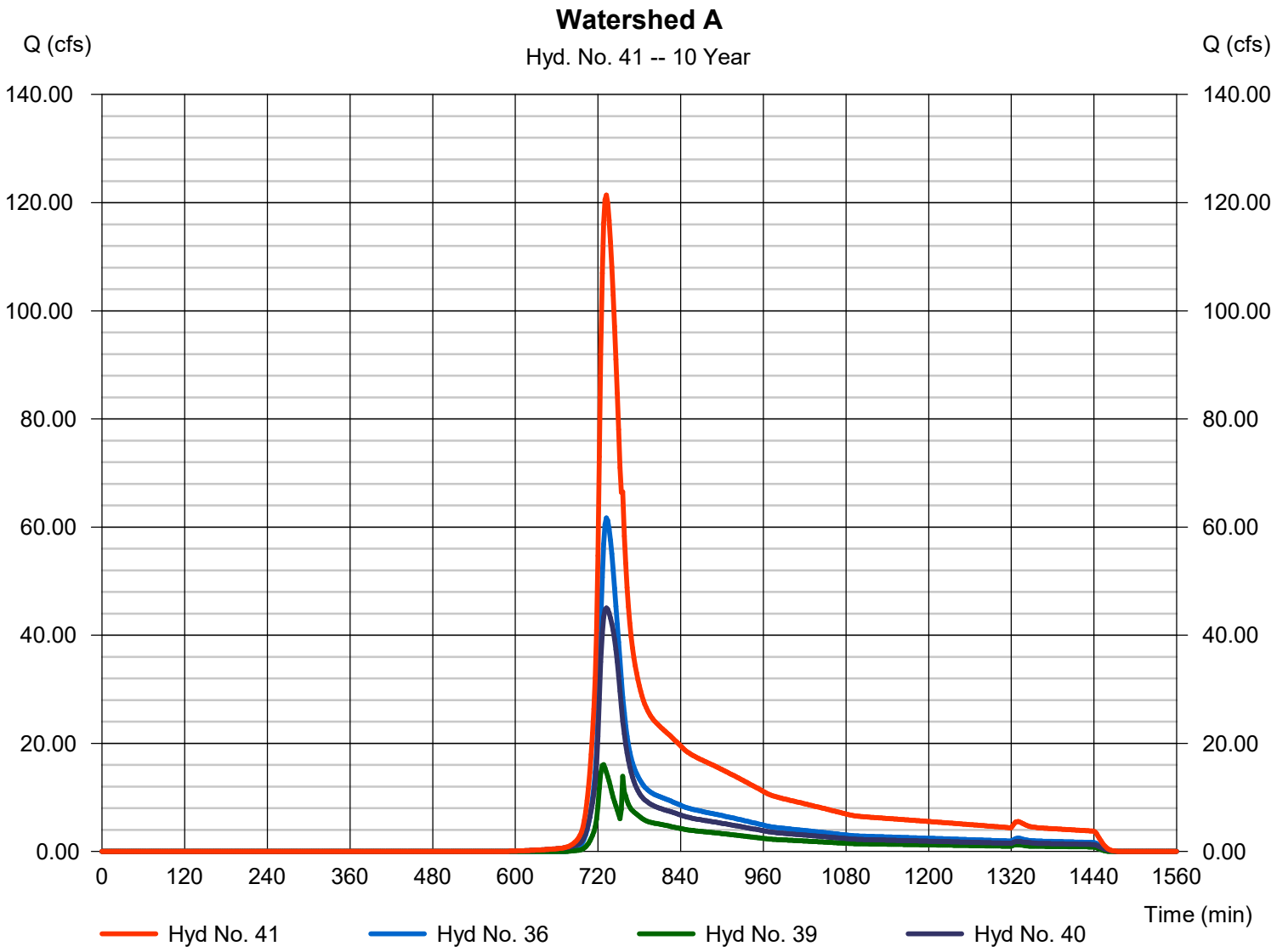
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 41

Watershed A

Hydrograph type	= Combine	Peak discharge	= 121.42 cfs
Storm frequency	= 10 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 671,093 cuft
Inflow hyds.	= 36, 39, 40	Contrib. drain. area	= 0.000 ac



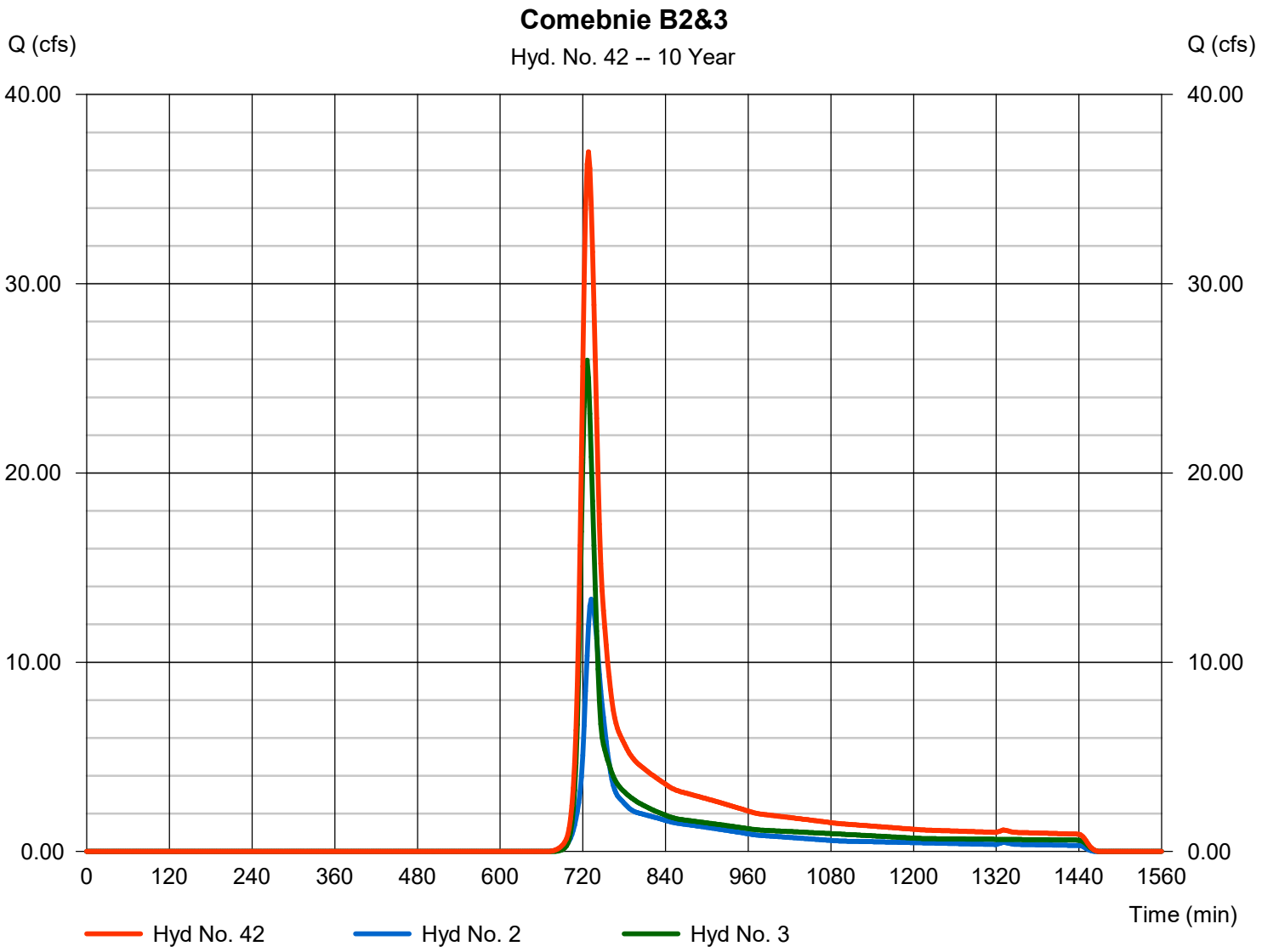
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 42

Comebnie B2&3

Hydrograph type	= Combine	Peak discharge	= 36.97 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 148,012 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 31.290 ac



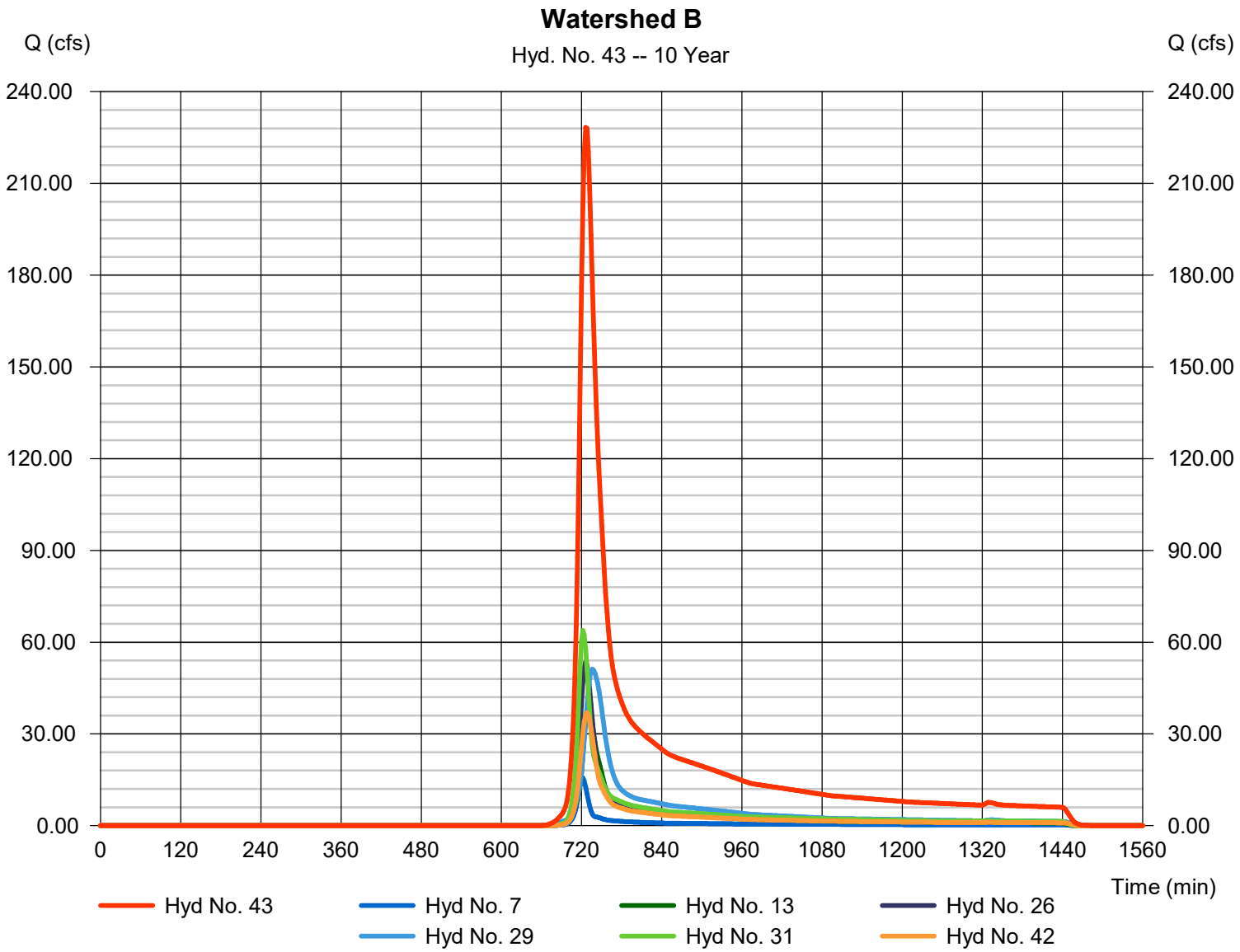
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 43

Watershed B

Hydrograph type	= Combine	Peak discharge	= 228.29 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 1,014,200 cuft
Inflow hyds.	= 7, 13, 26, 29, 31, 42	Contrib. drain. area	= 7.760 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	60.67	2	730	241,801	------	------	------	B1
2	SCS Runoff	21.12	2	732	89,874	------	------	------	B2
3	SCS Runoff	40.93	2	726	133,684	------	------	------	B3
4	SCS Runoff	87.13	2	722	230,630	------	------	------	B4
5	SCS Runoff	55.96	2	736	274,486	------	------	------	B5
6	SCS Runoff	64.76	2	726	210,251	------	------	------	B6
7	SCS Runoff	23.75	2	722	62,661	------	------	------	B7
8	SCS Runoff	28.04	2	722	74,910	------	------	------	B8
9	SCS Runoff	15.74	2	734	72,761	------	------	------	B9
10	SCS Runoff	0.035	2	748	757	------	------	------	B10
11	SCS Runoff	0.044	2	748	959	------	------	------	B11
12	Combine	0.079	2	748	1,716	10, 11	------	------	Combine B10&11
13	Combine	60.67	2	730	243,517	1, 12	------	------	Combine B10&11 with B1
14	SCS Runoff	51.55	2	732	221,107	------	------	------	A1
15	SCS Runoff	10.77	2	724	34,998	------	------	------	A11
16	SCS Runoff	34.11	2	738	172,273	------	------	------	A3
17	SCS Runoff	45.58	2	730	192,386	------	------	------	A4
18	SCS Runoff	30.05	2	732	127,879	------	------	------	A5
19	SCS Runoff	30.94	2	738	154,917	------	------	------	A12
20	SCS Runoff	13.78	2	738	69,008	------	------	------	A6
21	SCS Runoff	2.866	2	724	9,444	------	------	------	A8
22	SCS Runoff	28.45	2	726	97,728	------	------	------	A9
23	SCS Runoff	17.55	2	730	70,420	------	------	------	A10
24	SCS Runoff	10.51	2	726	37,824	------	------	------	B12
25	Reservoir	21.32	2	726	74,909	8	132.40	11,817	Pond B8
26	Combine	86.08	2	726	285,160	6, 25	------	------	Combine B6&8
27	Reservoir	9.495	2	730	37,824	24	126.10	2,105	Pond B12
28	Combine	24.70	2	732	110,585	9, 27	------	------	Combine B9&12
29	Combine	79.53	2	736	385,071	5, 28	------	------	Combine B9&12 with B5
30	SCS Runoff	22.82	2	730	93,989	------	------	------	B13
31	Combine	100.66	2	722	324,619	4, 30	------	------	Combine B4&13
32	Reservoir	0.000	2	n/a	0	17	107.64	192,385	A4 Pond
33	Reservoir	30.51	2	738	95,543	18	108.18	33,481	A5 Pond
34	SCS Runoff	24.38	2	726	87,703	------	------	------	A7

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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
35	Combine	47.89	2	730	242,620	19, 34	------	------	Combine A7&12
36	Combine	99.39	2	732	463,727	14, 35	------	------	Combine A7&12 with A-1
37	SCS Runoff	4.755	2	730	19,393	------	------	------	A2
38	Combine	17.55	2	730	70,420	23, 32,	------	------	Combine A10&4
39	Combine	48.81	2	738	200,960	15, 33, 38	------	------	Combine A10&4 and A5 with A11
40	Combine	71.51	2	732	367,847	16, 20, 21, 22, 37,	------	------	Combine A2,6,8,9 and A3
41	Combine	206.34	2	738	1,032,534	36, 39, 40	------	------	Watershed A
42	Combine	58.52	2	728	223,559	2, 3,	------	------	Comebnie B2&3
43	Combine	363.62	2	726	1,524,585	7, 13, 26, 29, 31, 42	------	------	Watershed B

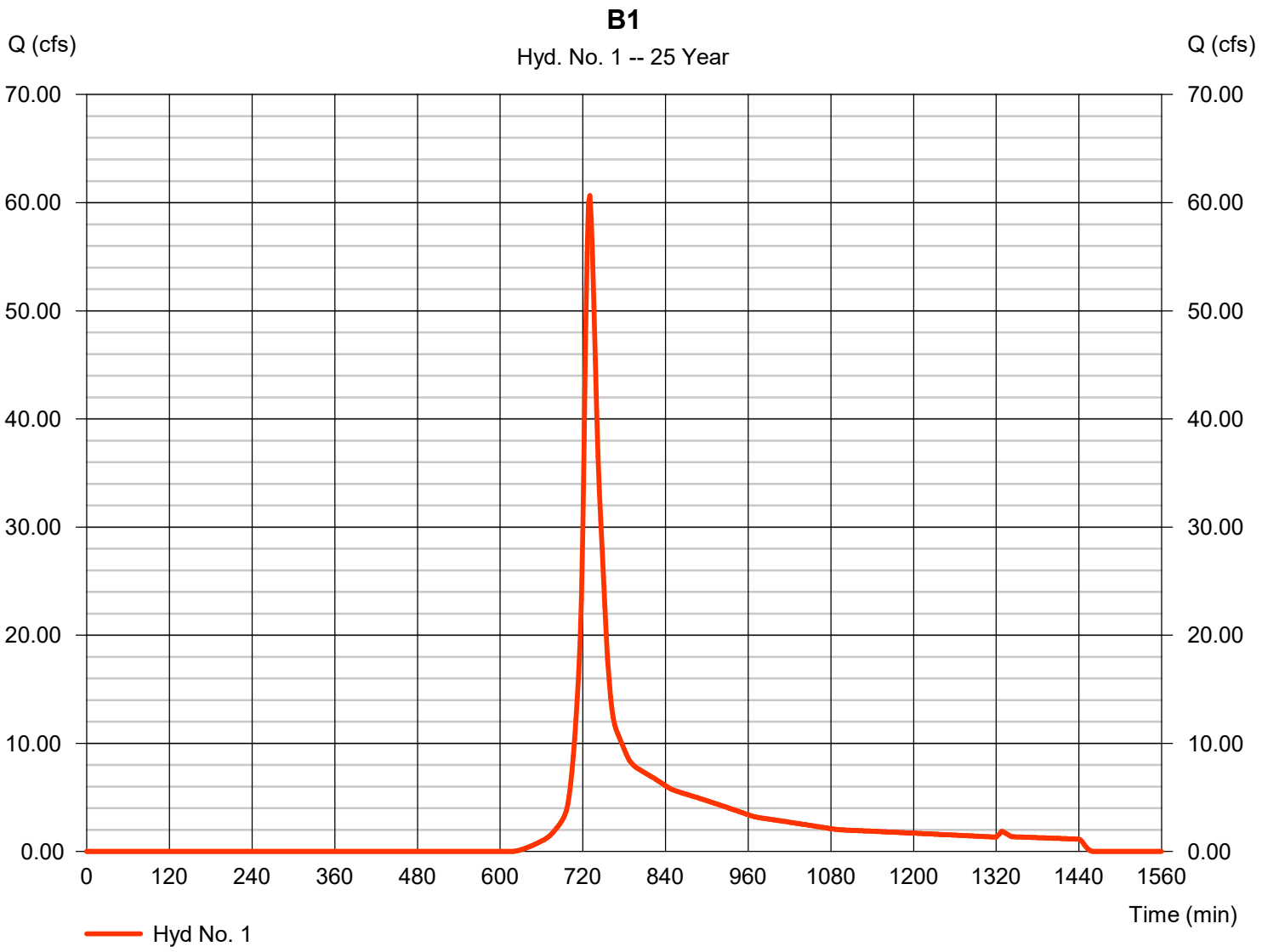
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 1

B1

Hydrograph type	= SCS Runoff	Peak discharge	= 60.67 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 241,801 cuft
Drainage area	= 31.170 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.00 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



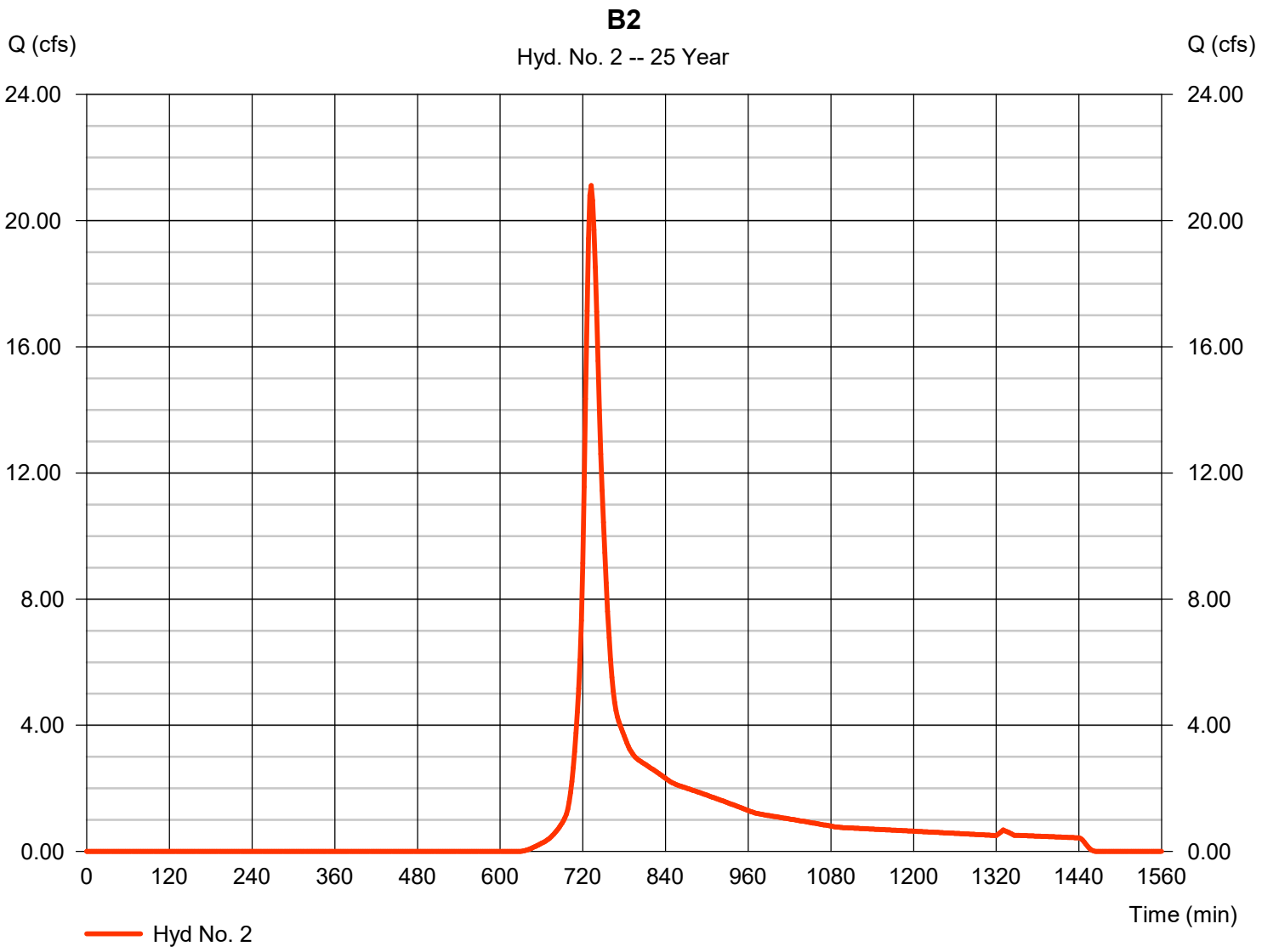
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 2

B2

Hydrograph type	= SCS Runoff	Peak discharge	= 21.12 cfs
Storm frequency	= 25 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 89,874 cuft
Drainage area	= 12.770 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 14.00 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



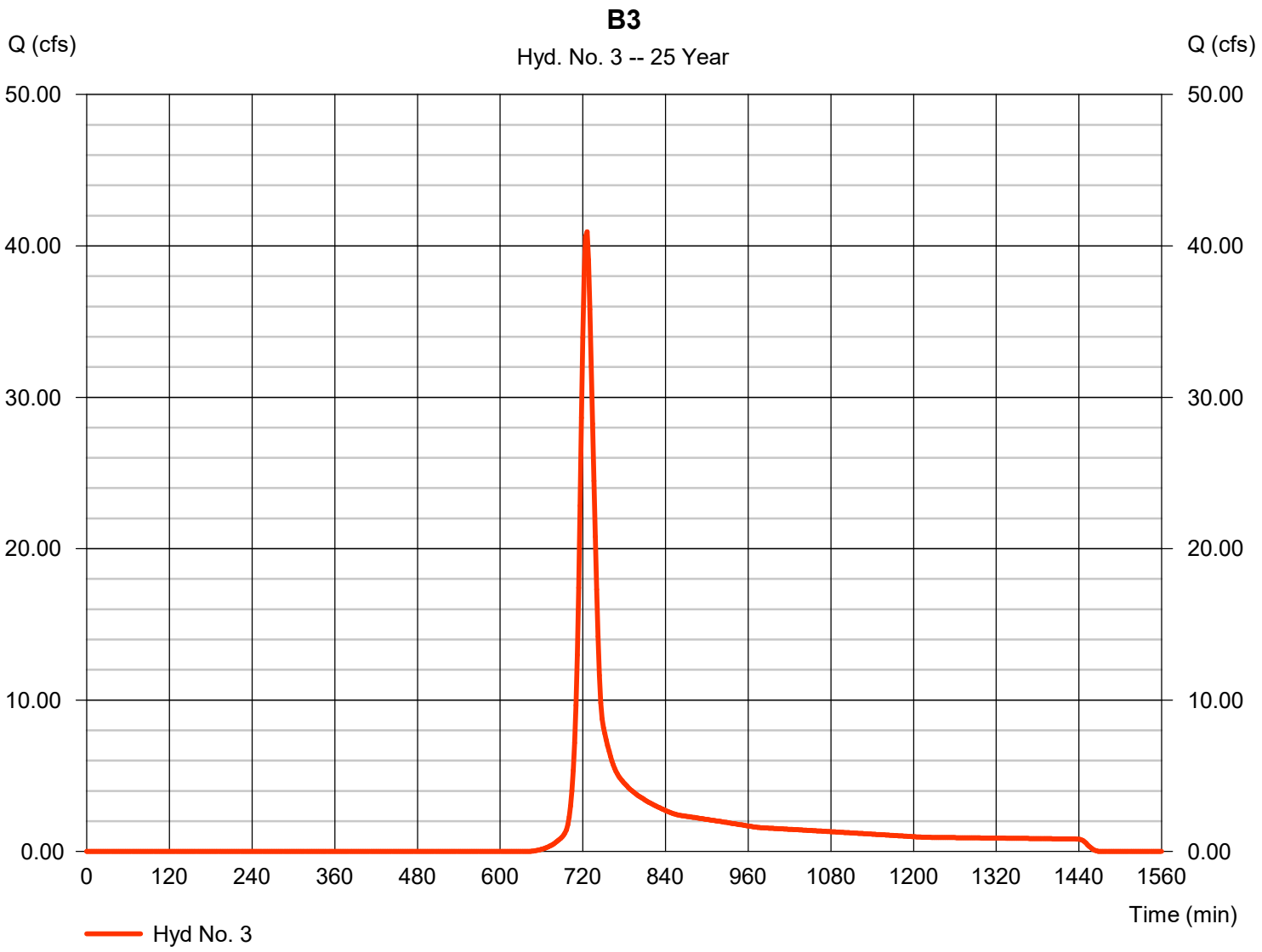
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 3

B3

Hydrograph type	= SCS Runoff	Peak discharge	= 40.93 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 133,684 cuft
Drainage area	= 18.520 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.80 min
Total precip.	= 5.85 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



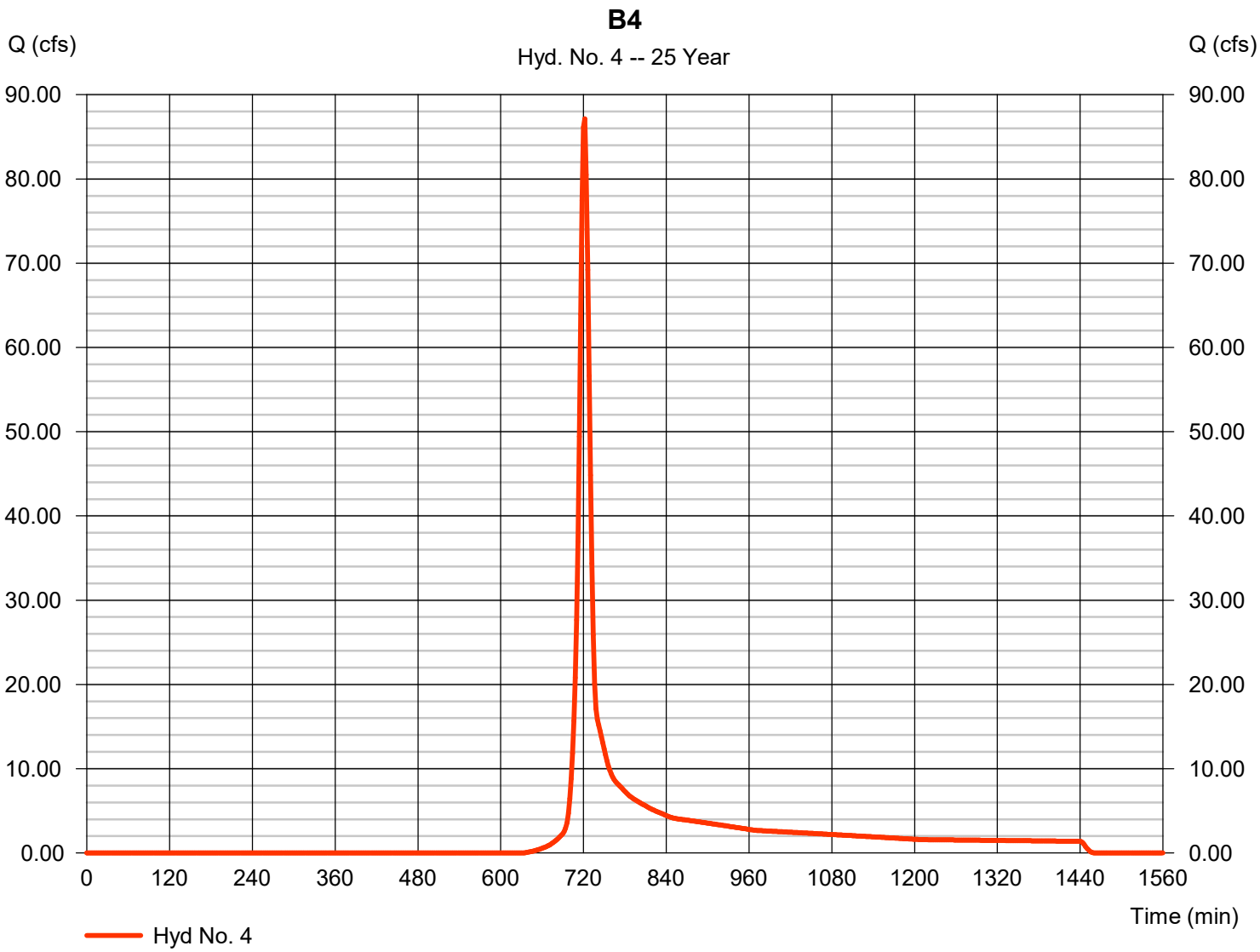
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 4

B4

Hydrograph type	= SCS Runoff	Peak discharge	= 87.13 cfs
Storm frequency	= 25 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 230,630 cuft
Drainage area	= 29.730 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.80 min
Total precip.	= 5.85 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



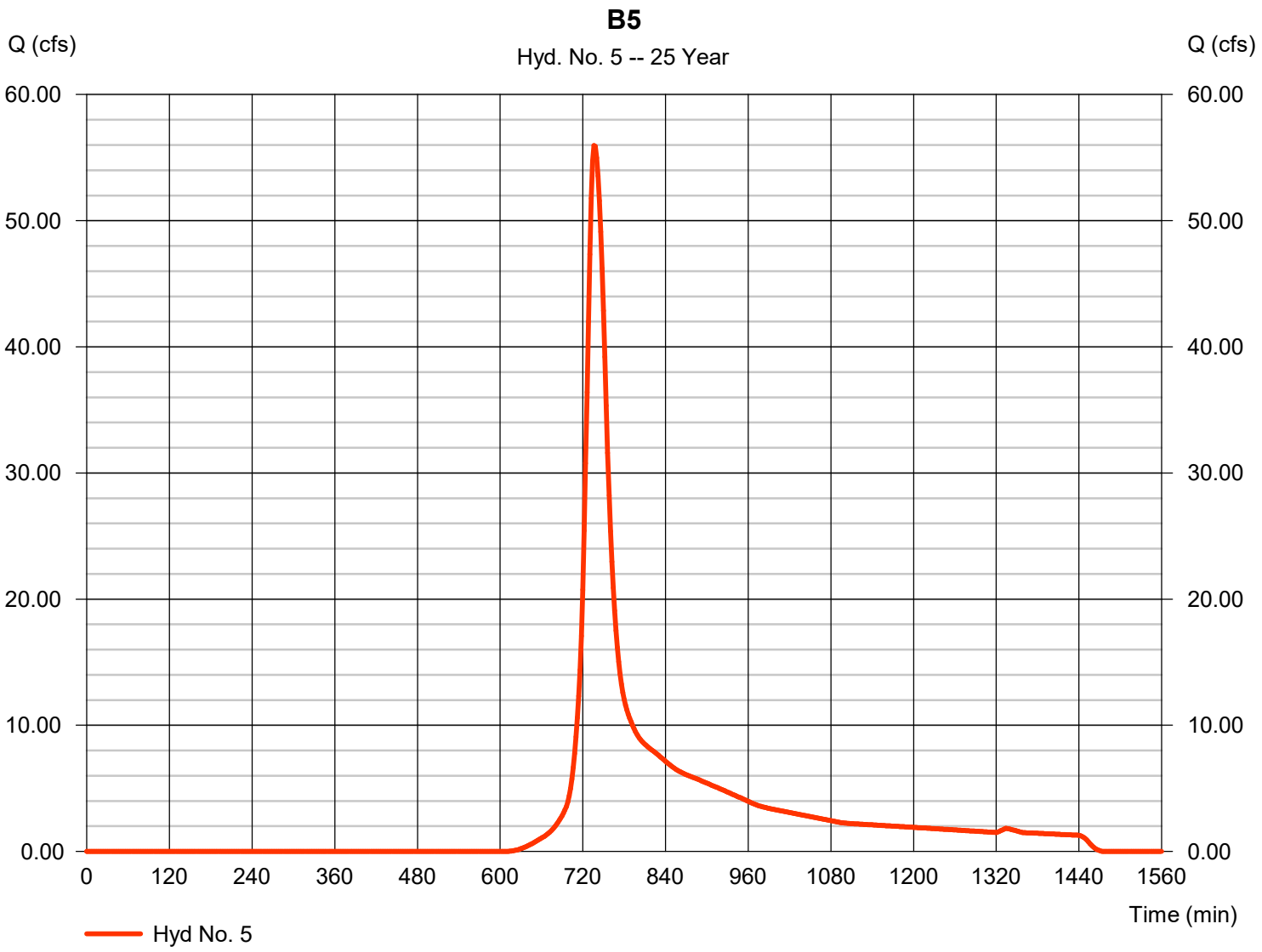
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 5

B5

Hydrograph type	= SCS Runoff	Peak discharge	= 55.96 cfs
Storm frequency	= 25 yrs	Time to peak	= 736 min
Time interval	= 2 min	Hyd. volume	= 274,486 cuft
Drainage area	= 34.440 ac	Curve number	= 64
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 20.40 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



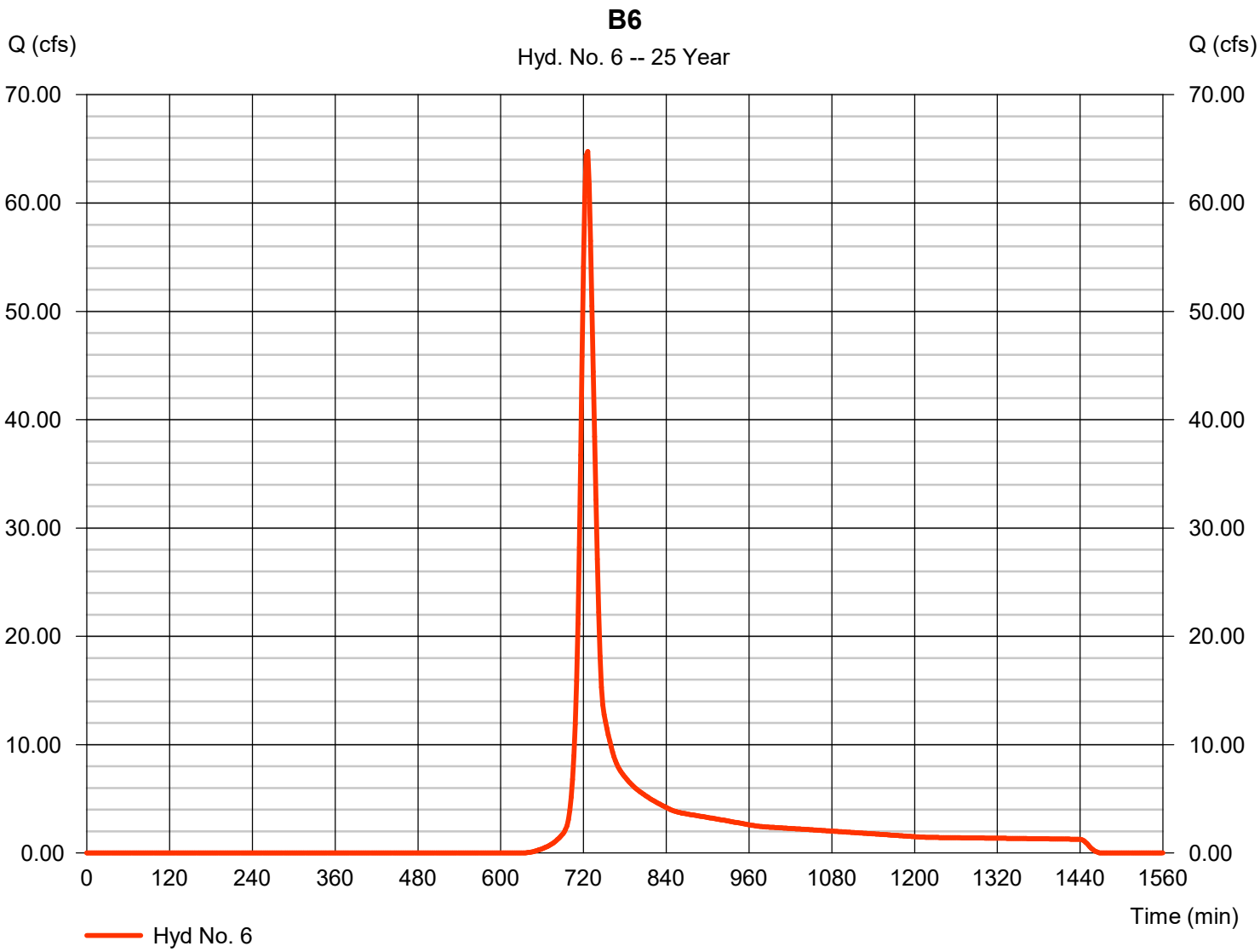
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 6

B6

Hydrograph type	= SCS Runoff	Peak discharge	= 64.76 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 210,251 cuft
Drainage area	= 27.950 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.10 min
Total precip.	= 5.85 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



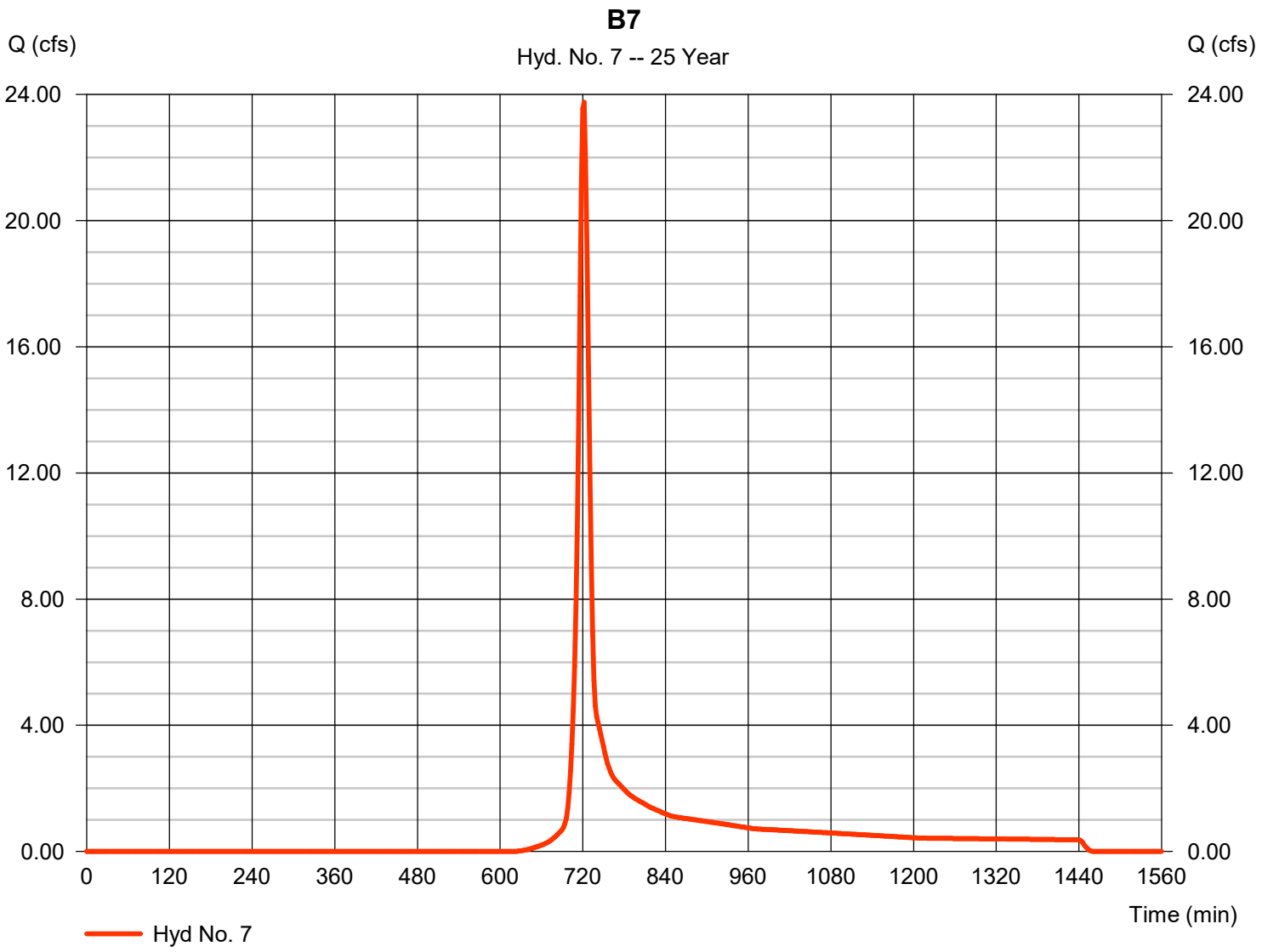
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 7

B7

Hydrograph type	= SCS Runoff	Peak discharge	= 23.75 cfs
Storm frequency	= 25 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 62,661 cuft
Drainage area	= 7.760 ac	Curve number	= 64
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.30 min
Total precip.	= 5.85 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



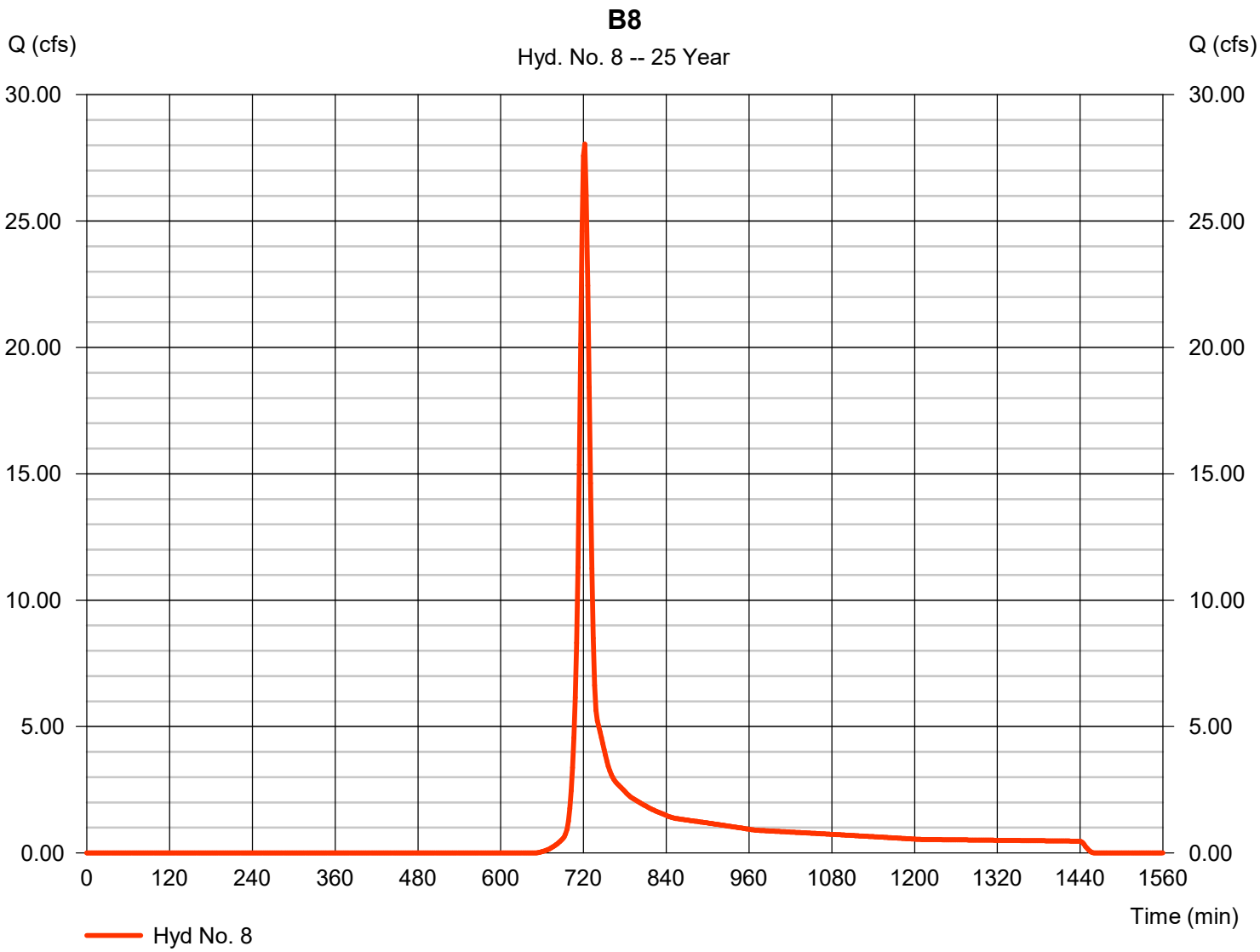
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 8

B8

Hydrograph type	= SCS Runoff	Peak discharge	= 28.04 cfs
Storm frequency	= 25 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 74,910 cuft
Drainage area	= 10.500 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.00 min
Total precip.	= 5.85 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



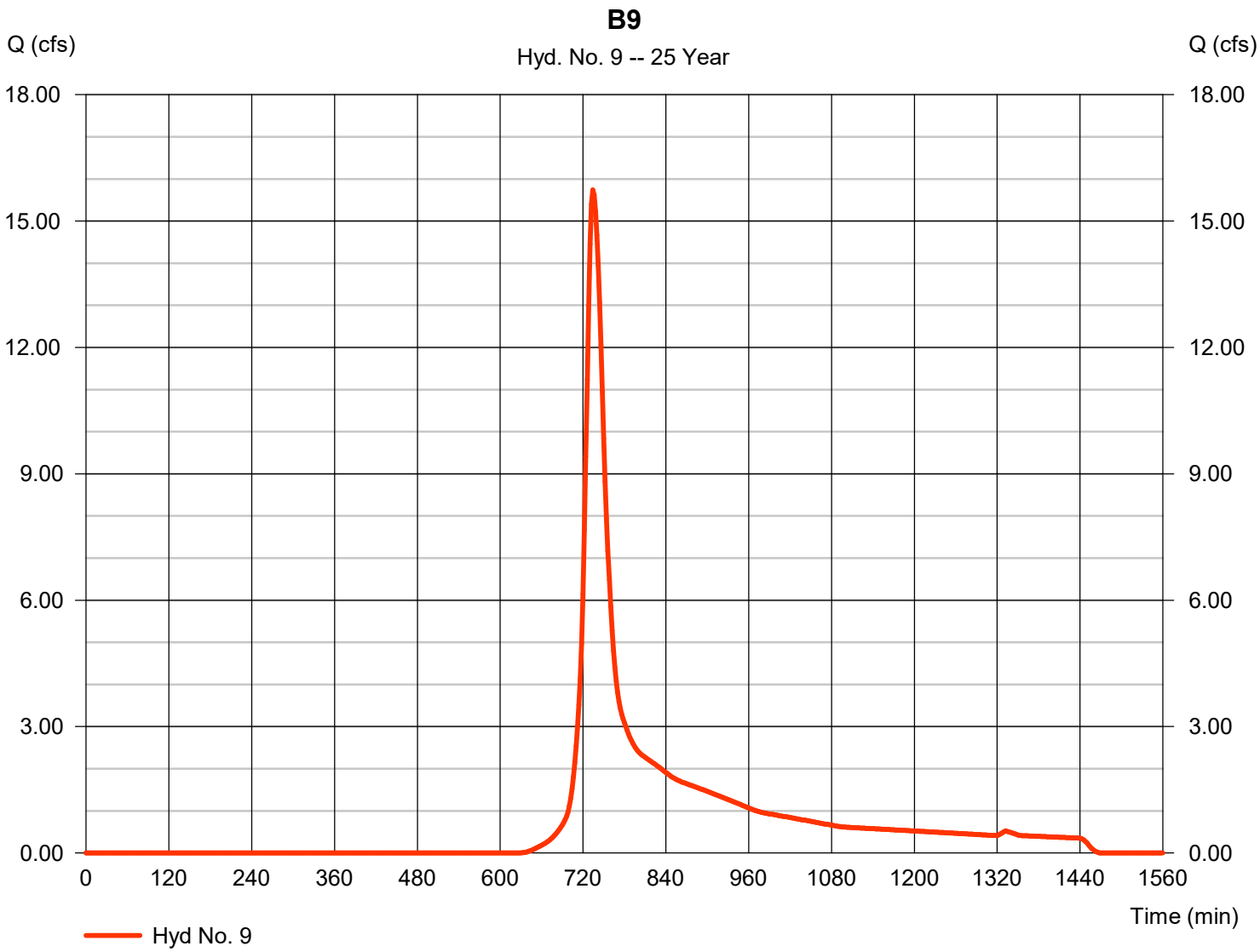
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 9

B9

Hydrograph type	= SCS Runoff	Peak discharge	= 15.74 cfs
Storm frequency	= 25 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 72,761 cuft
Drainage area	= 10.080 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.40 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



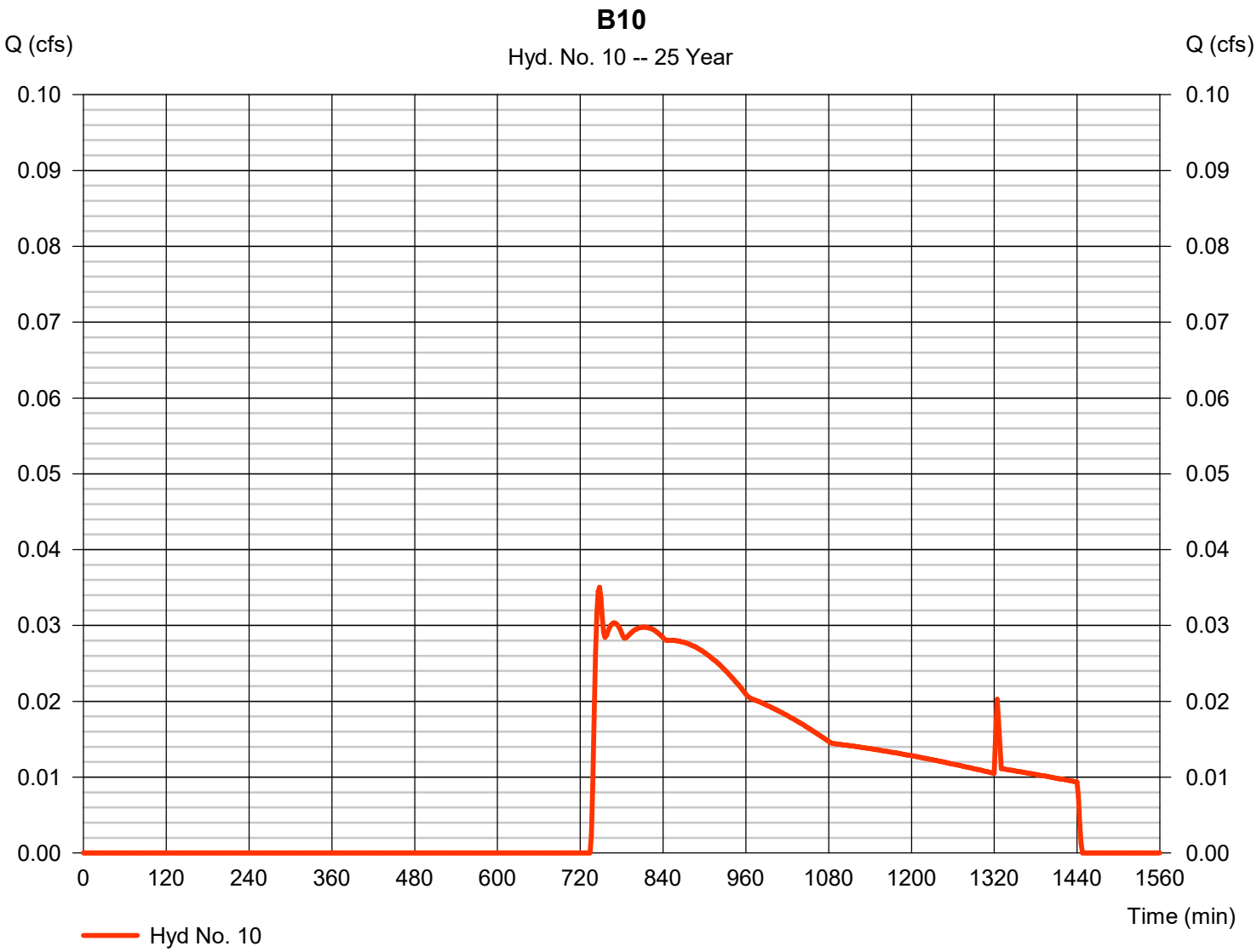
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 10

B10

Hydrograph type	= SCS Runoff	Peak discharge	= 0.035 cfs
Storm frequency	= 25 yrs	Time to peak	= 748 min
Time interval	= 2 min	Hyd. volume	= 757 cuft
Drainage area	= 1.010 ac	Curve number	= 35
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.60 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



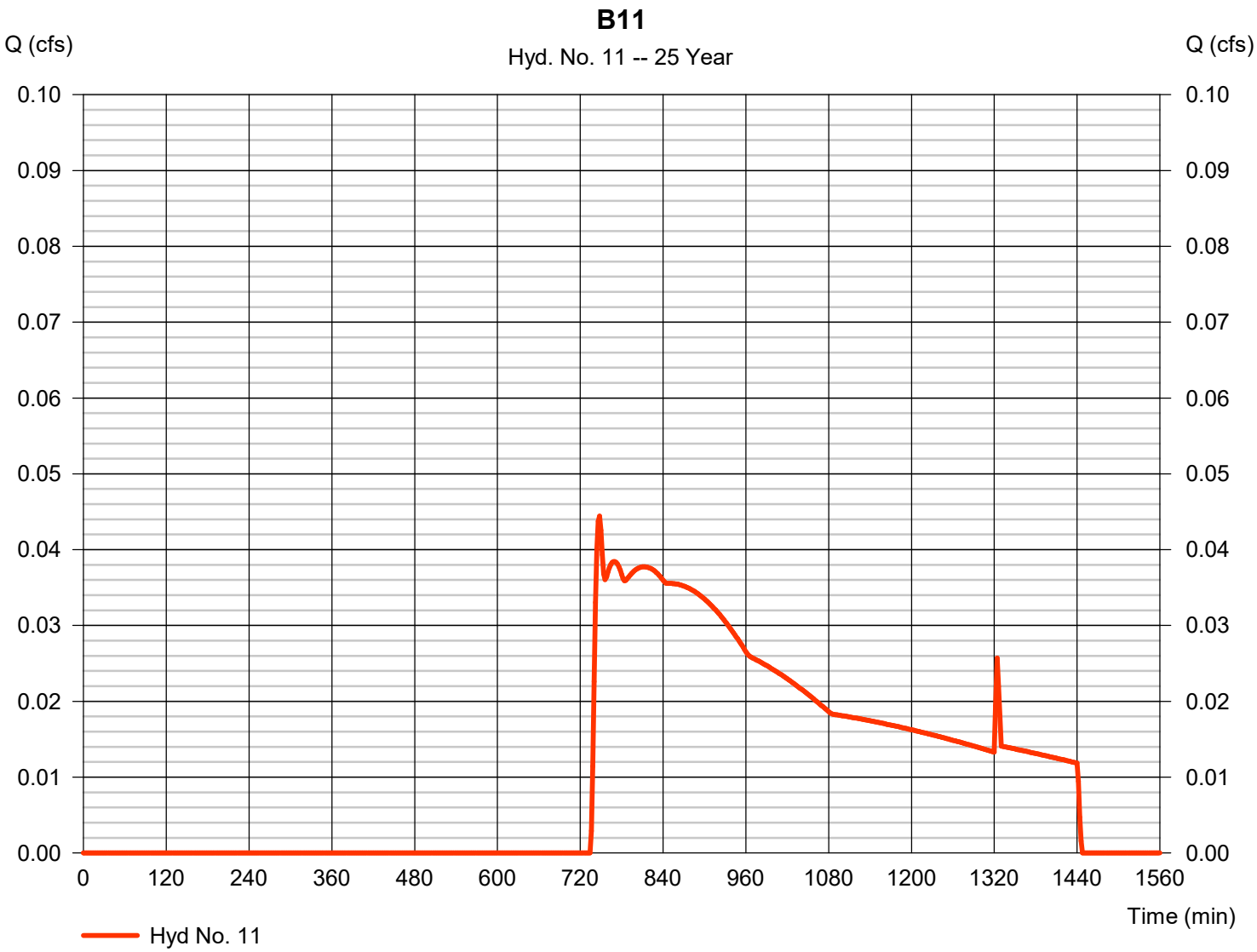
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 11

B11

Hydrograph type	= SCS Runoff	Peak discharge	= 0.044 cfs
Storm frequency	= 25 yrs	Time to peak	= 748 min
Time interval	= 2 min	Hyd. volume	= 959 cuft
Drainage area	= 1.280 ac	Curve number	= 35
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.70 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



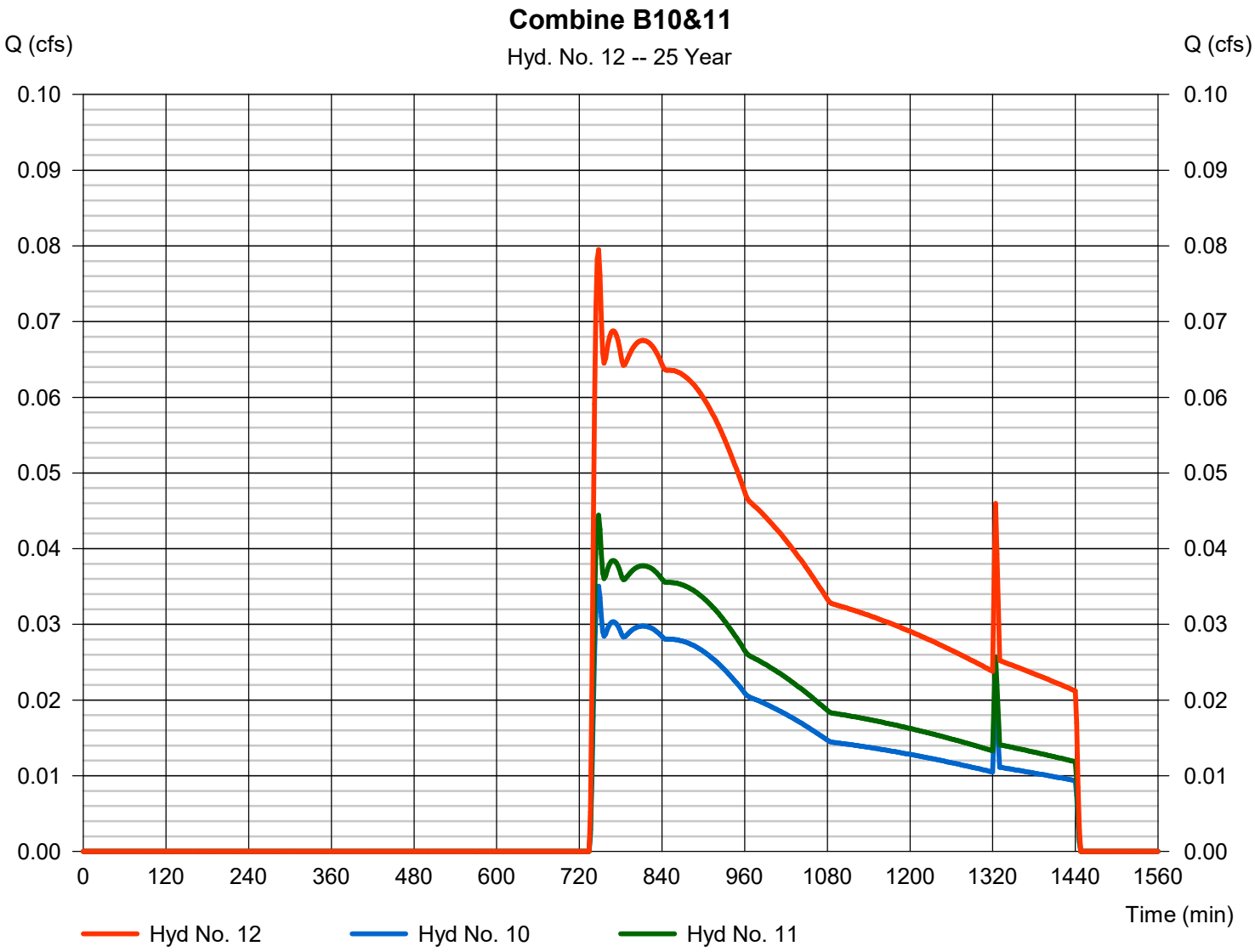
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 12

Combine B10&11

Hydrograph type	= Combine	Peak discharge	= 0.079 cfs
Storm frequency	= 25 yrs	Time to peak	= 748 min
Time interval	= 2 min	Hyd. volume	= 1,716 cuft
Inflow hyds.	= 10, 11	Contrib. drain. area	= 2.290 ac



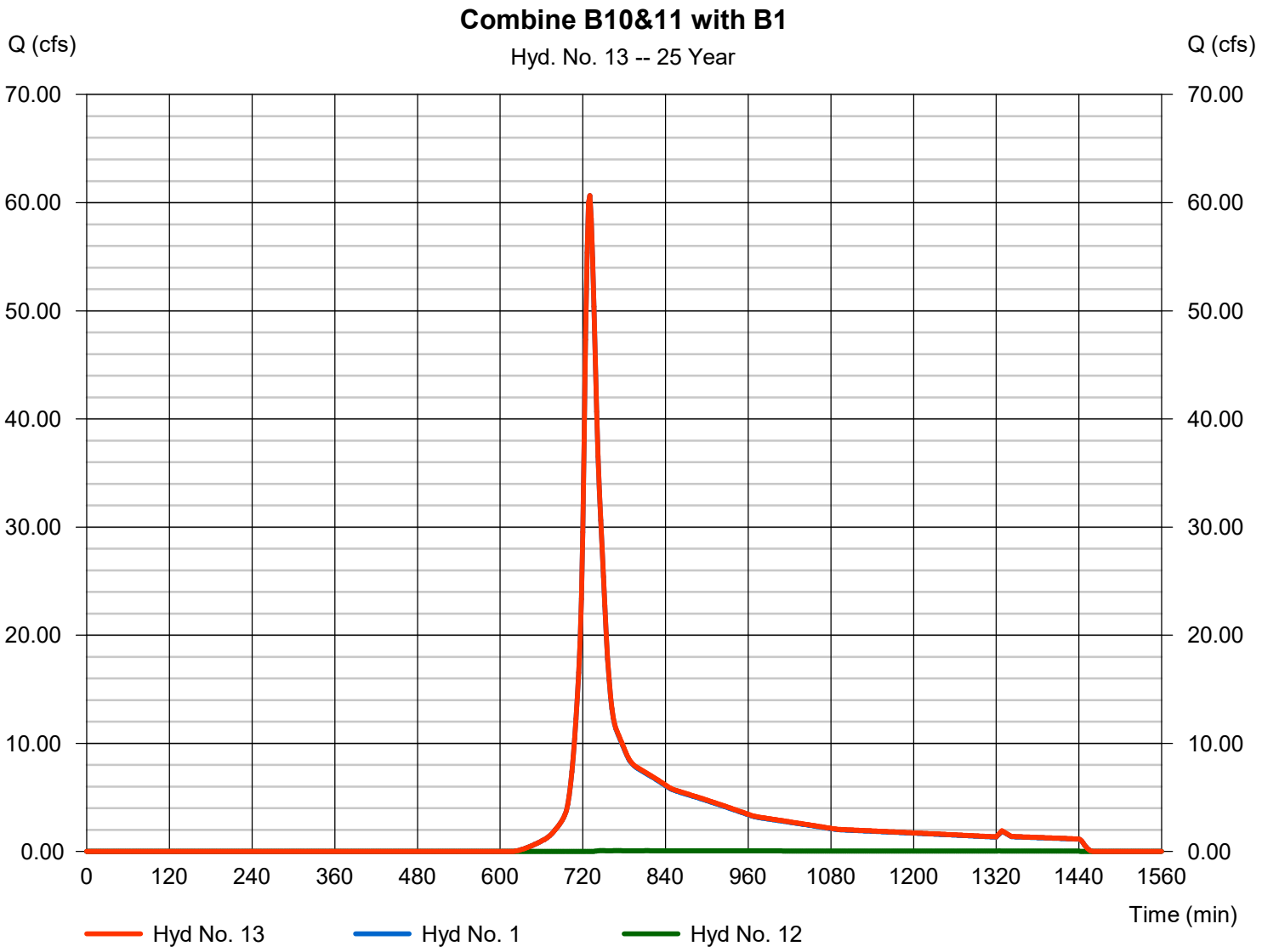
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 13

Combine B10&11 with B1

Hydrograph type	= Combine	Peak discharge	= 60.67 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 243,517 cuft
Inflow hyds.	= 1, 12	Contrib. drain. area	= 31.170 ac



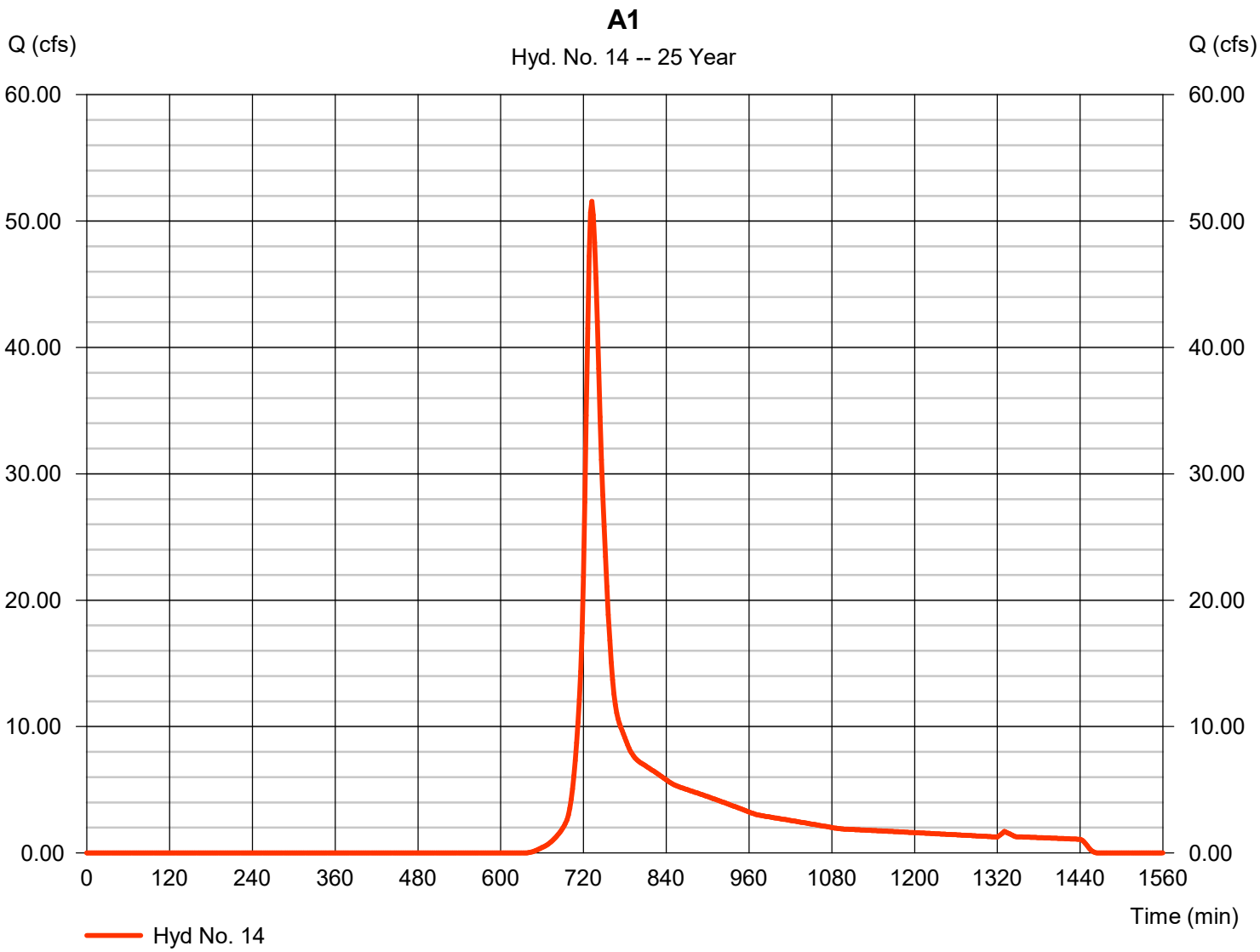
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 14

A1

Hydrograph type	= SCS Runoff	Peak discharge	= 51.55 cfs
Storm frequency	= 25 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 221,107 cuft
Drainage area	= 32.780 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 14.70 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



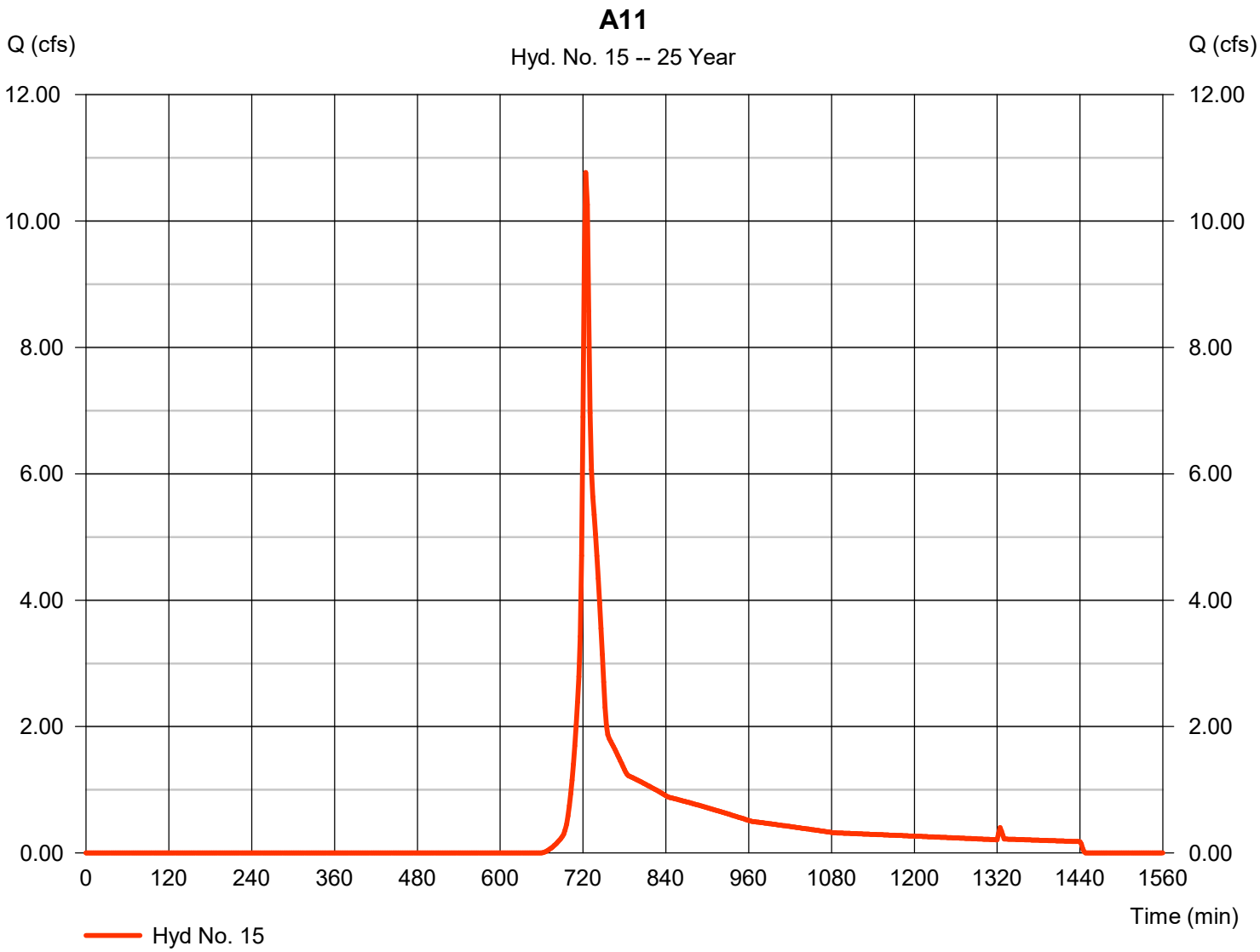
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 15

A11

Hydrograph type	= SCS Runoff	Peak discharge	= 10.77 cfs
Storm frequency	= 25 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 34,998 cuft
Drainage area	= 6.180 ac	Curve number	= 58
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



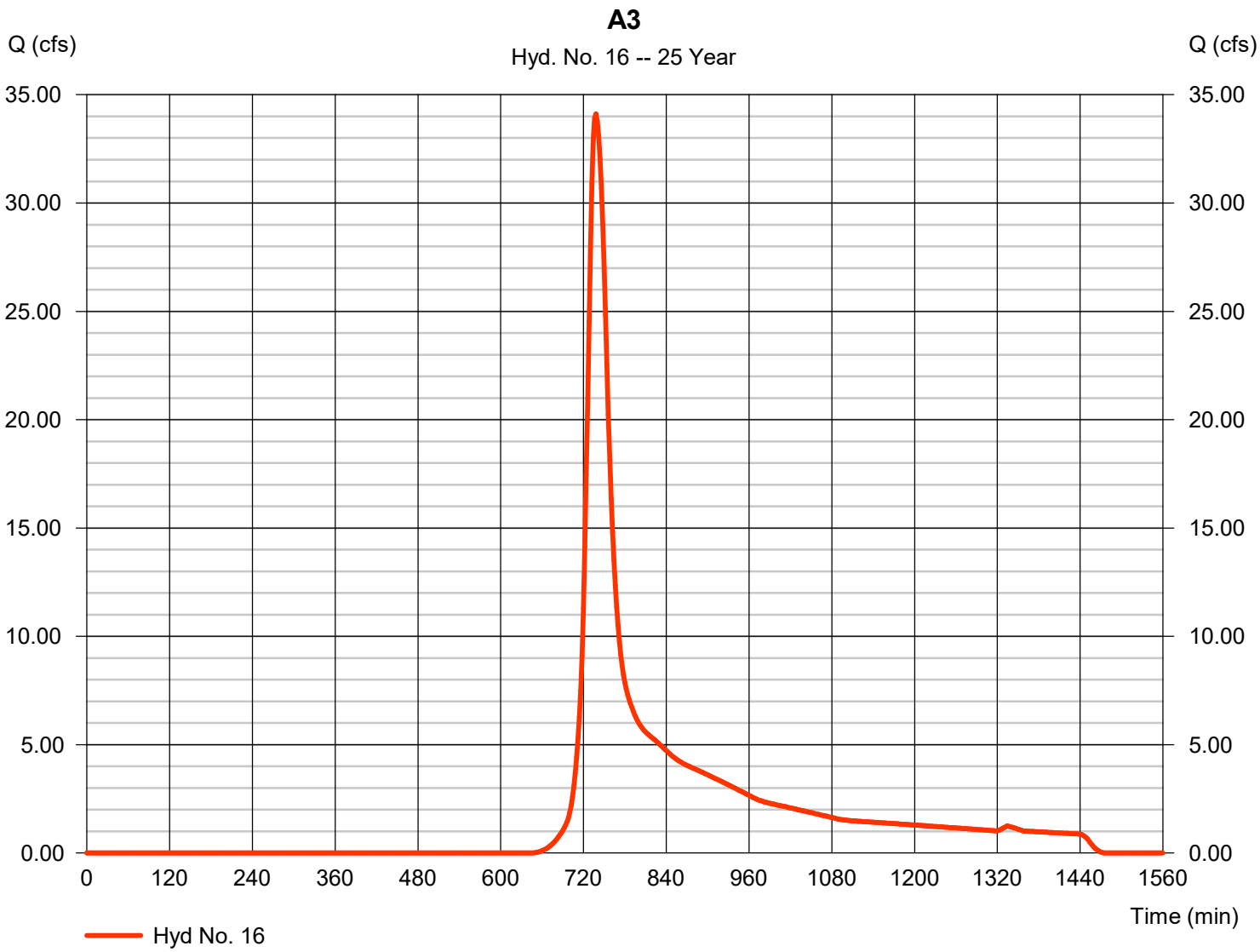
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 16

A3

Hydrograph type	= SCS Runoff	Peak discharge	= 34.11 cfs
Storm frequency	= 25 yrs	Time to peak	= 738 min
Time interval	= 2 min	Hyd. volume	= 172,273 cuft
Drainage area	= 25.560 ac	Curve number	= 60
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 22.40 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



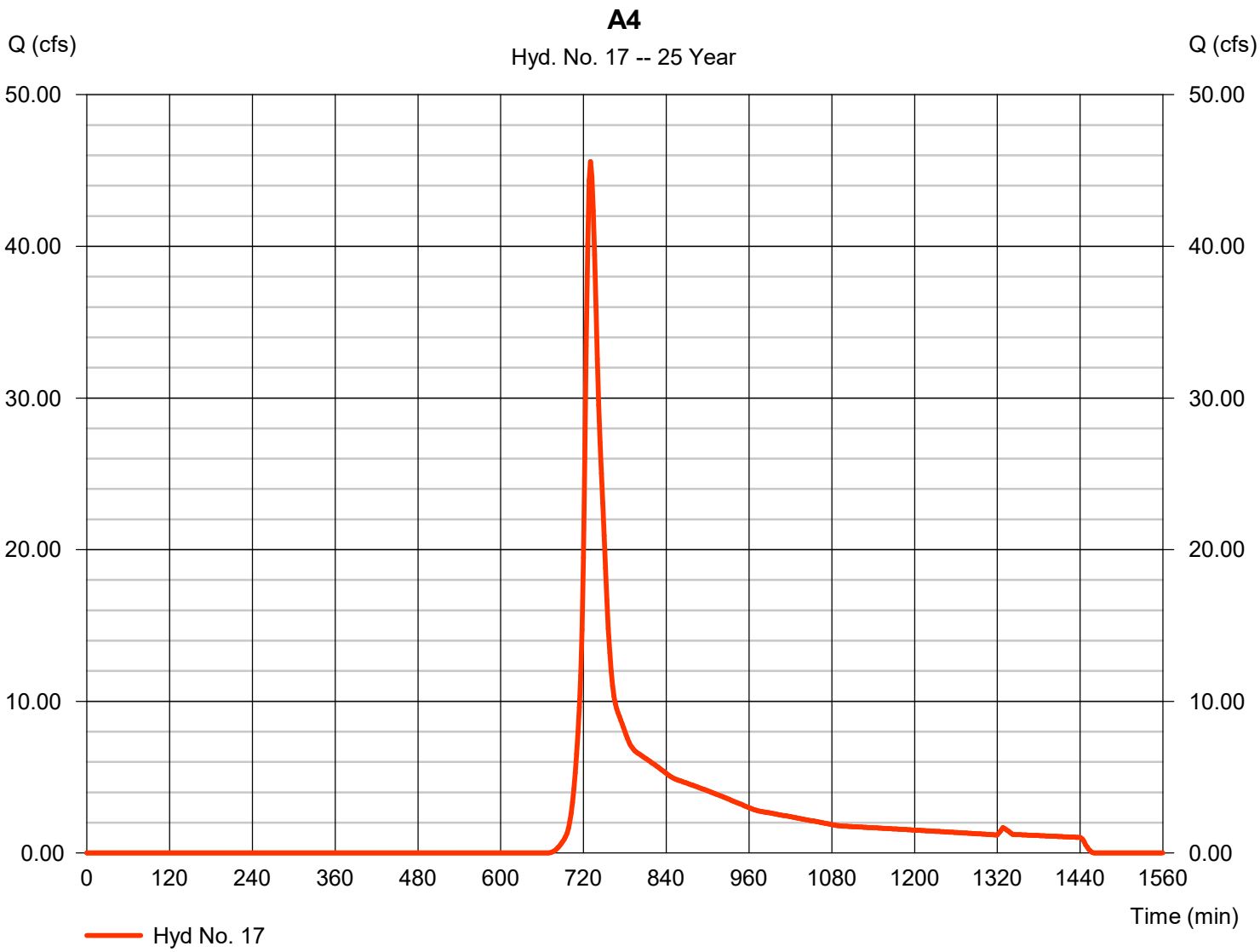
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 17

A4

Hydrograph type	= SCS Runoff	Peak discharge	= 45.58 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 192,386 cuft
Drainage area	= 32.410 ac	Curve number	= 57
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.30 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



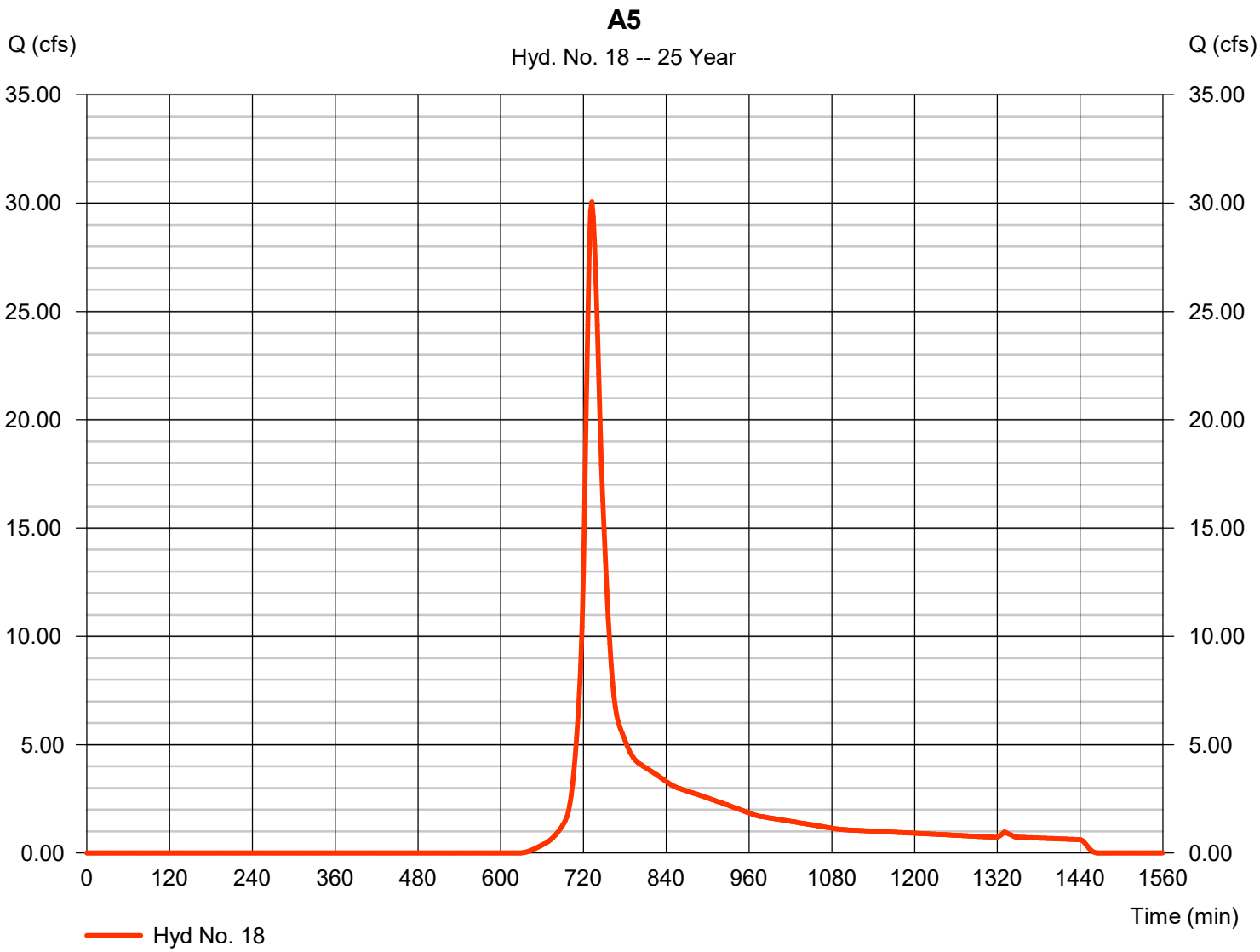
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 18

A5

Hydrograph type	= SCS Runoff	Peak discharge	= 30.05 cfs
Storm frequency	= 25 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 127,879 cuft
Drainage area	= 18.170 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.50 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



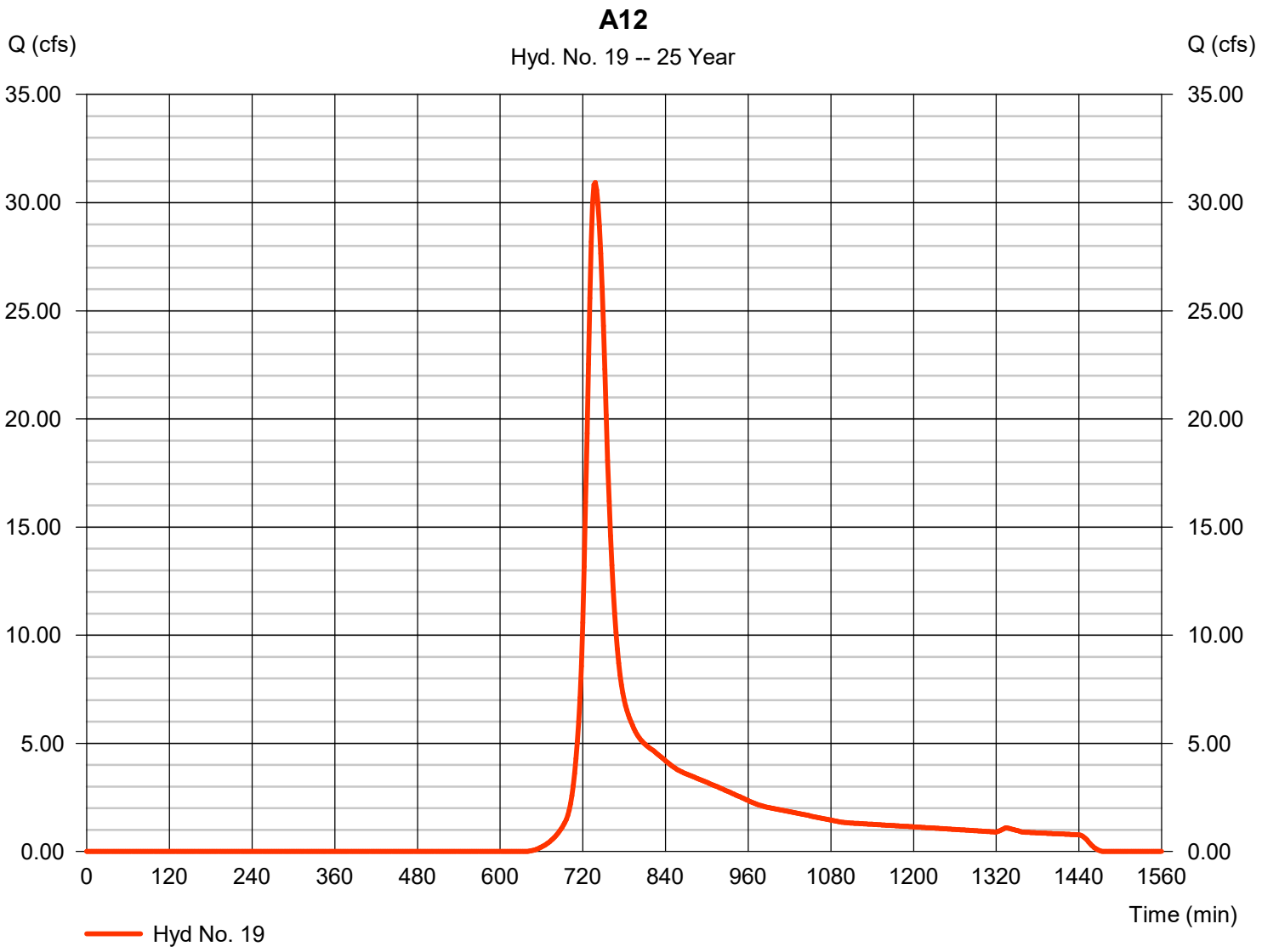
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 19

A12

Hydrograph type	= SCS Runoff	Peak discharge	= 30.94 cfs
Storm frequency	= 25 yrs	Time to peak	= 738 min
Time interval	= 2 min	Hyd. volume	= 154,917 cuft
Drainage area	= 22.000 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 22.80 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



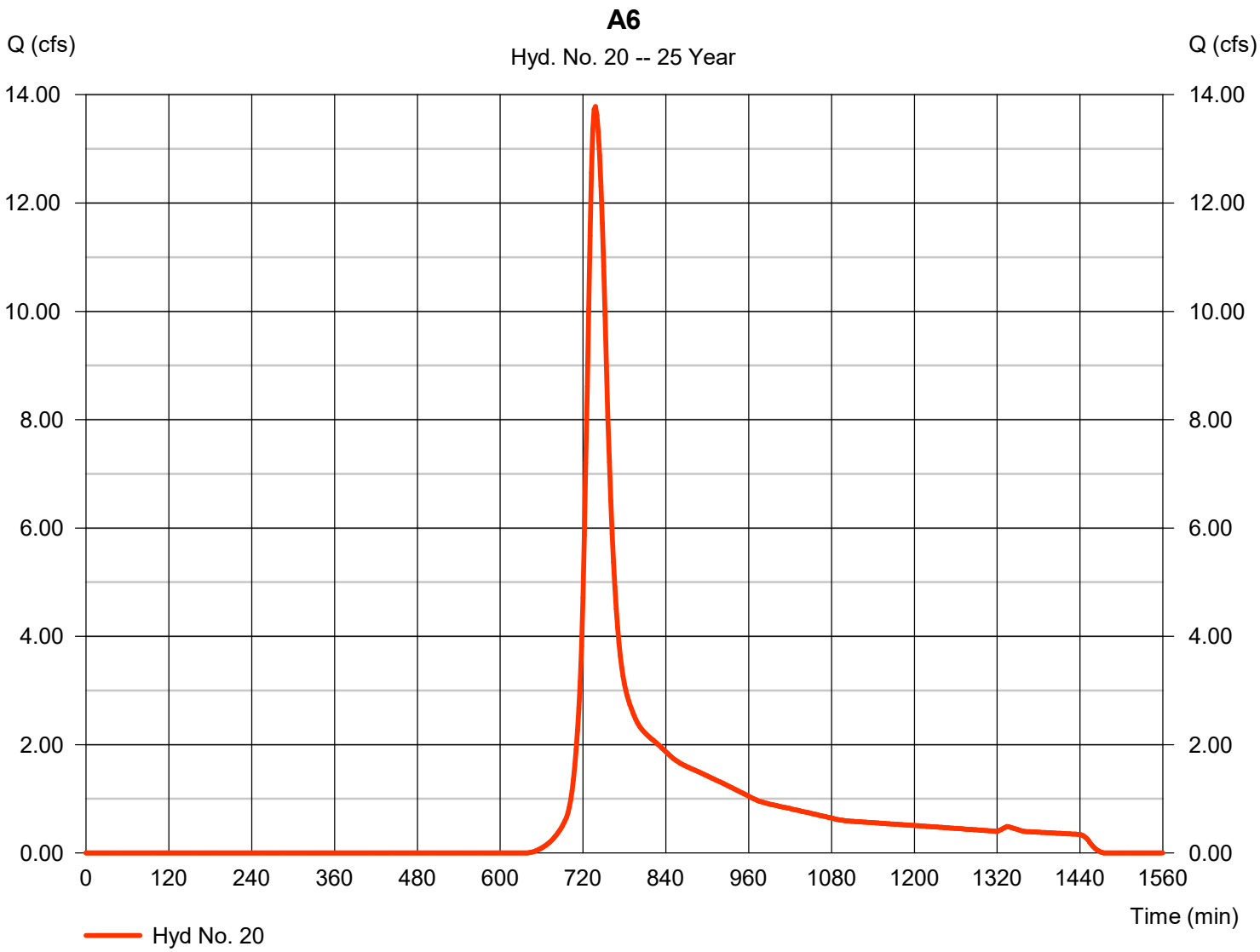
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 20

A6

Hydrograph type	= SCS Runoff	Peak discharge	= 13.78 cfs
Storm frequency	= 25 yrs	Time to peak	= 738 min
Time interval	= 2 min	Hyd. volume	= 69,008 cuft
Drainage area	= 9.800 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 20.20 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



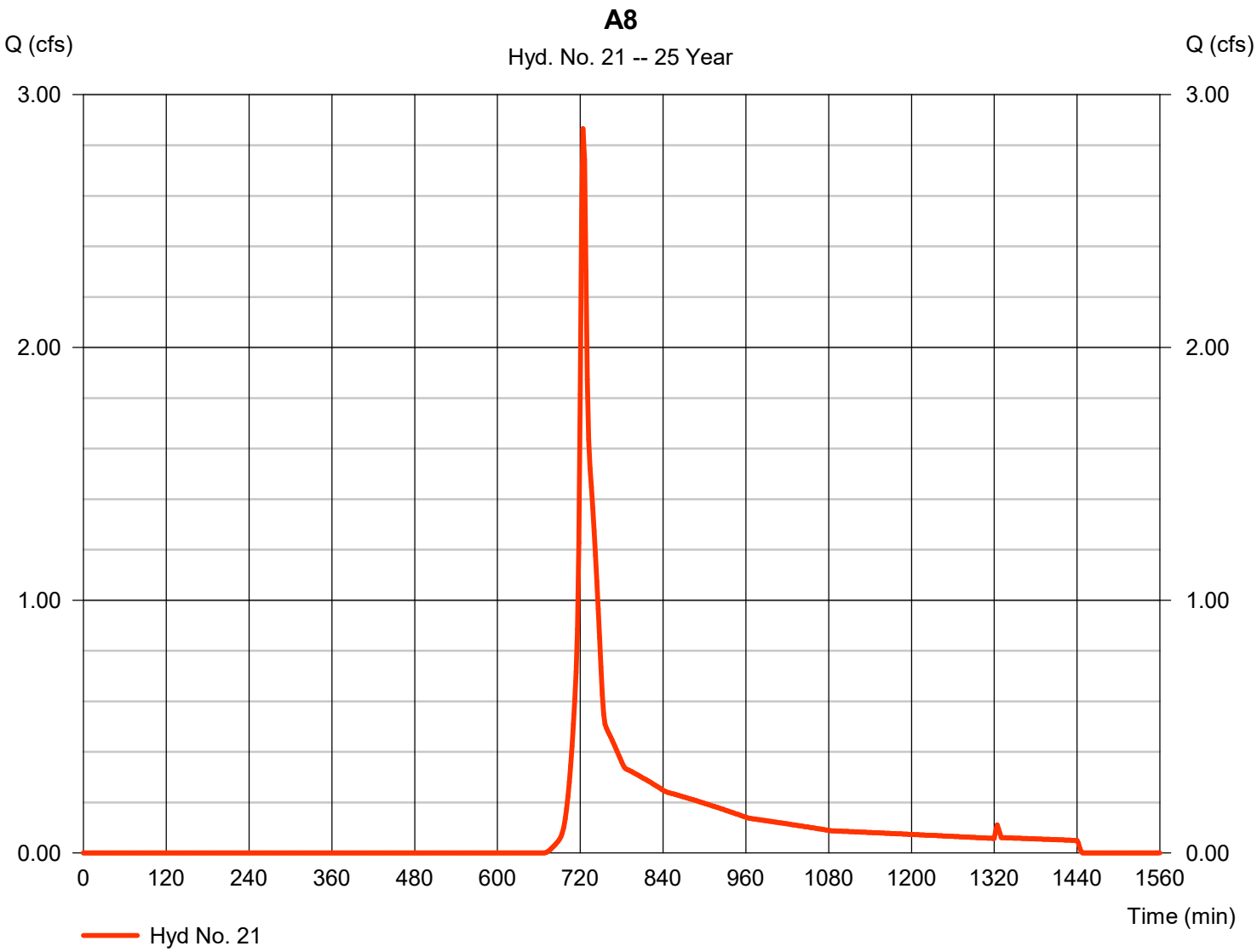
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 21

A8

Hydrograph type	= SCS Runoff	Peak discharge	= 2.866 cfs
Storm frequency	= 25 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 9,444 cuft
Drainage area	= 1.750 ac	Curve number	= 57
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



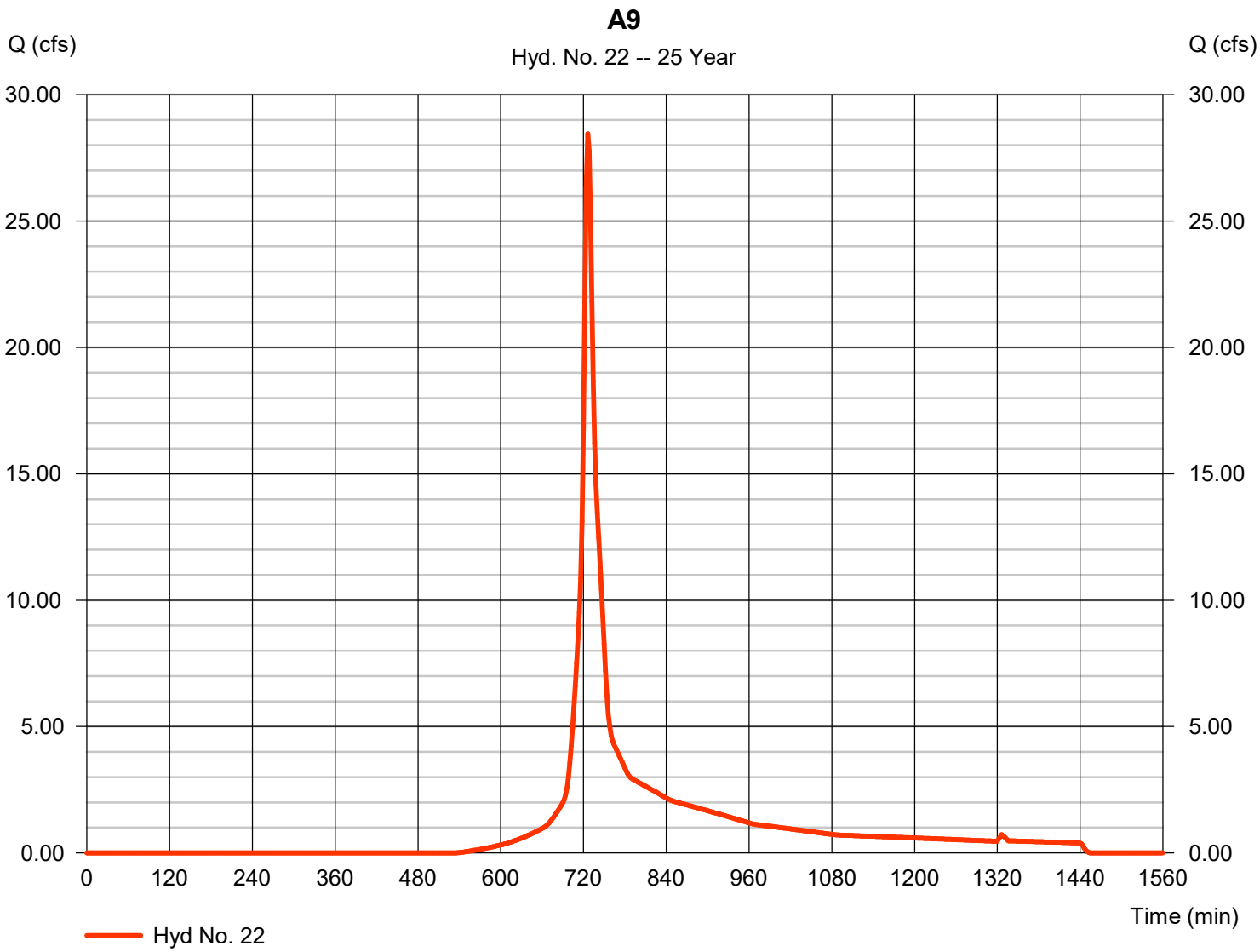
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 22

A9

Hydrograph type	= SCS Runoff	Peak discharge	= 28.45 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 97,728 cuft
Drainage area	= 9.690 ac	Curve number	= 71
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.70 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



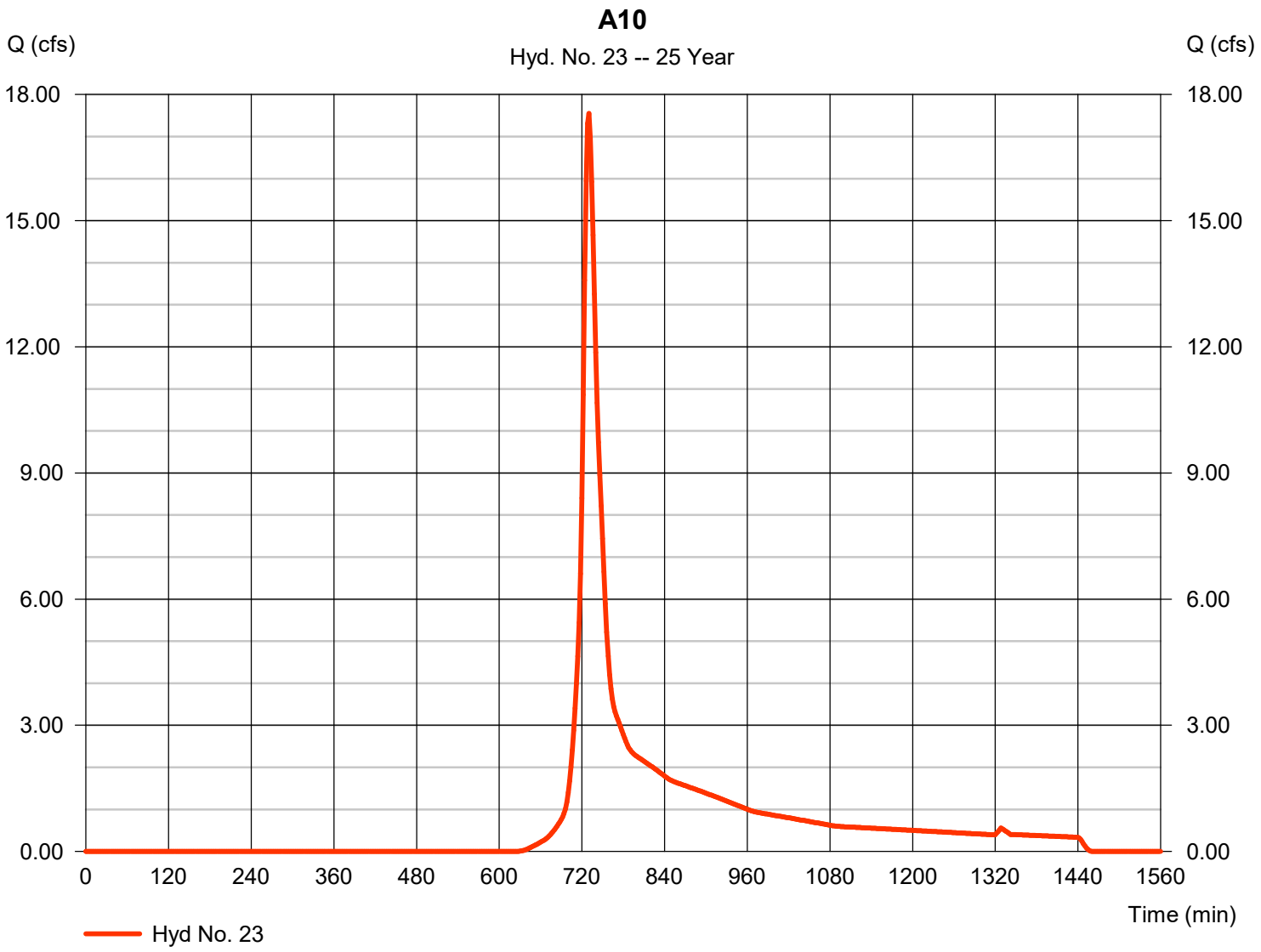
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 23

A10

Hydrograph type	= SCS Runoff	Peak discharge	= 17.55 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 70,420 cuft
Drainage area	= 9.460 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.30 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



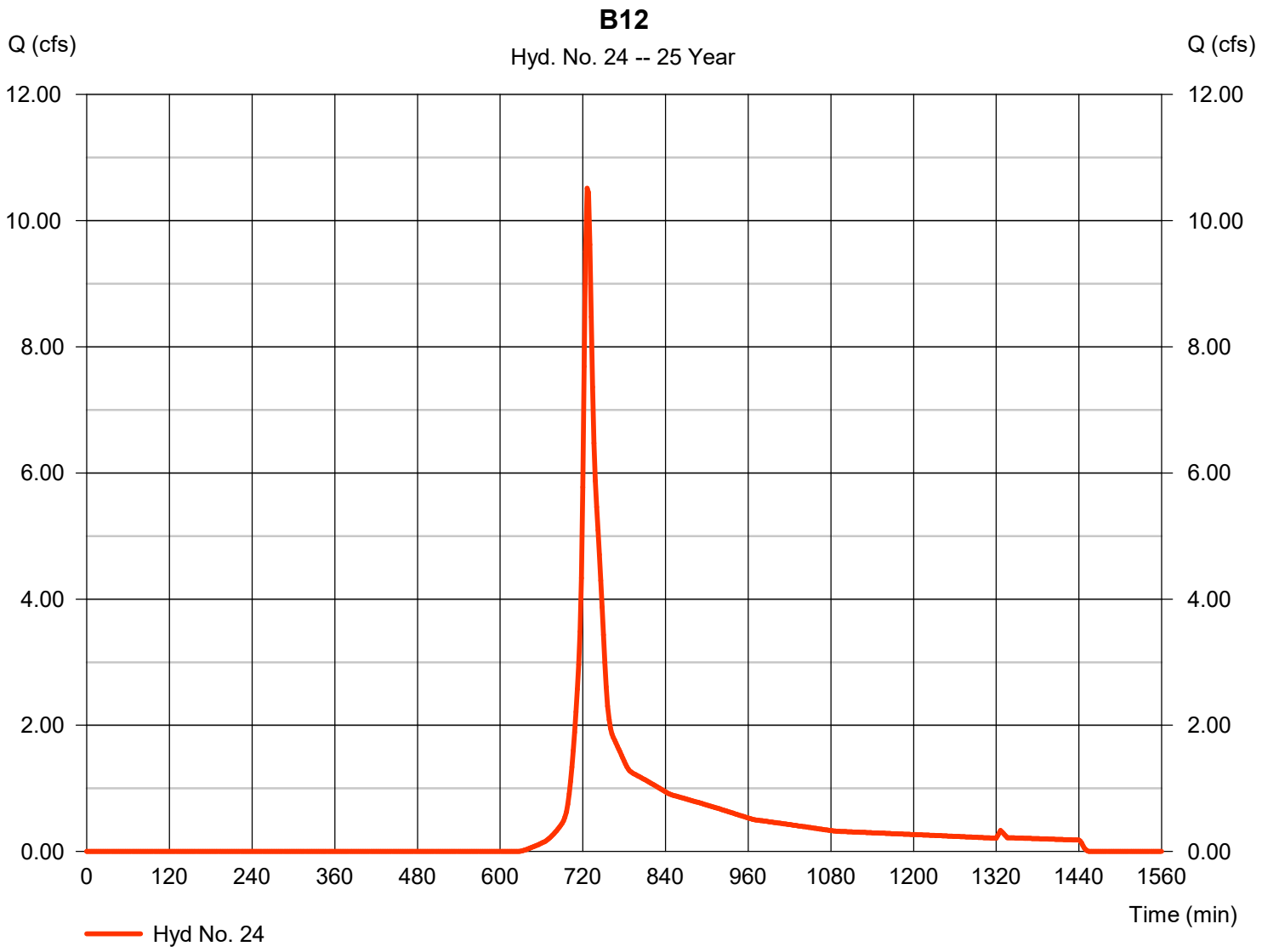
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 24

B12

Hydrograph type	= SCS Runoff	Peak discharge	= 10.51 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 37,824 cuft
Drainage area	= 5.240 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.80 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

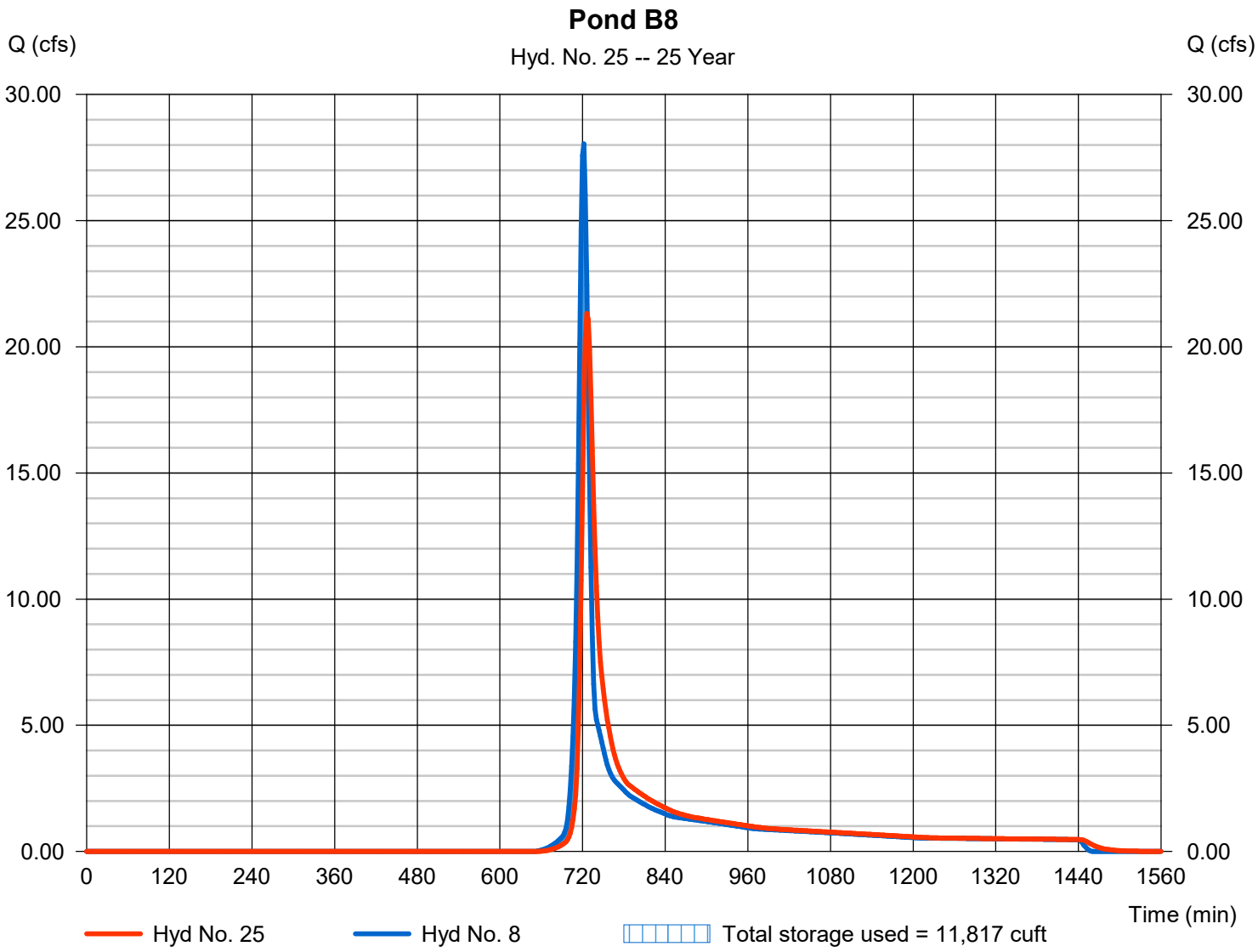
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 25

Pond B8

Hydrograph type	= Reservoir	Peak discharge	= 21.32 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 74,909 cuft
Inflow hyd. No.	= 8 - B8	Max. Elevation	= 132.40 ft
Reservoir name	= B8 Pond	Max. Storage	= 11,817 cuft

Storage Indication method used.



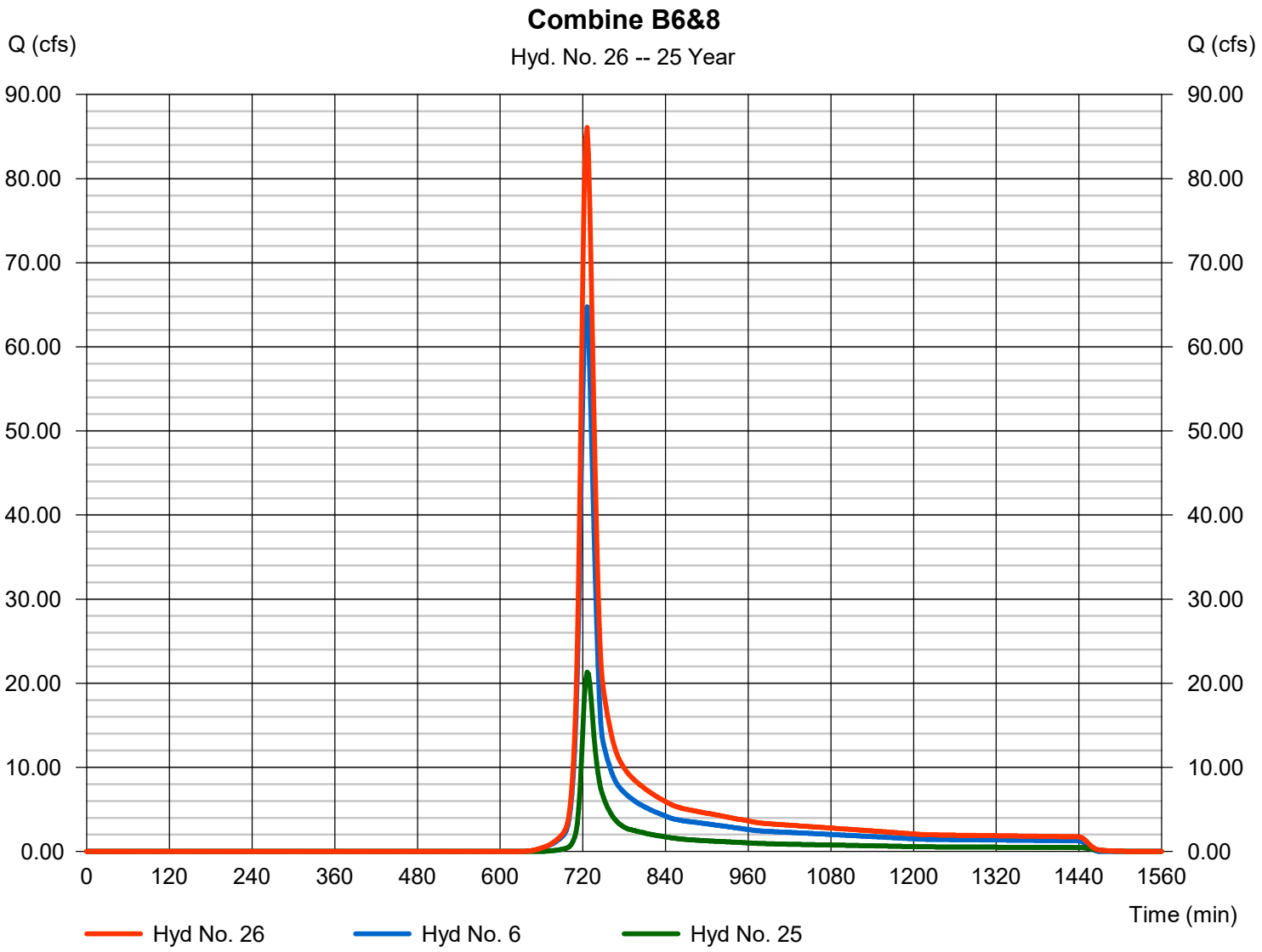
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 26

Combine B6&8

Hydrograph type	= Combine	Peak discharge	= 86.08 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 285,160 cuft
Inflow hyds.	= 6, 25	Contrib. drain. area	= 27.950 ac



Hydrograph Report

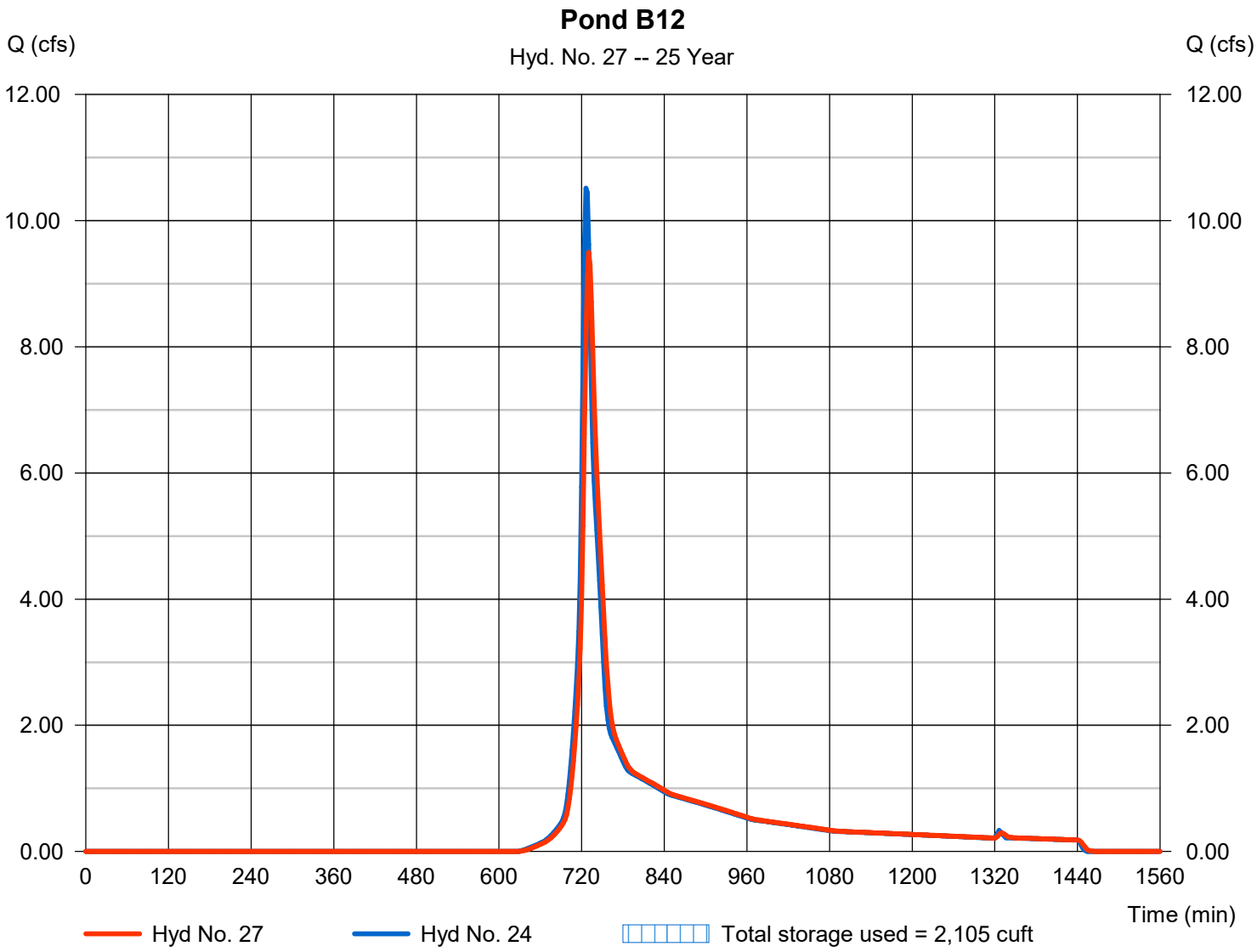
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 27

Pond B12

Hydrograph type	= Reservoir	Peak discharge	= 9.495 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 37,824 cuft
Inflow hyd. No.	= 24 - B12	Max. Elevation	= 126.10 ft
Reservoir name	= B12 Pond	Max. Storage	= 2,105 cuft

Storage Indication method used.



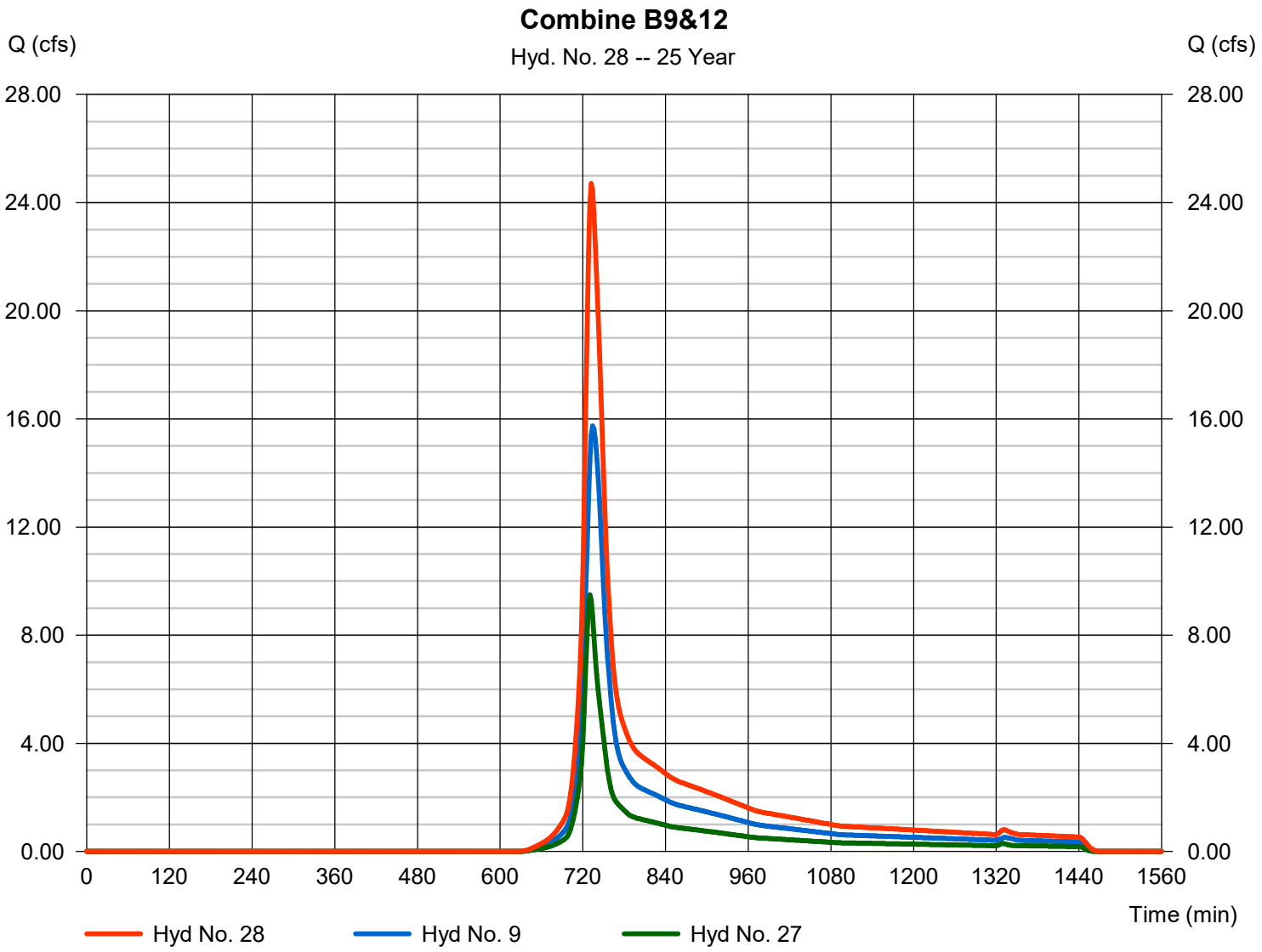
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 28

Combine B9&12

Hydrograph type	= Combine	Peak discharge	= 24.70 cfs
Storm frequency	= 25 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 110,585 cuft
Inflow hyds.	= 9, 27	Contrib. drain. area	= 10.080 ac



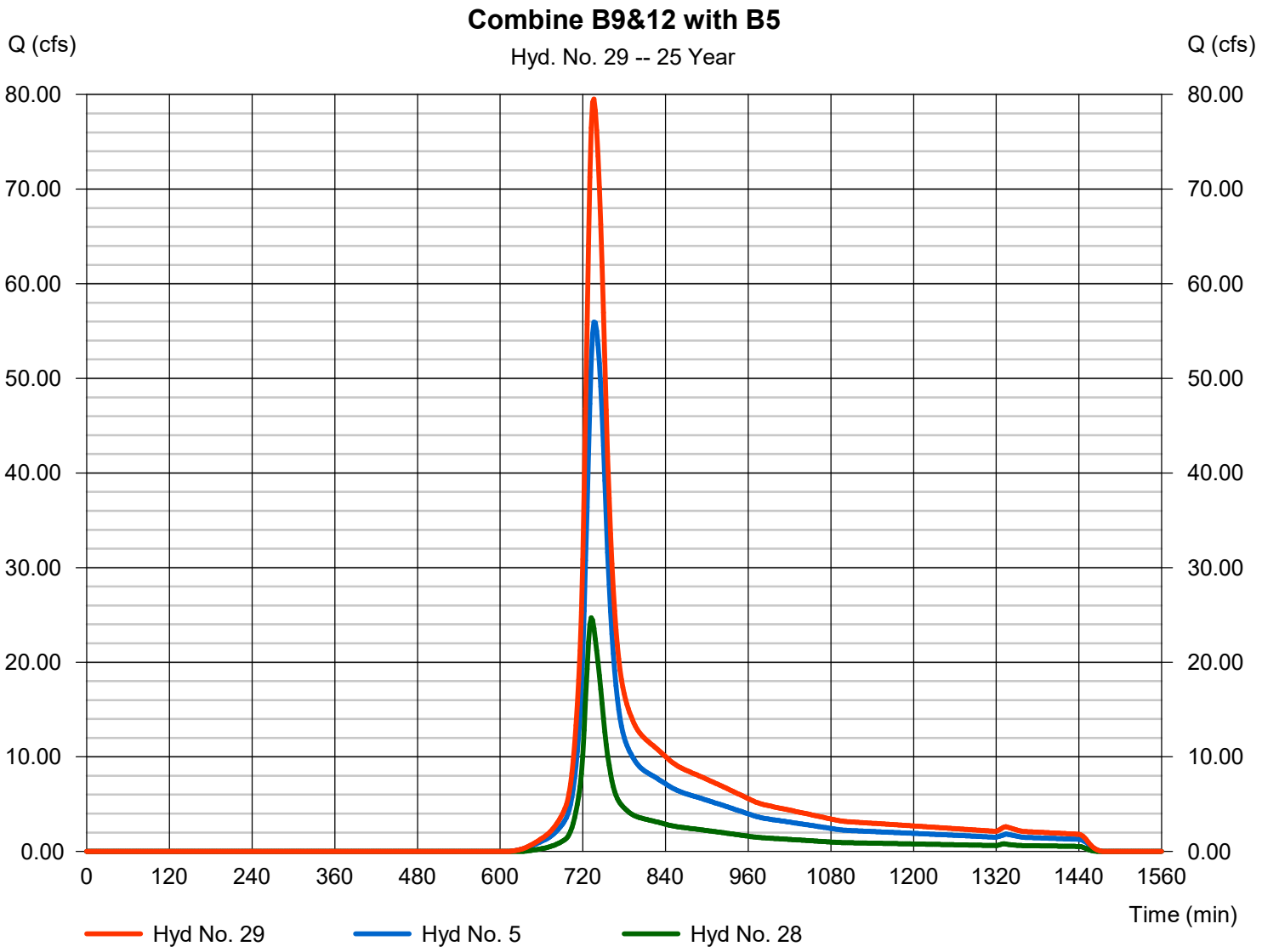
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 29

Combine B9&12 with B5

Hydrograph type	= Combine	Peak discharge	= 79.53 cfs
Storm frequency	= 25 yrs	Time to peak	= 736 min
Time interval	= 2 min	Hyd. volume	= 385,071 cuft
Inflow hyds.	= 5, 28	Contrib. drain. area	= 34.440 ac



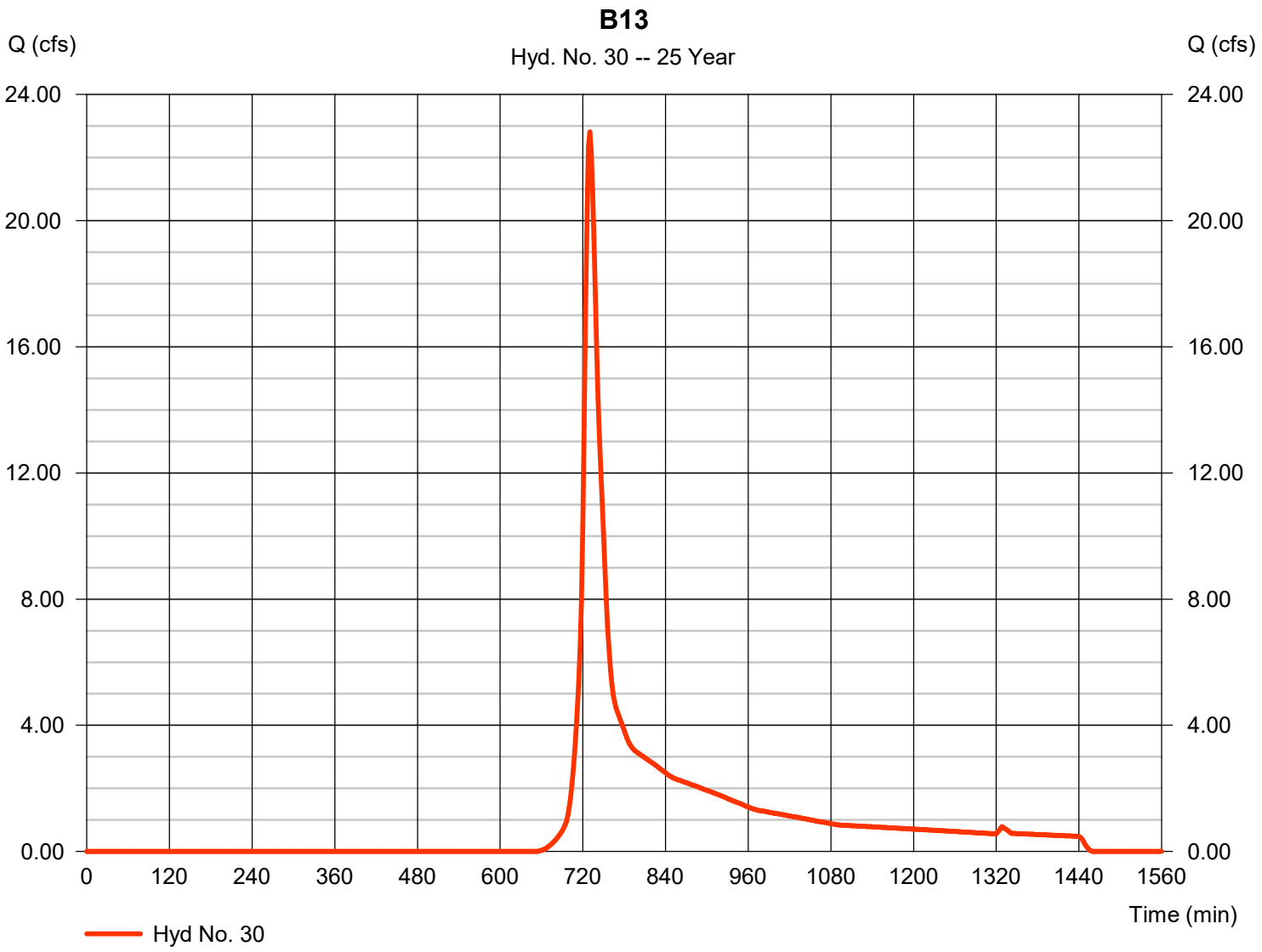
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 30

B13

Hydrograph type	= SCS Runoff	Peak discharge	= 22.82 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 93,989 cuft
Drainage area	= 14.400 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 10.40 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



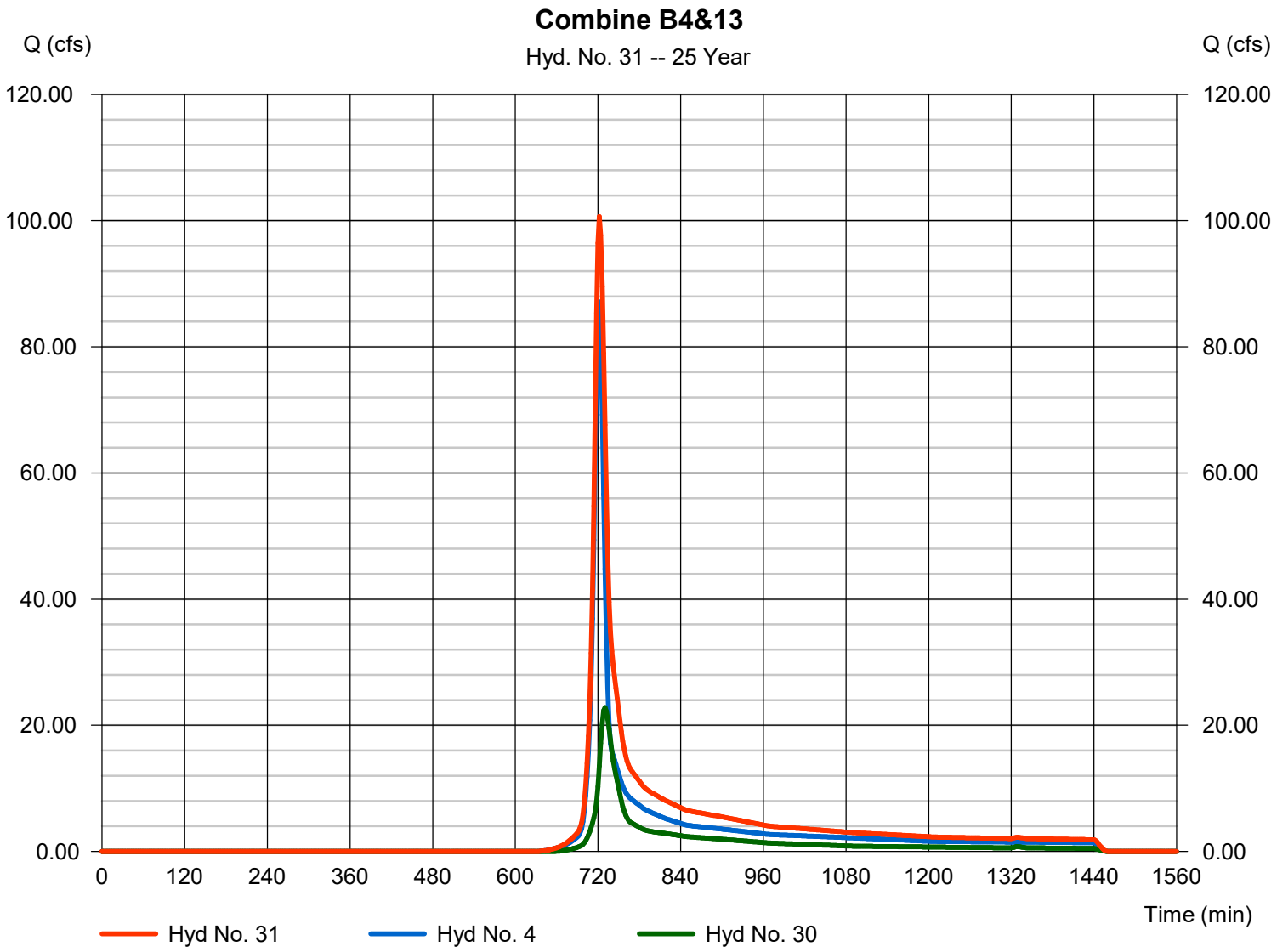
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 31

Combine B4&13

Hydrograph type	= Combine	Peak discharge	= 100.66 cfs
Storm frequency	= 25 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 324,619 cuft
Inflow hyds.	= 4, 30	Contrib. drain. area	= 44.130 ac



Hydrograph Report

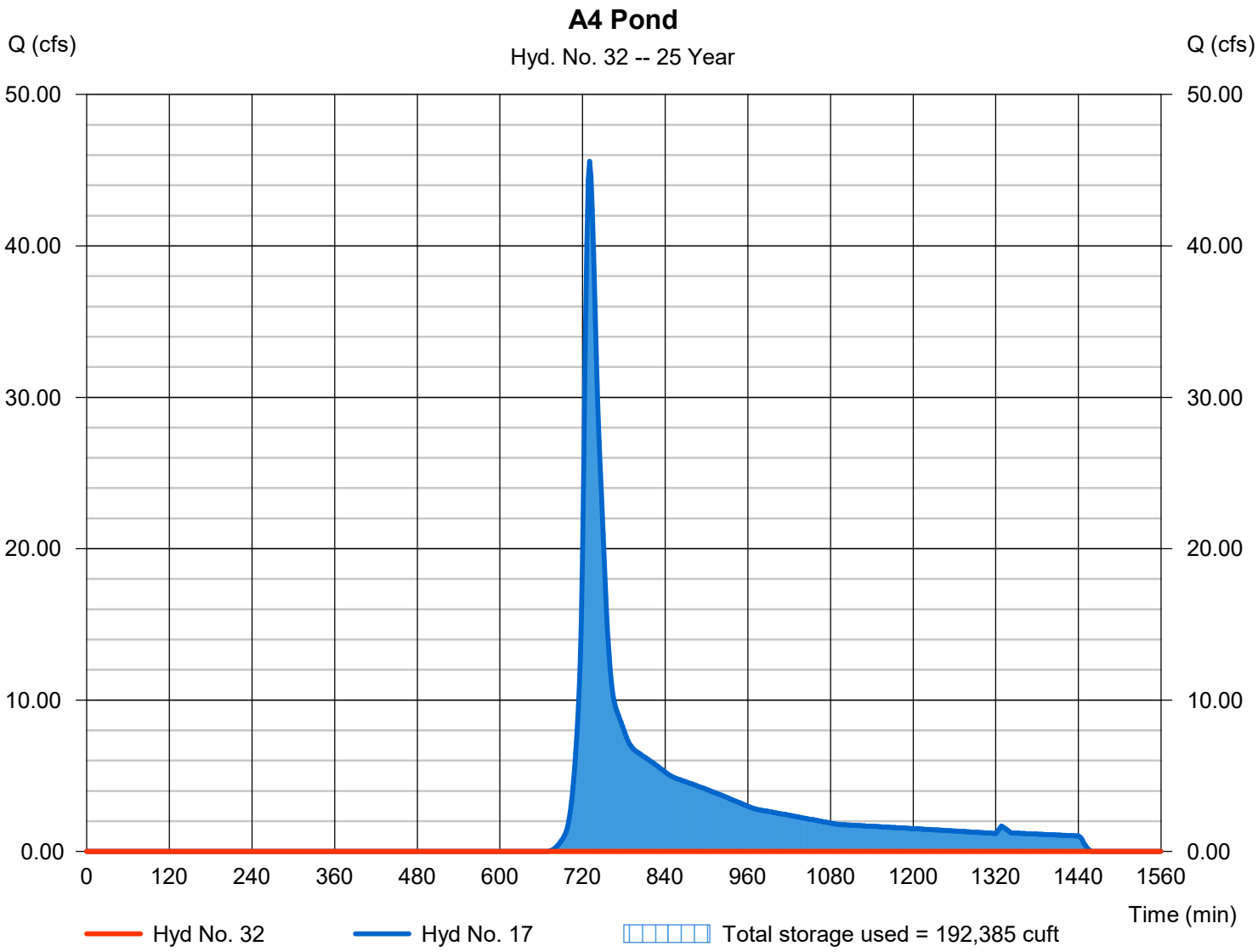
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 32

A4 Pond

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 25 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 17 - A4	Max. Elevation	= 107.64 ft
Reservoir name	= A4 Pond	Max. Storage	= 192,385 cuft

Storage Indication method used.



Hydrograph Report

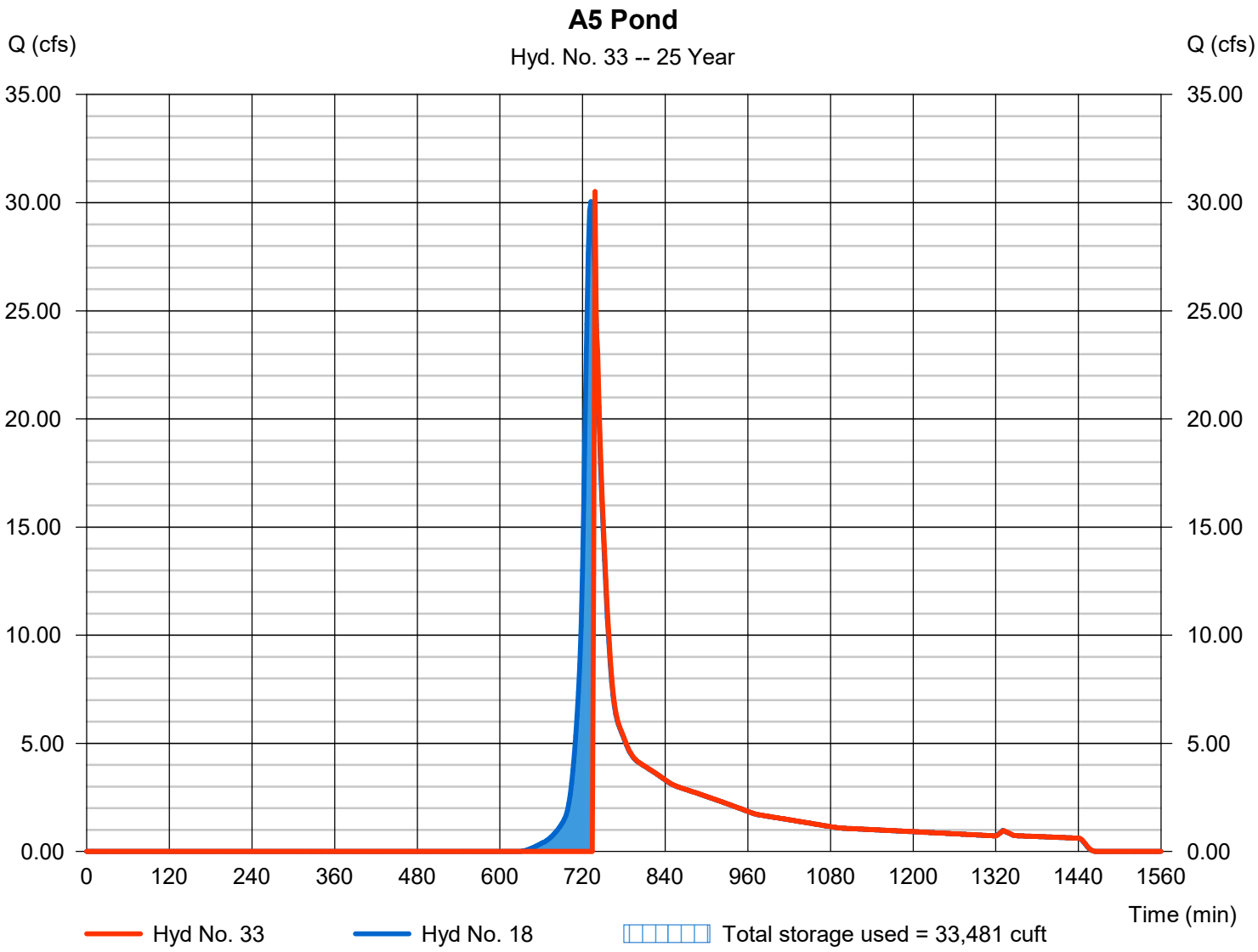
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 33

A5 Pond

Hydrograph type	= Reservoir	Peak discharge	= 30.51 cfs
Storm frequency	= 25 yrs	Time to peak	= 738 min
Time interval	= 2 min	Hyd. volume	= 95,543 cuft
Inflow hyd. No.	= 18 - A5	Max. Elevation	= 108.18 ft
Reservoir name	= A5 Pond	Max. Storage	= 33,481 cuft

Storage Indication method used.



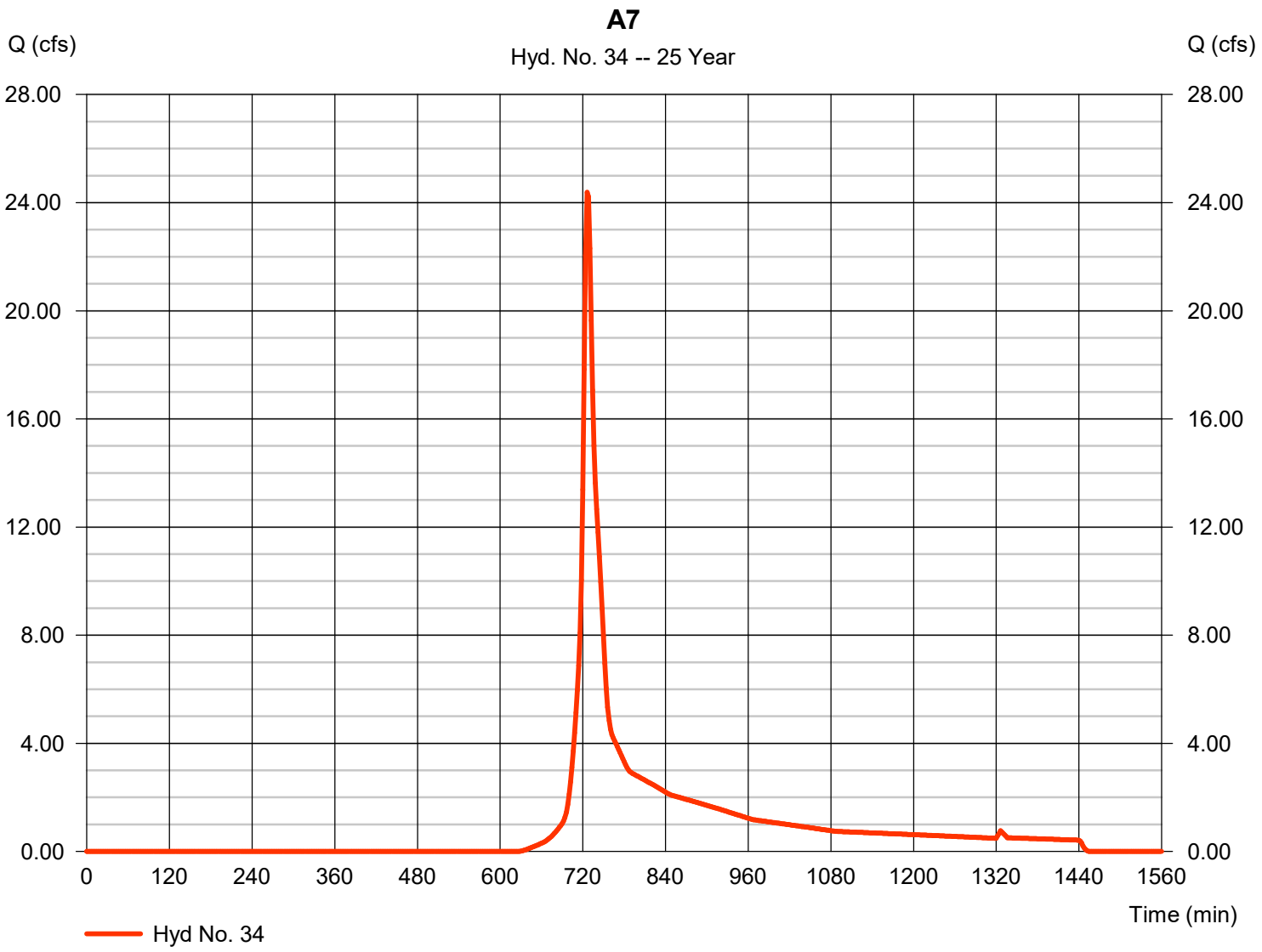
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 34

A7

Hydrograph type	= SCS Runoff	Peak discharge	= 24.38 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 87,703 cuft
Drainage area	= 12.150 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.00 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



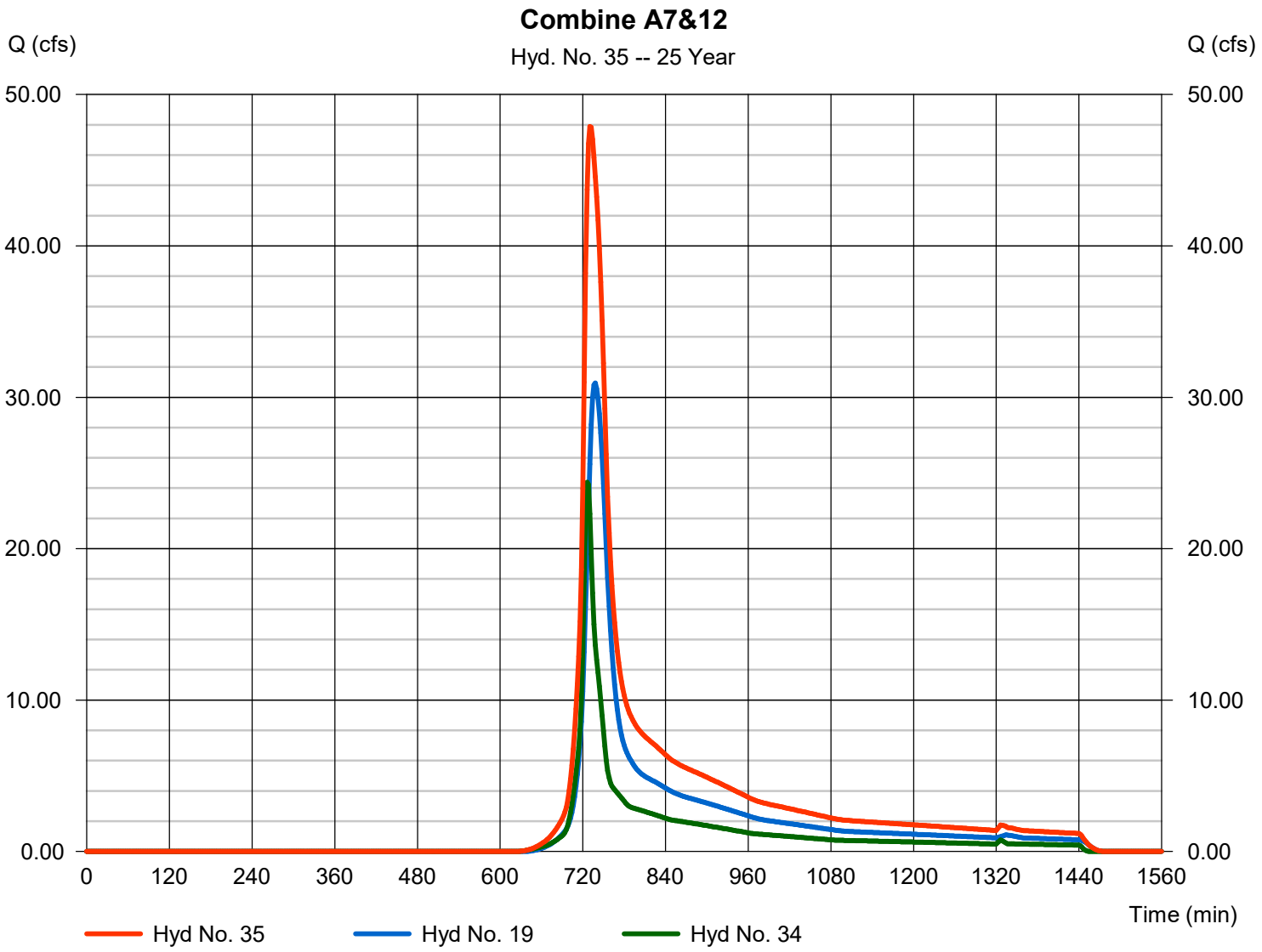
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 35

Combine A7&12

Hydrograph type	= Combine	Peak discharge	= 47.89 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 242,620 cuft
Inflow hyds.	= 19, 34	Contrib. drain. area	= 34.150 ac



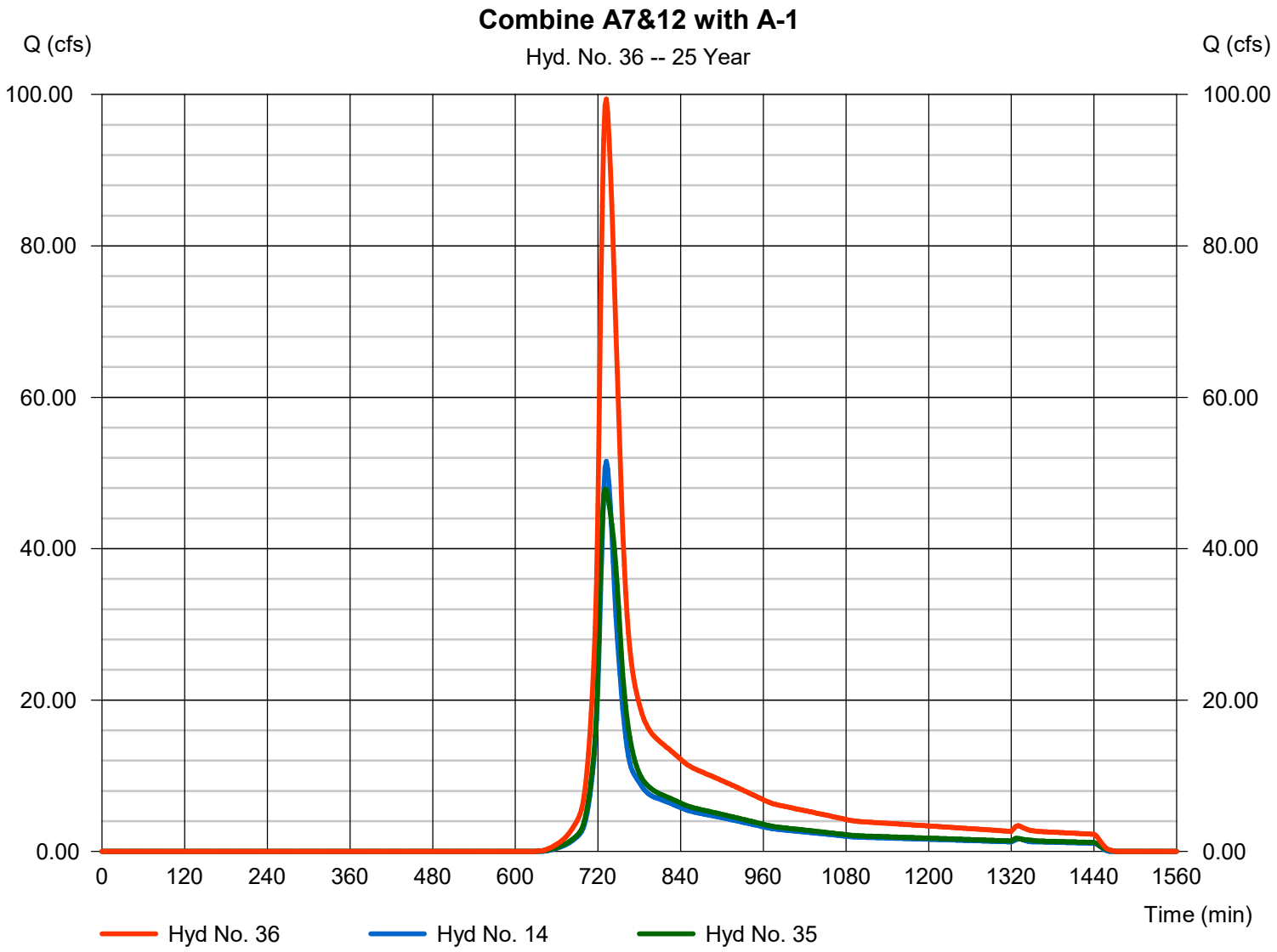
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 36

Combine A7&12 with A-1

Hydrograph type	= Combine	Peak discharge	= 99.39 cfs
Storm frequency	= 25 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 463,727 cuft
Inflow hyds.	= 14, 35	Contrib. drain. area	= 32.780 ac



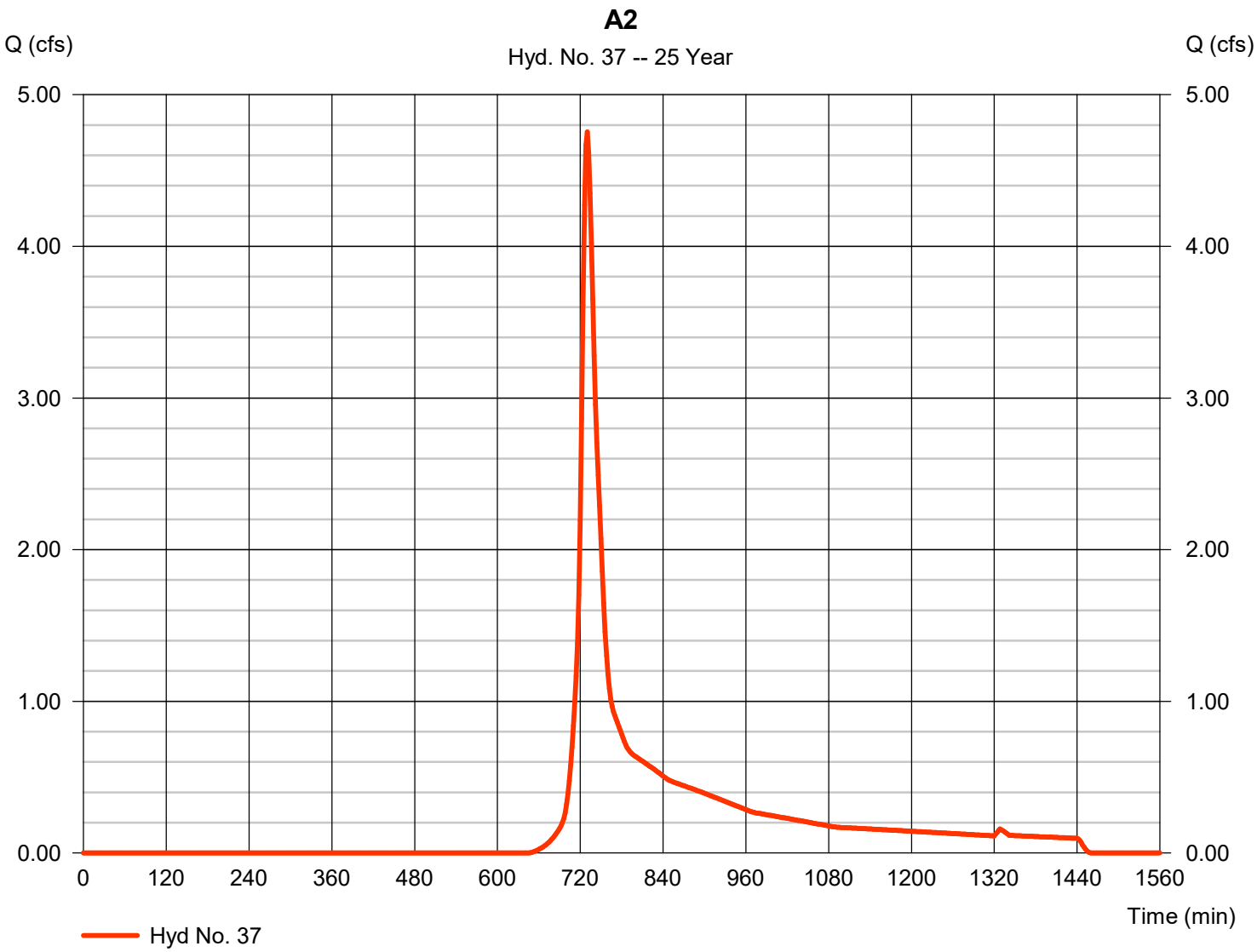
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 37

A2

Hydrograph type	= SCS Runoff	Peak discharge	= 4.755 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 19,393 cuft
Drainage area	= 2.840 ac	Curve number	= 60
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.70 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



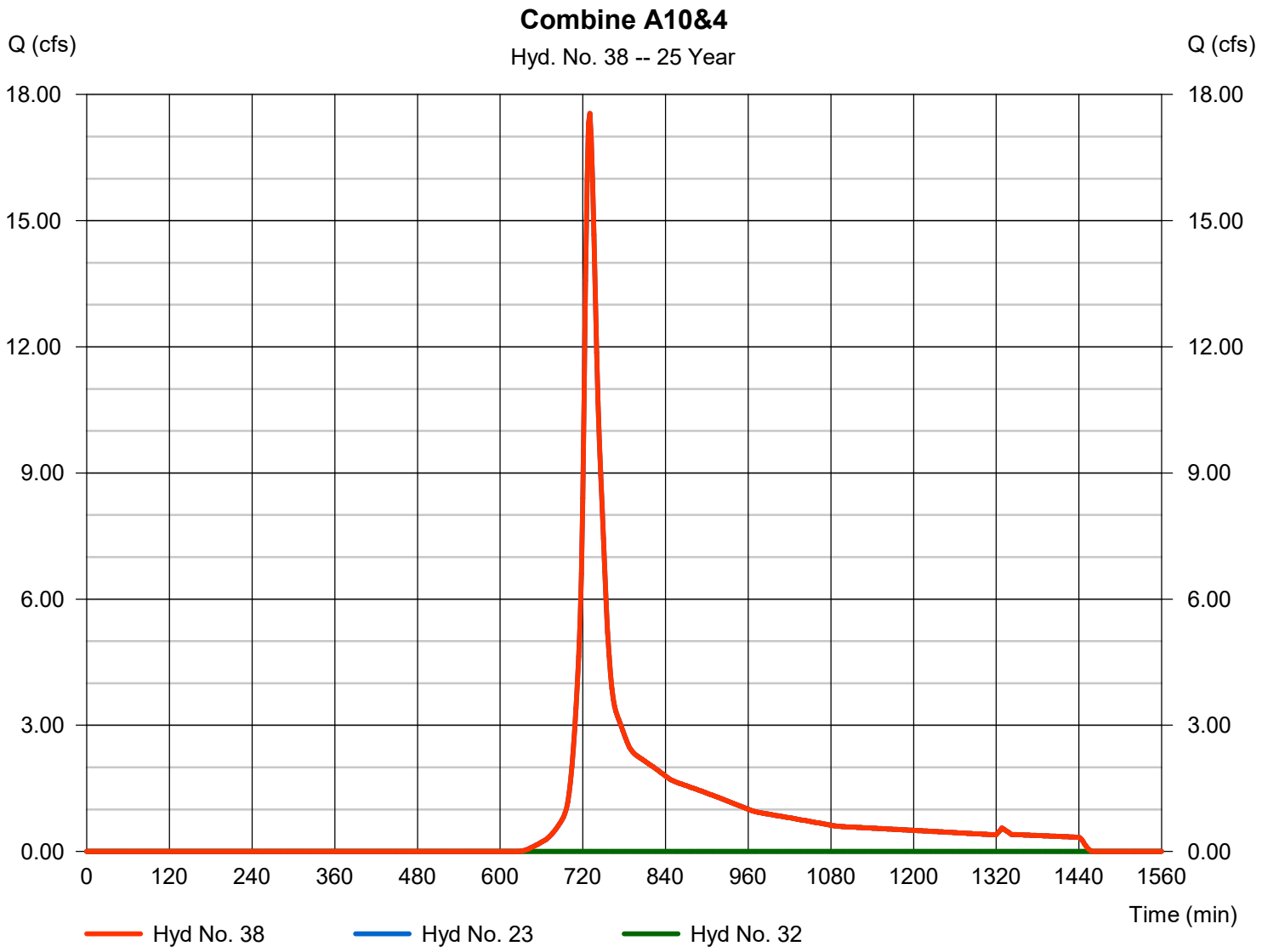
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 38

Combine A10&4

Hydrograph type	= Combine	Peak discharge	= 17.55 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 70,420 cuft
Inflow hyds.	= 23, 32	Contrib. drain. area	= 9.460 ac



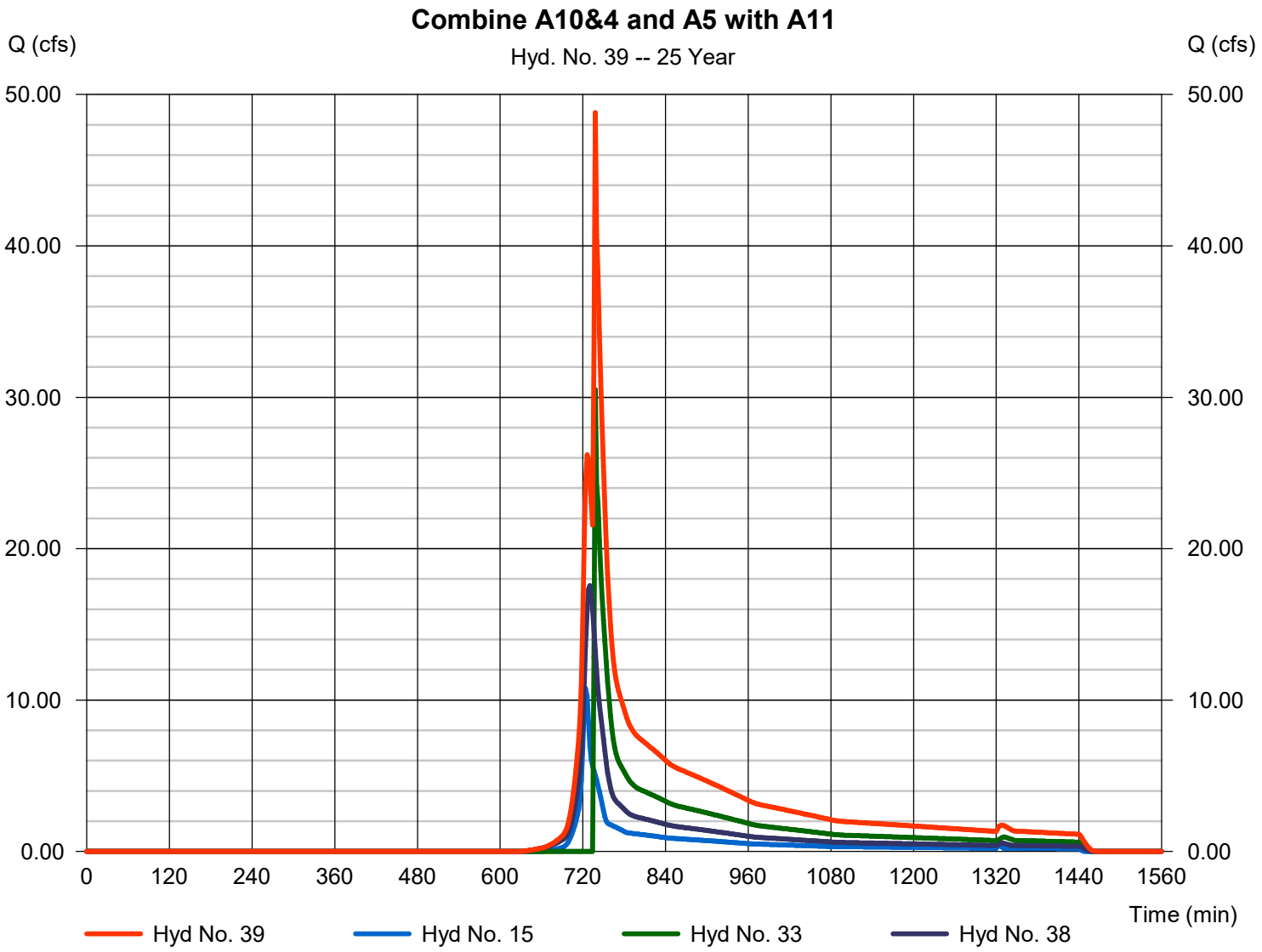
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 39

Combine A10&4 and A5 with A11

Hydrograph type	= Combine	Peak discharge	= 48.81 cfs
Storm frequency	= 25 yrs	Time to peak	= 738 min
Time interval	= 2 min	Hyd. volume	= 200,960 cuft
Inflow hyds.	= 15, 33, 38	Contrib. drain. area	= 6.180 ac



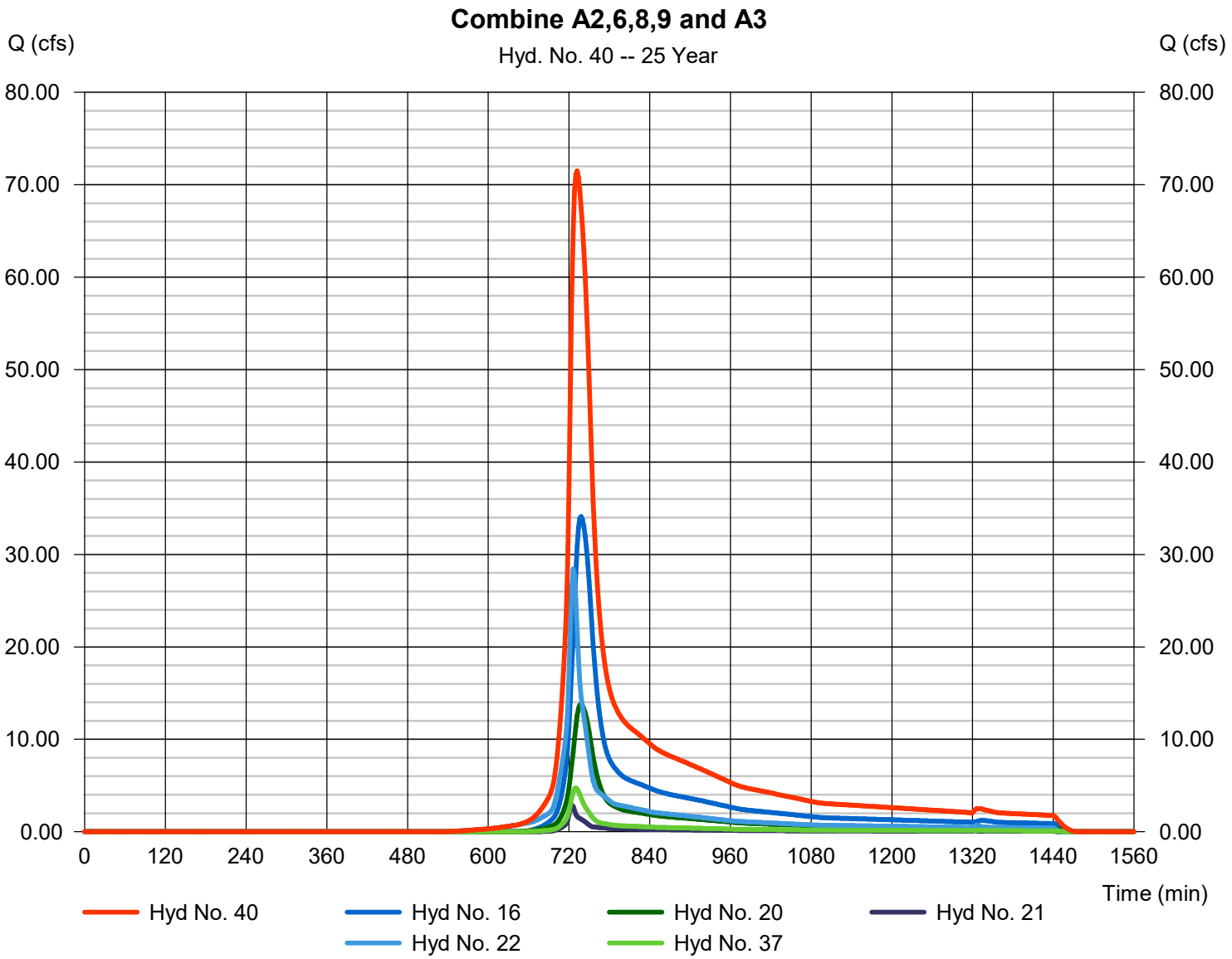
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 40

Combine A2,6,8,9 and A3

Hydrograph type	= Combine	Peak discharge	= 71.51 cfs
Storm frequency	= 25 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 367,847 cuft
Inflow hyds.	= 16, 20, 21, 22, 37	Contrib. drain. area	= 49.640 ac



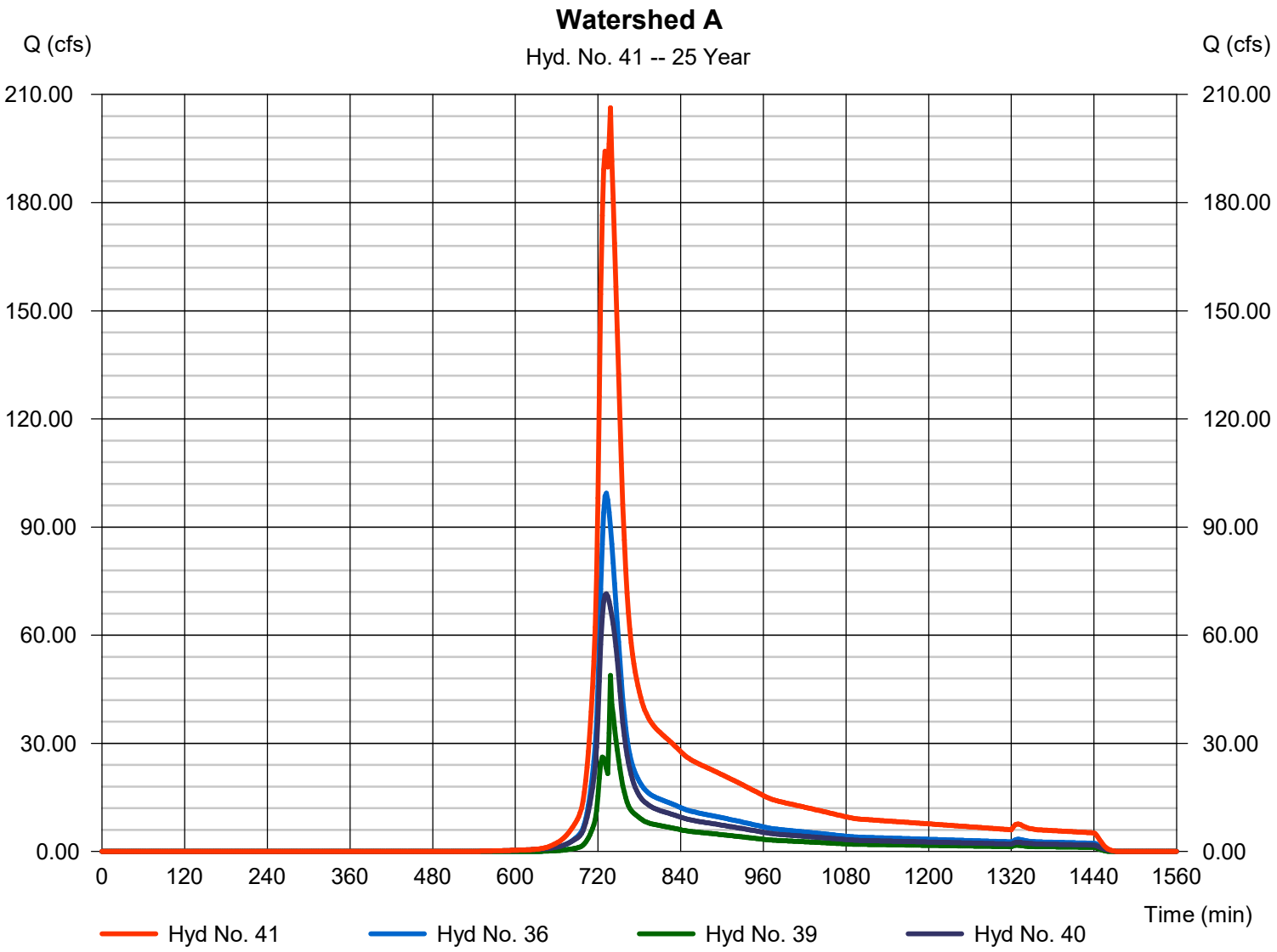
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 41

Watershed A

Hydrograph type	= Combine	Peak discharge	= 206.34 cfs
Storm frequency	= 25 yrs	Time to peak	= 738 min
Time interval	= 2 min	Hyd. volume	= 1,032,534 cuft
Inflow hyds.	= 36, 39, 40	Contrib. drain. area	= 0.000 ac



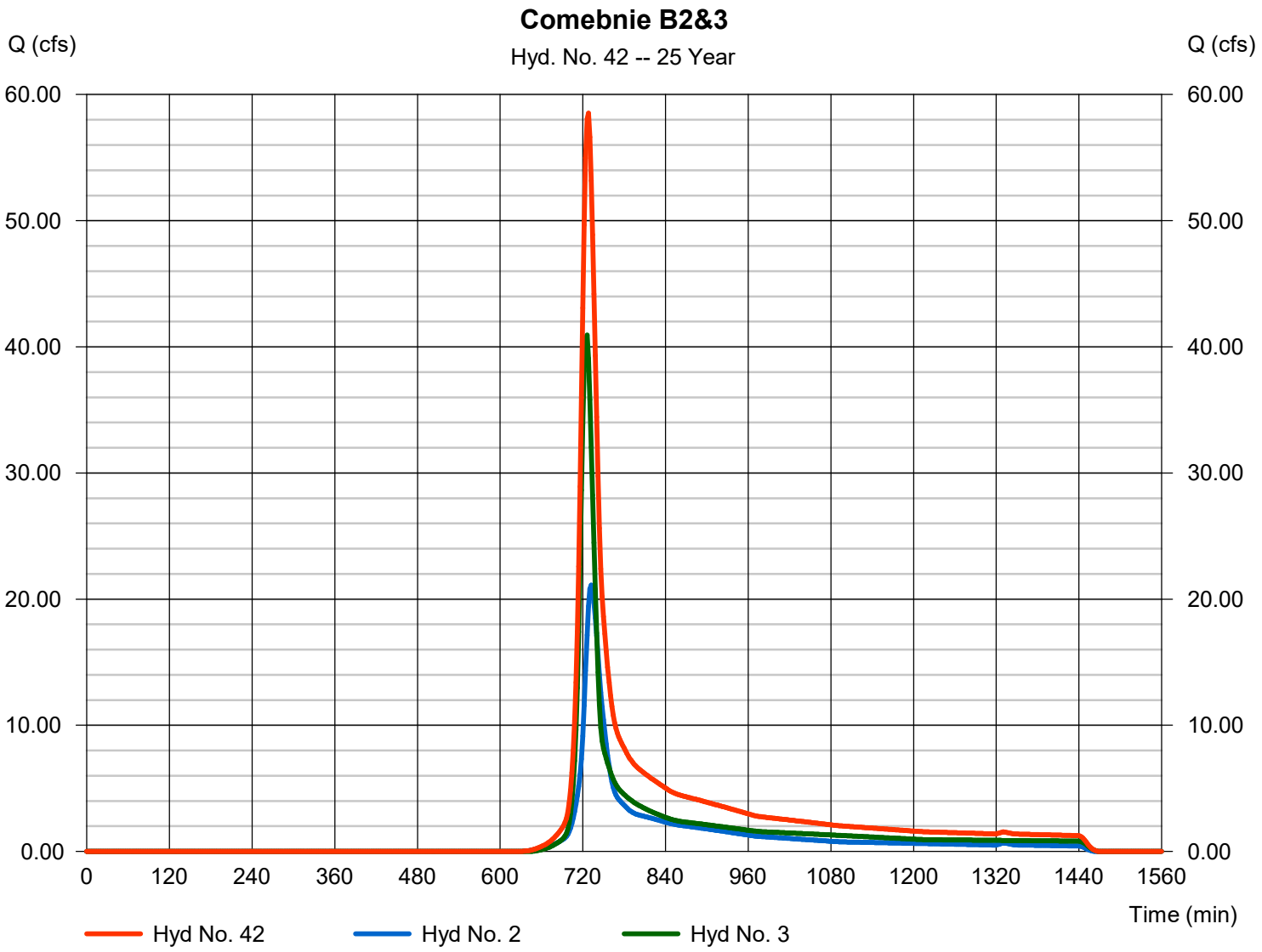
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 42

Comebnie B2&3

Hydrograph type	= Combine	Peak discharge	= 58.52 cfs
Storm frequency	= 25 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 223,559 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 31.290 ac



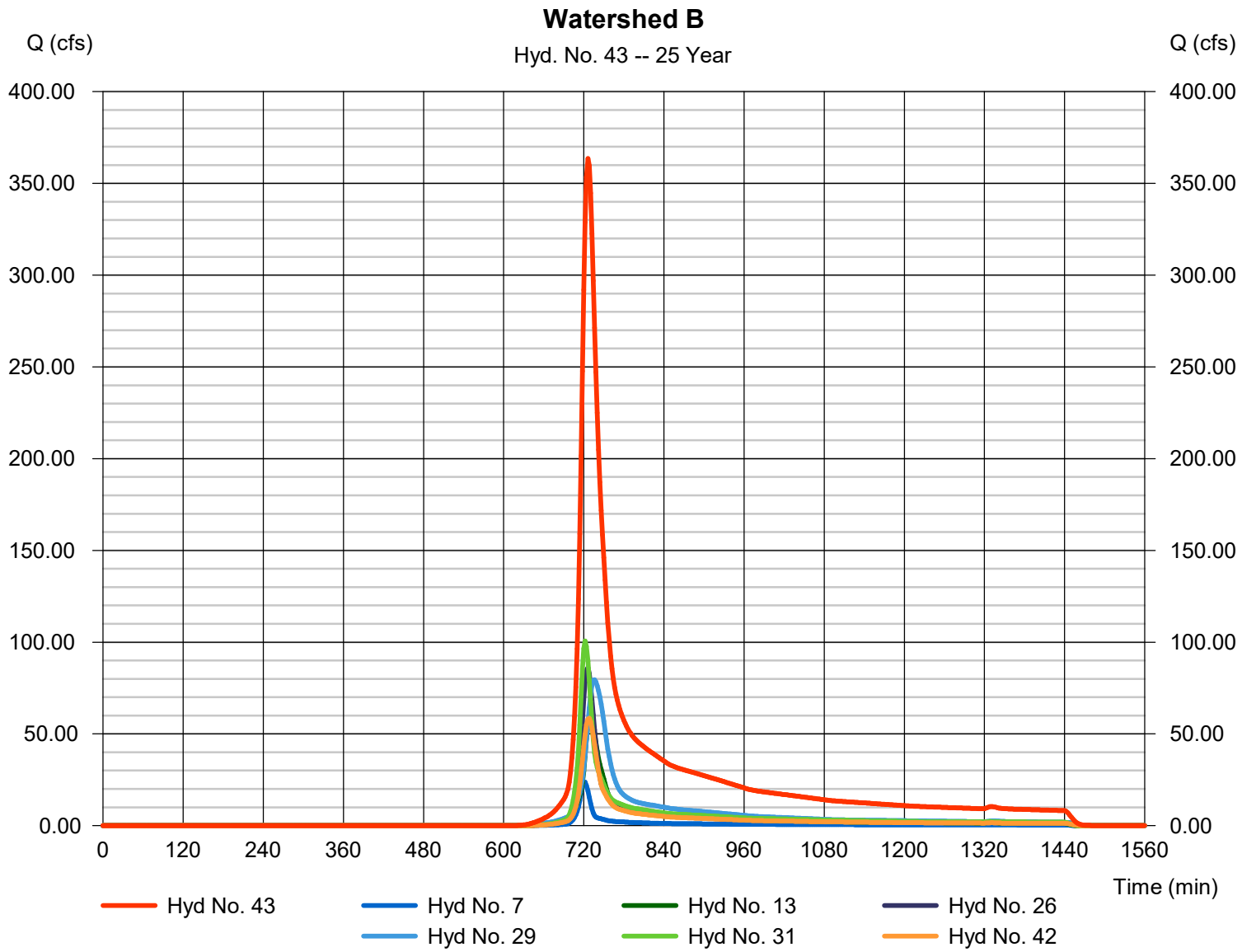
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 43

Watershed B

Hydrograph type	= Combine	Peak discharge	= 363.62 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 1,524,585 cuft
Inflow hyds.	= 7, 13, 26, 29, 31, 42	Contrib. drain. area	= 7.760 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	77.82	2	730	305,690	------	------	------	B1
2	SCS Runoff	27.28	2	732	114,125	------	------	------	B2
3	SCS Runoff	52.76	2	726	169,756	------	------	------	B3
4	SCS Runoff	111.06	2	722	291,567	------	------	------	B4
5	SCS Runoff	71.57	2	736	345,531	------	------	------	B5
6	SCS Runoff	82.93	2	726	265,804	------	------	------	B6
7	SCS Runoff	30.10	2	722	78,879	------	------	------	B7
8	SCS Runoff	36.21	2	722	95,561	------	------	------	B8
9	SCS Runoff	20.37	2	734	92,394	------	------	------	B9
10	SCS Runoff	0.124	2	742	1,351	------	------	------	B10
11	SCS Runoff	0.157	2	742	1,712	------	------	------	B11
12	Combine	0.280	2	742	3,064	10, 11	------	------	Combine B10&11
13	Combine	77.94	2	730	308,753	1, 12	------	------	Combine B10&11 with B1
14	SCS Runoff	67.09	2	732	282,060	------	------	------	A1
15	SCS Runoff	14.40	2	724	45,317	------	------	------	A11
16	SCS Runoff	44.69	2	738	220,815	------	------	------	A3
17	SCS Runoff	61.41	2	730	250,458	------	------	------	A4
18	SCS Runoff	38.82	2	732	162,384	------	------	------	A5
19	SCS Runoff	40.26	2	736	197,623	------	------	------	A12
20	SCS Runoff	17.94	2	736	88,032	------	------	------	A6
21	SCS Runoff	3.871	2	724	12,294	------	------	------	A8
22	SCS Runoff	35.03	2	726	119,801	------	------	------	A9
23	SCS Runoff	22.67	2	730	89,421	------	------	------	A10
24	SCS Runoff	13.64	2	726	48,030	------	------	------	B12
25	Reservoir	28.94	2	726	95,560	8	132.49	14,474	Pond B8
26	Combine	111.87	2	726	361,364	6, 25	------	------	Combine B6&8
27	Reservoir	12.84	2	730	48,030	24	126.12	2,515	Pond B12
28	Combine	32.02	2	732	140,425	9, 27	------	------	Combine B9&12
29	Combine	101.36	2	734	485,956	5, 28	------	------	Combine B9&12 with B5
30	SCS Runoff	30.16	2	730	121,071	------	------	------	B13
31	Combine	129.72	2	722	412,639	4, 30	------	------	Combine B4&13
32	Reservoir	0.000	2	n/a	0	17	109.10	250,458	A4 Pond
33	Reservoir	46.17	2	732	130,049	18	108.29	34,069	A5 Pond
34	SCS Runoff	31.62	2	726	111,368	------	------	------	A7

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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
35	Combine	62.60	2	730	308,991	19, 34	------	------	Combine A7&12
36	Combine	129.34	2	732	591,051	14, 35	------	------	Combine A7&12 with A-1
37	SCS Runoff	6.234	2	730	24,858	------	------	------	A2
38	Combine	22.67	2	730	89,421	23, 32,	------	------	Combine A10&4
39	Combine	75.81	2	732	264,786	15, 33, 38	------	------	Combine A10&4 and A5 with A11
40	Combine	92.49	2	732	465,800	16, 20, 21, 22, 37,	------	------	Combine A2,6,8,9 and A3
41	Combine	297.64	2	732	1,321,637	36, 39, 40	------	------	Watershed A
42	Combine	75.57	2	728	283,881	2, 3,	------	------	Comebnie B2&3
43	Combine	471.49	2	726	1,931,473	7, 13, 26, 29, 31, 42	------	------	Watershed B

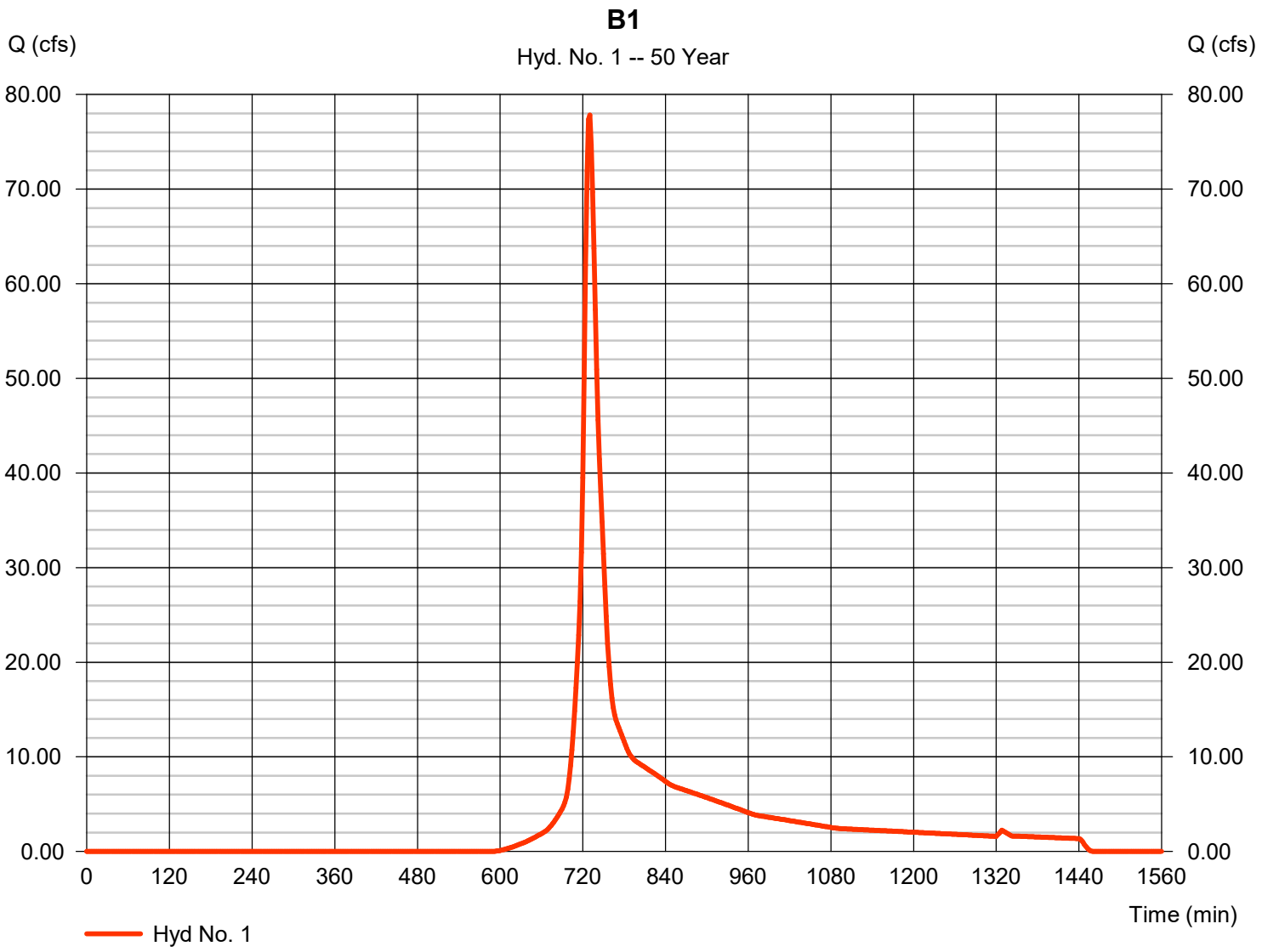
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 1

B1

Hydrograph type	= SCS Runoff	Peak discharge	= 77.82 cfs
Storm frequency	= 50 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 305,690 cuft
Drainage area	= 31.170 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.00 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



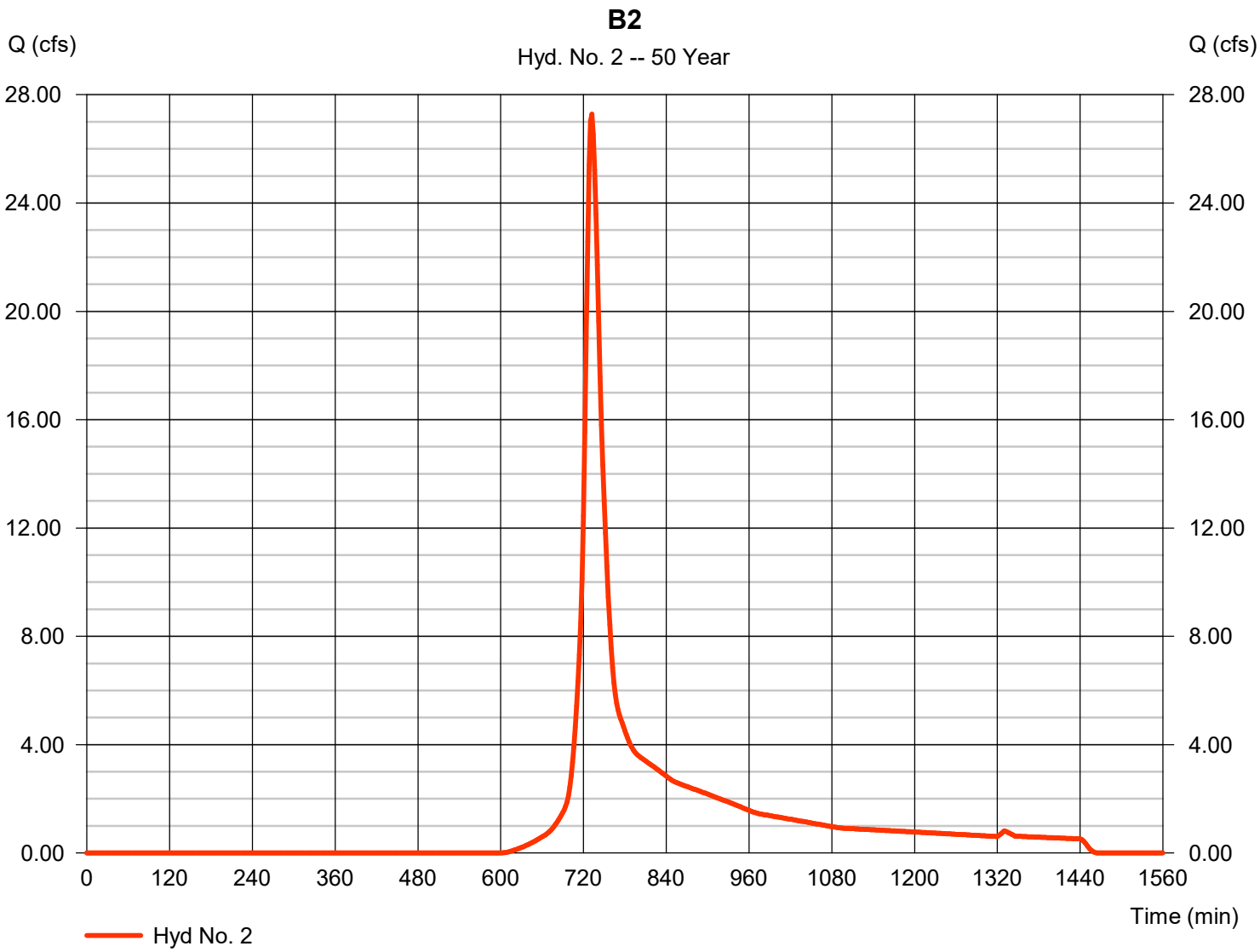
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 2

B2

Hydrograph type	= SCS Runoff	Peak discharge	= 27.28 cfs
Storm frequency	= 50 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 114,125 cuft
Drainage area	= 12.770 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 14.00 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



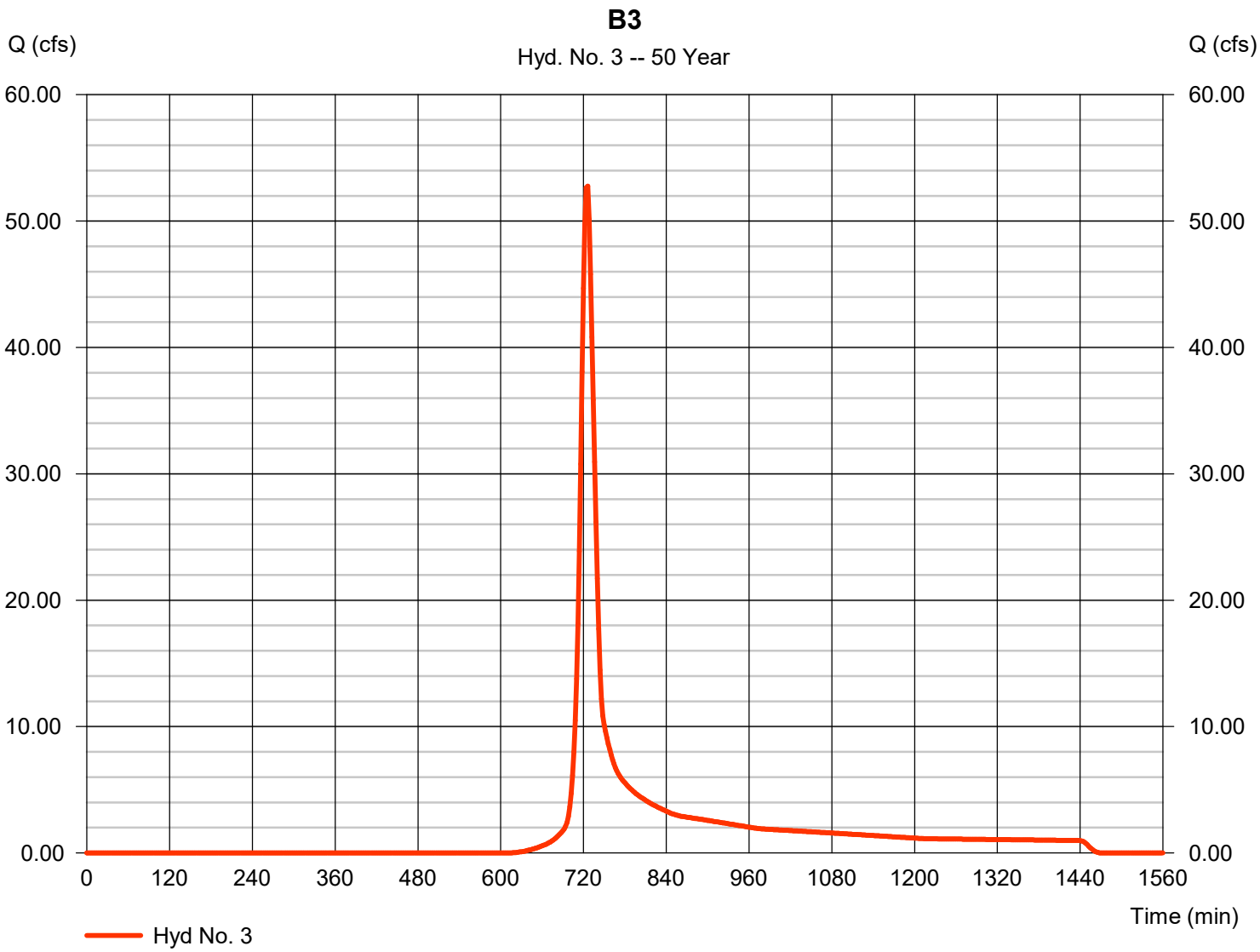
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 3

B3

Hydrograph type	= SCS Runoff	Peak discharge	= 52.76 cfs
Storm frequency	= 50 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 169,756 cuft
Drainage area	= 18.520 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.80 min
Total precip.	= 6.62 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



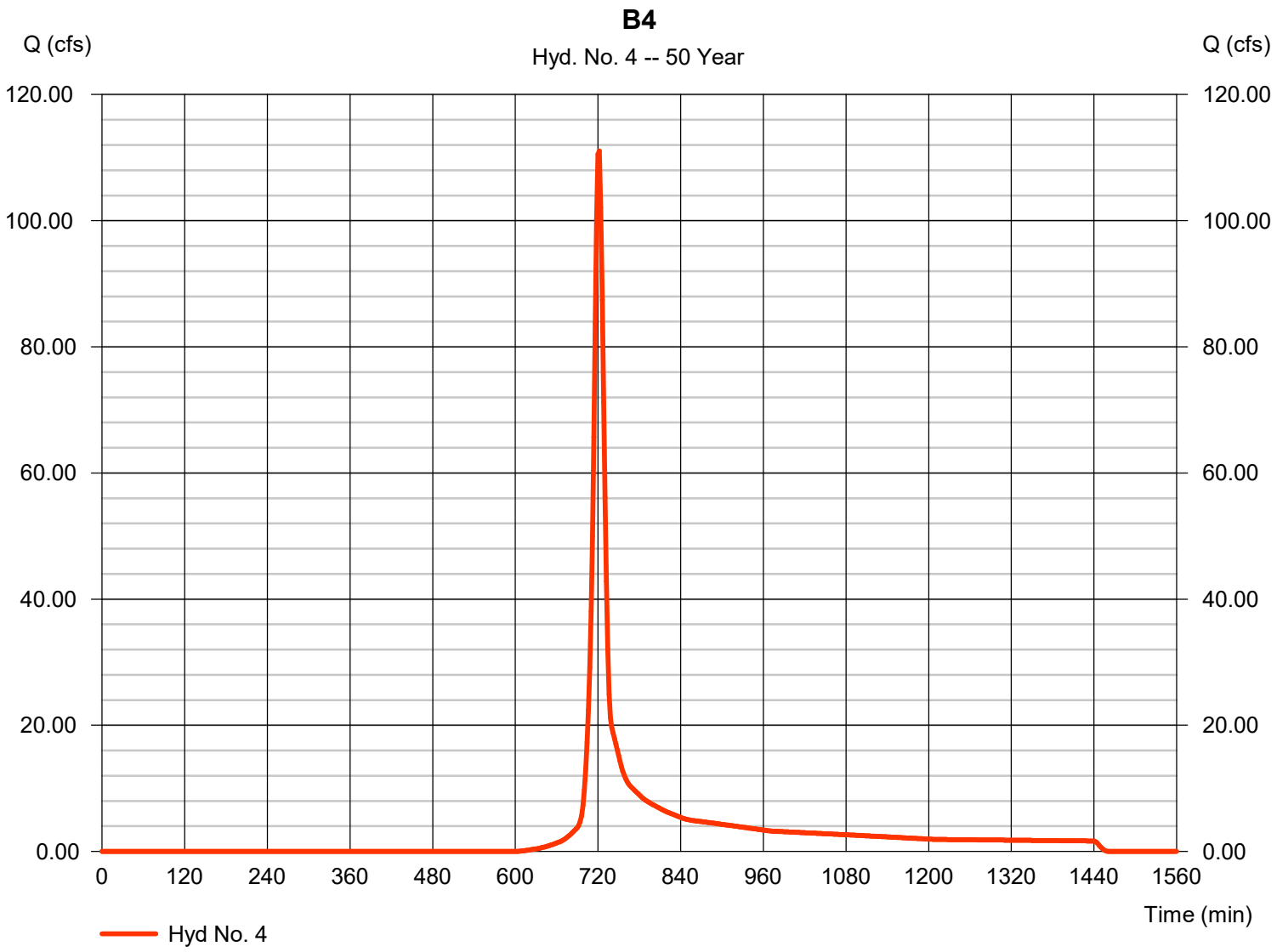
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 4

B4

Hydrograph type	= SCS Runoff	Peak discharge	= 111.06 cfs
Storm frequency	= 50 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 291,567 cuft
Drainage area	= 29.730 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.80 min
Total precip.	= 6.62 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



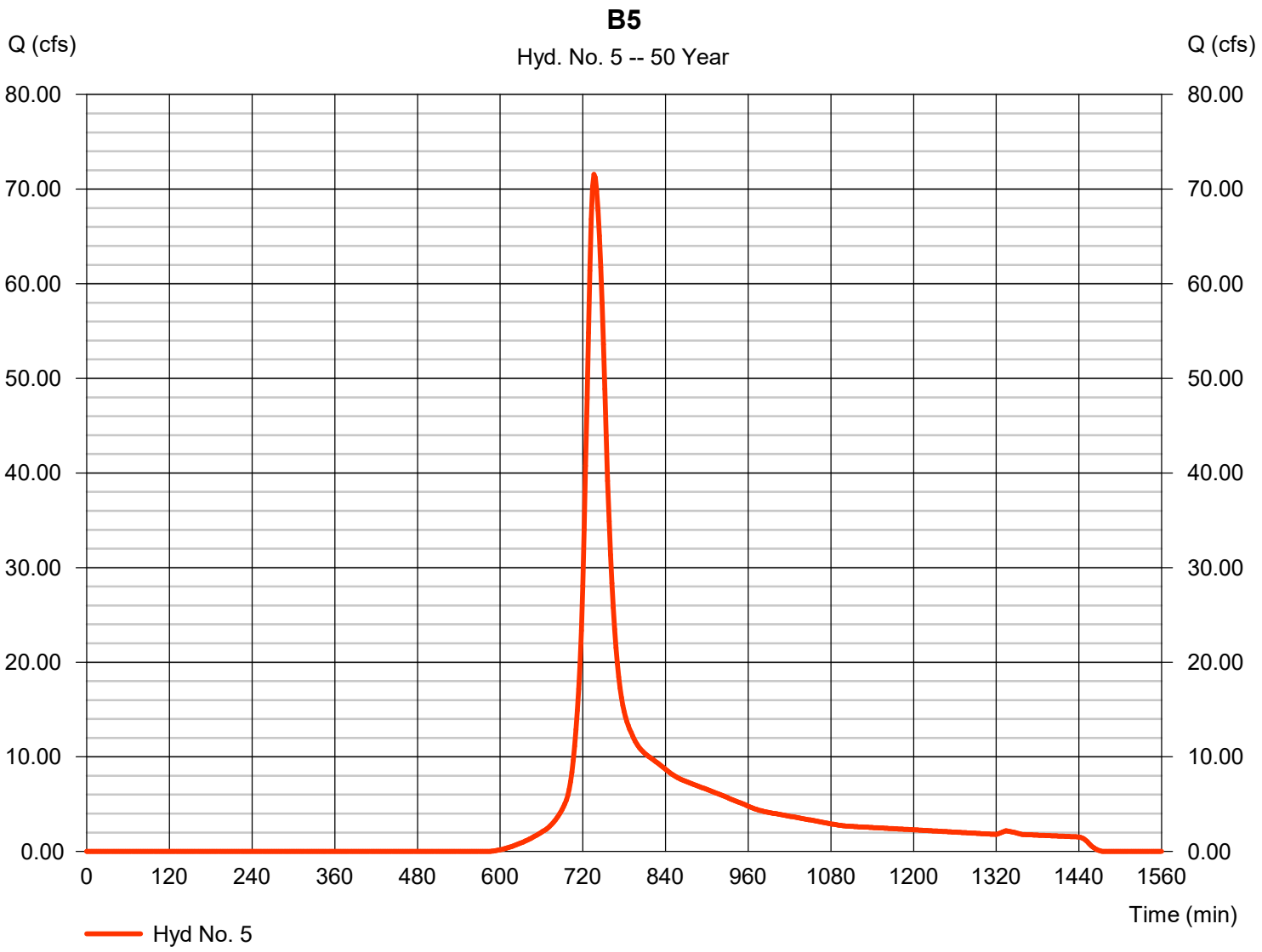
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 5

B5

Hydrograph type	= SCS Runoff	Peak discharge	= 71.57 cfs
Storm frequency	= 50 yrs	Time to peak	= 736 min
Time interval	= 2 min	Hyd. volume	= 345,531 cuft
Drainage area	= 34.440 ac	Curve number	= 64
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 20.40 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



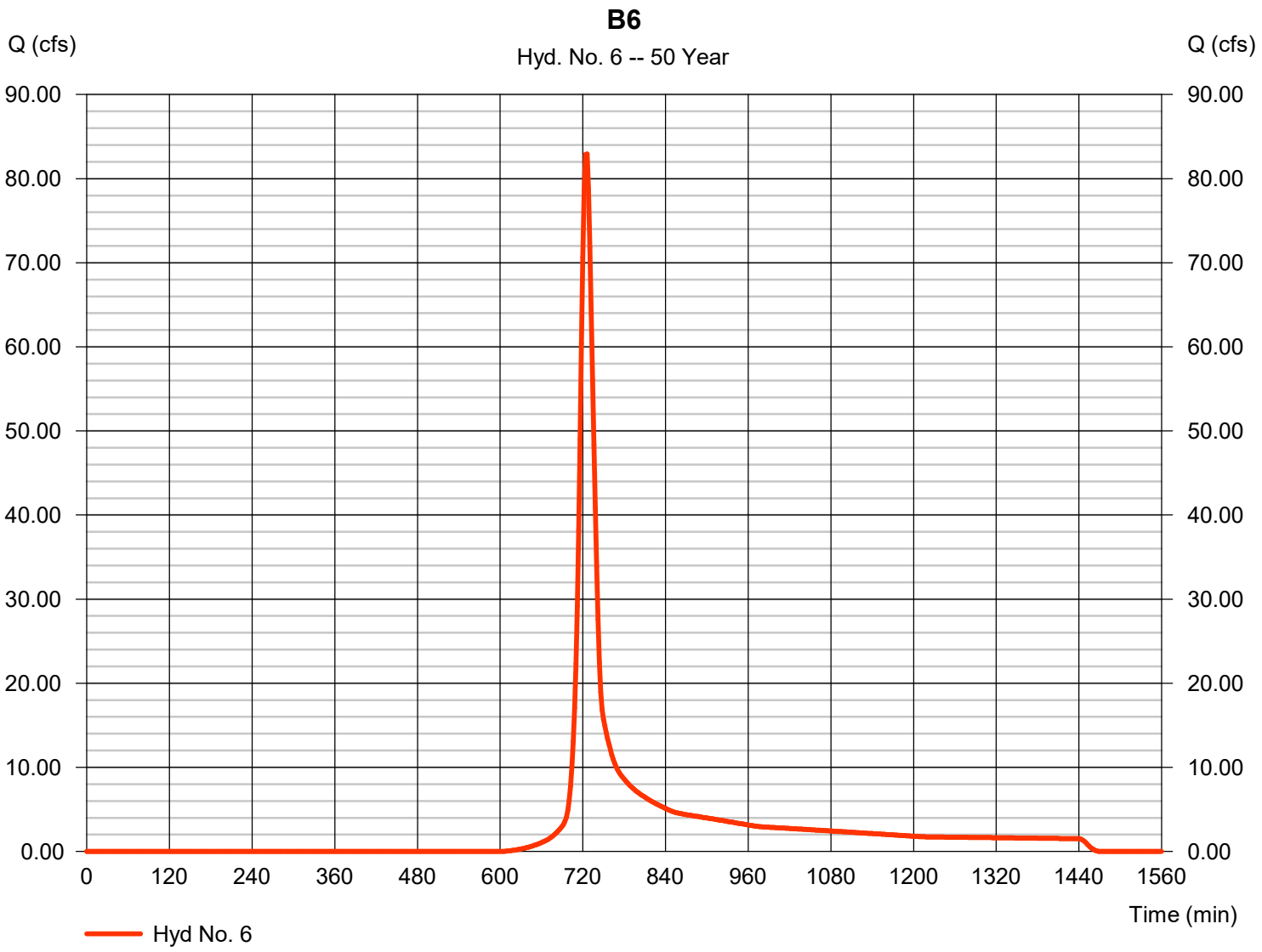
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 6

B6

Hydrograph type	= SCS Runoff	Peak discharge	= 82.93 cfs
Storm frequency	= 50 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 265,804 cuft
Drainage area	= 27.950 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.10 min
Total precip.	= 6.62 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



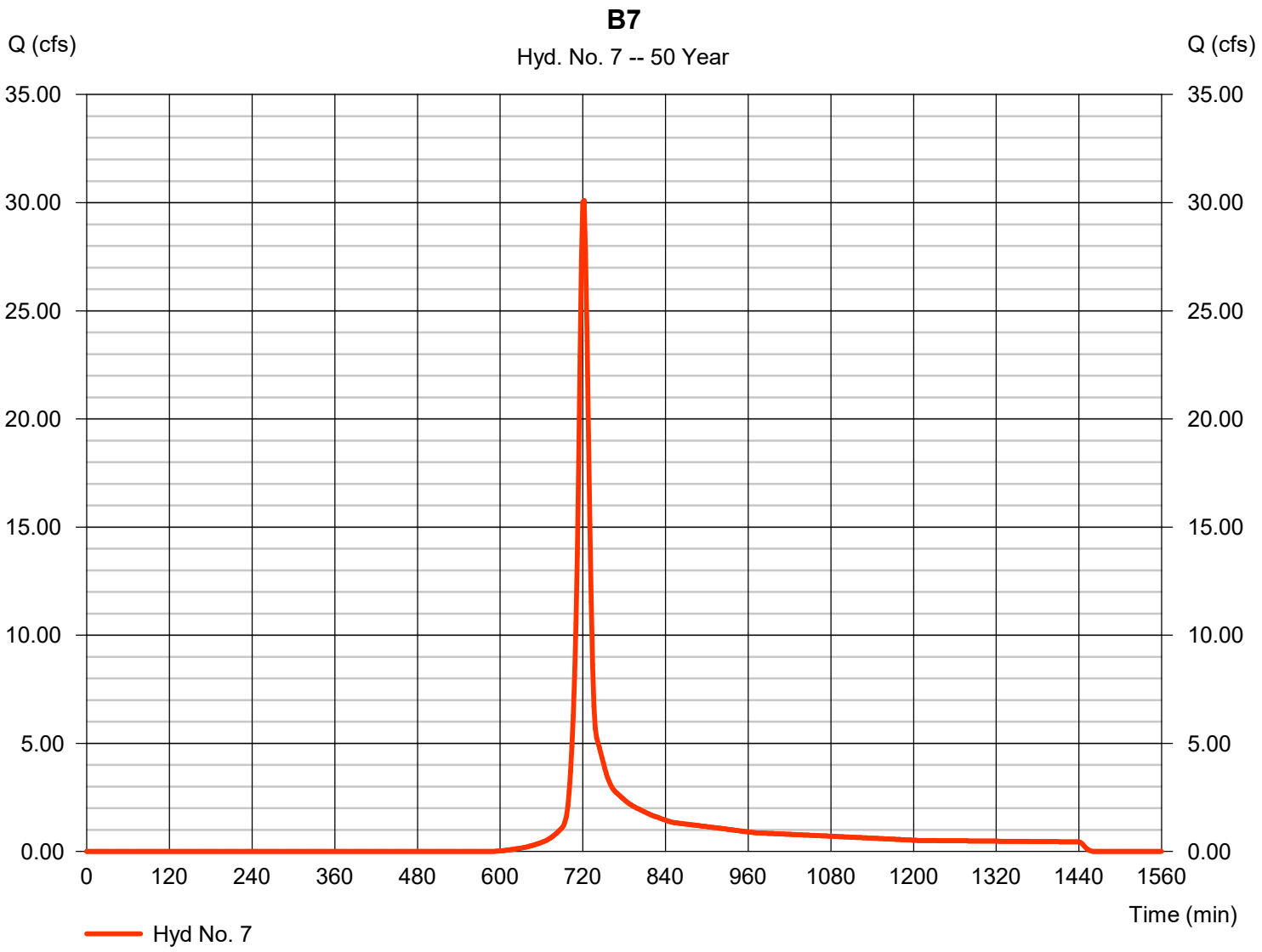
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 7

B7

Hydrograph type	= SCS Runoff	Peak discharge	= 30.10 cfs
Storm frequency	= 50 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 78,879 cuft
Drainage area	= 7.760 ac	Curve number	= 64
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.30 min
Total precip.	= 6.62 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



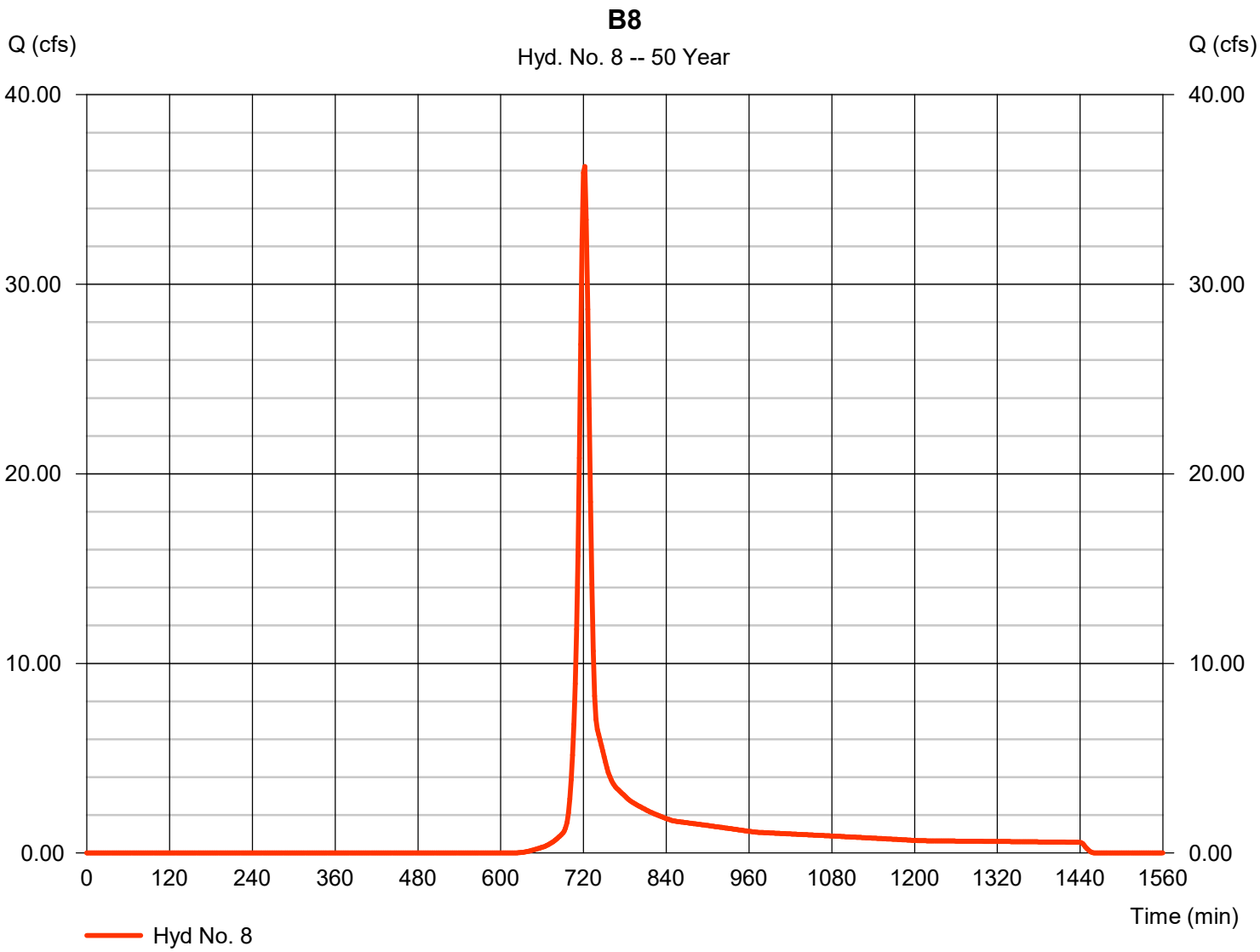
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 8

B8

Hydrograph type	= SCS Runoff	Peak discharge	= 36.21 cfs
Storm frequency	= 50 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 95,561 cuft
Drainage area	= 10.500 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.00 min
Total precip.	= 6.62 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



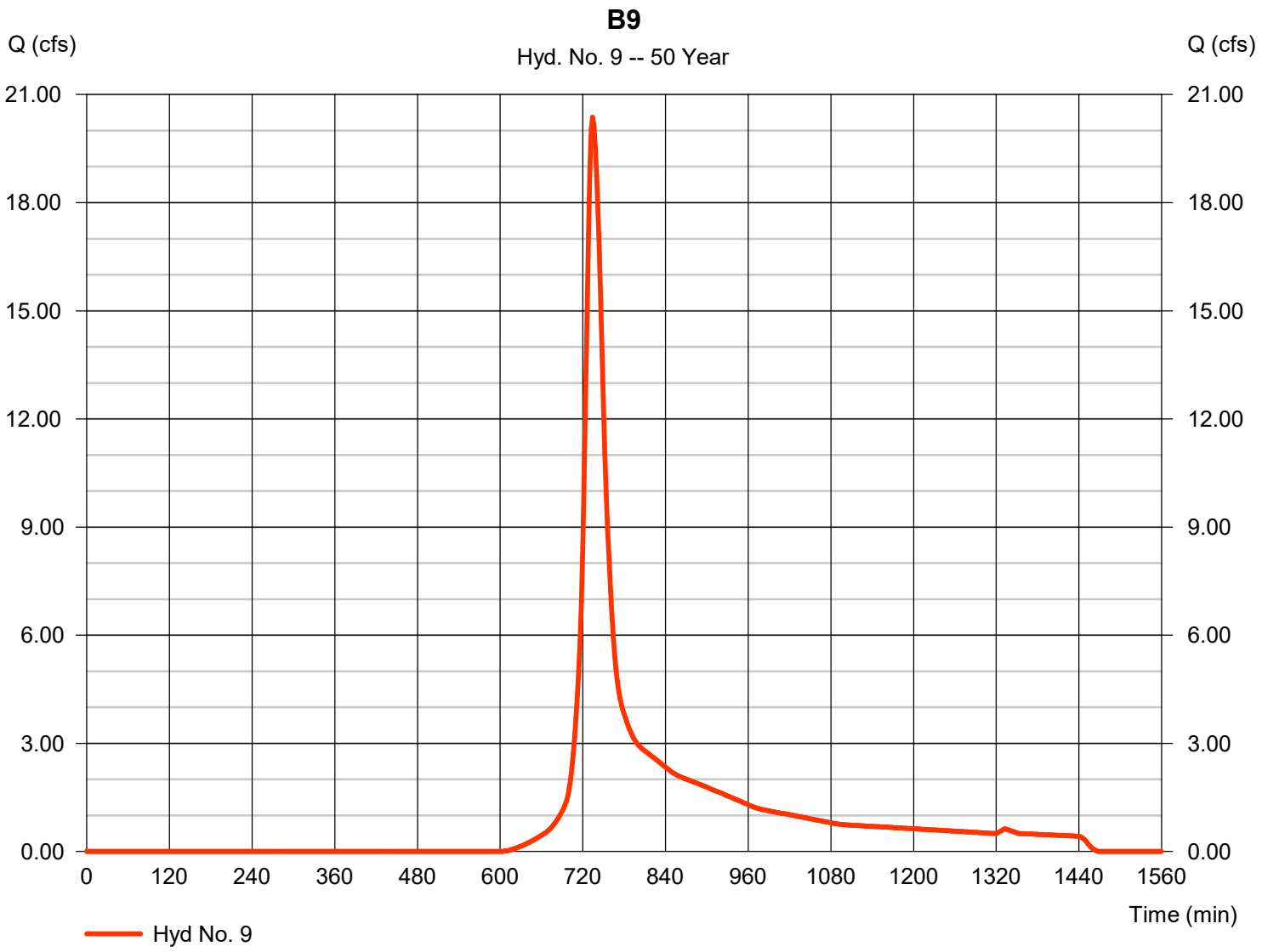
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 9

B9

Hydrograph type	= SCS Runoff	Peak discharge	= 20.37 cfs
Storm frequency	= 50 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 92,394 cuft
Drainage area	= 10.080 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.40 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



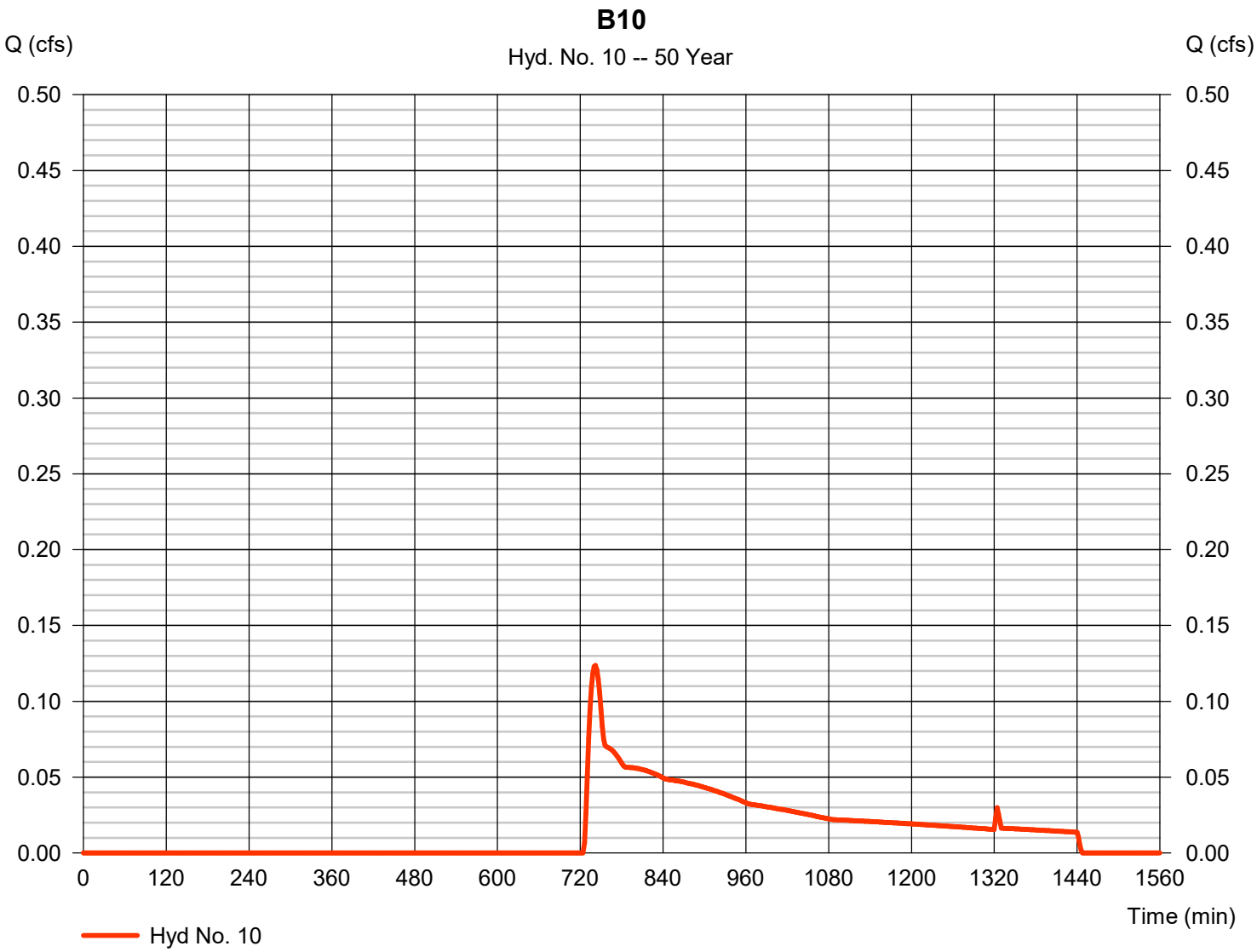
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 10

B10

Hydrograph type	= SCS Runoff	Peak discharge	= 0.124 cfs
Storm frequency	= 50 yrs	Time to peak	= 742 min
Time interval	= 2 min	Hyd. volume	= 1,351 cuft
Drainage area	= 1.010 ac	Curve number	= 35
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.60 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



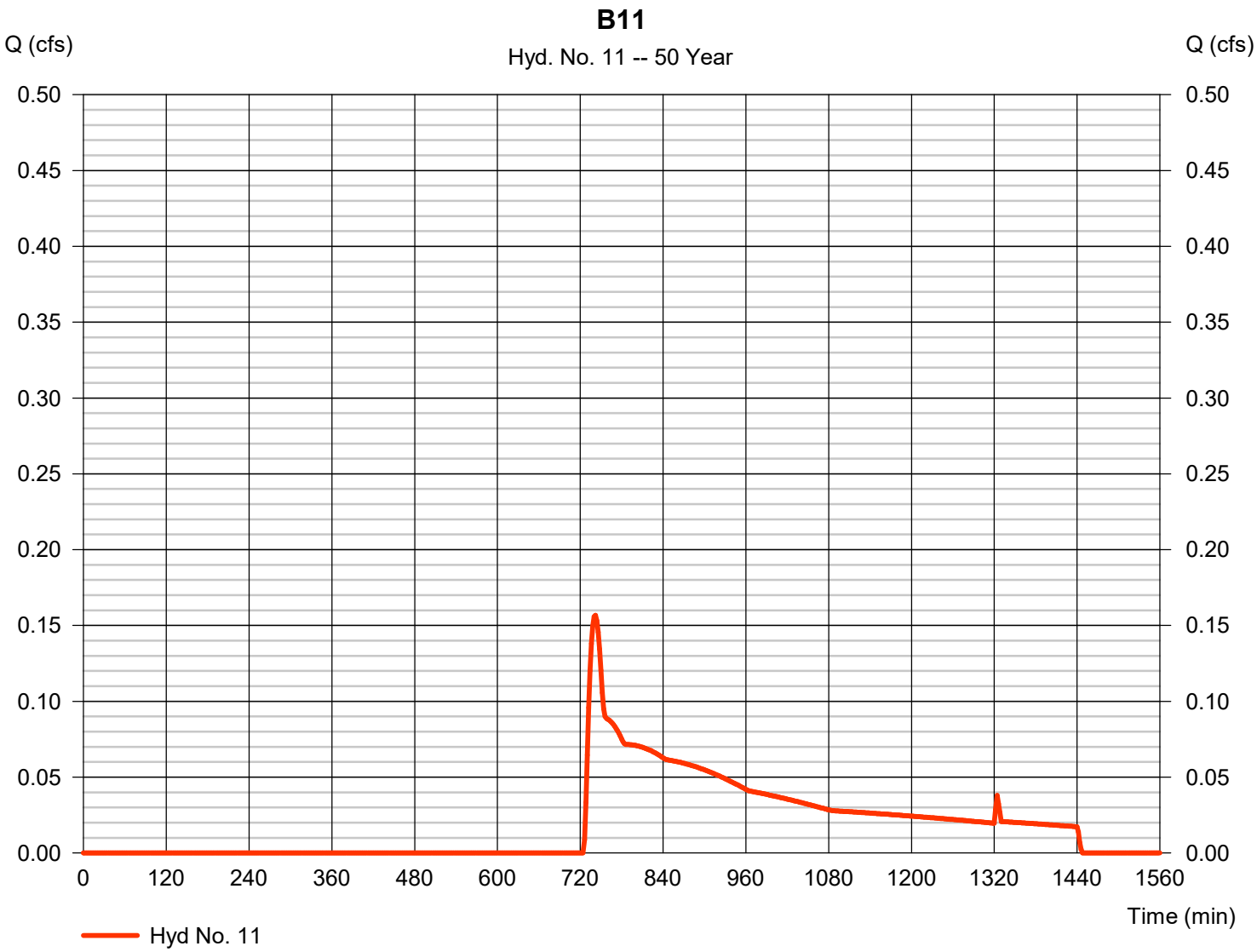
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 11

B11

Hydrograph type	= SCS Runoff	Peak discharge	= 0.157 cfs
Storm frequency	= 50 yrs	Time to peak	= 742 min
Time interval	= 2 min	Hyd. volume	= 1,712 cuft
Drainage area	= 1.280 ac	Curve number	= 35
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.70 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



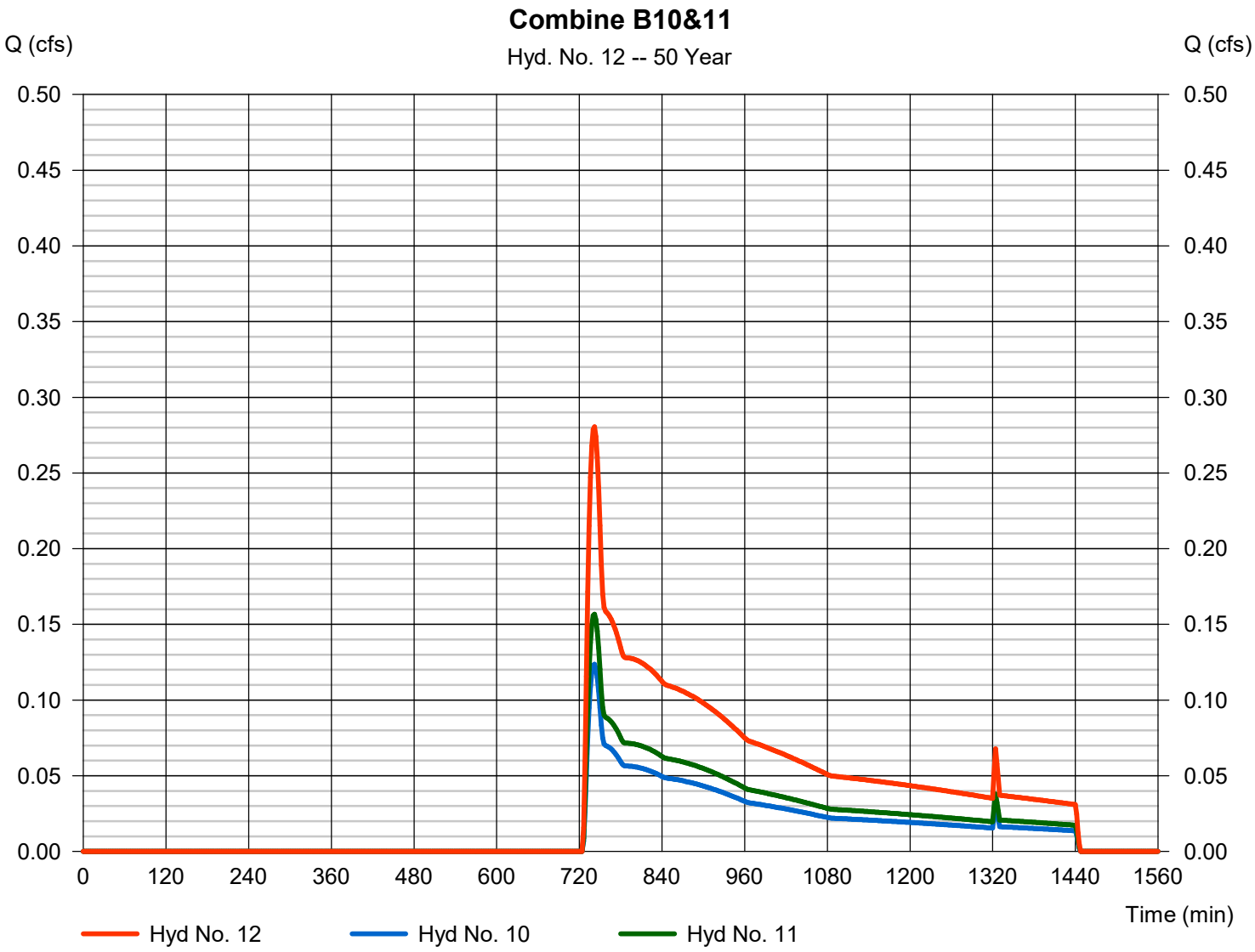
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 12

Combine B10&11

Hydrograph type	= Combine	Peak discharge	= 0.280 cfs
Storm frequency	= 50 yrs	Time to peak	= 742 min
Time interval	= 2 min	Hyd. volume	= 3,064 cuft
Inflow hyds.	= 10, 11	Contrib. drain. area	= 2.290 ac



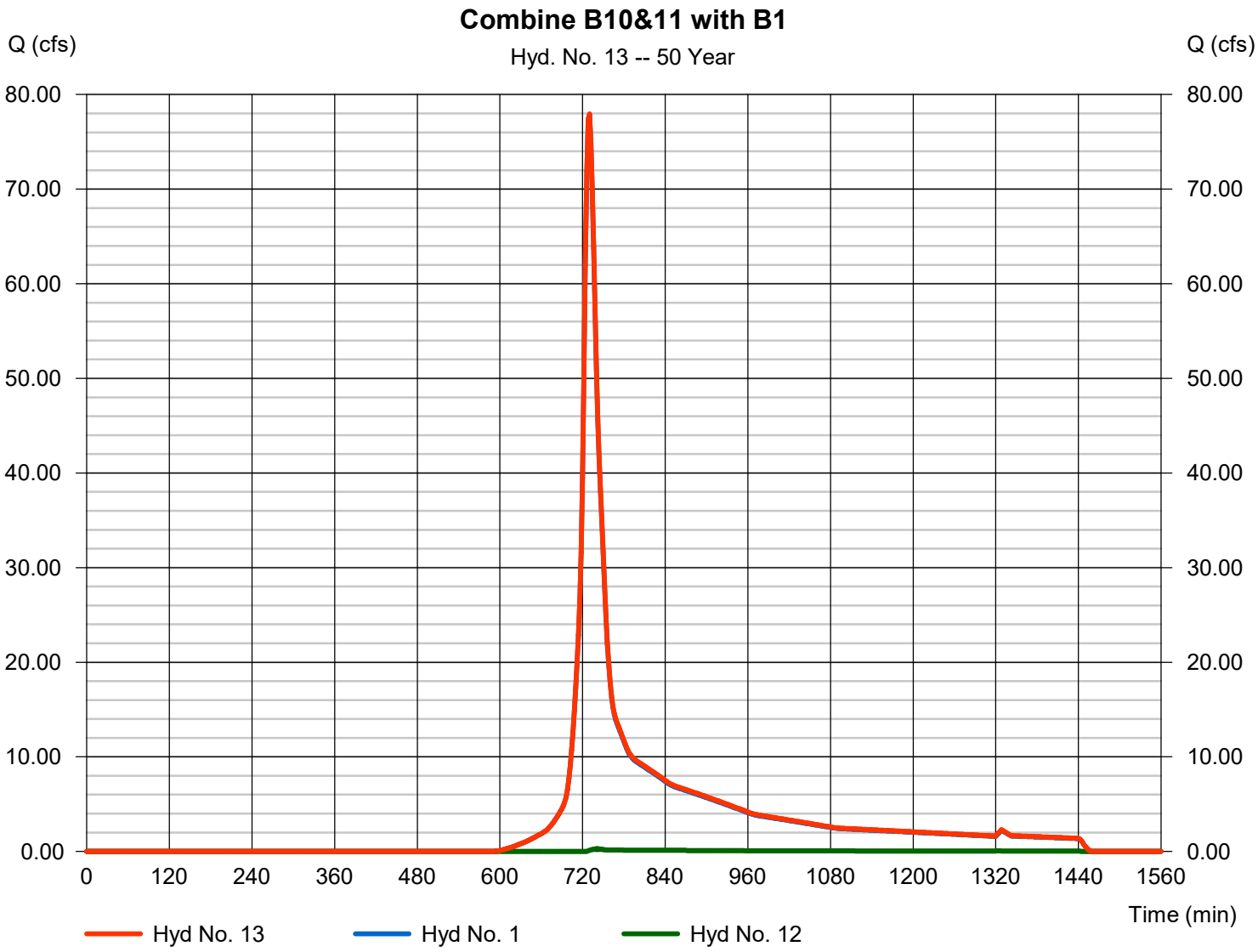
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 13

Combine B10&11 with B1

Hydrograph type	= Combine	Peak discharge	= 77.94 cfs
Storm frequency	= 50 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 308,753 cuft
Inflow hyds.	= 1, 12	Contrib. drain. area	= 31.170 ac



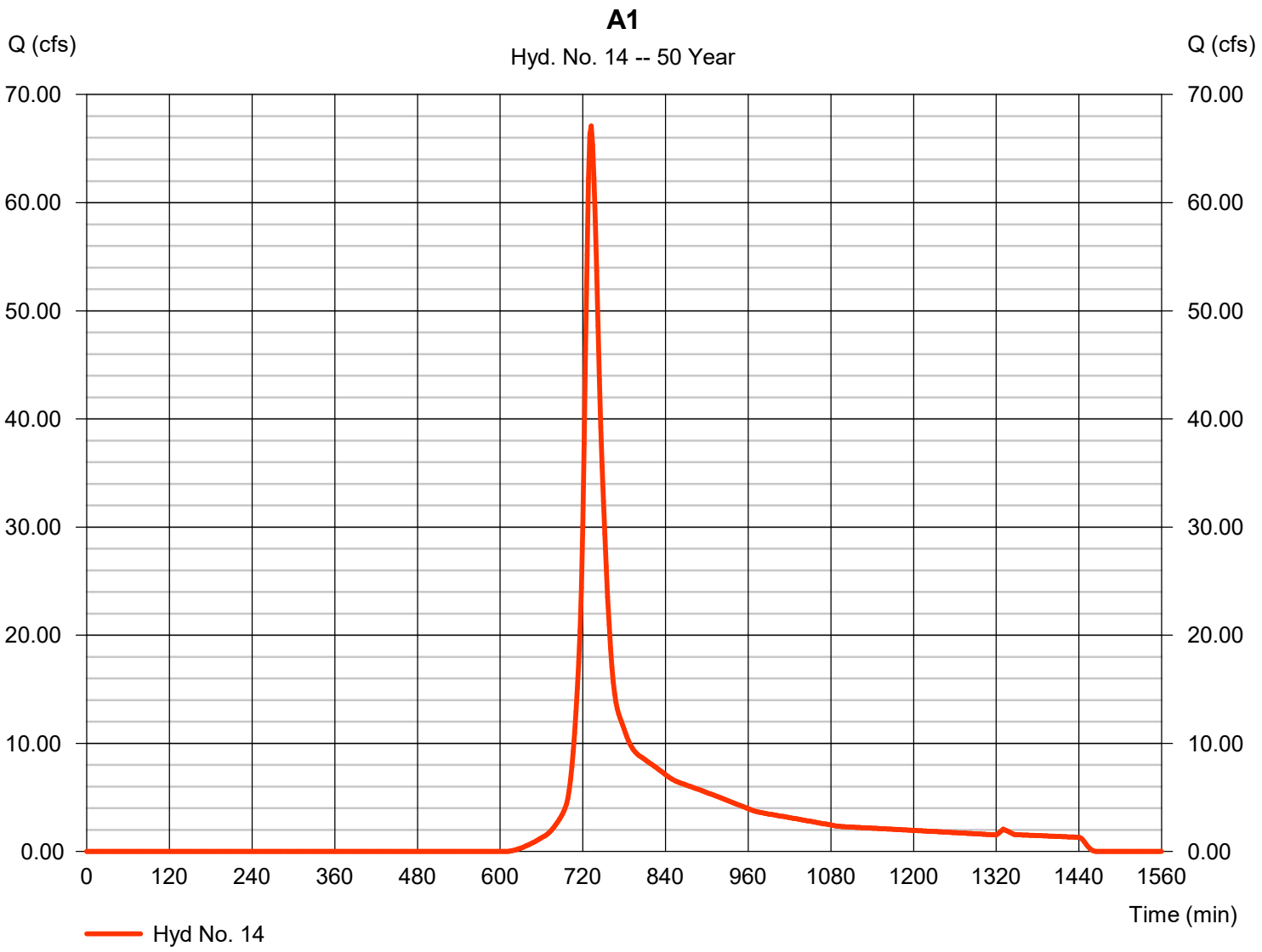
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 14

A1

Hydrograph type	= SCS Runoff	Peak discharge	= 67.09 cfs
Storm frequency	= 50 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 282,060 cuft
Drainage area	= 32.780 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 14.70 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



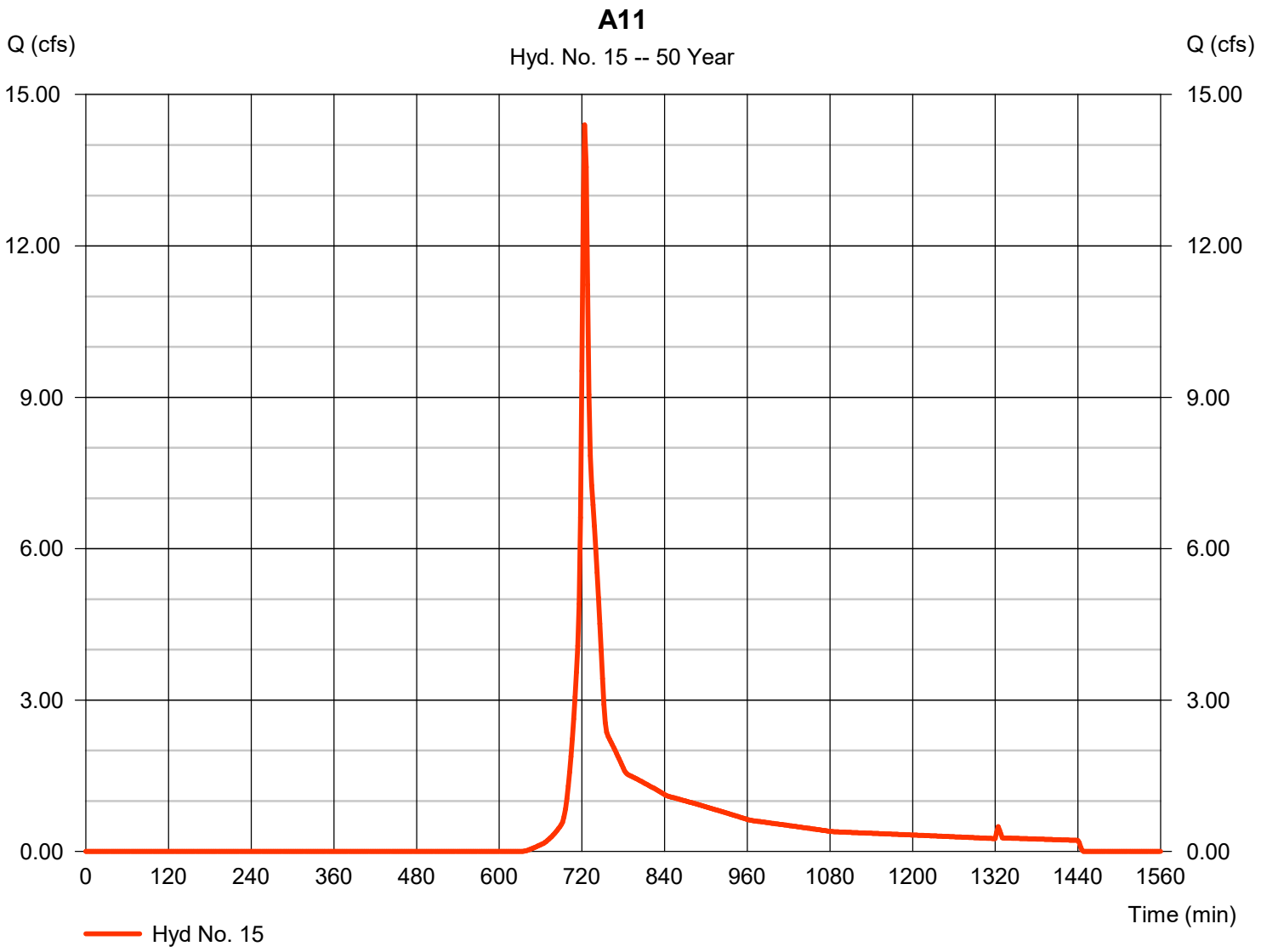
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 15

A11

Hydrograph type	= SCS Runoff	Peak discharge	= 14.40 cfs
Storm frequency	= 50 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 45,317 cuft
Drainage area	= 6.180 ac	Curve number	= 58
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



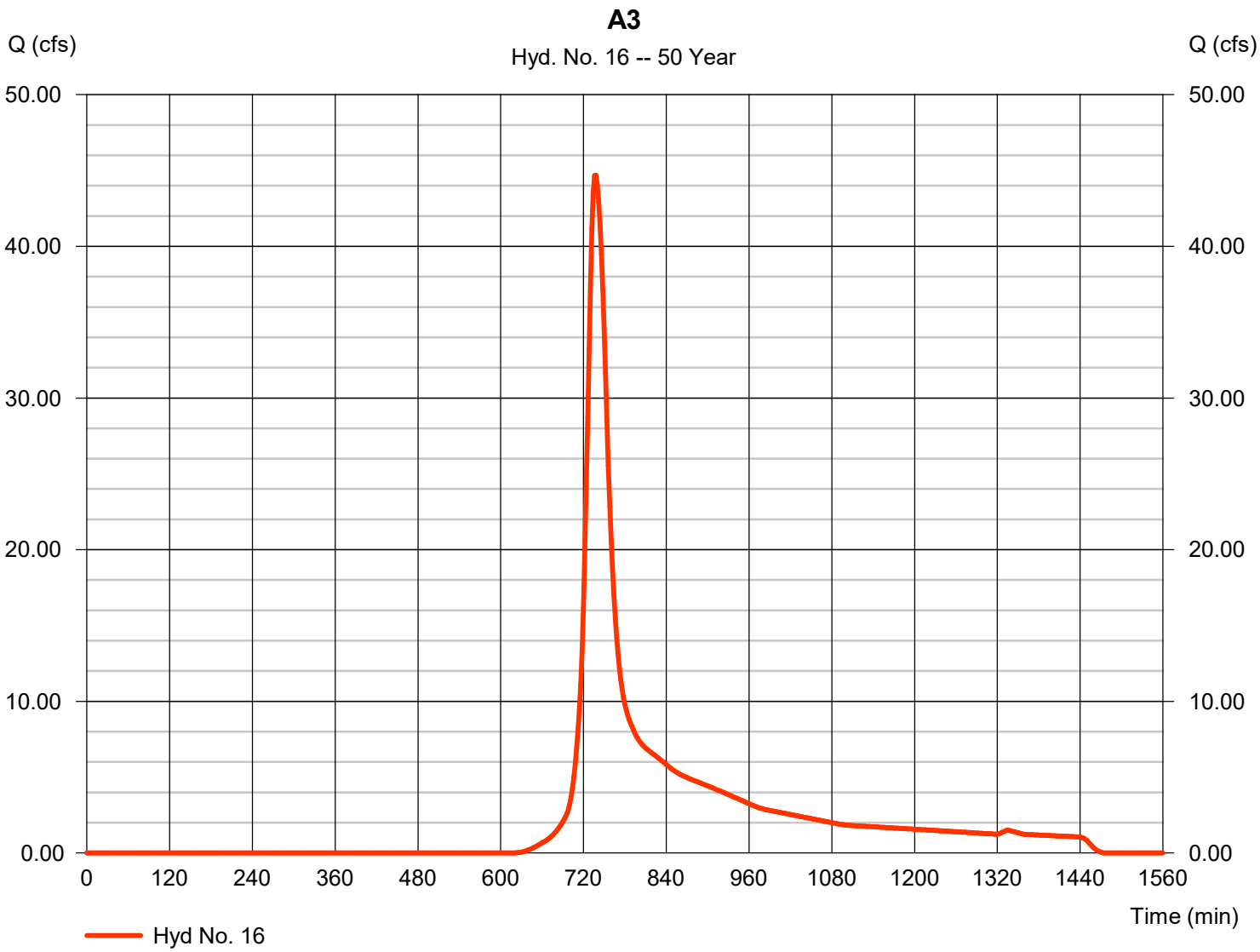
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 16

A3

Hydrograph type	= SCS Runoff	Peak discharge	= 44.69 cfs
Storm frequency	= 50 yrs	Time to peak	= 738 min
Time interval	= 2 min	Hyd. volume	= 220,815 cuft
Drainage area	= 25.560 ac	Curve number	= 60
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 22.40 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



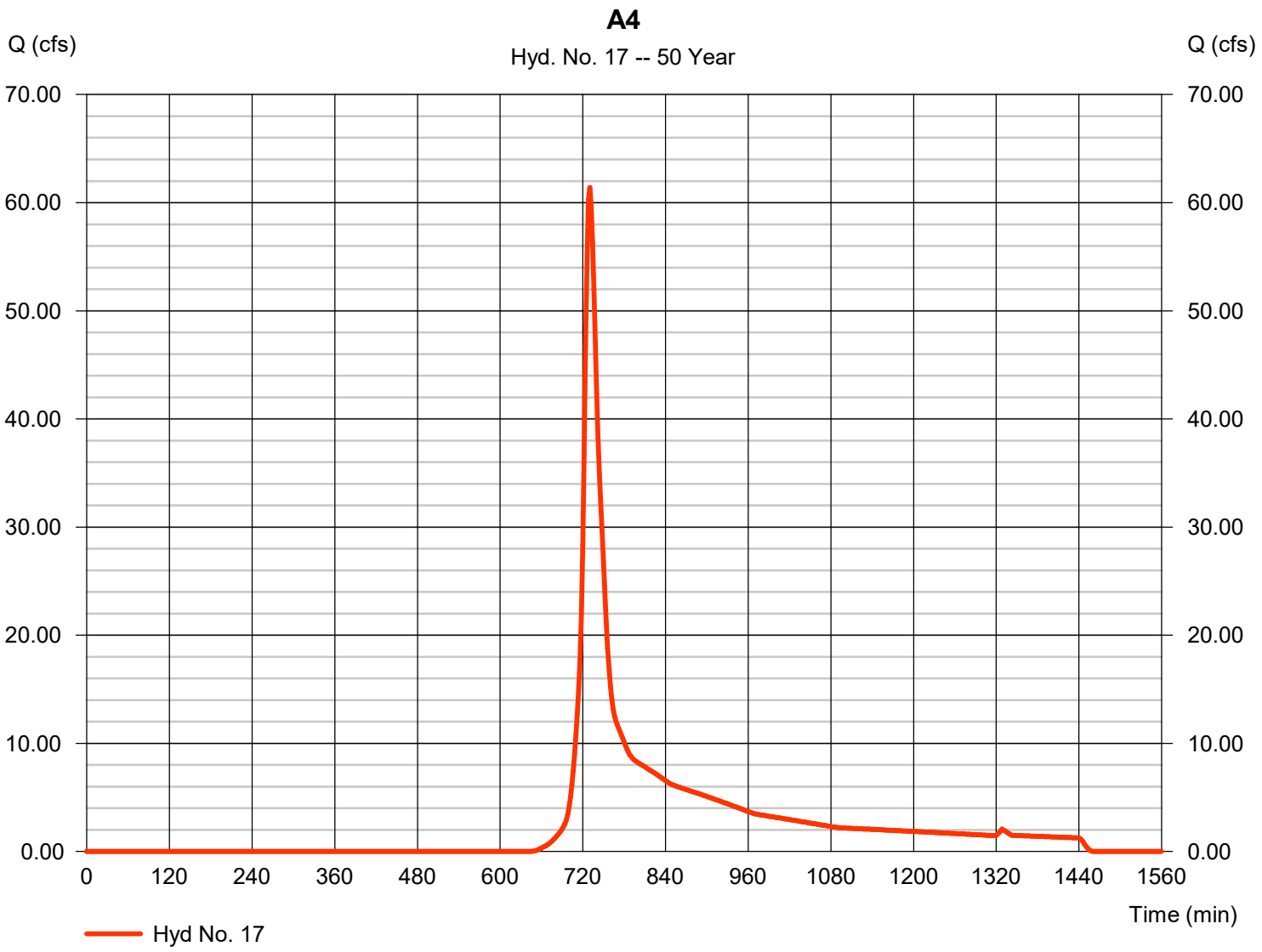
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 17

A4

Hydrograph type	= SCS Runoff	Peak discharge	= 61.41 cfs
Storm frequency	= 50 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 250,458 cuft
Drainage area	= 32.410 ac	Curve number	= 57
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.30 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



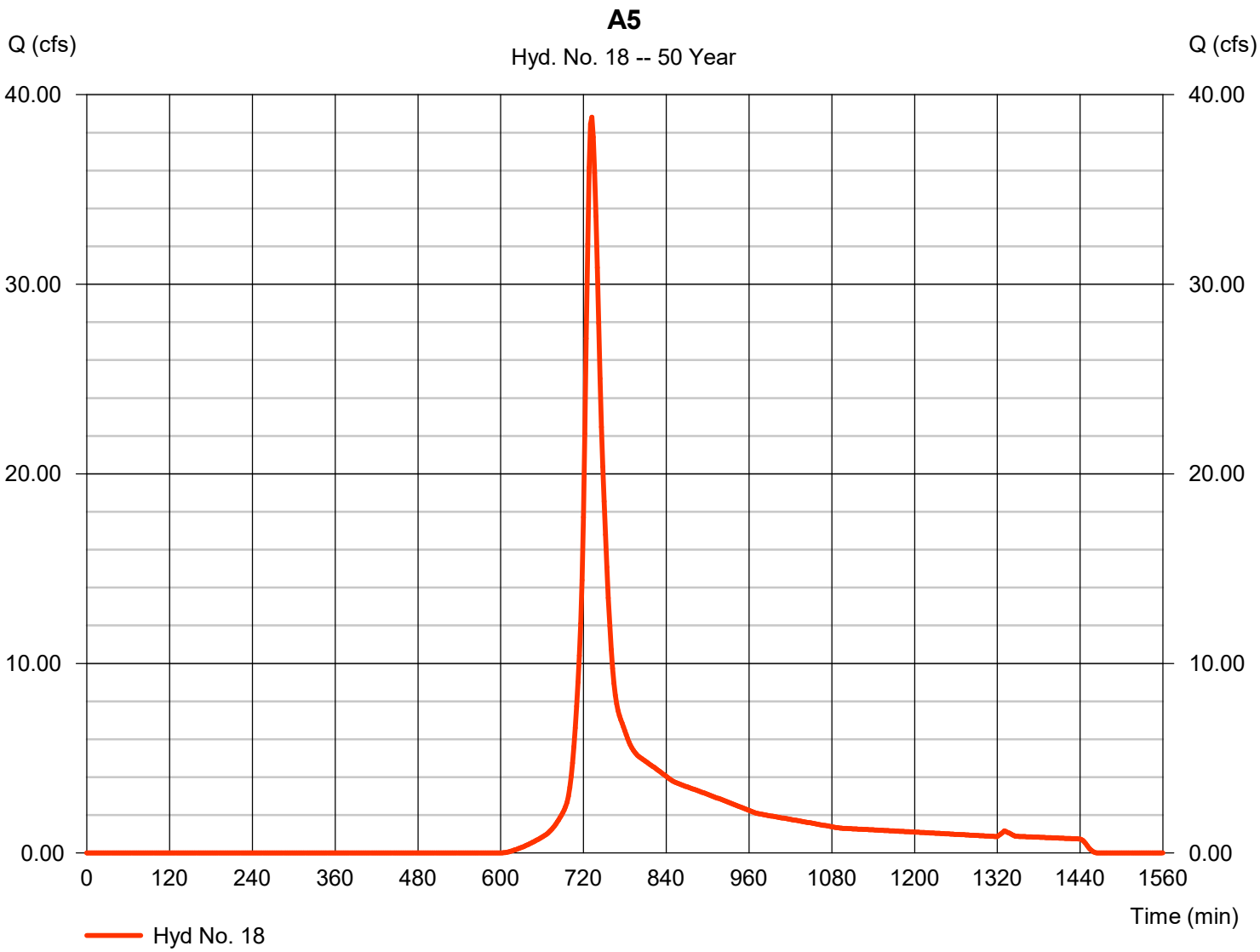
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 18

A5

Hydrograph type	= SCS Runoff	Peak discharge	= 38.82 cfs
Storm frequency	= 50 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 162,384 cuft
Drainage area	= 18.170 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.50 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



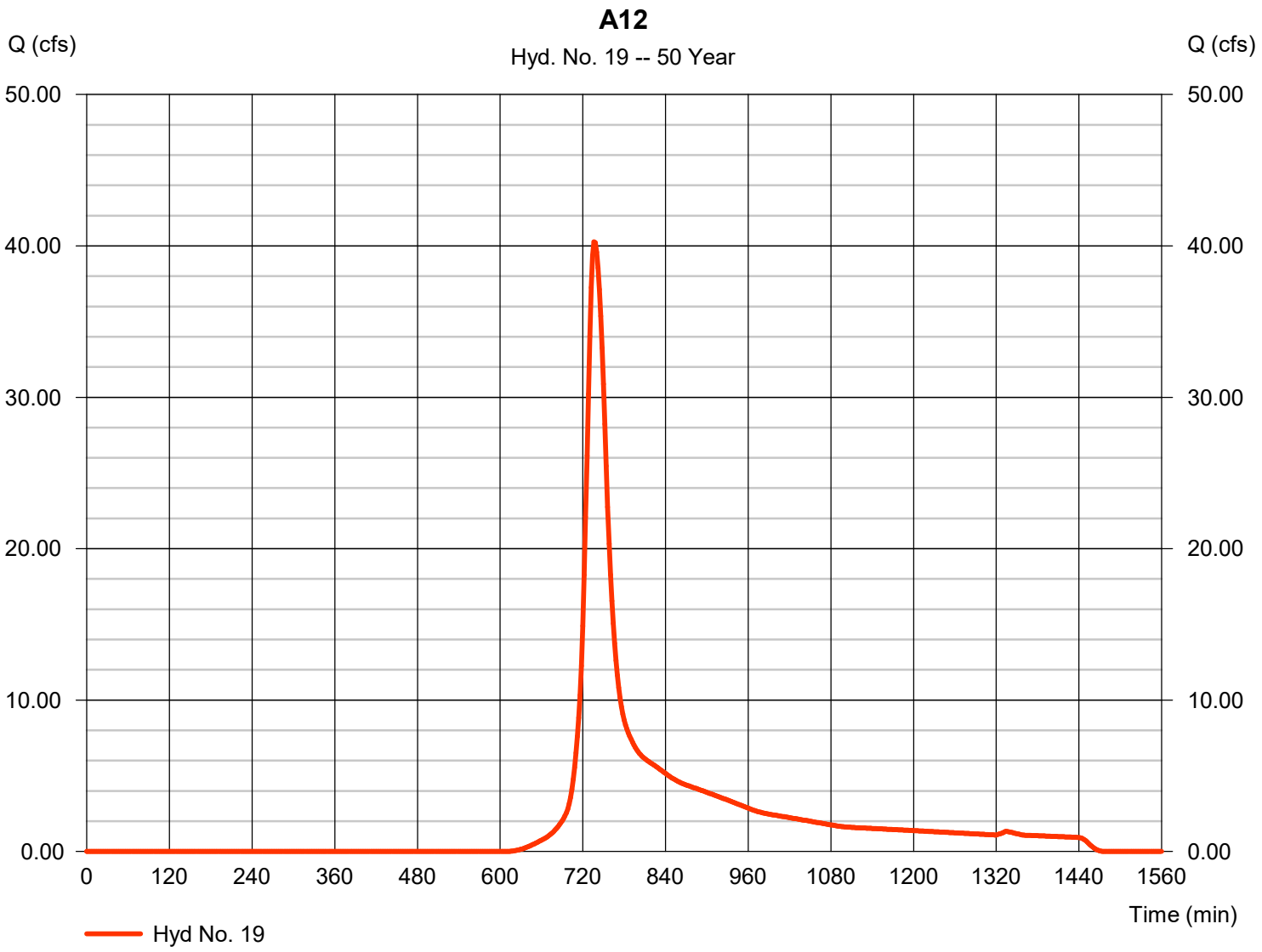
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 19

A12

Hydrograph type	= SCS Runoff	Peak discharge	= 40.26 cfs
Storm frequency	= 50 yrs	Time to peak	= 736 min
Time interval	= 2 min	Hyd. volume	= 197,623 cuft
Drainage area	= 22.000 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 22.80 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



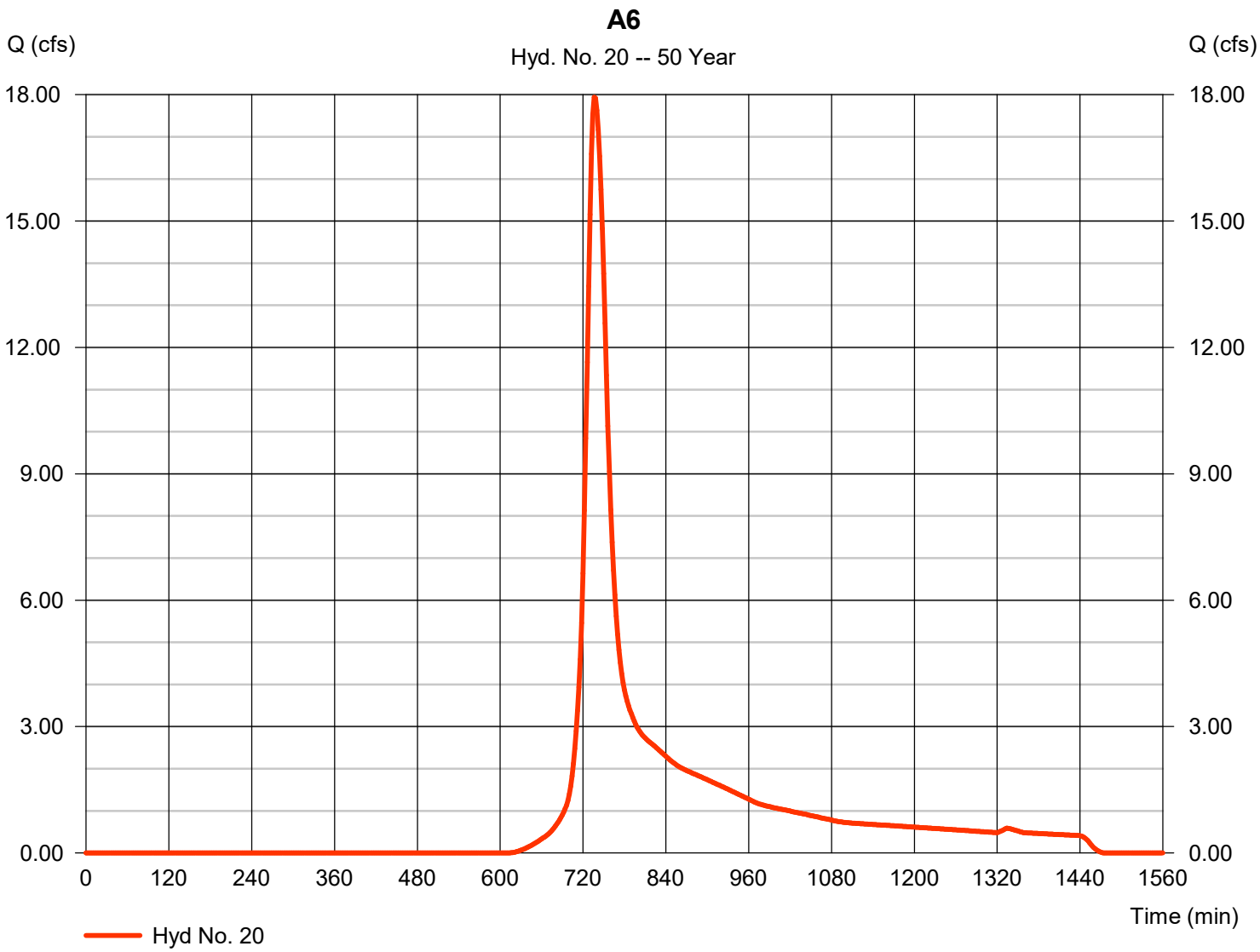
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 20

A6

Hydrograph type	= SCS Runoff	Peak discharge	= 17.94 cfs
Storm frequency	= 50 yrs	Time to peak	= 736 min
Time interval	= 2 min	Hyd. volume	= 88,032 cuft
Drainage area	= 9.800 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 20.20 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



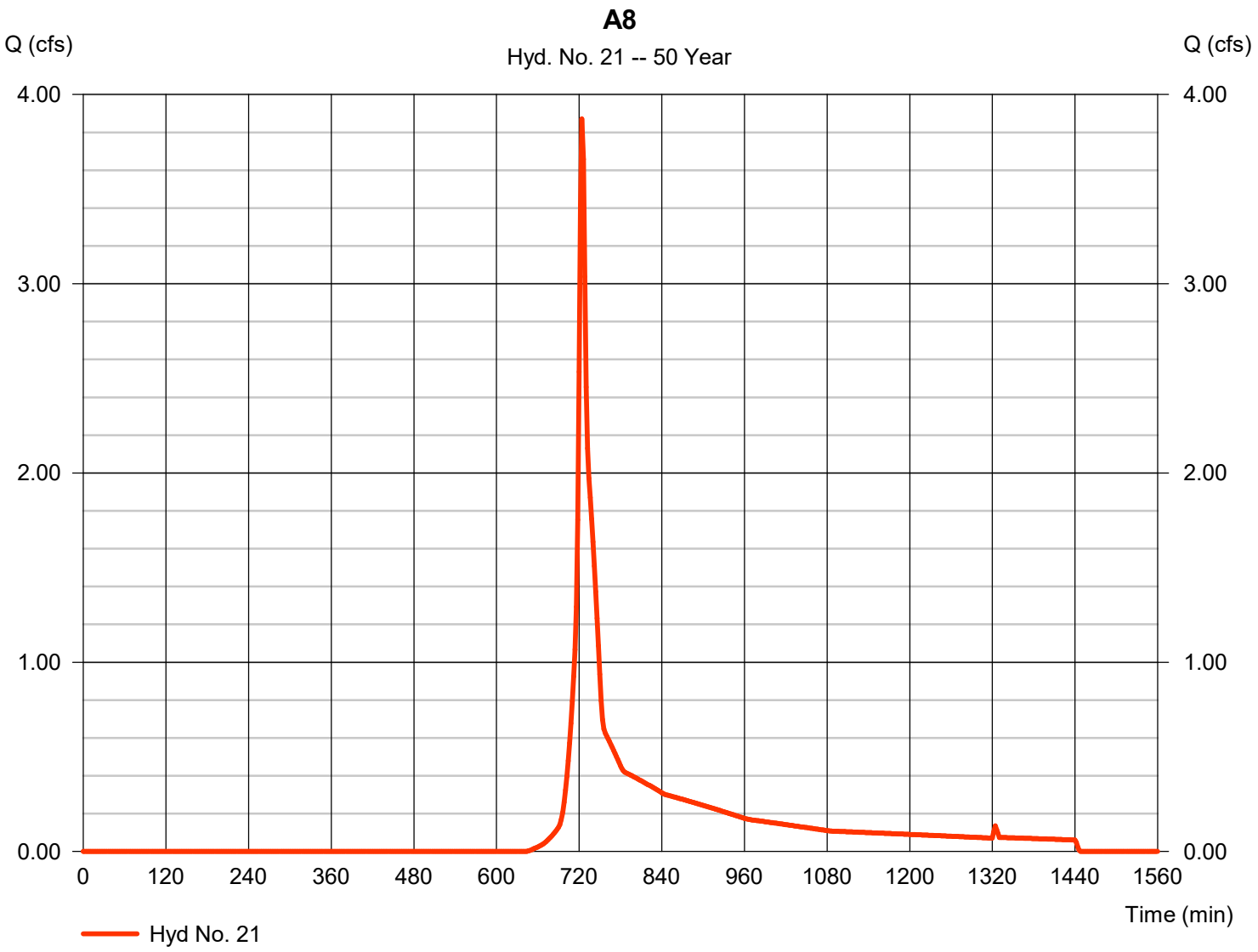
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 21

A8

Hydrograph type	= SCS Runoff	Peak discharge	= 3.871 cfs
Storm frequency	= 50 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 12,294 cuft
Drainage area	= 1.750 ac	Curve number	= 57
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



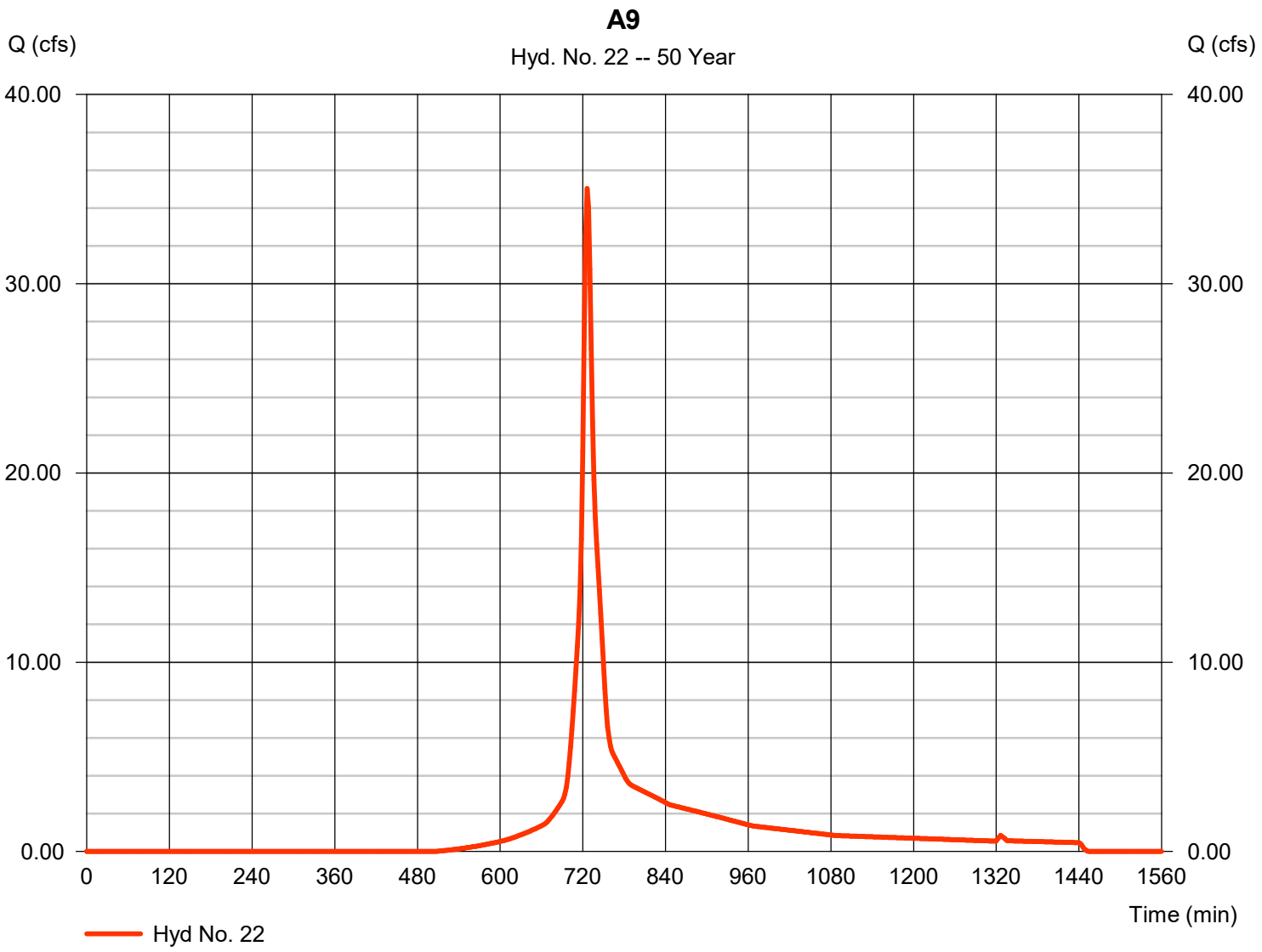
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 22

A9

Hydrograph type	= SCS Runoff	Peak discharge	= 35.03 cfs
Storm frequency	= 50 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 119,801 cuft
Drainage area	= 9.690 ac	Curve number	= 71
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.70 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



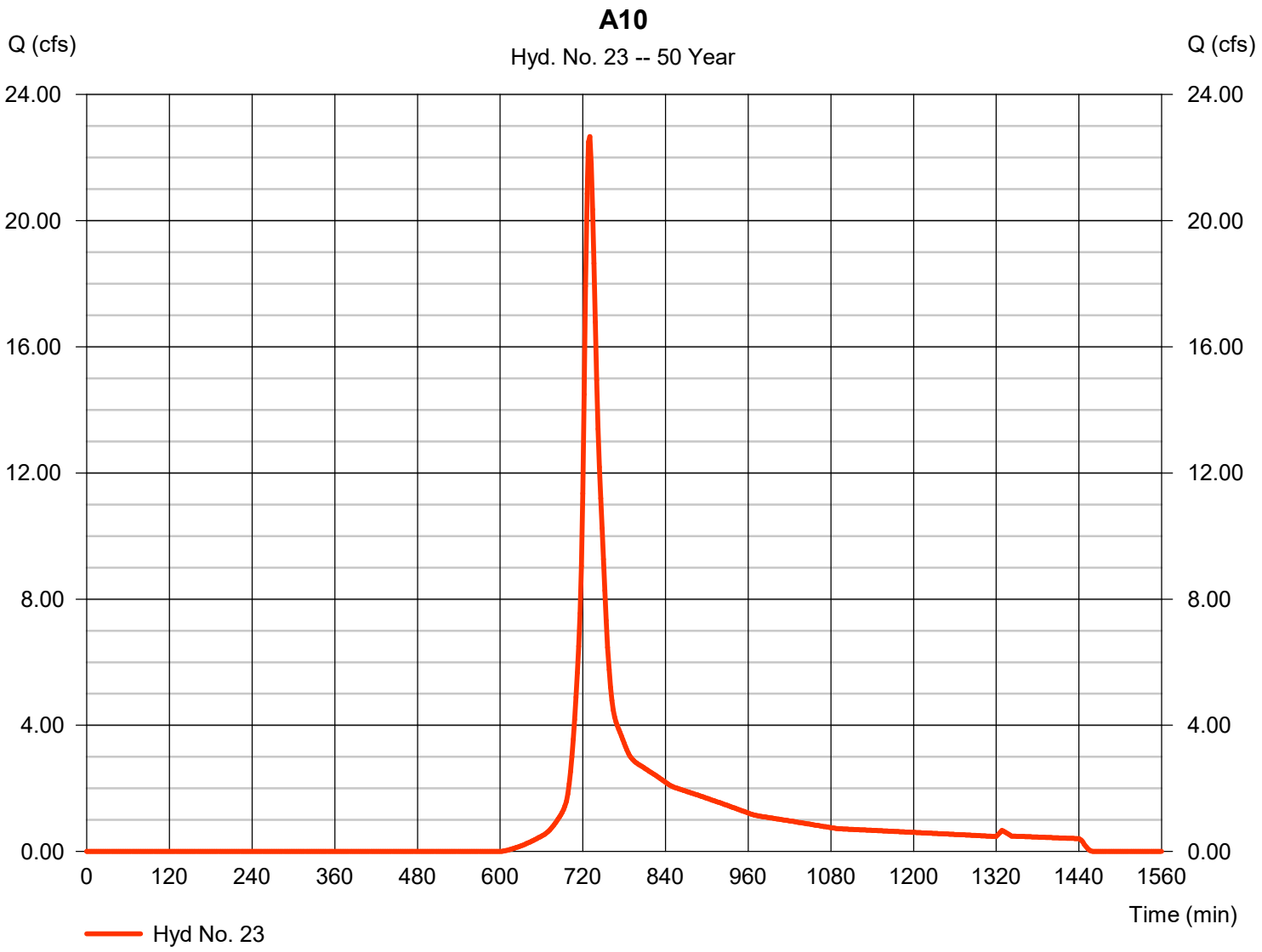
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 23

A10

Hydrograph type	= SCS Runoff	Peak discharge	= 22.67 cfs
Storm frequency	= 50 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 89,421 cuft
Drainage area	= 9.460 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.30 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



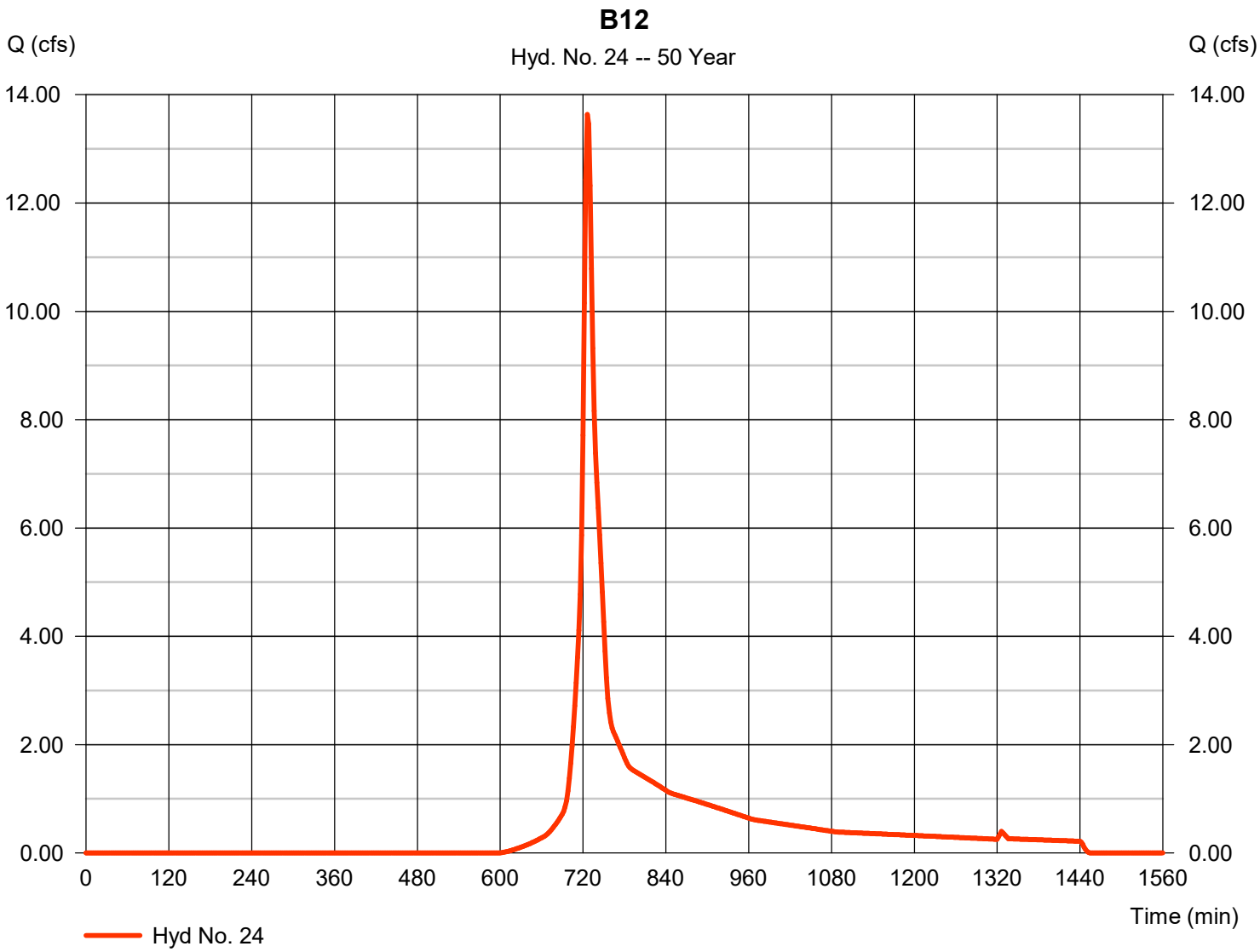
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 24

B12

Hydrograph type	= SCS Runoff	Peak discharge	= 13.64 cfs
Storm frequency	= 50 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 48,030 cuft
Drainage area	= 5.240 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.80 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

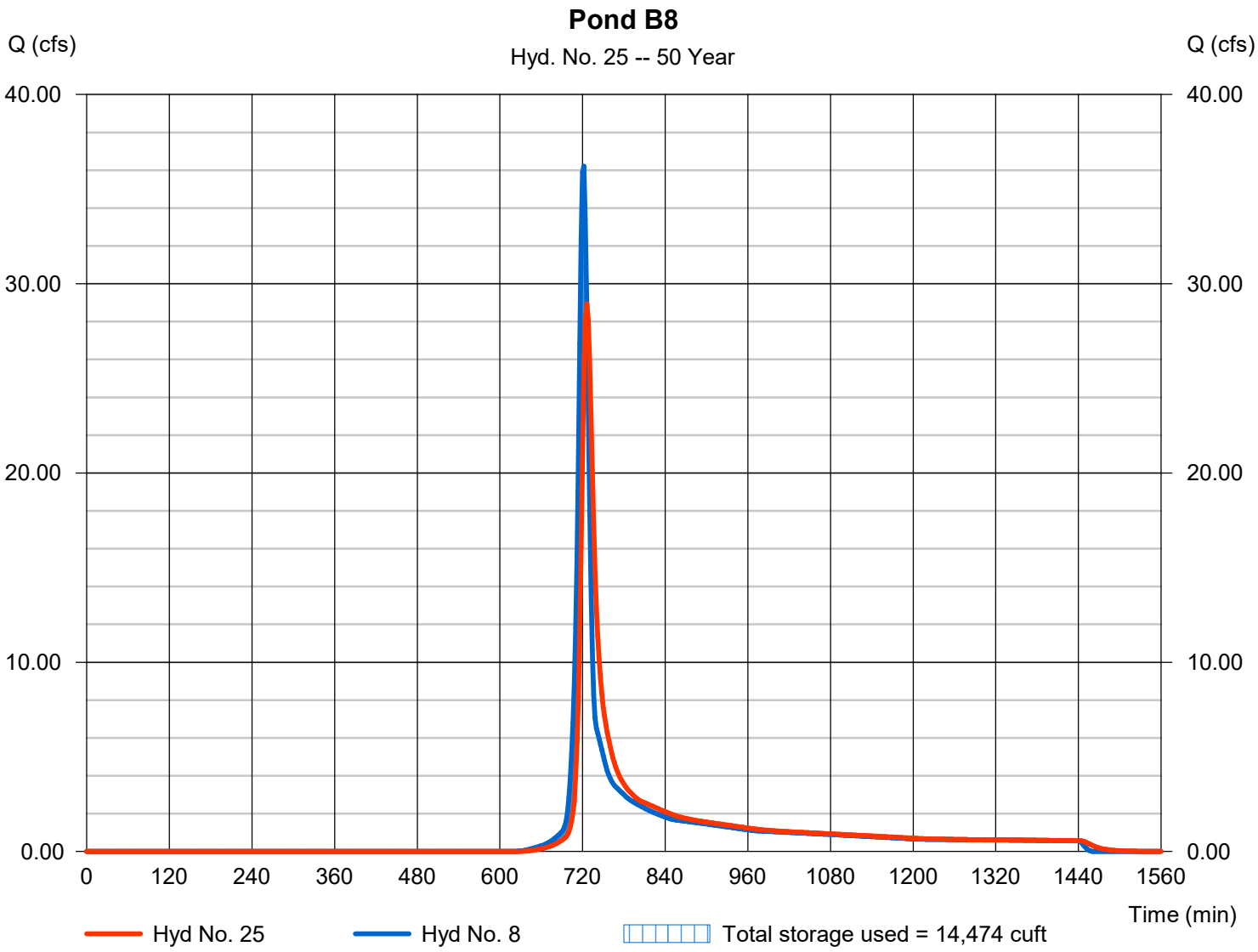
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 25

Pond B8

Hydrograph type	= Reservoir	Peak discharge	= 28.94 cfs
Storm frequency	= 50 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 95,560 cuft
Inflow hyd. No.	= 8 - B8	Max. Elevation	= 132.49 ft
Reservoir name	= B8 Pond	Max. Storage	= 14,474 cuft

Storage Indication method used.



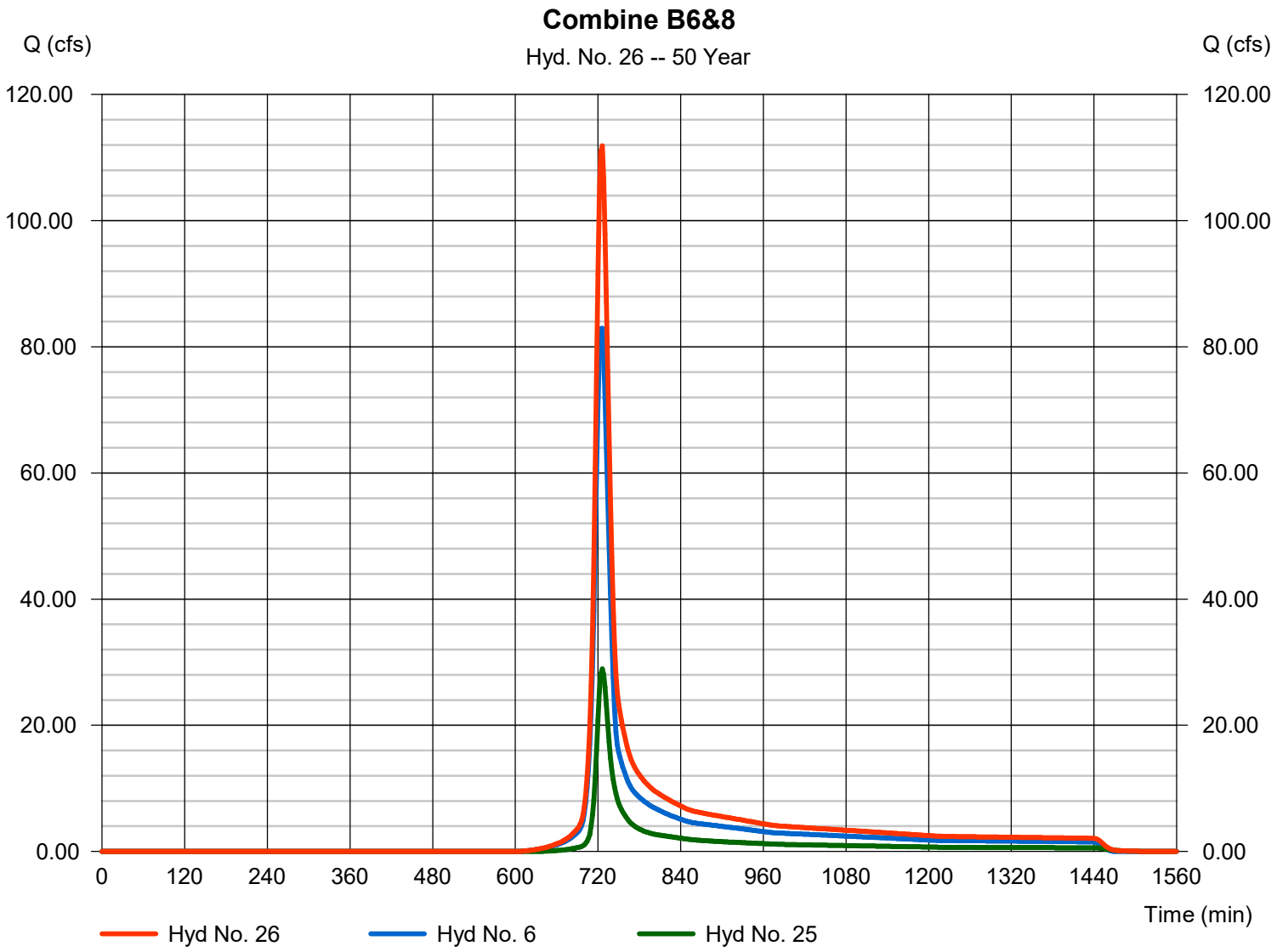
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 26

Combine B6&8

Hydrograph type	= Combine	Peak discharge	= 111.87 cfs
Storm frequency	= 50 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 361,364 cuft
Inflow hyds.	= 6, 25	Contrib. drain. area	= 27.950 ac



Hydrograph Report

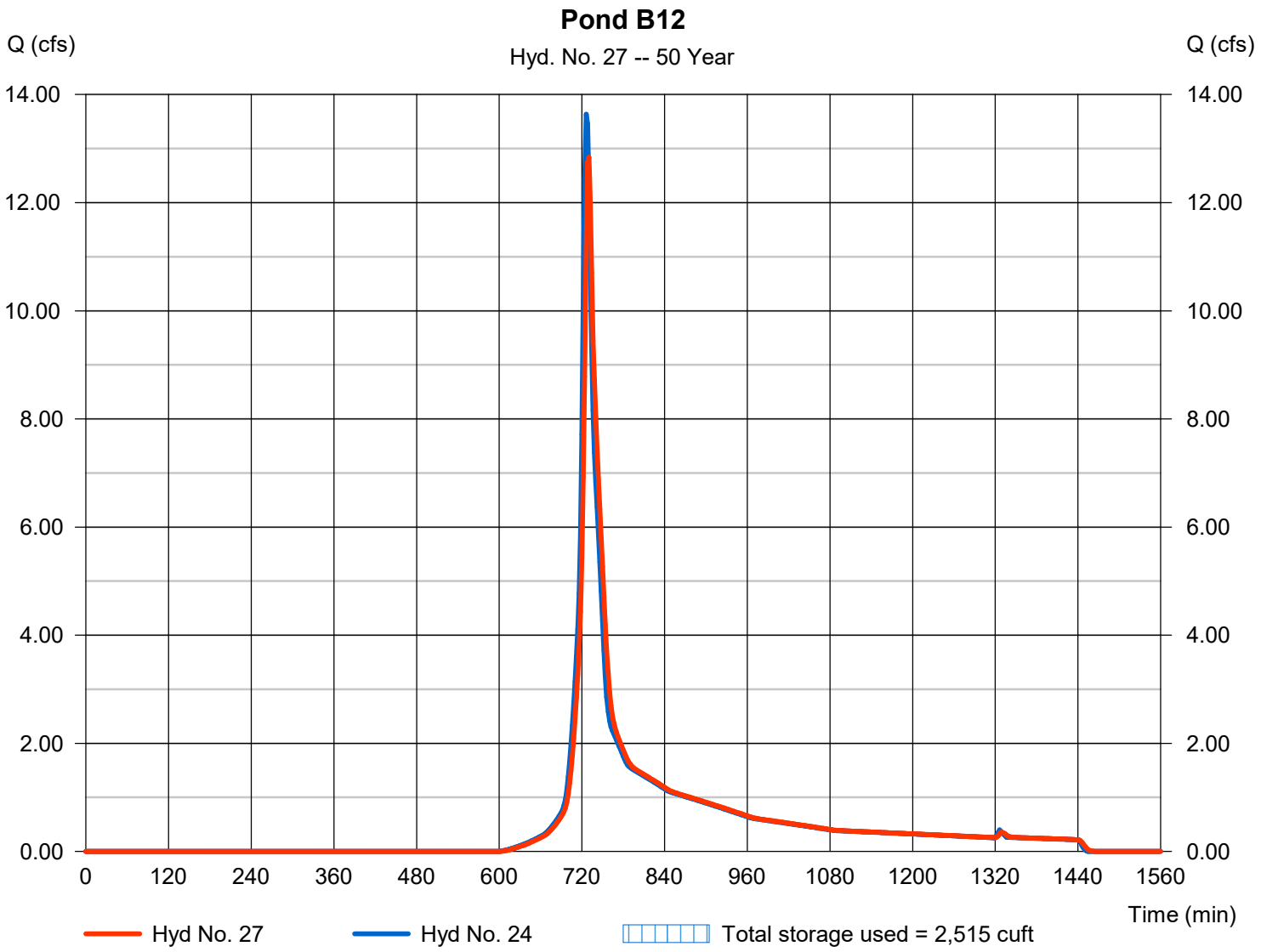
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 27

Pond B12

Hydrograph type	= Reservoir	Peak discharge	= 12.84 cfs
Storm frequency	= 50 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 48,030 cuft
Inflow hyd. No.	= 24 - B12	Max. Elevation	= 126.12 ft
Reservoir name	= B12 Pond	Max. Storage	= 2,515 cuft

Storage Indication method used.



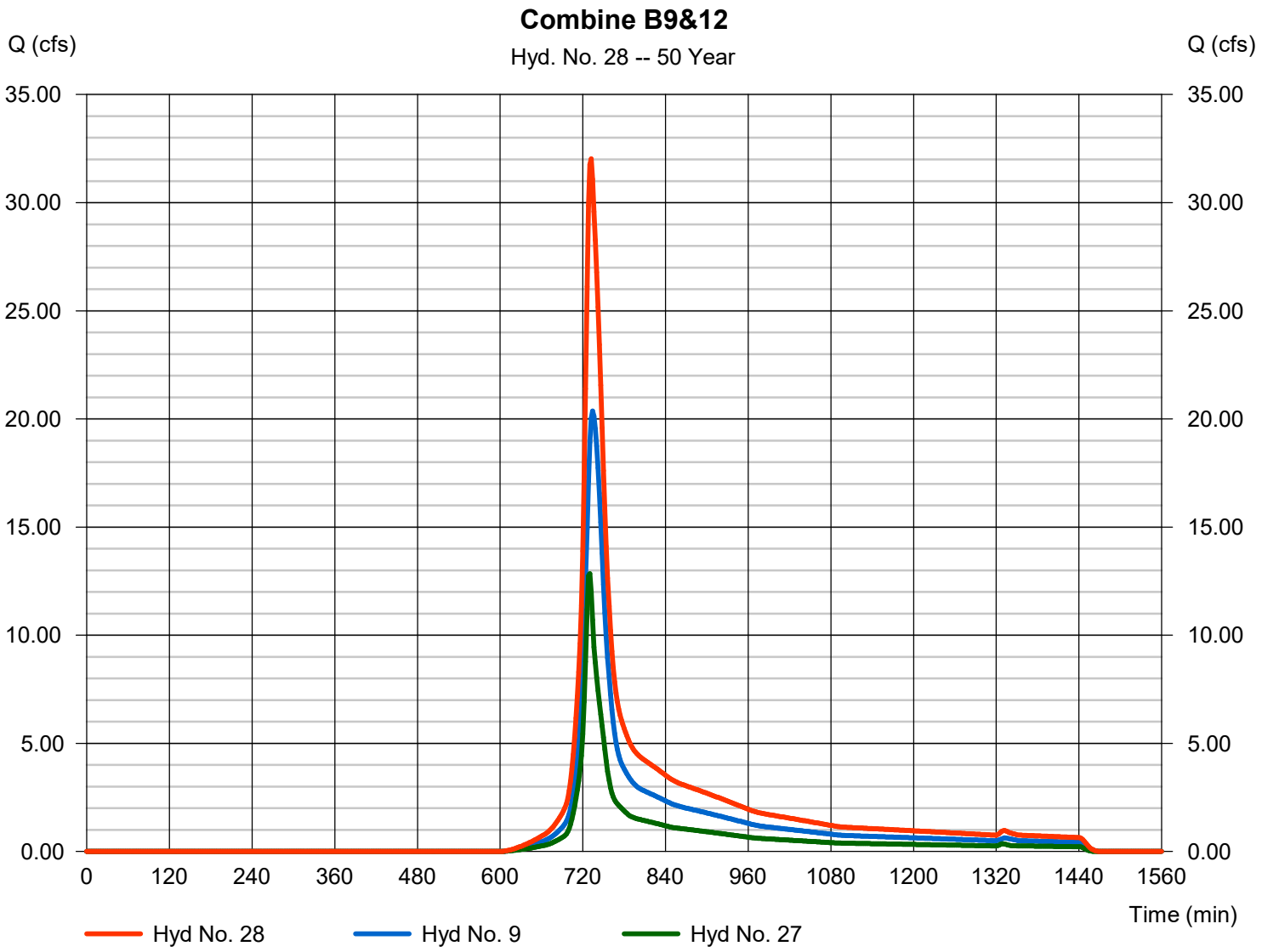
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 28

Combine B9&12

Hydrograph type	= Combine	Peak discharge	= 32.02 cfs
Storm frequency	= 50 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 140,425 cuft
Inflow hyds.	= 9, 27	Contrib. drain. area	= 10.080 ac



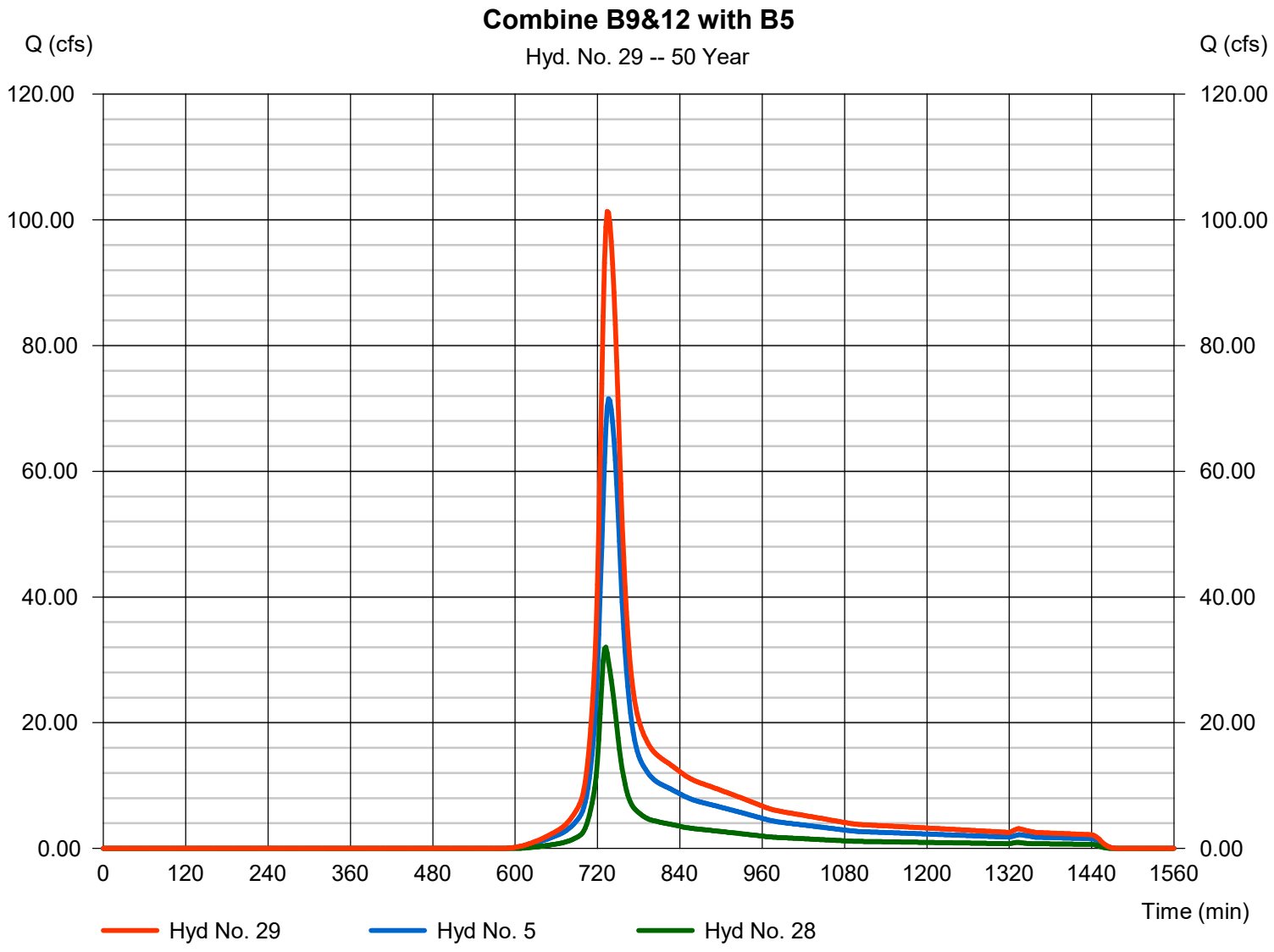
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 29

Combine B9&12 with B5

Hydrograph type	= Combine	Peak discharge	= 101.36 cfs
Storm frequency	= 50 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 485,956 cuft
Inflow hyds.	= 5, 28	Contrib. drain. area	= 34.440 ac



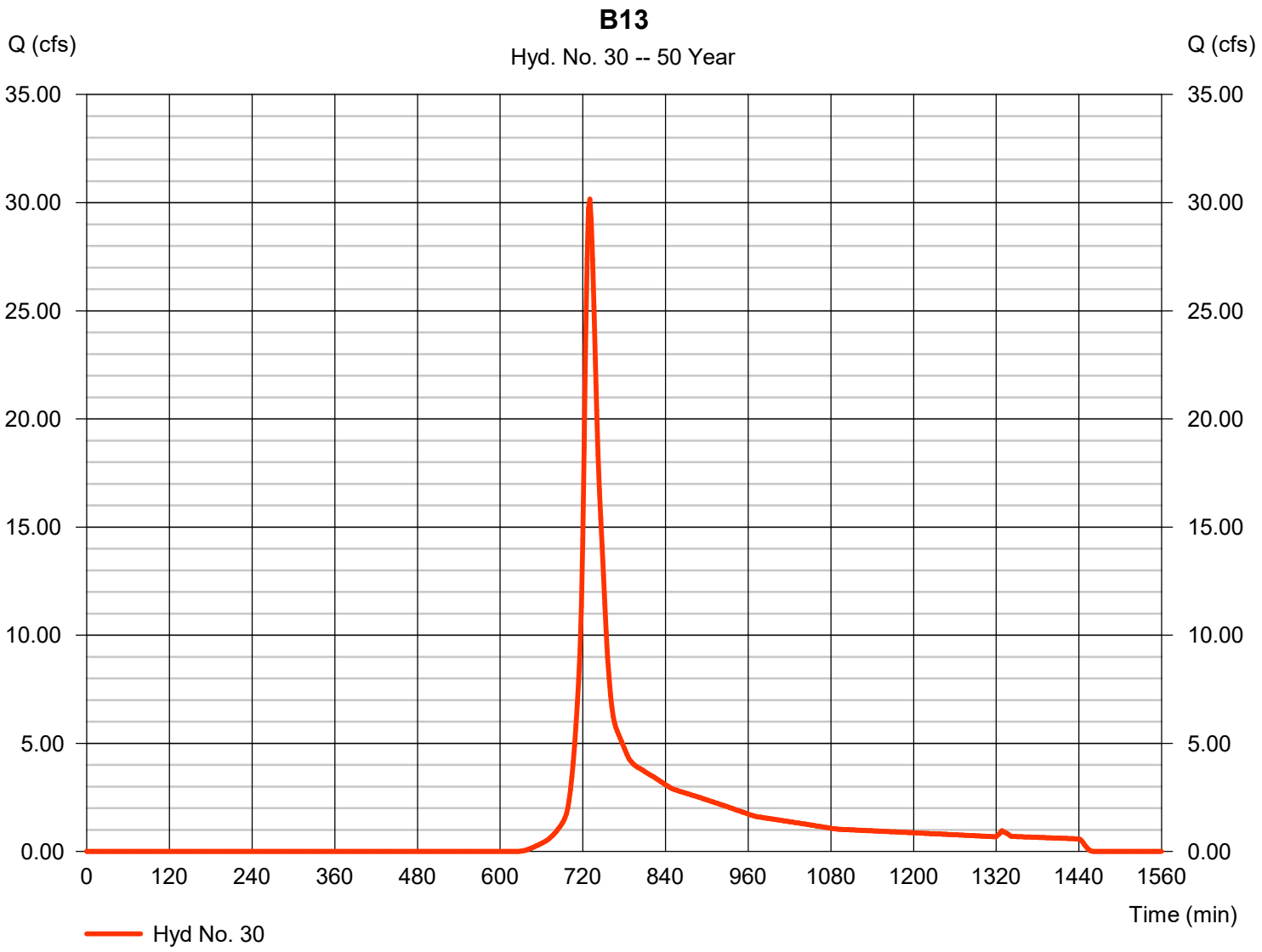
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 30

B13

Hydrograph type	= SCS Runoff	Peak discharge	= 30.16 cfs
Storm frequency	= 50 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 121,071 cuft
Drainage area	= 14.400 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 10.40 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



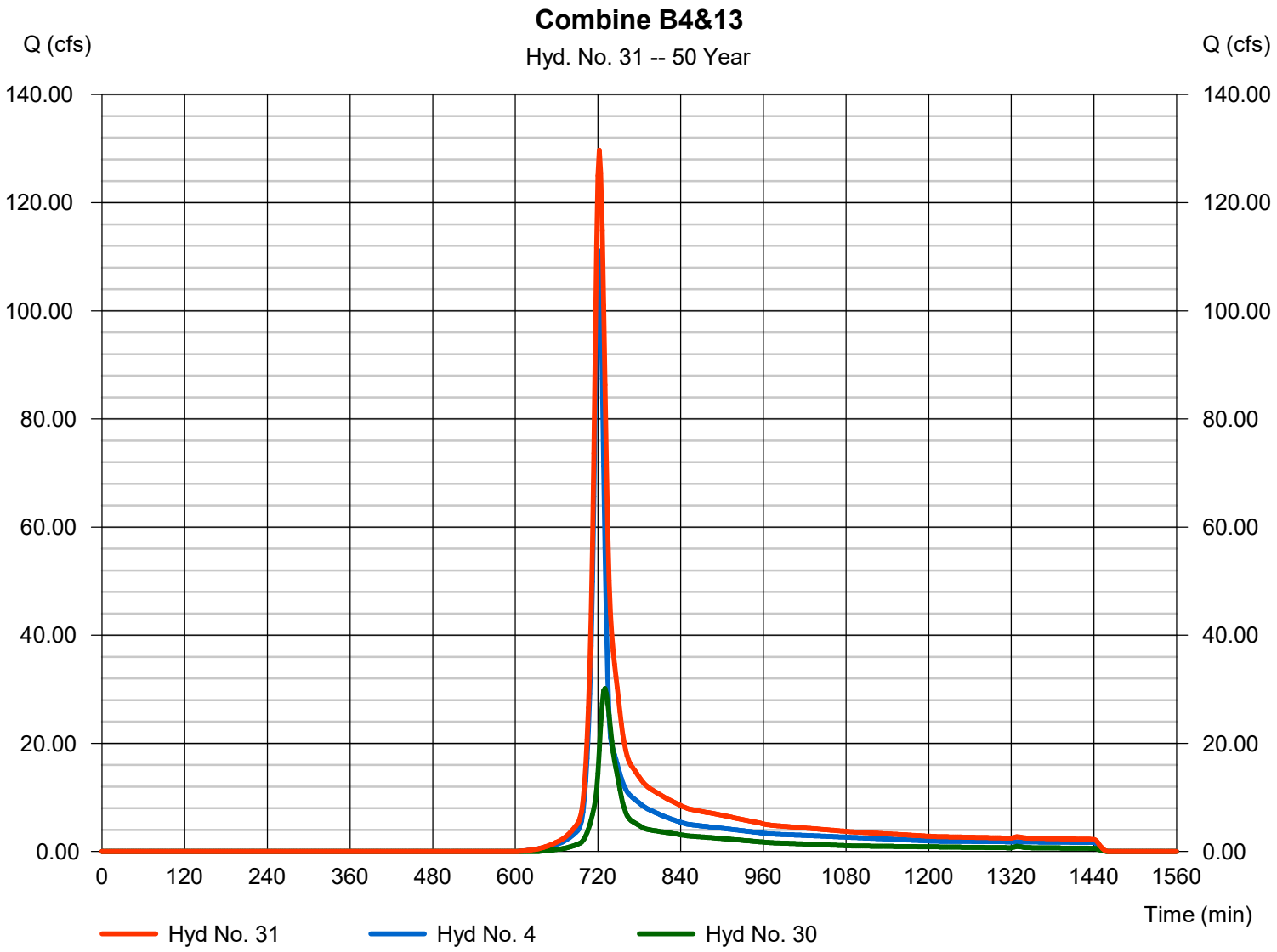
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 31

Combine B4&13

Hydrograph type	= Combine	Peak discharge	= 129.72 cfs
Storm frequency	= 50 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 412,639 cuft
Inflow hyds.	= 4, 30	Contrib. drain. area	= 44.130 ac



Hydrograph Report

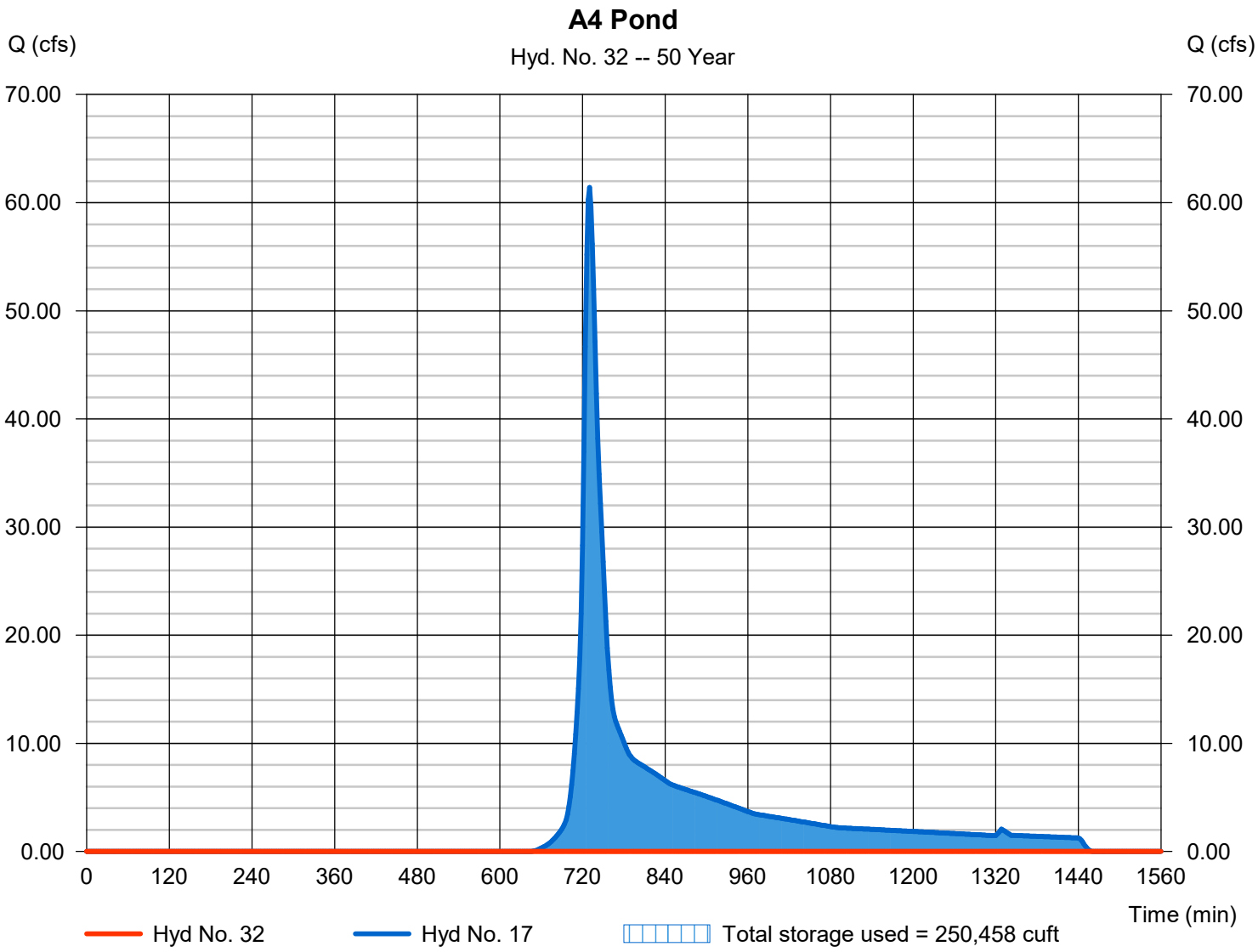
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 32

A4 Pond

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 50 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 17 - A4	Max. Elevation	= 109.10 ft
Reservoir name	= A4 Pond	Max. Storage	= 250,458 cuft

Storage Indication method used.



Hydrograph Report

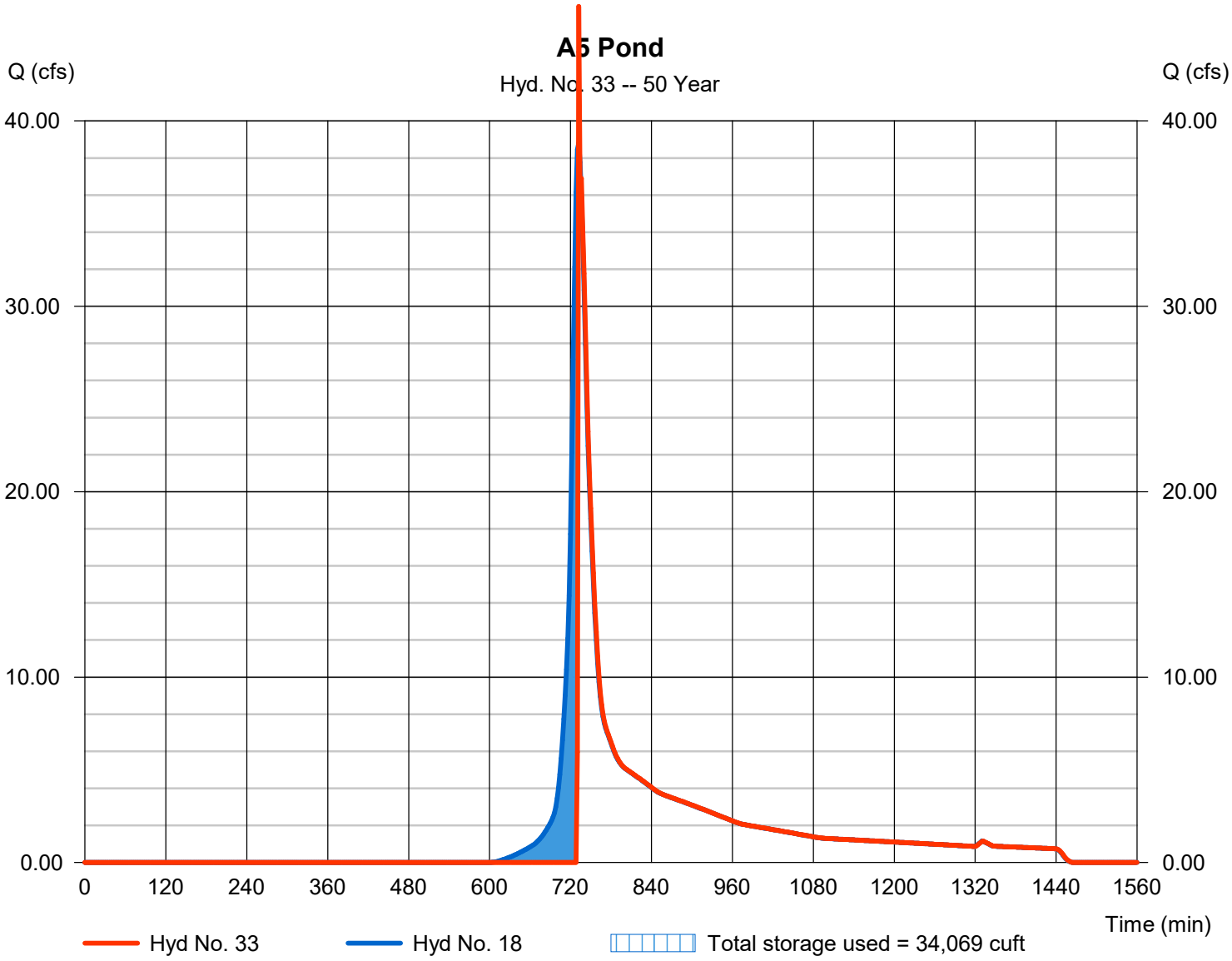
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 33

A5 Pond

Hydrograph type	= Reservoir	Peak discharge	= 46.17 cfs
Storm frequency	= 50 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 130,049 cuft
Inflow hyd. No.	= 18 - A5	Max. Elevation	= 108.29 ft
Reservoir name	= A5 Pond	Max. Storage	= 34,069 cuft

Storage Indication method used.



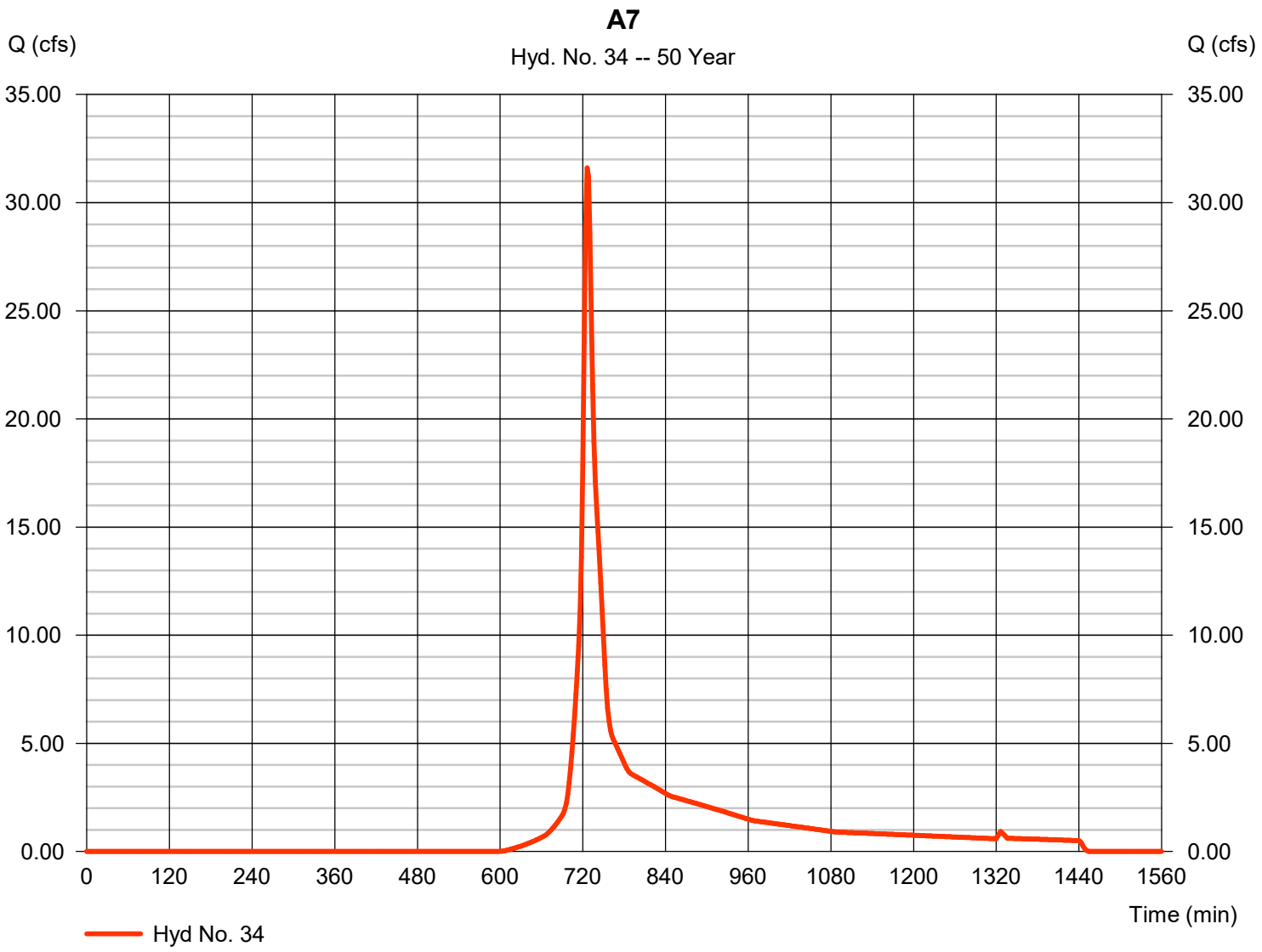
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 34

A7

Hydrograph type	= SCS Runoff	Peak discharge	= 31.62 cfs
Storm frequency	= 50 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 111,368 cuft
Drainage area	= 12.150 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.00 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



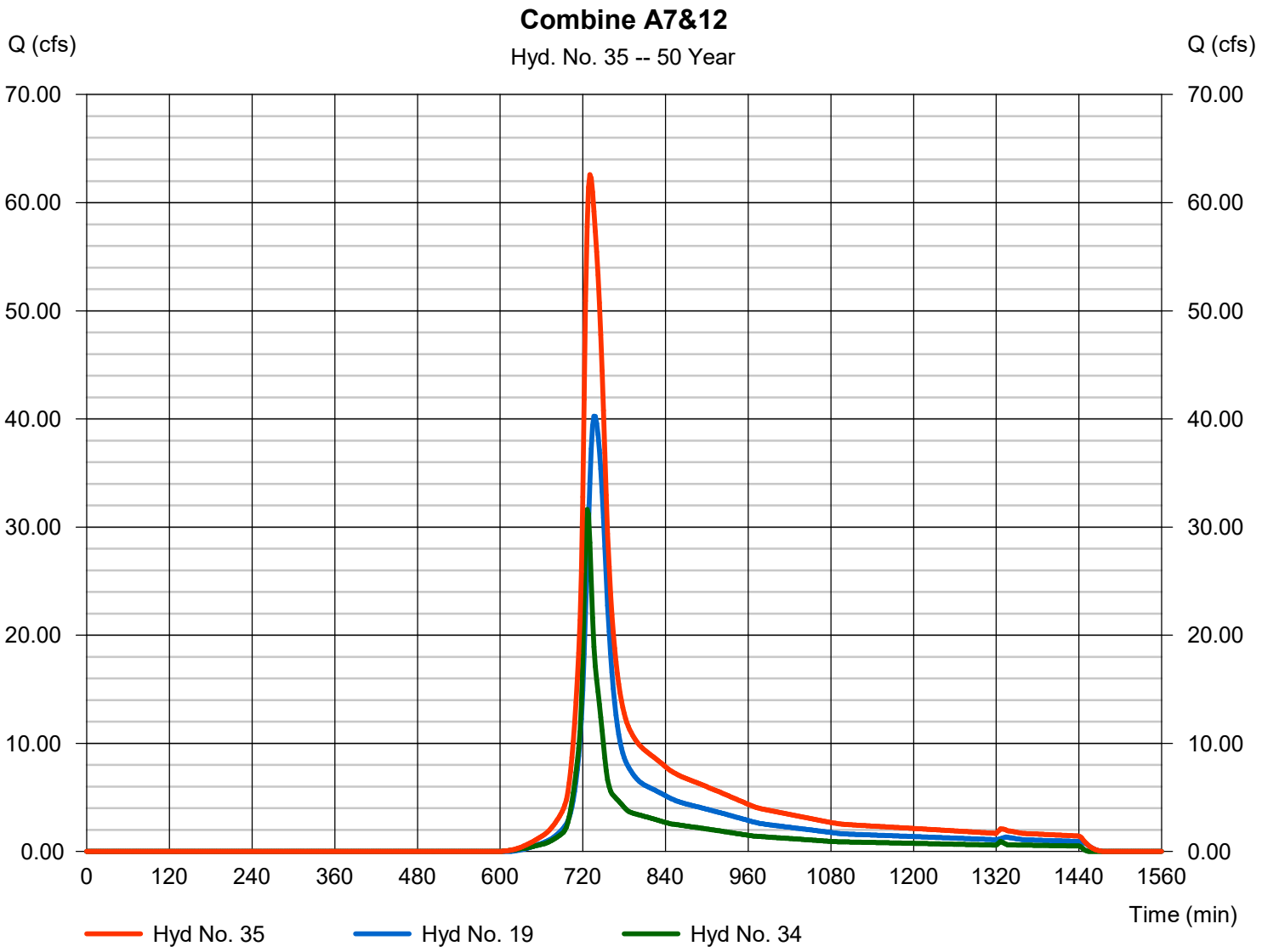
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 35

Combine A7&12

Hydrograph type	= Combine	Peak discharge	= 62.60 cfs
Storm frequency	= 50 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 308,991 cuft
Inflow hyds.	= 19, 34	Contrib. drain. area	= 34.150 ac



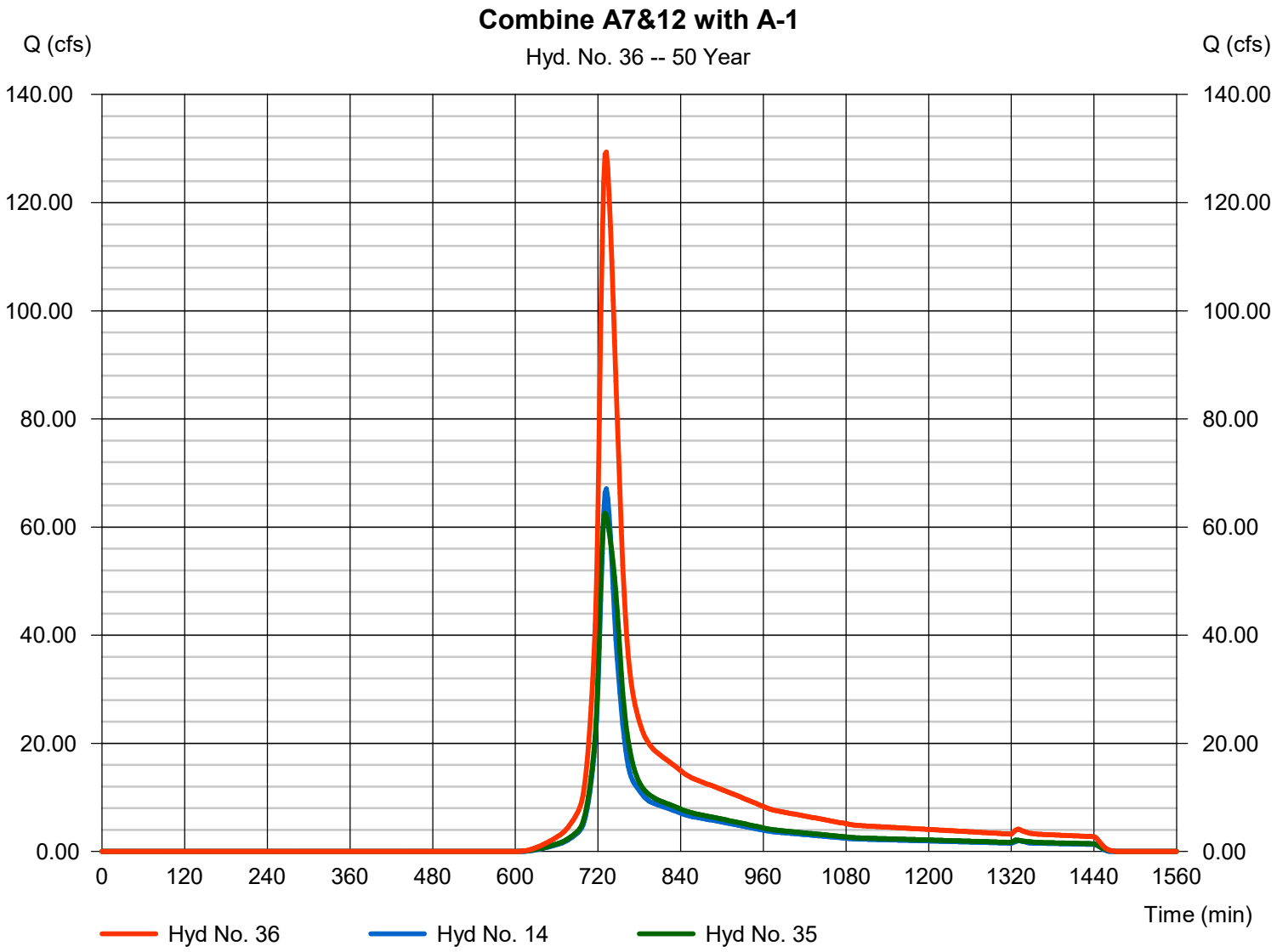
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 36

Combine A7&12 with A-1

Hydrograph type	= Combine	Peak discharge	= 129.34 cfs
Storm frequency	= 50 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 591,051 cuft
Inflow hyds.	= 14, 35	Contrib. drain. area	= 32.780 ac



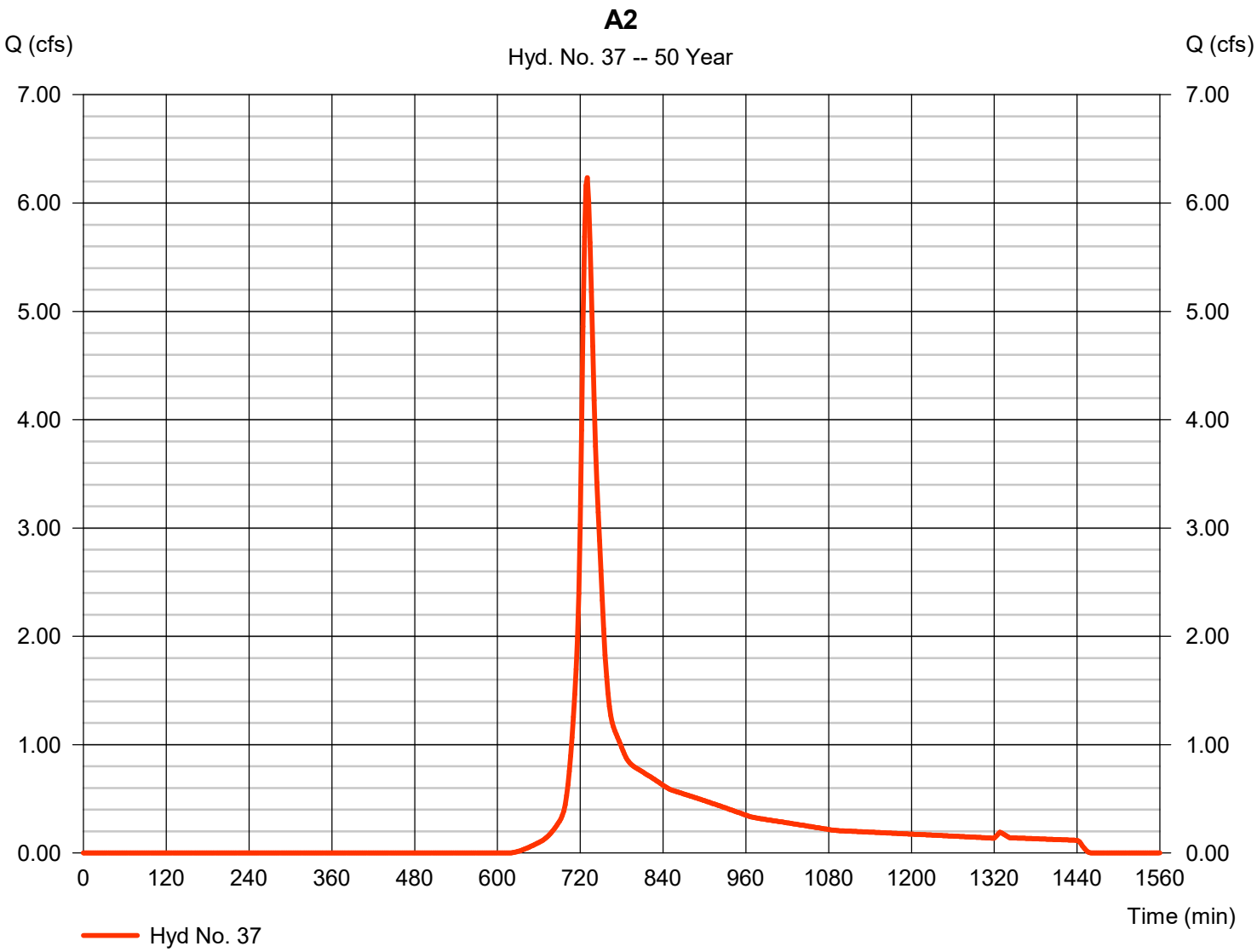
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 37

A2

Hydrograph type	= SCS Runoff	Peak discharge	= 6.234 cfs
Storm frequency	= 50 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 24,858 cuft
Drainage area	= 2.840 ac	Curve number	= 60
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.70 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



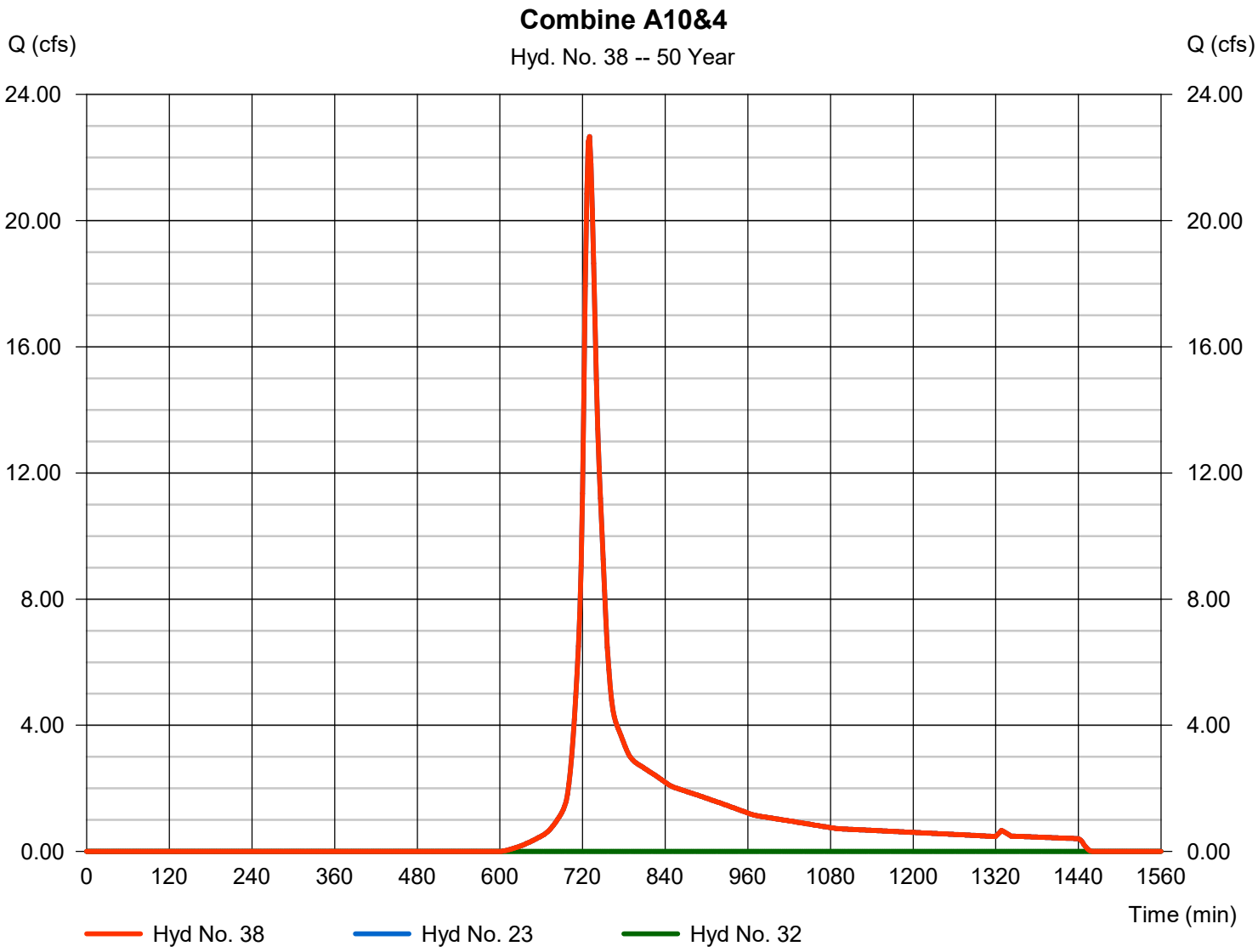
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 38

Combine A10&4

Hydrograph type	= Combine	Peak discharge	= 22.67 cfs
Storm frequency	= 50 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 89,421 cuft
Inflow hyds.	= 23, 32	Contrib. drain. area	= 9.460 ac



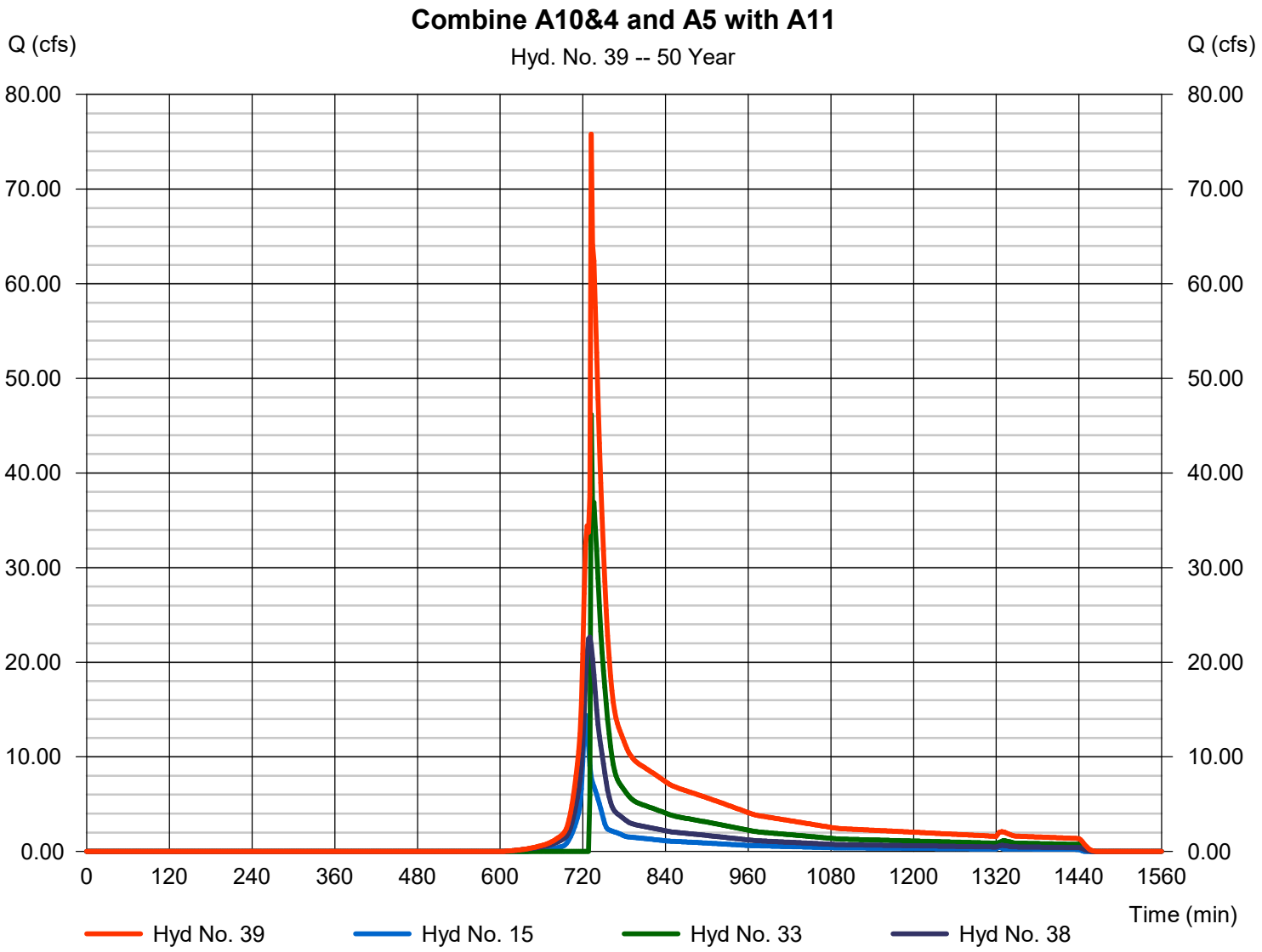
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 39

Combine A10&4 and A5 with A11

Hydrograph type	= Combine	Peak discharge	= 75.81 cfs
Storm frequency	= 50 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 264,786 cuft
Inflow hyds.	= 15, 33, 38	Contrib. drain. area	= 6.180 ac



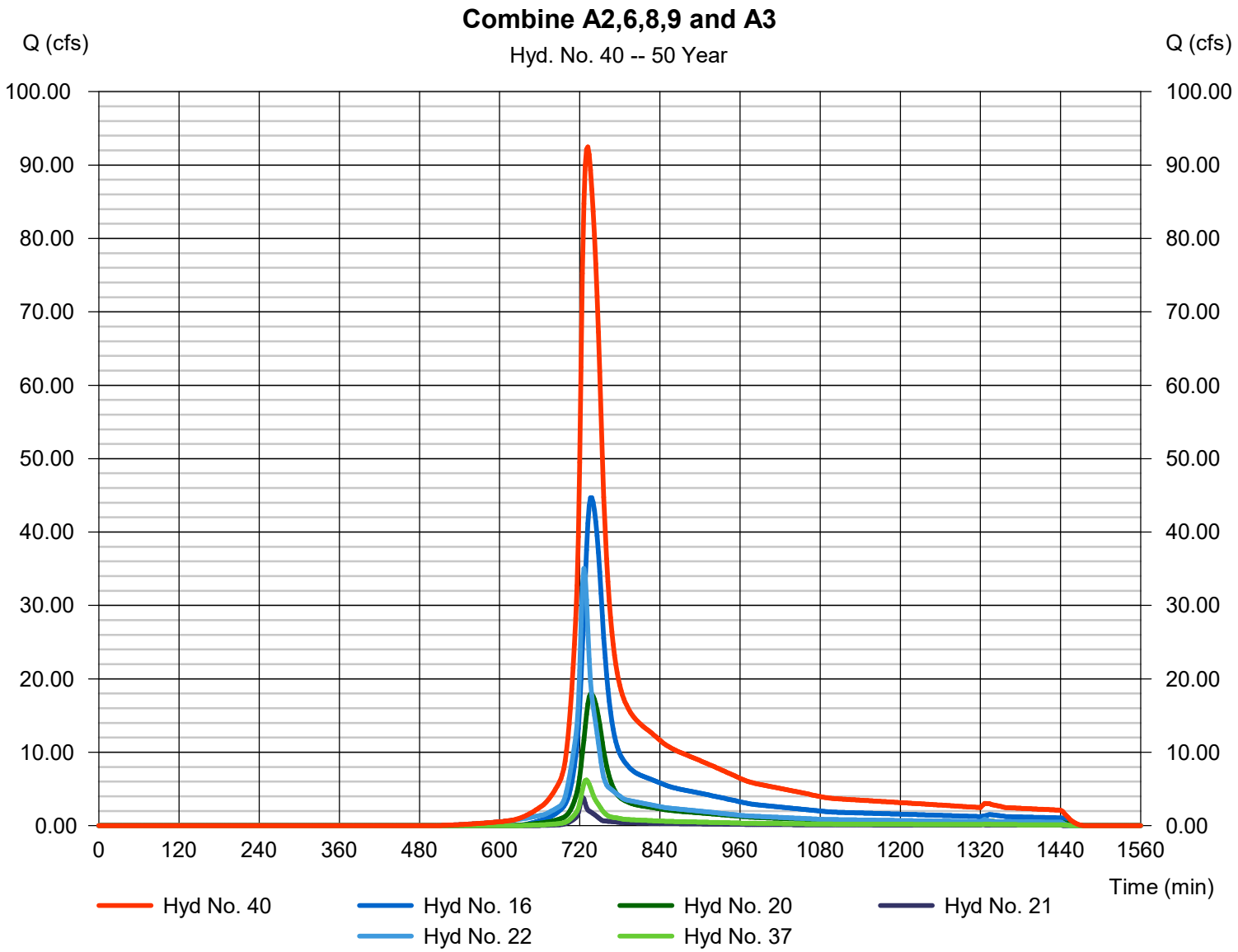
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 40

Combine A2,6,8,9 and A3

Hydrograph type	= Combine	Peak discharge	= 92.49 cfs
Storm frequency	= 50 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 465,800 cuft
Inflow hyds.	= 16, 20, 21, 22, 37	Contrib. drain. area	= 49.640 ac



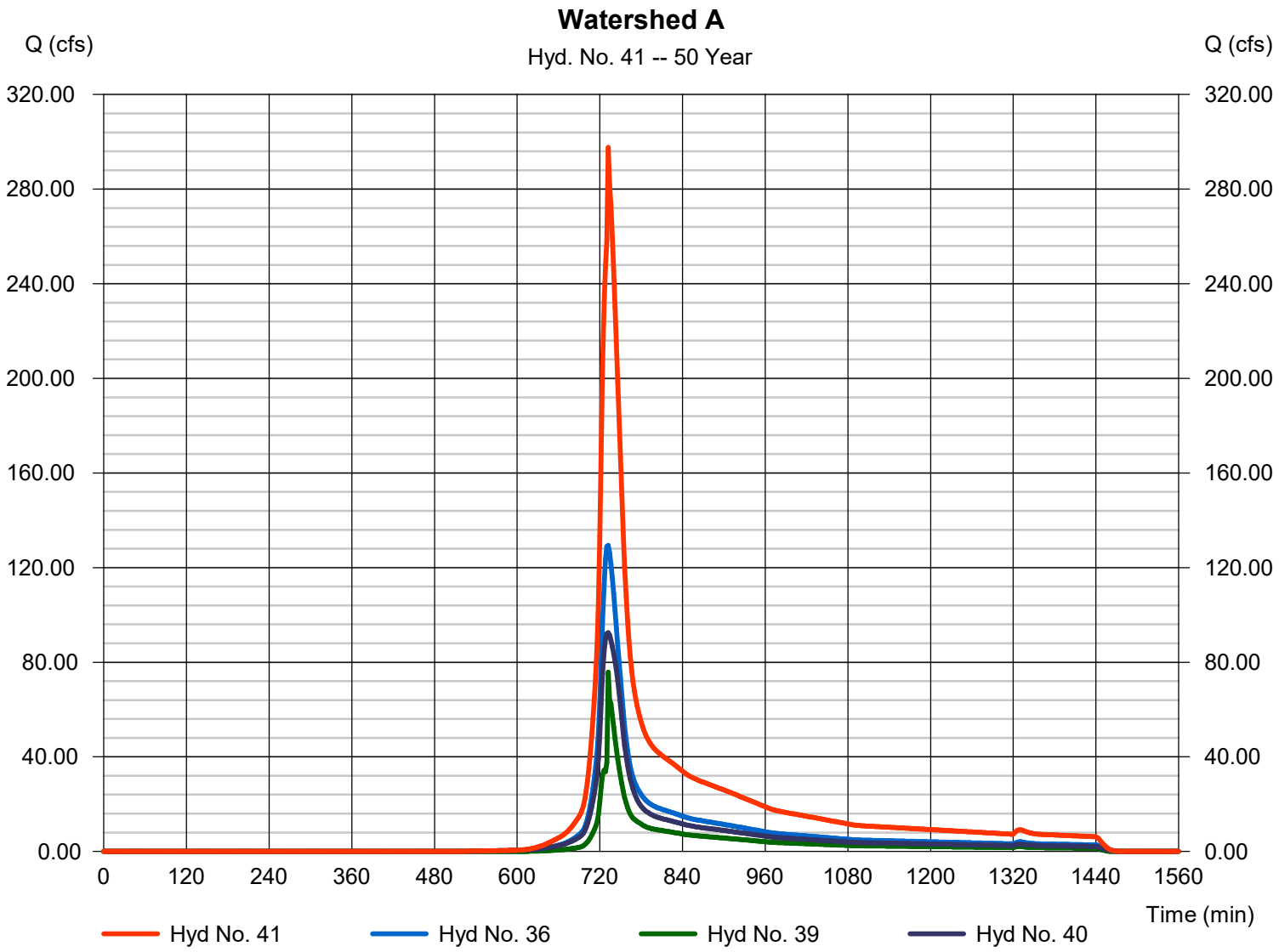
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 41

Watershed A

Hydrograph type	= Combine	Peak discharge	= 297.64 cfs
Storm frequency	= 50 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 1,321,637 cuft
Inflow hyds.	= 36, 39, 40	Contrib. drain. area	= 0.000 ac



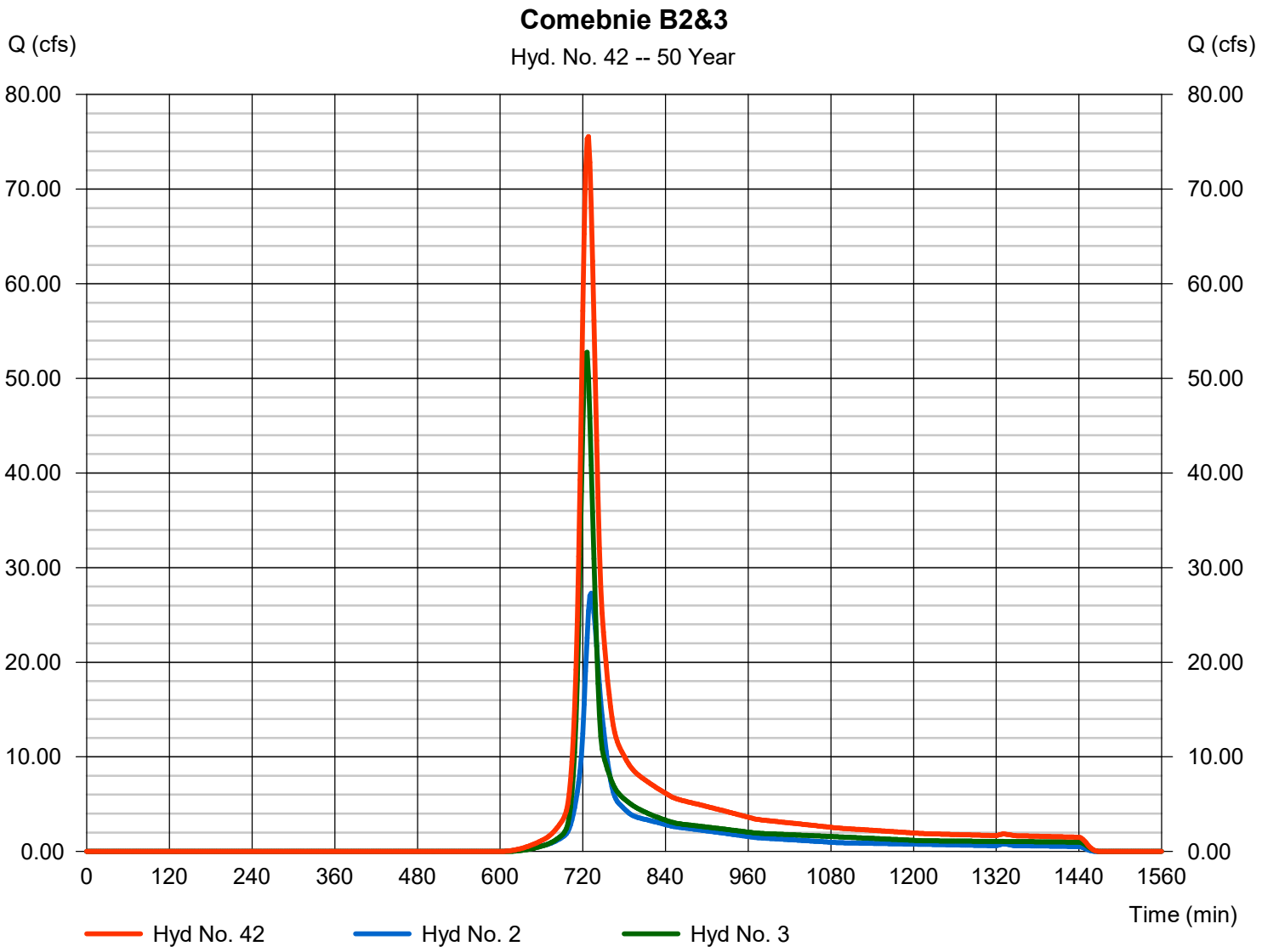
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 42

Comebnie B2&3

Hydrograph type	= Combine	Peak discharge	= 75.57 cfs
Storm frequency	= 50 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 283,881 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 31.290 ac



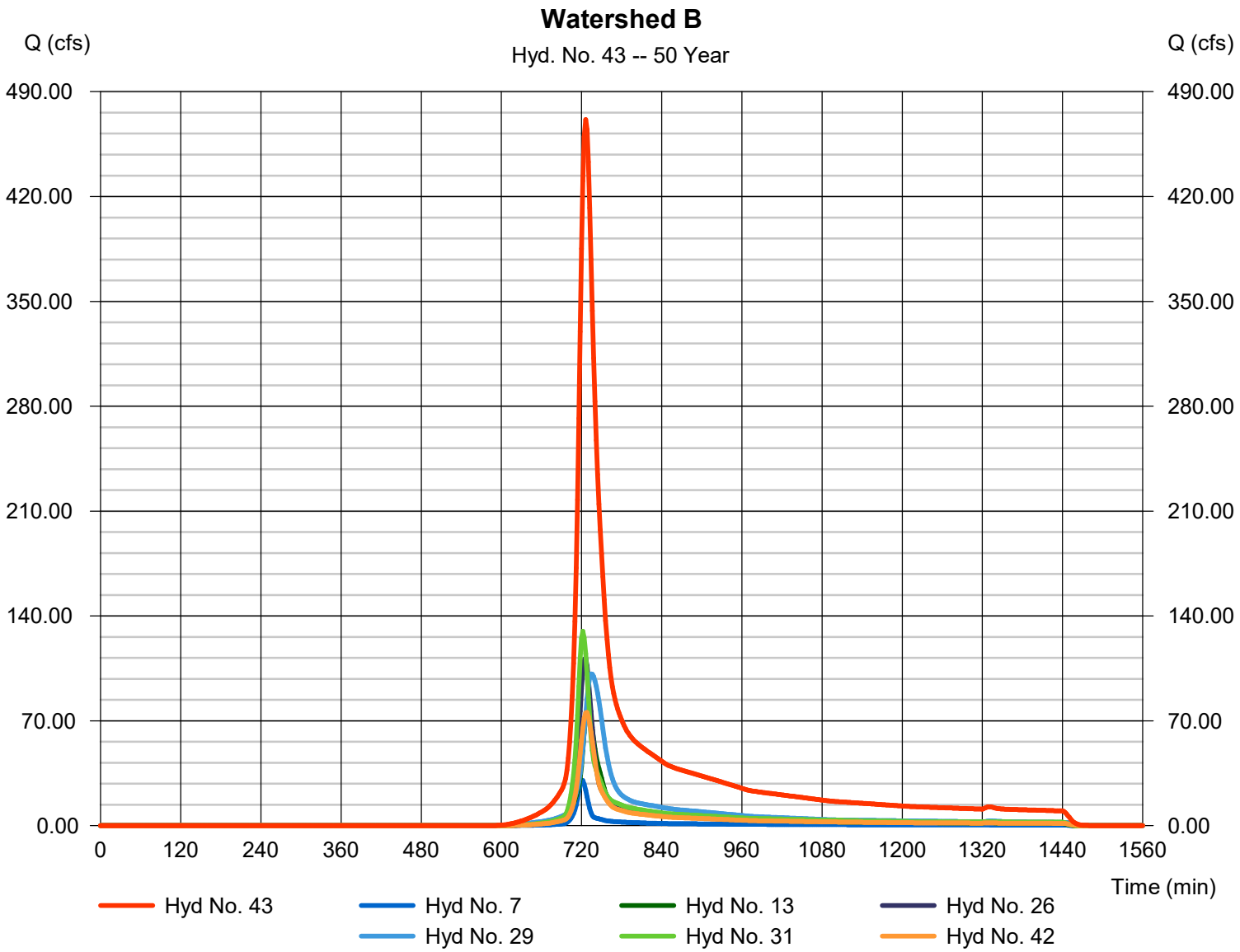
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 05 / 11 / 2020

Hyd. No. 43

Watershed B

Hydrograph type	= Combine	Peak discharge	= 471.49 cfs
Storm frequency	= 50 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 1,931,473 cuft
Inflow hyds.	= 7, 13, 26, 29, 31, 42	Contrib. drain. area	= 7.760 ac



APPENDIX B

Proposed Stormwater Discharge Calculations

LANGAN

Project **Project Hudson** By **RJS** Date **5/21/2020**

Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: Present (Developed) **Proposed Watershed A1-1**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**0.34**	**33.62**
A	**Open Space, Good Cond.**	**39**			**0.31**	**11.97**
B	**Open Space, Good Cond.**	**61**			**18.62**	**1135.83**
B	**Woods, Good Cond.**	**55**			**2.04**	**112.45**
				Totals =	**21.31**	**1293.87**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{1293.87}{21.31} = 60.70 \quad \text{Use CN} = \boxed{61}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Project **Project Hudson** By **RJS** Date **5/21/2020**

Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: Present Developed **Proposed Watershed A1-2**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**13.00**	**1274.24**
B	**Open Space, Good Cond.**	**61**			**0.39**	**23.50**
D	**Open Space, Good Cond.**	**80**			**9.32**	**745.61**
				Totals =	**22.71**	**2043.35**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{2043.35}{22.71} = 89.98 \quad \text{Use CN} = \mathbf{90}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Project **Project Hudson** By **RJS** Date **5/21/2020**

Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: Present (Developed) **Proposed Watershed A1-3**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**10.97**	**1075.51**
B	**Open Space, Good Cond.**	**61**			**4.28**	**260.84**
				Totals =	**15.25**	**1336.35**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{1336.35}{15.25} = 87.63 \qquad \text{Use CN} = \mathbf{88}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Project **Project Hudson** By **RJS** Date **5/21/2020**

Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: Present Developed **Proposed Watershed A1-4**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**28.33**	**2776.78**
B	**Streets, Gravel**	**85**			**0.70**	**59.81**
A	**Open Space, Good Cond.**	**39**			**0.01**	**0.24**
B	**Open Space, Good Cond.**	**61**			**11.53**	**703.10**
				Totals =	**40.57**	**3539.93**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{3539.93}{40.57} = 87.25 \quad \text{Use CN} = \mathbf{87}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Project **Project Hudson** By **RJS** Date **5/21/2020**

Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: Present (Developed) **Proposed Watershed A1-5**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**9.11**	**892.49**
B	**Open Space, Good Cond.**	**61**			**4.01**	**244.89**
				Totals =	**13.12**	**1137.39**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{1137.39}{13.12} = 86.68 \quad \text{Use CN} = \mathbf{87}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Project **Project Hudson** By **RJS** Date **5/21/2020**

Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: Present Developed **Proposed Watershed A1-6**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**4.66**	**456.99**
B	**Open Space, Good Cond.**	**61**			**2.25**	**137.22**
D	**Open Space, Good Cond.**	**80**			**0.30**	**23.77**
				Totals =	**7.21**	**617.97**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{617.97}{7.21} = 85.71 \quad \text{Use CN} = \mathbf{86}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Project **Project Hudson** By **RJS** Date **5/21/2020**

Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: Present (Developed) **Proposed Watershed A2**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
B	**Open Space, Good Cond.**	**61**			**0.34**	**20.66**
B	**Woods-Grass Comb., Good Cond.**	**58**			**0.09**	**5.36**
				Totals =	**0.43**	**26.03**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{26.03}{0.43} = 60.36 \quad \text{Use CN} = \mathbf{60}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Project **Project Hudson** By **RJS** Date **5/21/2020**

Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: Present (Developed) **Proposed Watershed A3**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**0.09**	**9.29**
B	**Open Space, Good Cond.**	**61**			**7.94**	**484.35**
B	**Woods, Good Cond.**	**55**			**2.26**	**124.10**
D	**Woods, Good Cond.**	**77**			**0.05**	**3.70**
				Totals =	**10.34**	**621.43**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{621.43}{10.34} = 60.10 \quad \text{Use CN} = \boxed{60}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Project **Project Hudson** By **RJS** Date **5/21/2020**

Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: Present (Developed) **Proposed Watershed A4**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**0.25**	**24.28**
B	**Open Space, Good Cond.**	**61**			**5.82**	**355.26**
B	**Woods, Good Cond.**	**55**			**0.30**	**16.24**
				Totals =	**6.37**	**395.77**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{395.77}{6.37} = 62.16 \quad \text{Use CN} = \mathbf{62}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Project **Project Hudson** By **RJS** Date **5/21/2020**

Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: Present Developed **Proposed Watershed A5**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**0.12**	**11.80**
B	**Open Space, Good Cond.**	**61**			**3.06**	**186.62**
B	**Woods, Good Cond.**	**55**			**0.05**	**2.85**
D	**Open Space, Good Cond.**	**80**			**0.07**	**5.26**
				Totals =	**3.30**	**206.54**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{206.54}{3.30} = 62.64 \quad \text{Use CN} = \mathbf{63}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Project **Project Hudson** By **RJS** Date **5/21/2020**

Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: Present Developed **Proposed Watershed A6-1**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**0.14**	**13.25**
B	**Open Space, Good Cond.**	**61**			**3.88**	**236.68**
B	**Woods, Good Cond.**	**55**			**0.30**	**16.60**
				Totals =	**4.32**	**266.53**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{266.53}{4.32} = 61.74 \quad \text{Use CN} = \mathbf{62}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Project **Project Hudson** By **RJS** Date **5/21/2020**

Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: Present (Developed) **Proposed Watershed A6-2**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**23.47**	**2299.98**
B	**Open Space, Good Cond.**	**61**			**6.17**	**376.59**
B	**Woods, Good Cond.**	**55**			**0.26**	**14.27**
				Totals =	**29.90**	**2690.84**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{2690.84}{29.90} = 89.99 \qquad \text{Use CN} = \mathbf{90}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Project **Project Hudson** By **RJS** Date **5/21/2020**

Location **Hudson, NH** Checked **NLK** Date **5/21/2020**

Circle one: Present (Developed) **Proposed Watershed A8**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**0.01**	**1.38**
A	**Open Space, Good Cond.**	**39**			**0.43**	**16.59**
A	**Woods, Good Cond.**	**30**			**1.31**	**39.43**
				Totals =	**1.75**	**57.40**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{57.40}{1.75} = 32.73 \quad \text{Use CN} = \mathbf{33}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

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Circle one: Present (Developed) **Proposed Watershed A11-1**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**0.10**	**10.03**
B	**Open Space, Good Cond.**	**61**			**2.49**	**151.85**
B	**Woods, Good Cond.**	**55**			**3.07**	**168.67**
				Totals =	**5.66**	**330.55**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{330.55}{5.66} = 58.42 \quad \text{Use CN} = \mathbf{58}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

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Circle one: Present Developed **Proposed Watershed A11-2**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**31.28**	**3065.85**
A	**Open Space, Good Cond.**	**39**			**1.01**	**39.30**
B	**Open Space, Good Cond.**	**61**			**9.34**	**570.04**
D	**Open Space, Good Cond.**	**80**			**0.02**	**1.28**
				Totals =	**41.65**	**3676.47**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{3676.47}{41.65} = 88.26 \quad \text{Use CN} = \mathbf{88}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

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Circle one: Present Developed **Proposed Watershed A11-3**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**0.45**	**44.49**
B	**Open Space, Good Cond.**	**61**			**2.87**	**175.35**
B	**Woods, Good Cond.**	**55**			**0.14**	**7.47**
				Totals =	**3.46**	**227.31**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{227.31}{3.46} = 65.61 \quad \text{Use CN} = \mathbf{66}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

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Circle one: Present (Developed) **Proposed Watershed B1-1**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**0.10**	**10.11**
A	**Open Space, Good Cond.**	**39**			**0.07**	**2.77**
A	**Woods, Good Cond.**	**30**			**0.06**	**1.89**
B	**Open Space, Good Cond.**	**61**			**2.56**	**155.99**
B	**Woods, Good Cond.**	**55**			**11.88**	**653.17**
D	**Open Space, Good Cond.**	**80**			**1.06**	**84.72**
D	**Woods, Good Cond.**	**77**			**8.93**	**687.67**
				Totals =	**24.66**	**1596.33**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{1596.33}{24.66} = 64.73 \qquad \text{Use CN} = \boxed{65}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

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Circle one: Present (Developed) **Proposed Watershed B1-2**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**11.57**	**1133.55**
A	**Open Space, Good Cond.**	**39**			**0.36**	**14.10**
B	**Open Space, Good Cond.**	**61**			**3.97**	**242.03**
				Totals =	**15.90**	**1389.69**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{1389.69}{15.90} = 87.42 \quad \text{Use CN} = \mathbf{87}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

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Circle one: Present (Developed) **Proposed Watershed B2**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
B	**Open Space, Good Cond.**	**61**			**5.22**	**318.68**
B	**Woods, Good Cond.**	**55**			**0.19**	**10.46**
D	**Open Space, Good Cond.**	**80**			**0.63**	**50.49**
D	**Woods, Good Cond.**	**77**			**0.01**	**0.40**
				Totals =	**6.05**	**380.03**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{380.03}{6.05} = 62.81 \quad \text{Use CN} = \mathbf{63}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

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Circle one: Present (Developed) **Proposed Watershed B3**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
B	**Open Space, Good Cond.**	**61**			**2.35**	**143.55**
B	**Woods, Good Cond.**	**55**			**7.29**	**400.73**
D	**Open Space, Good Cond.**	**80**			**0.29**	**23.37**
D	**Woods, Good Cond.**	**77**			**3.83**	**295.07**
				Totals =	**13.76**	**862.71**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{862.71}{13.76} = 62.68 \quad \text{Use CN} = \mathbf{63}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

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Circle one: Present Developed **Proposed Watershed B4**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**0.11**	**10.37**
B	**Open Space, Good Cond.**	**61**			**7.91**	**482.71**
B	**Woods, Good Cond.**	**55**			**11.71**	**644.13**
D	**Open Space, Good Cond.**	**80**			**1.47**	**117.90**
D	**Woods, Good Cond.**	**77**			**6.96**	**535.58**
				Totals =	**28.16**	**1790.69**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{1790.69}{28.16} = 63.59 \qquad \text{Use CN} = \boxed{64}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

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Circle one: Present (Developed) **Proposed Watershed B5**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
B	**Open Space, Good Cond.**	**61**			**8.47**	**516.78**
B	**Woods, Good Cond.**	**55**			**3.26**	**179.47**
D	**Open Space, Good Cond.**	**80**			**5.25**	**419.65**
D	**Woods, Good Cond.**	**77**			**0.55**	**42.29**
				Totals =	**17.53**	**1158.19**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{1158.19}{17.53} = 66.07 \quad \text{Use CN} = \mathbf{66}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

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Circle one: Present Developed **Proposed Watershed B6-1**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**0.18**	**17.72**
A	**Open Space, Good Cond.**	**39**			**0.16**	**6.24**
B	**Open Space, Good Cond.**	**61**			**6.83**	**416.43**
B	**Woods, Good Cond.**	**55**			**0.39**	**21.52**
D	**Open Space, Good Cond.**	**80**			**1.61**	**129.09**
D	**Woods, Good Cond.**	**77**			**0.02**	**1.63**
				Totals =	**9.19**	**592.64**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{592.64}{9.19} = 64.46 \quad \text{Use CN} = \mathbf{64}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

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Circle one: Present (Developed) **Proposed Watershed B6-2**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**2.56**	**251.18**
B	**Open Space, Good Cond.**	**61**			**3.63**	**221.16**
				Totals =	**6.19**	**472.34**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{472.34}{6.19} = 76.32 \quad \text{Use CN} = \mathbf{76}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

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Circle one: Present Developed **Proposed Watershed B6-3**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**3.32**	**325.62**
B	**Open Space, Good Cond.**	**61**			**0.61**	**37.16**
				Totals =	**3.93**	**362.78**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{362.78}{3.93} = 92.27 \quad \text{Use CN} = \mathbf{92}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

Project	**Project Hudson**	By **RJS**	Date **5/21/2020**
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Circle one:	Present (Developed)	**Proposed Watershed B6-4**	

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
A	**Impervious**	**98**			**6.89**	**674.98**
B	**Open Space, Good Cond.**	**61**			**2.67**	**163.14**
				Totals =	**9.56**	**838.12**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{838.12}{9.56} = 87.65 \qquad \text{Use CN} = \mathbf{88}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

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Circle one: Present (Developed) **Proposed Watershed B7**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
B	**Open Space, Good Cond.**	**61**			**2.31**	**141.10**
B	**Woods, Good Cond.**	**55**			**3.24**	**178.15**
D	**Open Space, Good Cond.**	**80**			**0.44**	**35.16**
D	**Woods, Good Cond.**	**77**			**1.78**	**137.17**
				Totals =	**7.77**	**491.58**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{491.58}{7.77} = 63.24 \quad \text{Use CN} = \mathbf{63}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

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Circle one: Present (Developed) **Proposed Watershed B8**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
B	**Open Space, Good Cond.**	**61**			**2.31**	**140.68**
B	**Woods, Good Cond.**	**55**			**0.11**	**6.23**
				Totals =	**2.42**	**146.92**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{146.92}{2.42} = 60.72 \quad \text{Use CN} = \mathbf{61}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

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Circle one: Present (Developed) **Proposed Watershed B10**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Open Space, Good Cond.**	**39**			**0.32**	**12.46**
A	**Woods, Good Cond.**	**30**			**0.51**	**15.17**
				Totals =	**0.83**	**27.64**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{27.64}{0.83} = 33.48 \quad \text{Use CN} = \mathbf{33}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

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Circle one: Present (Developed) **Proposed Watershed B11**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Open Space, Good Cond.**	**39**			**0.21**	**8.38**
A	**Woods-Grass Comb., Good Cond.**	**32**			**0.61**	**19.64**
B	**Open Space, Good Cond.**	**61**			**0.12**	**7.37**
B	**Woods, Good Cond.**	**55**			**0.01**	**0.31**
				Totals =	**0.95**	**35.69**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{35.69}{0.95} = 37.38 \quad \text{Use CN} = \mathbf{37}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

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Circle one: Present Developed **Proposed Watershed B13**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi² [ ] %	Product of CN x area
A	**Impervious**	**98**			**0.09**	**8.78**
B	**Open Space, Good Cond.**	**61**			**1.64**	**100.09**
B	**Woods, Good Cond.**	**55**			**9.87**	**542.86**
D	**Open Space, Good Cond.**	**80**			**0.38**	**30.70**
D	**Woods, Good Cond.**	**77**			**1.41**	**108.44**
				Totals =	**13.39**	**790.87**

1 Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{790.87}{13.39} = 59.05 \quad \text{Use CN} = \boxed{59}$$

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

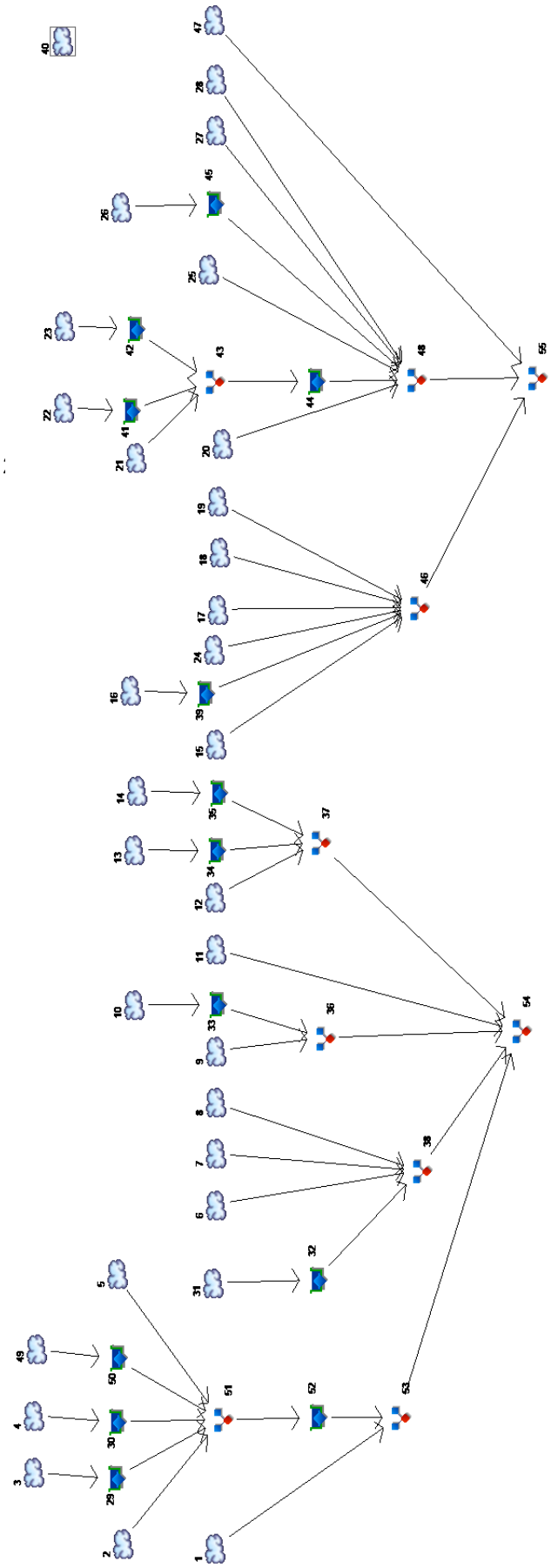
Watershed	Sheet Flow Length (ft)	Sheet Flow Slope %	Sheet Flow Mannings n	Shallow Concentrated Flow Length L1 (ft)	Shallow Concentrated Flow Slope % (L1)	Shallow Concentrated Flow Length L2 (ft)	Shallow Concentrated Flow Slope % (L2)	Shallow Concentrated Flow Length L3 (ft)	Shallow Concentrated Flow Slope % (L3)	Total Flow Length (ft)	Tc
A1-1	100	1.7	0.15	189	1.7					289	12
A1-2	100	1.2	0.15	107	1.2	197	1			1237	18
A1-3	30	1.2	0.15	82	2.4					102	7
A1-4	100	0.3	0.15	50	0.3					150	21
A1-5	100	4.1	0.15	76	1.5					176	7
A1-6	100	2.3	0.15	9	2.3					109	10
A2	100	2.5	0.15	138	5.1					238	10
A3	100	1.5	0.15	545	1.5	160	16			805	16
A4	100	10.9	0.15	185	10.9					285	6
A5	100	7.5	0.15	299	7.5					399	7
A6-1	96	4.2	0.15							96	7
A6-2	100	2.5	0.15	162	2.2	150	2.7			1481	15
A8	70	30	0.15							70	5
A11-1	100	1.5	0.15	76	6.9					176	11
A11-2	100	2	0.15	494	1.5					594	17
A11-3	100	18.6	0.15	10	13.6	127	5.1			237	5
B1-1	100	3	0.15	353	3.7					453	10
B1-2	100	3	0.15	118	2.6					218	9
B2	100	2	0.15	197	1.8					297	11
B3	100	1.5	0.15	70	1.4					170	12
B4	100	2	0.15	360	4					460	11.8
B5	100	1	0.15	105	3.3					205	15
B6-1	100	2.7	0.15	160	2.7					260	10
B6-2	100	3	0.15	1147	1.3					1247	24
B6-3	100	6.1	0.15	112	2.8					212	6
B6-4	100	20	0.15	32	21.9	394	1.3			524	7
B7	100	4	0.15	460	3					560	10.3
B8	100	2	0.15	183	9.3					283	11.0
B10	100	10	0.15	100	10					200	5.6
B11	100	5	0.15	169	4.3					269	8
B13	100	12	0.15	200	1	560	8	200	2	1060	10.4

Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Legend

Hyd.	Origin	Description
1	SCS Runoff	A1-1
2	SCS Runoff	A1-2
3	SCS Runoff	A1-3
4	SCS Runoff	A1-4
5	SCS Runoff	A1-6
6	SCS Runoff	A2
7	SCS Runoff	A3
8	SCS Runoff	A4
9	SCS Runoff	A6-1
10	SCS Runoff	A6-2
11	SCS Runoff	A8
12	SCS Runoff	A11-1
13	SCS Runoff	A11-2
14	SCS Runoff	A11-3
15	SCS Runoff	B1-1
16	SCS Runoff	B1-2
17	SCS Runoff	B3
18	SCS Runoff	B4
19	SCS Runoff	B5
20	SCS Runoff	B6-1
21	SCS Runoff	B6-2
22	SCS Runoff	B6-3
23	SCS Runoff	B6-4
24	SCS Runoff	B-2
25	SCS Runoff	B7
26	SCS Runoff	B8
27	SCS Runoff	B10
28	SCS Runoff	B11
29	Reservoir	Pond A1-3
30	Reservoir	Pond A1-4
31	SCS Runoff	A5
32	Reservoir	Pond A-5
33	Reservoir	Pond A6-2
34	Reservoir	Pond A11-2
35	Reservoir	Pond A11-3
36	Combine	A6
37	Combine	A11
38	Combine	A (2 through 5)
39	Reservoir	Pond B1-2
40	SCS Runoff	None
41	Reservoir	Pond B6-3
42	Reservoir	Pond B6-4
43	Combine	Combine to B6-2
44	Reservoir	Pond B6-2
45	Reservoir	Pond B8
46	Combine	Combine B1 through B5
47	SCS Runoff	B13
48	Combine	Combine B6 through B12
49	SCS Runoff	A1-5
50	Reservoir	Pond A1-5
51	Combine	To A1-2
52	Reservoir	Pond A1-2
53	Combine	Combine A1
54	Combine	Watershed A
55	Combine	Watershed B



Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	------	-------	5.298	-------	-------	23.37	37.60	48.92	-------	A1-1
2	SCS Runoff	------	-------	38.64	-------	-------	66.92	84.39	97.13	-------	A1-2
3	SCS Runoff	------	-------	31.00	-------	-------	55.28	70.38	81.40	-------	A1-3
4	SCS Runoff	------	-------	58.14	-------	-------	105.54	135.37	157.21	-------	A1-4
5	SCS Runoff	------	-------	12.37	-------	-------	22.90	29.51	34.36	-------	A1-6
6	SCS Runoff	------	-------	0.092	-------	-------	0.440	0.720	0.944	-------	A2
7	SCS Runoff	------	-------	2.034	-------	-------	9.409	15.43	20.23	-------	A3
8	SCS Runoff	------	-------	2.094	-------	-------	8.693	13.82	17.87	-------	A4
9	SCS Runoff	------	-------	1.319	-------	-------	5.470	8.668	11.24	-------	A6-1
10	SCS Runoff	------	-------	53.86	-------	-------	93.12	117.37	135.05	-------	A6-2
11	SCS Runoff	------	-------	0.000	-------	-------	0.009	0.032	0.104	-------	A8
12	SCS Runoff	------	-------	0.872	-------	-------	4.957	8.463	11.29	-------	A11-1
13	SCS Runoff	------	-------	65.43	-------	-------	117.17	149.37	172.90	-------	A11-2
14	SCS Runoff	------	-------	1.842	-------	-------	5.984	9.006	11.36	-------	A11-3
15	SCS Runoff	------	-------	10.29	-------	-------	34.57	52.52	66.54	-------	B1-1
16	SCS Runoff	------	-------	31.01	-------	-------	56.26	72.02	83.54	-------	B1-2
17	SCS Runoff	------	-------	4.502	-------	-------	17.17	26.78	34.35	-------	B3
18	SCS Runoff	------	-------	10.47	-------	-------	37.29	57.38	73.14	-------	B4
19	SCS Runoff	------	-------	7.298	-------	-------	23.12	34.73	43.77	-------	B5
20	SCS Runoff	------	-------	3.417	-------	-------	12.17	18.73	23.87	-------	B6-1
21	SCS Runoff	------	-------	4.689	-------	-------	10.62	14.61	17.61	-------	B6-2
22	SCS Runoff	------	-------	9.877	-------	-------	16.49	20.56	23.52	-------	B6-3
23	SCS Runoff	------	-------	19.43	-------	-------	34.66	44.12	51.03	-------	B6-4
24	SCS Runoff	------	-------	1.979	-------	-------	7.548	11.78	15.11	-------	B-2
25	SCS Runoff	------	-------	2.542	-------	-------	9.693	15.12	19.40	-------	B7
26	SCS Runoff	------	-------	0.602	-------	-------	2.653	4.270	5.555	-------	B8
27	SCS Runoff	------	-------	0.000	-------	-------	0.004	0.015	0.049	-------	B10
28	SCS Runoff	------	-------	0.000	-------	-------	0.013	0.082	0.196	-------	B11
29	Reservoir	3	-------	2.181	-------	-------	2.595	5.383	10.80	-------	Pond A1-3
30	Reservoir	4	-------	40.52	-------	-------	69.01	75.95	79.25	-------	Pond A1-4
31	SCS Runoff	------	-------	1.158	-------	-------	4.443	6.957	8.959	-------	A5
32	Reservoir	31	-------	0.000	-------	-------	0.000	0.000	0.000	-------	Pond A-5
33	Reservoir	10	-------	0.000	-------	-------	1.174	4.577	7.158	-------	Pond A6-2
34	Reservoir	13	-------	0.005	-------	-------	15.87	40.25	49.99	-------	Pond A11-2

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
35	Reservoir	14	-------	0.216	-------	-------	4.435	5.382	5.735	-------	Pond A11-3
36	Combine	9, 33,	-------	1.319	-------	-------	5.470	8.668	11.64	-------	A6
37	Combine	12, 34, 35,	-------	0.872	-------	-------	17.69	44.48	58.74	-------	A11
38	Combine	6, 7, 8, 32,	-------	3.473	-------	-------	15.80	25.93	34.03	-------	A (2 through 5)
39	Reservoir	16	-------	0.000	-------	-------	0.683	1.654	5.316	-------	Pond B1-2
40	SCS Runoff	------	-------	4.804	-------	-------	9.903	13.22	15.68	-------	None
41	Reservoir	22	-------	1.423	-------	-------	7.452	10.64	11.04	-------	Pond B6-3
42	Reservoir	23	-------	15.43	-------	-------	29.77	32.08	33.41	-------	Pond B6-4
43	Combine	21, 41, 42	-------	20.74	-------	-------	46.35	56.66	61.74	-------	Combine to B6-2
44	Reservoir	43	-------	0.010	-------	-------	4.484	12.36	27.42	-------	Pond B6-2
45	Reservoir	26	-------	0.015	-------	-------	0.119	0.258	0.402	-------	Pond B8
46	Combine	15, 17, 18, 19,	-------	34.43	-------	-------	119.32	183.02	233.34	-------	Combine B1 through B5
47	SCS Runoff	24, 39, ------	-------	2.448	-------	-------	12.70	21.22	28.05	-------	B13
48	Combine	20, 25, 27, 28,	-------	5.959	-------	-------	21.87	33.88	43.93	-------	Combine B6 through B12
49	SCS Runoff	44, 45, ------	-------	38.02	-------	-------	68.49	87.48	101.36	-------	A1-5
50	Reservoir	49	-------	0.000	-------	-------	5.403	20.48	32.70	-------	Pond A1-5
51	Combine	2, 5, 29, 30,	-------	74.89	-------	-------	152.01	198.82	231.15	-------	To A1-2
52	Reservoir	50 51	-------	6.434	-------	-------	41.82	43.58	46.89	-------	Pond A1-2
53	Combine	1, 52	-------	7.144	-------	-------	46.18	62.10	82.22	-------	Combine A1
54	Combine	11, 36, 37, 38,	-------	10.70	-------	-------	68.90	120.91	159.03	-------	Watershed A
55	Combine	53 46, 47, 48,	-------	42.54	-------	-------	153.89	238.11	305.32	-------	Watershed B

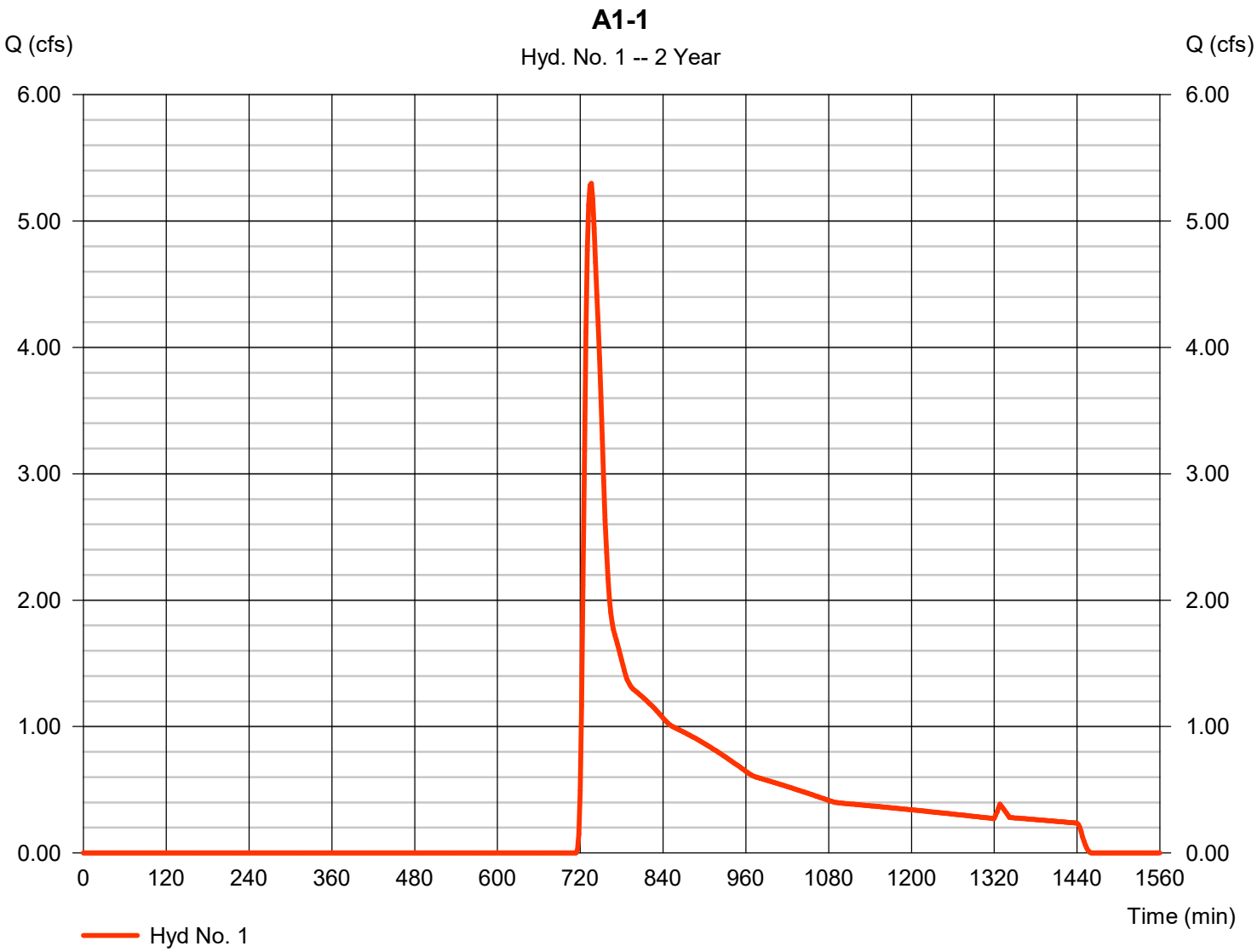
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 1

A1-1

Hydrograph type	= SCS Runoff	Peak discharge	= 5.298 cfs
Storm frequency	= 2 yrs	Time to peak	= 736 min
Time interval	= 2 min	Hyd. volume	= 32,525 cuft
Drainage area	= 21.310 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.00 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



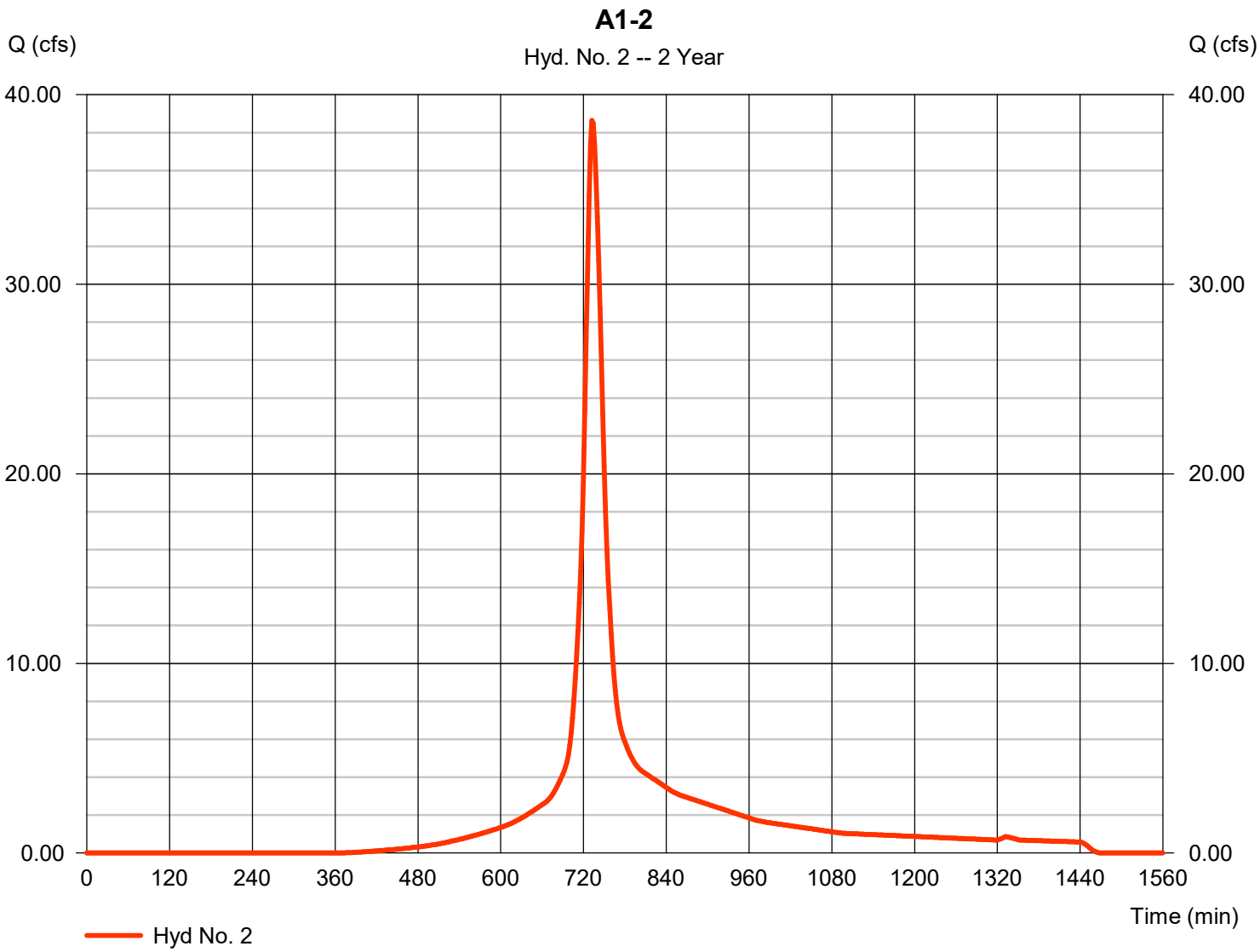
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 2

A1-2

Hydrograph type	= SCS Runoff	Peak discharge	= 38.64 cfs
Storm frequency	= 2 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 171,914 cuft
Drainage area	= 22.710 ac	Curve number	= 90
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.00 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



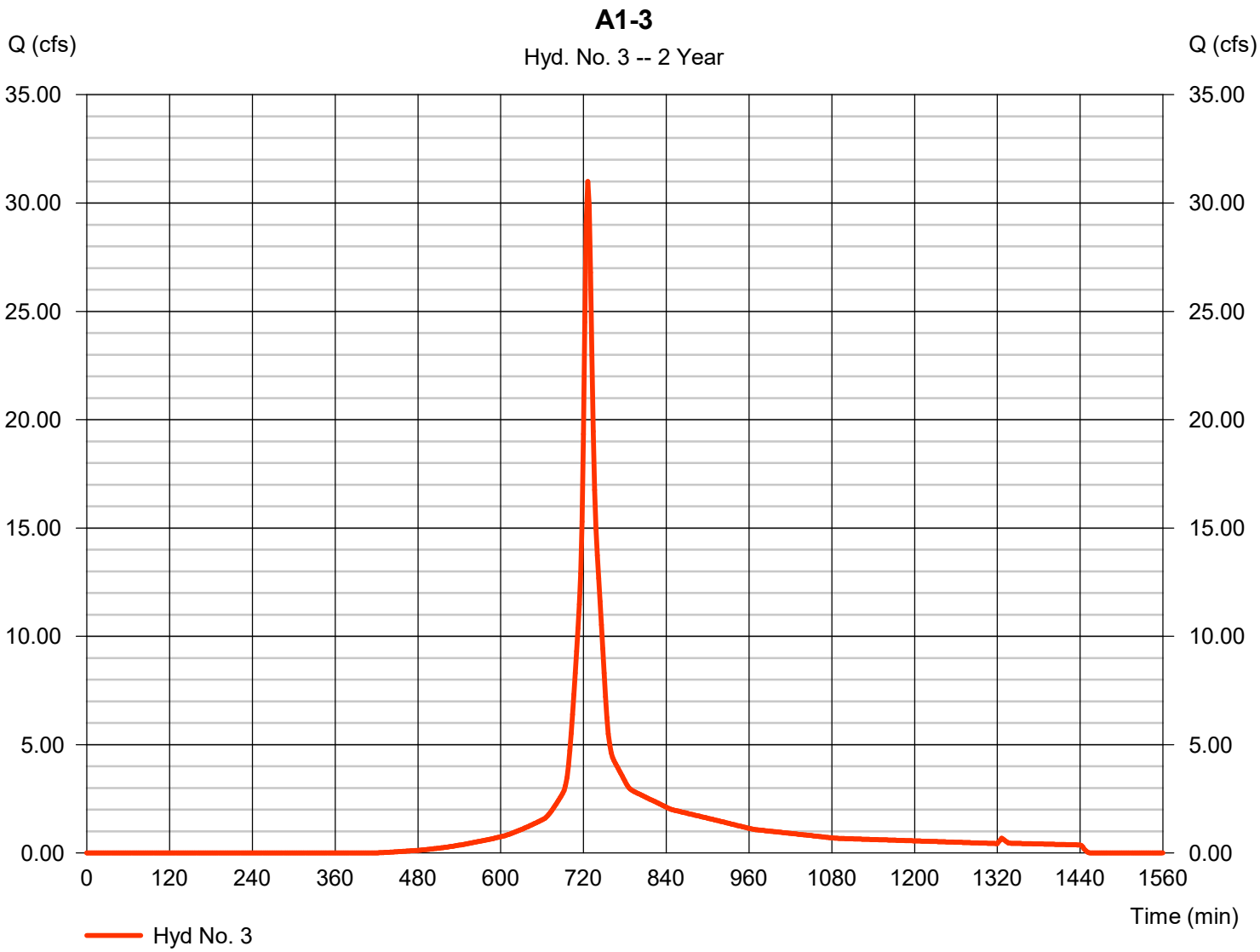
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 3

A1-3

Hydrograph type	= SCS Runoff	Peak discharge	= 31.00 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 106,081 cuft
Drainage area	= 15.250 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.00 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



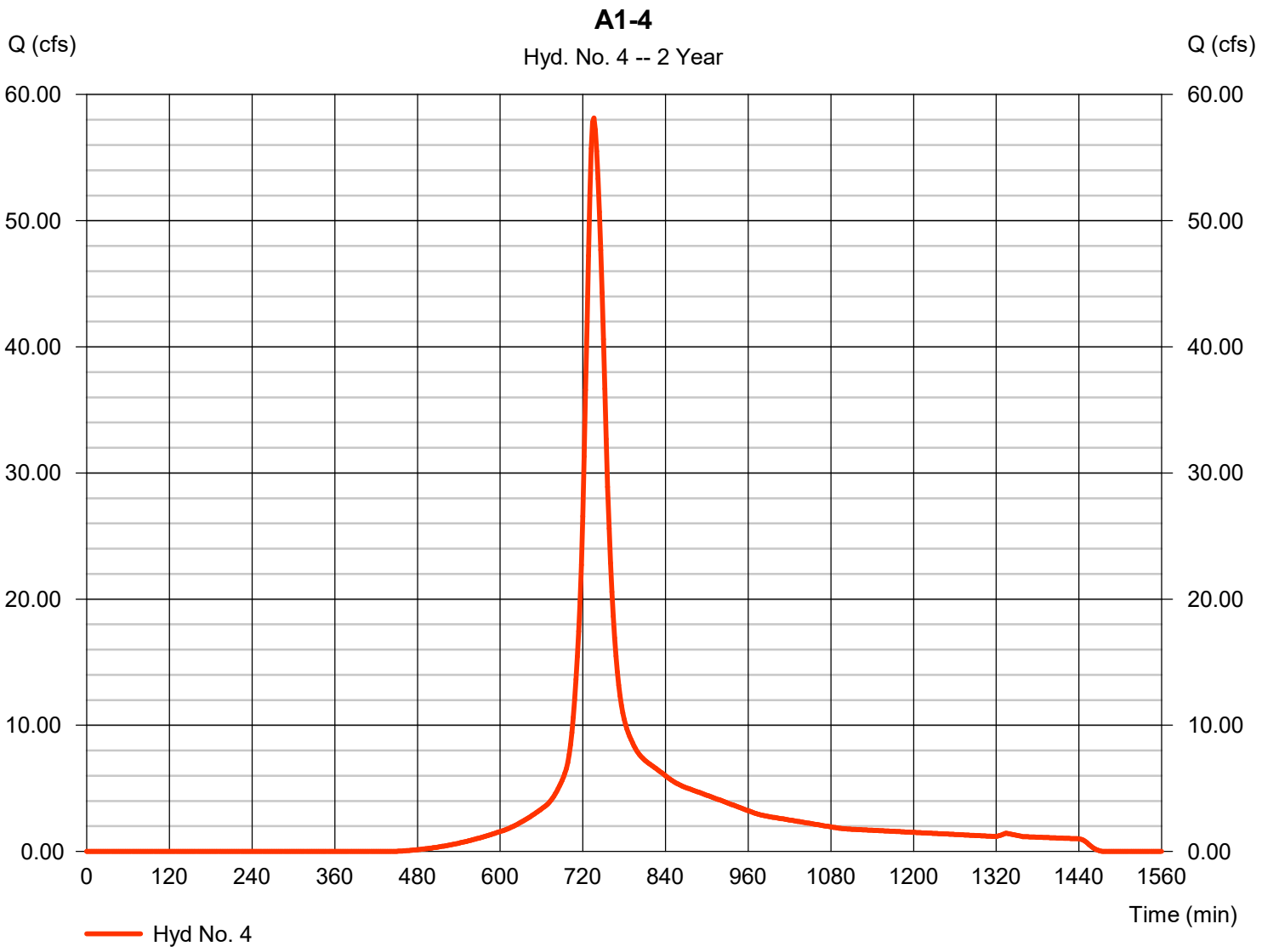
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 4

A1-4

Hydrograph type	= SCS Runoff	Peak discharge	= 58.14 cfs
Storm frequency	= 2 yrs	Time to peak	= 736 min
Time interval	= 2 min	Hyd. volume	= 275,139 cuft
Drainage area	= 40.570 ac	Curve number	= 87
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 21.00 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



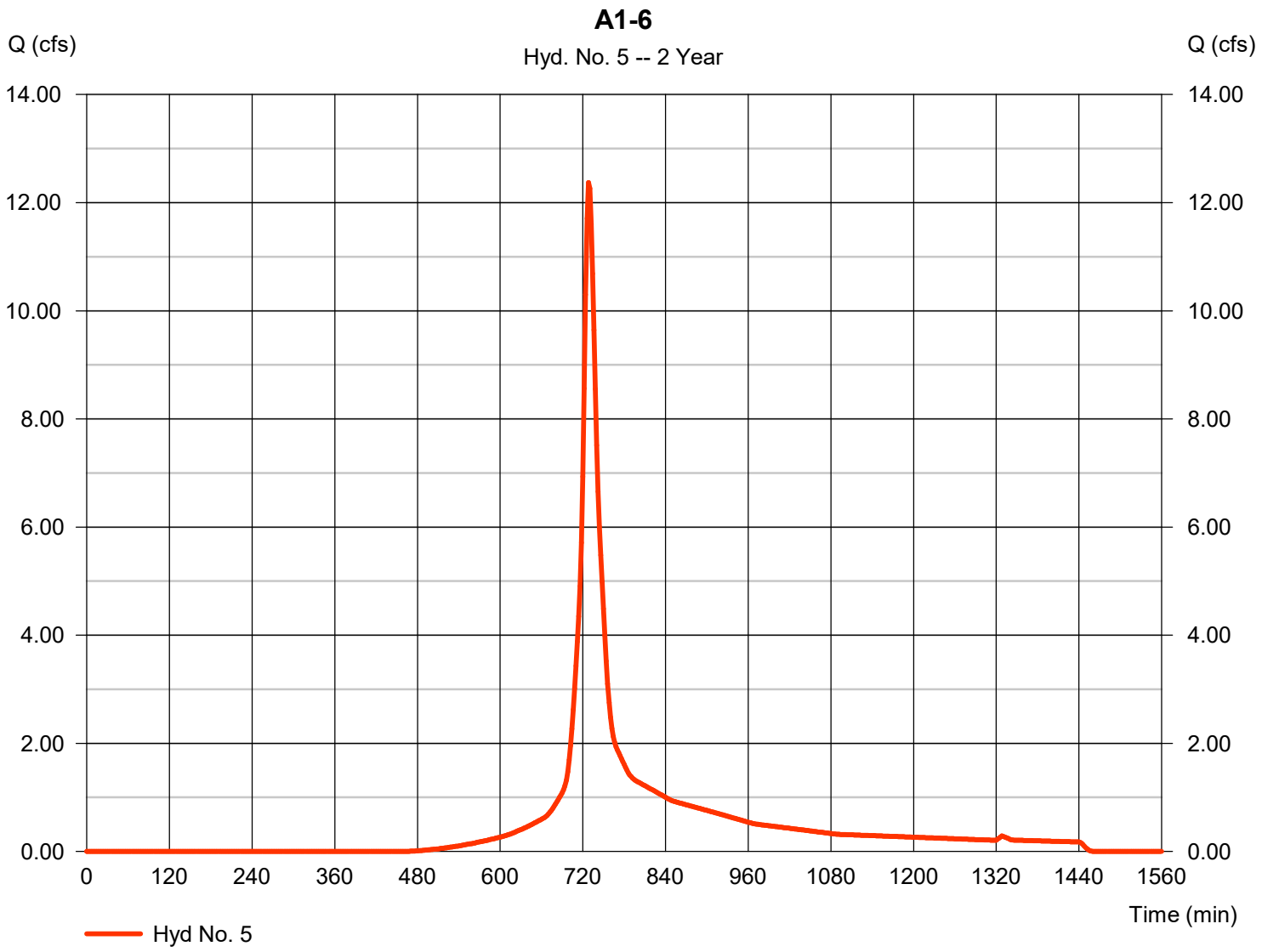
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 5

A1-6

Hydrograph type	= SCS Runoff	Peak discharge	= 12.37 cfs
Storm frequency	= 2 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 47,425 cuft
Drainage area	= 7.210 ac	Curve number	= 86
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



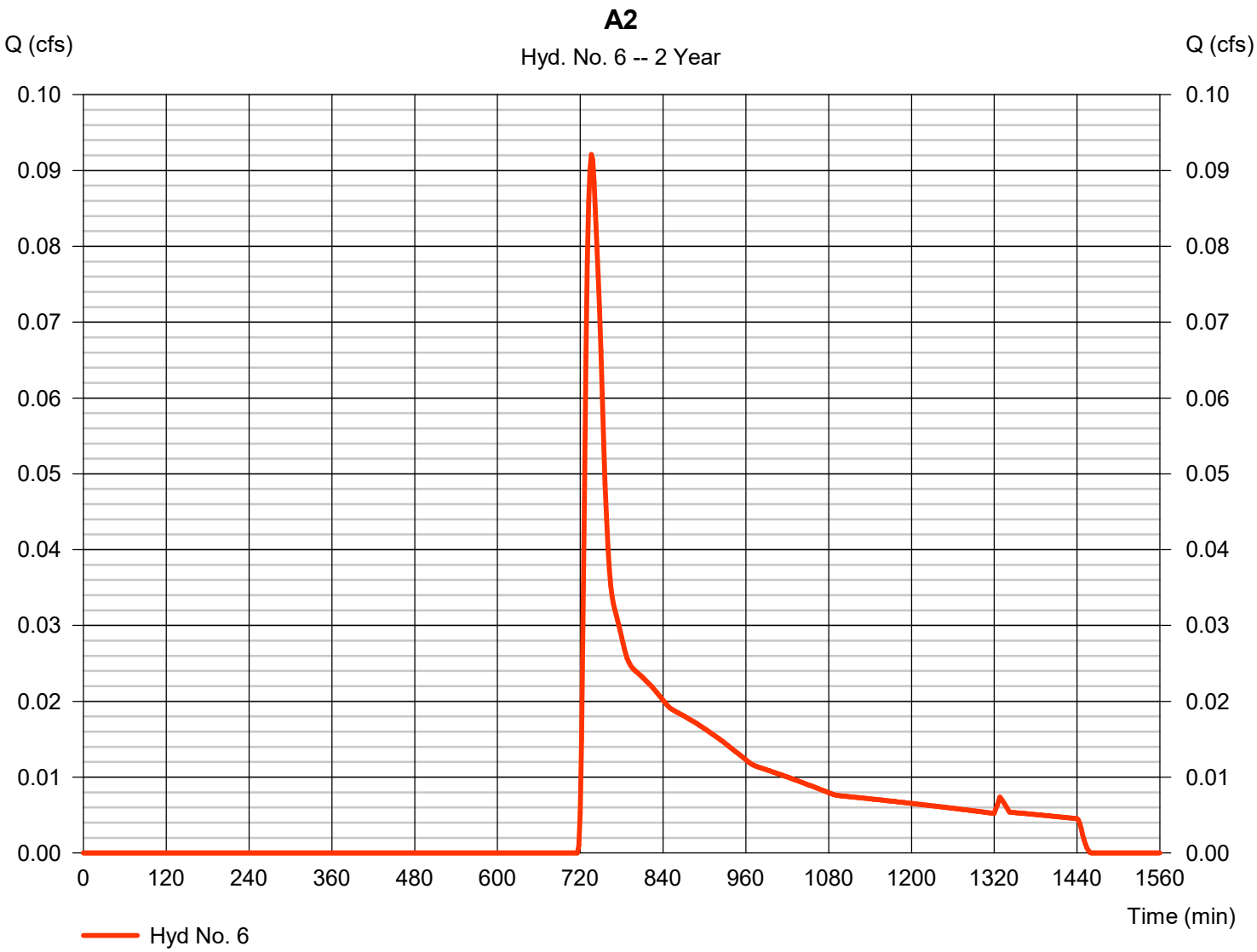
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 6

A2

Hydrograph type	= SCS Runoff	Peak discharge	= 0.092 cfs
Storm frequency	= 2 yrs	Time to peak	= 736 min
Time interval	= 2 min	Hyd. volume	= 602 cuft
Drainage area	= 0.430 ac	Curve number	= 60
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



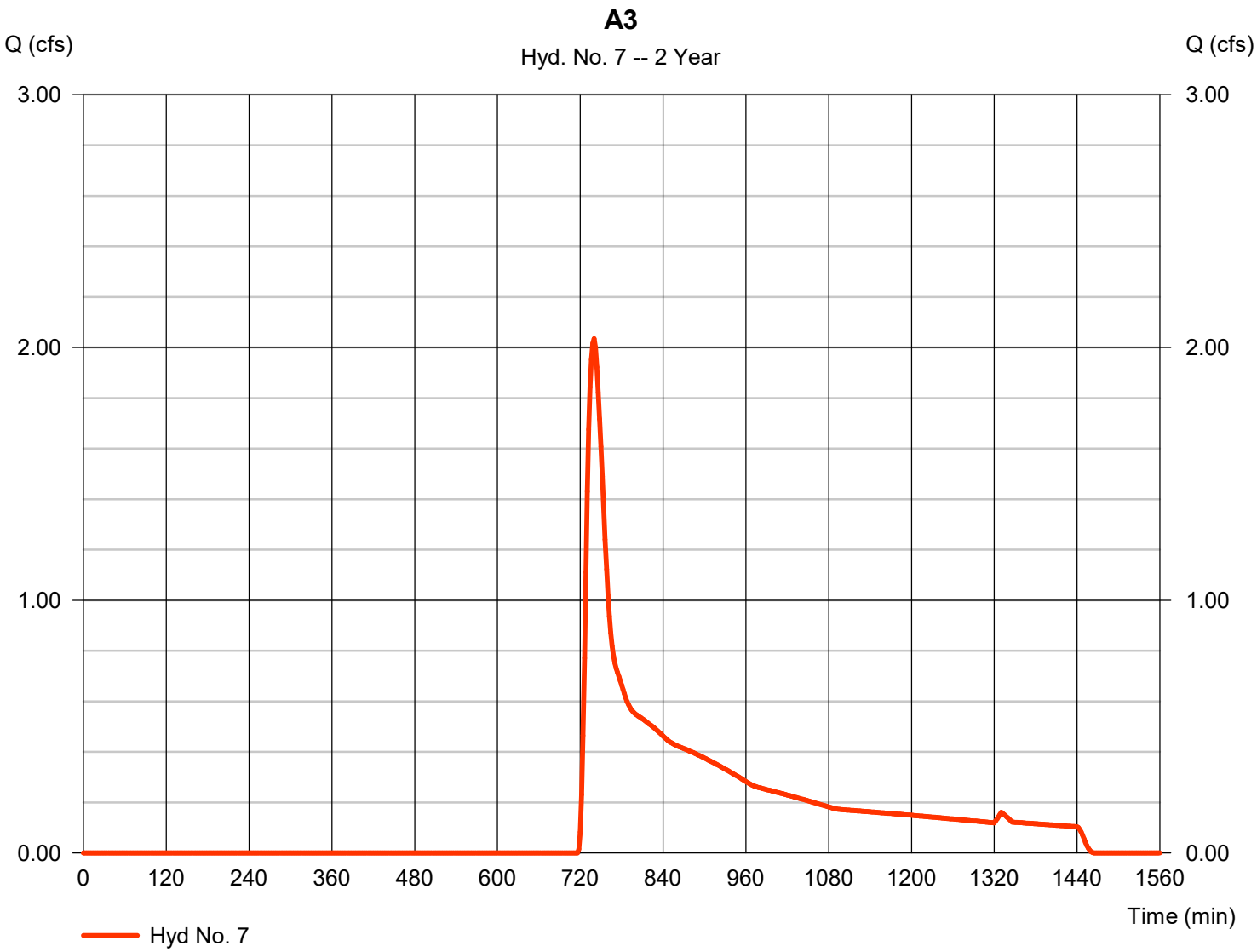
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 7

A3

Hydrograph type	= SCS Runoff	Peak discharge	= 2.034 cfs
Storm frequency	= 2 yrs	Time to peak	= 740 min
Time interval	= 2 min	Hyd. volume	= 13,679 cuft
Drainage area	= 10.340 ac	Curve number	= 60
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 16.00 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



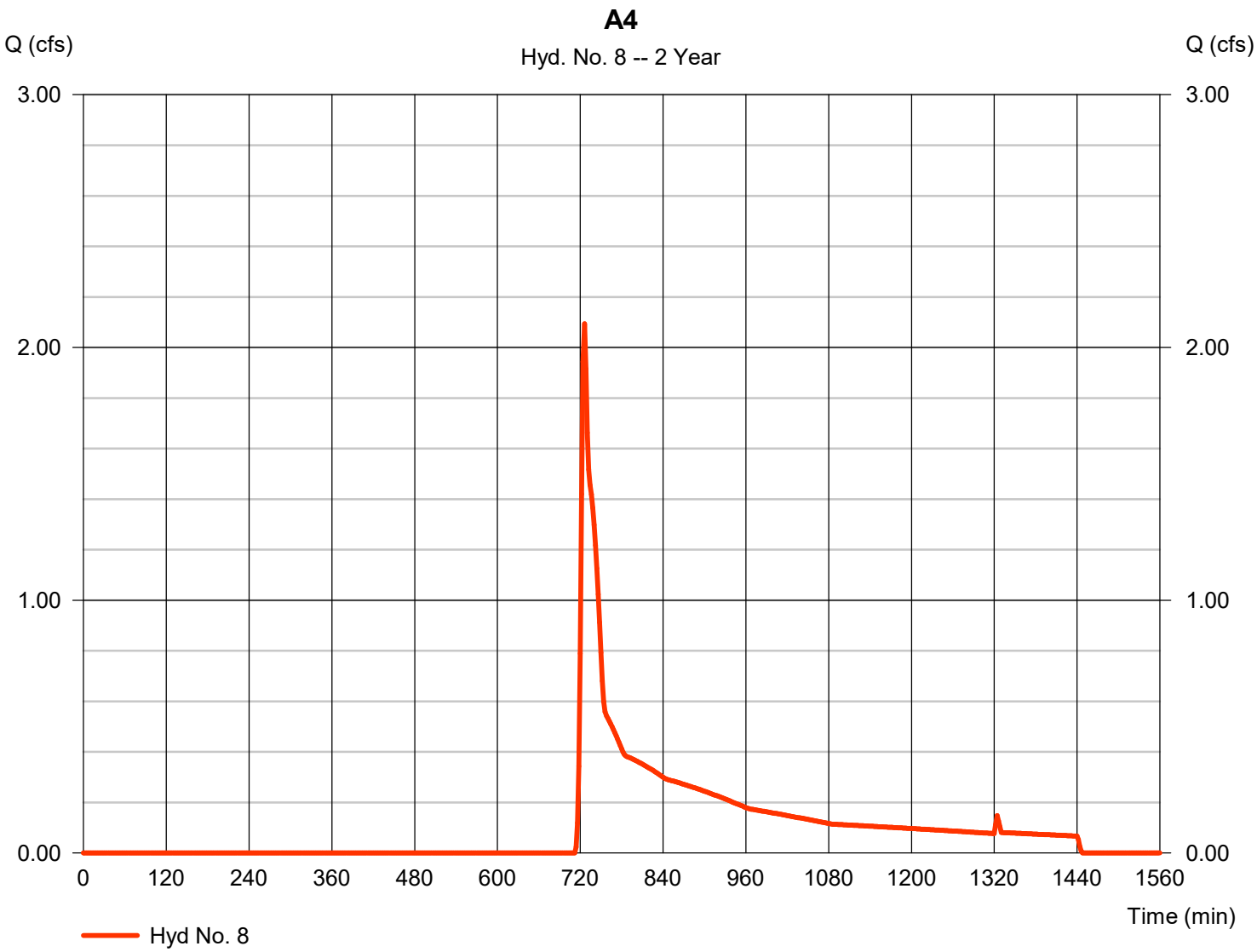
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 8

A4

Hydrograph type	= SCS Runoff	Peak discharge	= 2.094 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 9,603 cuft
Drainage area	= 6.370 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



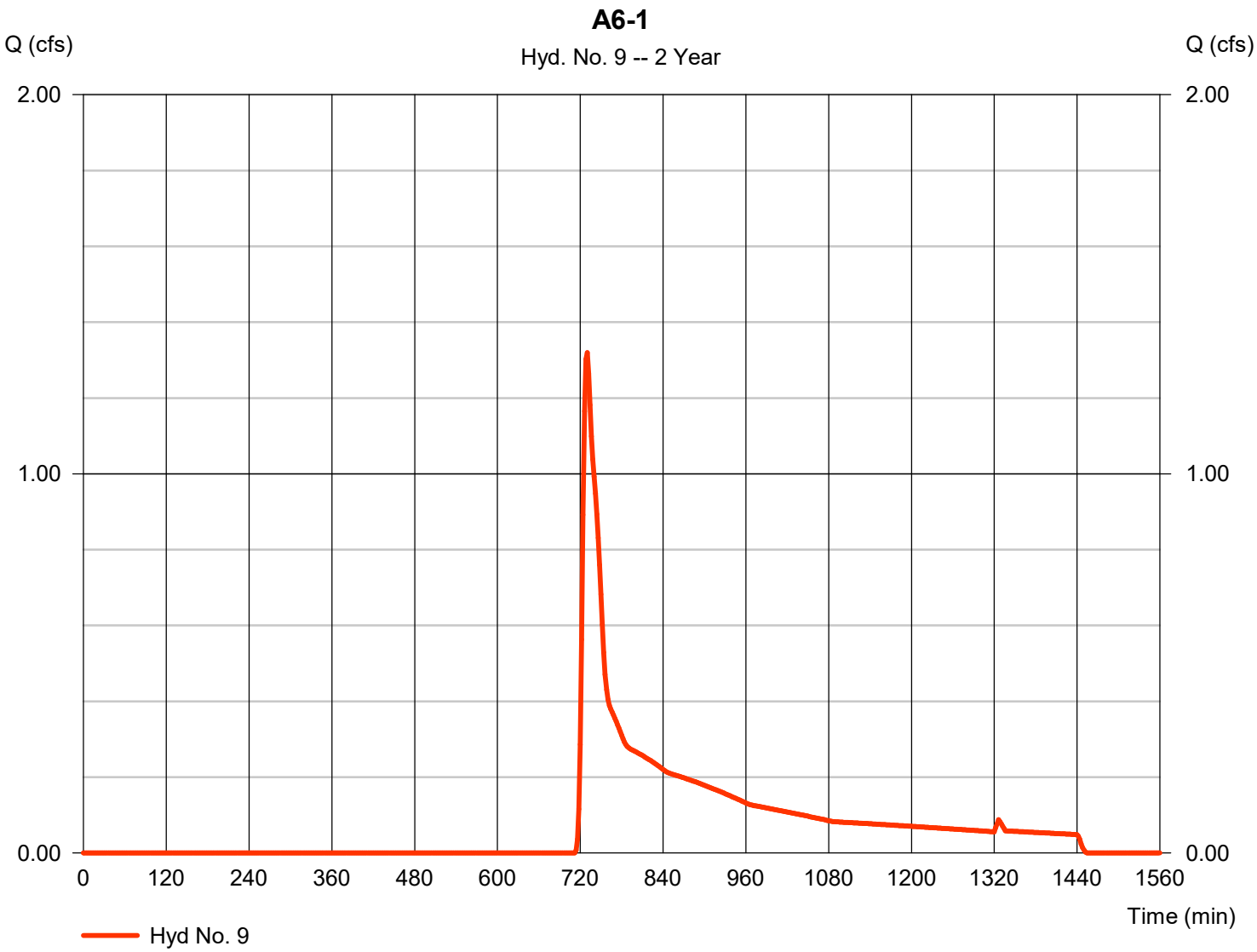
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 9

A6-1

Hydrograph type	= SCS Runoff	Peak discharge	= 1.319 cfs
Storm frequency	= 2 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 6,947 cuft
Drainage area	= 4.320 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.00 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



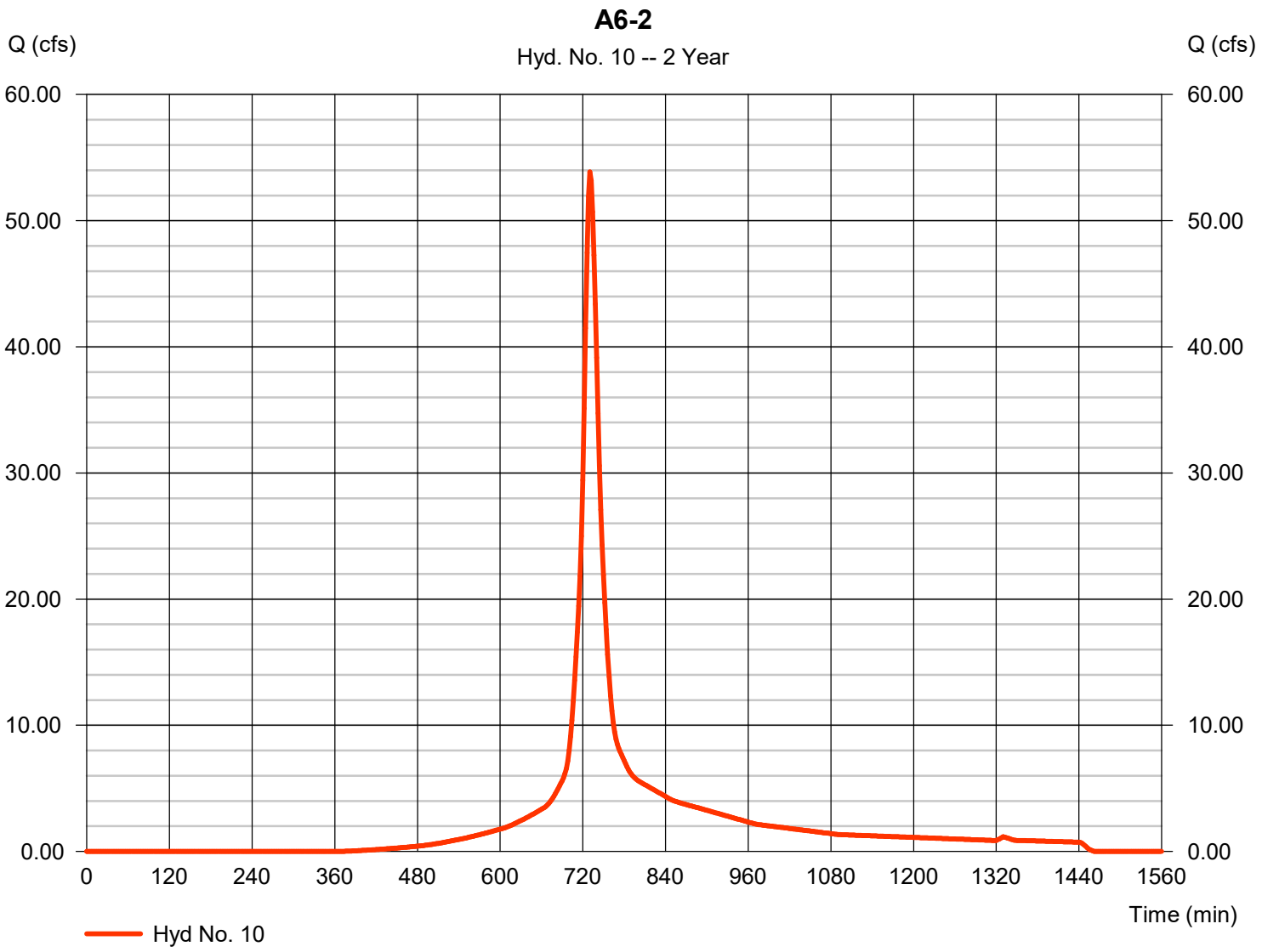
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 10

A6-2

Hydrograph type	= SCS Runoff	Peak discharge	= 53.86 cfs
Storm frequency	= 2 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 220,684 cuft
Drainage area	= 29.900 ac	Curve number	= 90
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.00 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



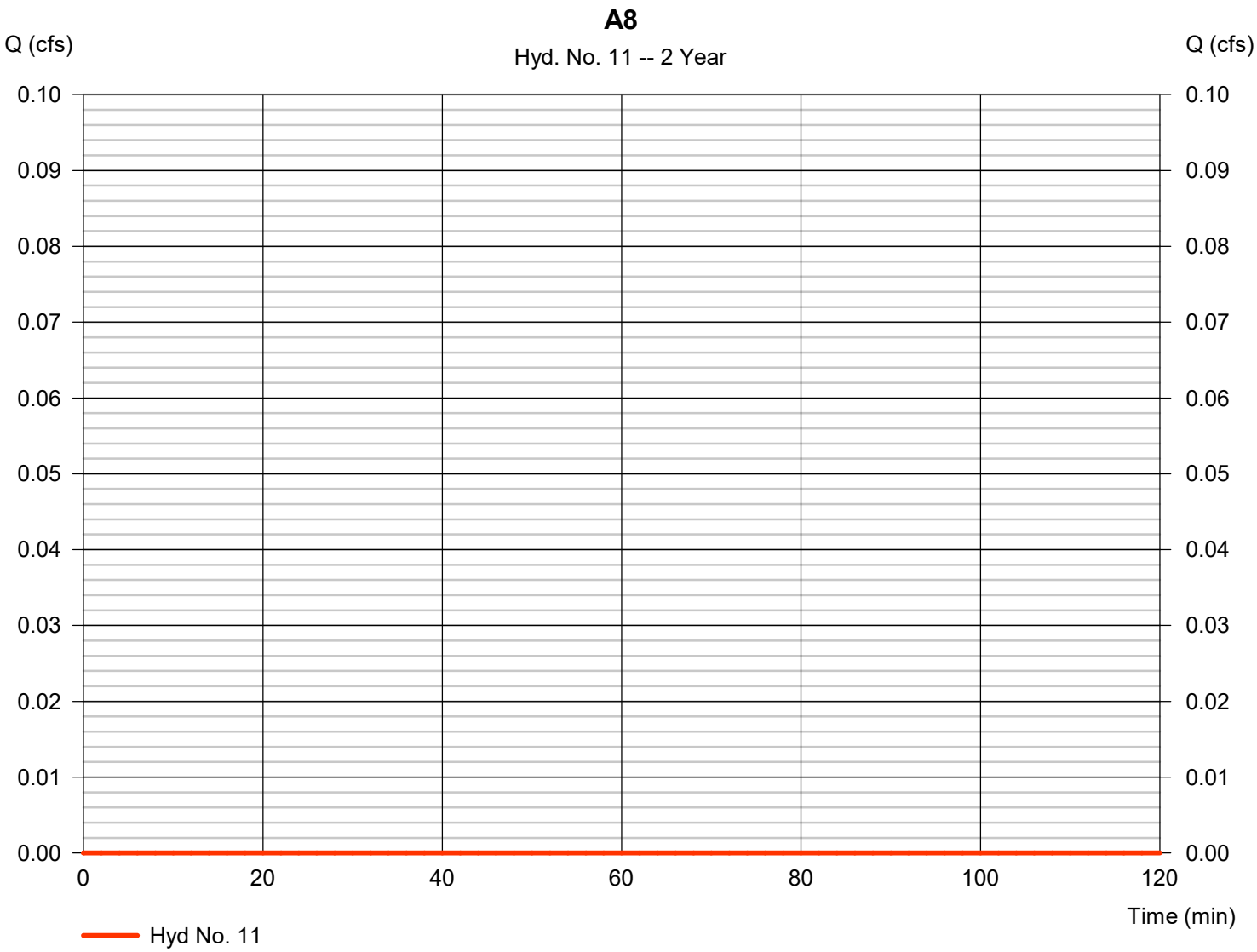
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 11

A8

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Drainage area	= 1.750 ac	Curve number	= 33
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



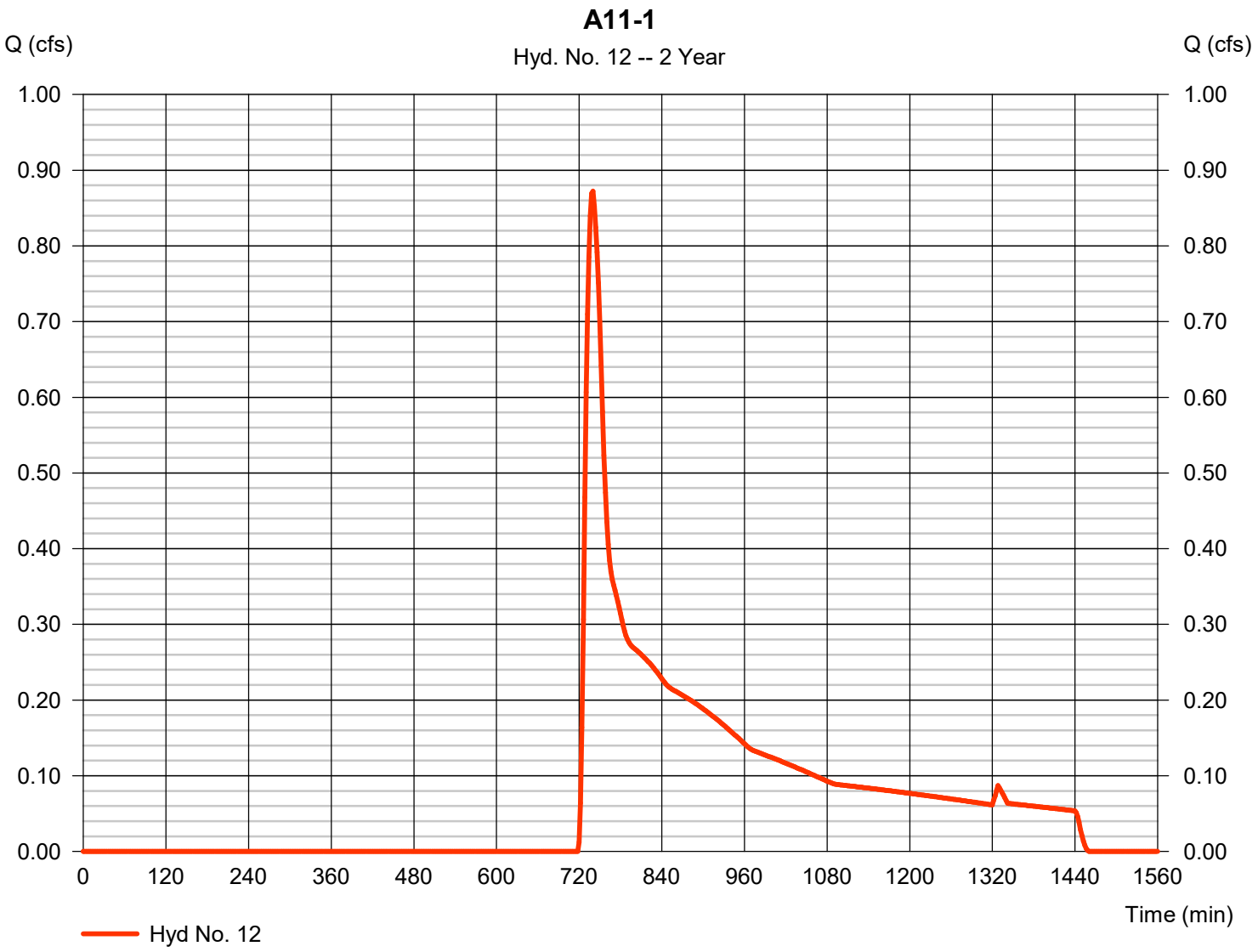
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 12

A11-1

Hydrograph type	= SCS Runoff	Peak discharge	= 0.872 cfs
Storm frequency	= 2 yrs	Time to peak	= 740 min
Time interval	= 2 min	Hyd. volume	= 6,571 cuft
Drainage area	= 5.660 ac	Curve number	= 58
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.00 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



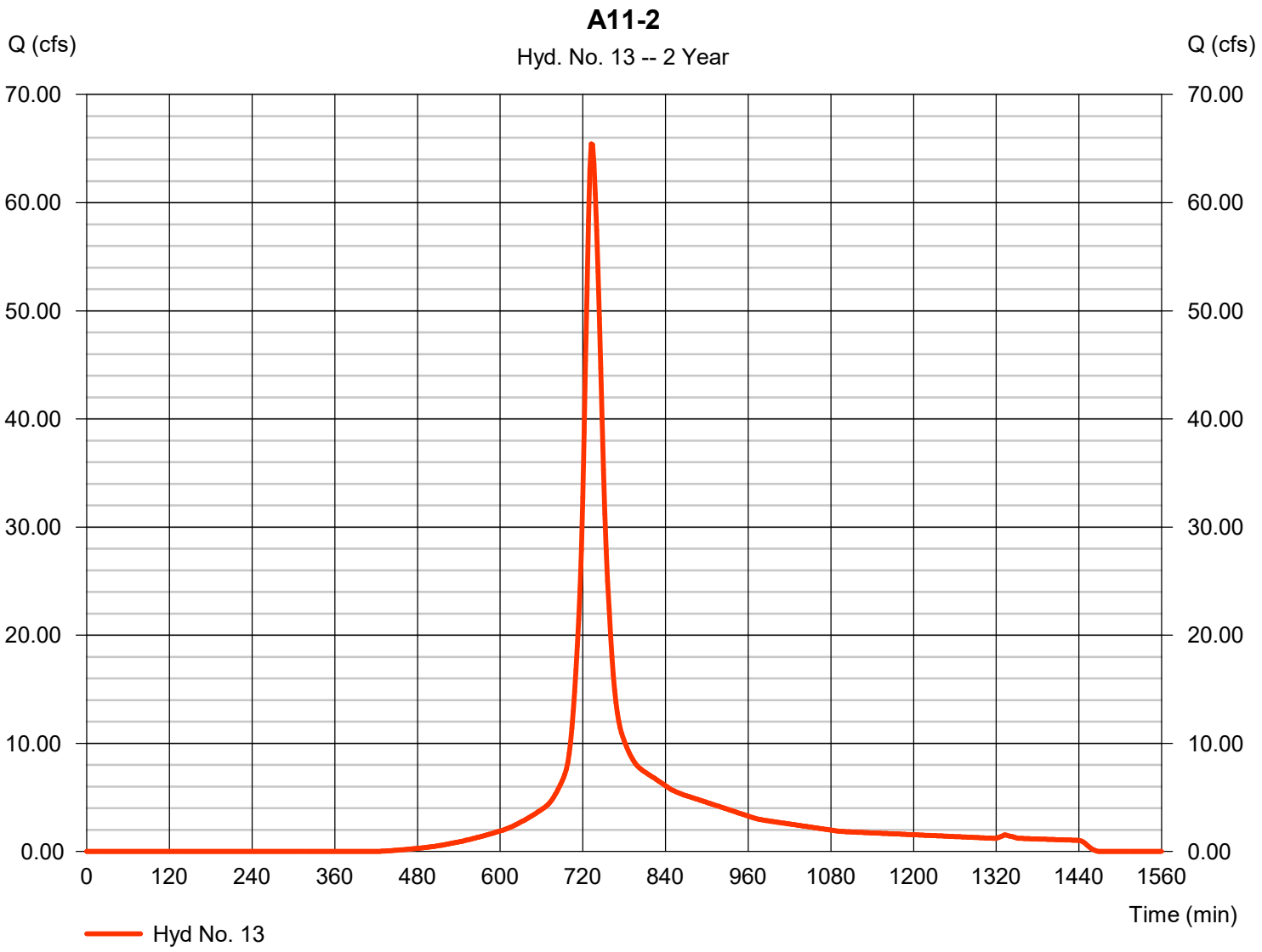
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 13

A11-2

Hydrograph type	= SCS Runoff	Peak discharge	= 65.43 cfs
Storm frequency	= 2 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 289,721 cuft
Drainage area	= 41.650 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.00 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



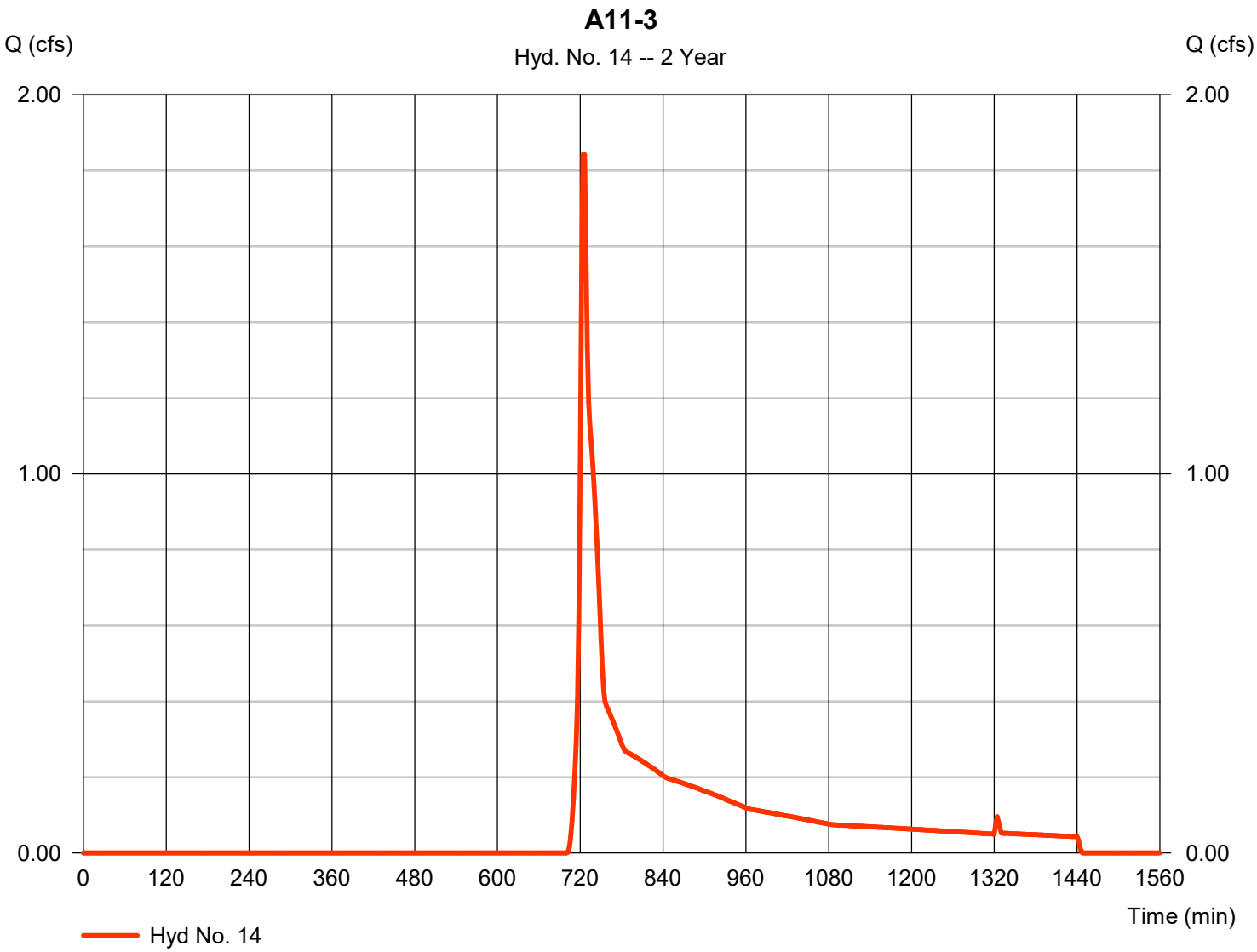
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 14

A11-3

Hydrograph type	= SCS Runoff	Peak discharge	= 1.842 cfs
Storm frequency	= 2 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 7,043 cuft
Drainage area	= 3.460 ac	Curve number	= 66
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



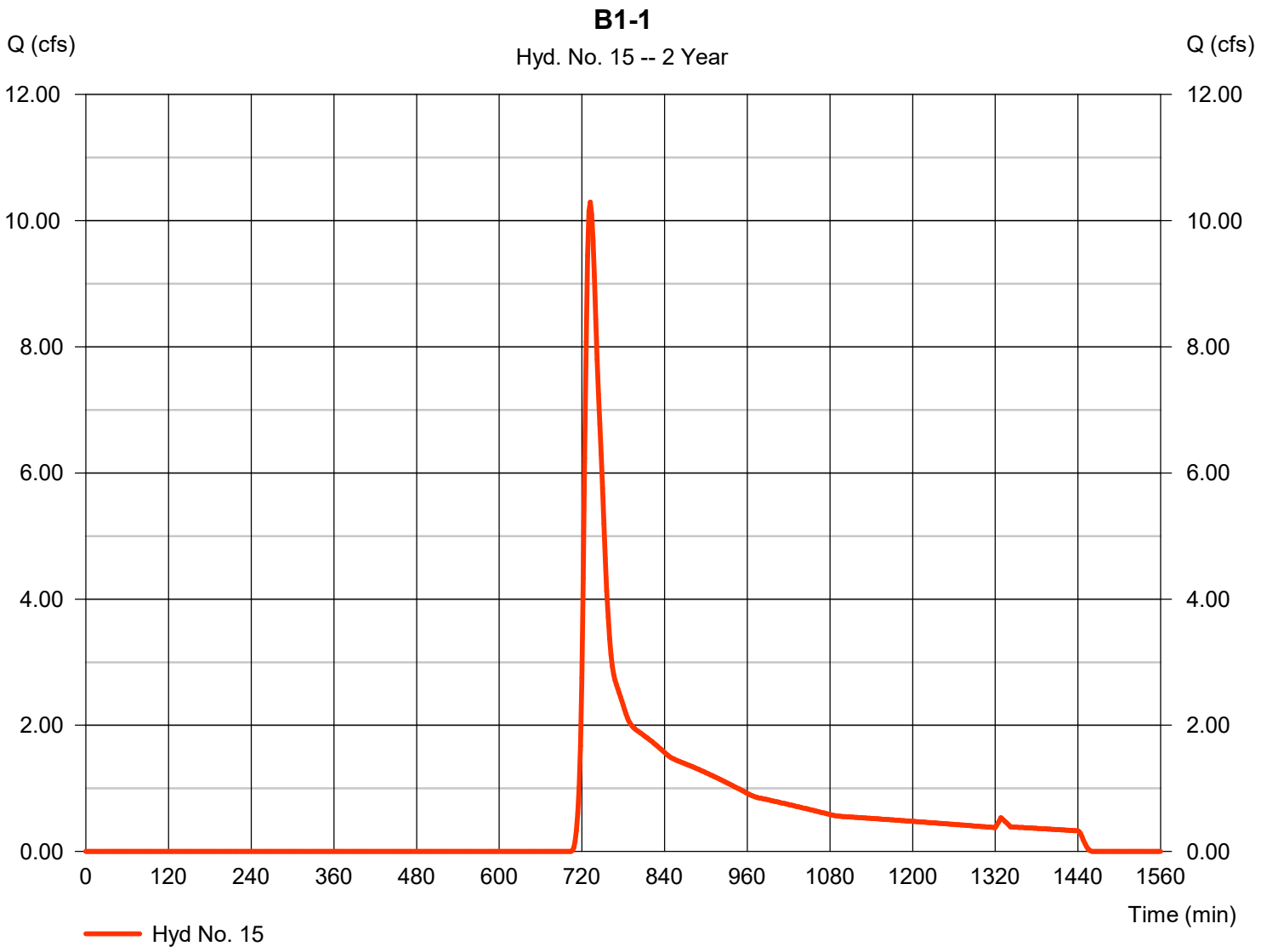
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 15

B1-1

Hydrograph type	= SCS Runoff	Peak discharge	= 10.29 cfs
Storm frequency	= 2 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 51,438 cuft
Drainage area	= 24.660 ac	Curve number	= 65
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



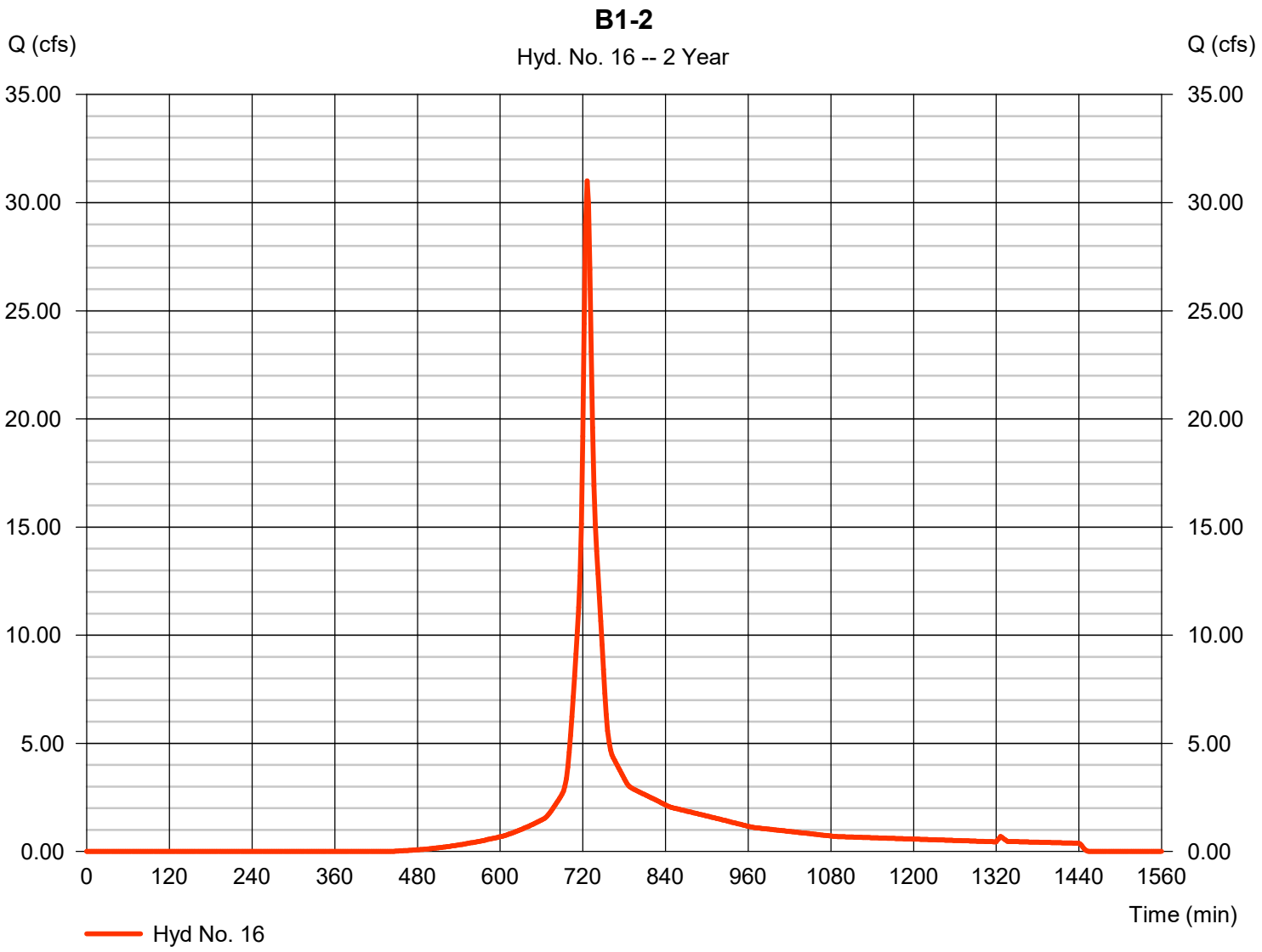
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 16

B1-2

Hydrograph type	= SCS Runoff	Peak discharge	= 31.01 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 105,939 cuft
Drainage area	= 15.900 ac	Curve number	= 87
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.00 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



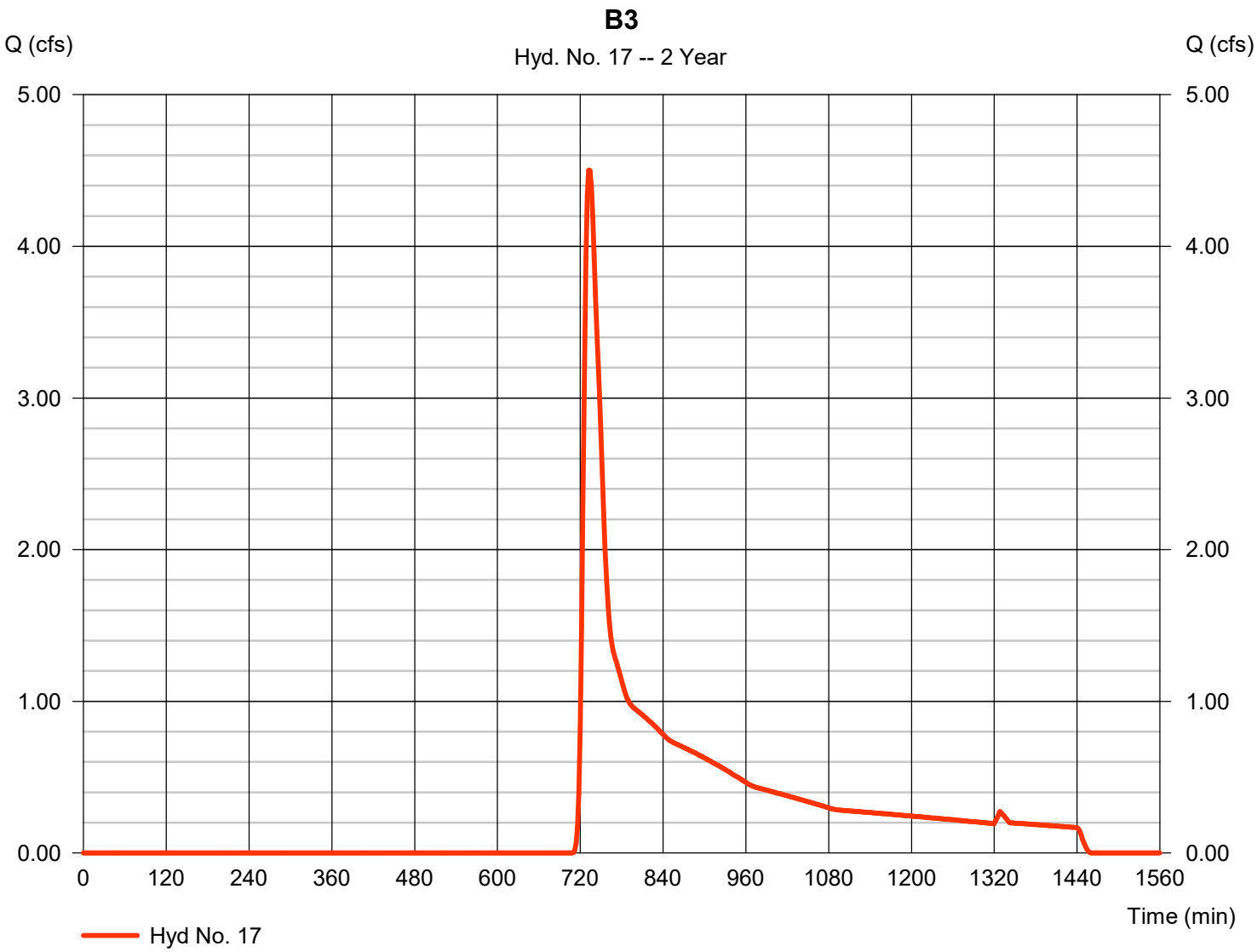
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 17

B3

Hydrograph type	= SCS Runoff	Peak discharge	= 4.502 cfs
Storm frequency	= 2 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 24,708 cuft
Drainage area	= 13.760 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.00 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



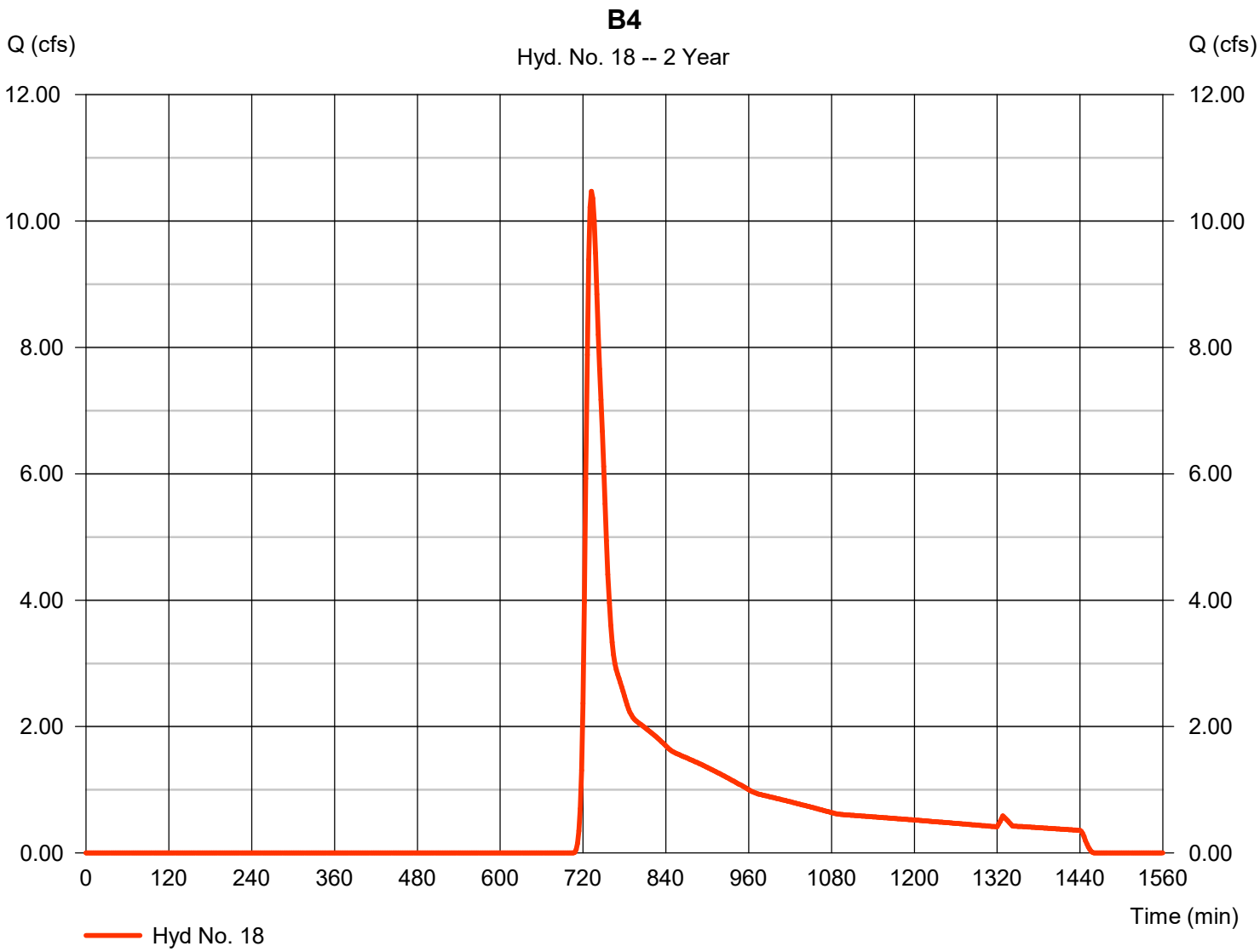
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 18

B4

Hydrograph type	= SCS Runoff	Peak discharge	= 10.47 cfs
Storm frequency	= 2 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 54,581 cuft
Drainage area	= 28.160 ac	Curve number	= 64
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.80 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



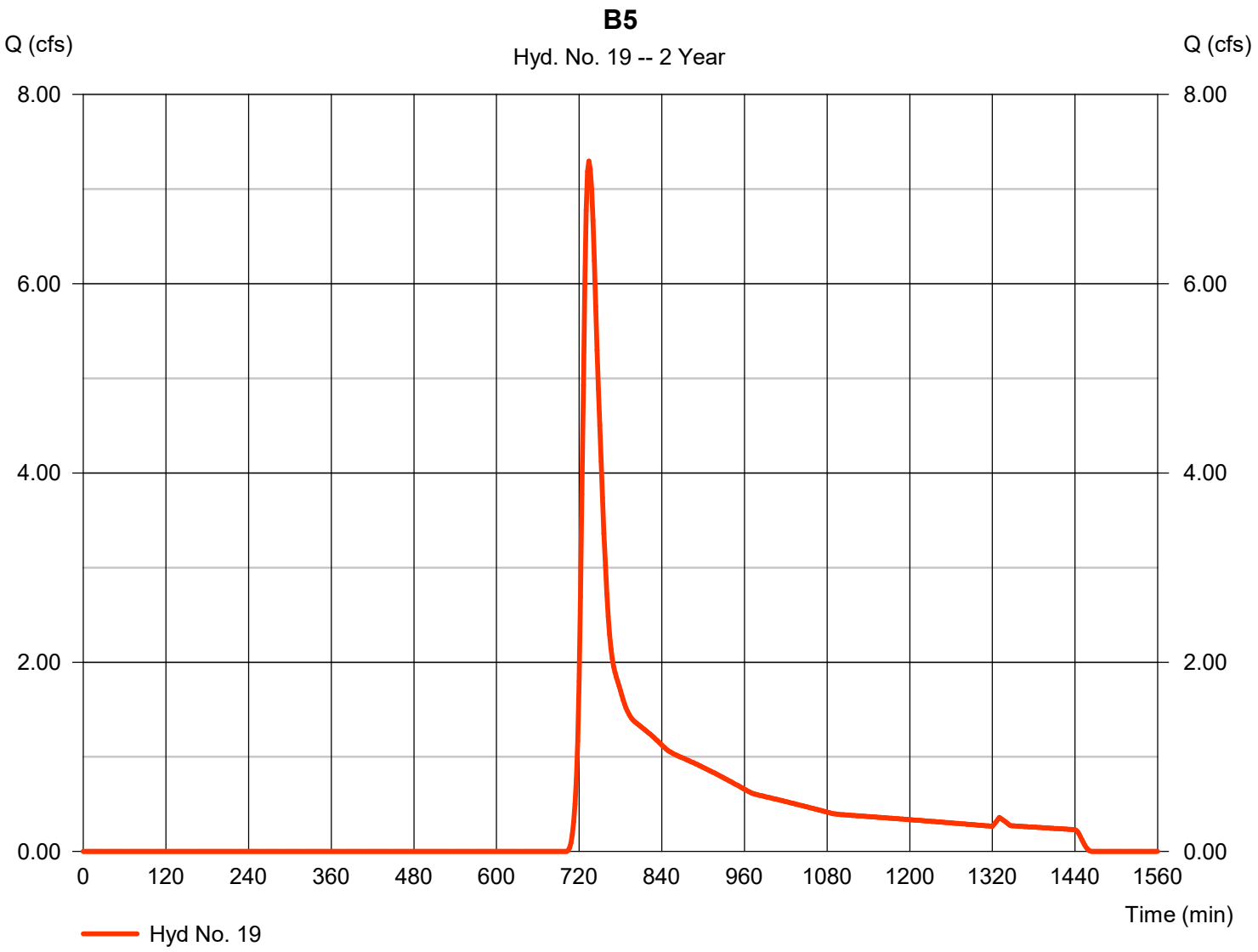
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 19

B5

Hydrograph type	= SCS Runoff	Peak discharge	= 7.298 cfs
Storm frequency	= 2 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 37,109 cuft
Drainage area	= 17.530 ac	Curve number	= 66
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.00 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



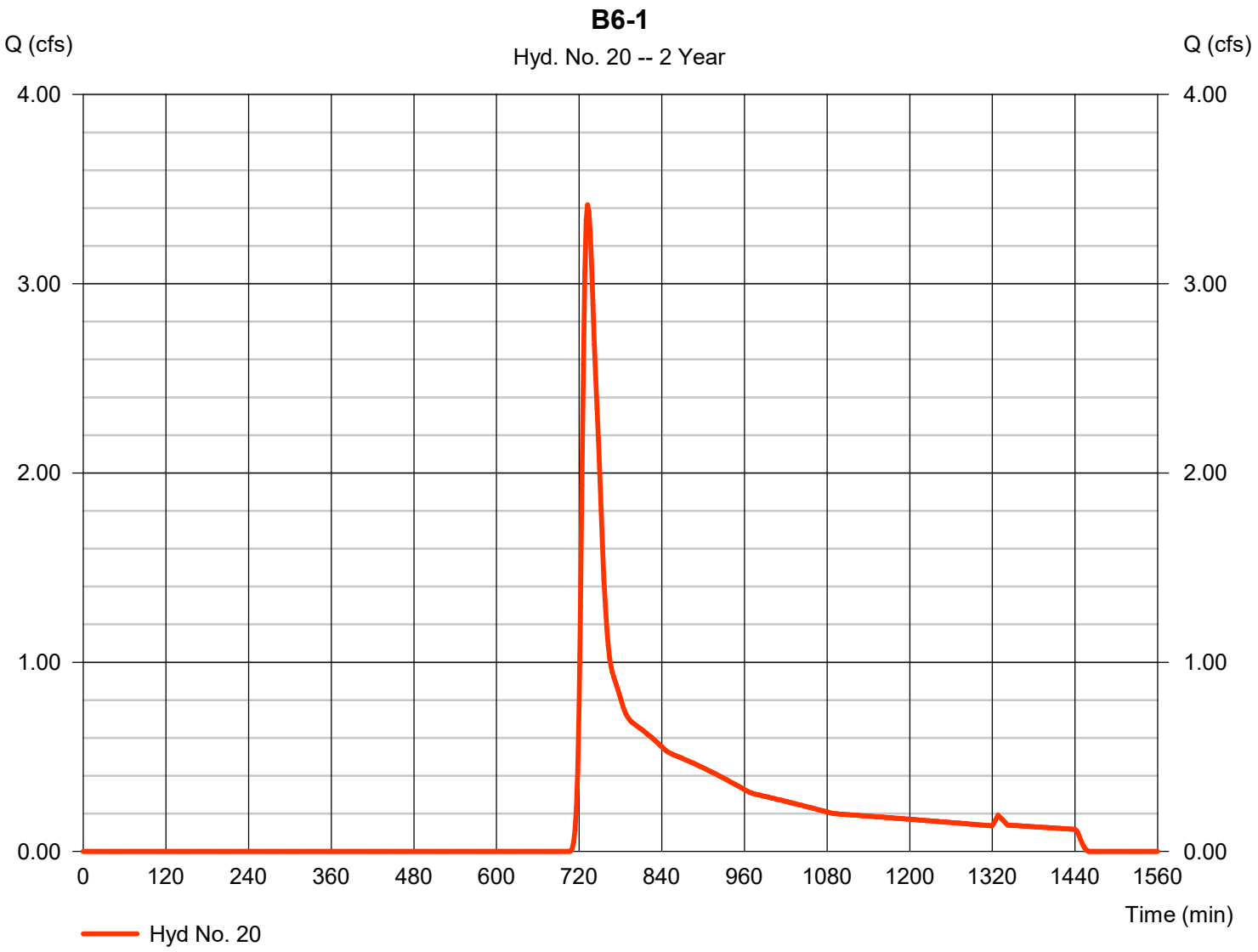
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 20

B6-1

Hydrograph type	= SCS Runoff	Peak discharge	= 3.417 cfs
Storm frequency	= 2 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 17,812 cuft
Drainage area	= 9.190 ac	Curve number	= 64
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



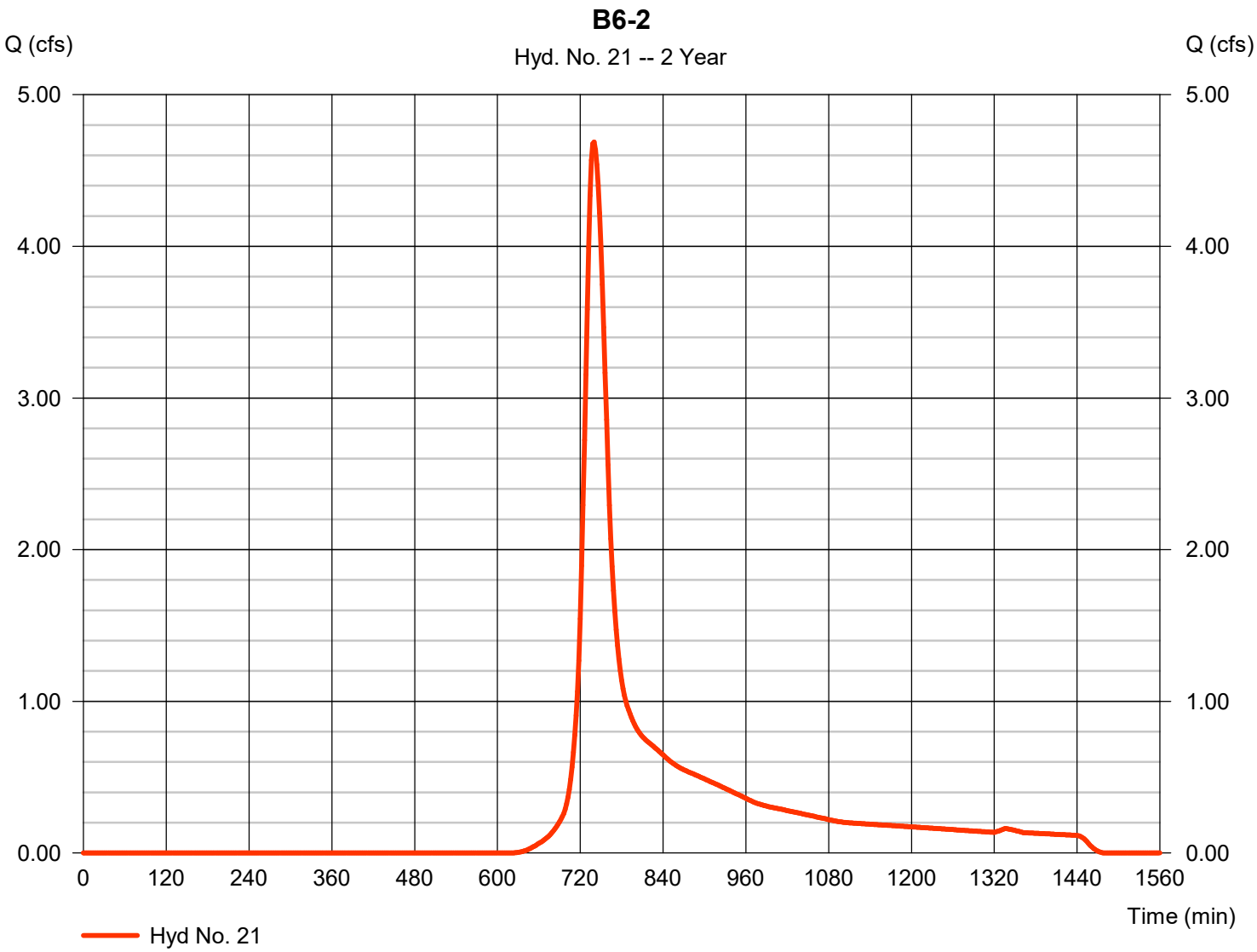
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 21

B6-2

Hydrograph type	= SCS Runoff	Peak discharge	= 4.689 cfs
Storm frequency	= 2 yrs	Time to peak	= 740 min
Time interval	= 2 min	Hyd. volume	= 24,105 cuft
Drainage area	= 6.190 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 24.00 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



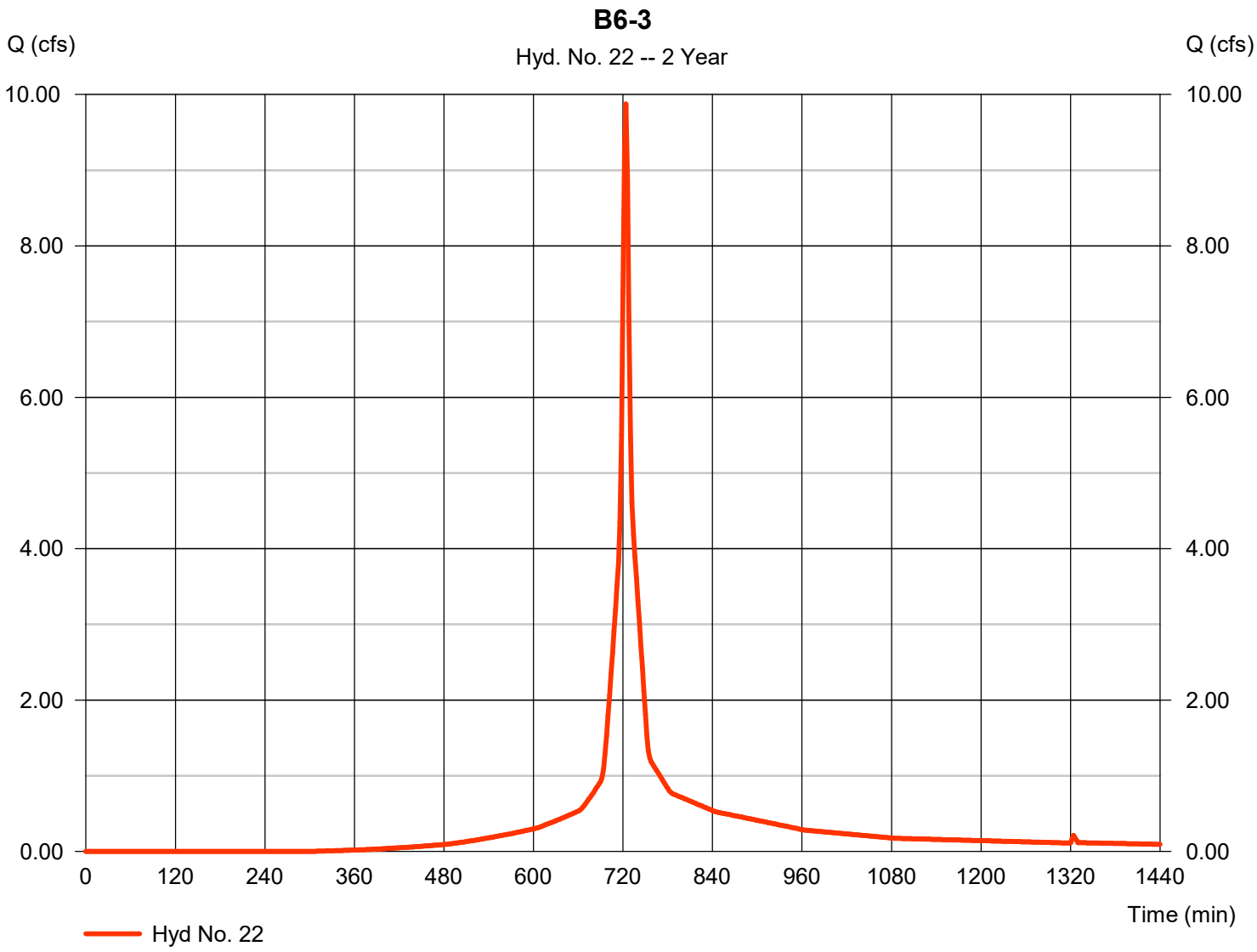
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 22

B6-3

Hydrograph type	= SCS Runoff	Peak discharge	= 9.877 cfs
Storm frequency	= 2 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 30,296 cuft
Drainage area	= 3.930 ac	Curve number	= 92
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



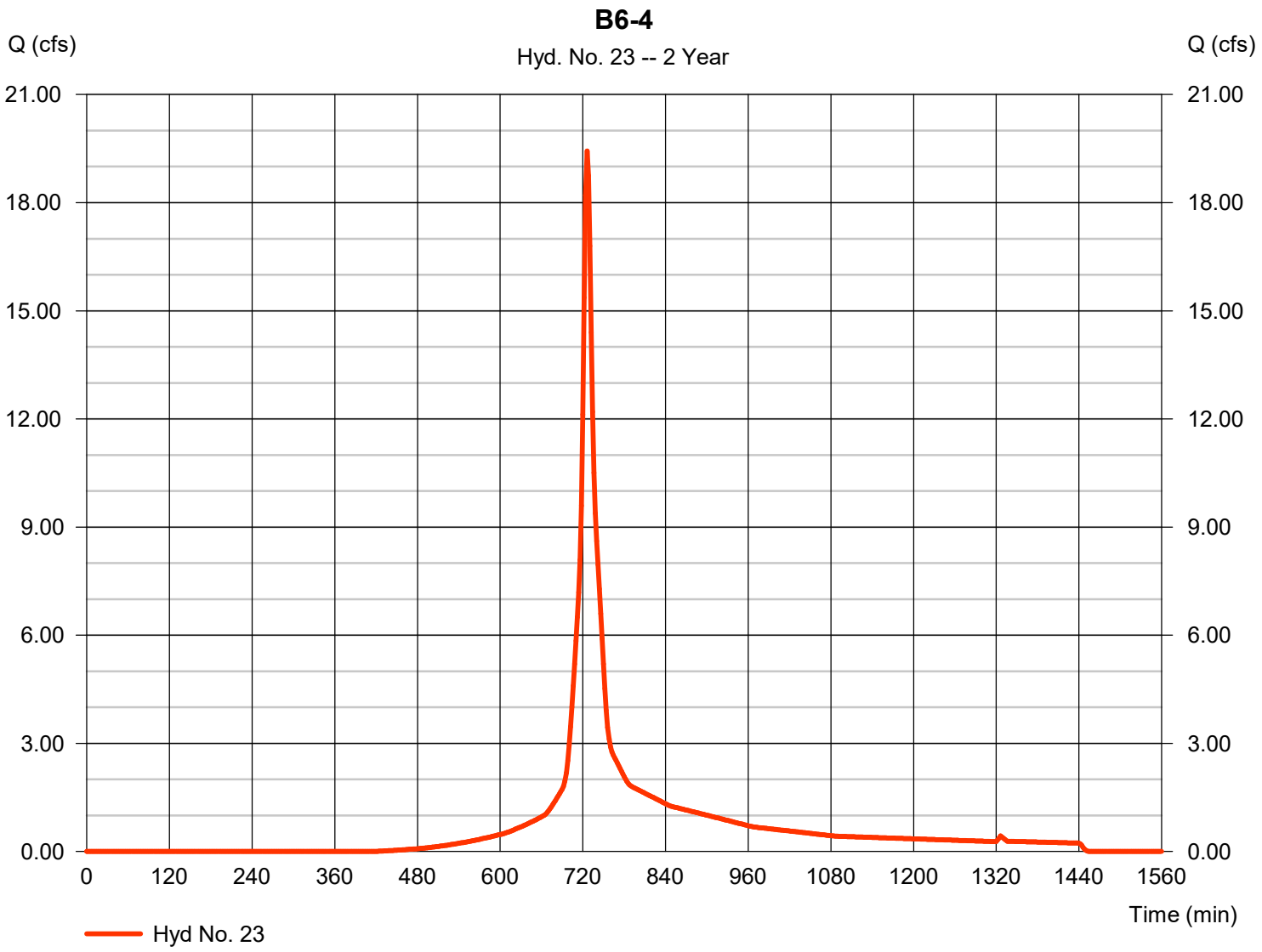
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 23

B6-4

Hydrograph type	= SCS Runoff	Peak discharge	= 19.43 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 66,500 cuft
Drainage area	= 9.560 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.00 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



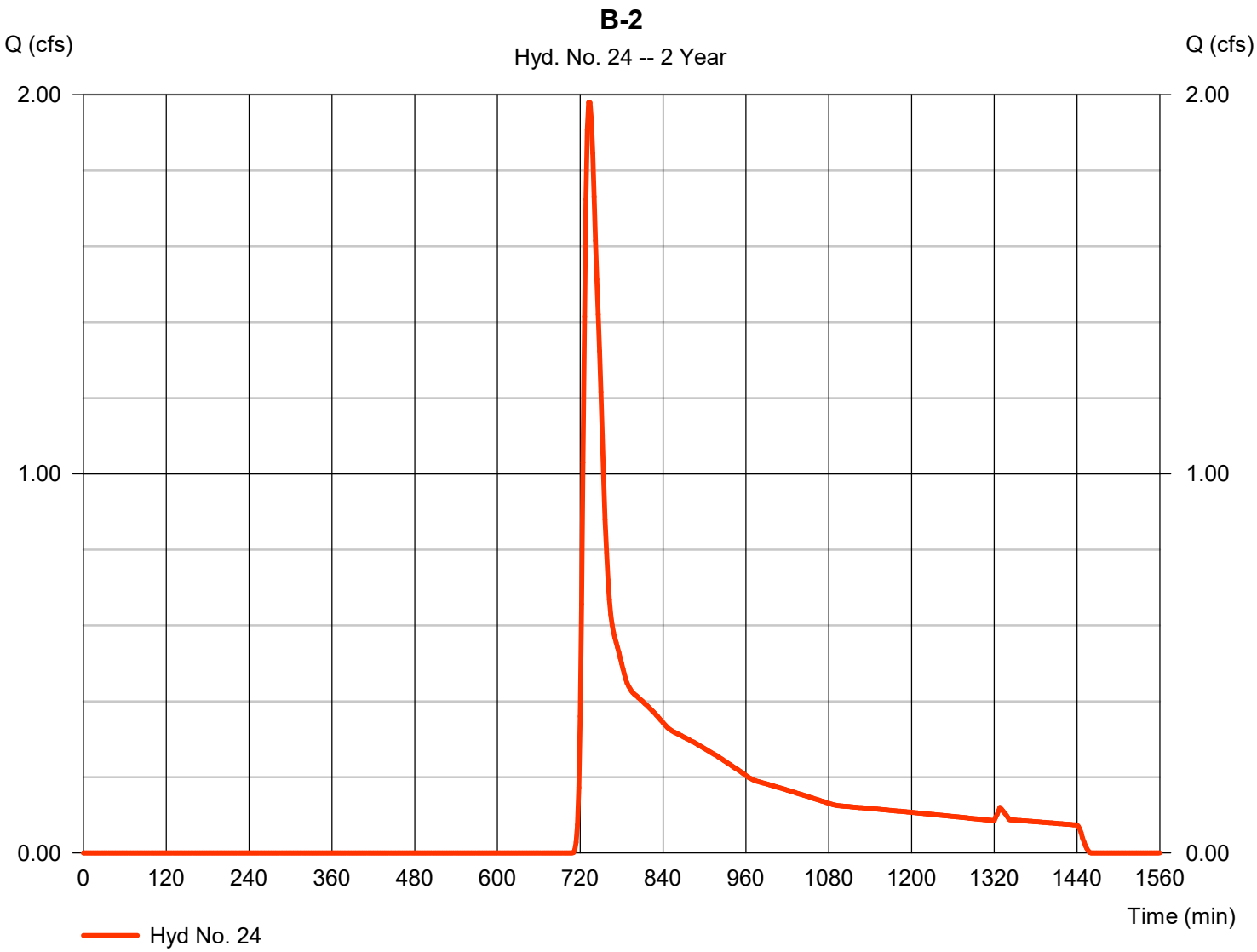
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 24

B-2

Hydrograph type	= SCS Runoff	Peak discharge	= 1.979 cfs
Storm frequency	= 2 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 10,864 cuft
Drainage area	= 6.050 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.00 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



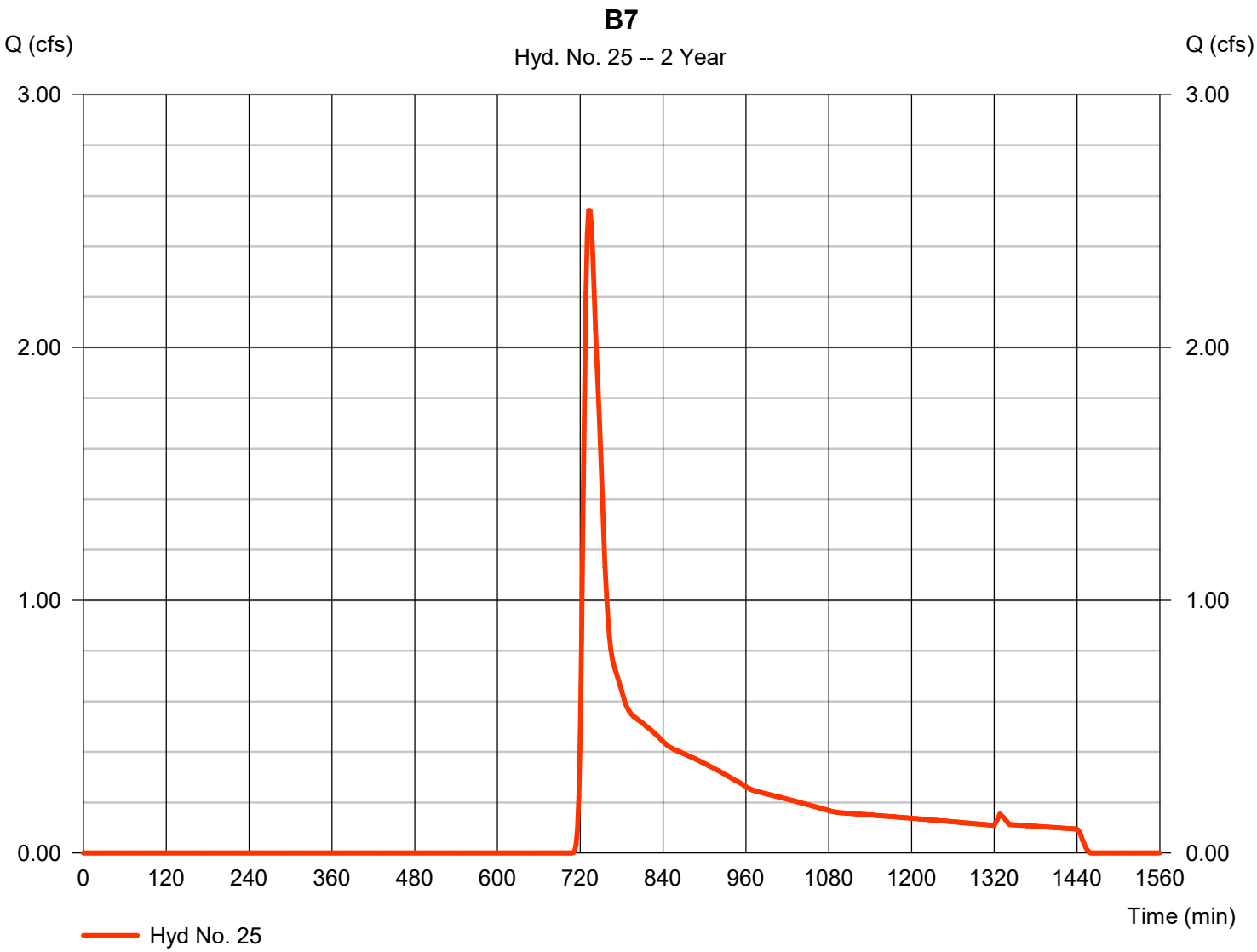
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 25

B7

Hydrograph type	= SCS Runoff	Peak discharge	= 2.542 cfs
Storm frequency	= 2 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 13,952 cuft
Drainage area	= 7.770 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



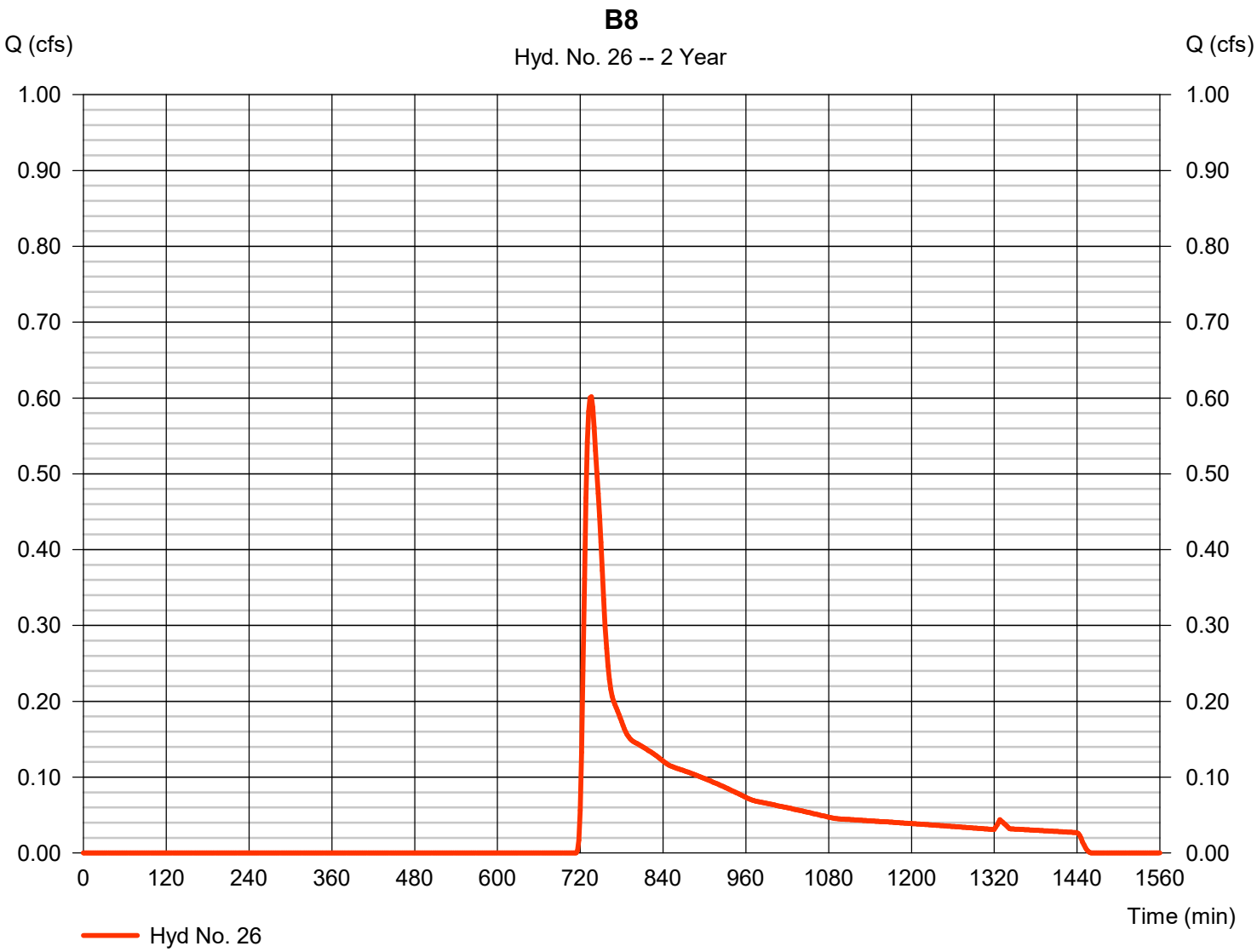
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 26

B8

Hydrograph type	= SCS Runoff	Peak discharge	= 0.602 cfs
Storm frequency	= 2 yrs	Time to peak	= 736 min
Time interval	= 2 min	Hyd. volume	= 3,694 cuft
Drainage area	= 2.420 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.00 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



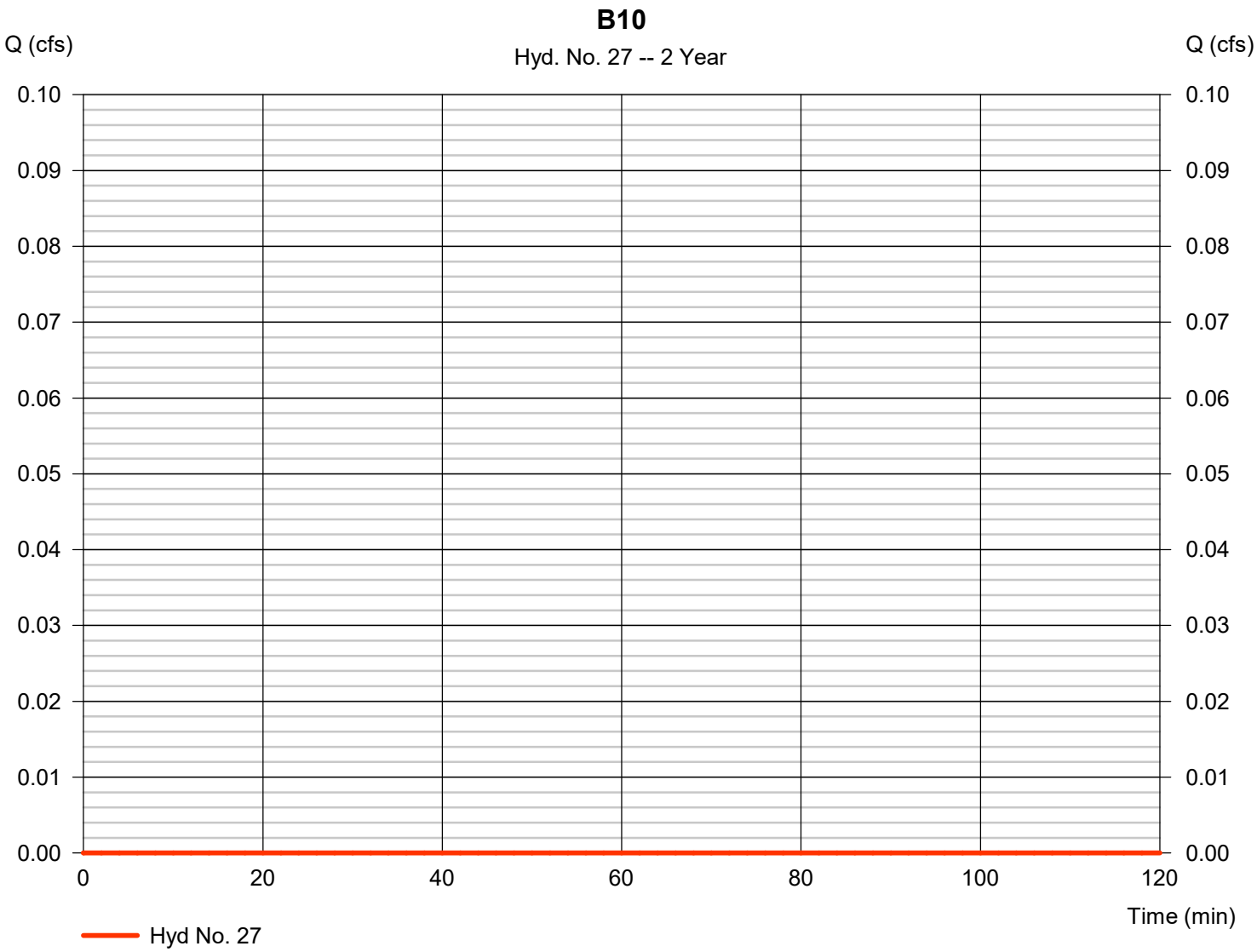
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 27

B10

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Drainage area	= 0.830 ac	Curve number	= 33
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.60 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



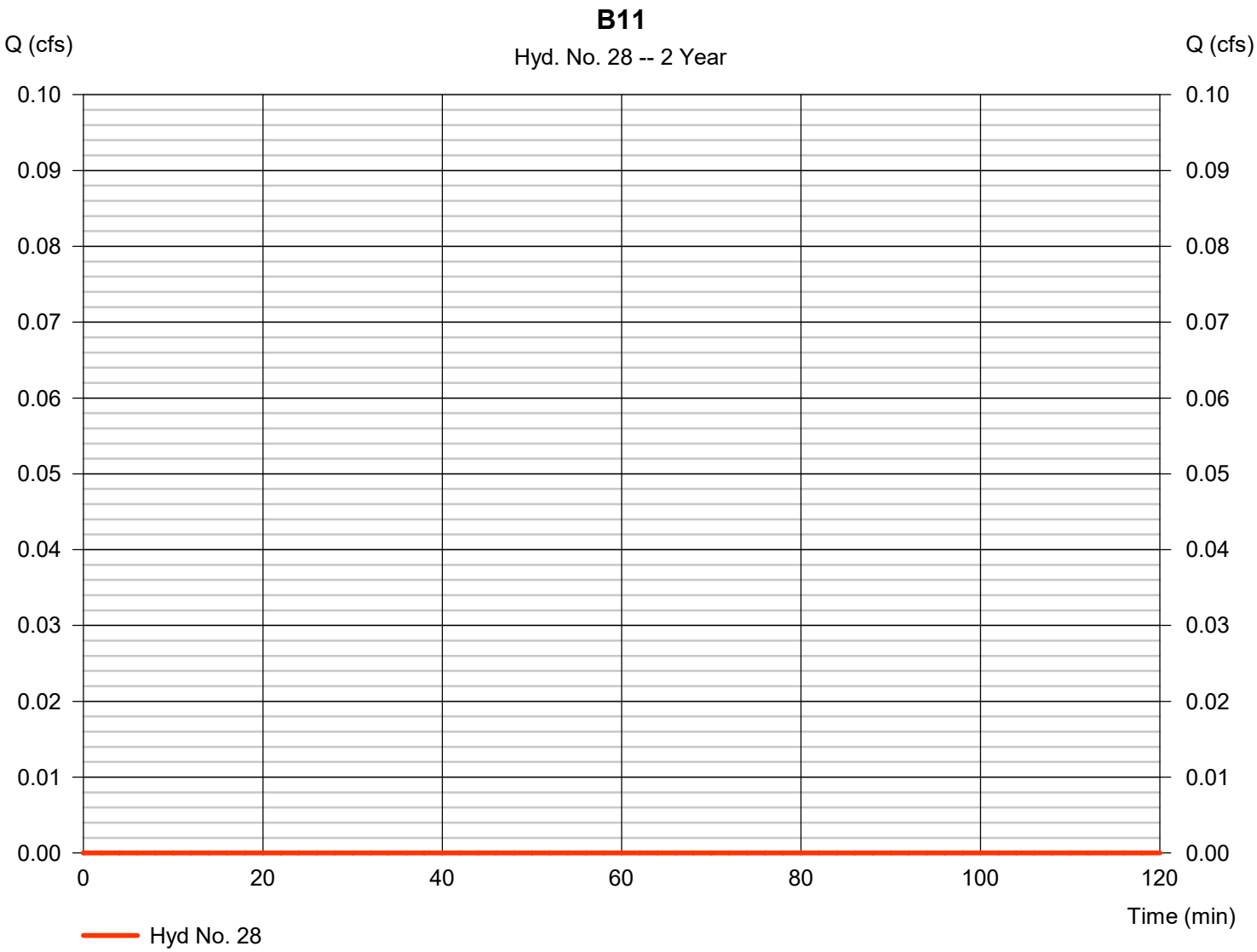
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 28

B11

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Drainage area	= 0.950 ac	Curve number	= 37
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.00 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

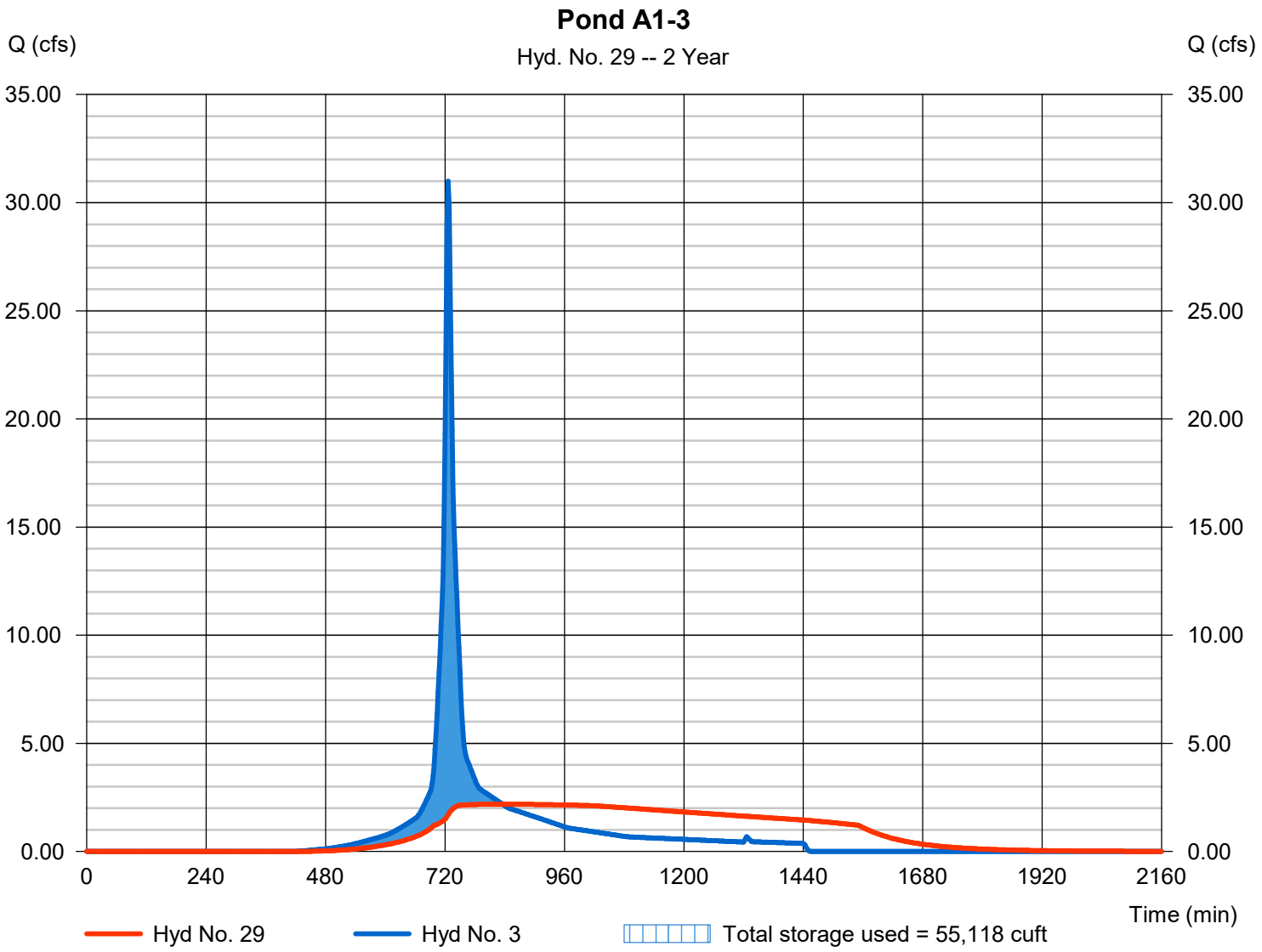
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 29

Pond A1-3

Hydrograph type	= Reservoir	Peak discharge	= 2.181 cfs
Storm frequency	= 2 yrs	Time to peak	= 836 min
Time interval	= 2 min	Hyd. volume	= 106,074 cuft
Inflow hyd. No.	= 3 - A1-3	Max. Elevation	= 132.15 ft
Reservoir name	= A1-3	Max. Storage	= 55,118 cuft

Storage Indication method used. Outflow includes exfiltration.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Pond No. 2 - A1-3

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 130.75 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	130.75	27,700	0	0
0.25	131.00	31,540	7,399	7,399
1.25	132.00	48,973	39,934	47,333
2.25	133.00	55,428	52,162	99,495
3.25	134.00	61,331	58,349	157,844
4.25	135.00	66,021	63,655	221,499

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	4.00	0.00	0.00
Span (in)	= 24.00	4.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 130.75	130.75	0.00	0.00
Length (ft)	= 470.00	0.50	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

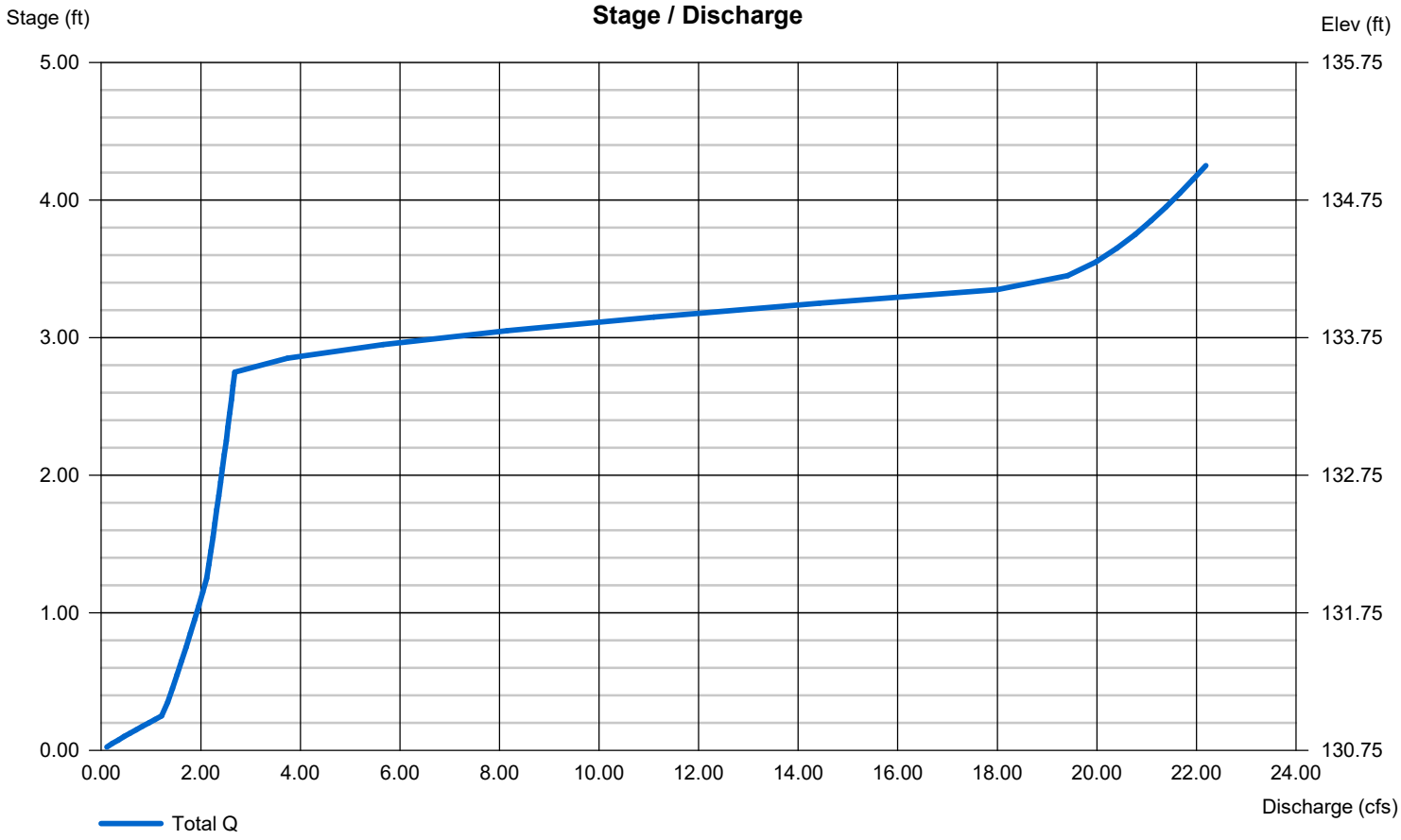
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 10.00	0.00	0.00	0.00
Crest El. (ft)	= 133.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 1.500 (by Contour)

TW Elev. (ft) = 0.00

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



Hydrograph Report

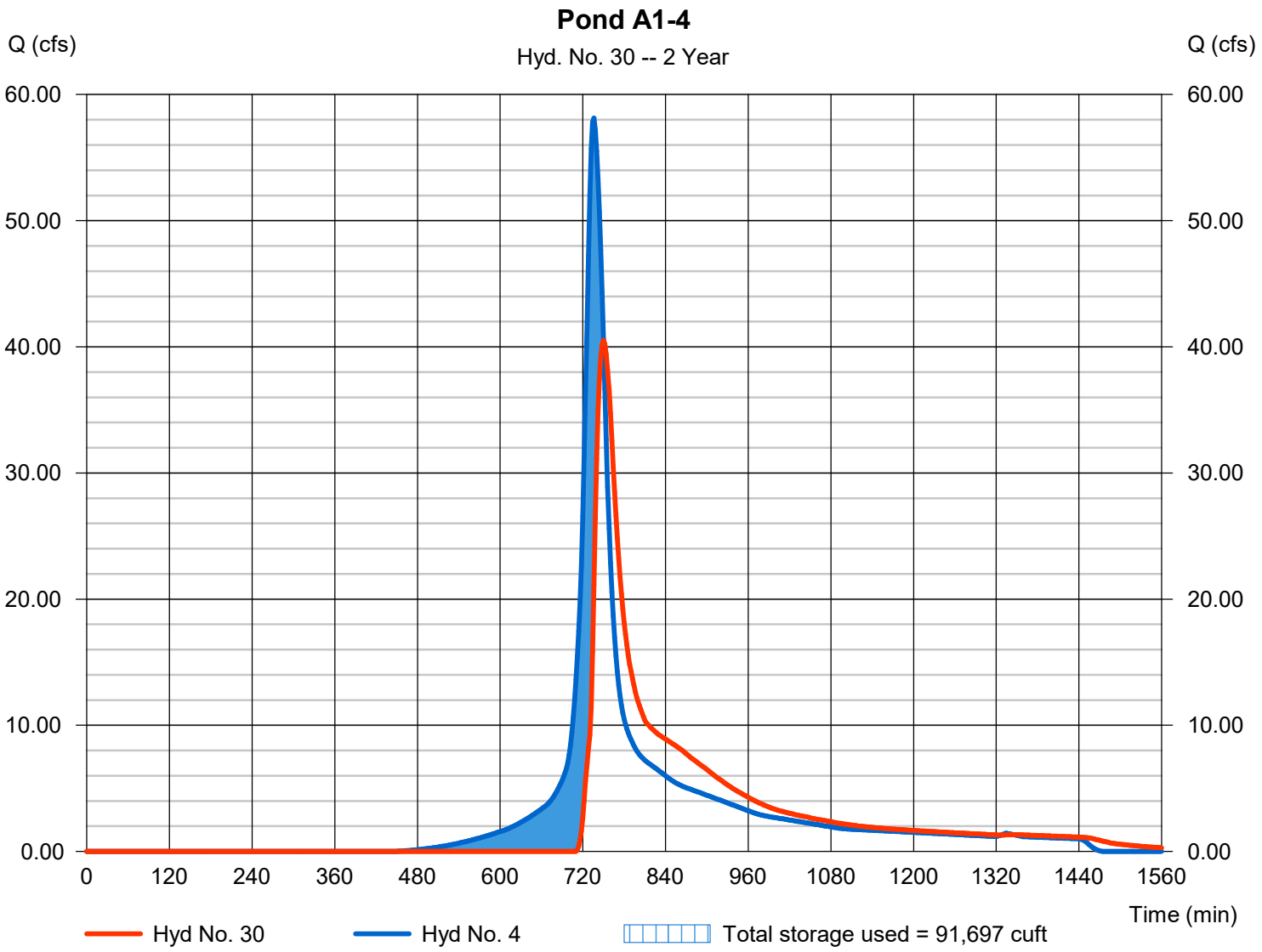
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 30

Pond A1-4

Hydrograph type	= Reservoir	Peak discharge	= 40.52 cfs
Storm frequency	= 2 yrs	Time to peak	= 750 min
Time interval	= 2 min	Hyd. volume	= 243,736 cuft
Inflow hyd. No.	= 4 - A1-4	Max. Elevation	= 136.12 ft
Reservoir name	= A1-4	Max. Storage	= 91,697 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Pond No. 3 - A1-4

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 132.25 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	132.25	13,450	0	0
0.75	133.00	17,300	11,500	11,500
1.75	134.00	22,600	19,889	31,389
2.75	135.00	28,000	25,249	56,638
3.75	136.00	33,700	30,803	87,441
4.75	137.00	39,700	36,655	124,097
5.00	137.25	41,100	10,098	134,195
5.75	138.00	78,100	43,960	178,155
6.75	139.00	95,100	86,452	264,607
7.25	139.50	102,000	49,260	313,867

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 36.00	10.00	0.00	0.00
Span (in)	= 36.00	10.00	0.00	0.00
No. Barrels	= 1	4	0	0
Invert El. (ft)	= 131.25	134.00	0.00	0.00
Length (ft)	= 144.00	0.50	0.00	0.00
Slope (%)	= 1.73	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

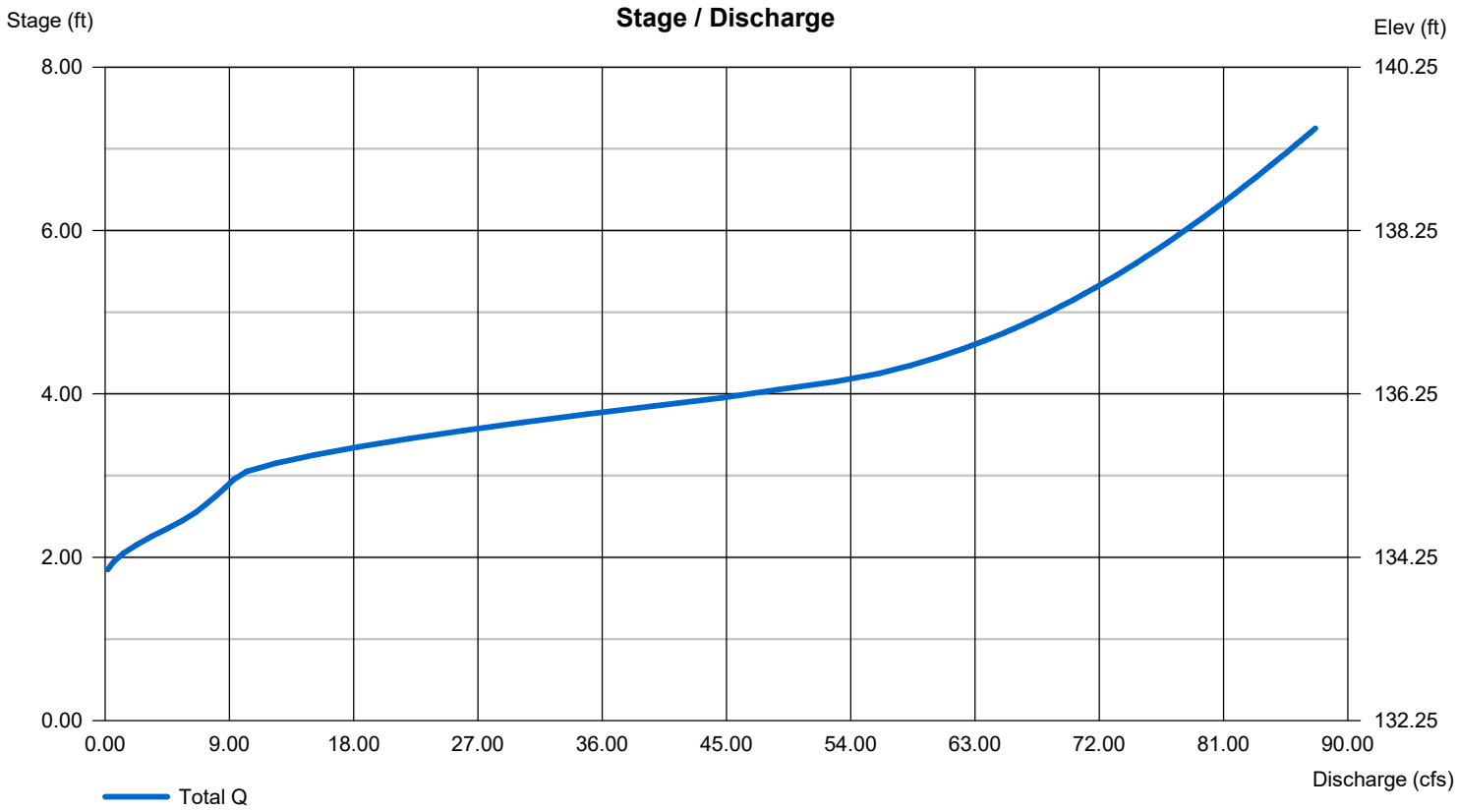
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 10.00	0.00	0.00	0.00
Crest El. (ft)	= 135.25	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

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



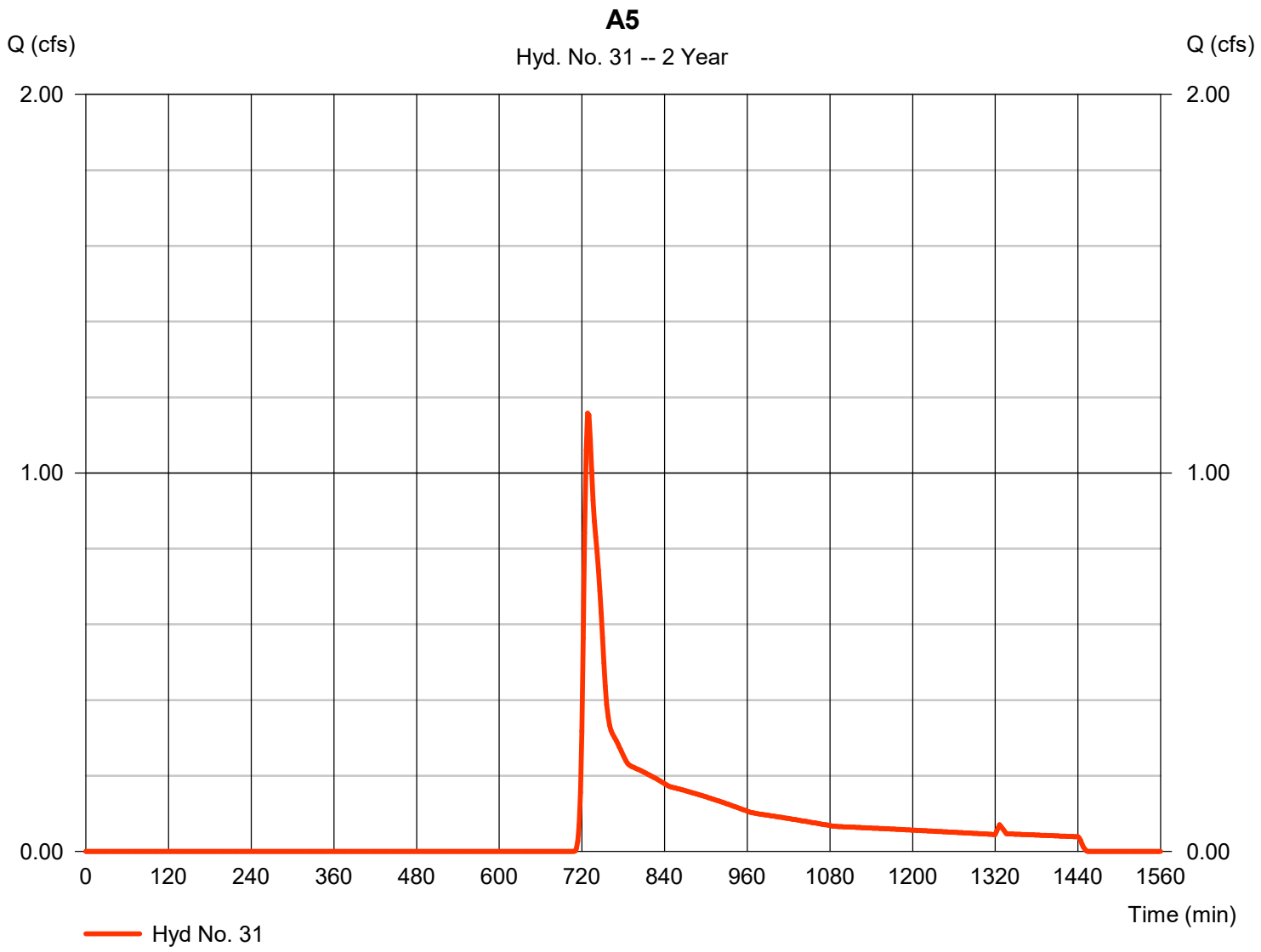
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 31

A5

Hydrograph type	= SCS Runoff	Peak discharge	= 1.158 cfs
Storm frequency	= 2 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 5,746 cuft
Drainage area	= 3.300 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.00 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

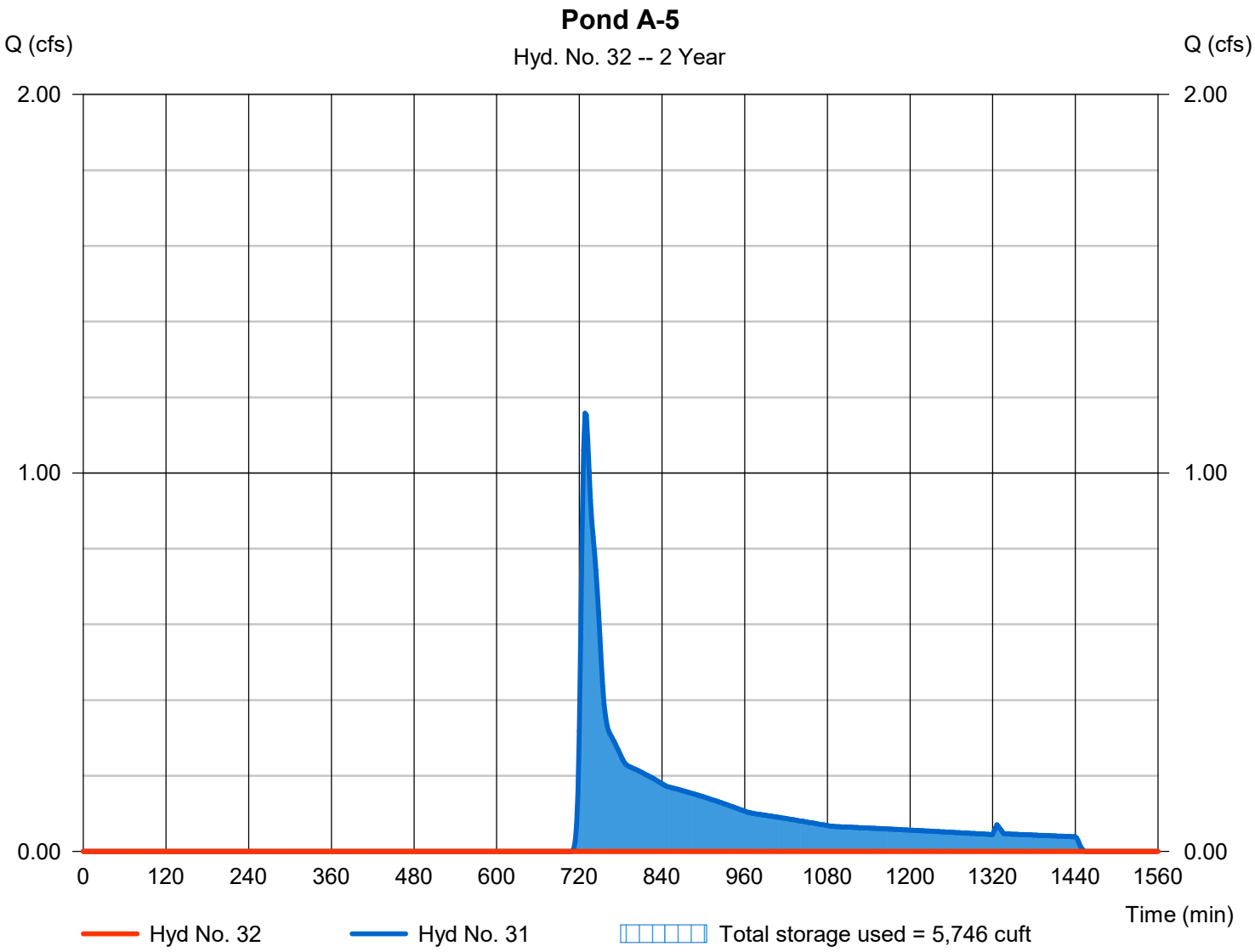
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 32

Pond A-5

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 31 - A5	Max. Elevation	= 104.14 ft
Reservoir name	= A5	Max. Storage	= 5,746 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Pond No. 6 - A5

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 102.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	102.00	1,460	0	0
1.00	103.00	2,550	1,980	1,980
2.00	104.00	3,800	3,154	5,134
3.00	105.00	5,110	4,438	9,572
8.00	110.00	10,375	37,940	47,512

Culvert / Orifice Structures

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

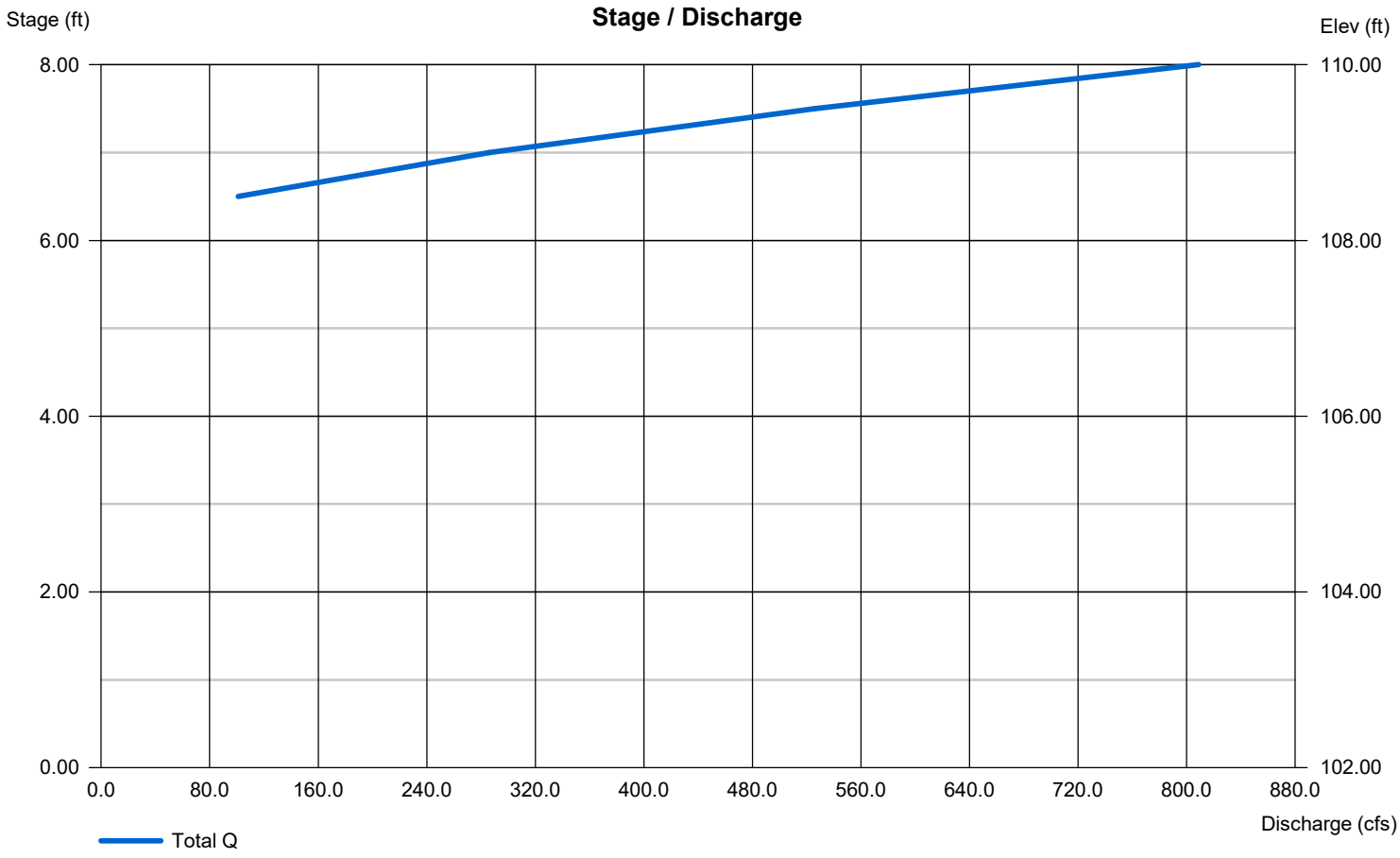
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 110.00	0.00	0.00	0.00
Crest El. (ft)	= 108.00	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

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



Hydrograph Report

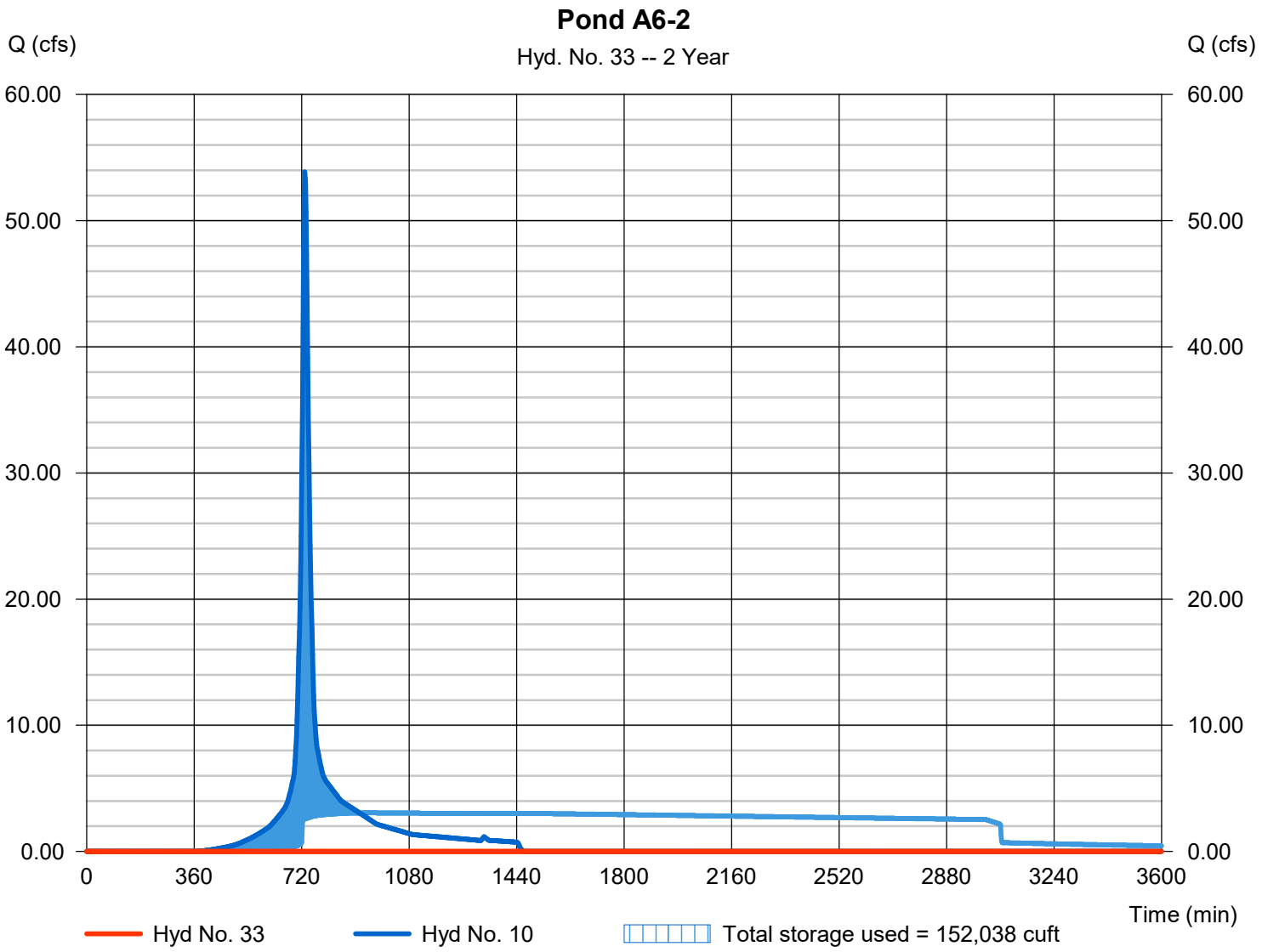
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 33

Pond A6-2

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= 774 min
Time interval	= 2 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 10 - A6-2	Max. Elevation	= 115.33 ft
Reservoir name	= A6-2	Max. Storage	= 152,038 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Pond No. 8 - A6-2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 112.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	112.00	34,672	0	0
1.00	113.00	38,208	36,422	36,422
2.00	114.00	49,792	43,868	80,290
3.00	115.00	55,641	52,684	132,974
4.00	116.00	60,460	58,028	191,002
5.00	117.00	64,735	62,579	253,581
6.00	118.00	69,111	66,904	320,486
7.00	119.00	73,587	71,330	391,816
8.00	120.00	78,164	75,857	467,672

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	6.00	0.00	0.00
Span (in)	= 12.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 114.00	115.50	0.00	0.00
Length (ft)	= 55.00	0.50	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

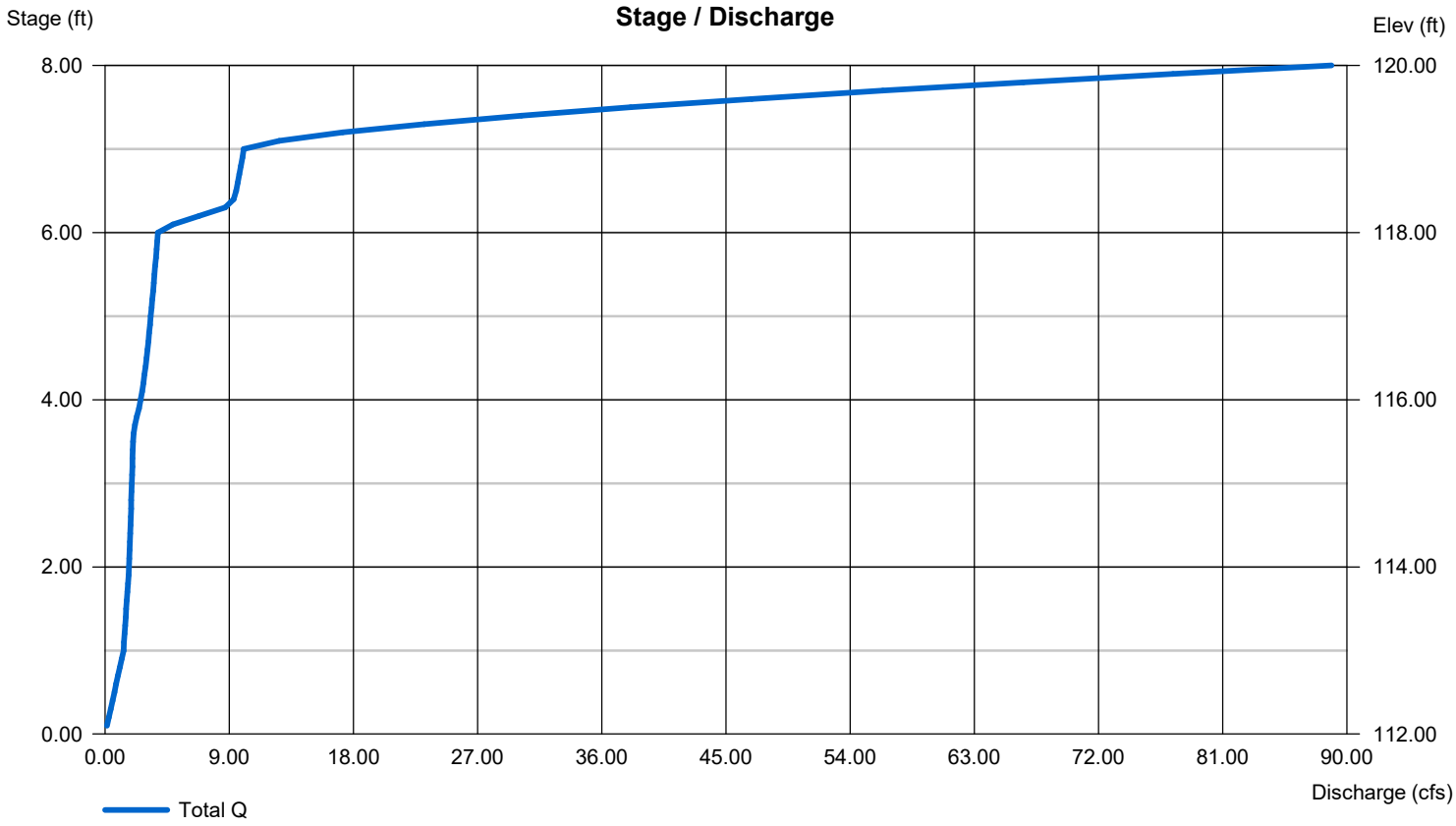
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 10.00	30.00	0.00	0.00
Crest El. (ft)	= 118.00	119.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= Rect	Broad	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 1.500 (by Contour)

TW Elev. (ft) = 0.00

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



Hydrograph Report

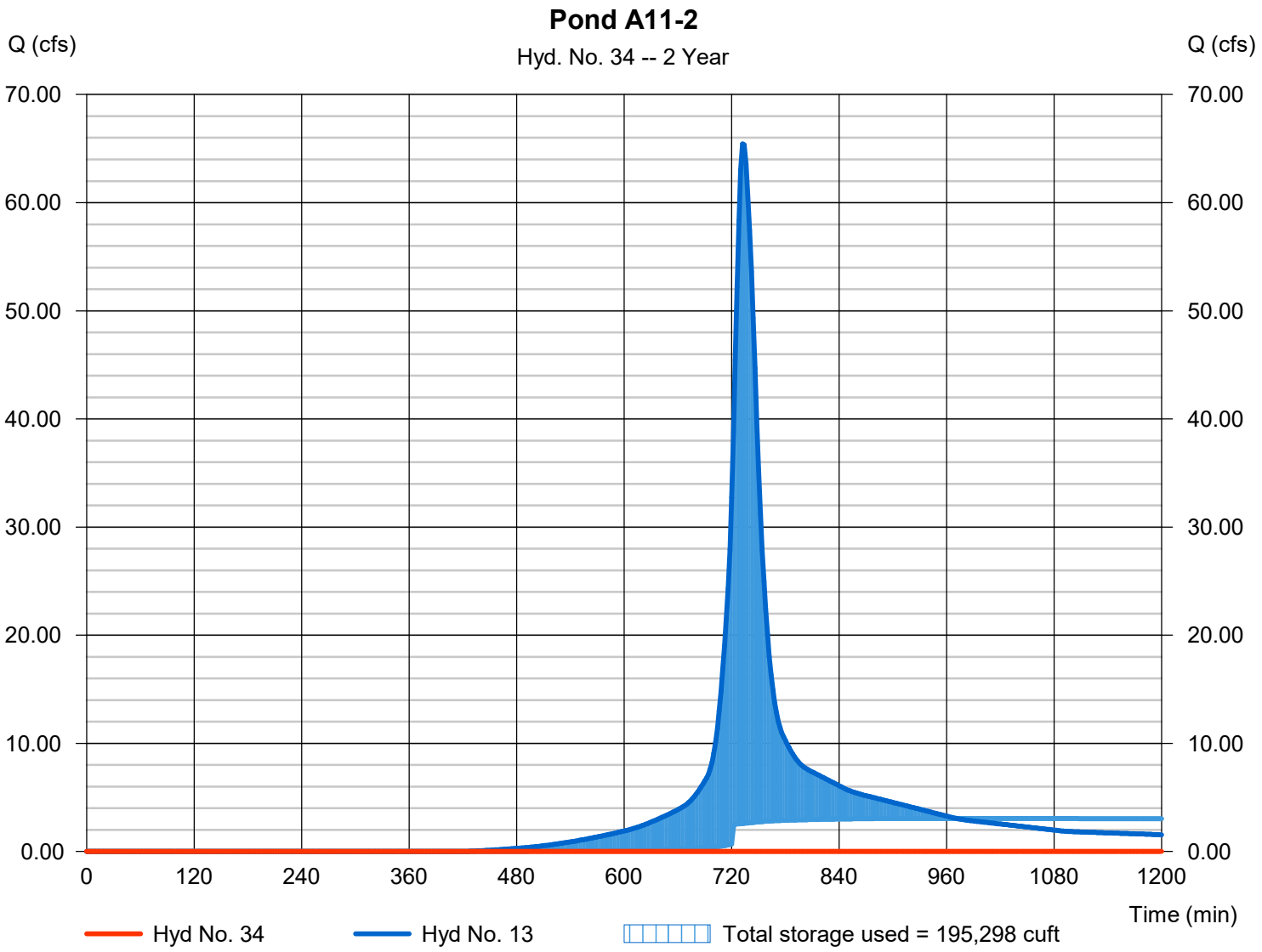
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 34

Pond A11-2

Hydrograph type	= Reservoir	Peak discharge	= 0.005 cfs
Storm frequency	= 2 yrs	Time to peak	= 982 min
Time interval	= 2 min	Hyd. volume	= 40 cuft
Inflow hyd. No.	= 13 - A11-2	Max. Elevation	= 116.81 ft
Reservoir name	= A11-2	Max. Storage	= 195,298 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Pond No. 10 - A11-2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 113.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	114.00	60,871	0	0
1.00	115.00	66,010	63,417	63,417
2.00	116.00	71,182	68,573	131,990
3.00	117.00	85,827	78,383	210,372
4.00	118.00	93,006	89,384	299,756
5.00	119.00	99,952	96,449	396,204
6.00	120.00	105,628	102,767	498,971

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 36.00	Inactive	0.00	0.00
Span (in)	= 36.00	12.00	0.00	0.00
No. Barrels	= 1	3	0	0
Invert El. (ft)	= 115.00	116.50	0.00	0.00
Length (ft)	= 70.00	0.50	0.00	0.00
Slope (%)	= 5.67	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

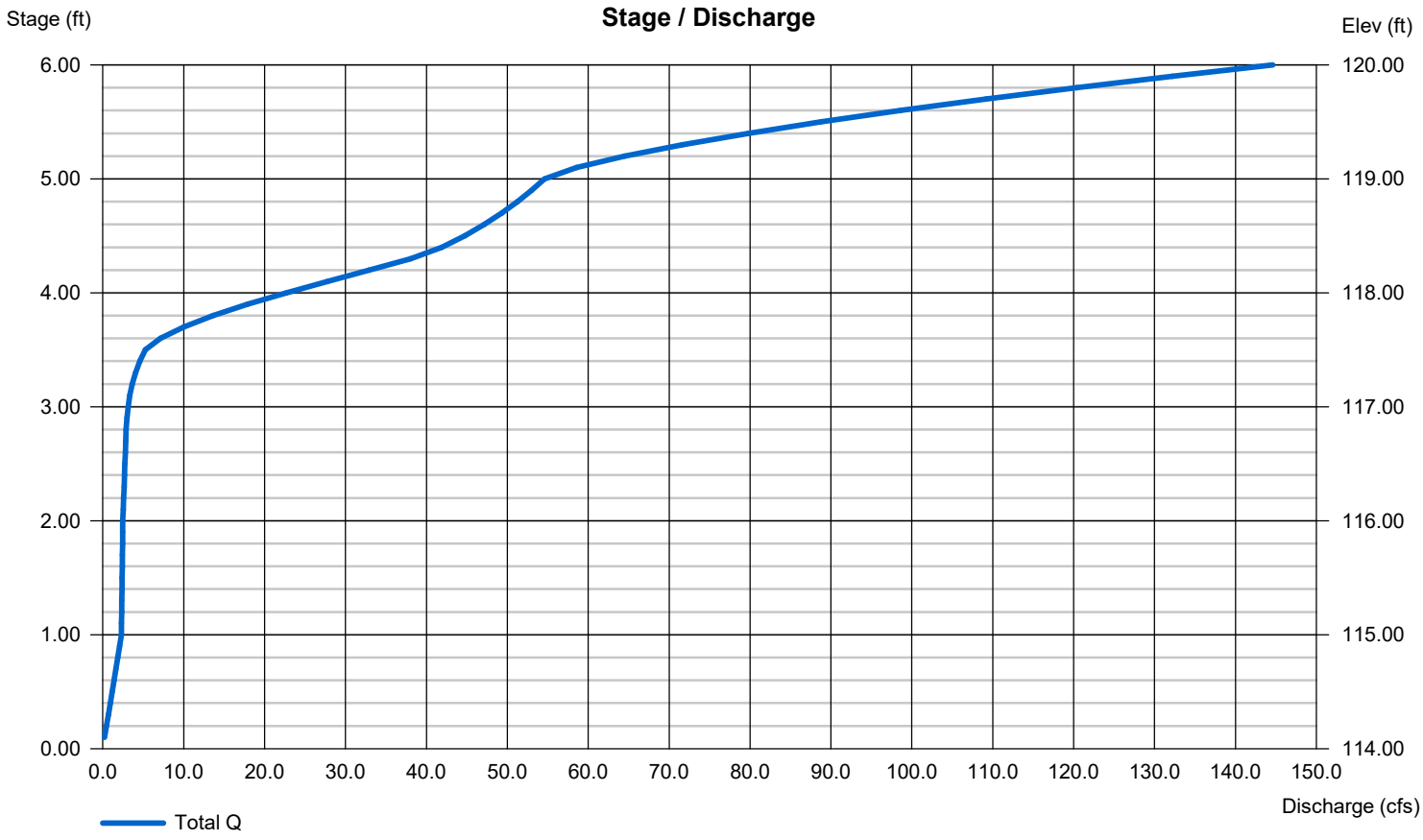
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 10.00	0.00	30.00	0.00
Crest El. (ft)	= 117.50	116.75	119.00	0.00
Weir Coeff.	= 3.33	4.40	2.60	3.33
Weir Type	= 1	120 degV	Broad	---
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr) = 1.500 (by Contour)

TW Elev. (ft) = 0.00

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



Hydrograph Report

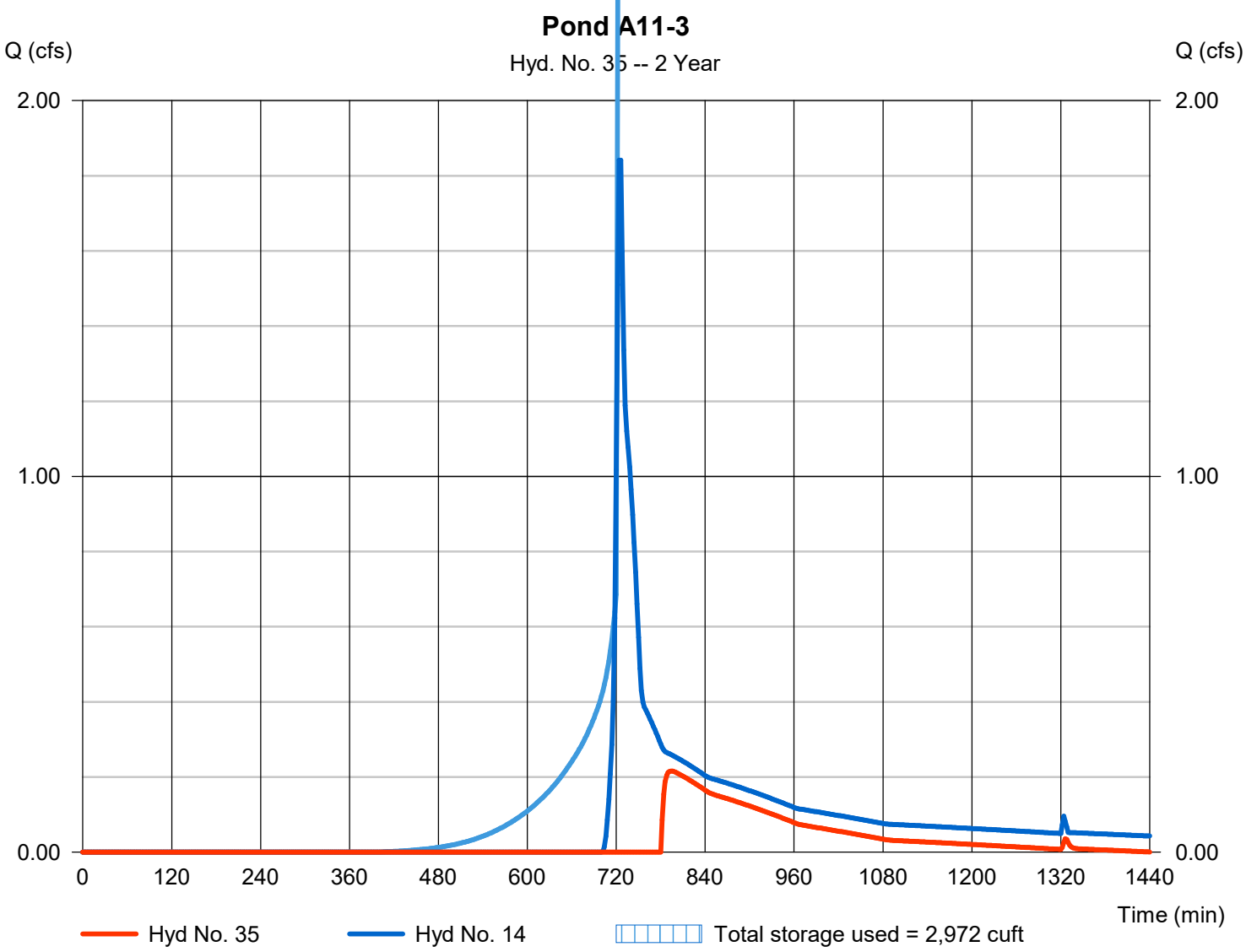
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 35

Pond A11-3

Hydrograph type	= Reservoir	Peak discharge	= 0.216 cfs
Storm frequency	= 2 yrs	Time to peak	= 794 min
Time interval	= 2 min	Hyd. volume	= 2,297 cuft
Inflow hyd. No.	= 14 - A11-3	Max. Elevation	= 109.22 ft
Reservoir name	= A11-3	Max. Storage	= 2,972 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Pond No. 11 - A11-3

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 108.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	108.00	1,100	0	0
4.00	112.00	4,100	9,764	9,764

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	0.00	0.00	0.00
Span (in)	= 12.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 107.00	0.00	0.00	0.00
Length (ft)	= 110.00	0.00	0.00	0.00
Slope (%)	= 1.36	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

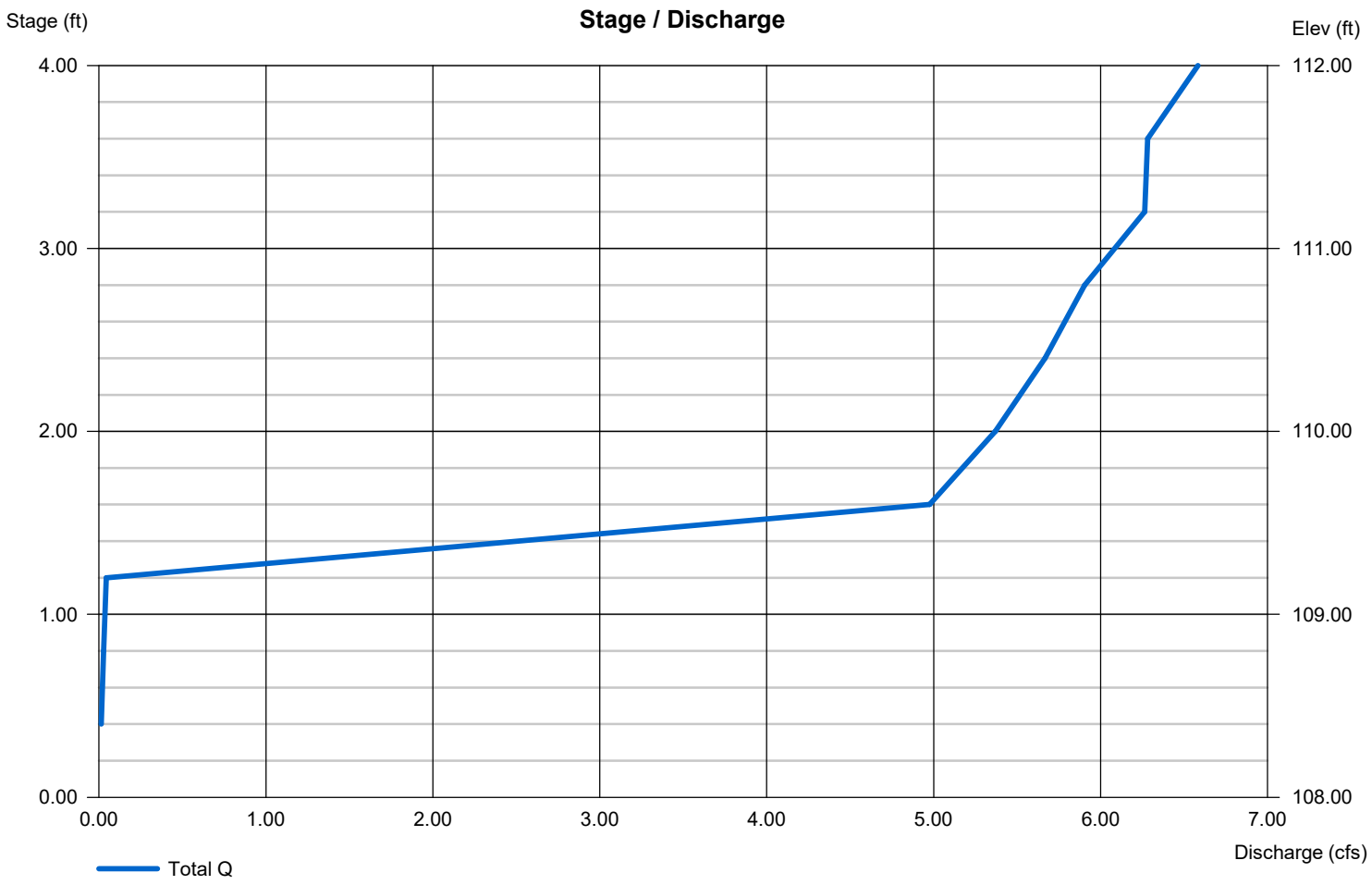
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 10.00	30.00	0.00	0.00
Crest El. (ft)	= 109.25	112.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= 1	Broad	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 1.500 (by Contour)

TW Elev. (ft) = 0.00

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



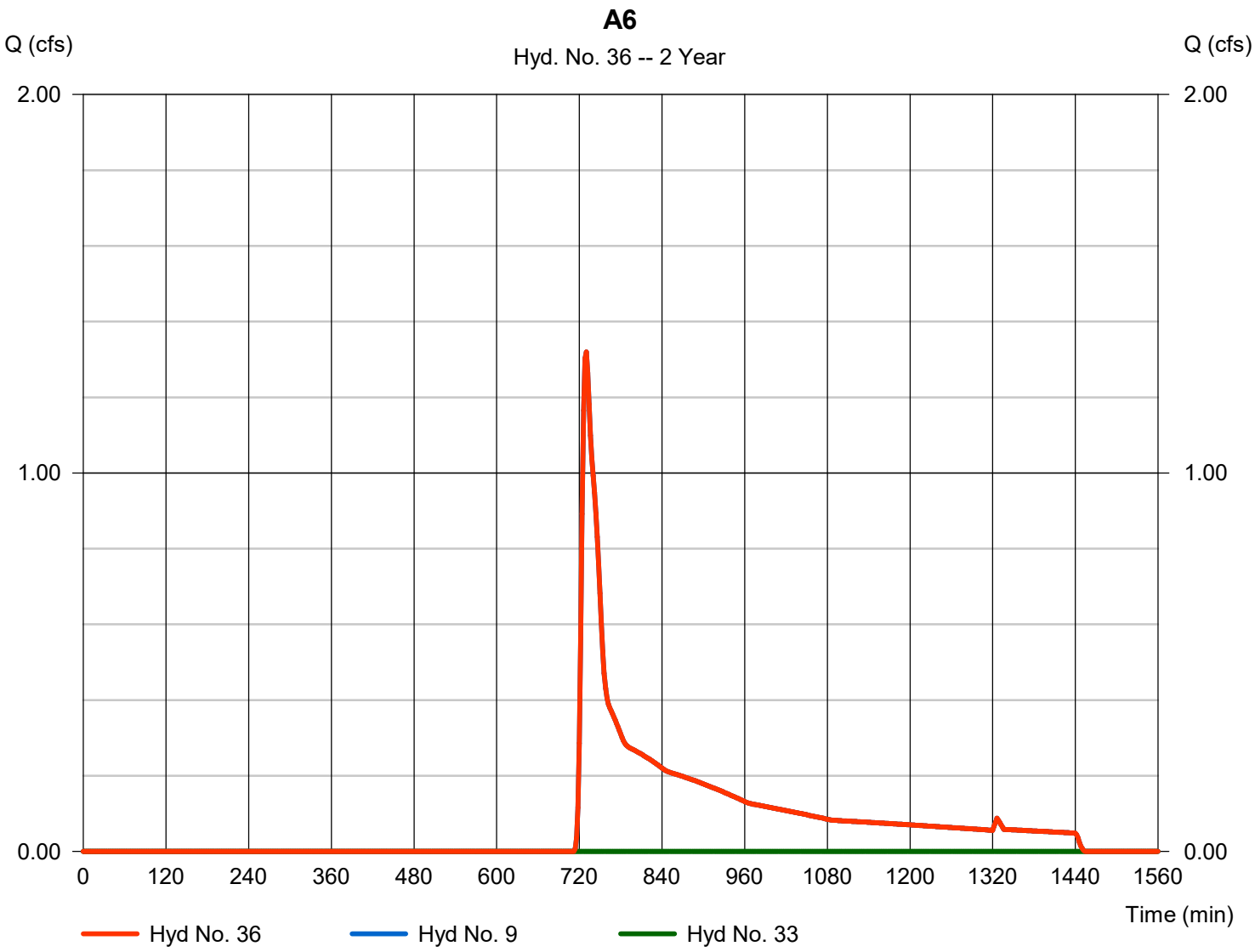
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 36

A6

Hydrograph type	= Combine	Peak discharge	= 1.319 cfs
Storm frequency	= 2 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 6,947 cuft
Inflow hyds.	= 9, 33	Contrib. drain. area	= 4.320 ac



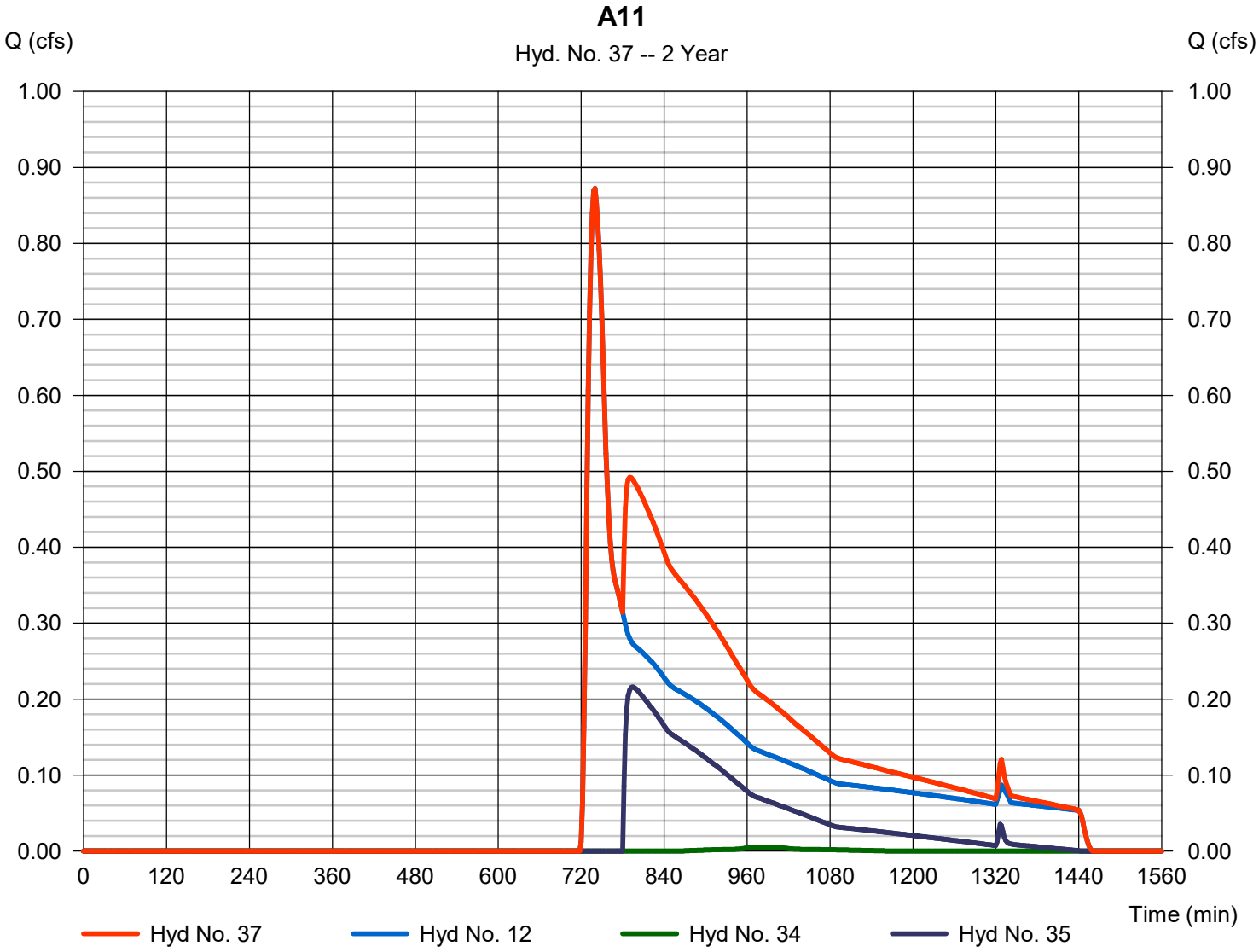
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 37

A11

Hydrograph type	= Combine	Peak discharge	= 0.872 cfs
Storm frequency	= 2 yrs	Time to peak	= 740 min
Time interval	= 2 min	Hyd. volume	= 8,908 cuft
Inflow hyds.	= 12, 34, 35	Contrib. drain. area	= 5.660 ac



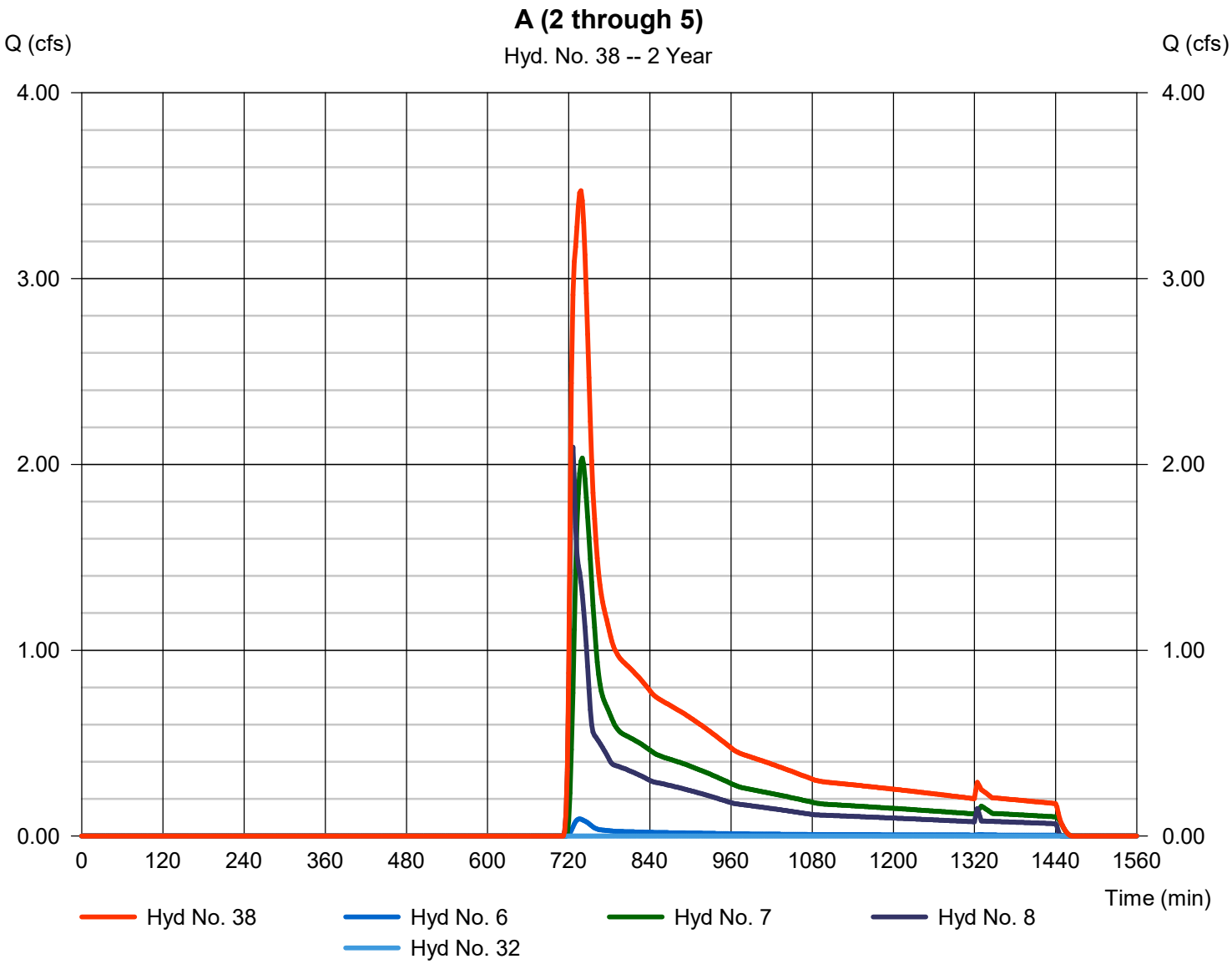
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 38

A (2 through 5)

Hydrograph type	= Combine	Peak discharge	= 3.473 cfs
Storm frequency	= 2 yrs	Time to peak	= 738 min
Time interval	= 2 min	Hyd. volume	= 23,883 cuft
Inflow hyds.	= 6, 7, 8, 32	Contrib. drain. area	= 17.140 ac



Hydrograph Report

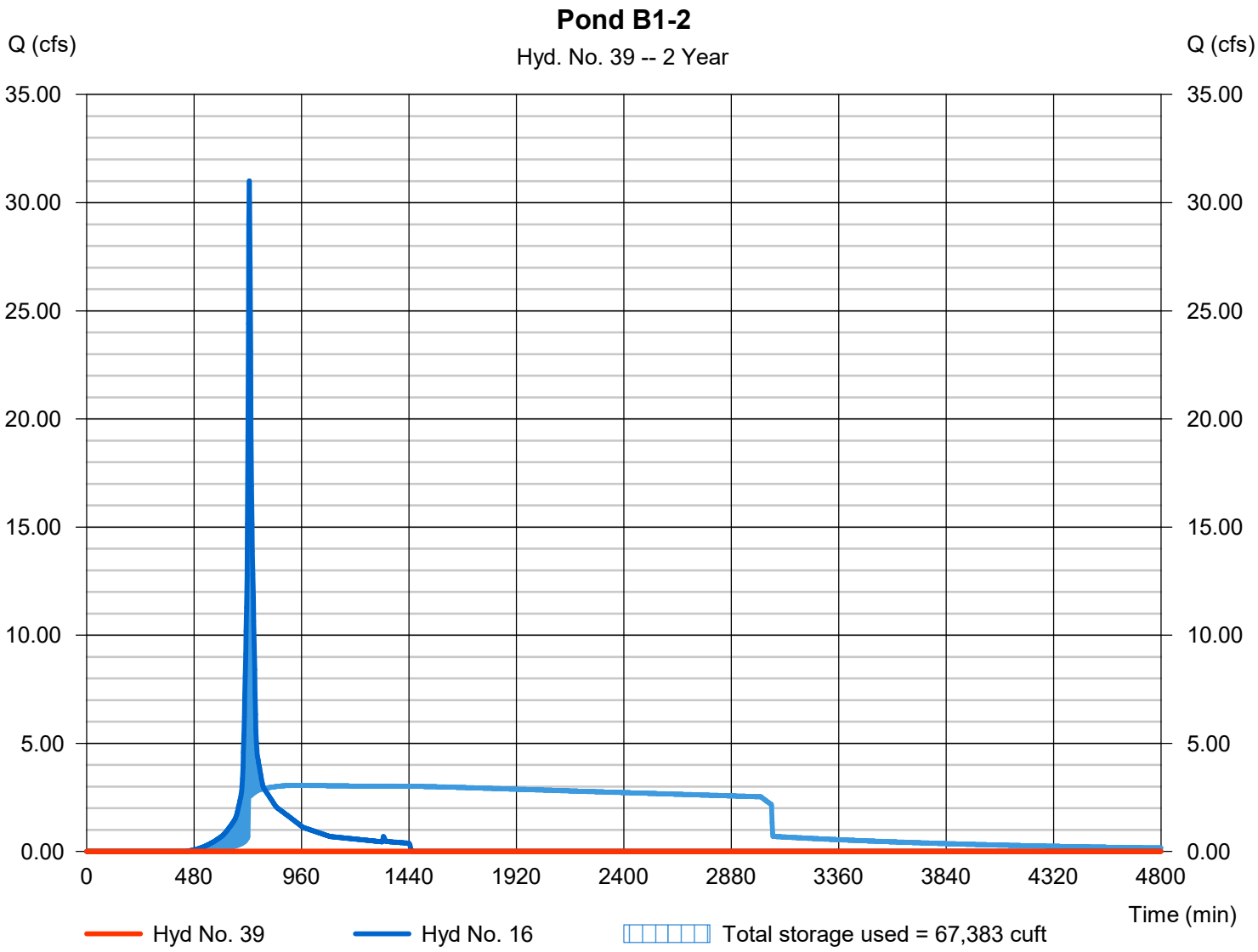
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 39

Pond B1-2

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= 1764 min
Time interval	= 2 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 16 - B1-2	Max. Elevation	= 131.30 ft
Reservoir name	= B1-2	Max. Storage	= 67,383 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Pond No. 13 - B1-2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 129.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	129.00	23,219	0	0
1.00	130.00	26,154	24,669	24,669
2.00	131.00	36,456	31,160	55,829
3.00	132.00	41,922	39,153	94,982
4.00	133.00	47,300	44,580	139,562
5.00	134.00	51,019	49,143	188,705
6.00	135.00	54,834	52,910	241,615

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	6.00	0.00	0.00
Span (in)	= 12.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 128.00	132.00	0.00	0.00
Length (ft)	= 141.00	0.50	0.00	0.00
Slope (%)	= 0.71	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

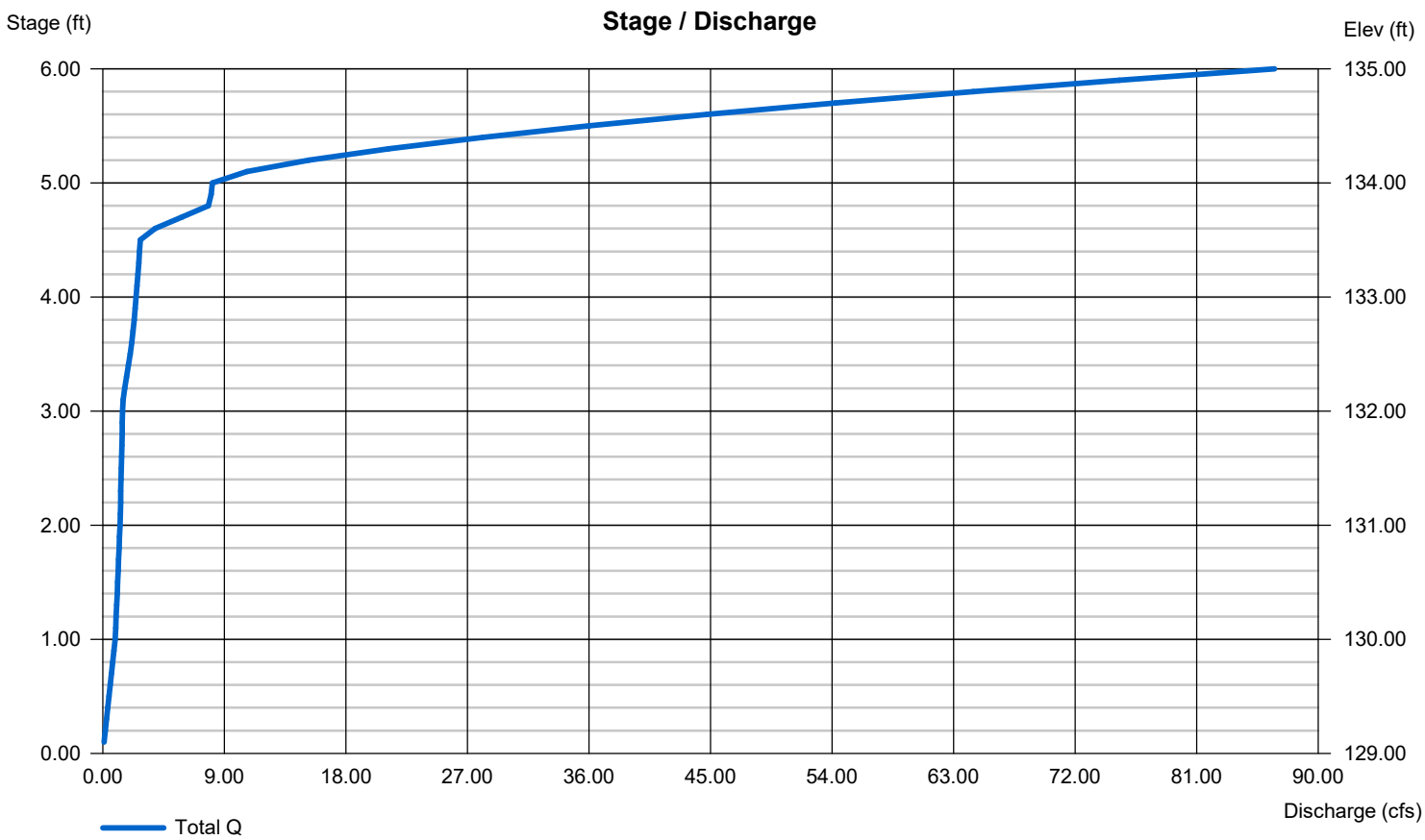
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 10.00	30.00	0.00	0.00
Crest El. (ft)	= 133.50	134.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= 1	Broad	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 1.500 (by Contour)

TW Elev. (ft) = 0.00

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



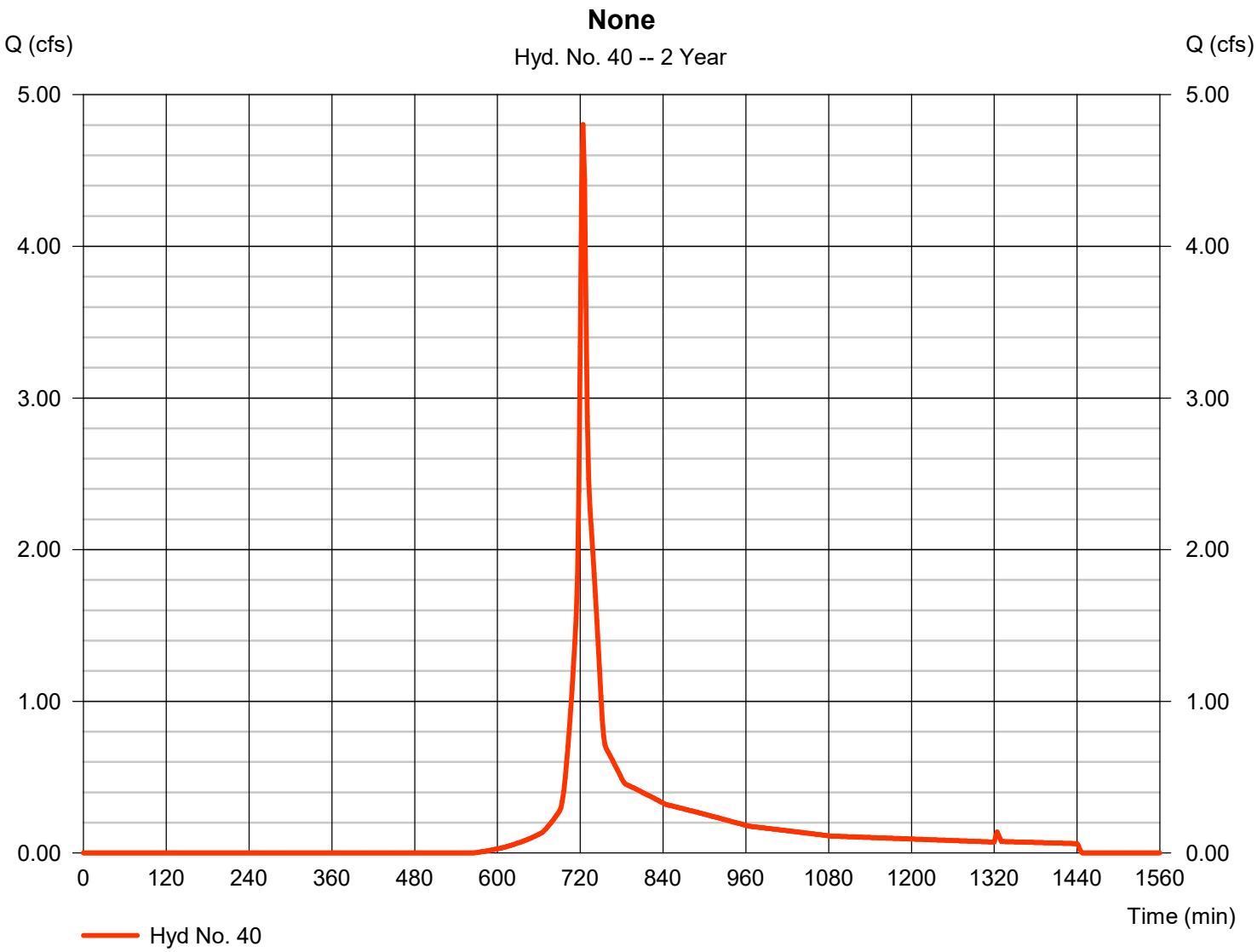
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 40

None

Hydrograph type	= SCS Runoff	Peak discharge	= 4.804 cfs
Storm frequency	= 2 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 14,517 cuft
Drainage area	= 3.200 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

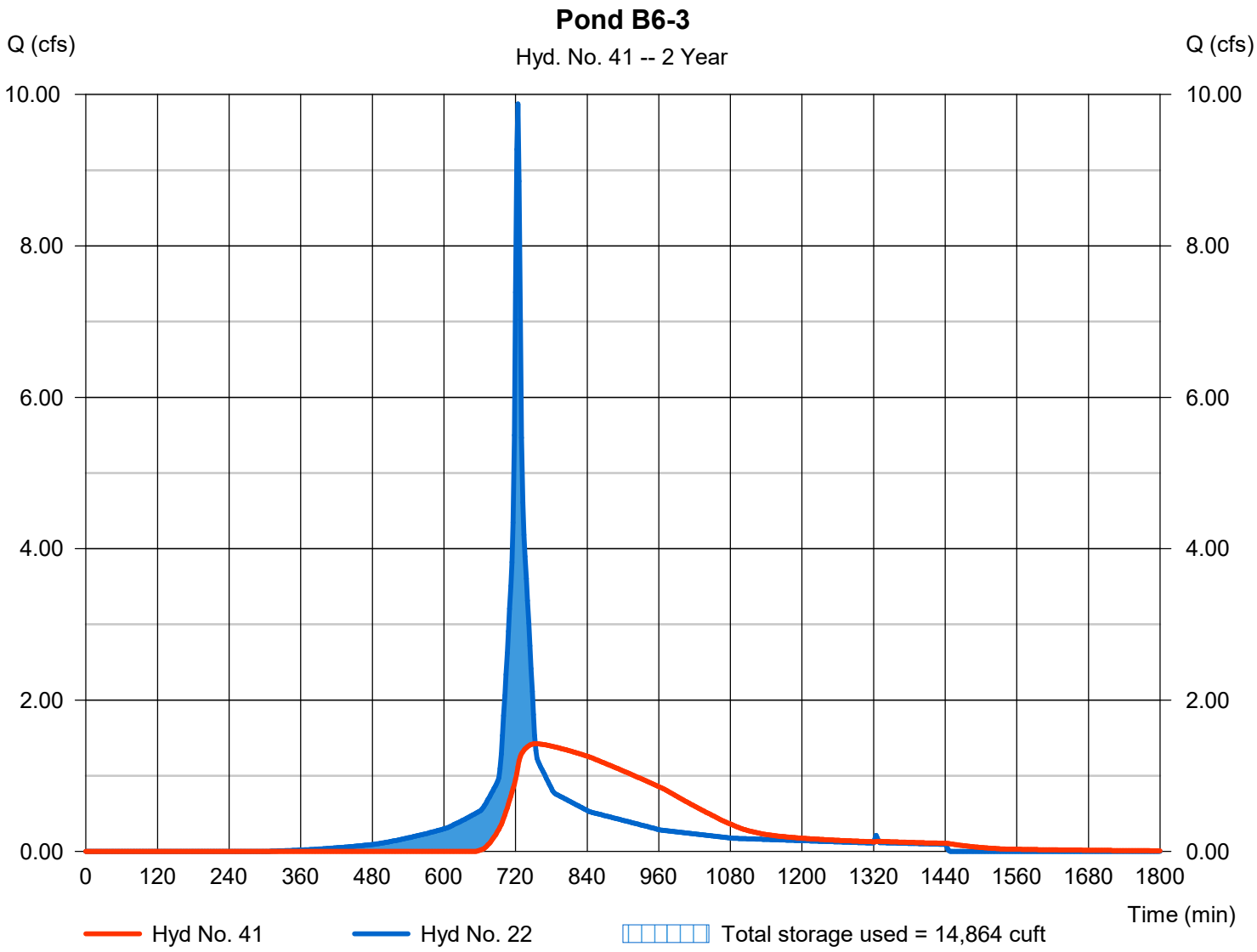
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 41

Pond B6-3

Hydrograph type	= Reservoir	Peak discharge	= 1.423 cfs
Storm frequency	= 2 yrs	Time to peak	= 754 min
Time interval	= 2 min	Hyd. volume	= 27,292 cuft
Inflow hyd. No.	= 22 - B6-3	Max. Elevation	= 137.52 ft
Reservoir name	= B6-3	Max. Storage	= 14,864 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Pond No. 16 - B6-3

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 134.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	134.00	2,600	0	0
1.00	135.00	3,400	2,991	2,991
2.00	136.00	4,400	3,889	6,880
3.00	137.00	5,400	4,891	11,771
4.00	138.00	6,600	5,989	17,760
5.00	139.00	7,900	7,240	25,000
6.00	140.00	9,200	8,541	33,540
7.00	141.00	10,700	9,940	43,480

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	6.00	0.00	0.00
Span (in)	= 15.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 133.00	135.00	0.00	0.00
Length (ft)	= 150.00	0.50	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

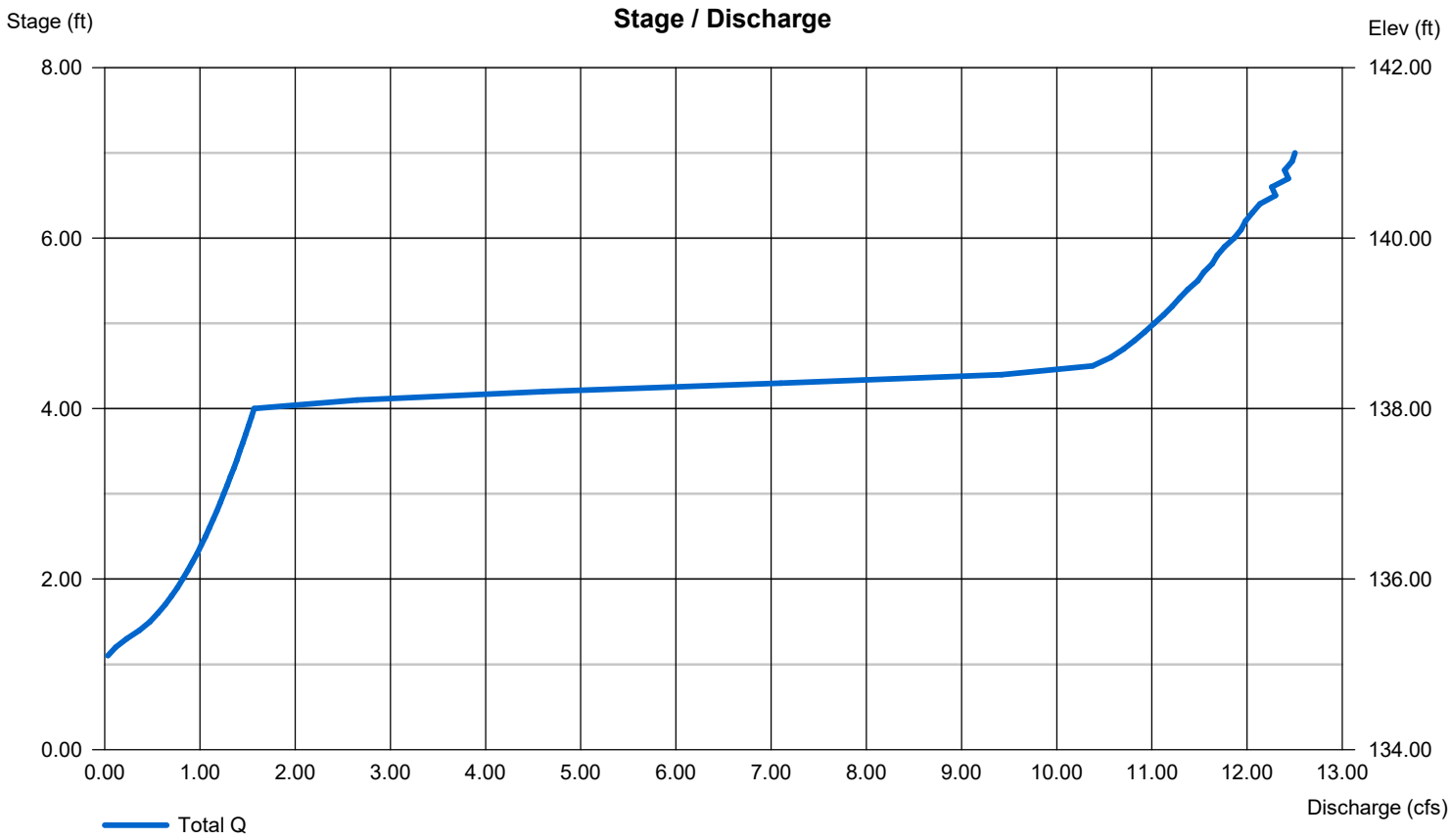
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 10.00	0.00	0.00	0.00
Crest El. (ft)	= 138.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

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



Hydrograph Report

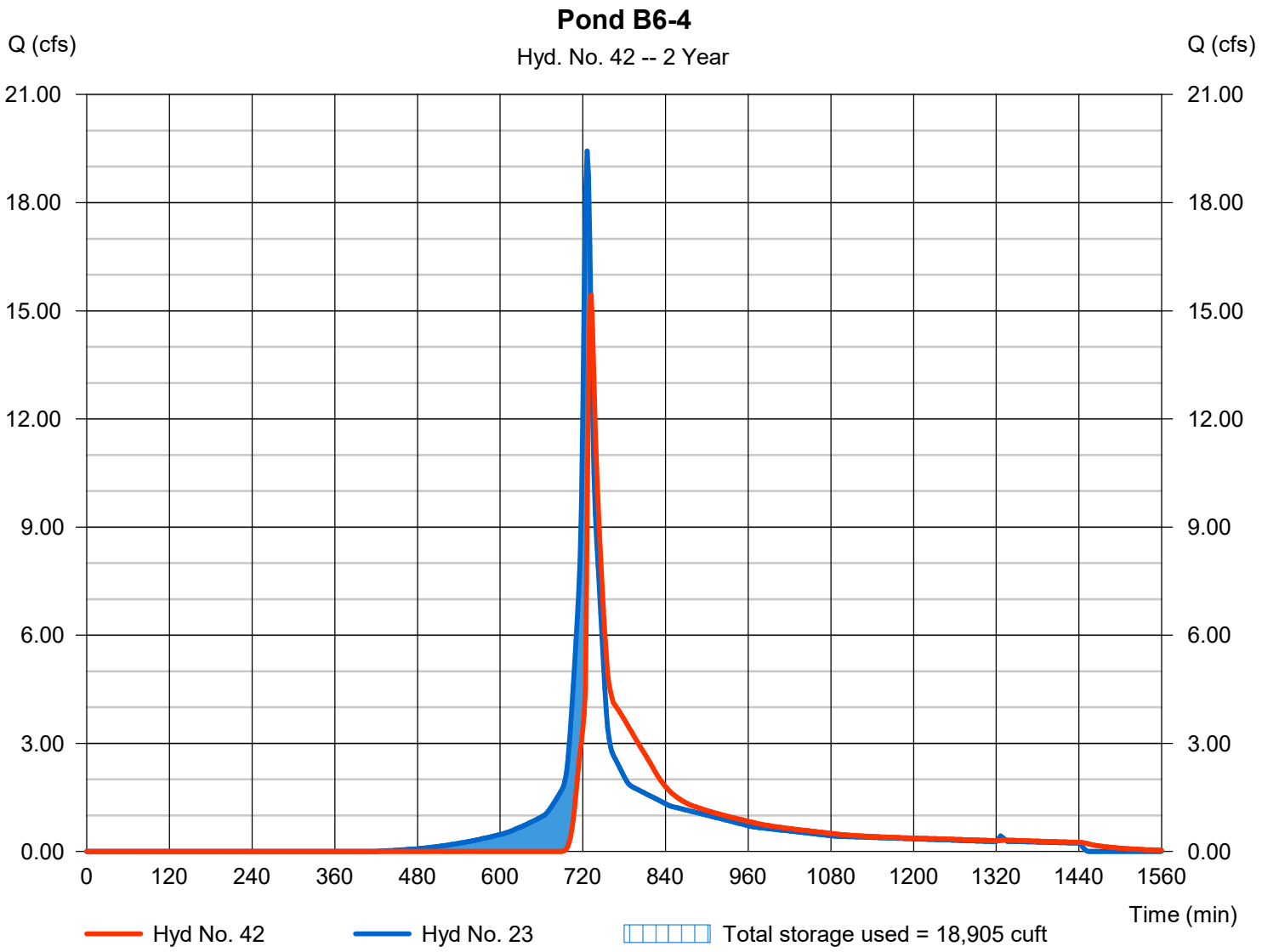
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 42

Pond B6-4

Hydrograph type	= Reservoir	Peak discharge	= 15.43 cfs
Storm frequency	= 2 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 59,710 cuft
Inflow hyd. No.	= 23 - B6-4	Max. Elevation	= 138.22 ft
Reservoir name	= B6-4	Max. Storage	= 18,905 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Pond No. 17 - B6-4

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 134.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	134.00	2,500	0	0
1.00	135.00	3,400	2,938	2,938
2.00	136.00	4,300	3,841	6,779
3.00	137.00	5,300	4,791	11,570
4.00	138.00	6,400	5,841	17,411
5.00	139.00	7,700	7,039	24,450
6.00	140.00	9,000	8,341	32,791
7.00	141.00	10,400	9,691	42,481

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 30.00	12.00	0.00	0.00
Span (in)	= 30.00	12.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 134.60	136.00	0.00	0.00
Length (ft)	= 920.00	0.50	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

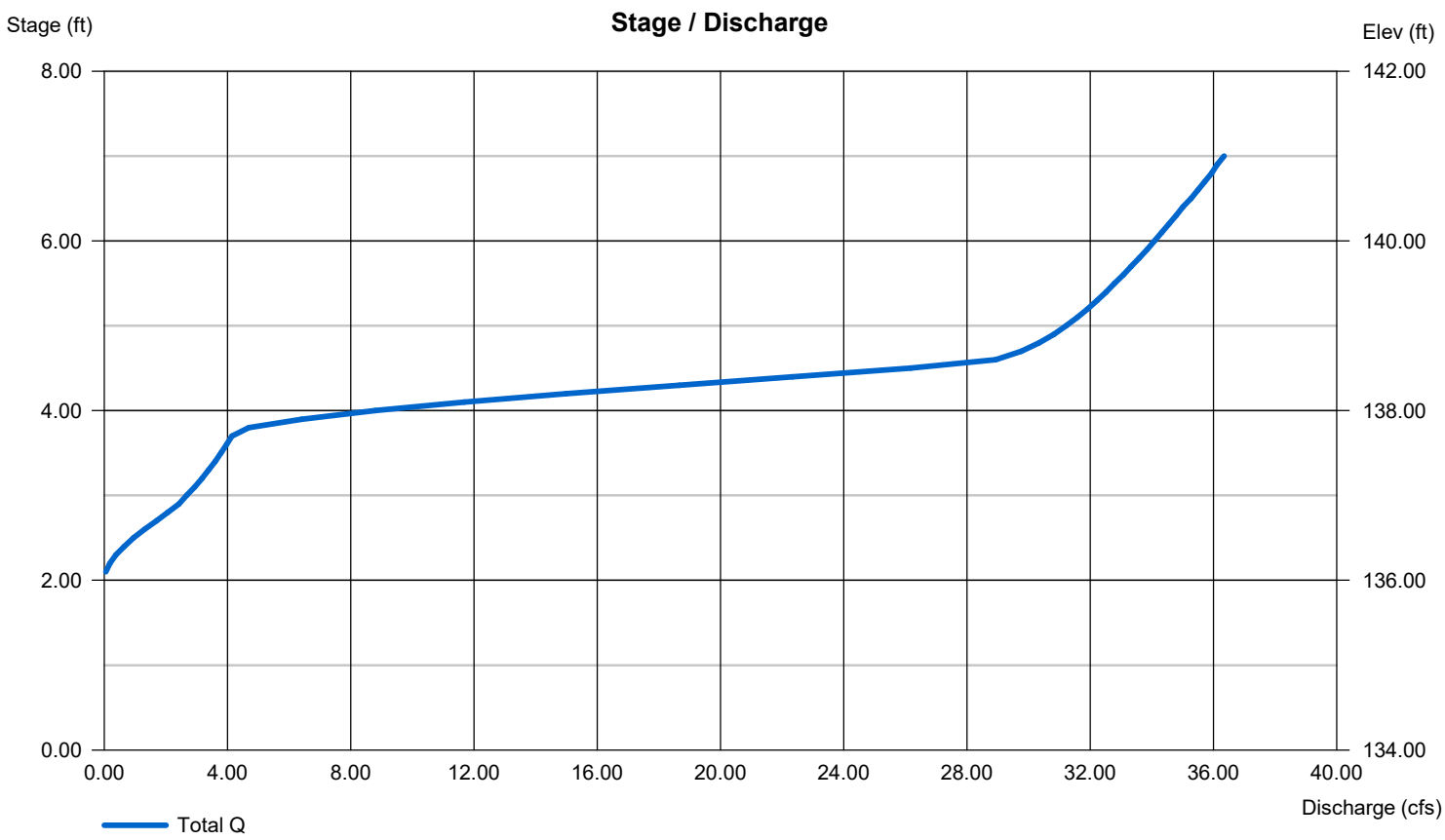
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 10.00	0.00	0.00	0.00
Crest El. (ft)	= 137.75	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

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



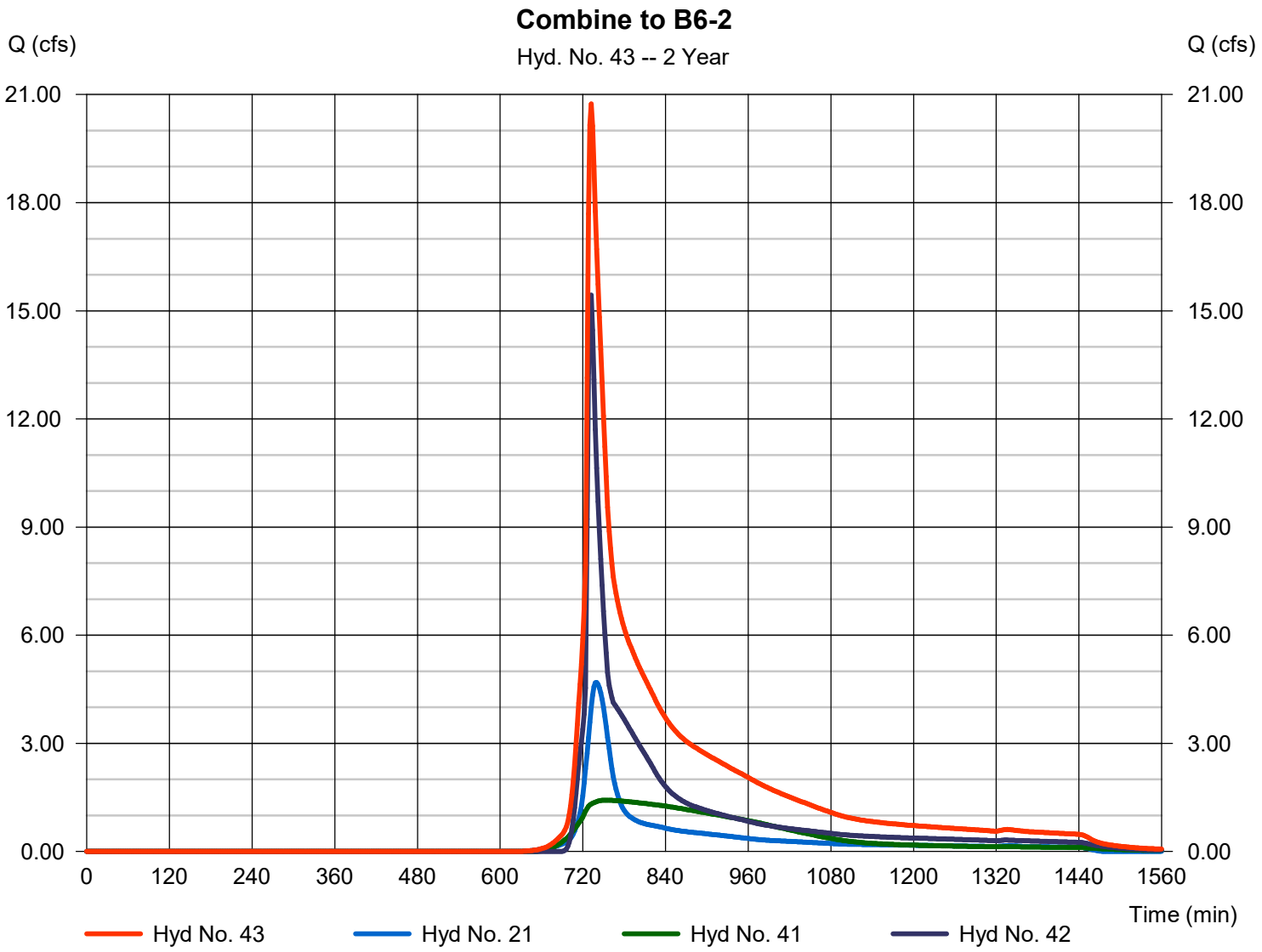
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 43

Combine to B6-2

Hydrograph type	= Combine	Peak discharge	= 20.74 cfs
Storm frequency	= 2 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 111,108 cuft
Inflow hyds.	= 21, 41, 42	Contrib. drain. area	= 6.190 ac



Hydrograph Report

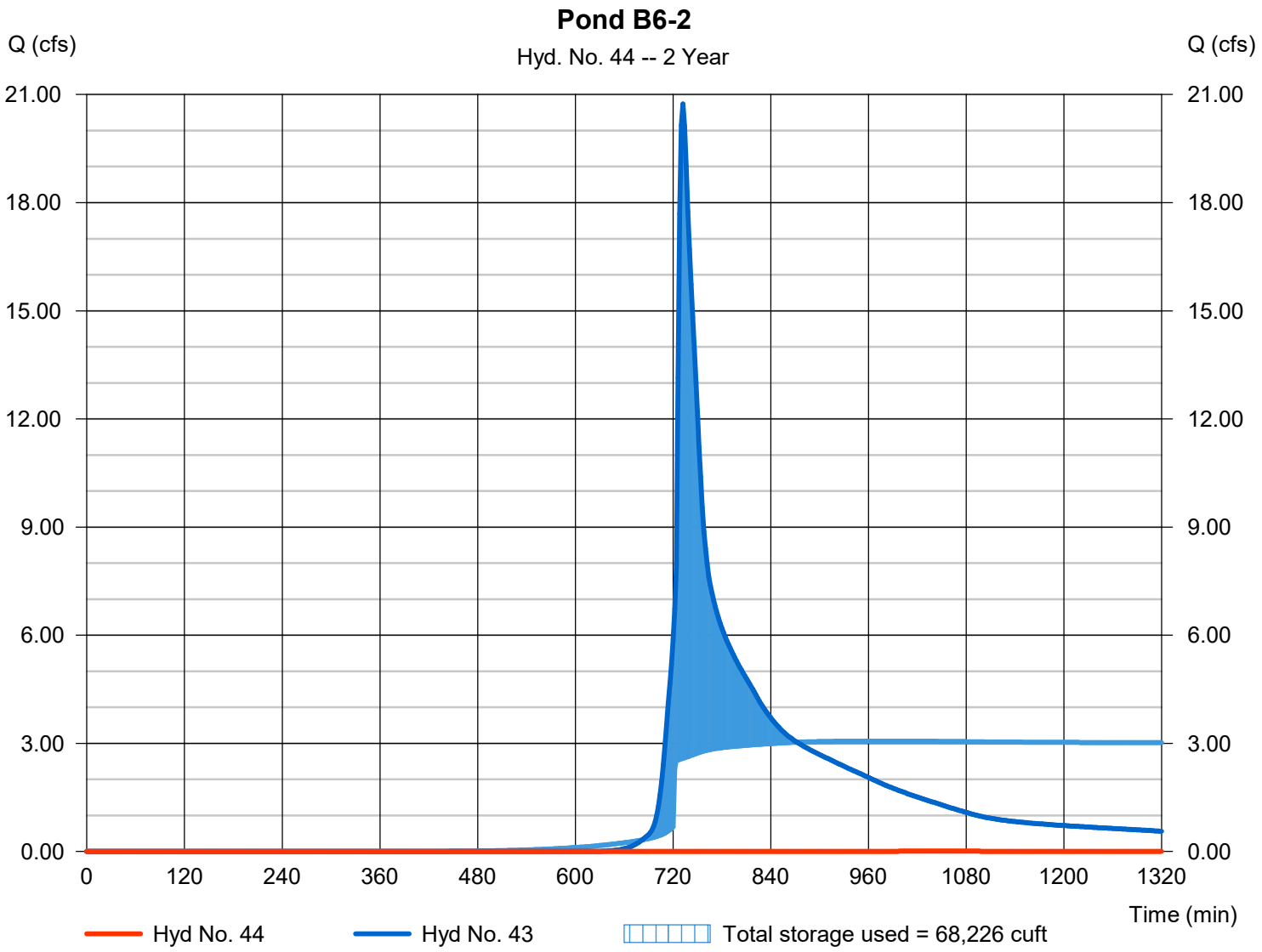
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 44

Pond B6-2

Hydrograph type	= Reservoir	Peak discharge	= 0.010 cfs
Storm frequency	= 2 yrs	Time to peak	= 1046 min
Time interval	= 2 min	Hyd. volume	= 73 cuft
Inflow hyd. No.	= 43 - Combine to B6-2	Max. Elevation	= 132.12 ft
Reservoir name	= B6-2	Max. Storage	= 68,226 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Pond No. 15 - B6-2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 130.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	130.00	27,364	0	0
1.00	131.00	31,150	29,234	29,234
2.00	132.00	37,300	34,175	63,409
3.00	133.00	42,164	39,703	103,112
4.00	134.00	48,484	45,283	148,395
5.00	135.00	54,100	51,261	199,656

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 30.00	Inactive	0.00	0.00
Span (in)	= 30.00	12.00	0.00	0.00
No. Barrels	= 1	2	0	0
Invert El. (ft)	= 129.00	132.05	0.00	0.00
Length (ft)	= 52.00	0.50	0.00	0.00
Slope (%)	= 7.69	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

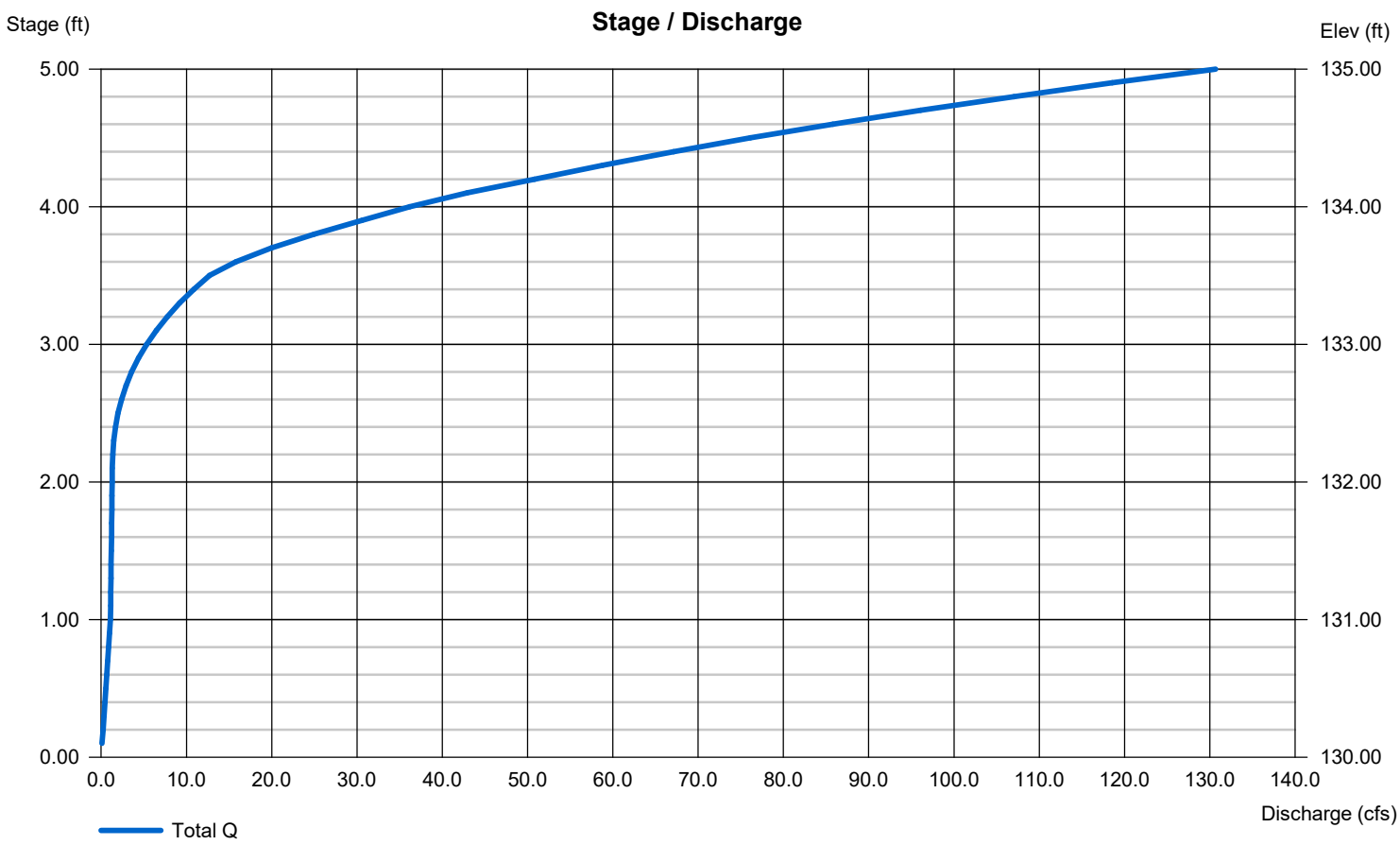
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 10.00	0.00	30.00	0.00
Crest El. (ft)	= 133.50	132.05	134.00	0.00
Weir Coeff.	= 3.33	4.40	2.60	3.33
Weir Type	= 1	120 degV	Broad	---
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr) = 1.500 (by Contour)

TW Elev. (ft) = 0.00

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



Hydrograph Report

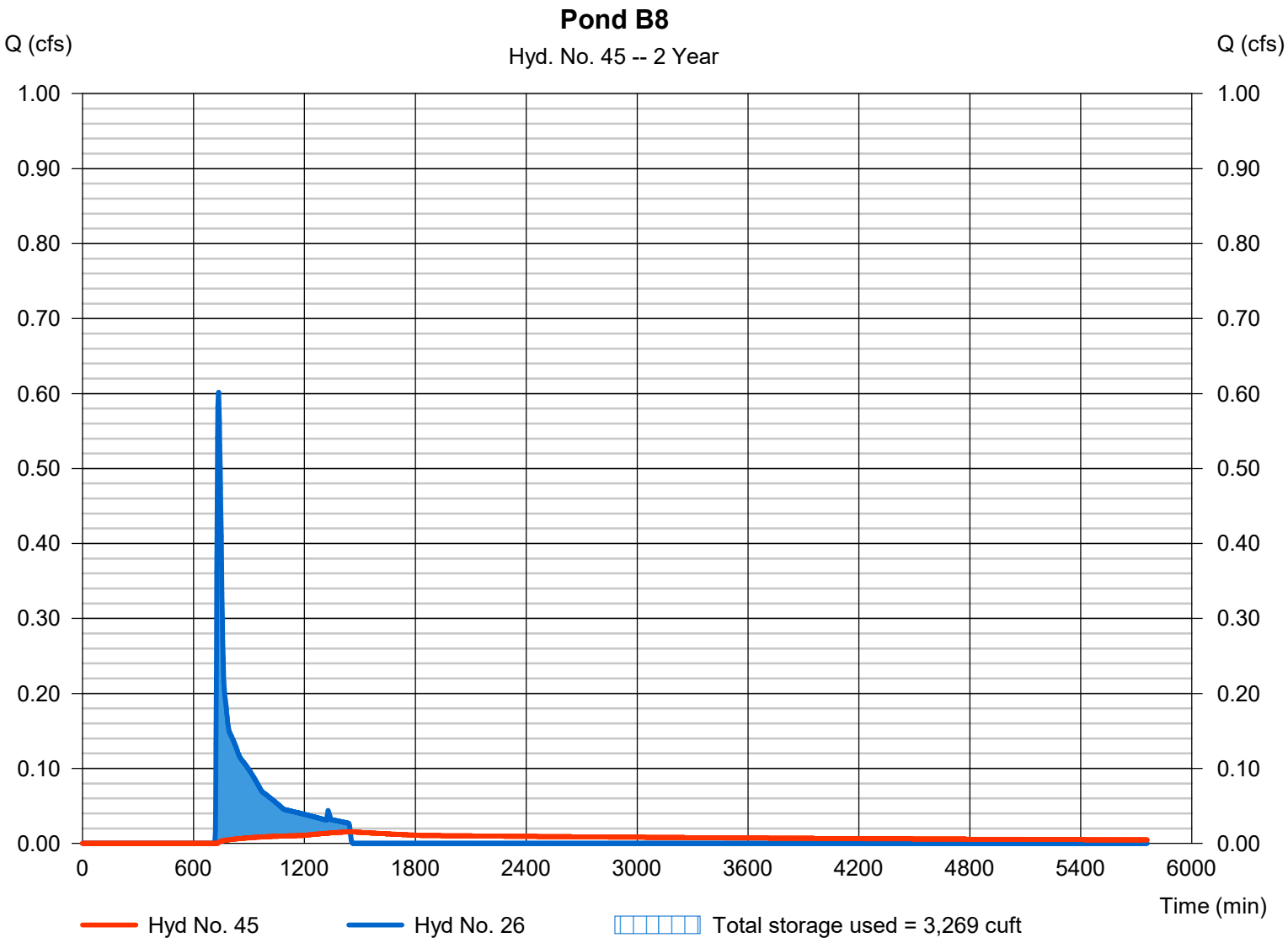
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 45

Pond B8

Hydrograph type	= Reservoir	Peak discharge	= 0.015 cfs
Storm frequency	= 2 yrs	Time to peak	= 1448 min
Time interval	= 2 min	Hyd. volume	= 2,403 cuft
Inflow hyd. No.	= 26 - B8	Max. Elevation	= 132.11 ft
Reservoir name	= B8	Max. Storage	= 3,269 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Pond No. 19 - B8

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 132.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	132.00	29,700	0	0
1.00	133.00	29,750	29,722	29,722
2.00	134.00	29,800	29,772	59,494

Culvert / Orifice Structures

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

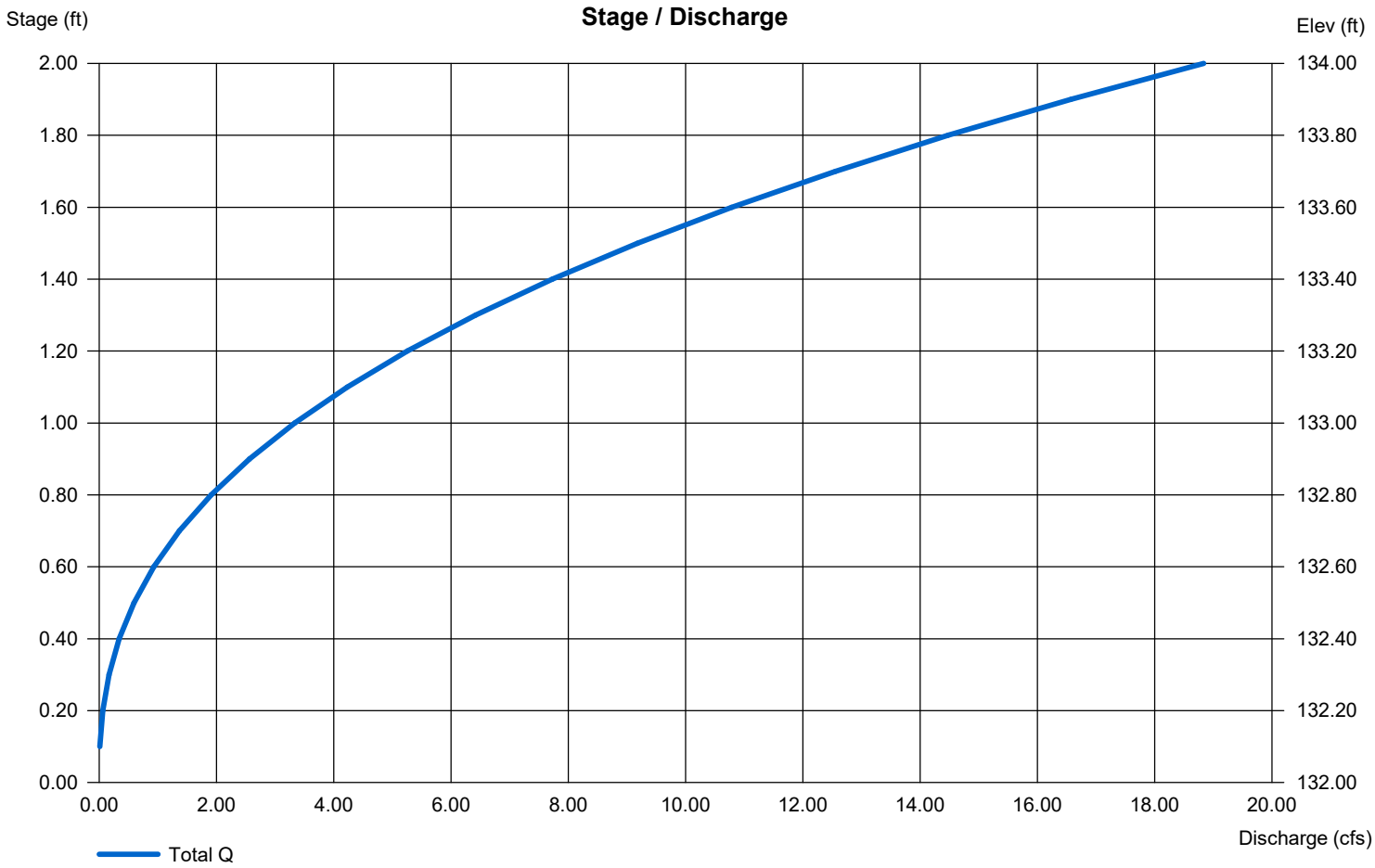
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 170.00	0.00	0.00	0.00
Crest El. (ft)	= 132.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

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



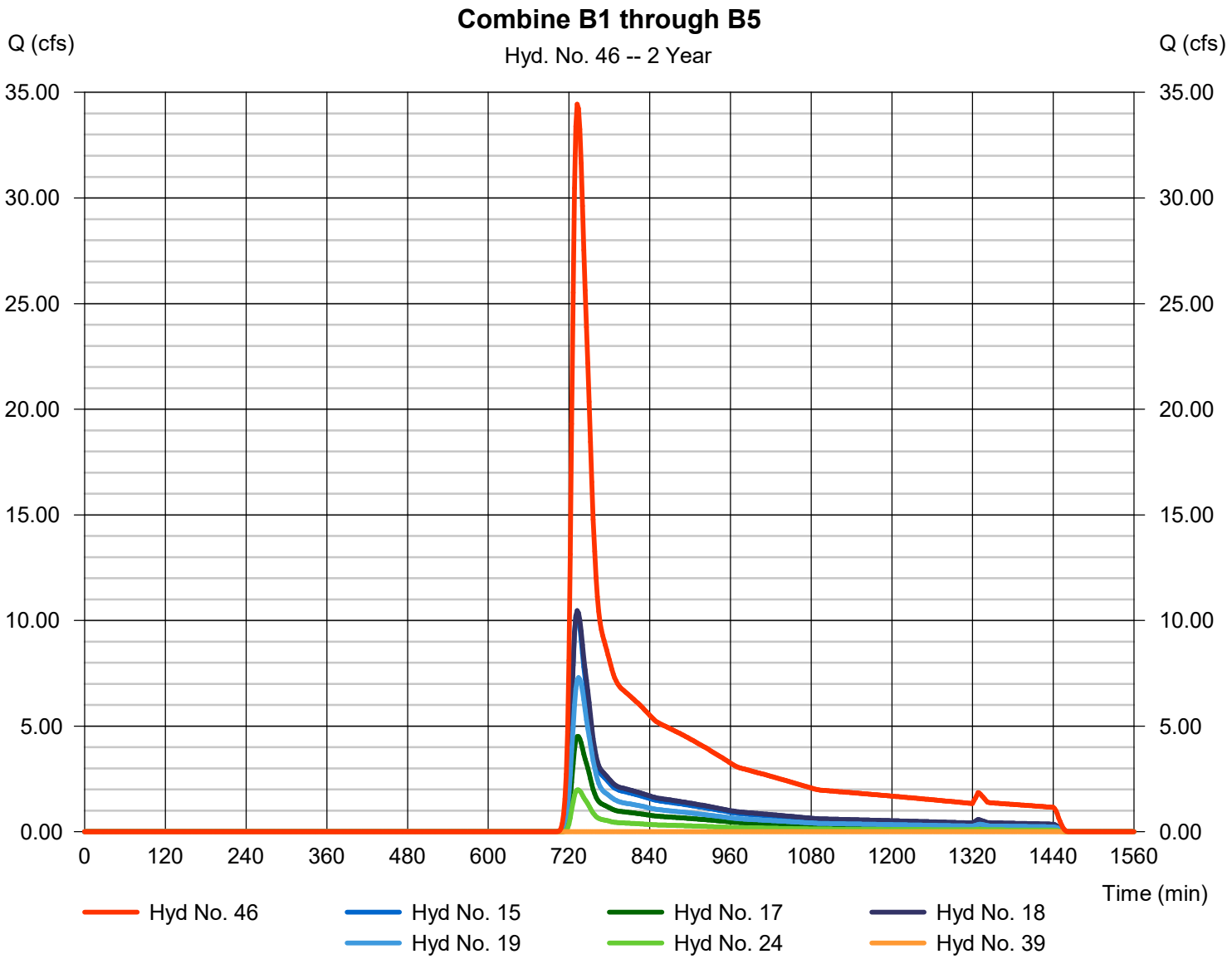
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 46

Combine B1 through B5

Hydrograph type	= Combine	Peak discharge	= 34.43 cfs
Storm frequency	= 2 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 178,700 cuft
Inflow hyds.	= 15, 17, 18, 19, 24, 39	Contrib. drain. area	= 90.160 ac



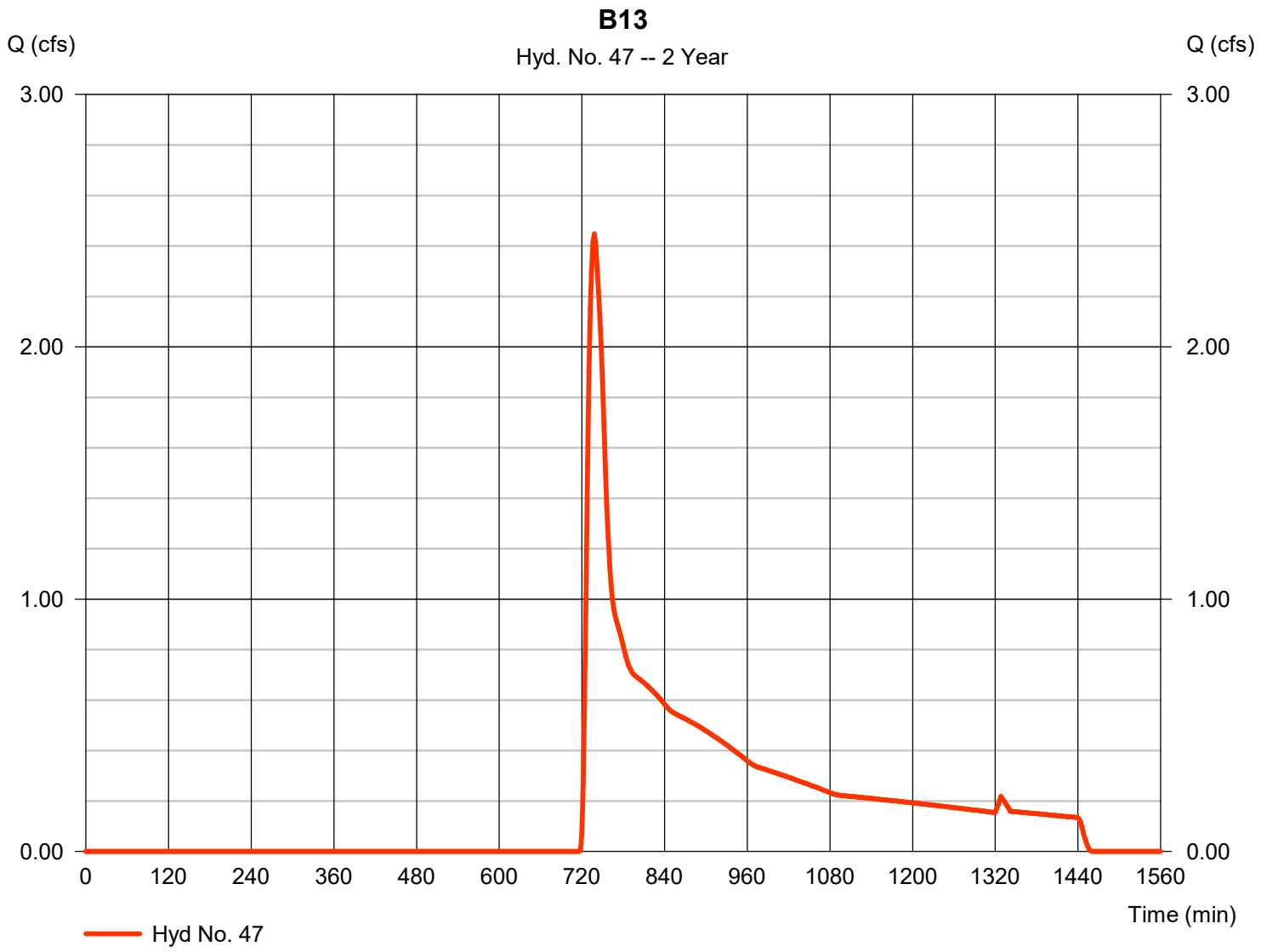
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 47

B13

Hydrograph type	= SCS Runoff	Peak discharge	= 2.448 cfs
Storm frequency	= 2 yrs	Time to peak	= 738 min
Time interval	= 2 min	Hyd. volume	= 17,100 cuft
Drainage area	= 13.390 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.40 min
Total precip.	= 3.11 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



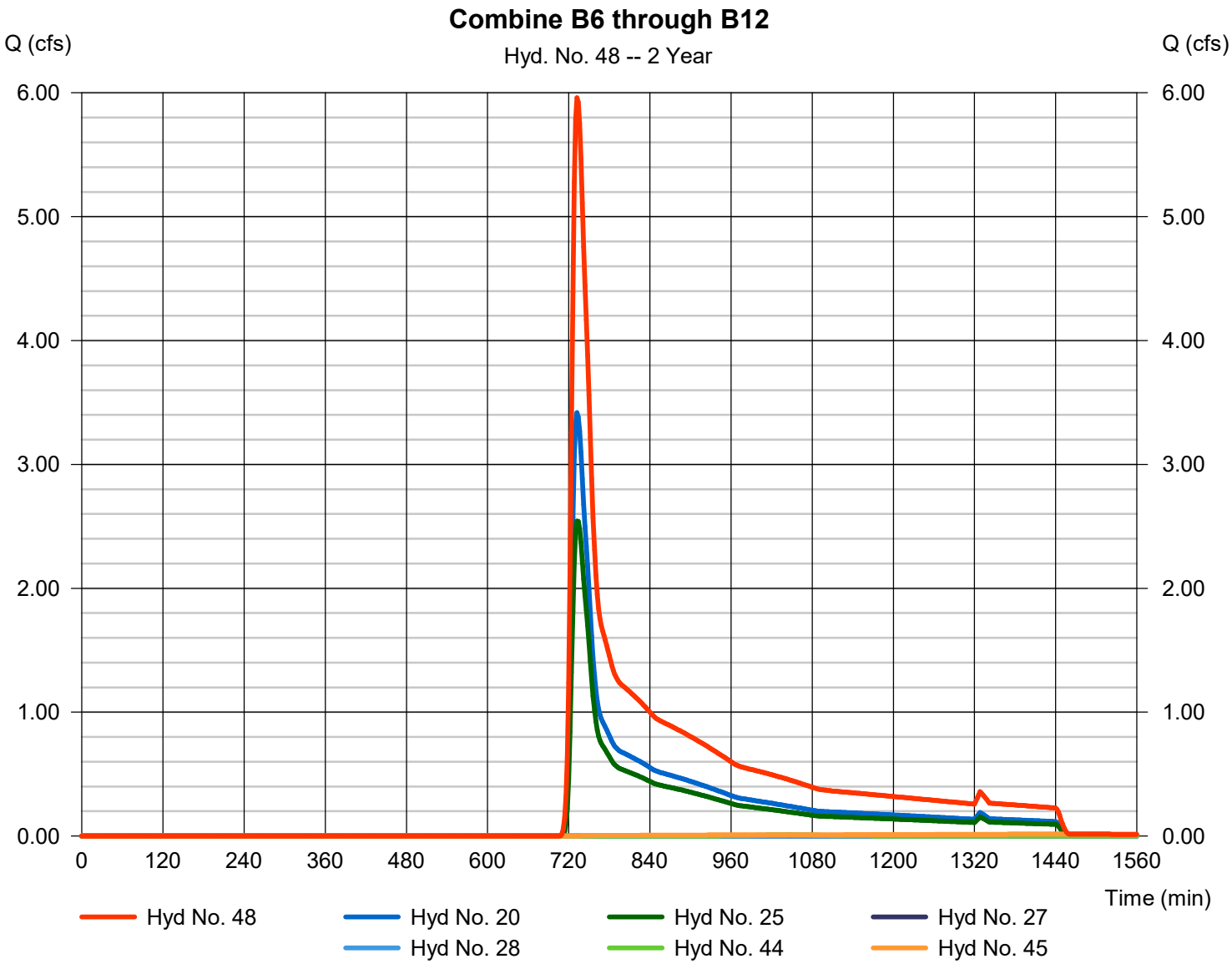
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 48

Combine B6 through B12

Hydrograph type	= Combine	Peak discharge	= 5.959 cfs
Storm frequency	= 2 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 34,240 cuft
Inflow hyds.	= 20, 25, 27, 28, 44, 45	Contrib. drain. area	= 18.740 ac



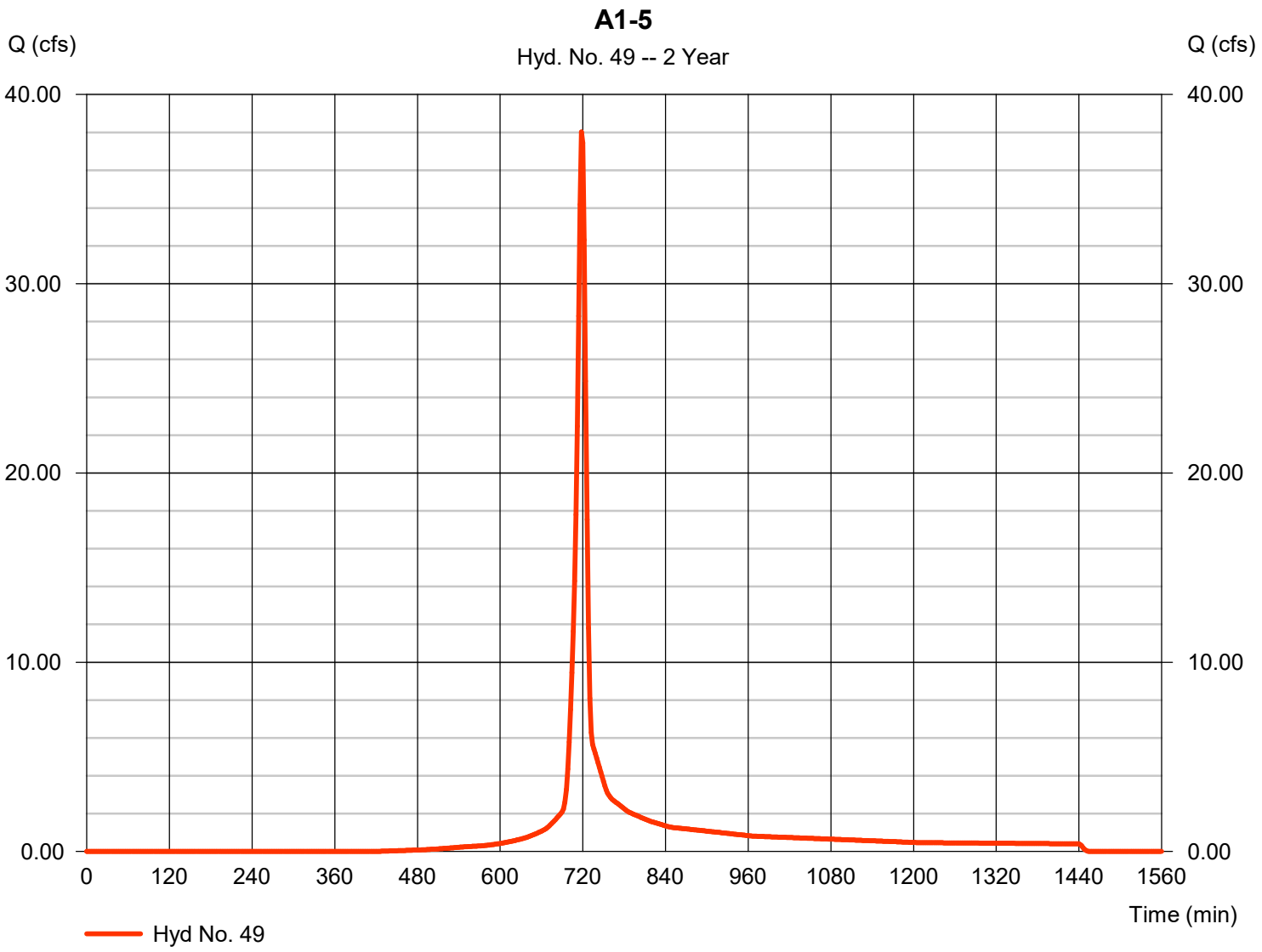
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 49

A1-5

Hydrograph type	= SCS Runoff	Peak discharge	= 38.02 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 87,417 cuft
Drainage area	= 13.120 ac	Curve number	= 87
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.00 min
Total precip.	= 3.11 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

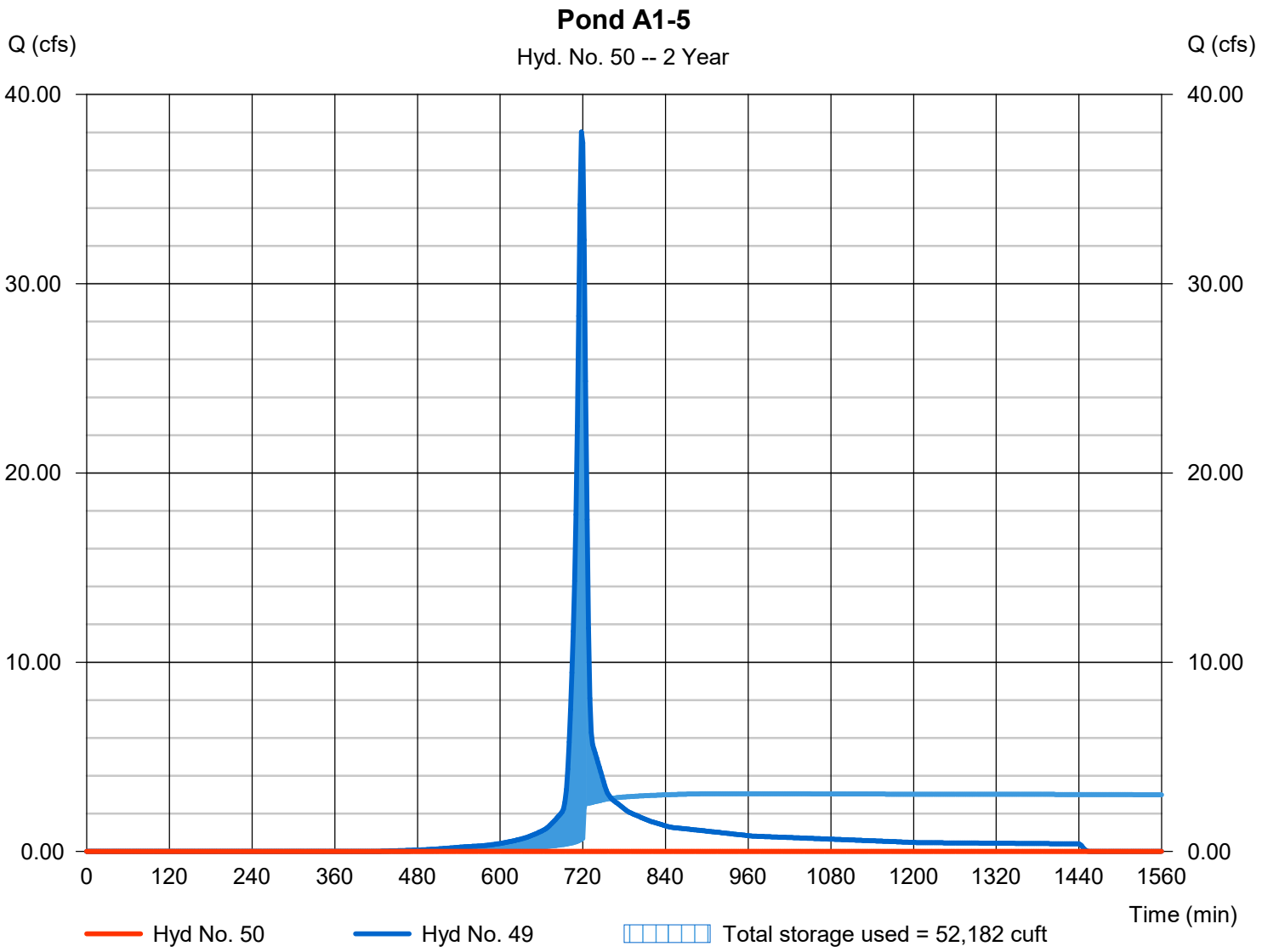
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 50

Pond A1-5

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= 1542 min
Time interval	= 2 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 49 - A1-5	Max. Elevation	= 134.36 ft
Reservoir name	= A1-5	Max. Storage	= 52,182 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Pond No. 4 - A1-5

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 133.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	133.00	35,500	0	0
1.00	134.00	39,300	37,380	37,380
2.00	135.00	43,200	41,231	78,611
3.00	136.00	47,200	45,181	123,791
4.00	137.00	51,300	49,231	173,022

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	Inactive	0.00	0.00
Span (in)	= 24.00	6.00	0.00	0.00
No. Barrels	= 1	4	0	0
Invert El. (ft)	= 132.00	134.50	0.00	0.00
Length (ft)	= 185.00	0.50	0.00	0.00
Slope (%)	= 1.06	0.00	0.00	n/a
N-Value	= .012	.012	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

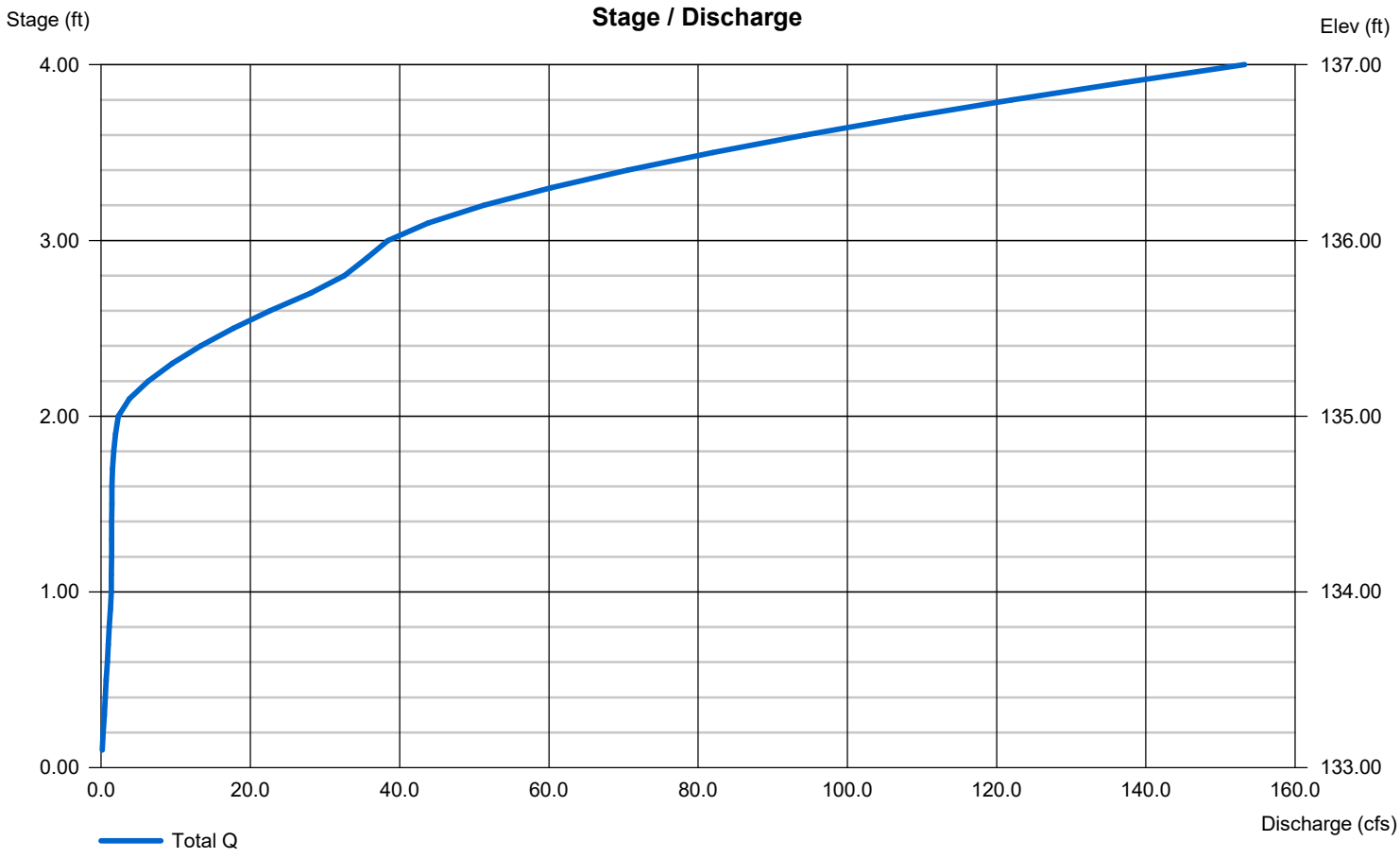
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 10.00	0.00	30.00	0.00
Crest El. (ft)	= 135.00	134.50	136.00	0.00
Weir Coeff.	= 3.33	4.40	2.60	3.33
Weir Type	= 1	120 degV	Broad	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 1.500 (by Contour)

TW Elev. (ft) = 0.00

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



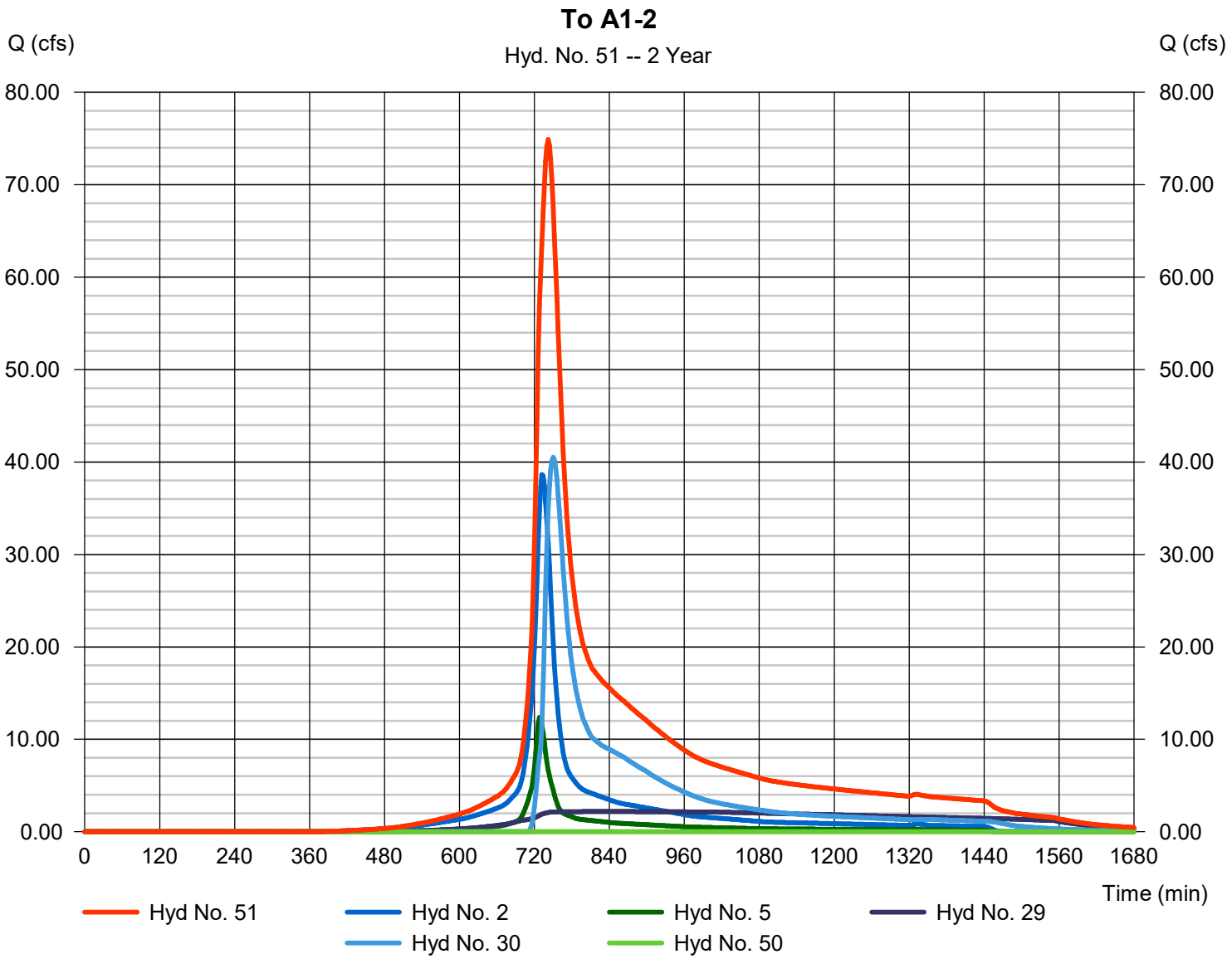
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 51

To A1-2

Hydrograph type	= Combine	Peak discharge	= 74.89 cfs
Storm frequency	= 2 yrs	Time to peak	= 742 min
Time interval	= 2 min	Hyd. volume	= 569,148 cuft
Inflow hyds.	= 2, 5, 29, 30, 50	Contrib. drain. area	= 29.920 ac



Hydrograph Report

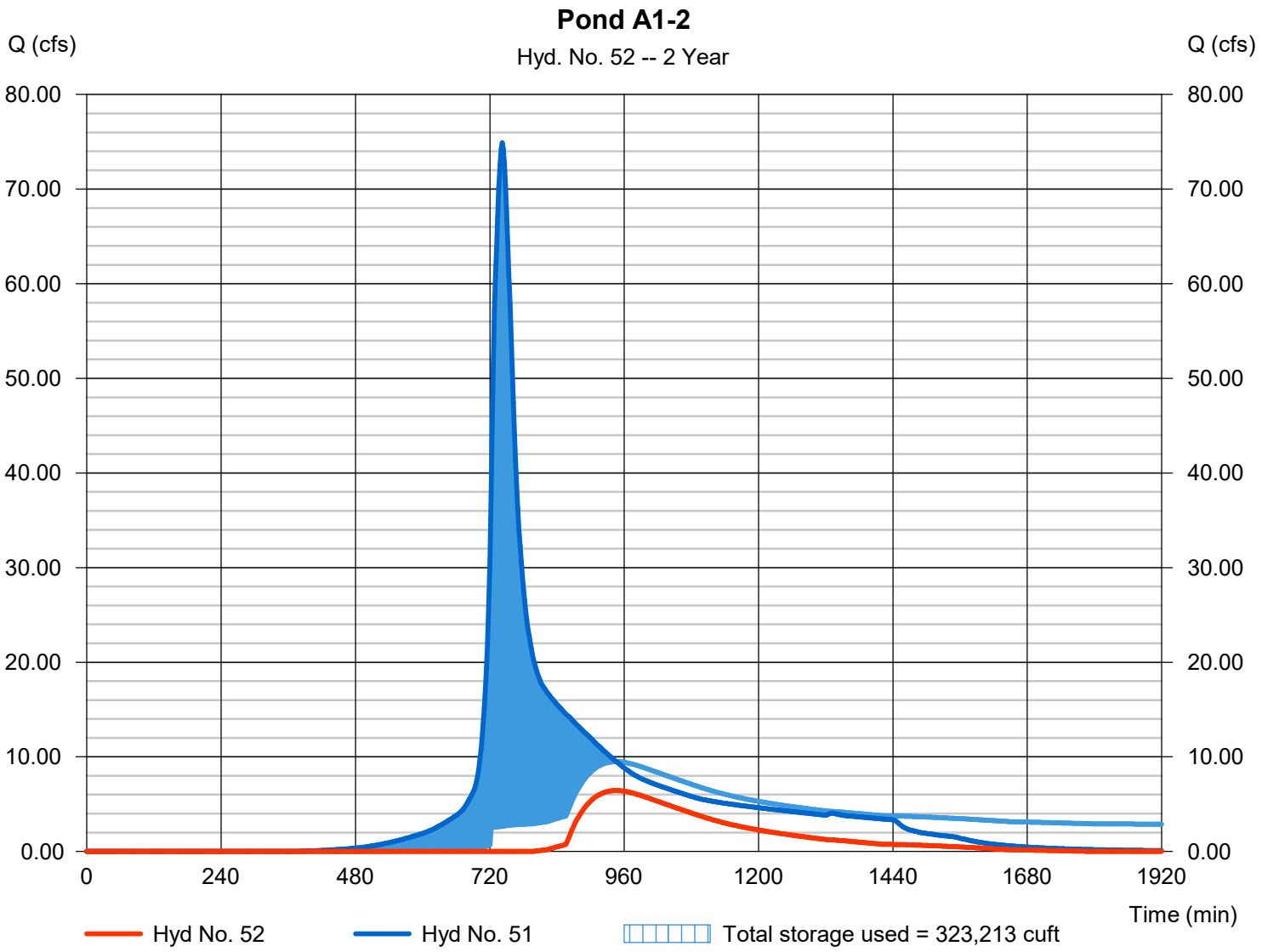
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 52

Pond A1-2

Hydrograph type	= Reservoir	Peak discharge	= 6.434 cfs
Storm frequency	= 2 yrs	Time to peak	= 946 min
Time interval	= 2 min	Hyd. volume	= 119,017 cuft
Inflow hyd. No.	= 51 - To A1-2	Max. Elevation	= 124.28 ft
Reservoir name	= A1-2	Max. Storage	= 323,213 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Pond No. 1 - A1-2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 118.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	118.00	14,200	0	0
2.89	120.89	20,100	49,312	49,312
2.90	120.90	62,300	393	49,705
3.00	121.00	72,800	6,748	56,452
4.00	122.00	77,177	74,970	131,423
6.89	124.89	90,900	242,577	374,000
6.90	124.90	105,100	979	374,979
7.00	125.00	119,400	11,216	386,195
10.49	128.49	140,400	452,811	839,006
10.50	128.50	162,000	1,511	840,517
11.00	129.00	167,400	82,338	922,855

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	Inactive	0.00	0.00
Span (in)	= 24.00	12.00	0.00	0.00
No. Barrels	= 1	2	0	0
Invert El. (ft)	= 116.20	122.00	0.00	0.00
Length (ft)	= 620.00	0.50	0.00	0.00
Slope (%)	= 2.00	0.00	0.00	n/a
N-Value	= .011	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

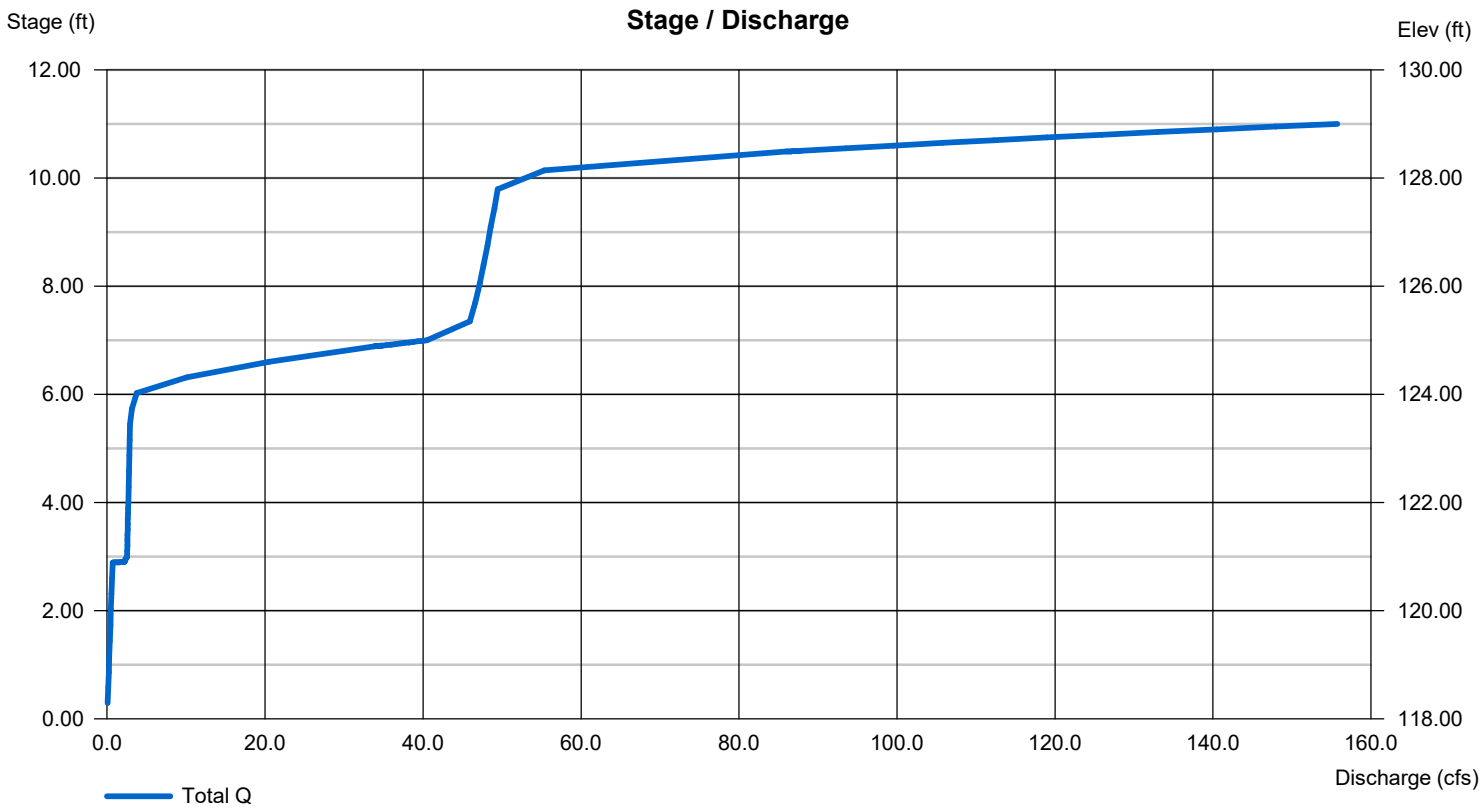
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 10.00	0.50	40.00	0.00
Crest El. (ft)	= 124.00	123.50	128.00	0.00
Weir Coeff.	= 3.33	3.33	2.60	3.33
Weir Type	= 1	Rect	Broad	---
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr) = 1.500 (by Contour)

TW Elev. (ft) = 0.00

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



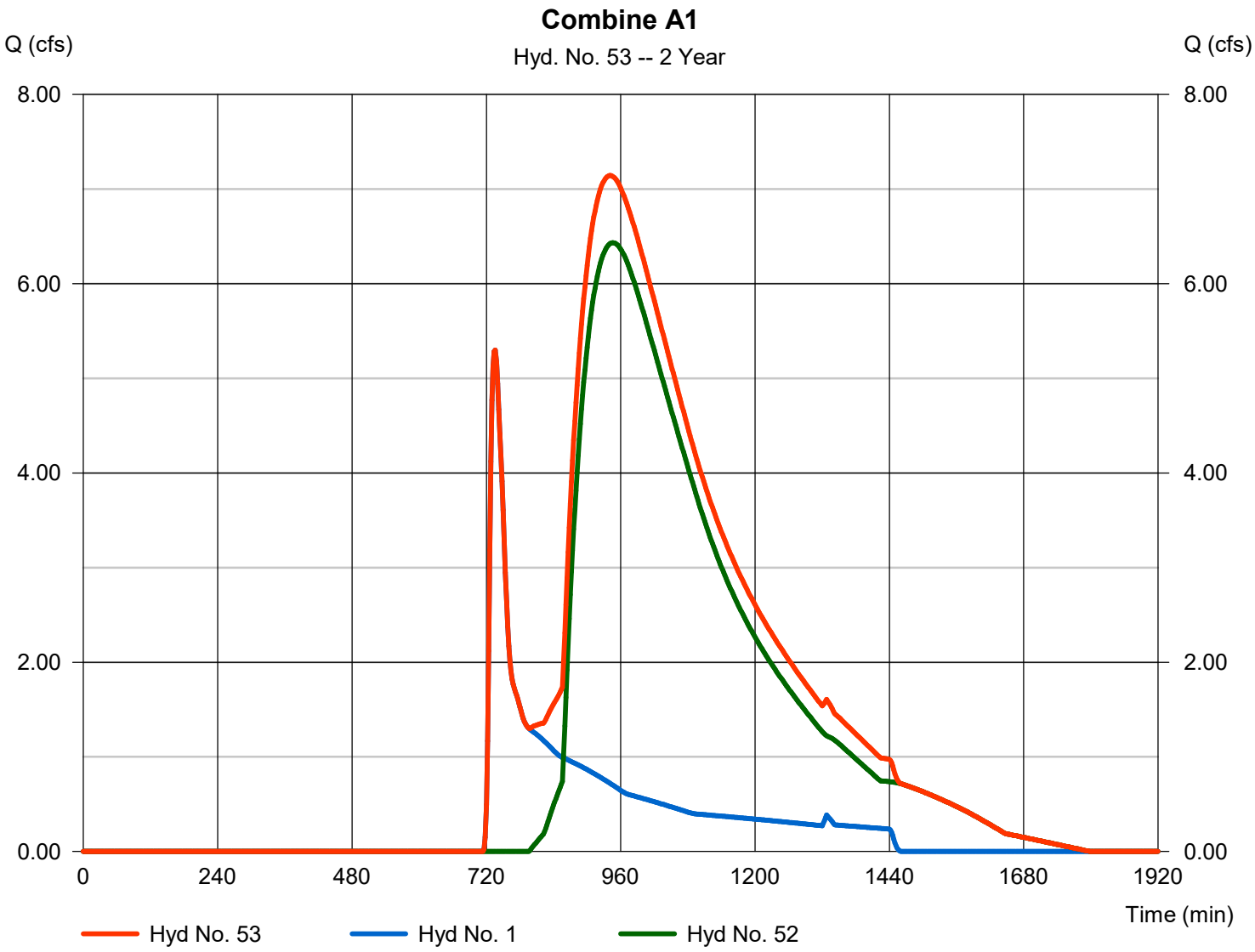
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 53

Combine A1

Hydrograph type	= Combine	Peak discharge	= 7.144 cfs
Storm frequency	= 2 yrs	Time to peak	= 942 min
Time interval	= 2 min	Hyd. volume	= 151,542 cuft
Inflow hyds.	= 1, 52	Contrib. drain. area	= 21.310 ac



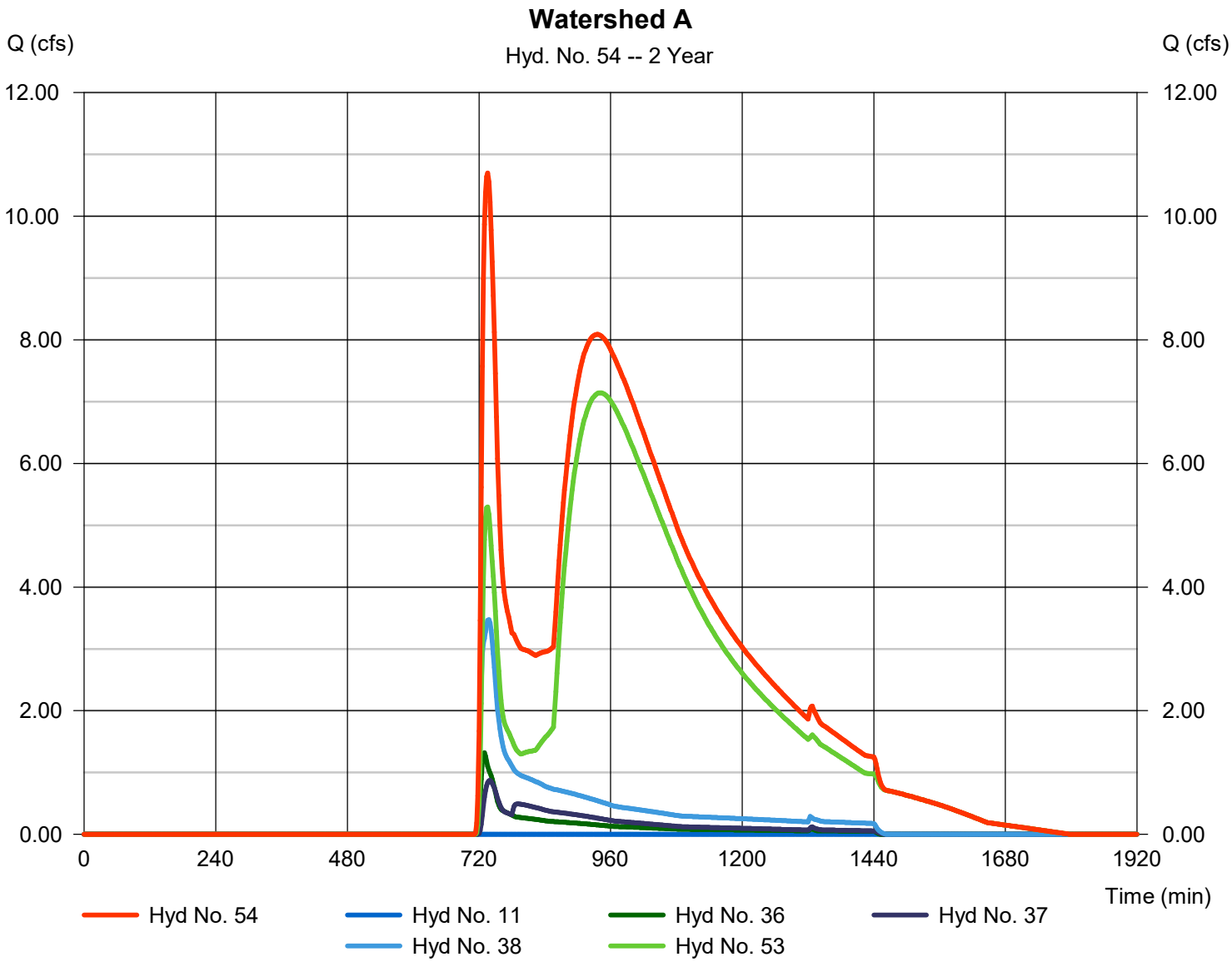
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 54

Watershed A

Hydrograph type	= Combine	Peak discharge	= 10.70 cfs
Storm frequency	= 2 yrs	Time to peak	= 736 min
Time interval	= 2 min	Hyd. volume	= 191,280 cuft
Inflow hyds.	= 11, 36, 37, 38, 53	Contrib. drain. area	= 1.750 ac



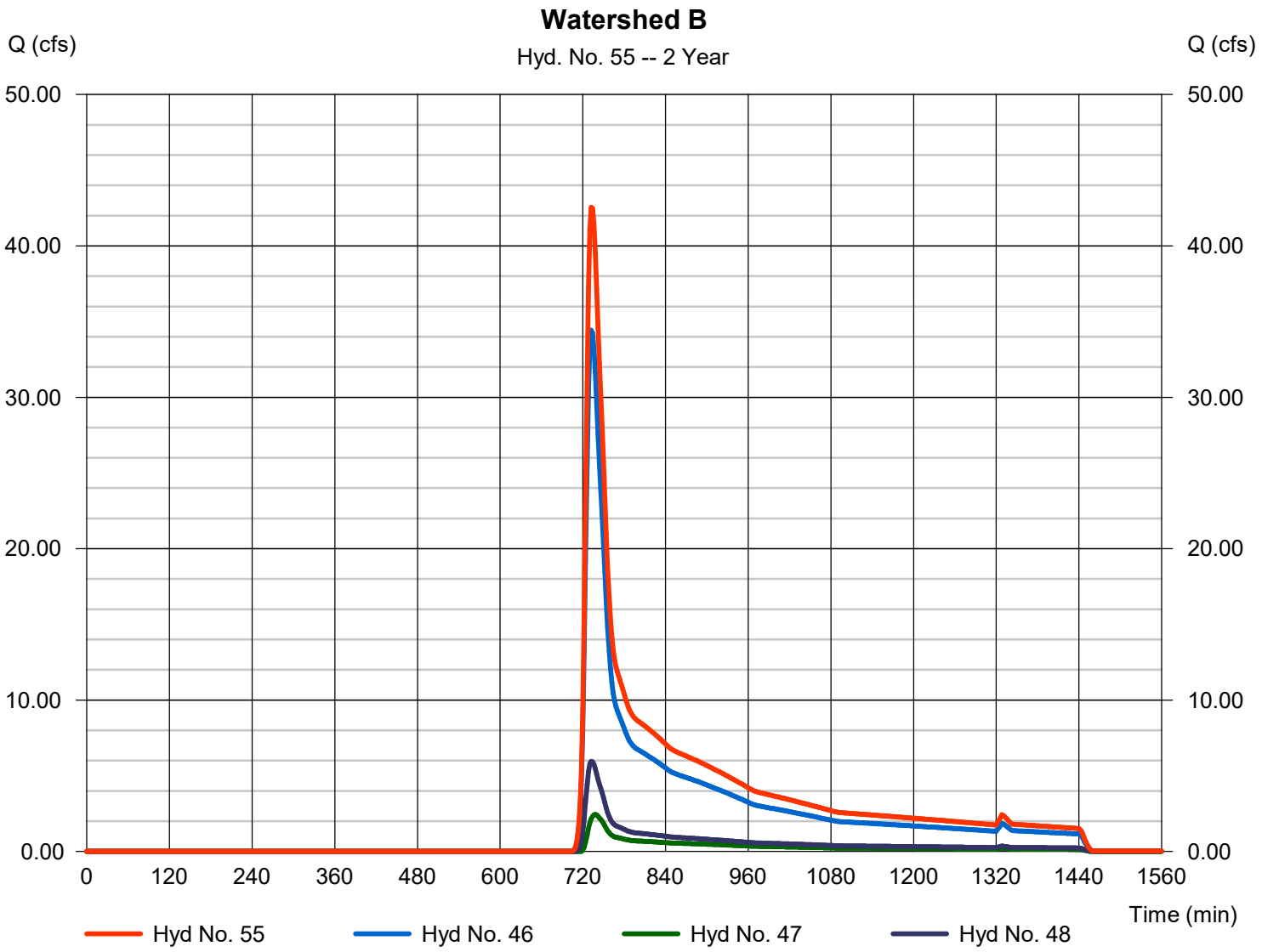
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 55

Watershed B

Hydrograph type	= Combine	Peak discharge	= 42.54 cfs
Storm frequency	= 2 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 230,040 cuft
Inflow hyds.	= 46, 47, 48	Contrib. drain. area	= 13.390 ac



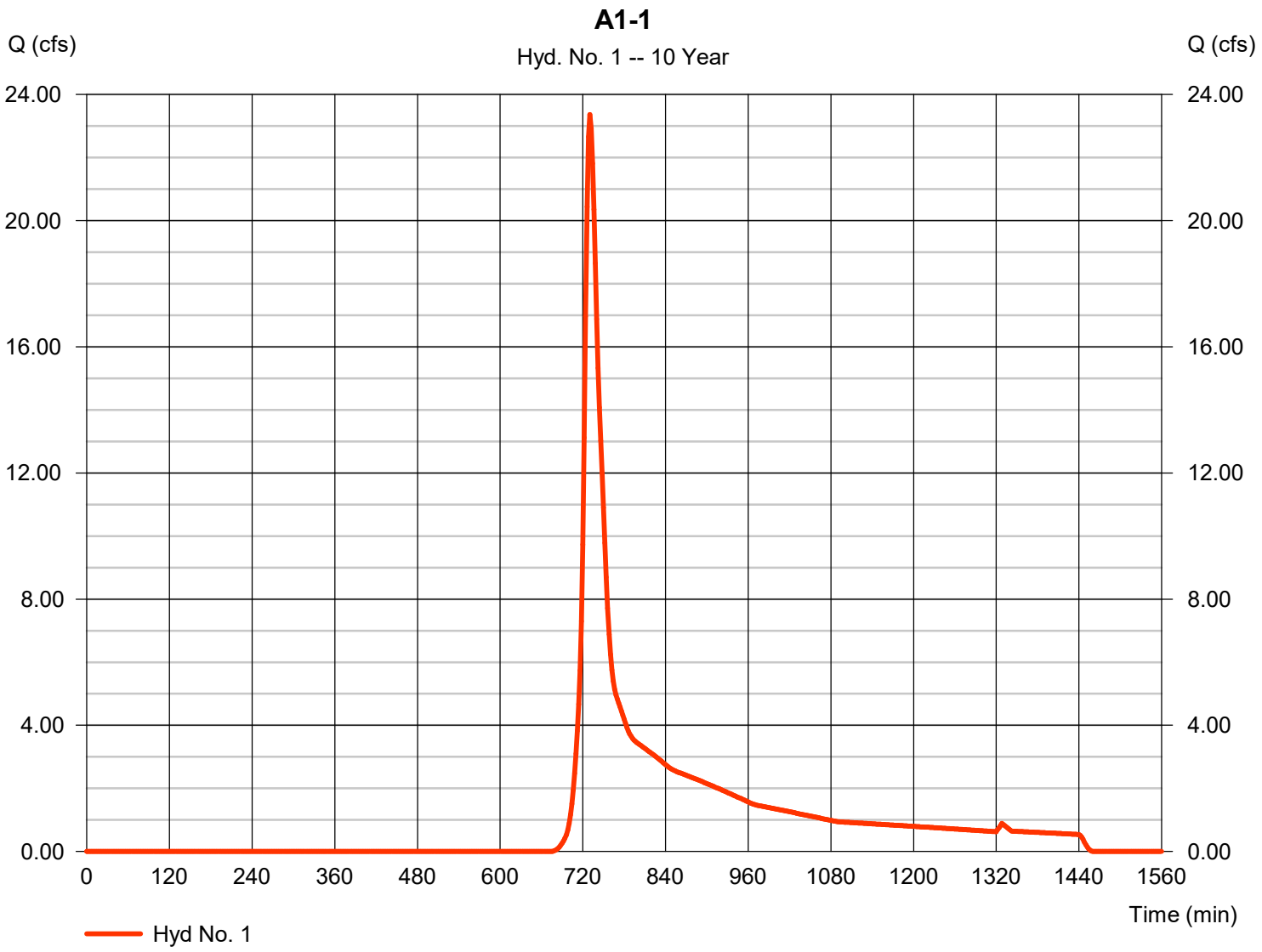
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 1

A1-1

Hydrograph type	= SCS Runoff	Peak discharge	= 23.37 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 99,766 cuft
Drainage area	= 21.310 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.00 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



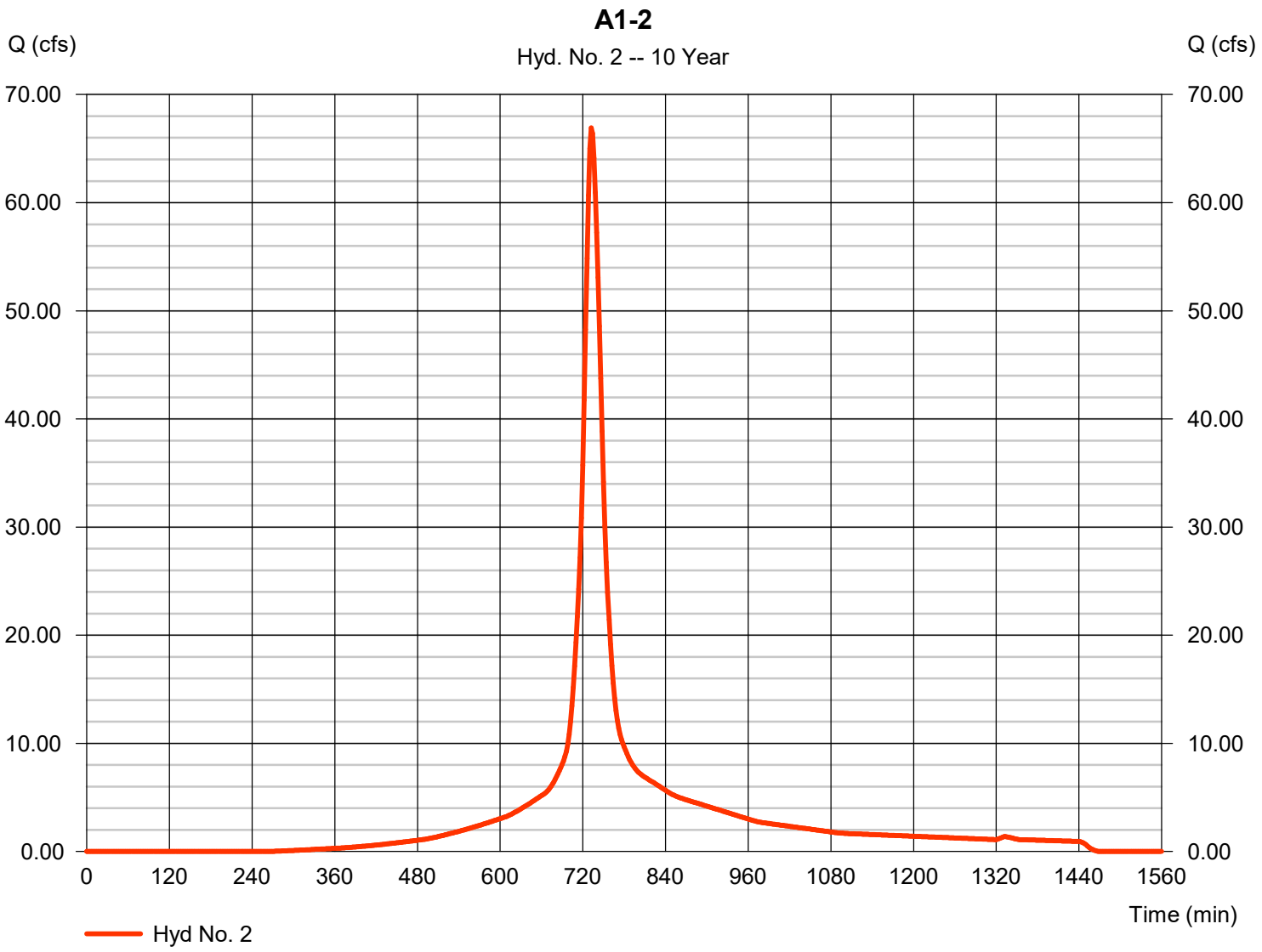
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 2

A1-2

Hydrograph type	= SCS Runoff	Peak discharge	= 66.92 cfs
Storm frequency	= 10 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 303,672 cuft
Drainage area	= 22.710 ac	Curve number	= 90
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.00 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



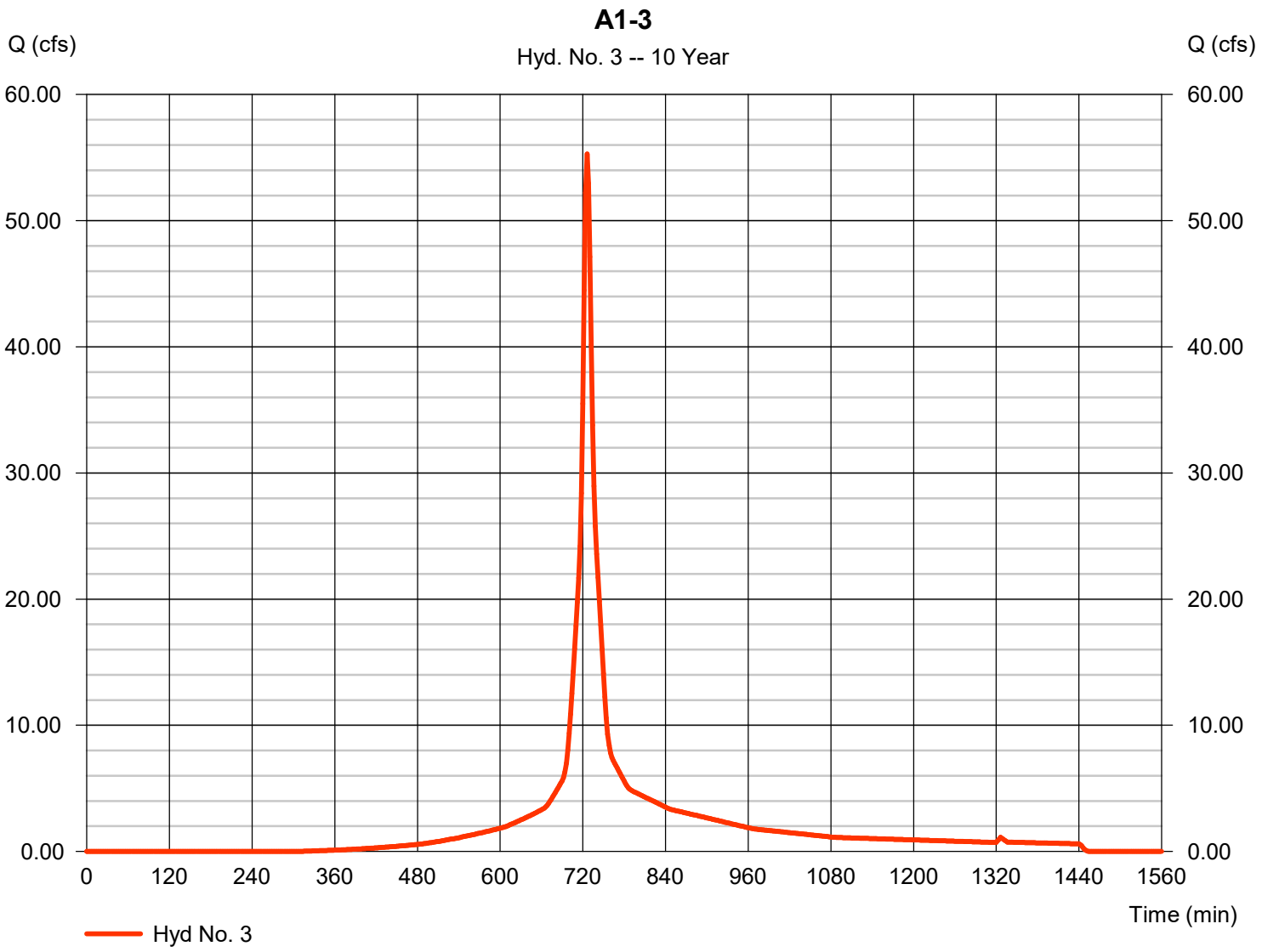
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 3

A1-3

Hydrograph type	= SCS Runoff	Peak discharge	= 55.28 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 192,605 cuft
Drainage area	= 15.250 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.00 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



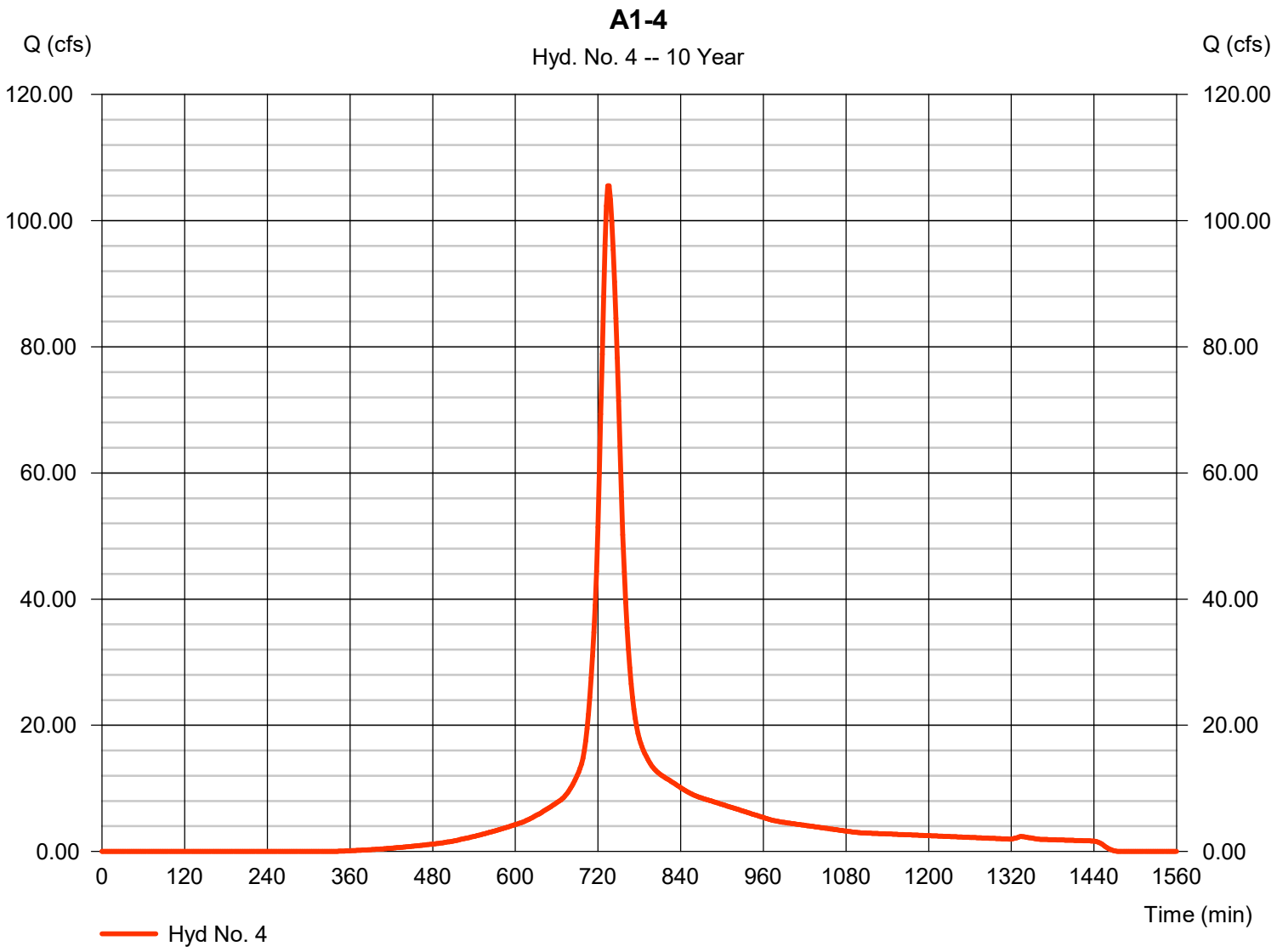
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 4

A1-4

Hydrograph type	= SCS Runoff	Peak discharge	= 105.54 cfs
Storm frequency	= 10 yrs	Time to peak	= 736 min
Time interval	= 2 min	Hyd. volume	= 506,556 cuft
Drainage area	= 40.570 ac	Curve number	= 87
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 21.00 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



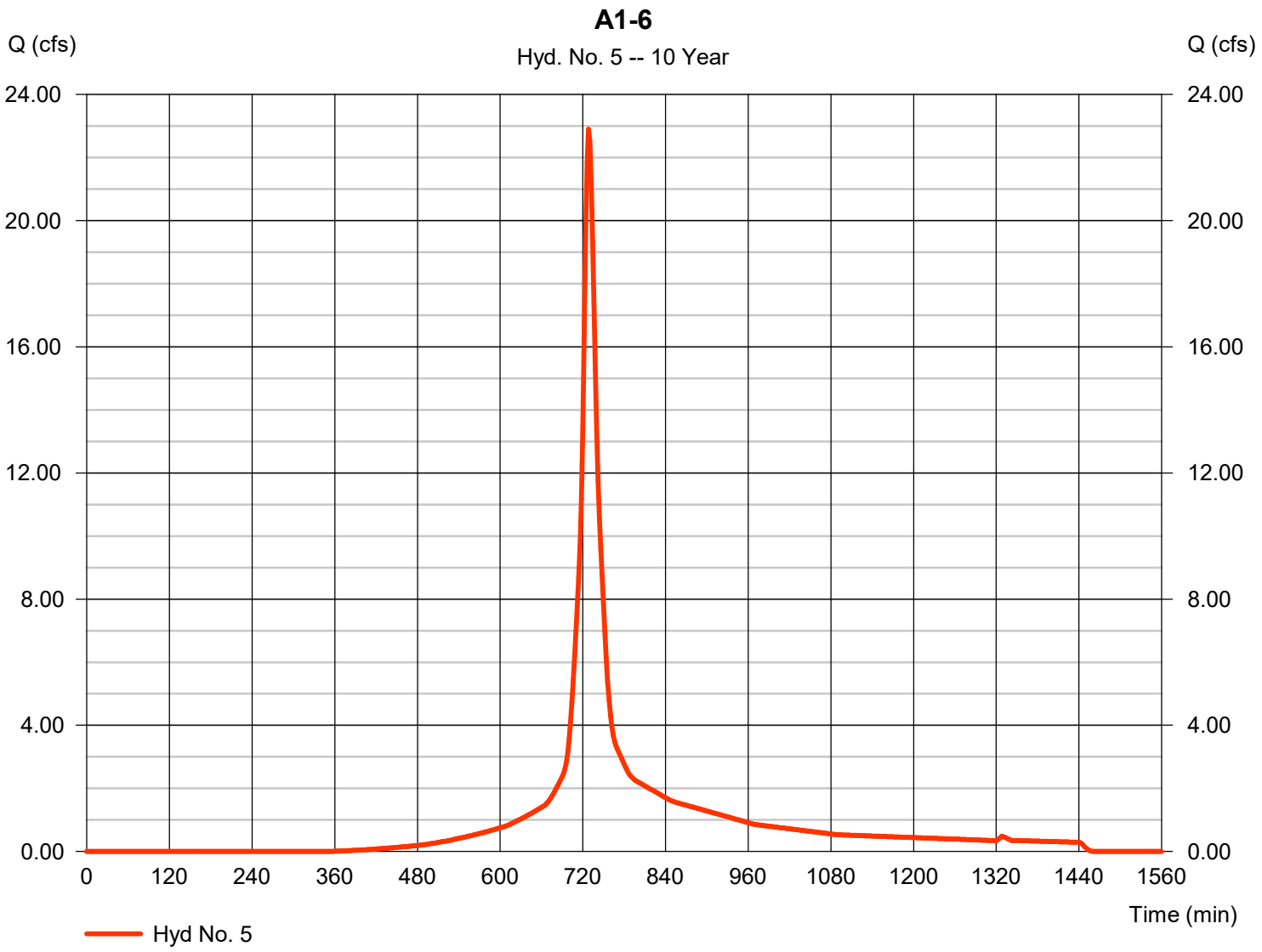
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 5

A1-6

Hydrograph type	= SCS Runoff	Peak discharge	= 22.90 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 88,549 cuft
Drainage area	= 7.210 ac	Curve number	= 86
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



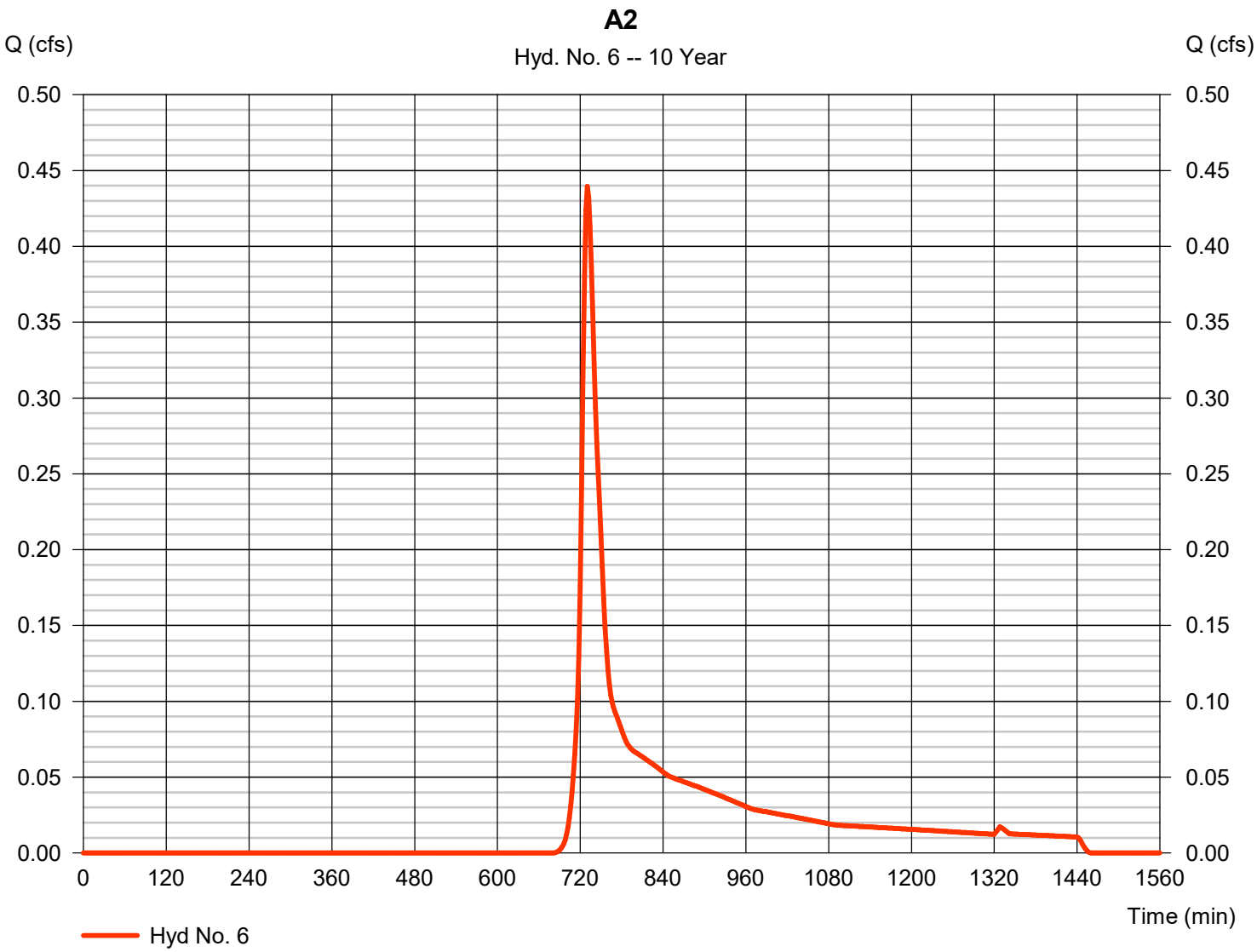
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 6

A2

Hydrograph type	= SCS Runoff	Peak discharge	= 0.440 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 1,909 cuft
Drainage area	= 0.430 ac	Curve number	= 60
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



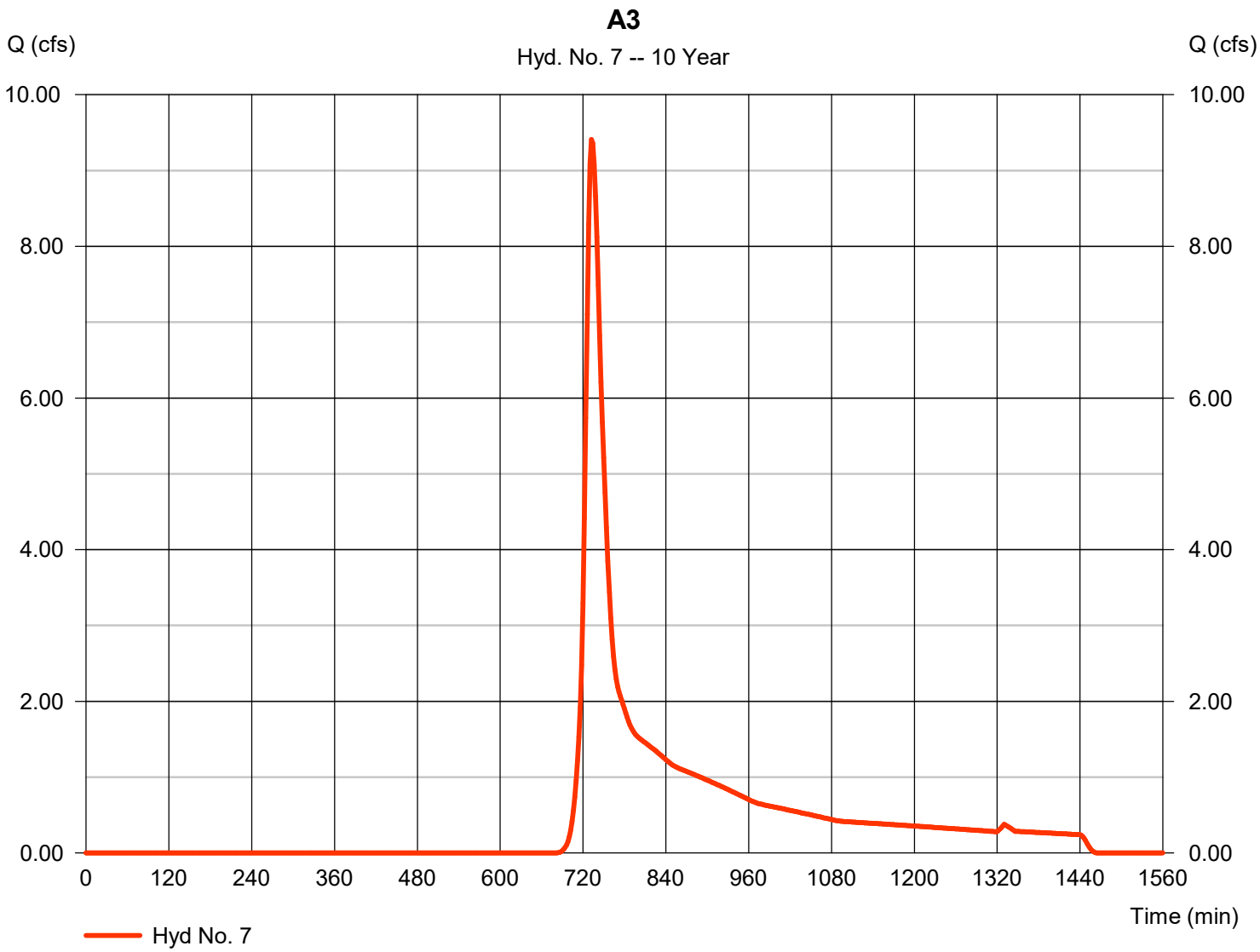
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 7

A3

Hydrograph type	= SCS Runoff	Peak discharge	= 9.409 cfs
Storm frequency	= 10 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 43,401 cuft
Drainage area	= 10.340 ac	Curve number	= 60
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 16.00 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



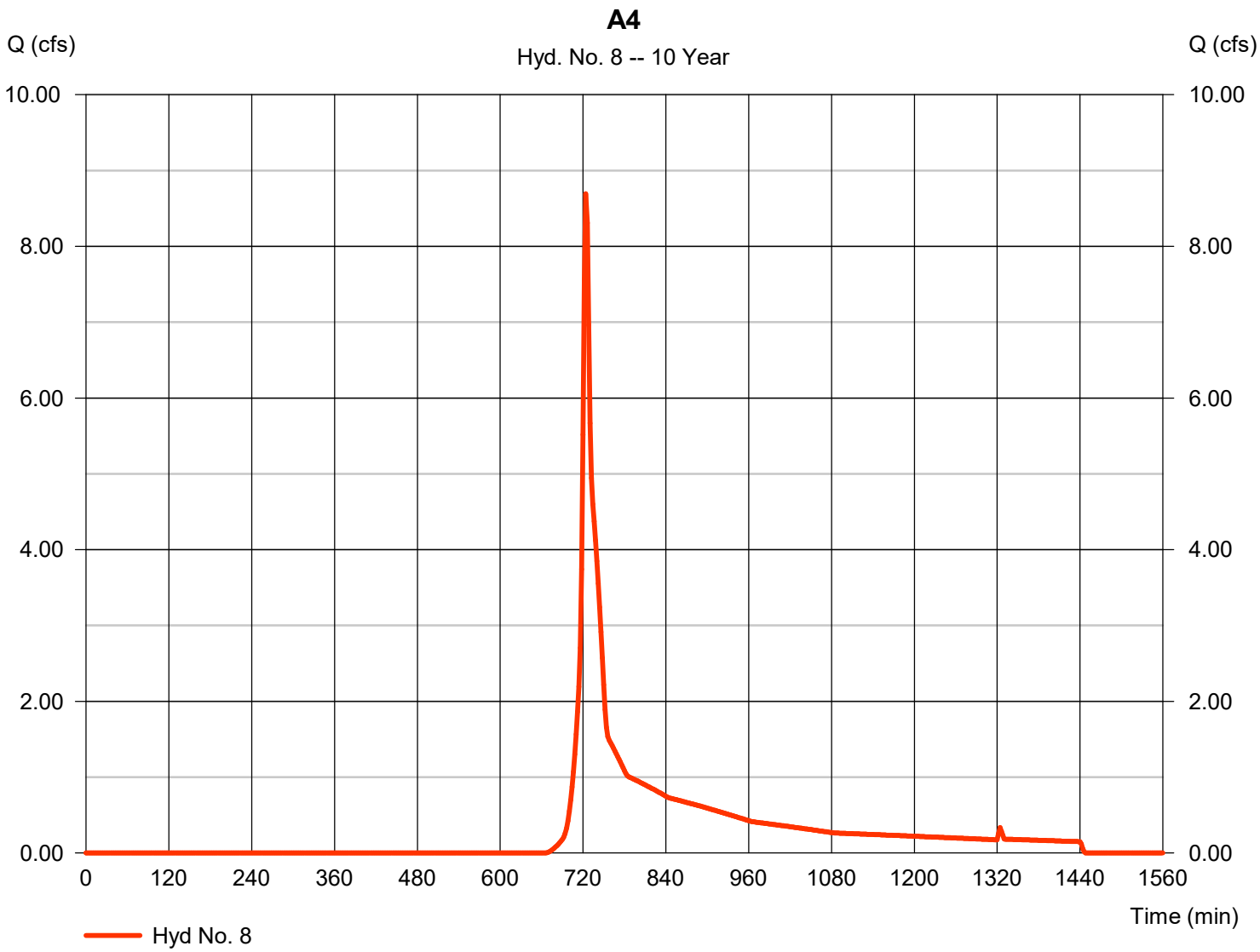
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 8

A4

Hydrograph type	= SCS Runoff	Peak discharge	= 8.693 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 28,540 cuft
Drainage area	= 6.370 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



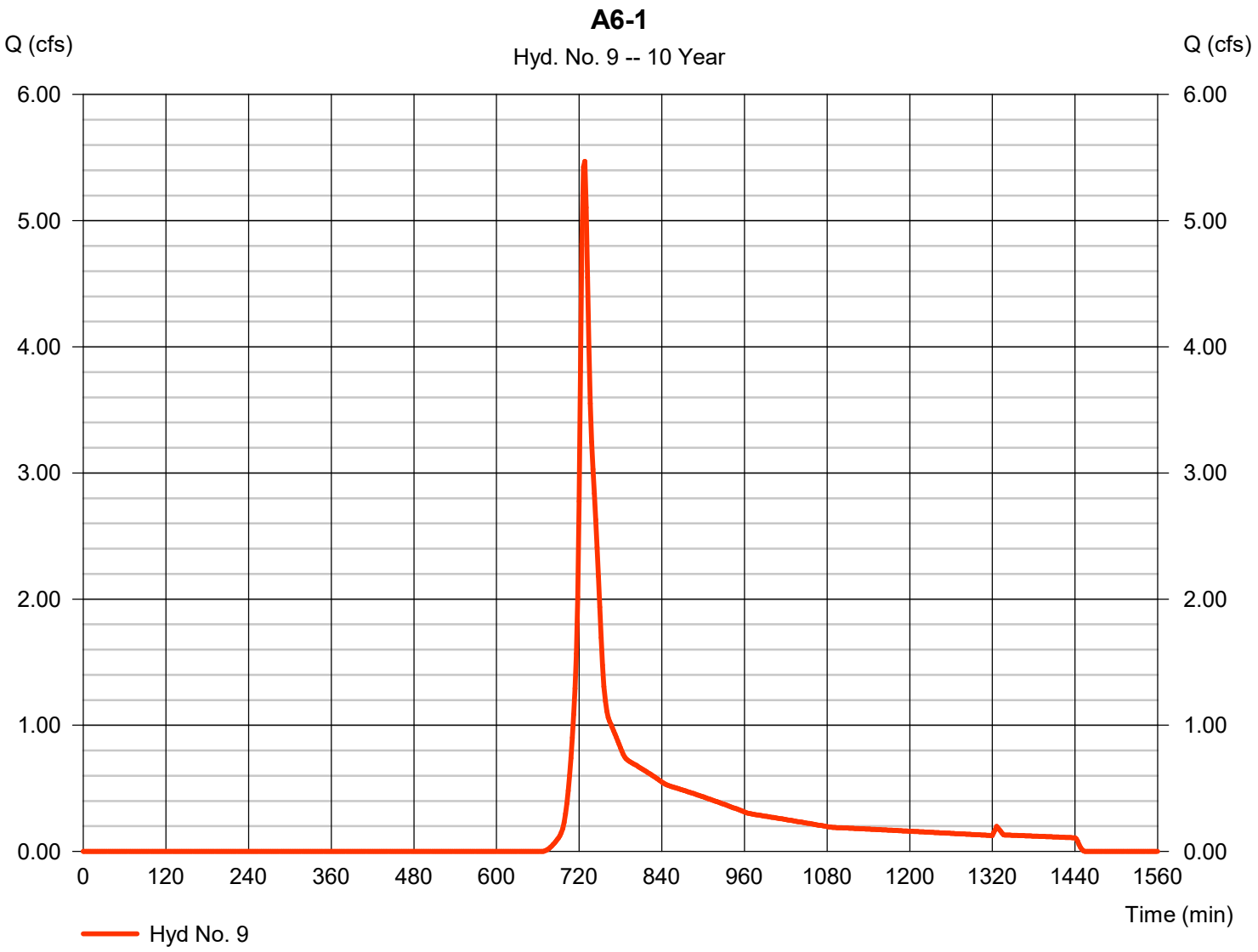
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 9

A6-1

Hydrograph type	= SCS Runoff	Peak discharge	= 5.470 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 20,646 cuft
Drainage area	= 4.320 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.00 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



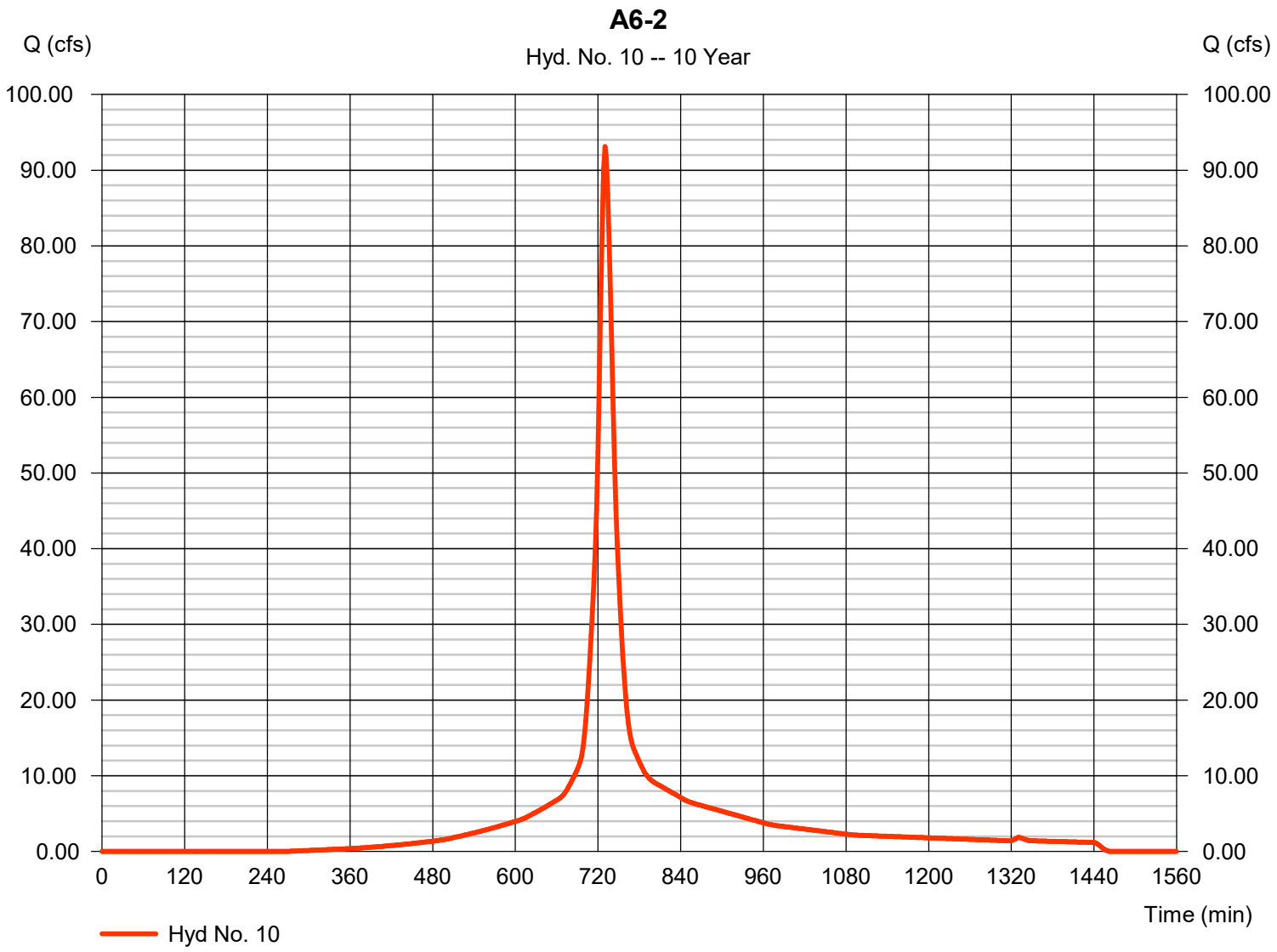
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 10

A6-2

Hydrograph type	= SCS Runoff	Peak discharge	= 93.12 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 389,820 cuft
Drainage area	= 29.900 ac	Curve number	= 90
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.00 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



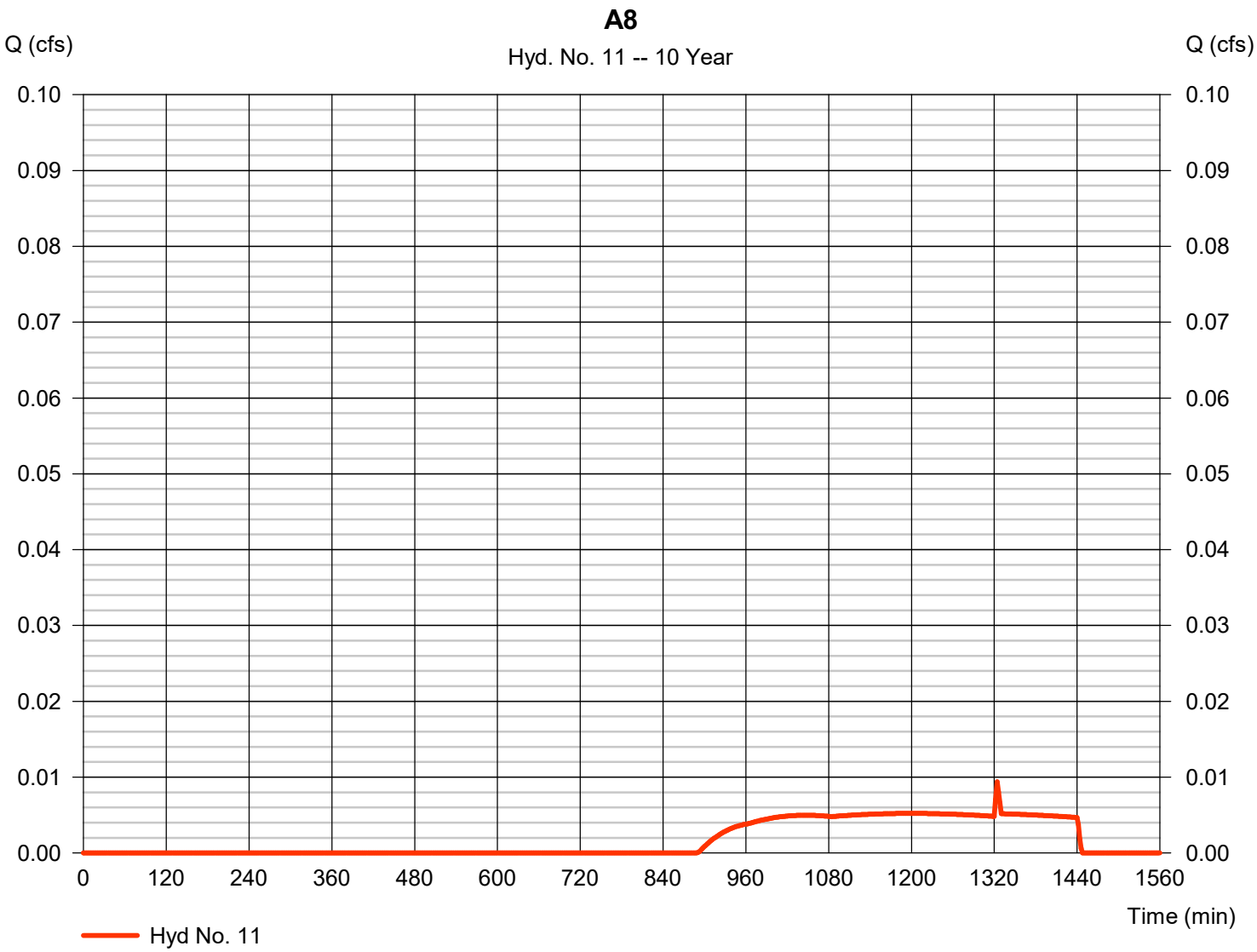
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 11

A8

Hydrograph type	= SCS Runoff	Peak discharge	= 0.009 cfs
Storm frequency	= 10 yrs	Time to peak	= 1324 min
Time interval	= 2 min	Hyd. volume	= 155 cuft
Drainage area	= 1.750 ac	Curve number	= 33
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



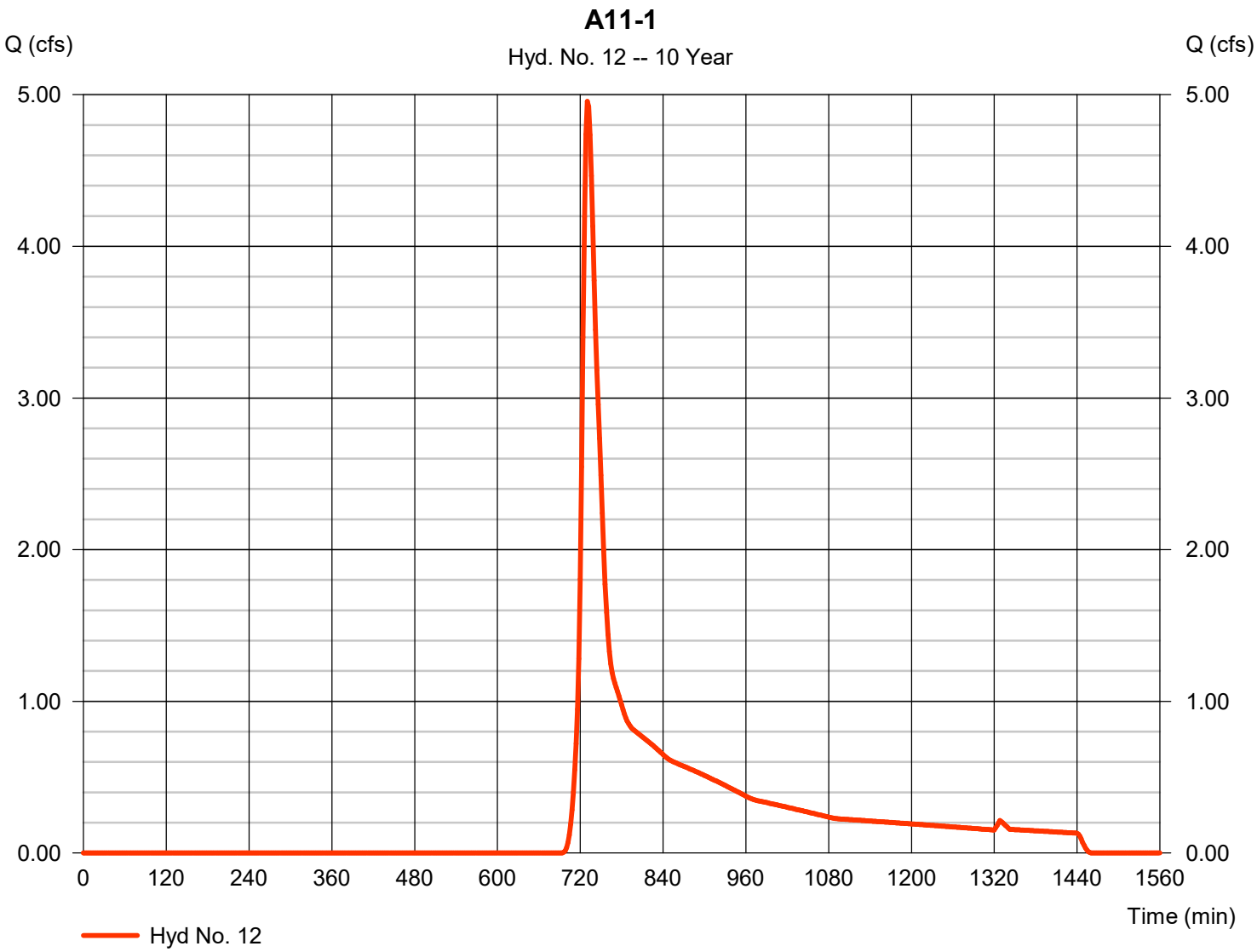
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 12

A11-1

Hydrograph type	= SCS Runoff	Peak discharge	= 4.957 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 22,470 cuft
Drainage area	= 5.660 ac	Curve number	= 58
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.00 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



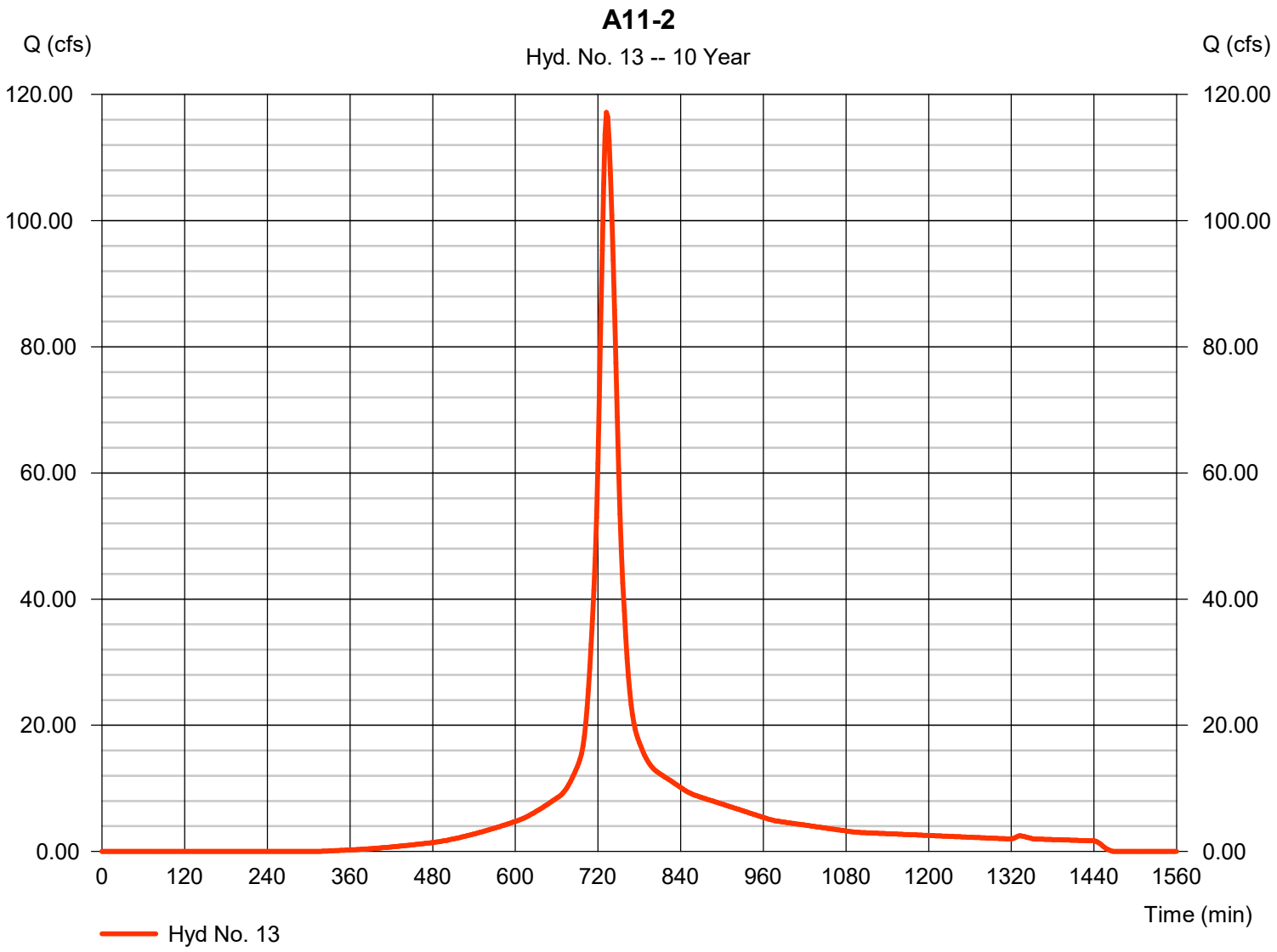
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 13

A11-2

Hydrograph type	= SCS Runoff	Peak discharge	= 117.17 cfs
Storm frequency	= 10 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 526,033 cuft
Drainage area	= 41.650 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.00 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



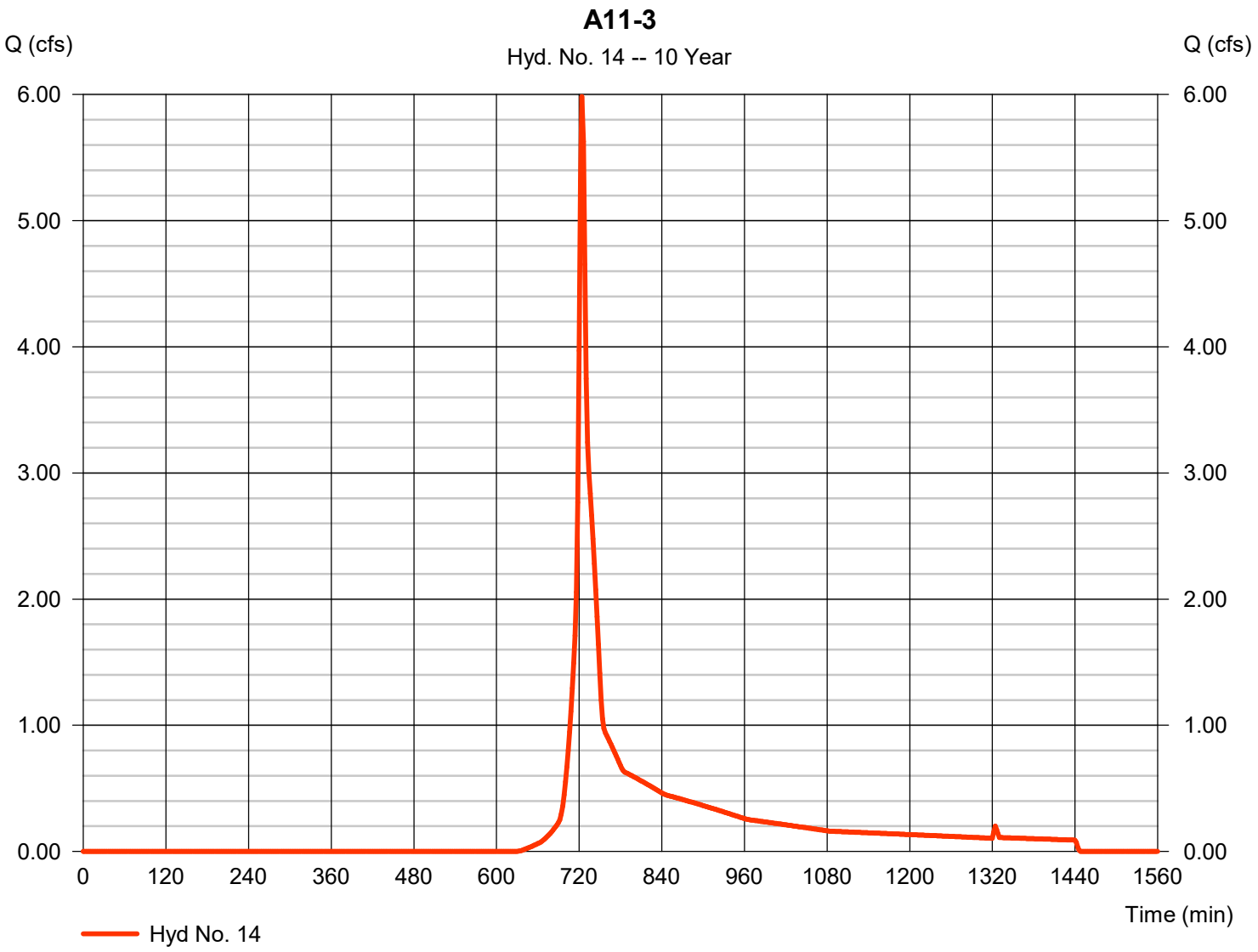
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 14

A11-3

Hydrograph type	= SCS Runoff	Peak discharge	= 5.984 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 18,756 cuft
Drainage area	= 3.460 ac	Curve number	= 66
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



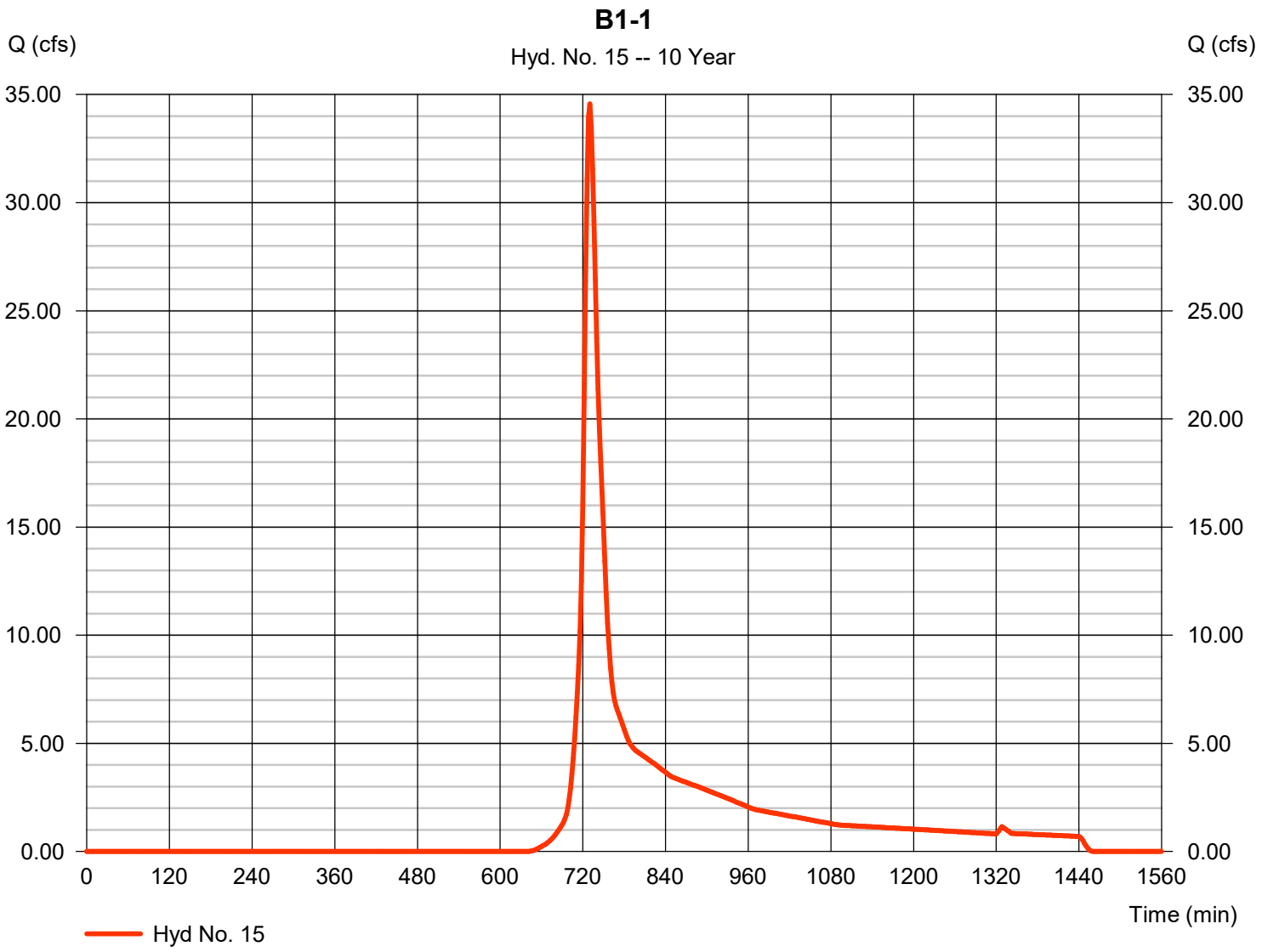
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 15

B1-1

Hydrograph type	= SCS Runoff	Peak discharge	= 34.57 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 140,494 cuft
Drainage area	= 24.660 ac	Curve number	= 65
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



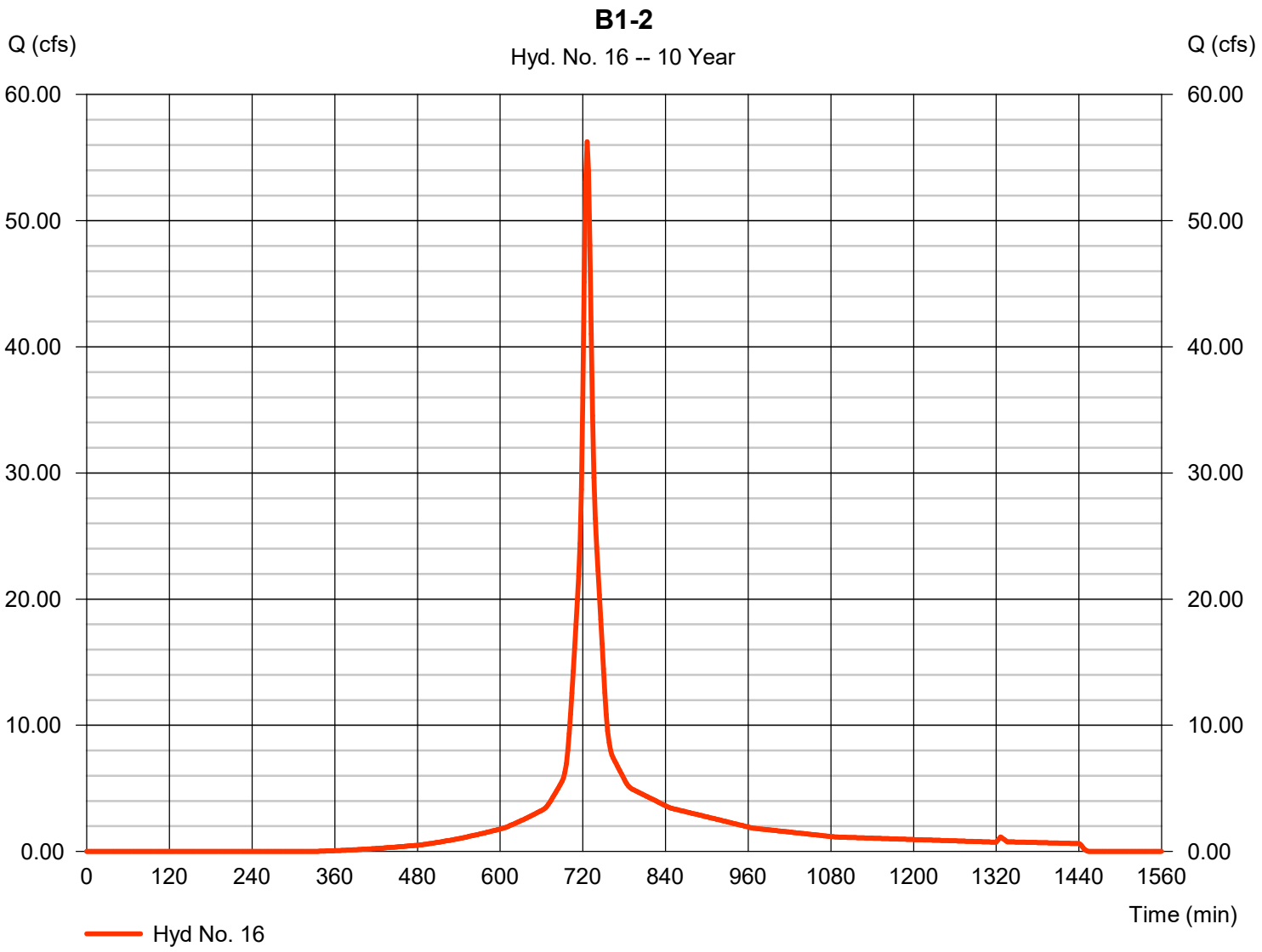
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 16

B1-2

Hydrograph type	= SCS Runoff	Peak discharge	= 56.26 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 195,044 cuft
Drainage area	= 15.900 ac	Curve number	= 87
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.00 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



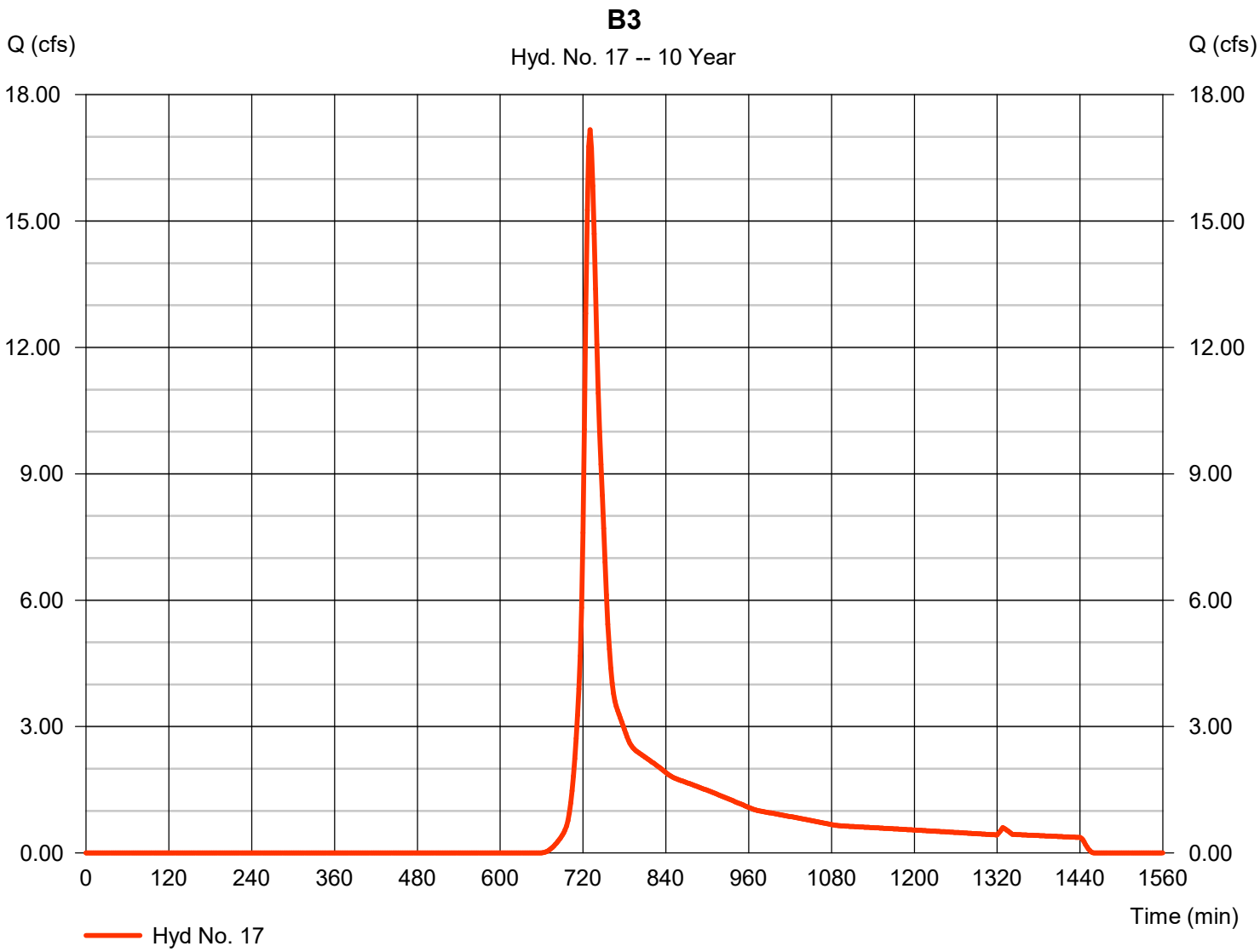
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 17

B3

Hydrograph type	= SCS Runoff	Peak discharge	= 17.17 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 71,277 cuft
Drainage area	= 13.760 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.00 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



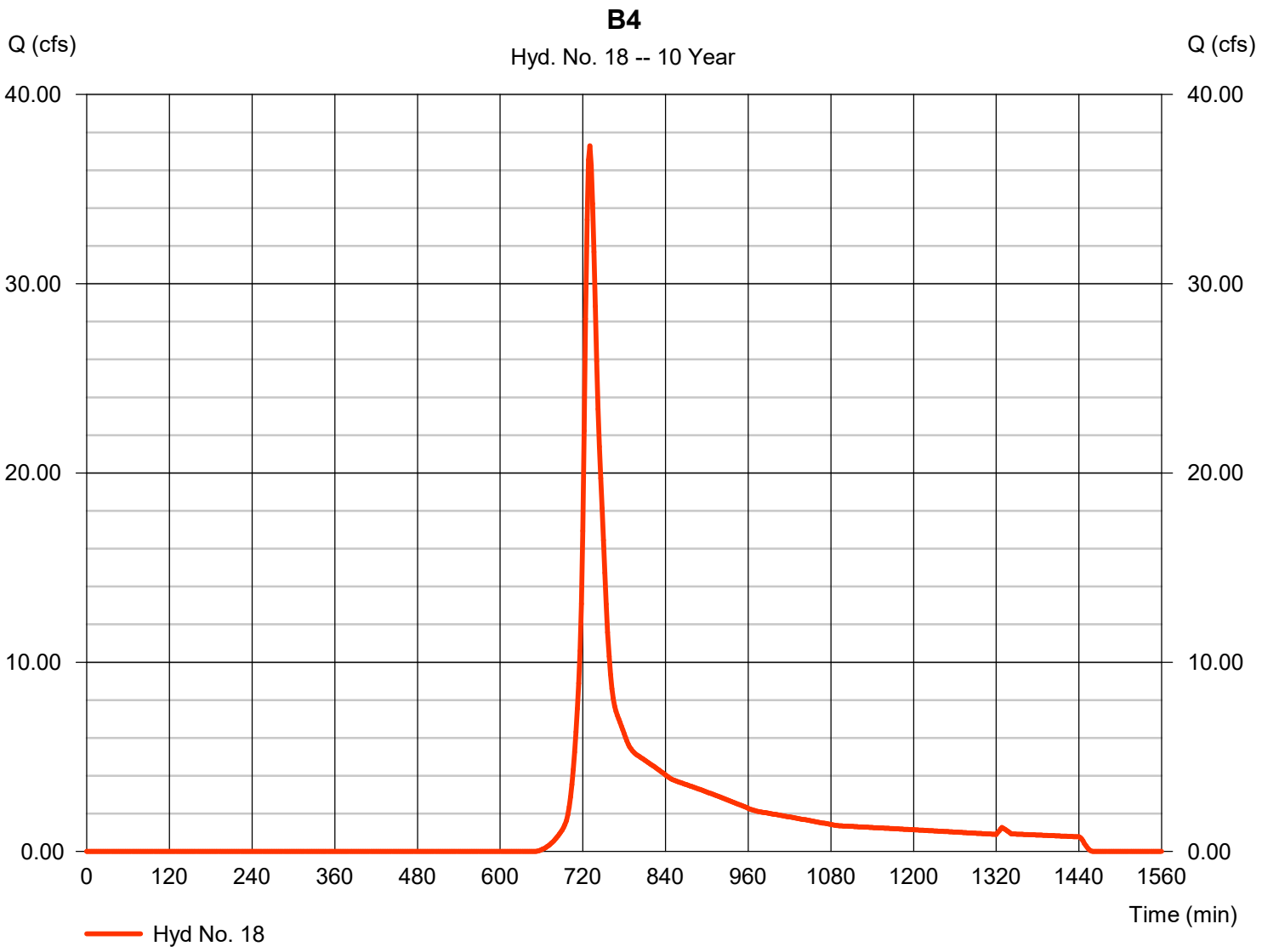
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 18

B4

Hydrograph type	= SCS Runoff	Peak discharge	= 37.29 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 153,086 cuft
Drainage area	= 28.160 ac	Curve number	= 64
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.80 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



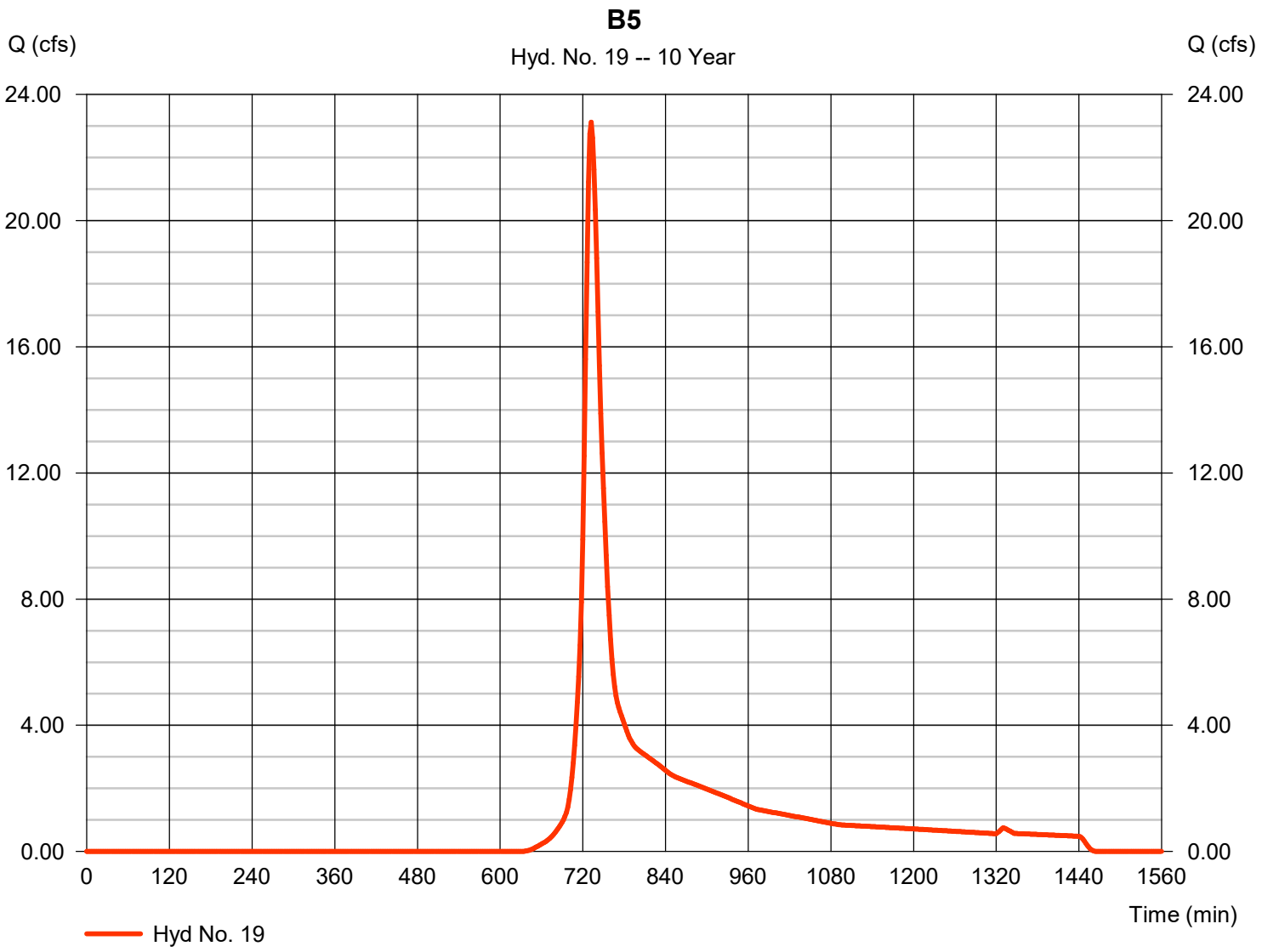
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 19

B5

Hydrograph type	= SCS Runoff	Peak discharge	= 23.12 cfs
Storm frequency	= 10 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 98,829 cuft
Drainage area	= 17.530 ac	Curve number	= 66
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.00 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



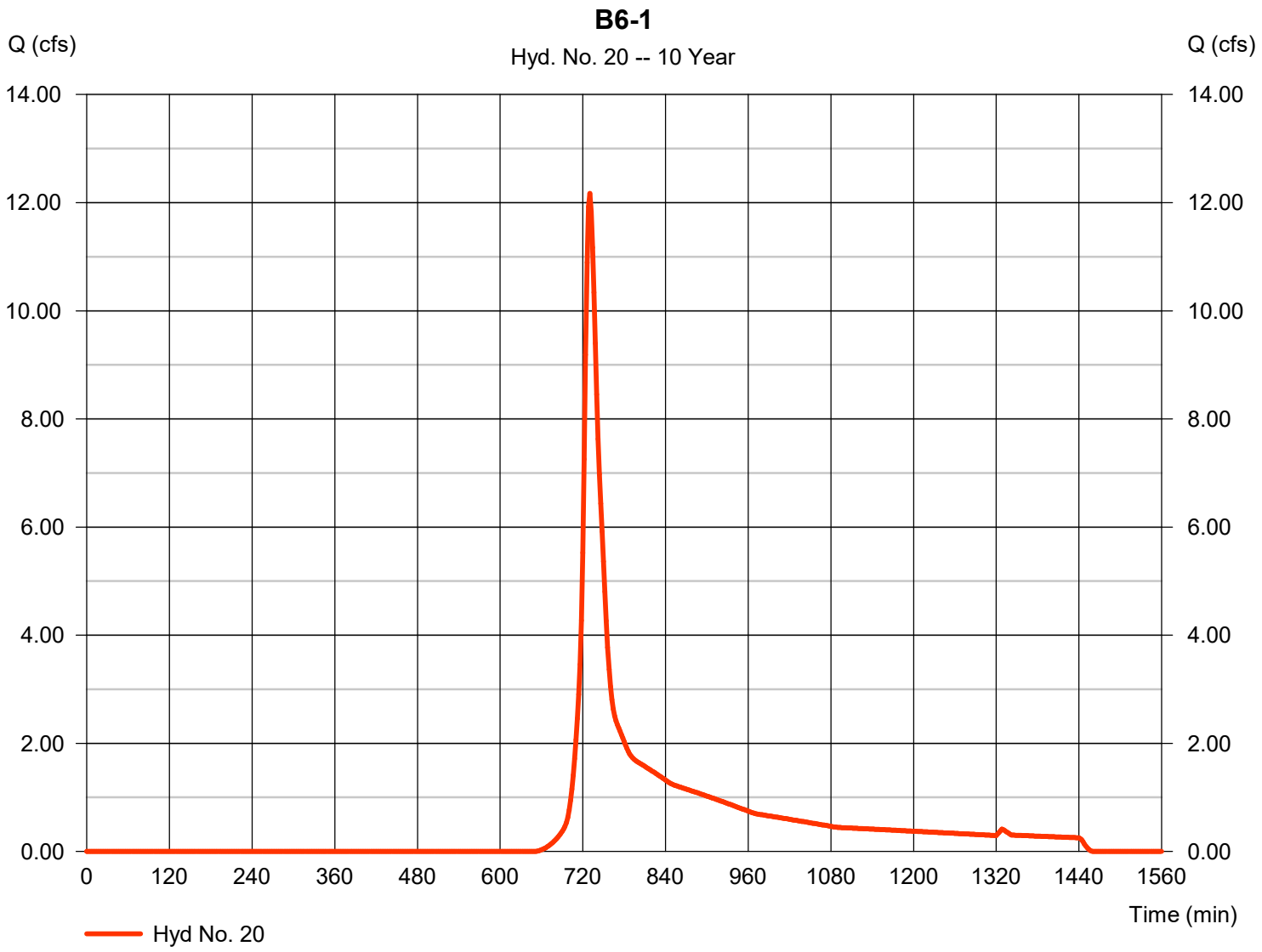
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 20

B6-1

Hydrograph type	= SCS Runoff	Peak discharge	= 12.17 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 49,959 cuft
Drainage area	= 9.190 ac	Curve number	= 64
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



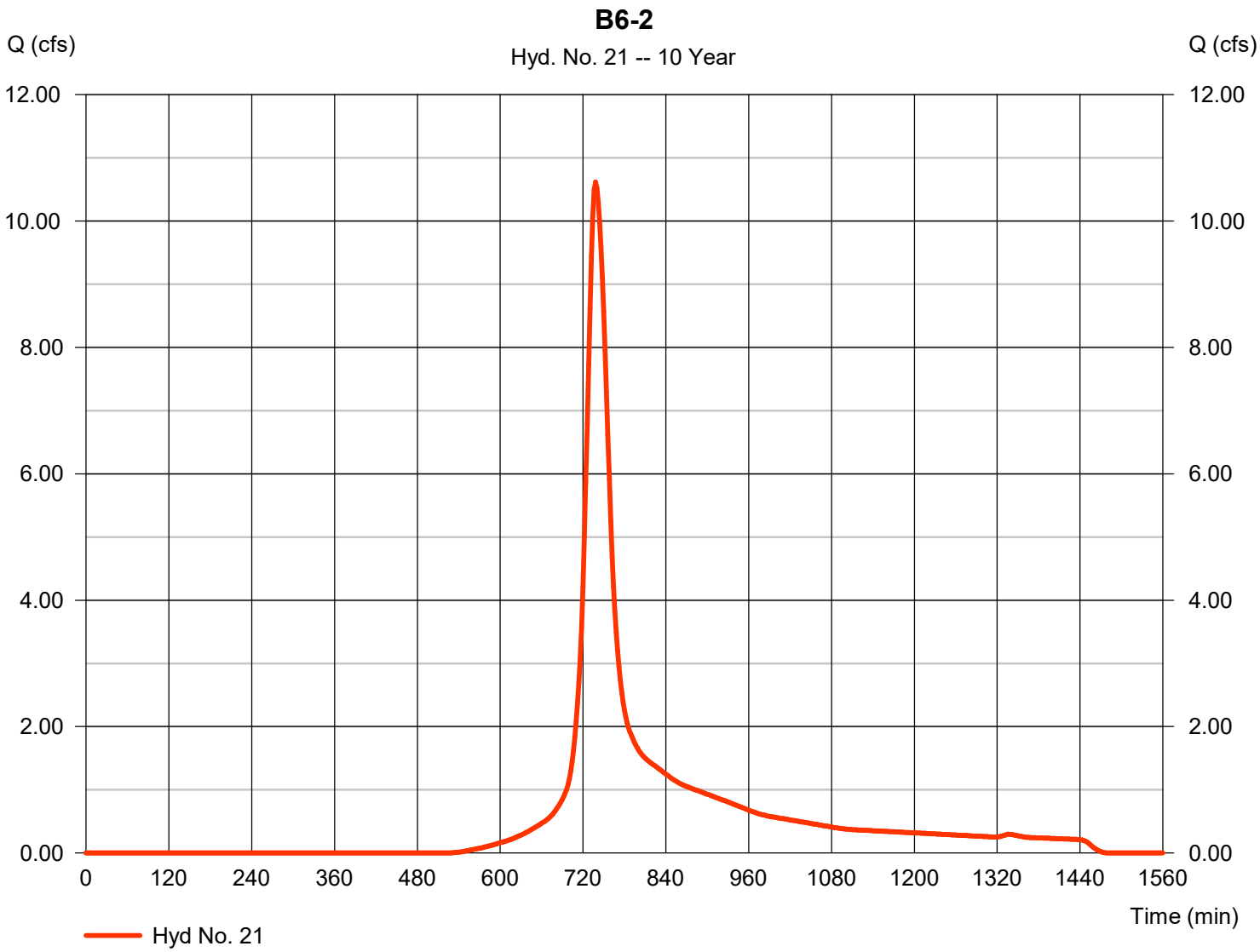
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 21

B6-2

Hydrograph type	= SCS Runoff	Peak discharge	= 10.62 cfs
Storm frequency	= 10 yrs	Time to peak	= 738 min
Time interval	= 2 min	Hyd. volume	= 52,458 cuft
Drainage area	= 6.190 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 24.00 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



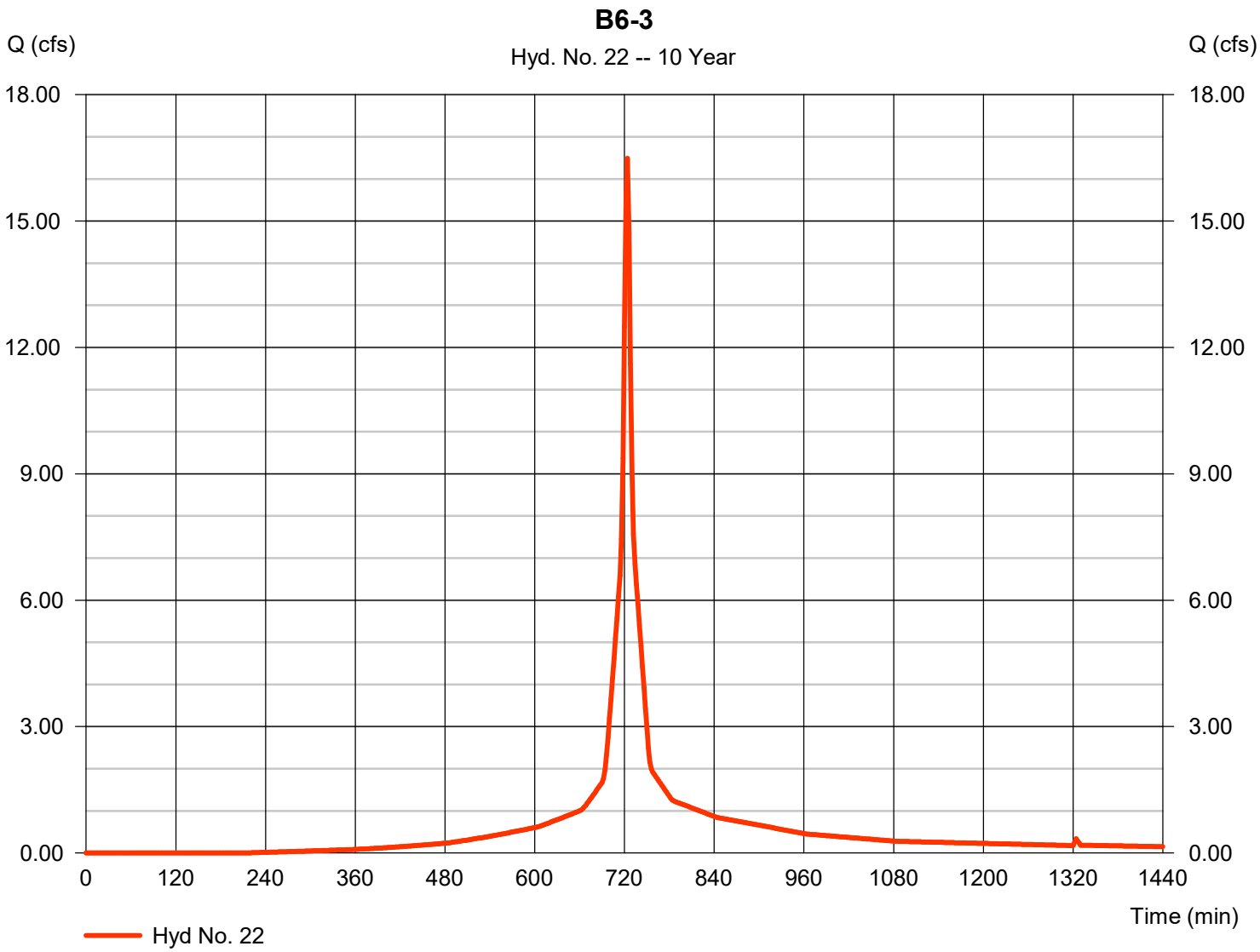
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 22

B6-3

Hydrograph type	= SCS Runoff	Peak discharge	= 16.49 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 52,081 cuft
Drainage area	= 3.930 ac	Curve number	= 92
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



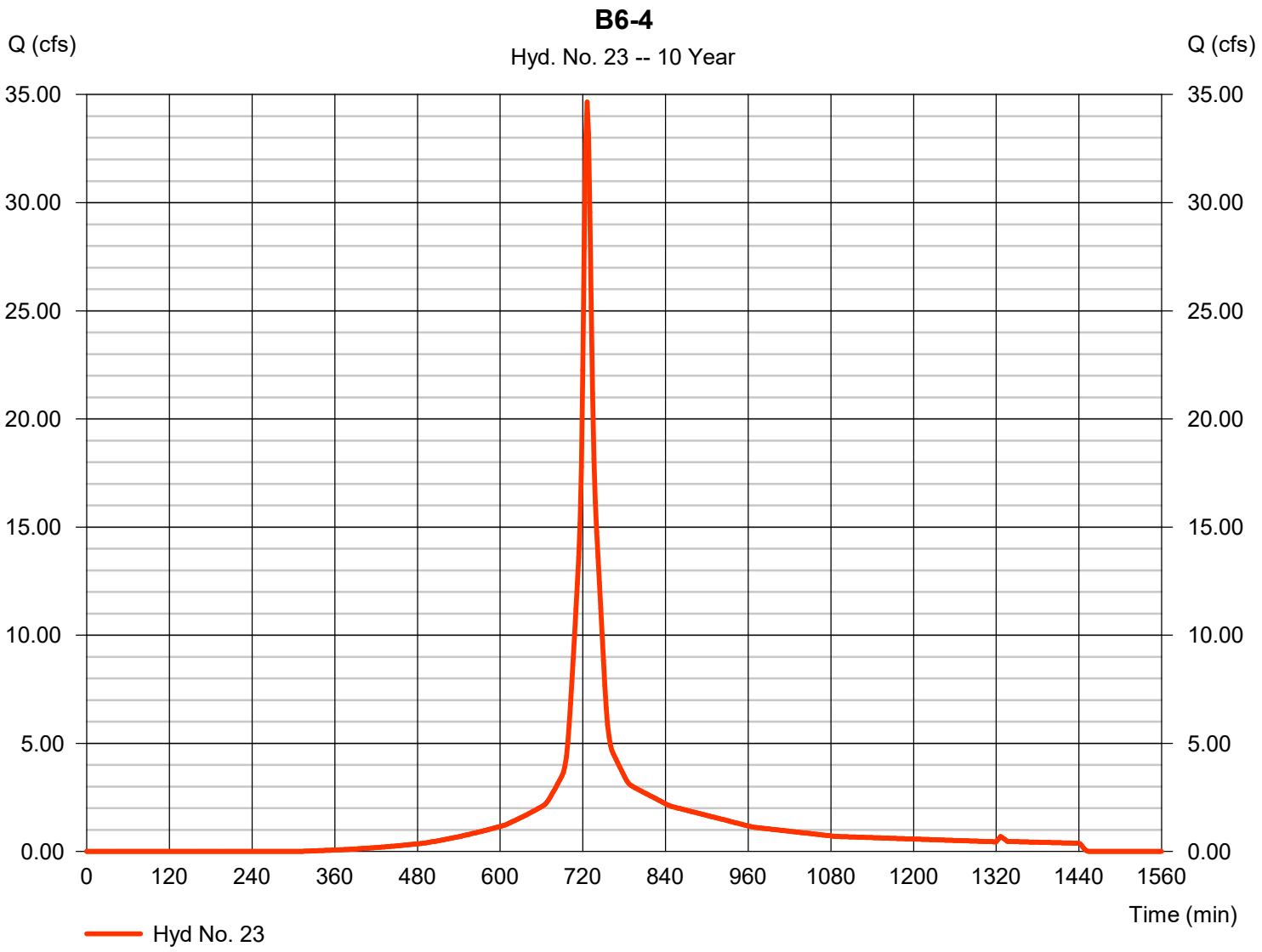
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 23

B6-4

Hydrograph type	= SCS Runoff	Peak discharge	= 34.66 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 120,741 cuft
Drainage area	= 9.560 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.00 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



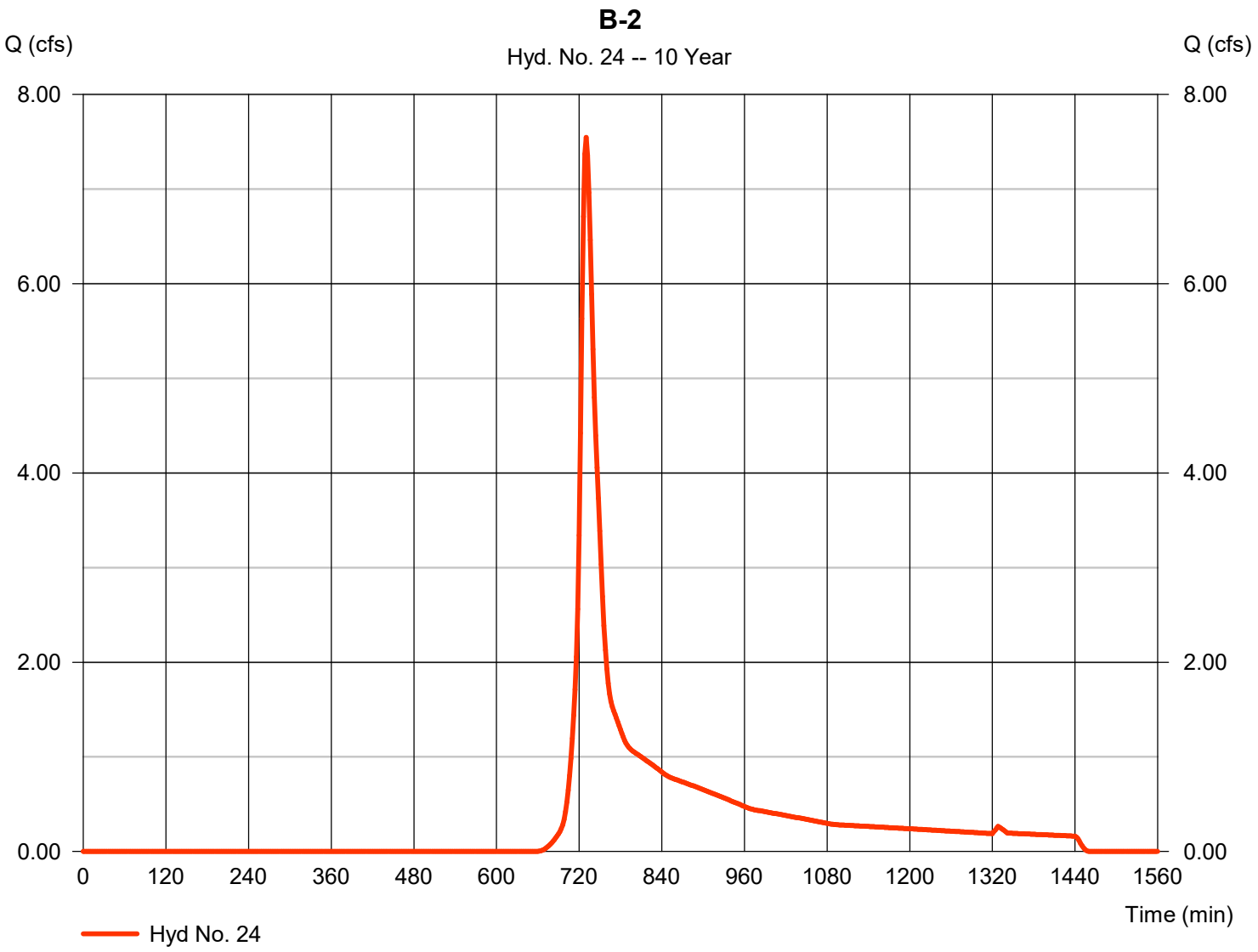
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 24

B-2

Hydrograph type	= SCS Runoff	Peak discharge	= 7.548 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 31,339 cuft
Drainage area	= 6.050 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.00 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



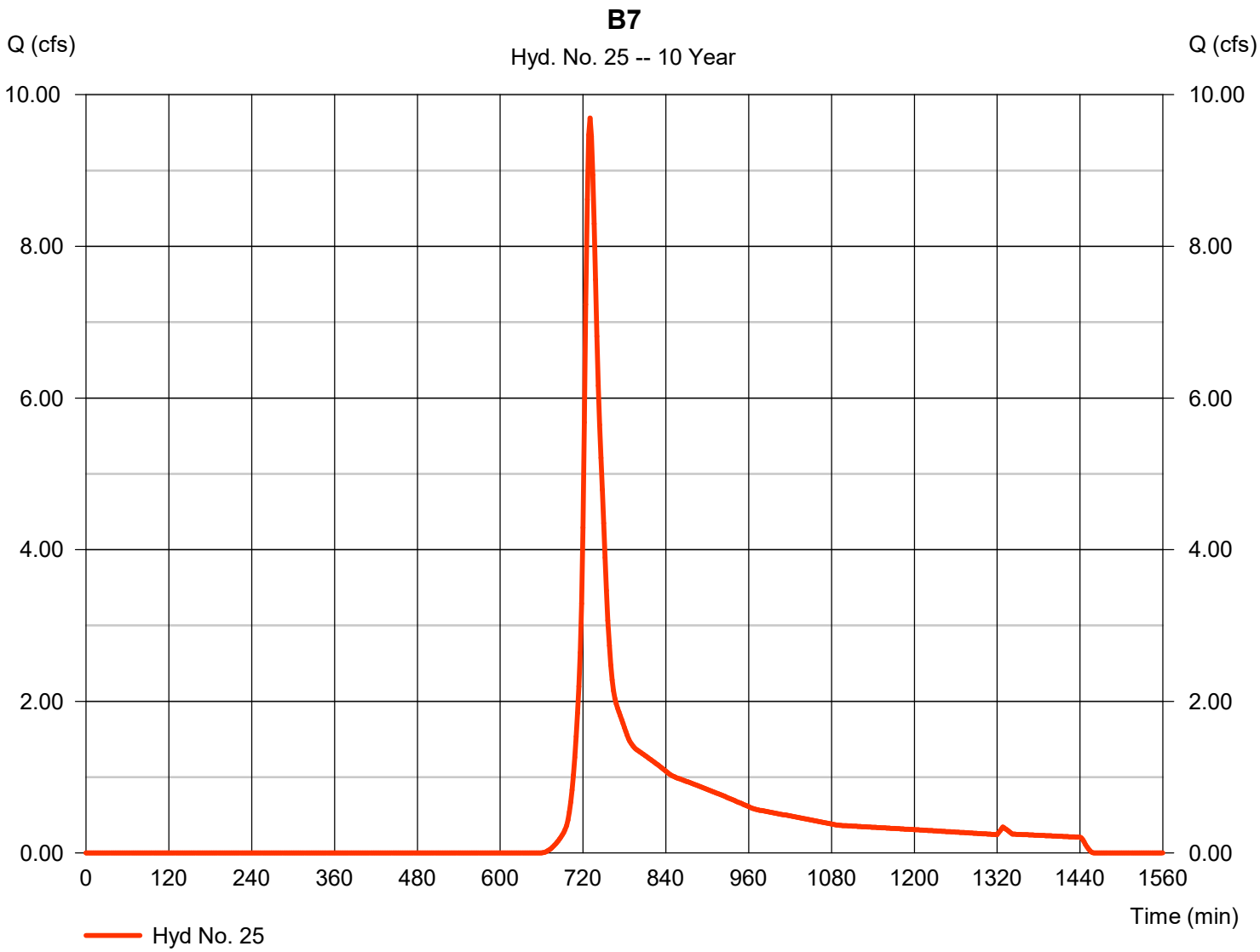
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 25

B7

Hydrograph type	= SCS Runoff	Peak discharge	= 9.693 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 40,249 cuft
Drainage area	= 7.770 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



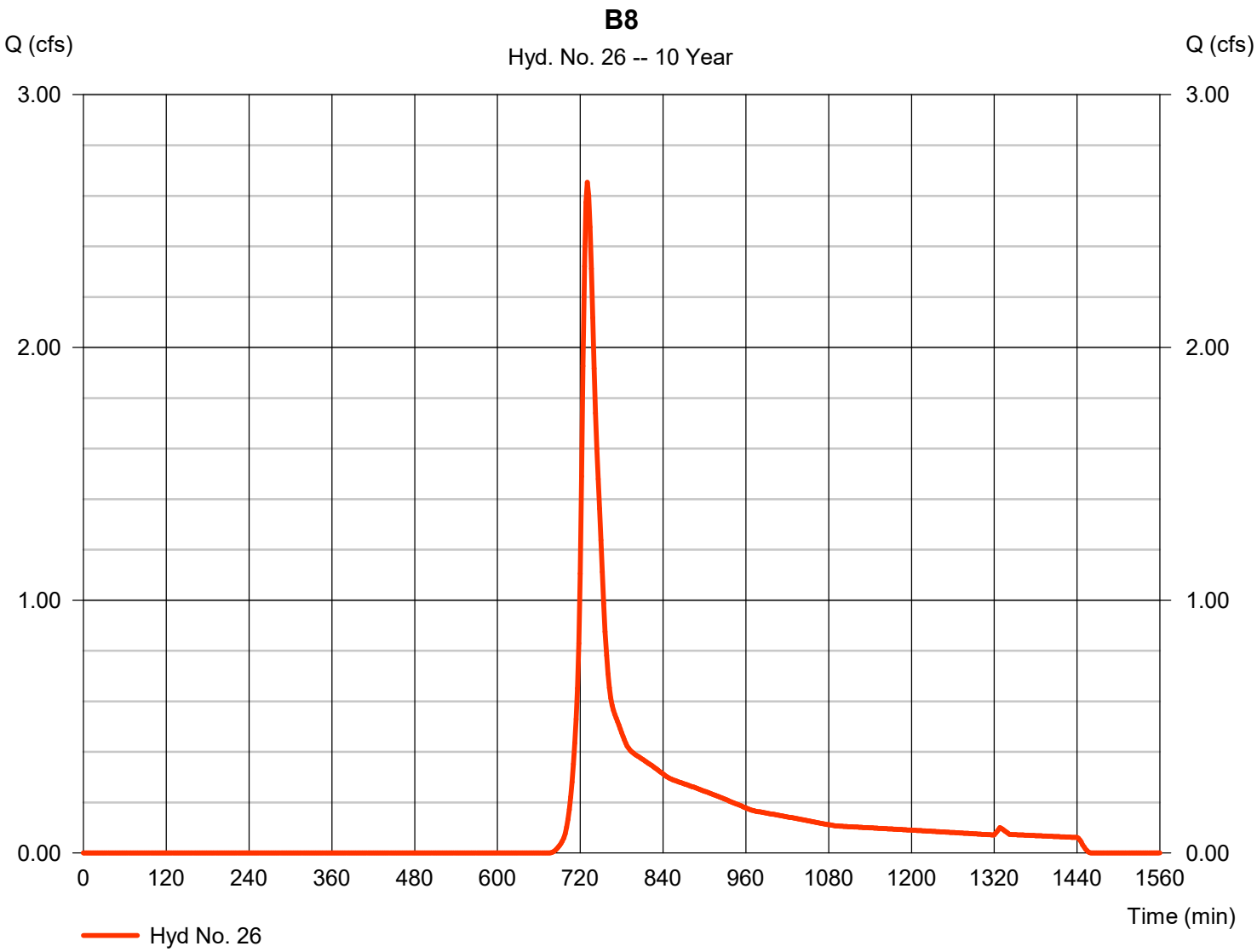
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 26

B8

Hydrograph type	= SCS Runoff	Peak discharge	= 2.653 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 11,330 cuft
Drainage area	= 2.420 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.00 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



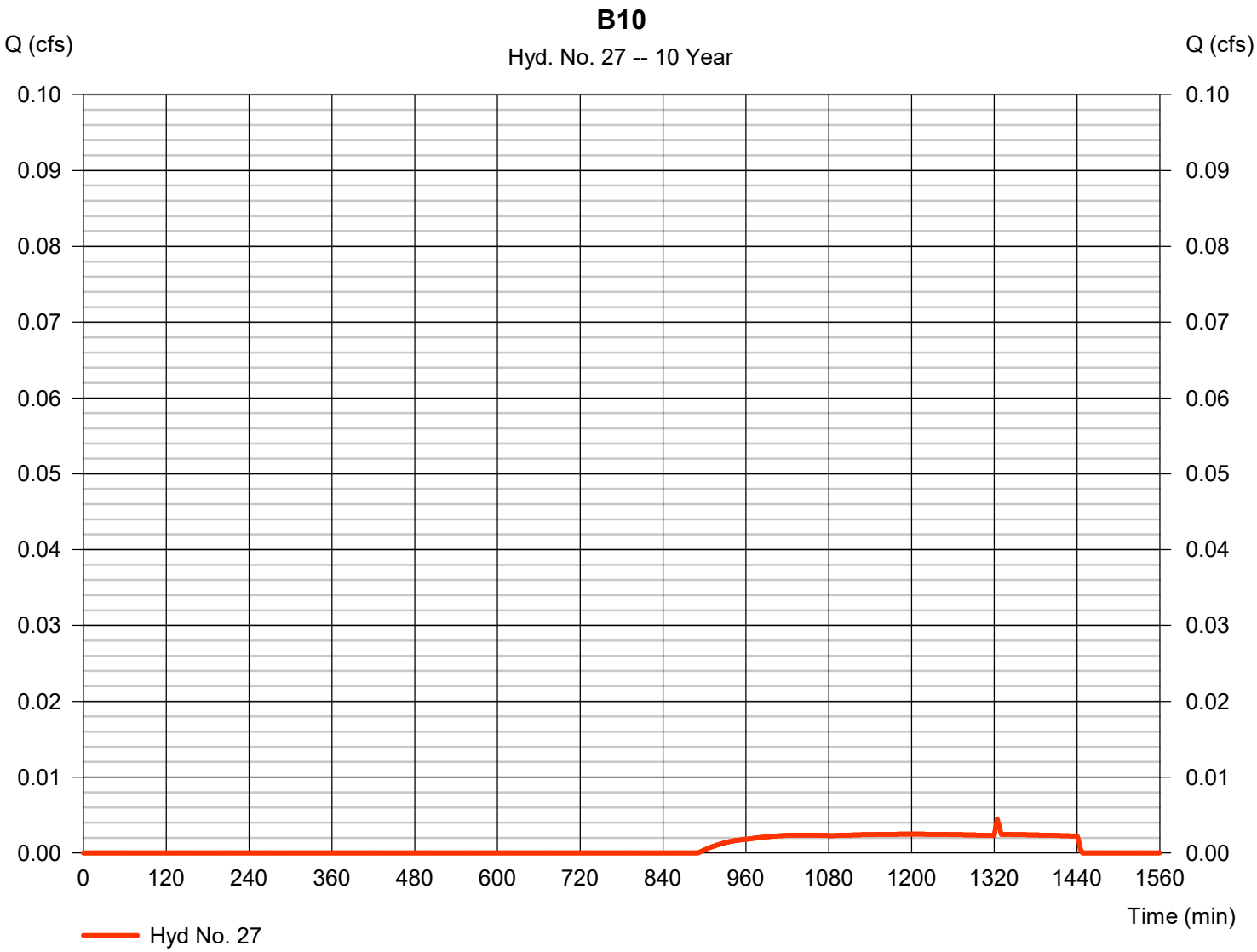
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 27

B10

Hydrograph type	= SCS Runoff	Peak discharge	= 0.004 cfs
Storm frequency	= 10 yrs	Time to peak	= 1324 min
Time interval	= 2 min	Hyd. volume	= 73 cuft
Drainage area	= 0.830 ac	Curve number	= 33
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.60 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



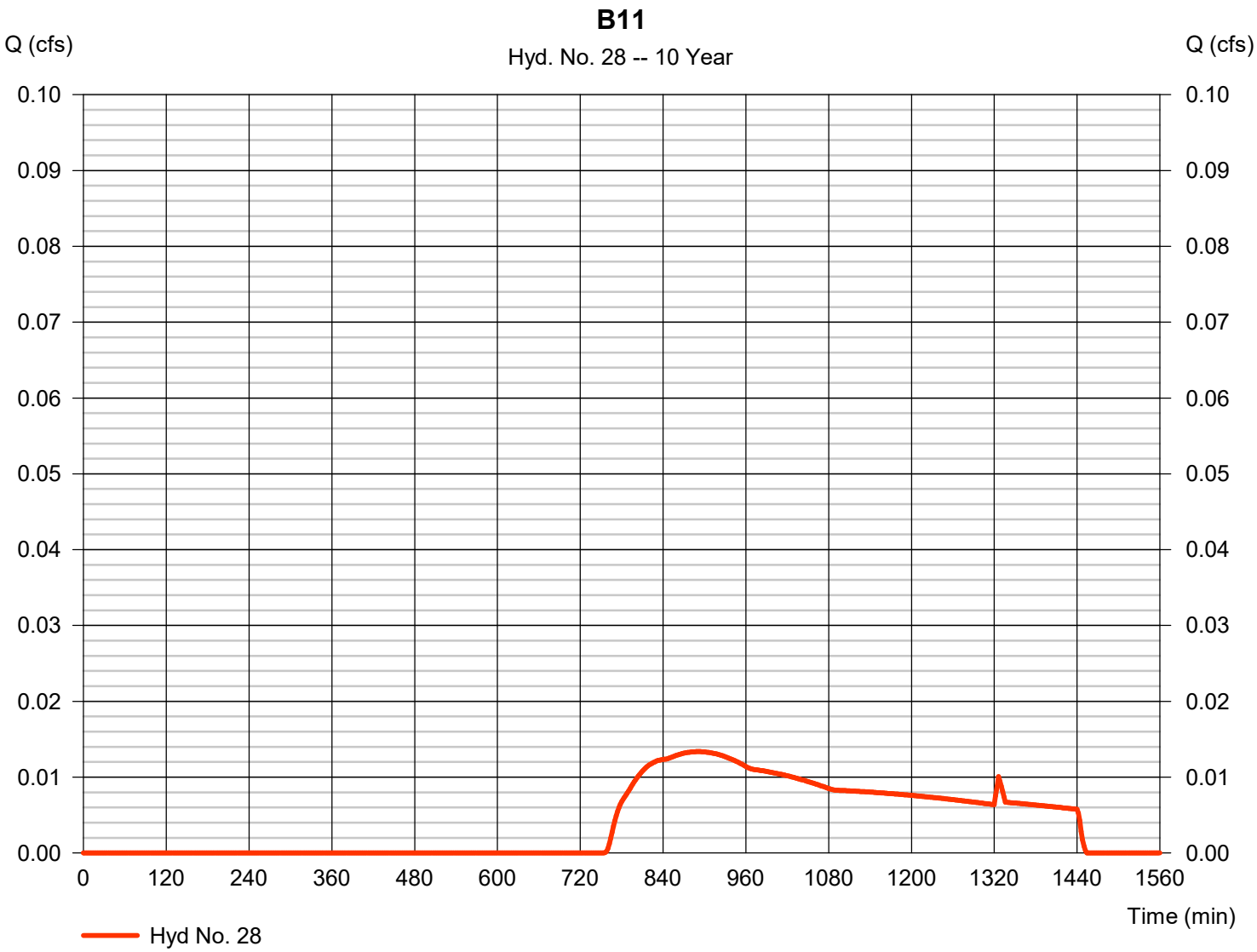
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 28

B11

Hydrograph type	= SCS Runoff	Peak discharge	= 0.013 cfs
Storm frequency	= 10 yrs	Time to peak	= 890 min
Time interval	= 2 min	Hyd. volume	= 364 cuft
Drainage area	= 0.950 ac	Curve number	= 37
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.00 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

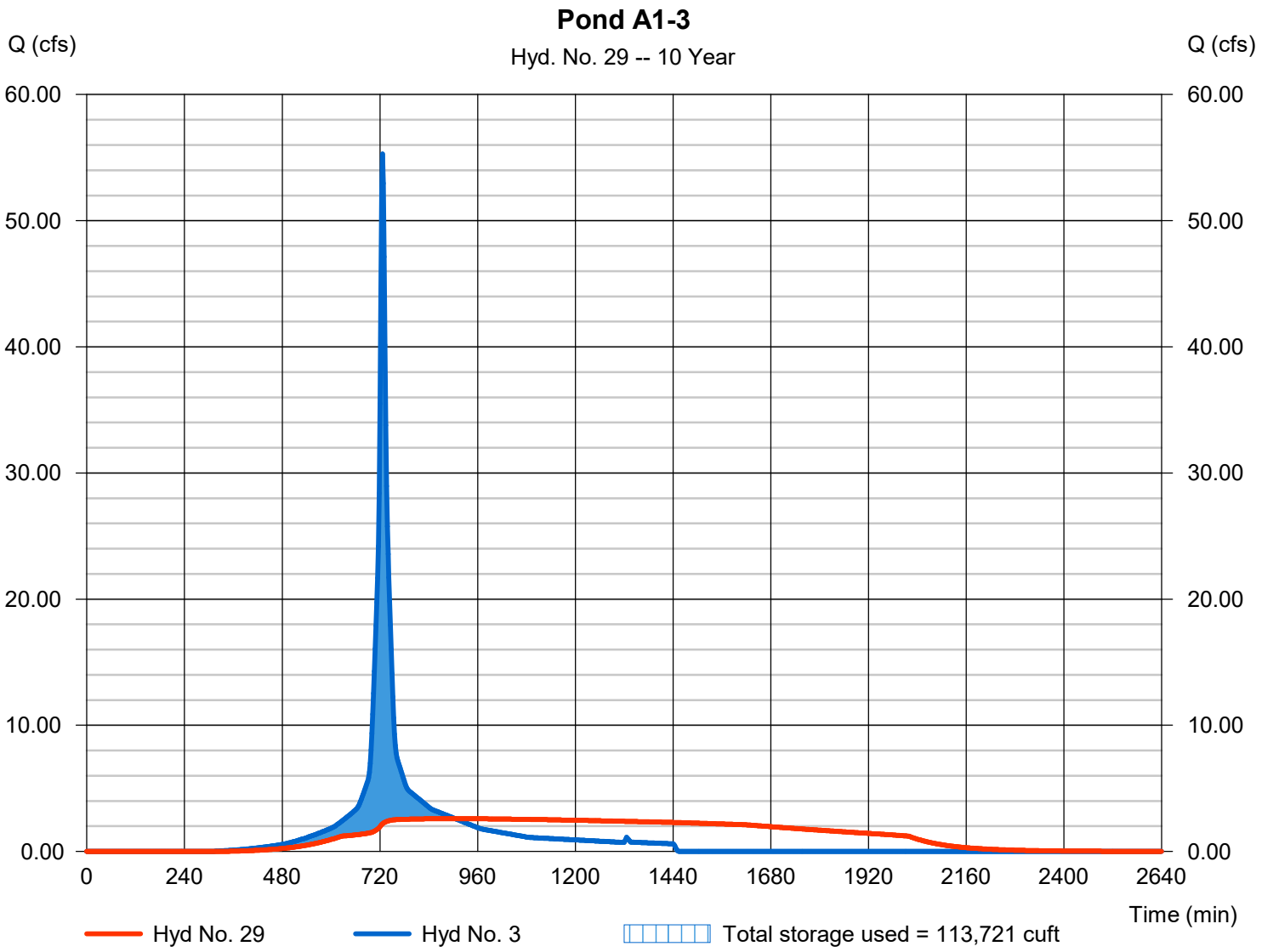
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 29

Pond A1-3

Hydrograph type	= Reservoir	Peak discharge	= 2.595 cfs
Storm frequency	= 10 yrs	Time to peak	= 904 min
Time interval	= 2 min	Hyd. volume	= 192,598 cuft
Inflow hyd. No.	= 3 - A1-3	Max. Elevation	= 133.24 ft
Reservoir name	= A1-3	Max. Storage	= 113,721 cuft

Storage Indication method used. Outflow includes exfiltration.



Hydrograph Report

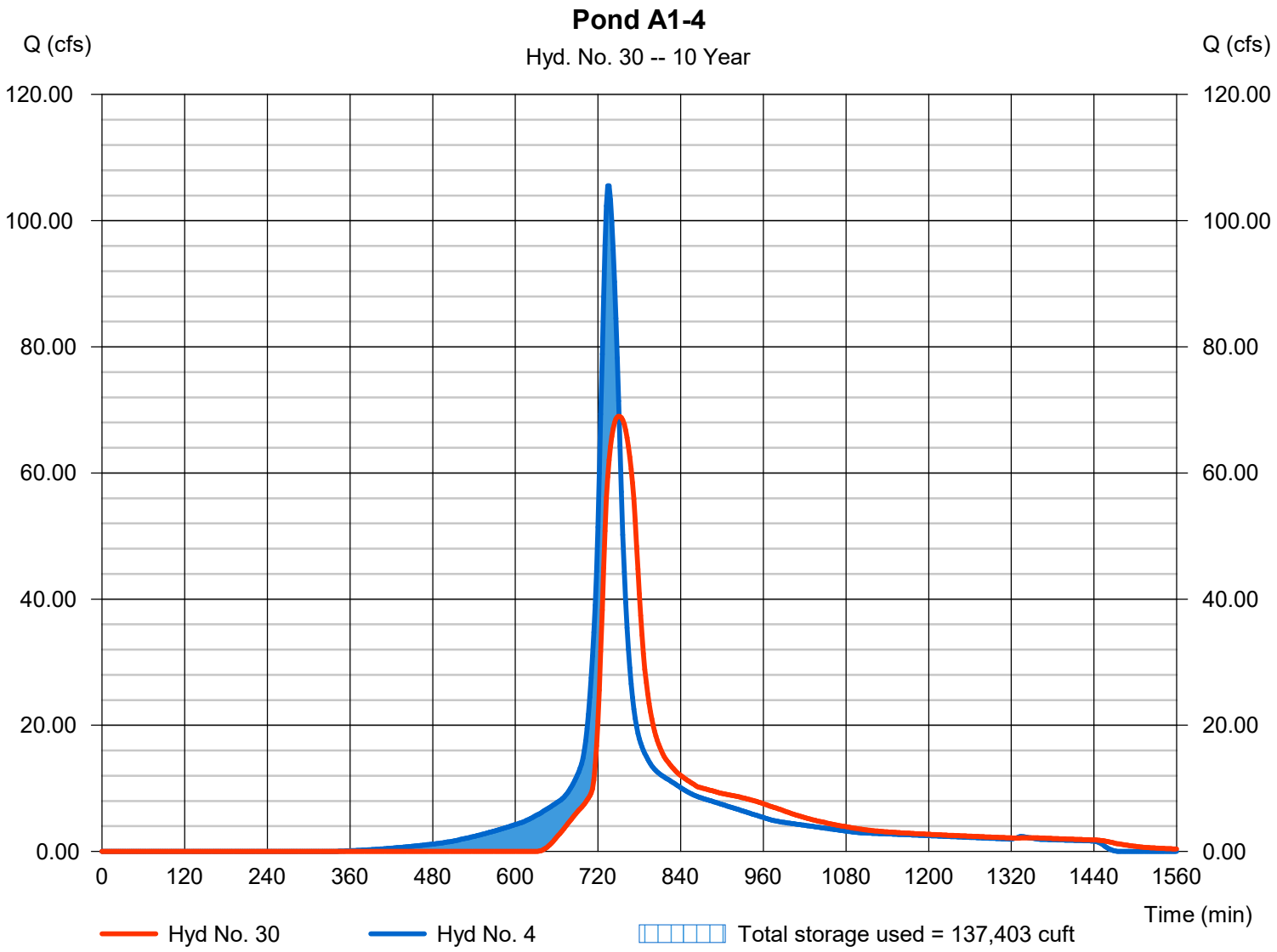
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 30

Pond A1-4

Hydrograph type	= Reservoir	Peak discharge	= 69.01 cfs
Storm frequency	= 10 yrs	Time to peak	= 750 min
Time interval	= 2 min	Hyd. volume	= 475,152 cuft
Inflow hyd. No.	= 4 - A1-4	Max. Elevation	= 137.31 ft
Reservoir name	= A1-4	Max. Storage	= 137,403 cuft

Storage Indication method used.



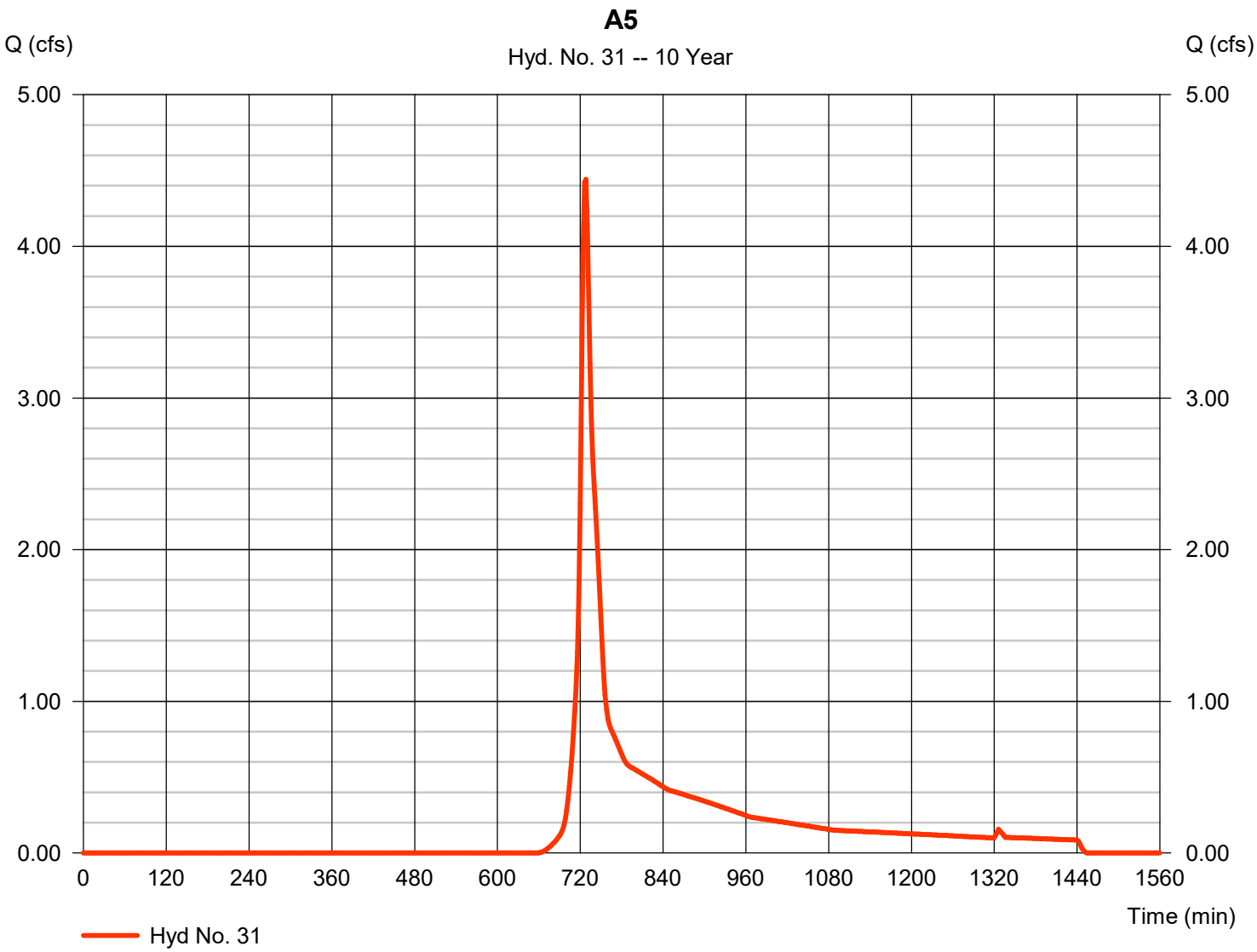
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 31

A5

Hydrograph type	= SCS Runoff	Peak discharge	= 4.443 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 16,576 cuft
Drainage area	= 3.300 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.00 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

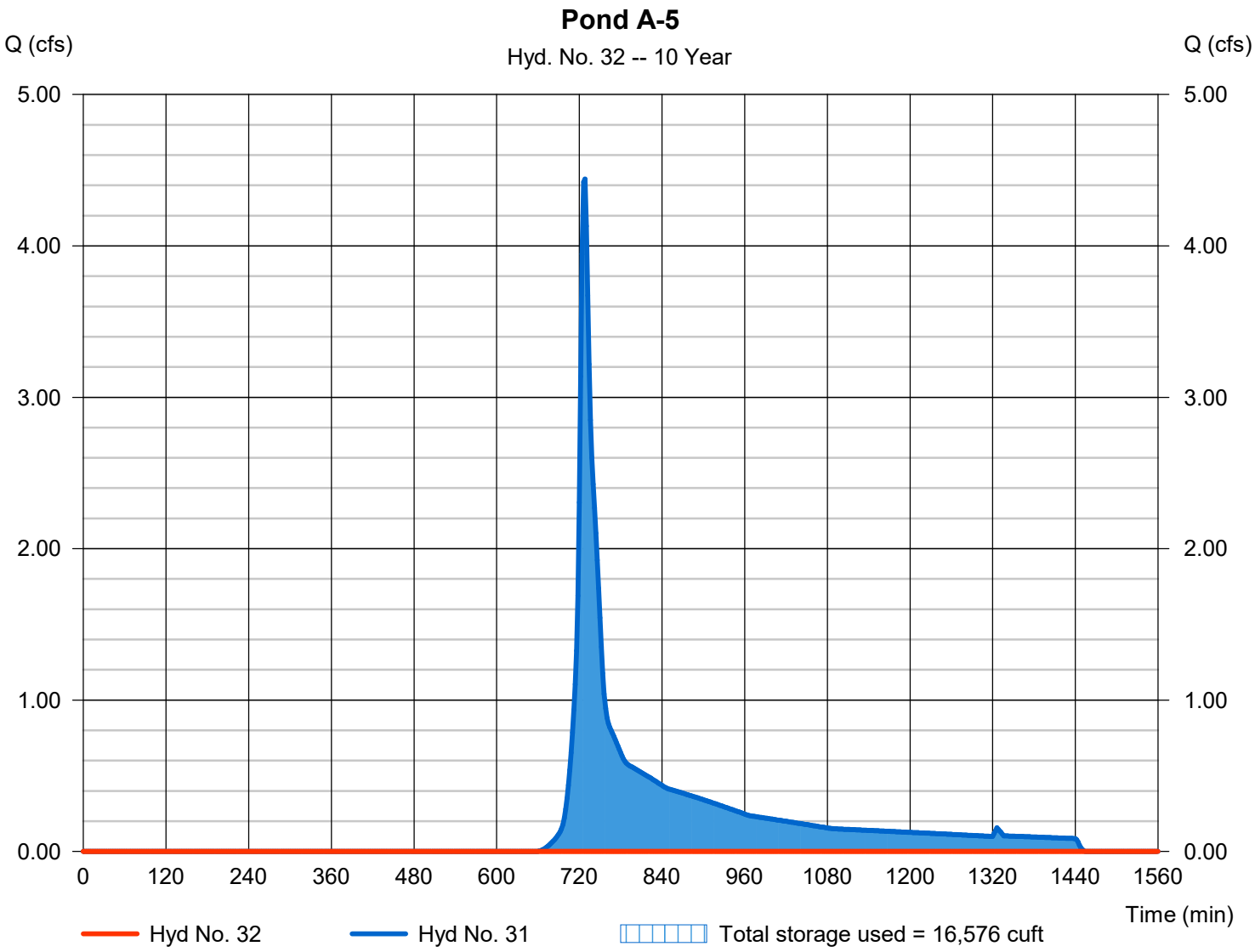
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 32

Pond A-5

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 10 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 31 - A5	Max. Elevation	= 105.92 ft
Reservoir name	= A5	Max. Storage	= 16,576 cuft

Storage Indication method used.



Hydrograph Report

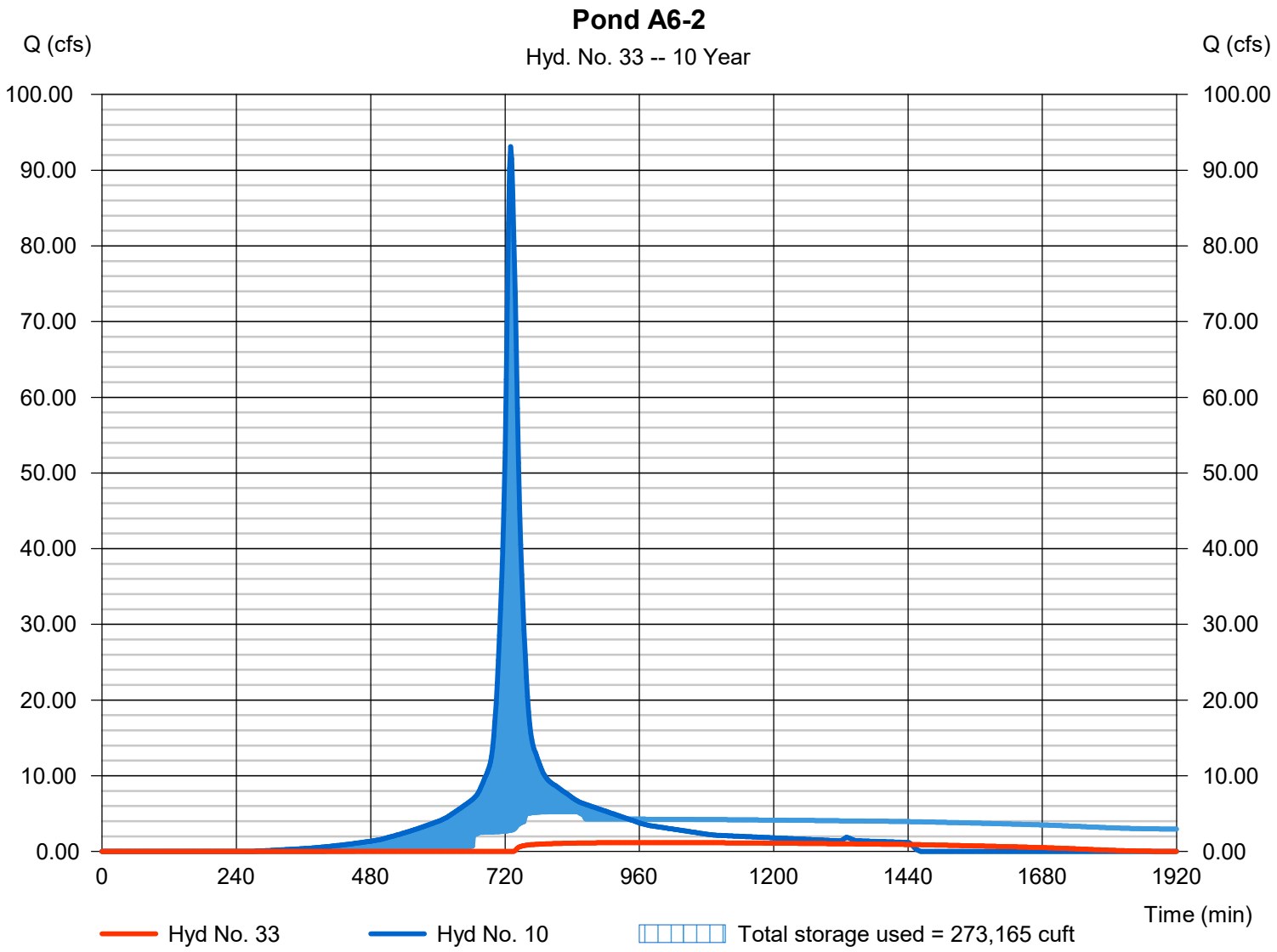
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 33

Pond A6-2

Hydrograph type	= Reservoir	Peak discharge	= 1.174 cfs
Storm frequency	= 10 yrs	Time to peak	= 974 min
Time interval	= 2 min	Hyd. volume	= 58,262 cuft
Inflow hyd. No.	= 10 - A6-2	Max. Elevation	= 117.29 ft
Reservoir name	= A6-2	Max. Storage	= 273,165 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

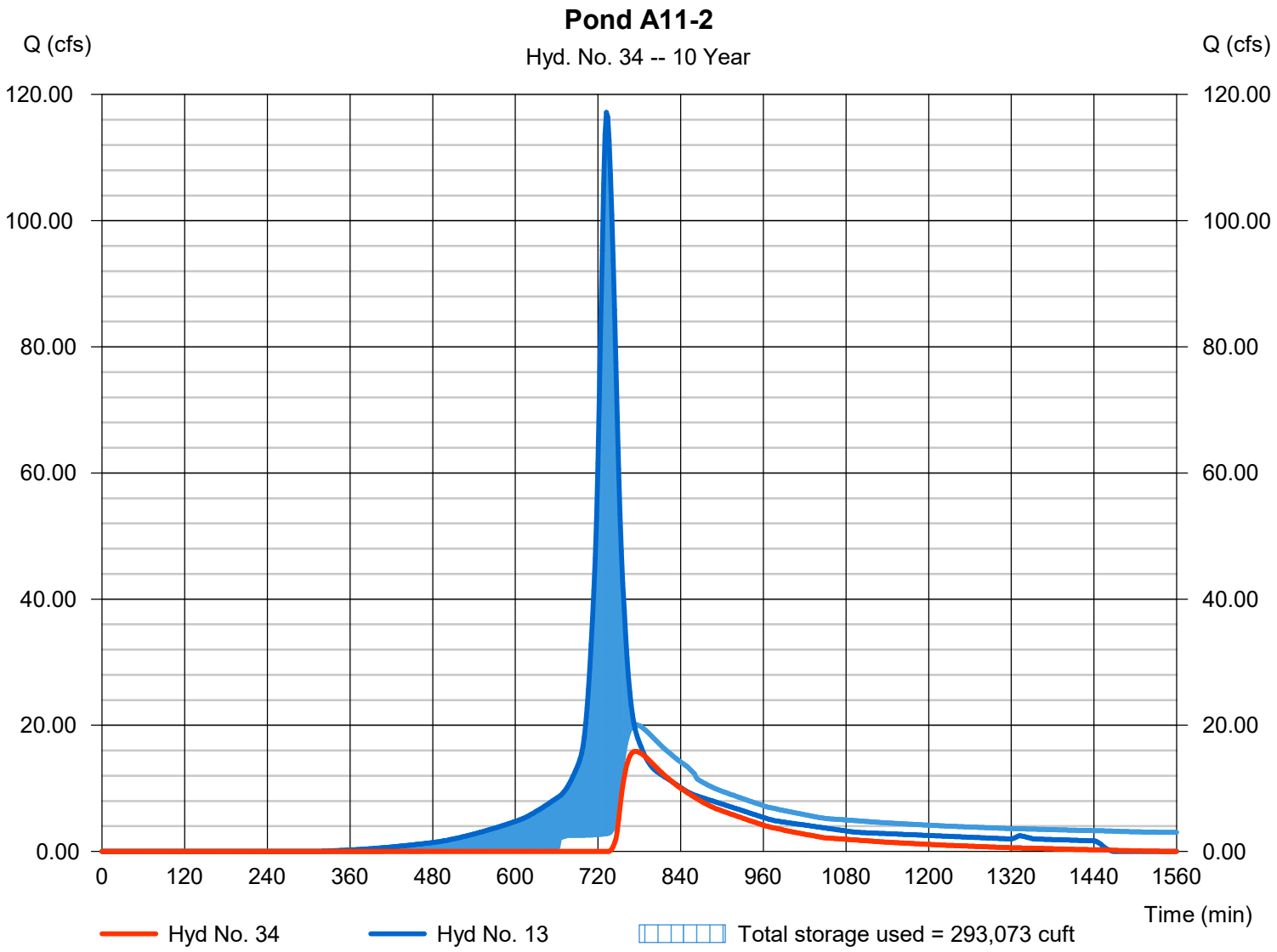
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 34

Pond A11-2

Hydrograph type	= Reservoir	Peak discharge	= 15.87 cfs
Storm frequency	= 10 yrs	Time to peak	= 774 min
Time interval	= 2 min	Hyd. volume	= 160,192 cuft
Inflow hyd. No.	= 13 - A11-2	Max. Elevation	= 117.93 ft
Reservoir name	= A11-2	Max. Storage	= 293,073 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

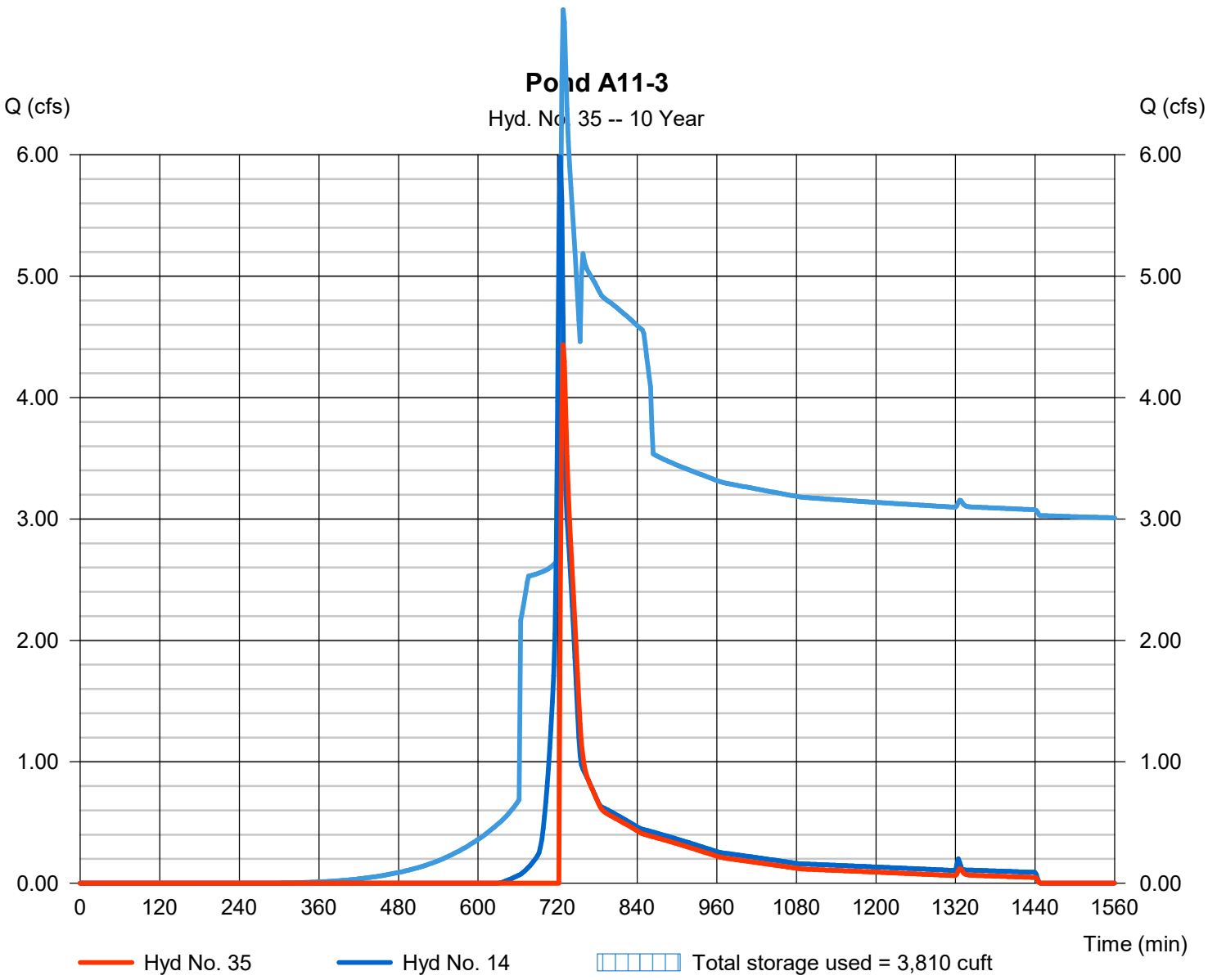
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 35

Pond A11-3

Hydrograph type	= Reservoir	Peak discharge	= 4.435 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 13,899 cuft
Inflow hyd. No.	= 14 - A11-3	Max. Elevation	= 109.56 ft
Reservoir name	= A11-3	Max. Storage	= 3,810 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



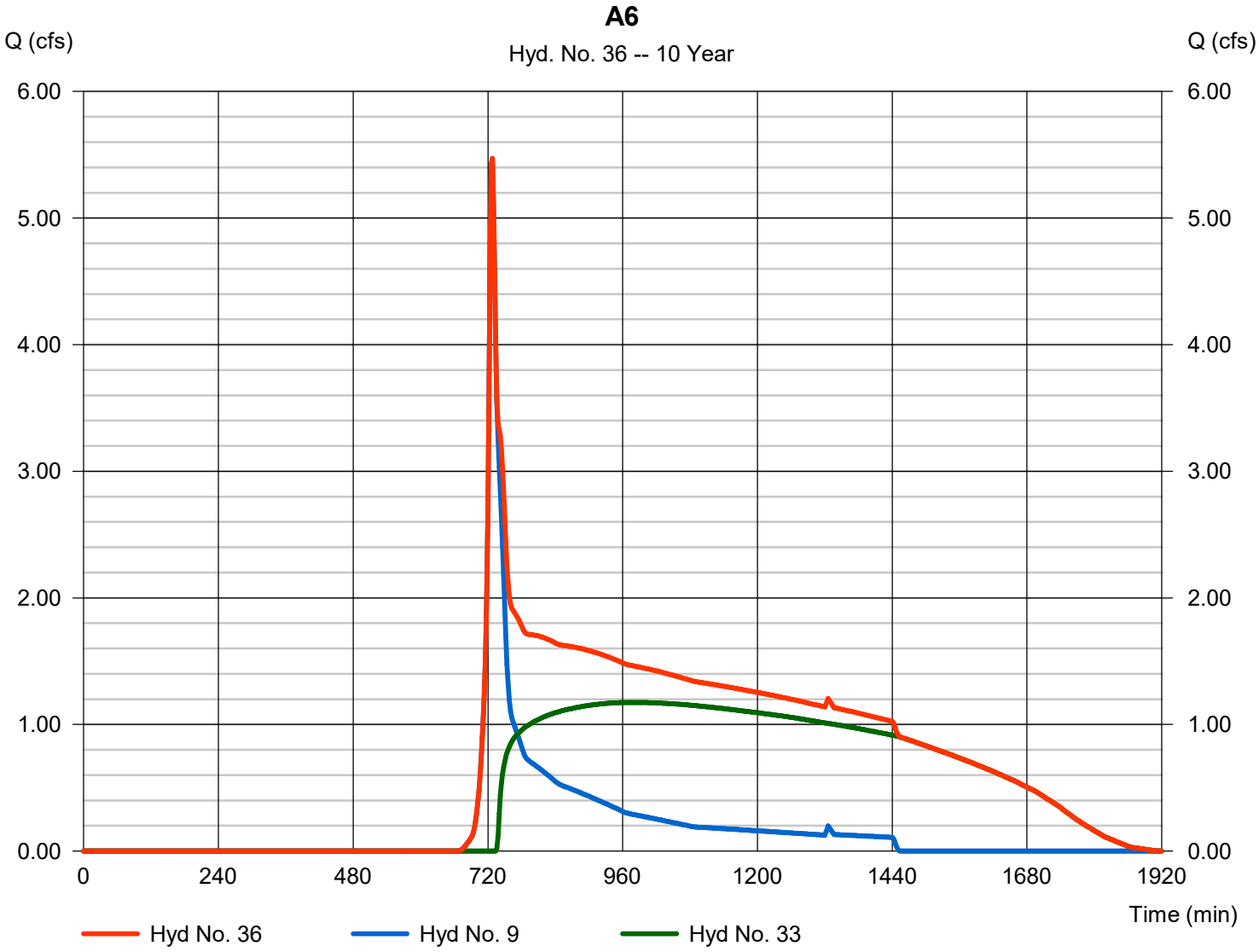
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 36

A6

Hydrograph type	= Combine	Peak discharge	= 5.470 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 78,908 cuft
Inflow hyds.	= 9, 33	Contrib. drain. area	= 4.320 ac



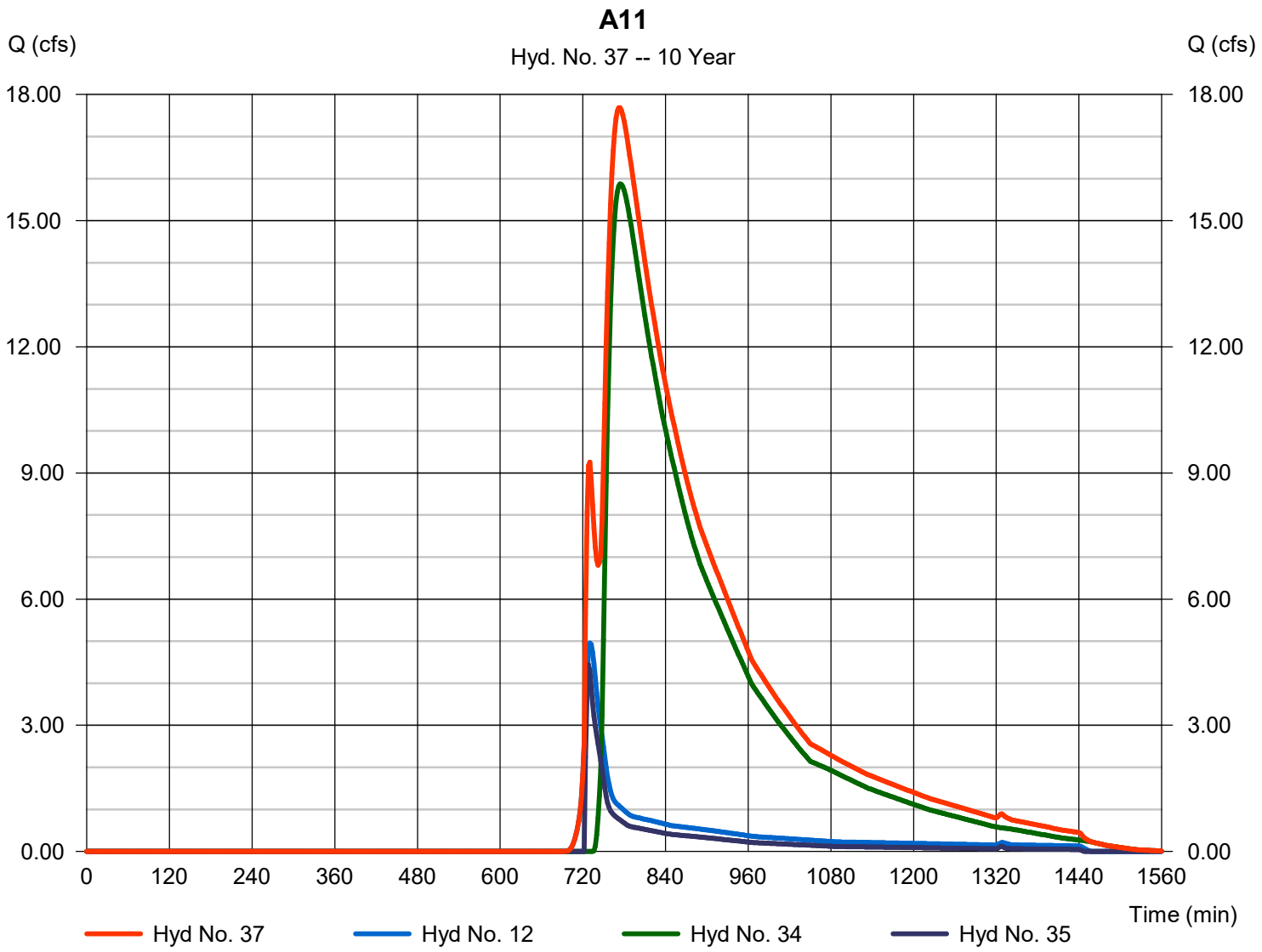
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 37

A11

Hydrograph type	= Combine	Peak discharge	= 17.69 cfs
Storm frequency	= 10 yrs	Time to peak	= 772 min
Time interval	= 2 min	Hyd. volume	= 196,561 cuft
Inflow hyds.	= 12, 34, 35	Contrib. drain. area	= 5.660 ac



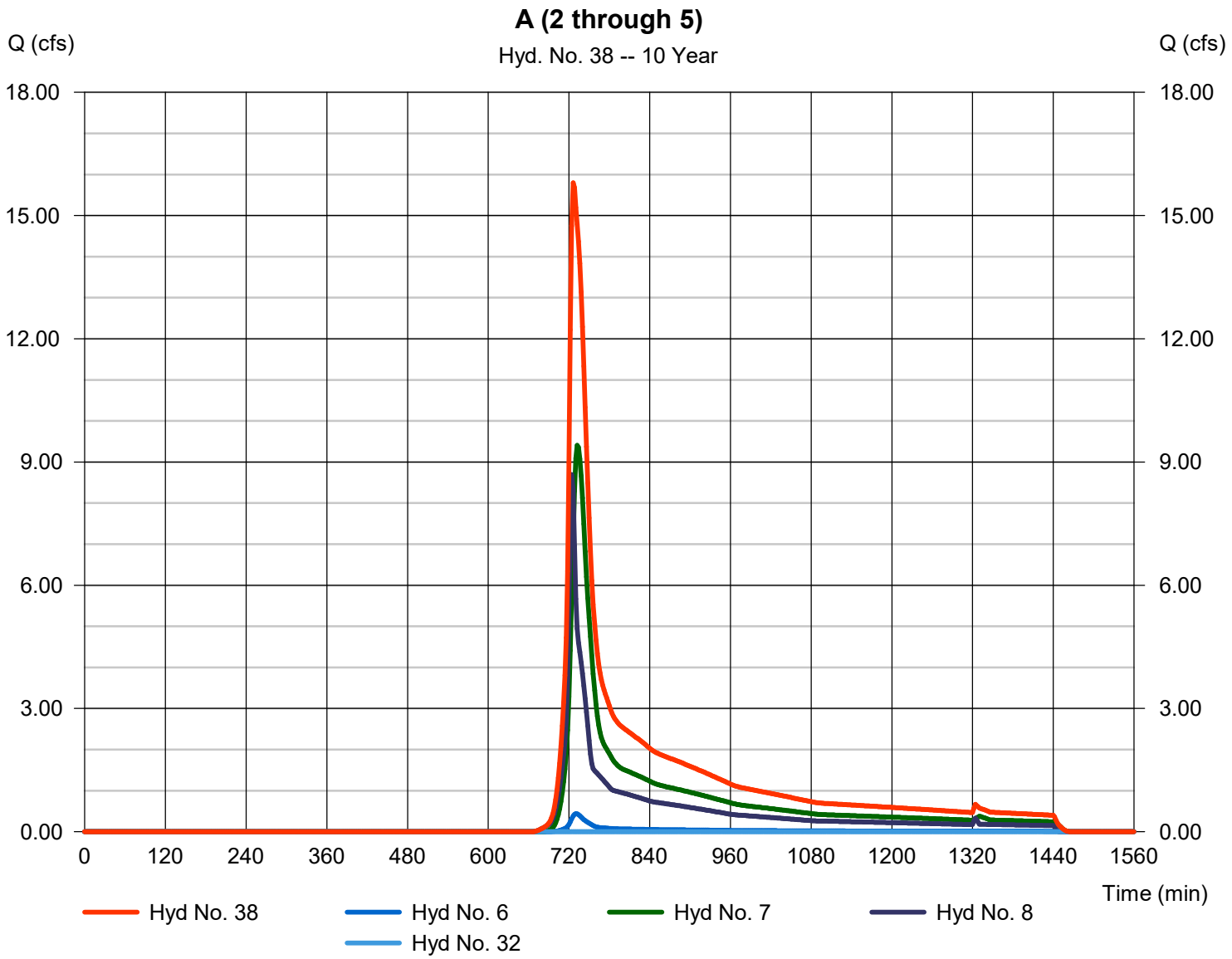
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 38

A (2 through 5)

Hydrograph type	= Combine	Peak discharge	= 15.80 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 73,850 cuft
Inflow hyds.	= 6, 7, 8, 32	Contrib. drain. area	= 17.140 ac



Hydrograph Report

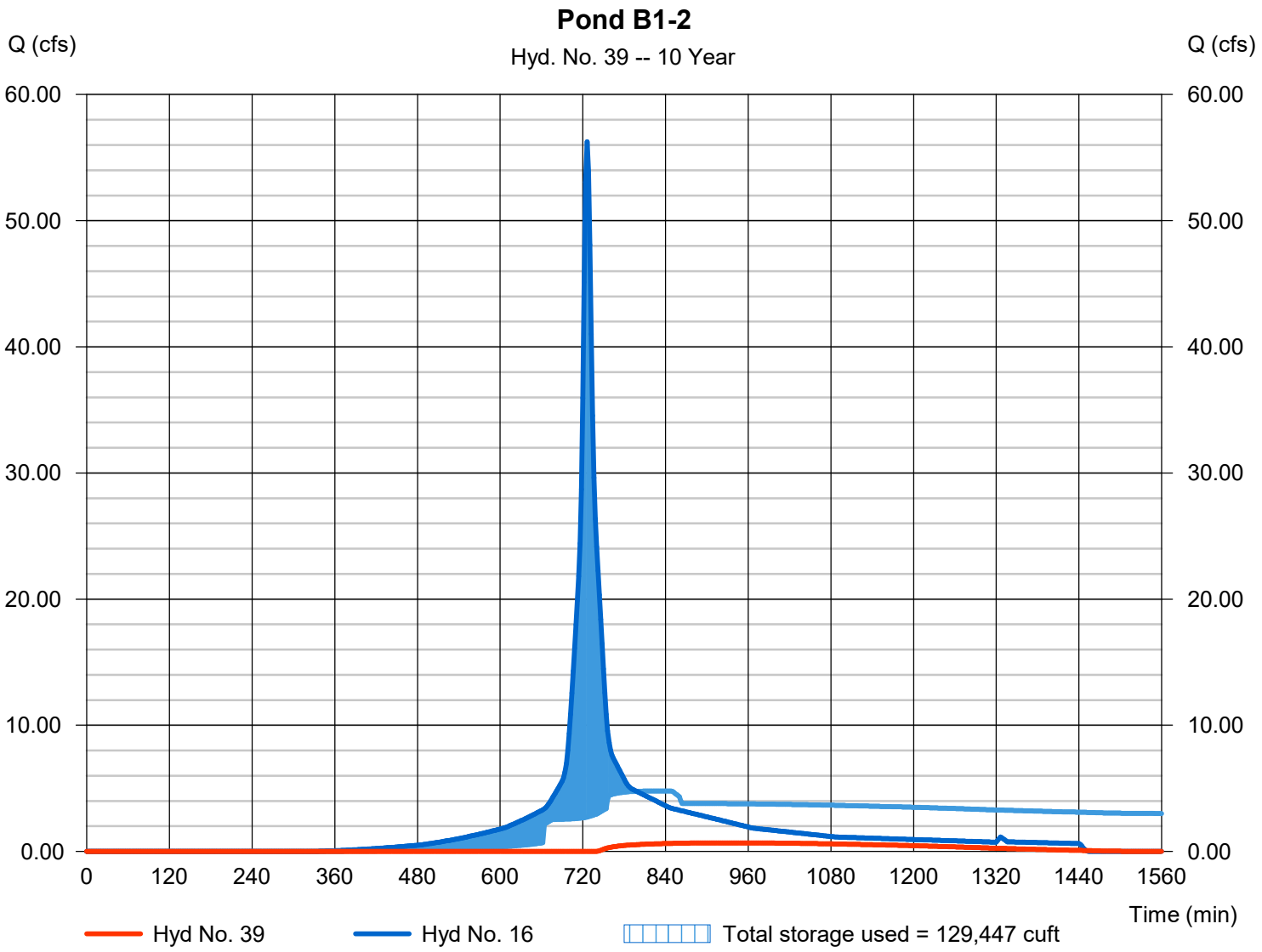
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 39

Pond B1-2

Hydrograph type	= Reservoir	Peak discharge	= 0.683 cfs
Storm frequency	= 10 yrs	Time to peak	= 934 min
Time interval	= 2 min	Hyd. volume	= 19,951 cuft
Inflow hyd. No.	= 16 - B1-2	Max. Elevation	= 132.77 ft
Reservoir name	= B1-2	Max. Storage	= 129,447 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



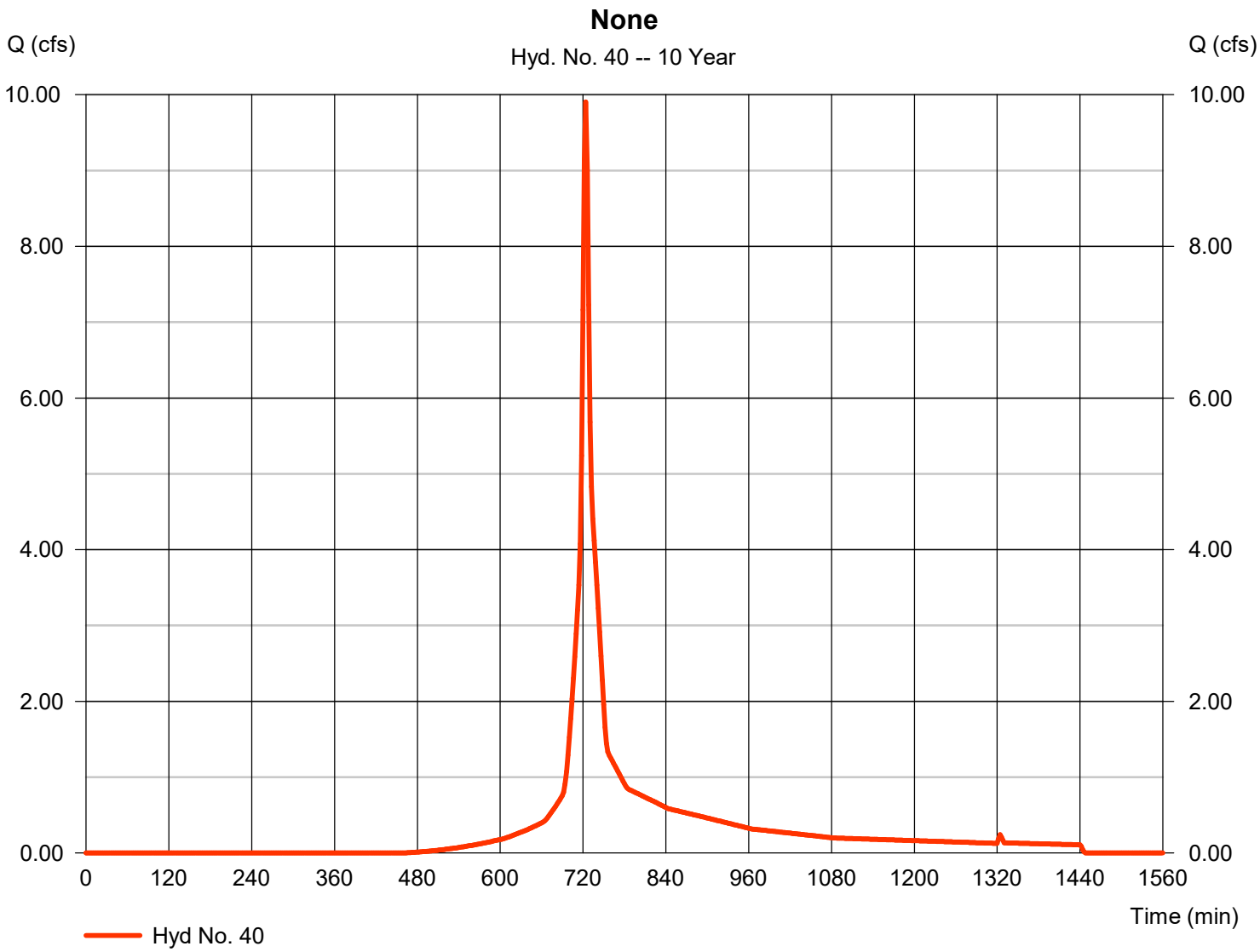
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 40

None

Hydrograph type	= SCS Runoff	Peak discharge	= 9.903 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 29,611 cuft
Drainage area	= 3.200 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

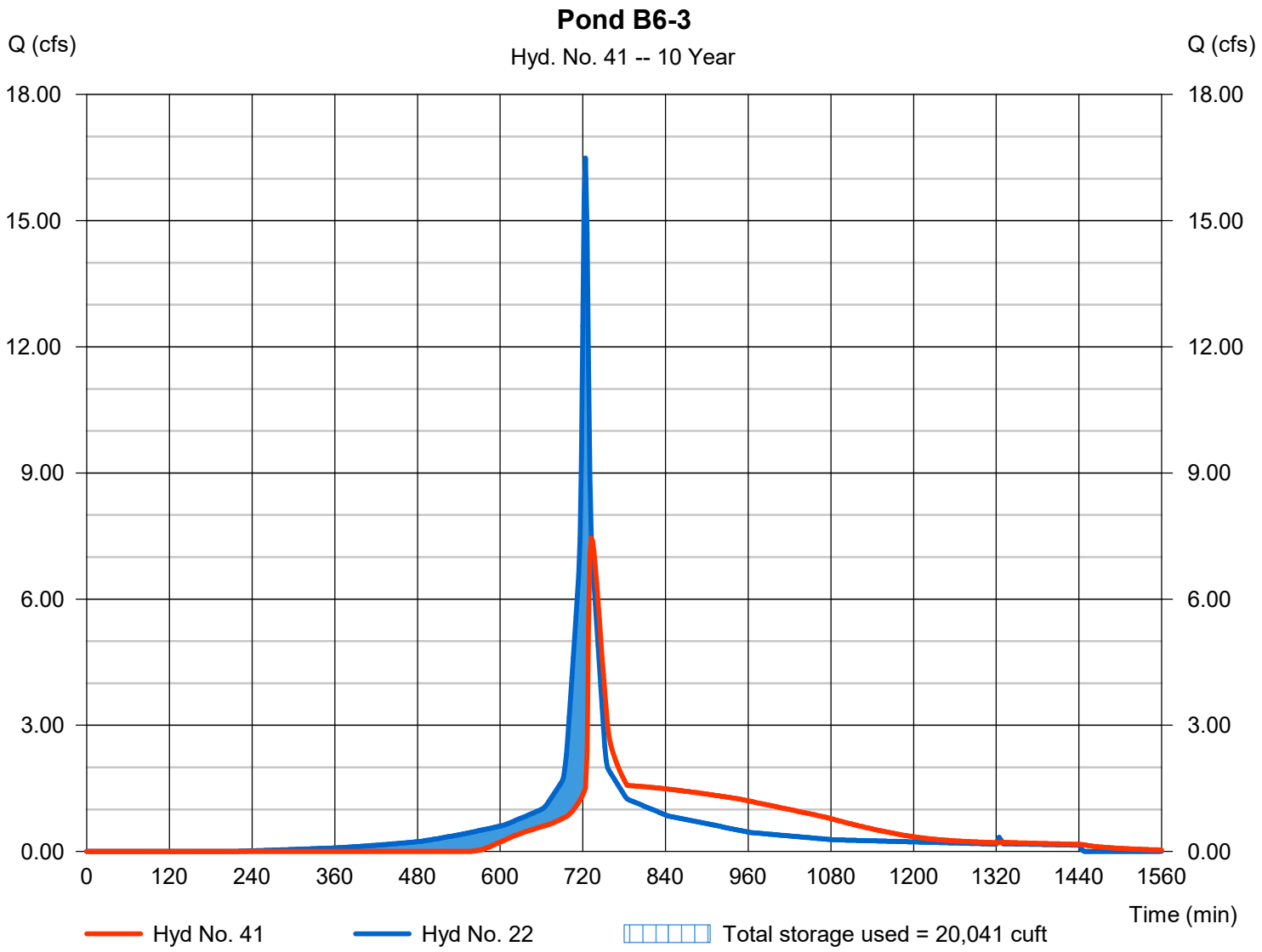
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 41

Pond B6-3

Hydrograph type	= Reservoir	Peak discharge	= 7.452 cfs
Storm frequency	= 10 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 49,078 cuft
Inflow hyd. No.	= 22 - B6-3	Max. Elevation	= 138.32 ft
Reservoir name	= B6-3	Max. Storage	= 20,041 cuft

Storage Indication method used.



Hydrograph Report

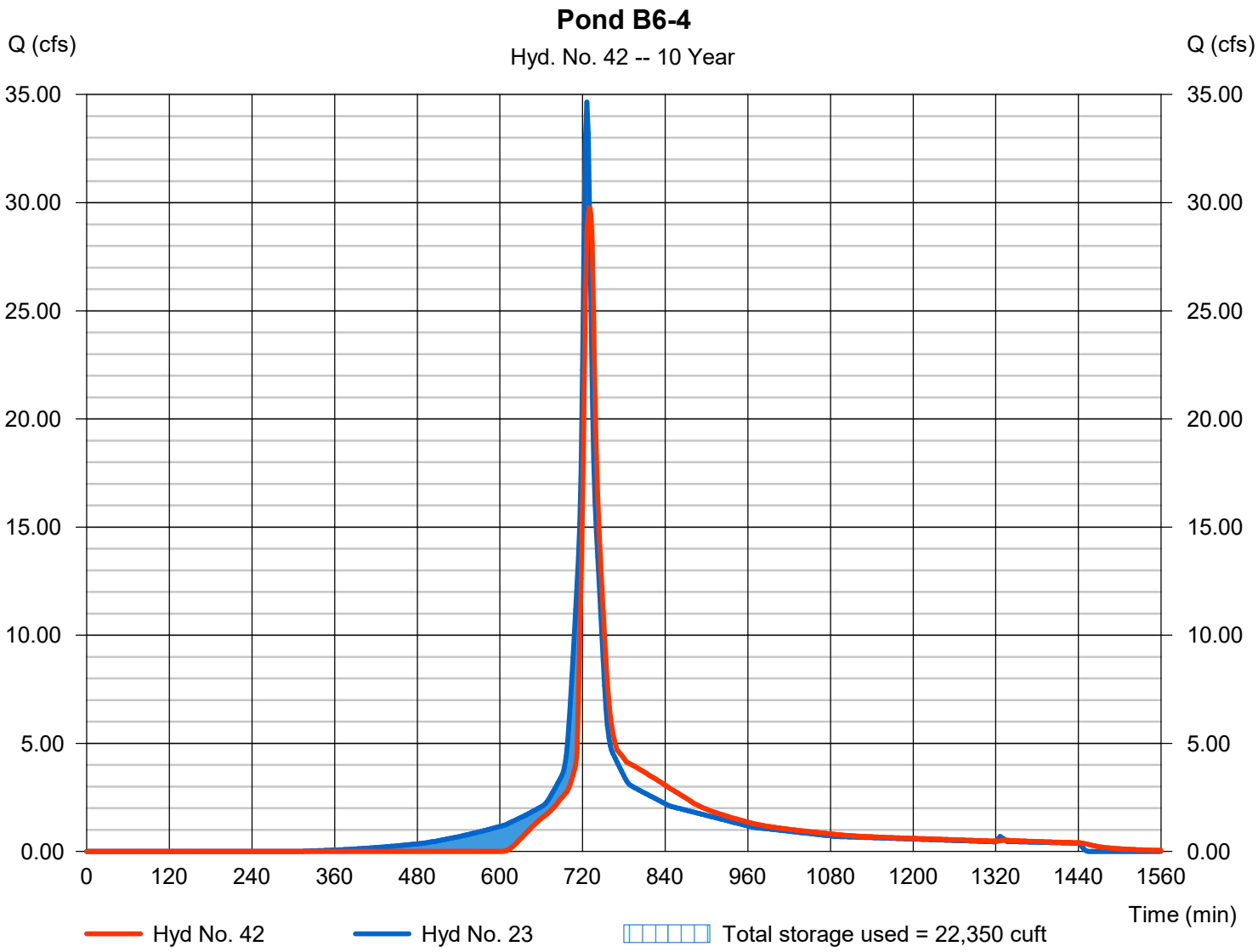
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 42

Pond B6-4

Hydrograph type	= Reservoir	Peak discharge	= 29.77 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 113,951 cuft
Inflow hyd. No.	= 23 - B6-4	Max. Elevation	= 138.70 ft
Reservoir name	= B6-4	Max. Storage	= 22,350 cuft

Storage Indication method used.



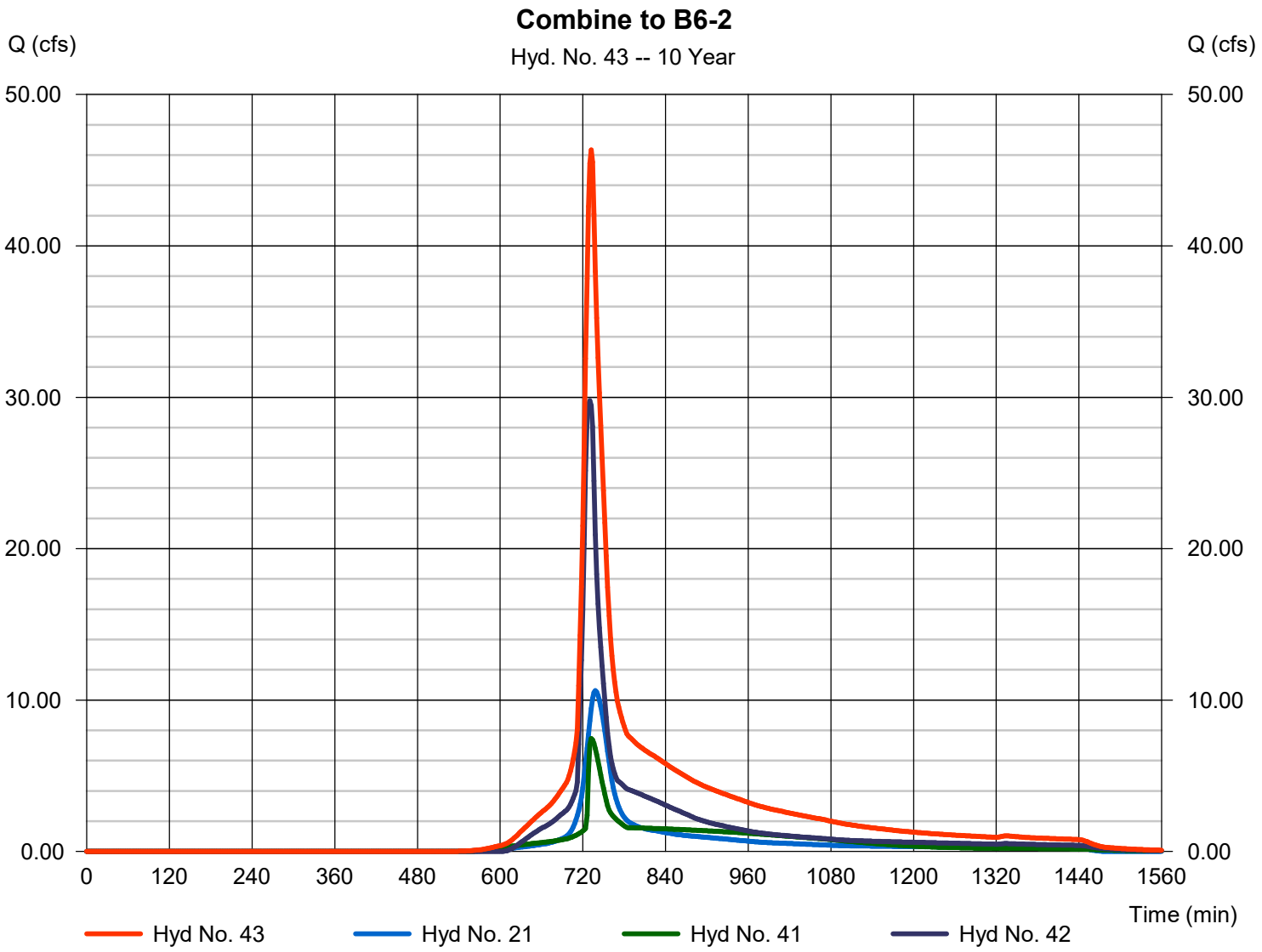
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 43

Combine to B6-2

Hydrograph type	= Combine	Peak discharge	= 46.35 cfs
Storm frequency	= 10 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 215,488 cuft
Inflow hyds.	= 21, 41, 42	Contrib. drain. area	= 6.190 ac



Hydrograph Report

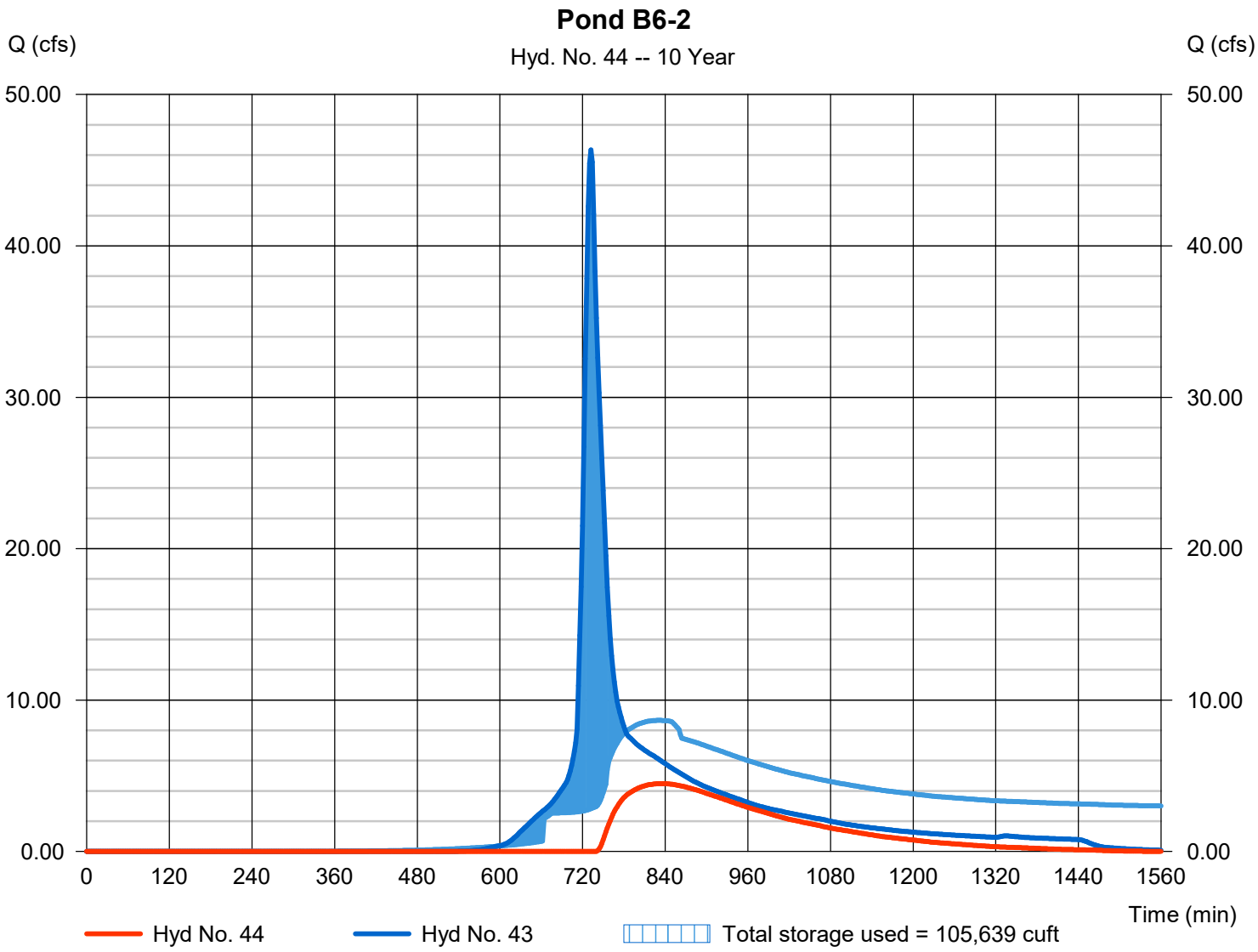
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 44

Pond B6-2

Hydrograph type	= Reservoir	Peak discharge	= 4.484 cfs
Storm frequency	= 10 yrs	Time to peak	= 834 min
Time interval	= 2 min	Hyd. volume	= 76,194 cuft
Inflow hyd. No.	= 43 - Combine to B6-2	Max. Elevation	= 133.06 ft
Reservoir name	= B6-2	Max. Storage	= 105,639 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

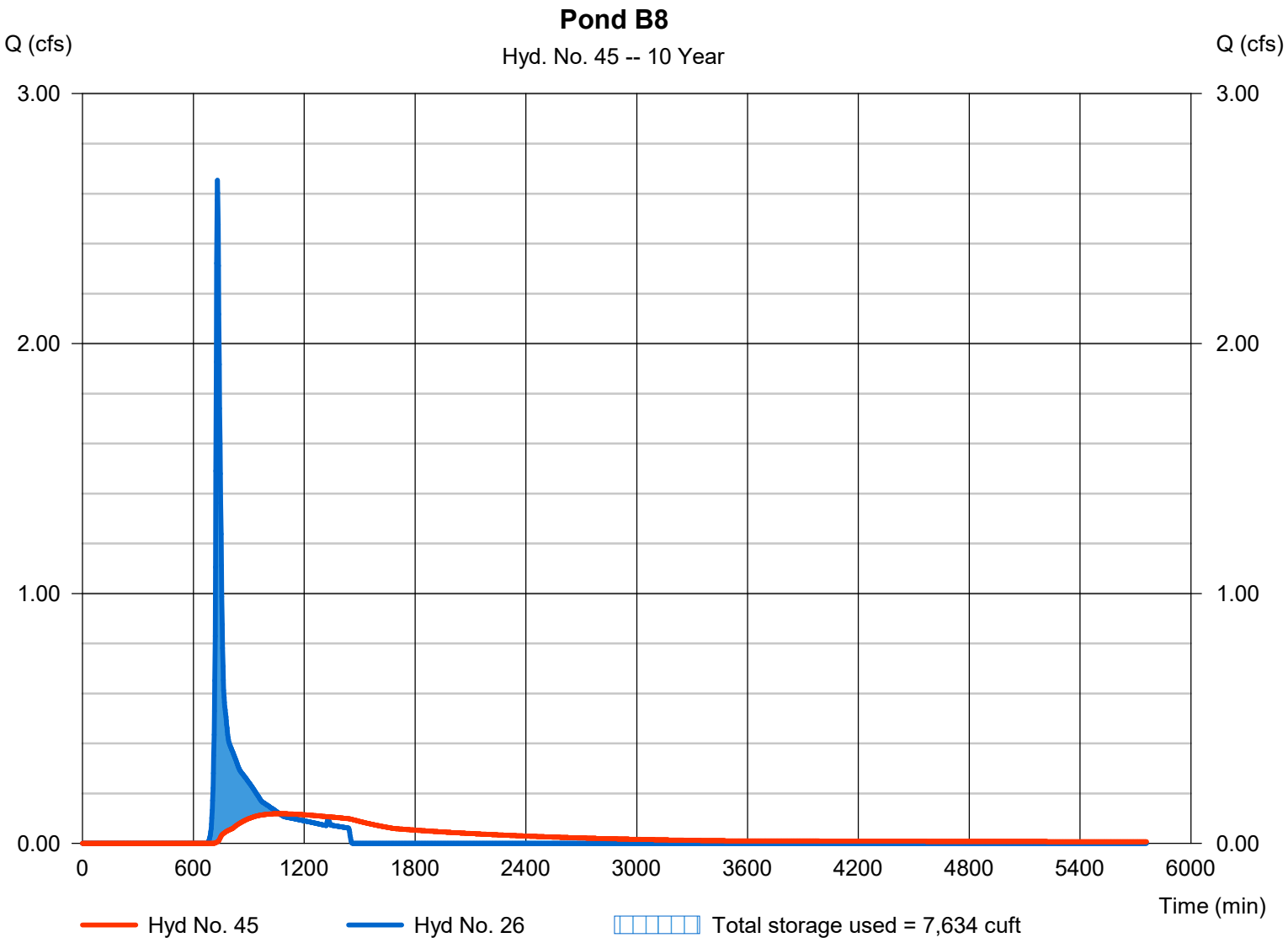
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 45

Pond B8

Hydrograph type	= Reservoir	Peak discharge	= 0.119 cfs
Storm frequency	= 10 yrs	Time to peak	= 1066 min
Time interval	= 2 min	Hyd. volume	= 9,517 cuft
Inflow hyd. No.	= 26 - B8	Max. Elevation	= 132.26 ft
Reservoir name	= B8	Max. Storage	= 7,634 cuft

Storage Indication method used.



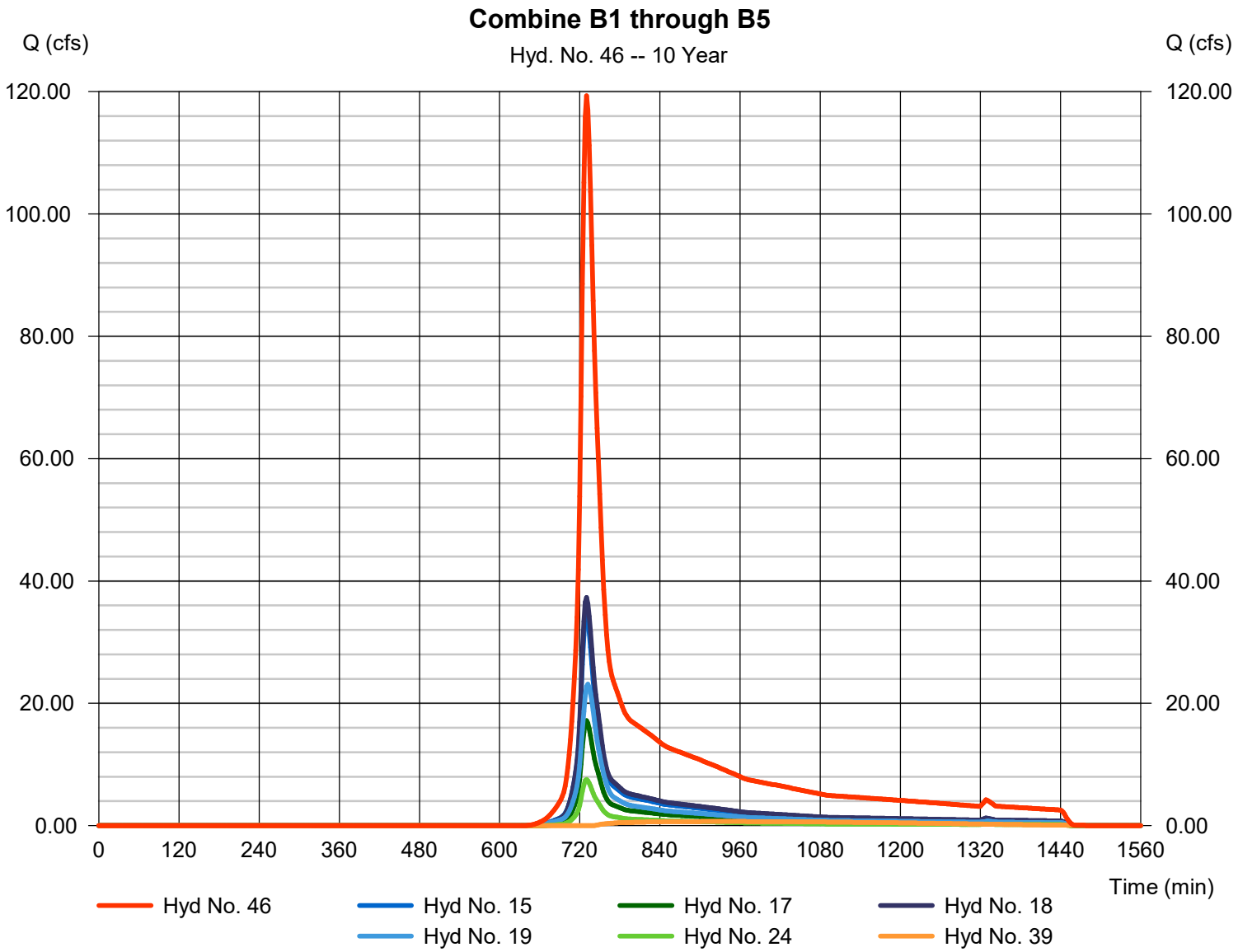
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 46

Combine B1 through B5

Hydrograph type	= Combine	Peak discharge	= 119.32 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 514,975 cuft
Inflow hyds.	= 15, 17, 18, 19, 24, 39	Contrib. drain. area	= 90.160 ac



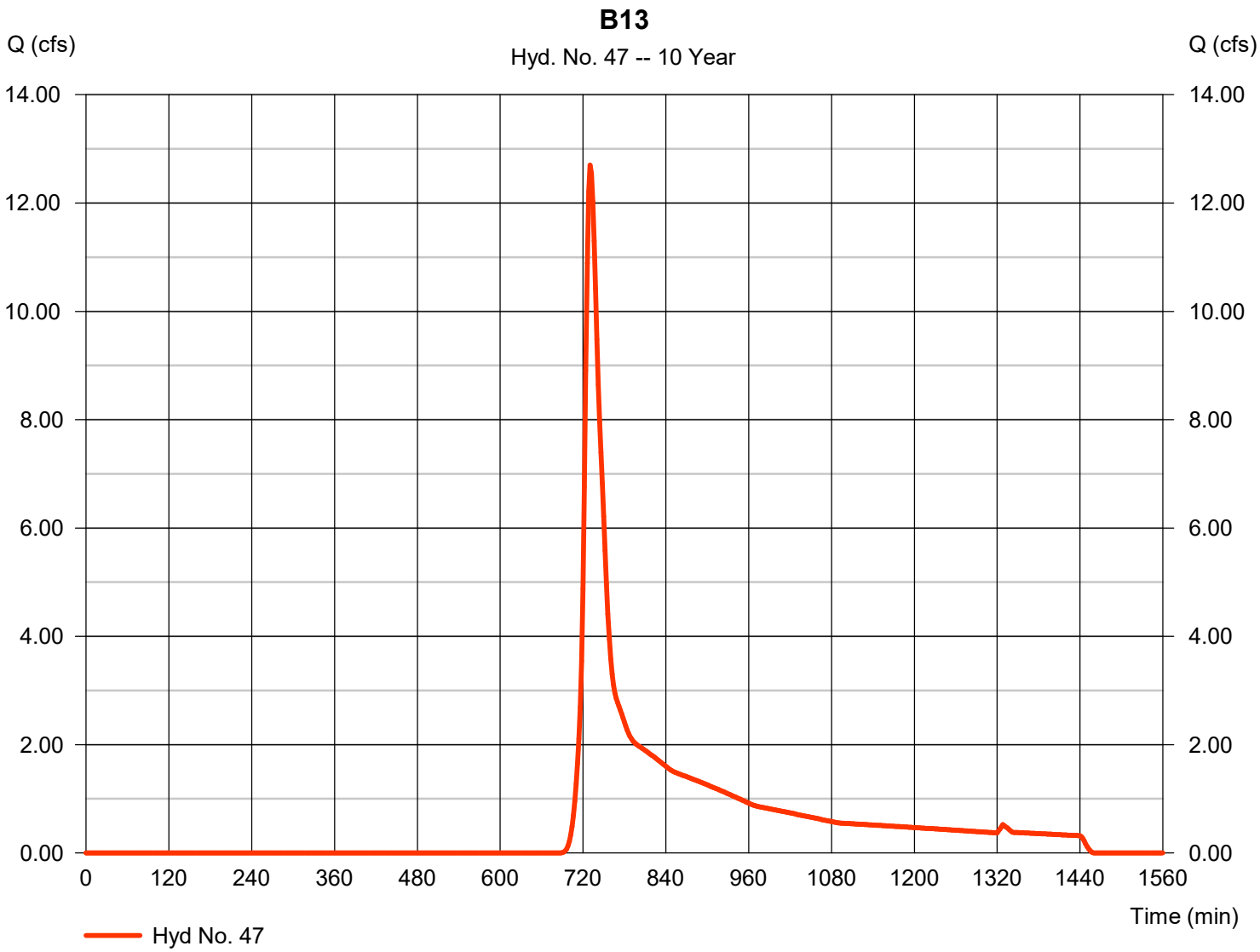
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 47

B13

Hydrograph type	= SCS Runoff	Peak discharge	= 12.70 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 56,269 cuft
Drainage area	= 13.390 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.40 min
Total precip.	= 4.80 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



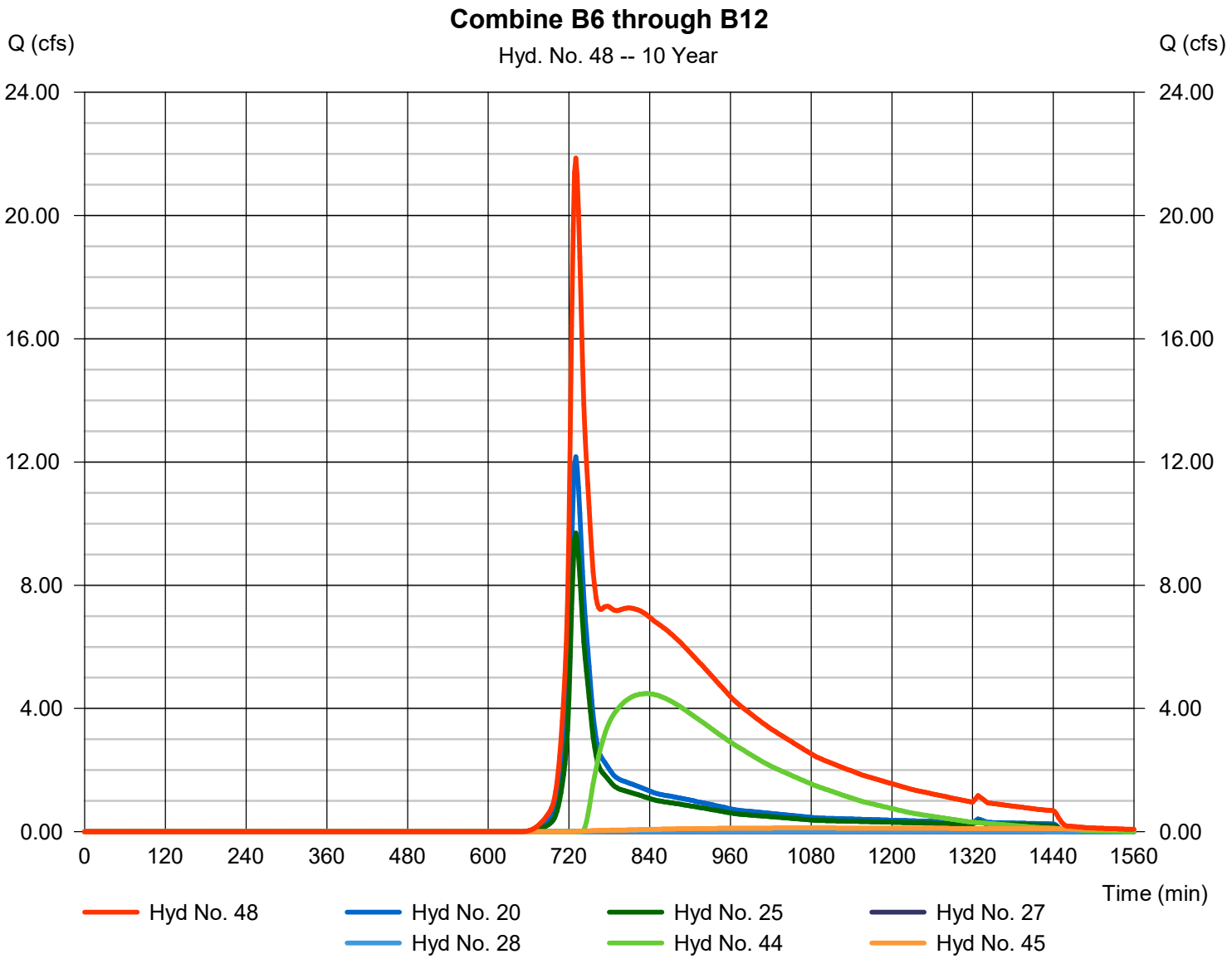
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 48

Combine B6 through B12

Hydrograph type	= Combine	Peak discharge	= 21.87 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 176,356 cuft
Inflow hyds.	= 20, 25, 27, 28, 44, 45	Contrib. drain. area	= 18.740 ac



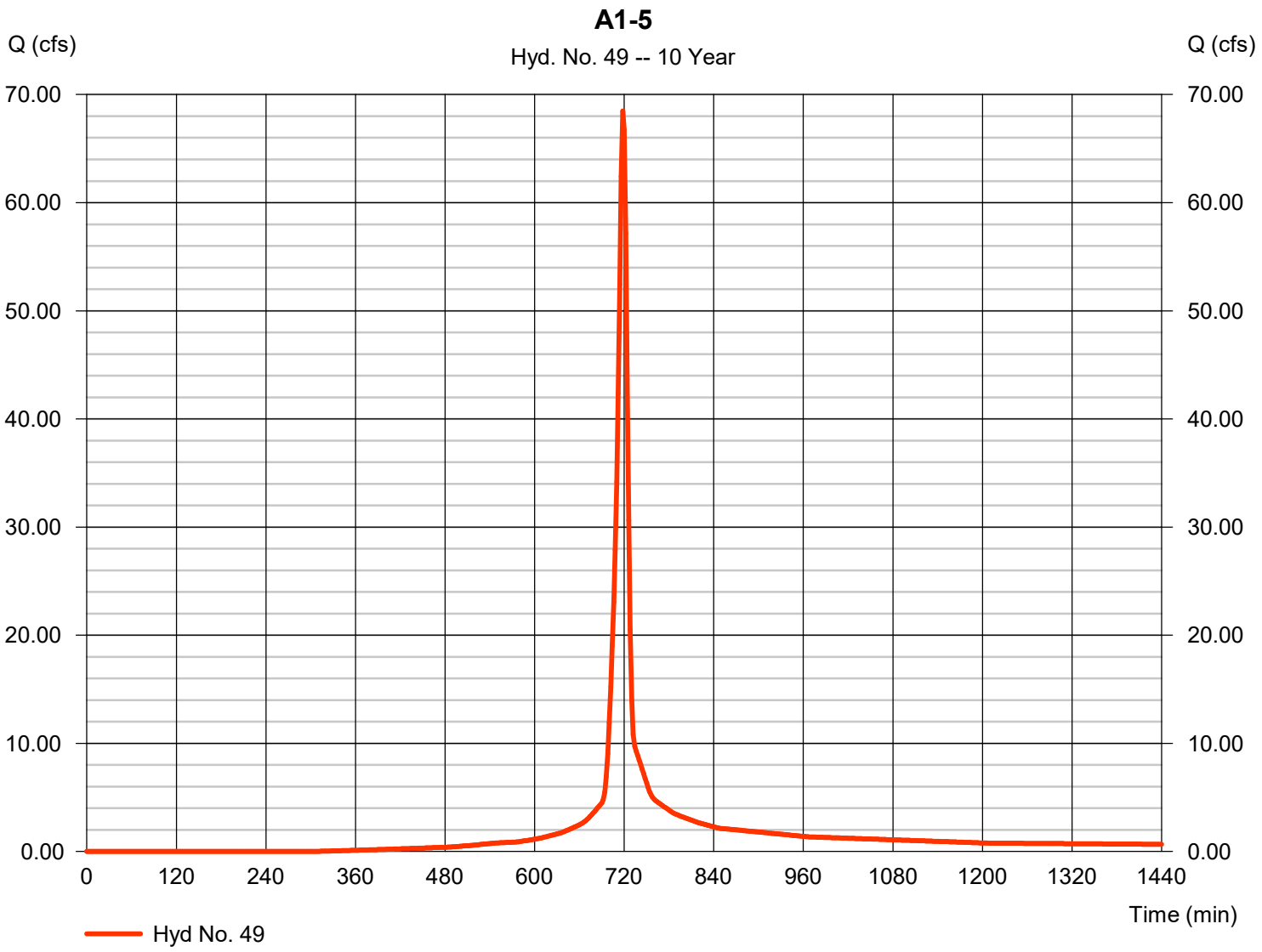
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 49

A1-5

Hydrograph type	= SCS Runoff	Peak discharge	= 68.49 cfs
Storm frequency	= 10 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 160,942 cuft
Drainage area	= 13.120 ac	Curve number	= 87
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.00 min
Total precip.	= 4.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

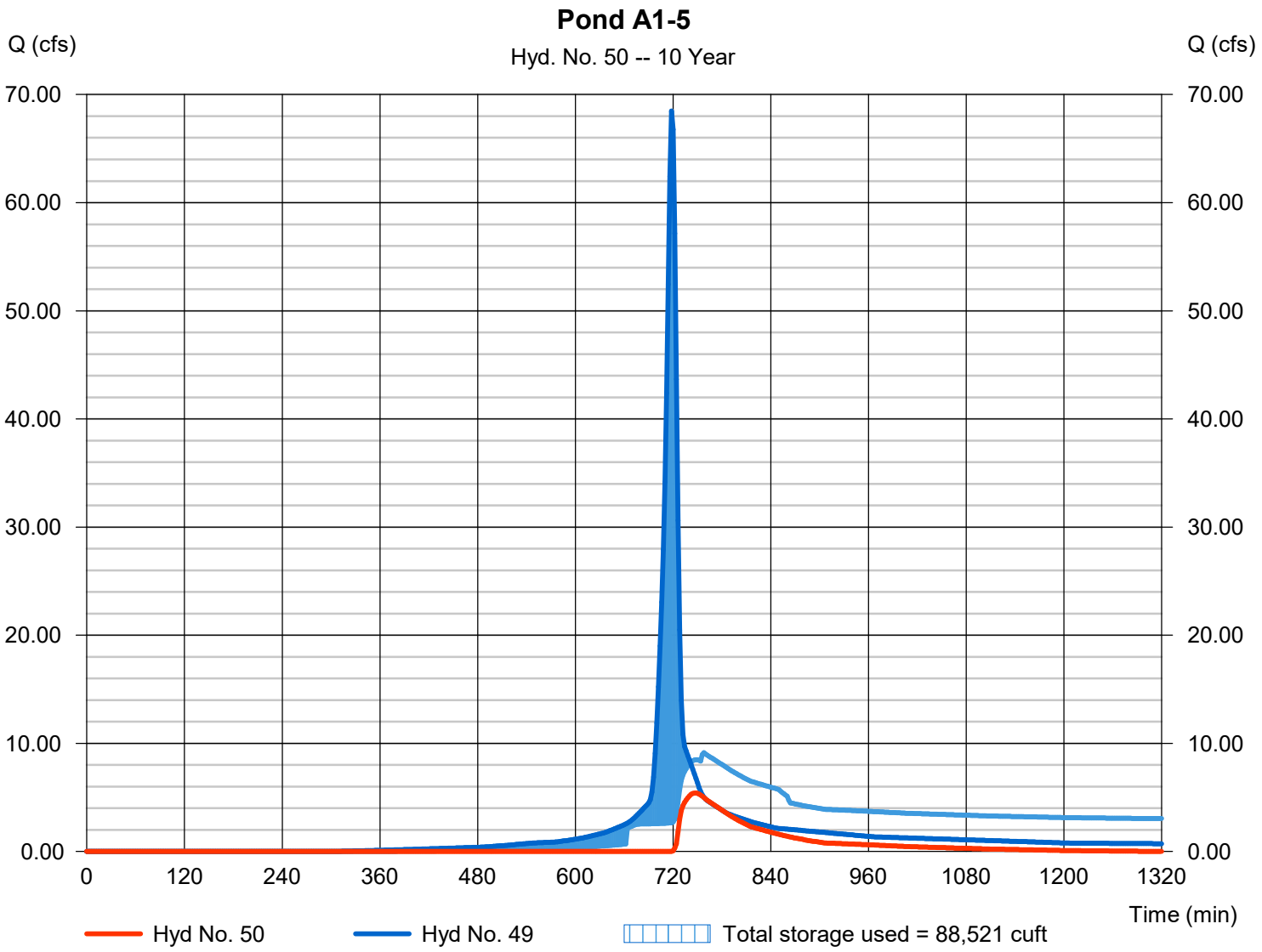
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 50

Pond A1-5

Hydrograph type	= Reservoir	Peak discharge	= 5.403 cfs
Storm frequency	= 10 yrs	Time to peak	= 748 min
Time interval	= 2 min	Hyd. volume	= 36,404 cuft
Inflow hyd. No.	= 49 - A1-5	Max. Elevation	= 135.22 ft
Reservoir name	= A1-5	Max. Storage	= 88,521 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



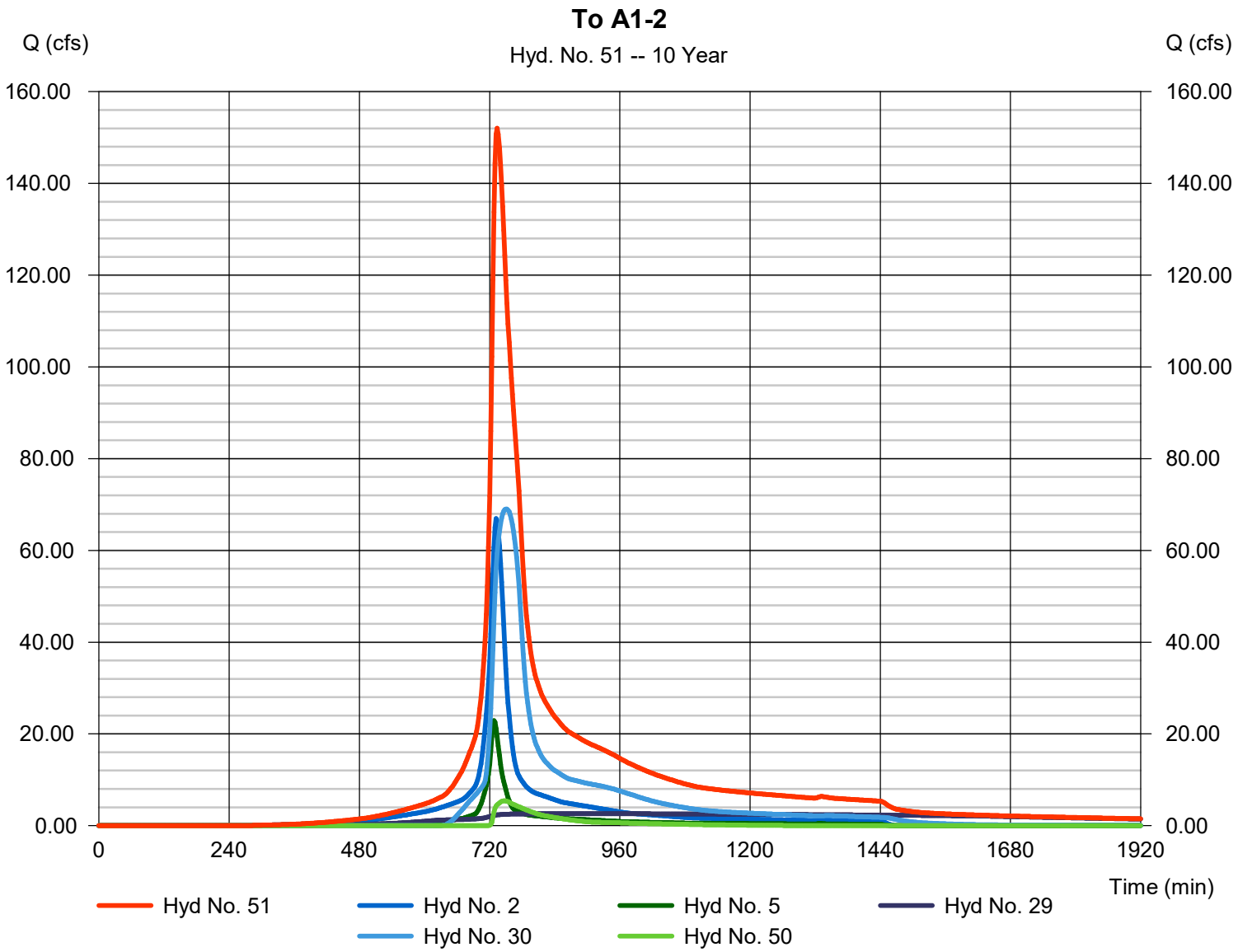
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 51

To A1-2

Hydrograph type	= Combine	Peak discharge	= 152.01 cfs
Storm frequency	= 10 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 1,096,376 cuft
Inflow hyds.	= 2, 5, 29, 30, 50	Contrib. drain. area	= 29.920 ac



Hydrograph Report

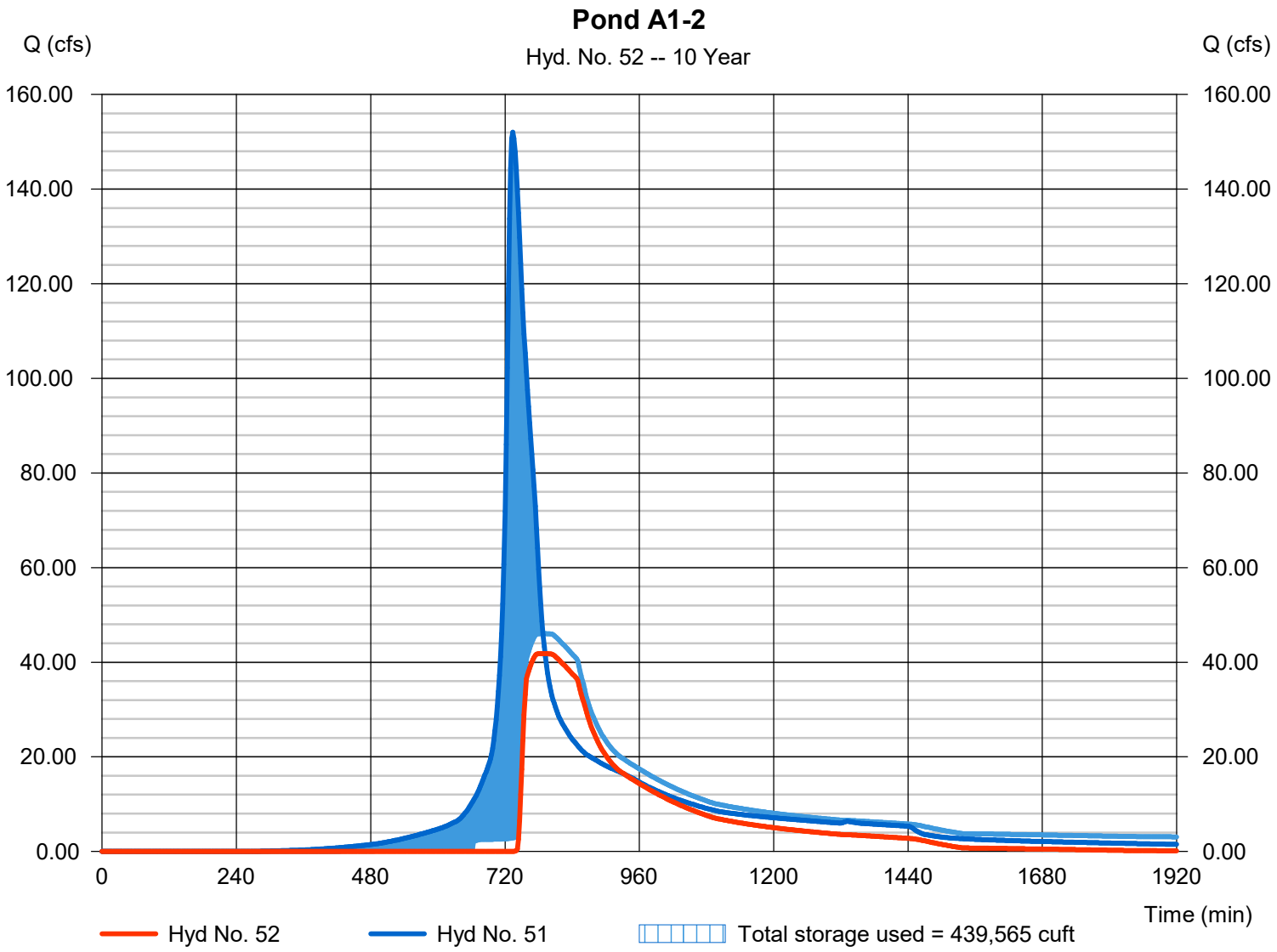
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 52

Pond A1-2

Hydrograph type	= Reservoir	Peak discharge	= 41.82 cfs
Storm frequency	= 10 yrs	Time to peak	= 788 min
Time interval	= 2 min	Hyd. volume	= 574,291 cuft
Inflow hyd. No.	= 51 - To A1-2	Max. Elevation	= 125.41 ft
Reservoir name	= A1-2	Max. Storage	= 439,565 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



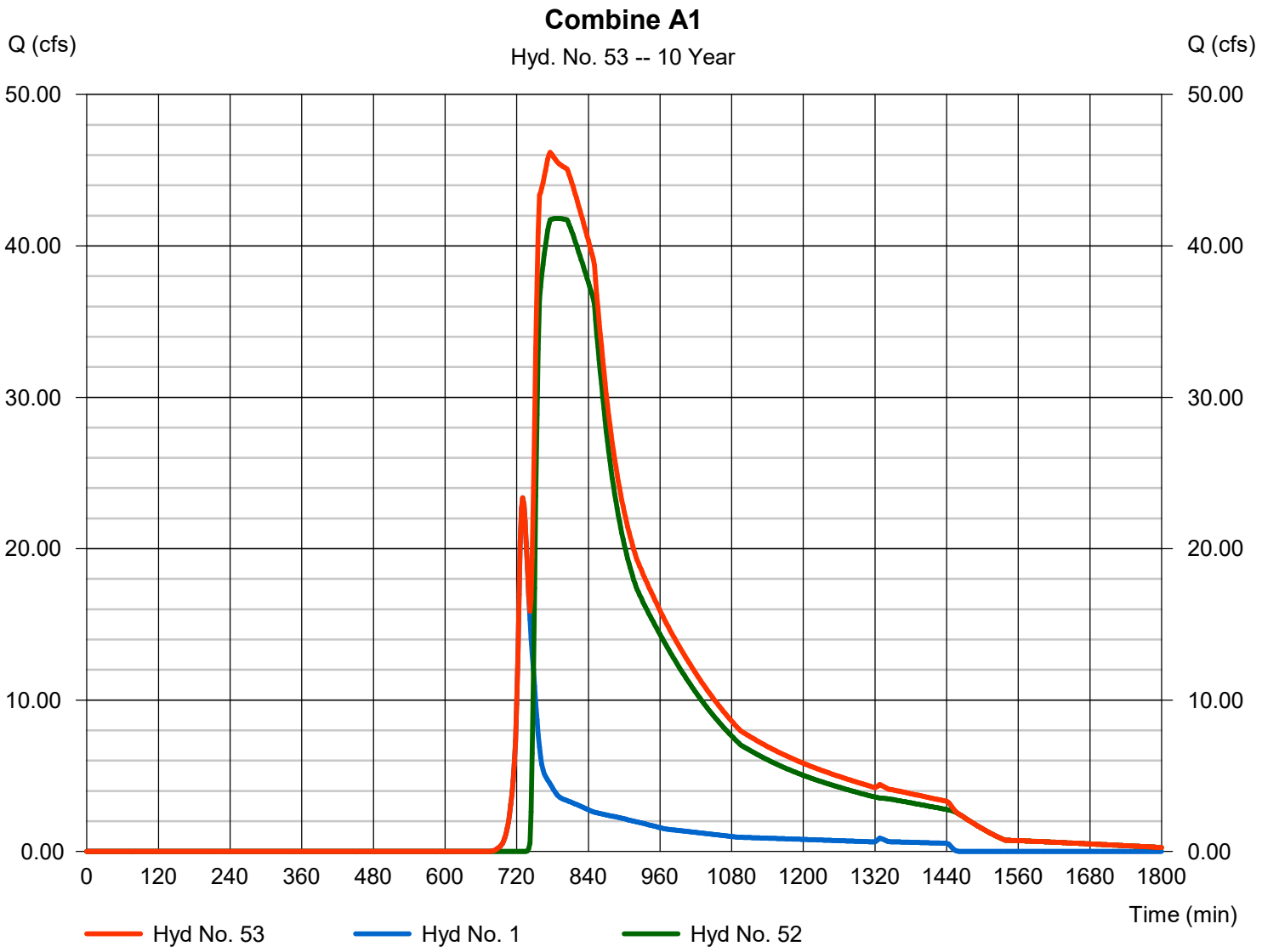
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 53

Combine A1

Hydrograph type	= Combine	Peak discharge	= 46.18 cfs
Storm frequency	= 10 yrs	Time to peak	= 776 min
Time interval	= 2 min	Hyd. volume	= 674,056 cuft
Inflow hyds.	= 1, 52	Contrib. drain. area	= 21.310 ac



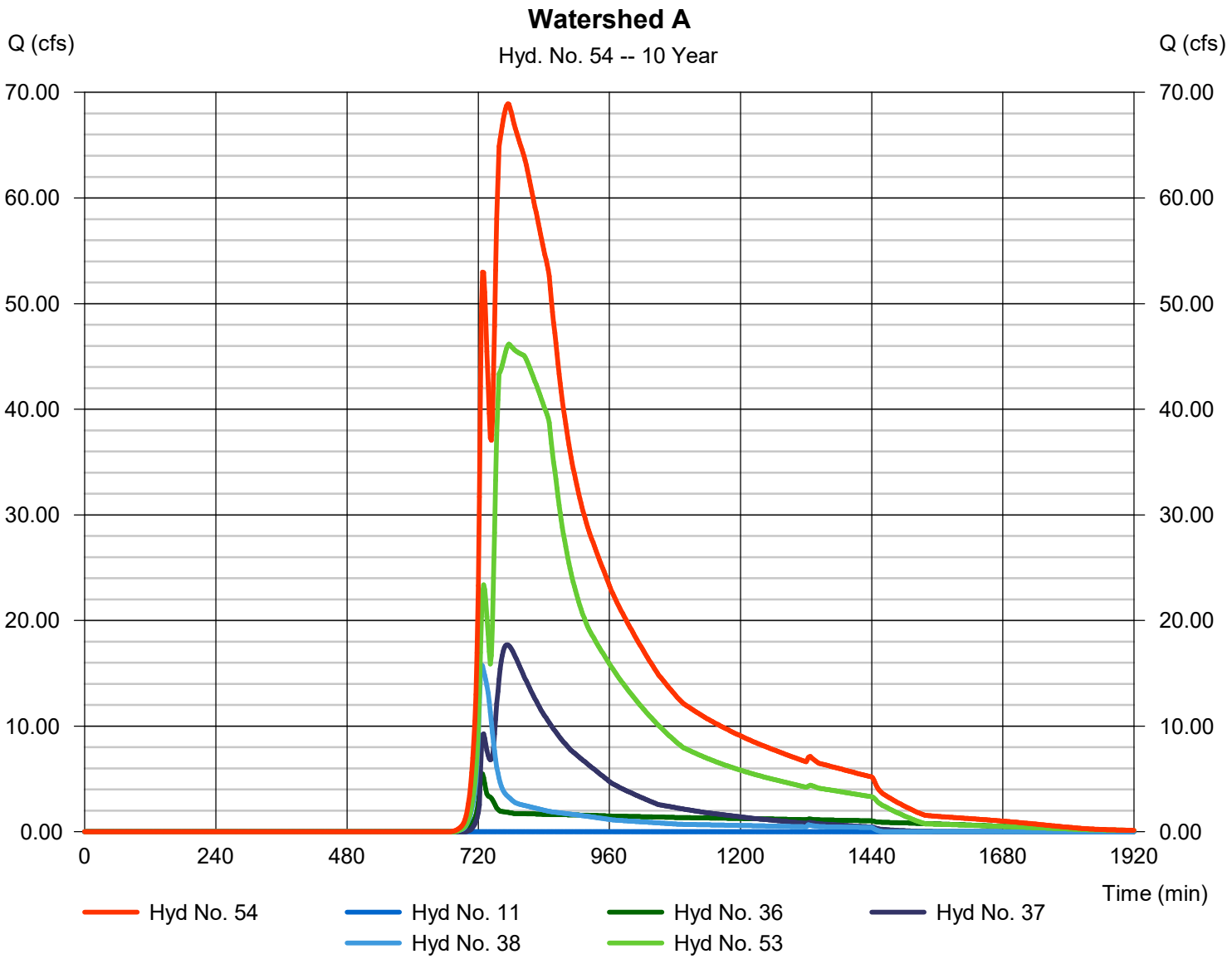
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 54

Watershed A

Hydrograph type	= Combine	Peak discharge	= 68.90 cfs
Storm frequency	= 10 yrs	Time to peak	= 774 min
Time interval	= 2 min	Hyd. volume	= 1,023,531 cuft
Inflow hyds.	= 11, 36, 37, 38, 53	Contrib. drain. area	= 1.750 ac



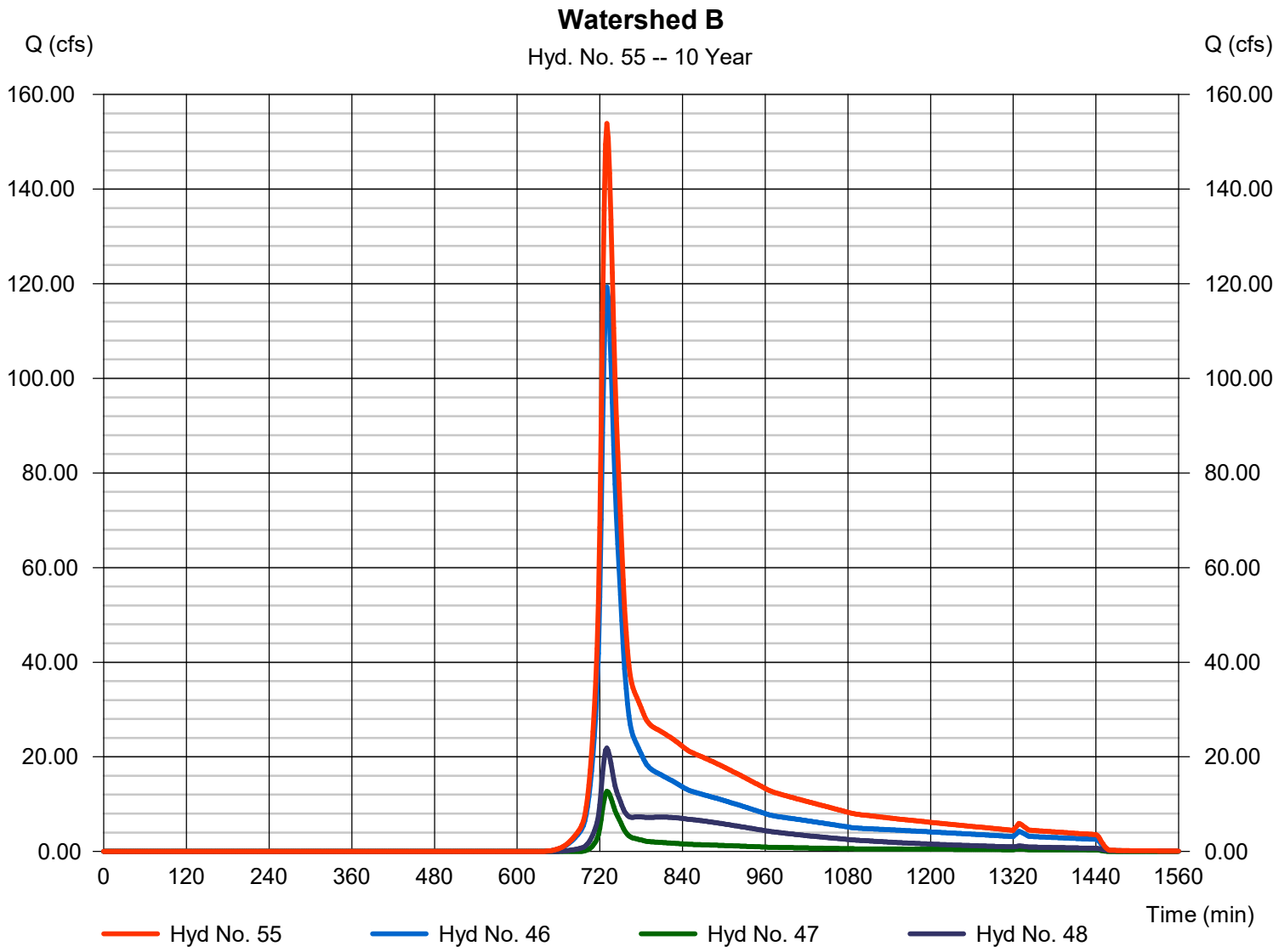
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 55

Watershed B

Hydrograph type	= Combine	Peak discharge	= 153.89 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 747,601 cuft
Inflow hyds.	= 46, 47, 48	Contrib. drain. area	= 13.390 ac



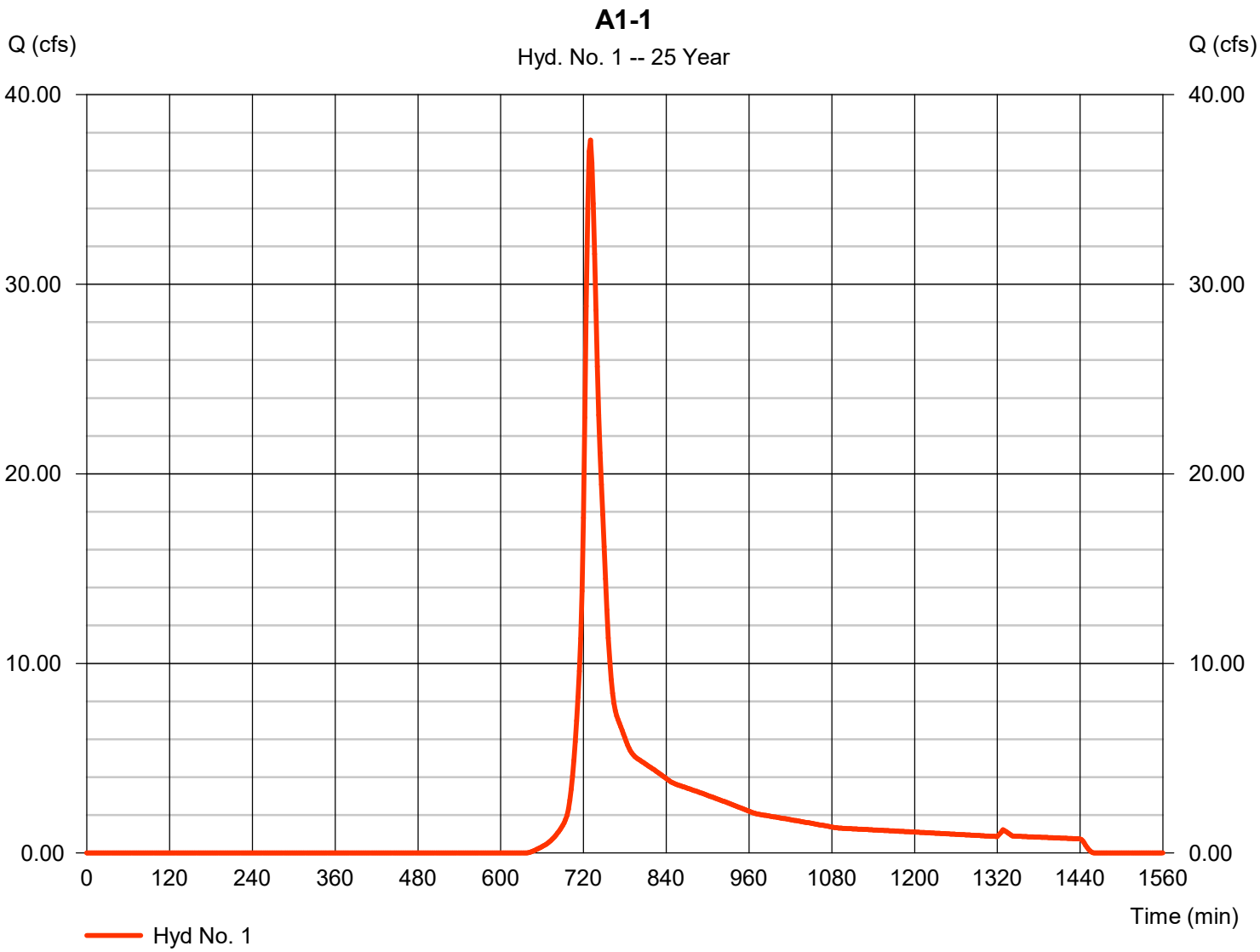
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 1

A1-1

Hydrograph type	= SCS Runoff	Peak discharge	= 37.60 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 152,033 cuft
Drainage area	= 21.310 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.00 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



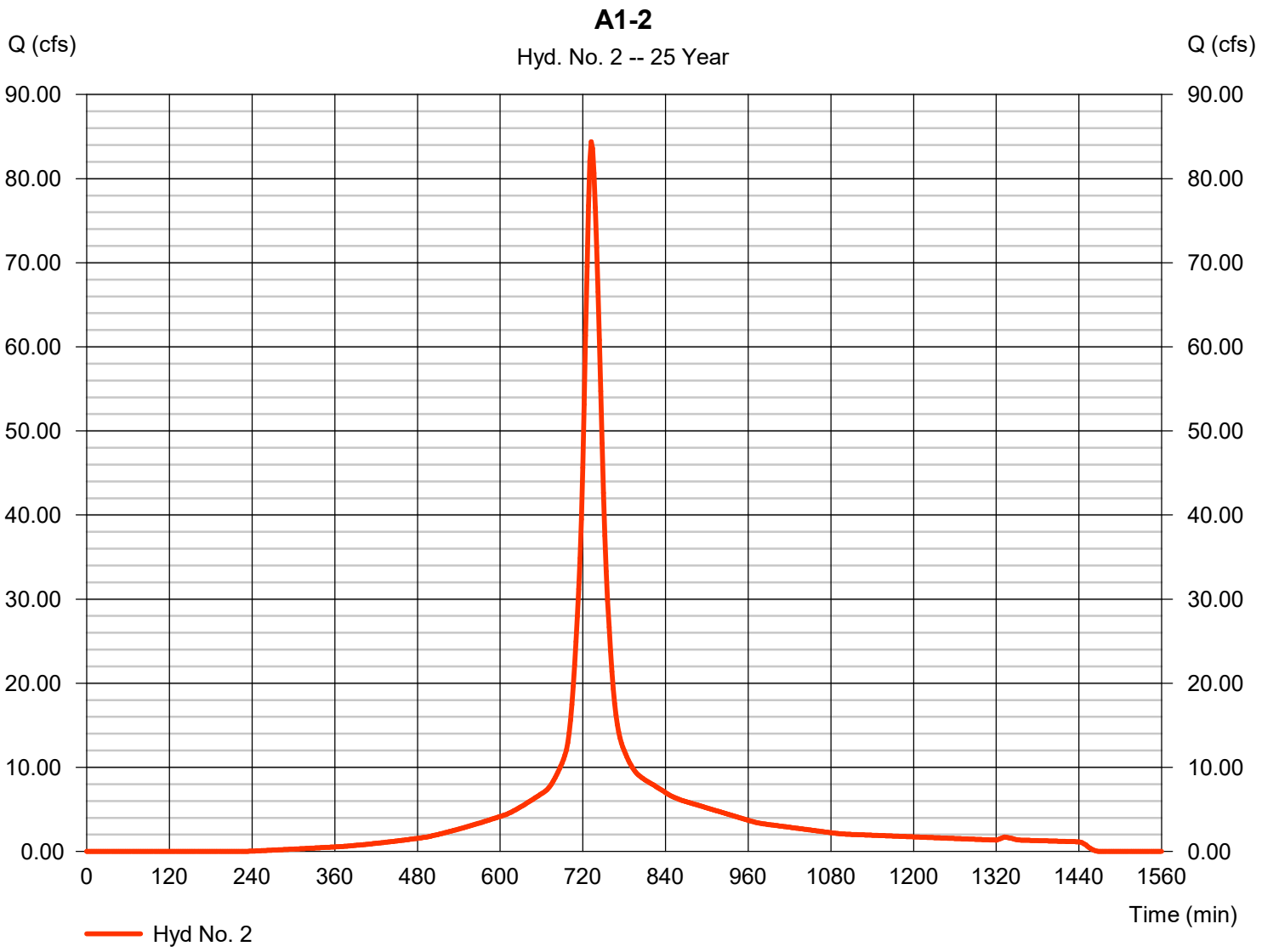
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 2

A1-2

Hydrograph type	= SCS Runoff	Peak discharge	= 84.39 cfs
Storm frequency	= 25 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 387,444 cuft
Drainage area	= 22.710 ac	Curve number	= 90
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.00 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



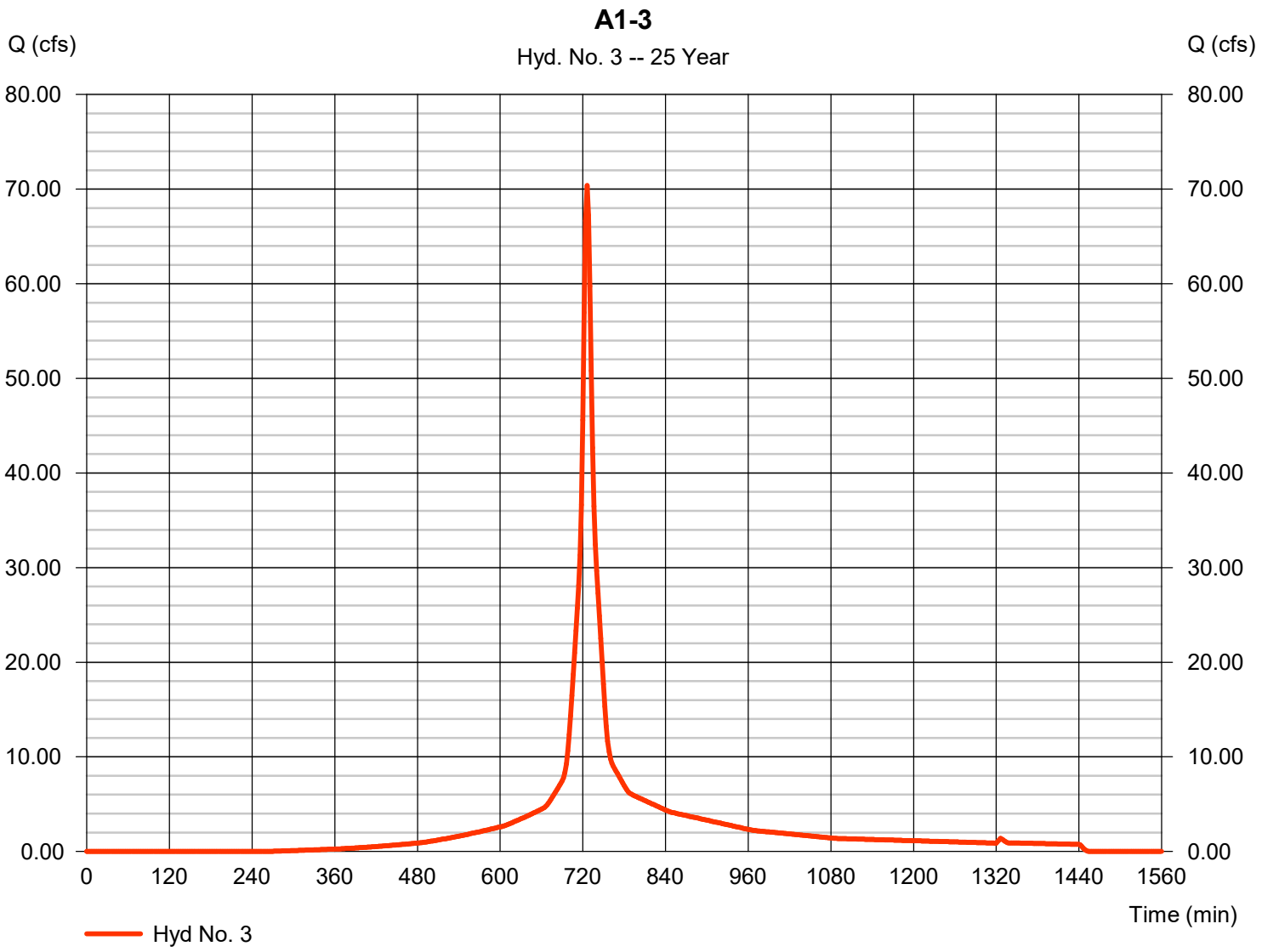
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 3

A1-3

Hydrograph type	= SCS Runoff	Peak discharge	= 70.38 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 248,087 cuft
Drainage area	= 15.250 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.00 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



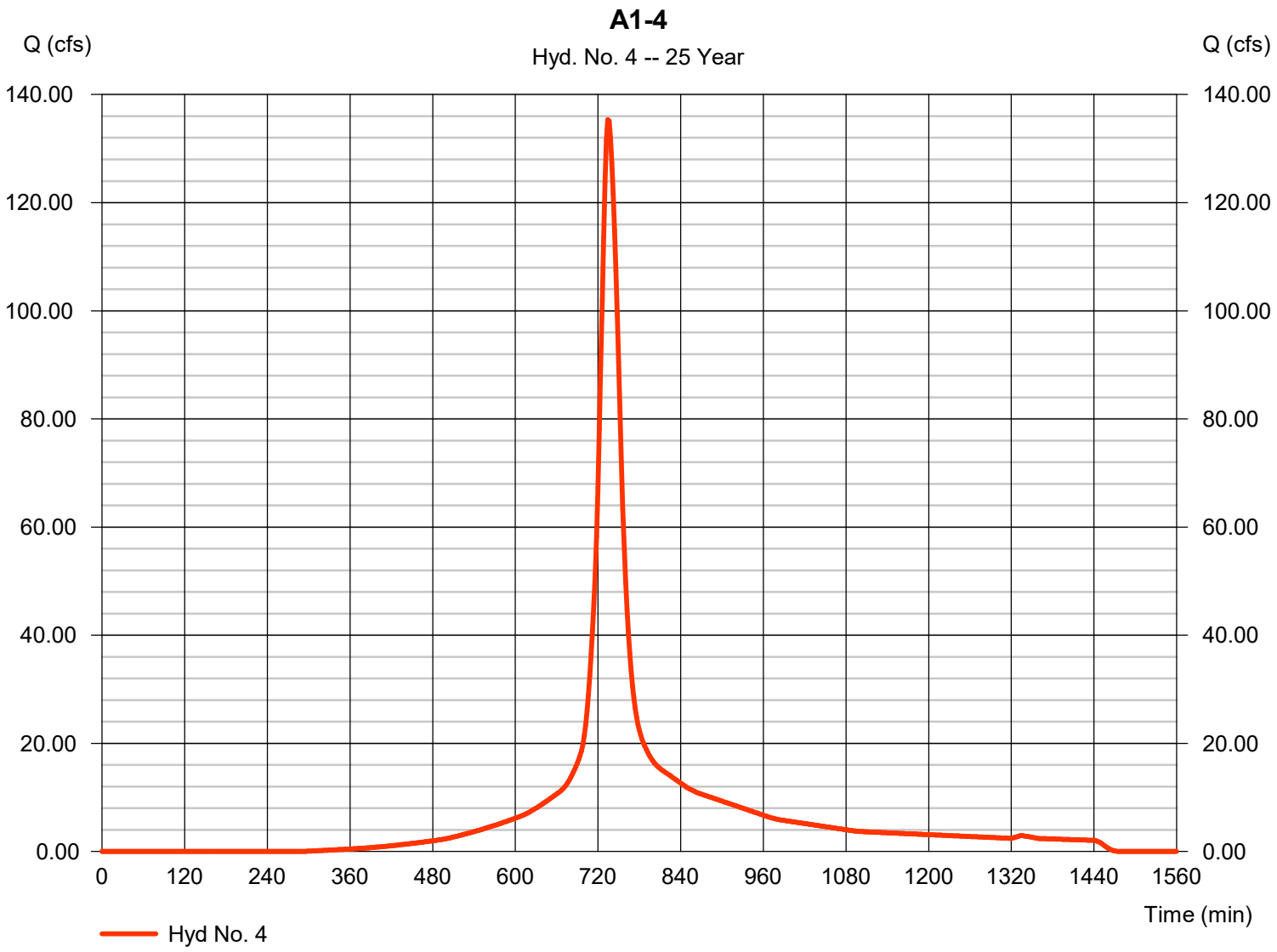
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 4

A1-4

Hydrograph type	= SCS Runoff	Peak discharge	= 135.37 cfs
Storm frequency	= 25 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 655,629 cuft
Drainage area	= 40.570 ac	Curve number	= 87
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 21.00 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



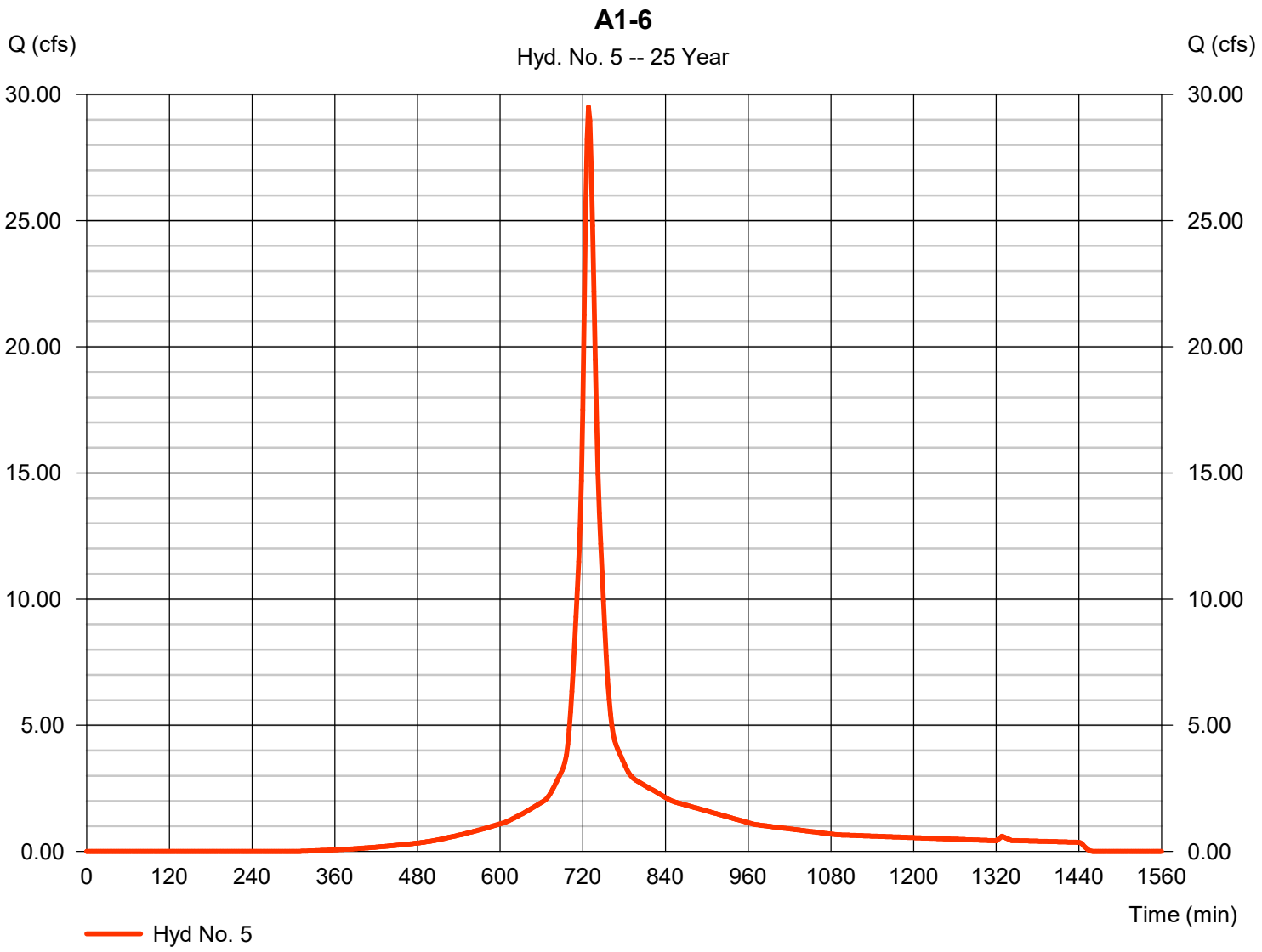
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 5

A1-6

Hydrograph type	= SCS Runoff	Peak discharge	= 29.51 cfs
Storm frequency	= 25 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 115,168 cuft
Drainage area	= 7.210 ac	Curve number	= 86
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



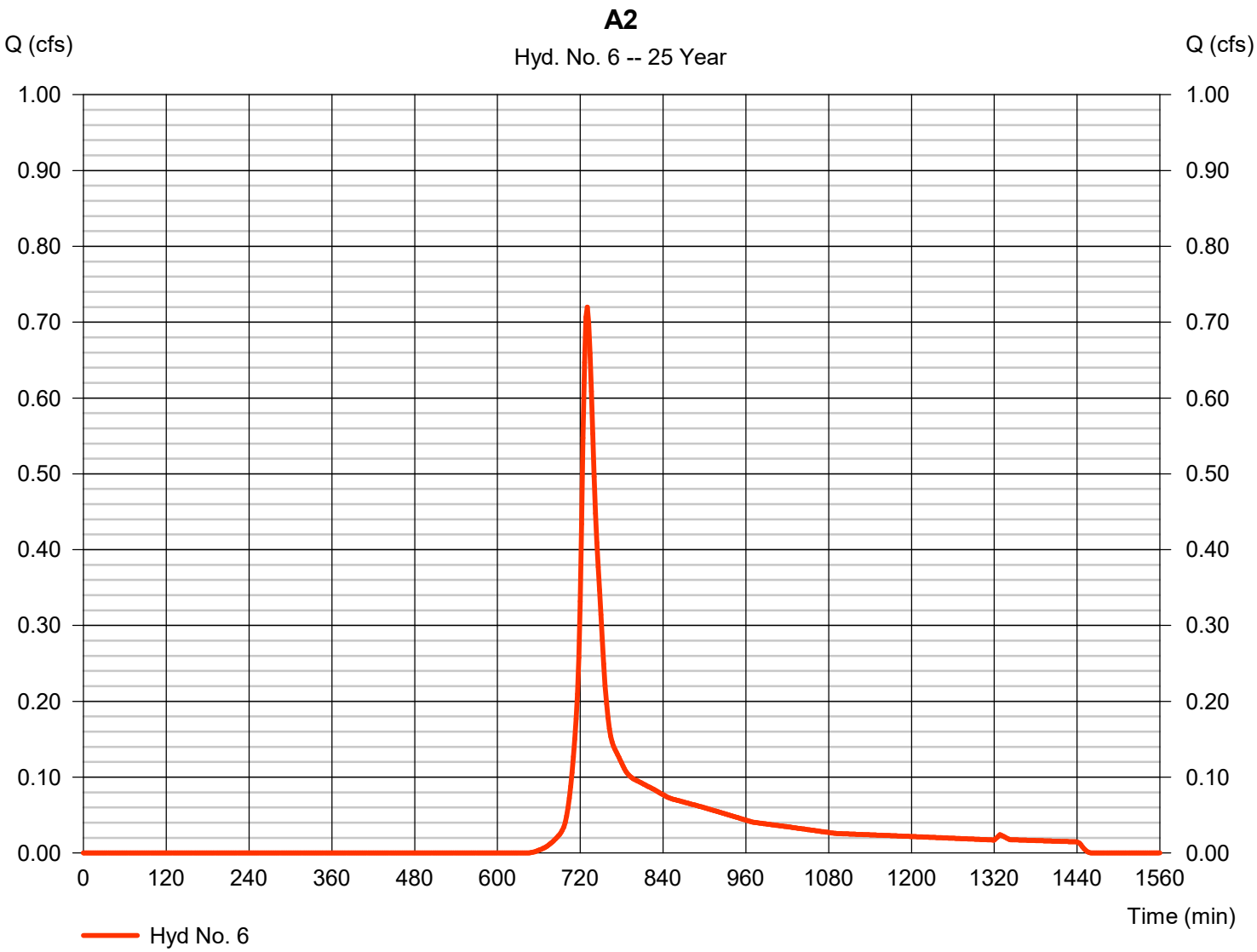
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 6

A2

Hydrograph type	= SCS Runoff	Peak discharge	= 0.720 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 2,936 cuft
Drainage area	= 0.430 ac	Curve number	= 60
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



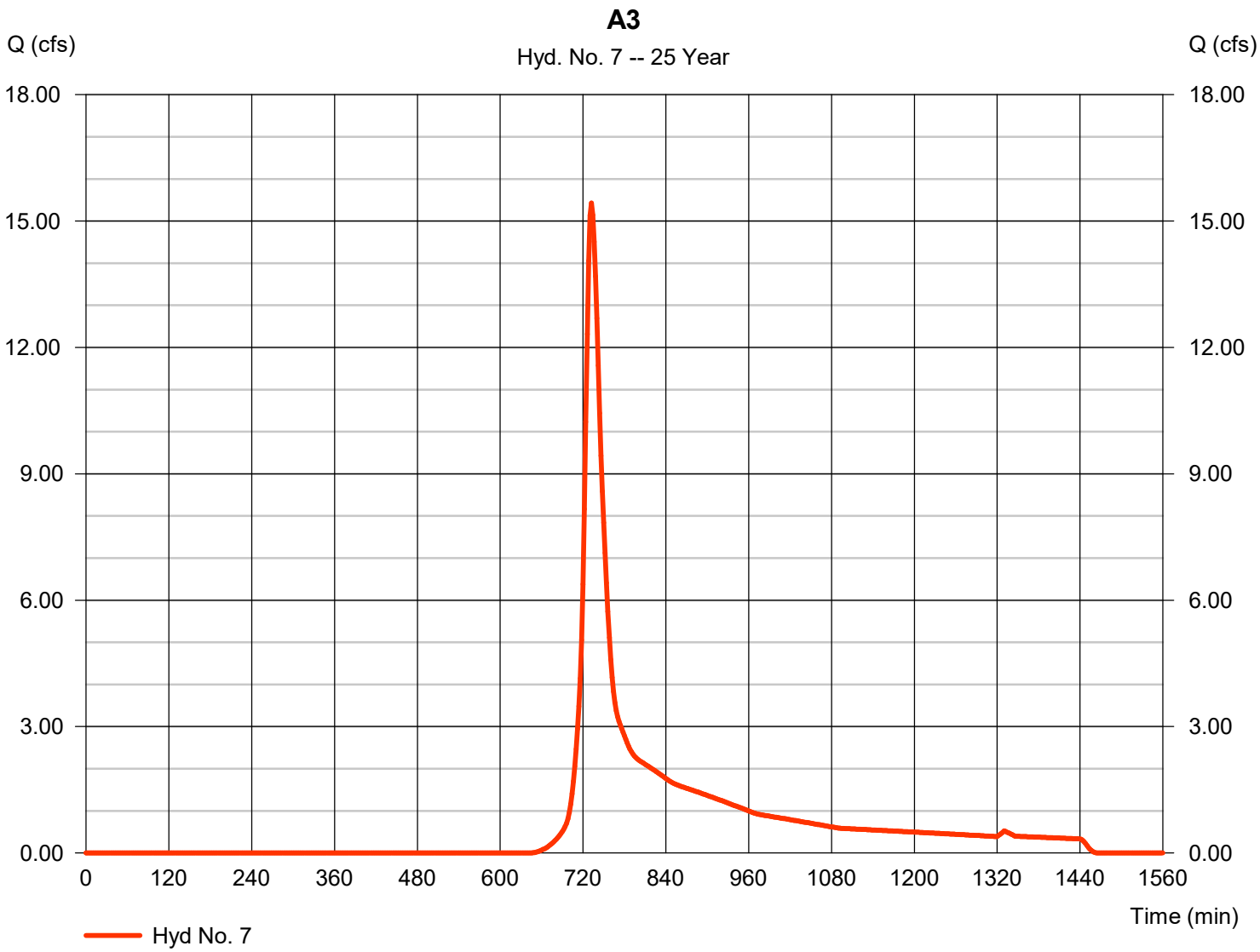
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 7

A3

Hydrograph type	= SCS Runoff	Peak discharge	= 15.43 cfs
Storm frequency	= 25 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 66,757 cuft
Drainage area	= 10.340 ac	Curve number	= 60
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 16.00 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



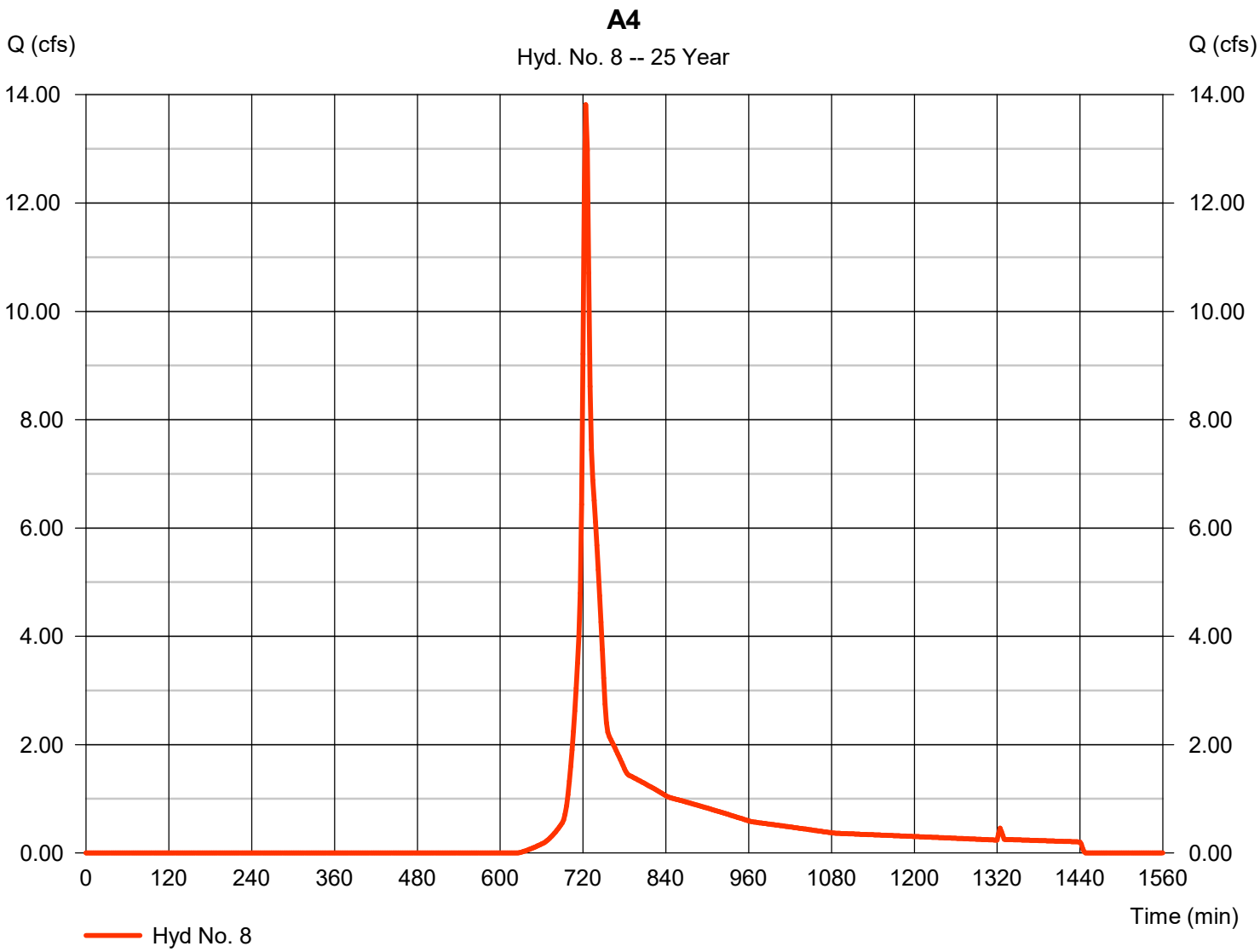
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 8

A4

Hydrograph type	= SCS Runoff	Peak discharge	= 13.82 cfs
Storm frequency	= 25 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 43,107 cuft
Drainage area	= 6.370 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



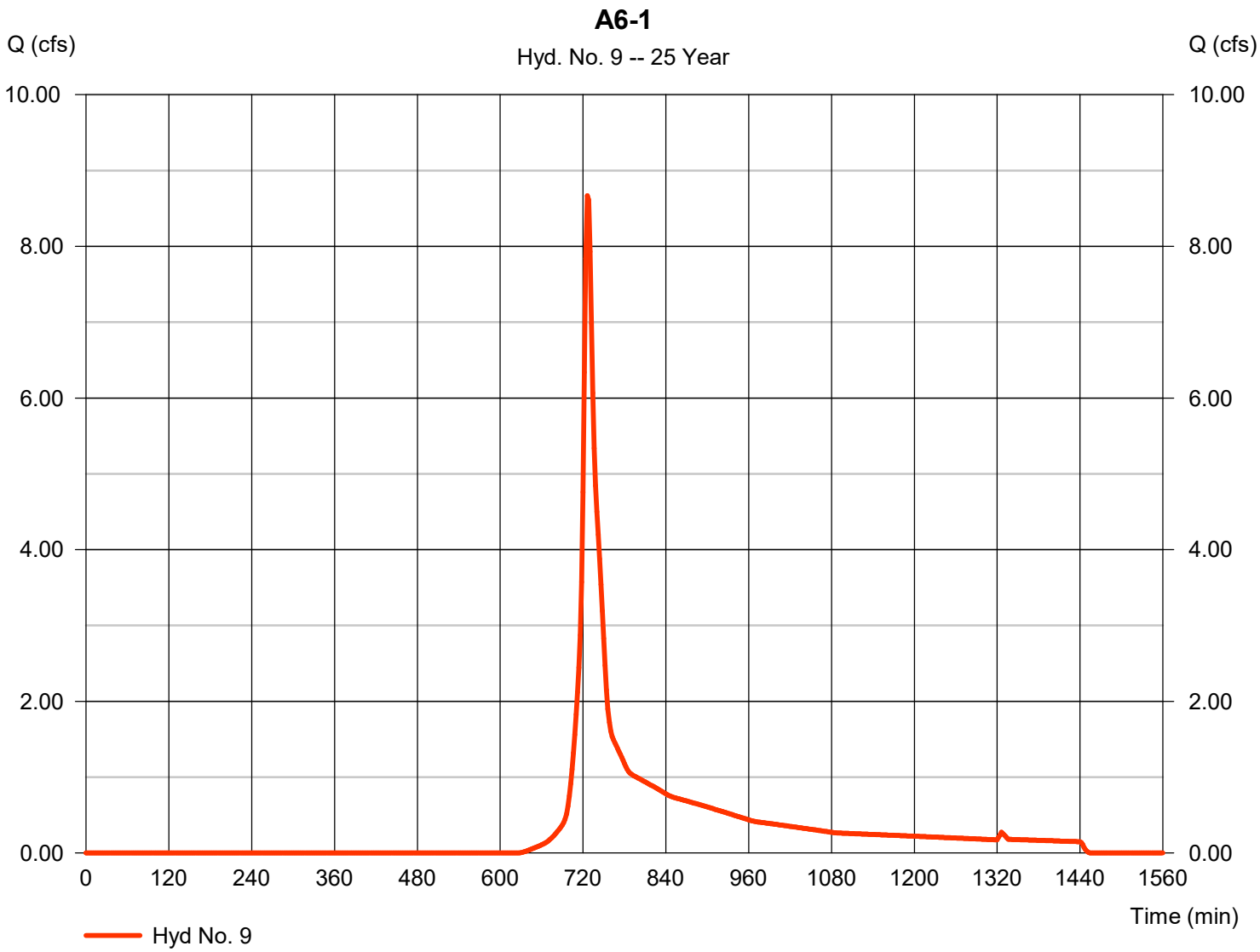
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 9

A6-1

Hydrograph type	= SCS Runoff	Peak discharge	= 8.668 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 31,183 cuft
Drainage area	= 4.320 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.00 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



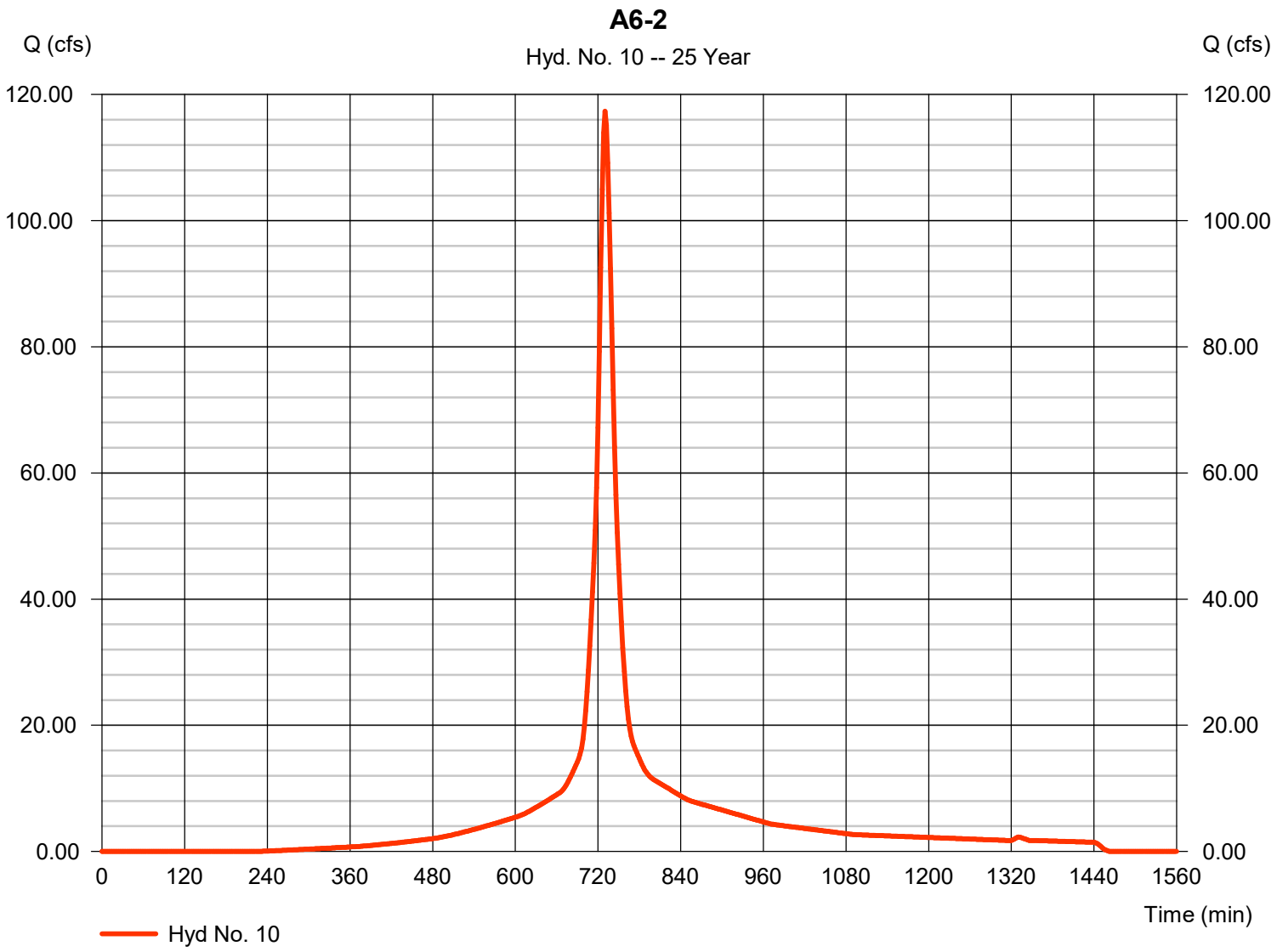
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 10

A6-2

Hydrograph type	= SCS Runoff	Peak discharge	= 117.37 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 497,356 cuft
Drainage area	= 29.900 ac	Curve number	= 90
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.00 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



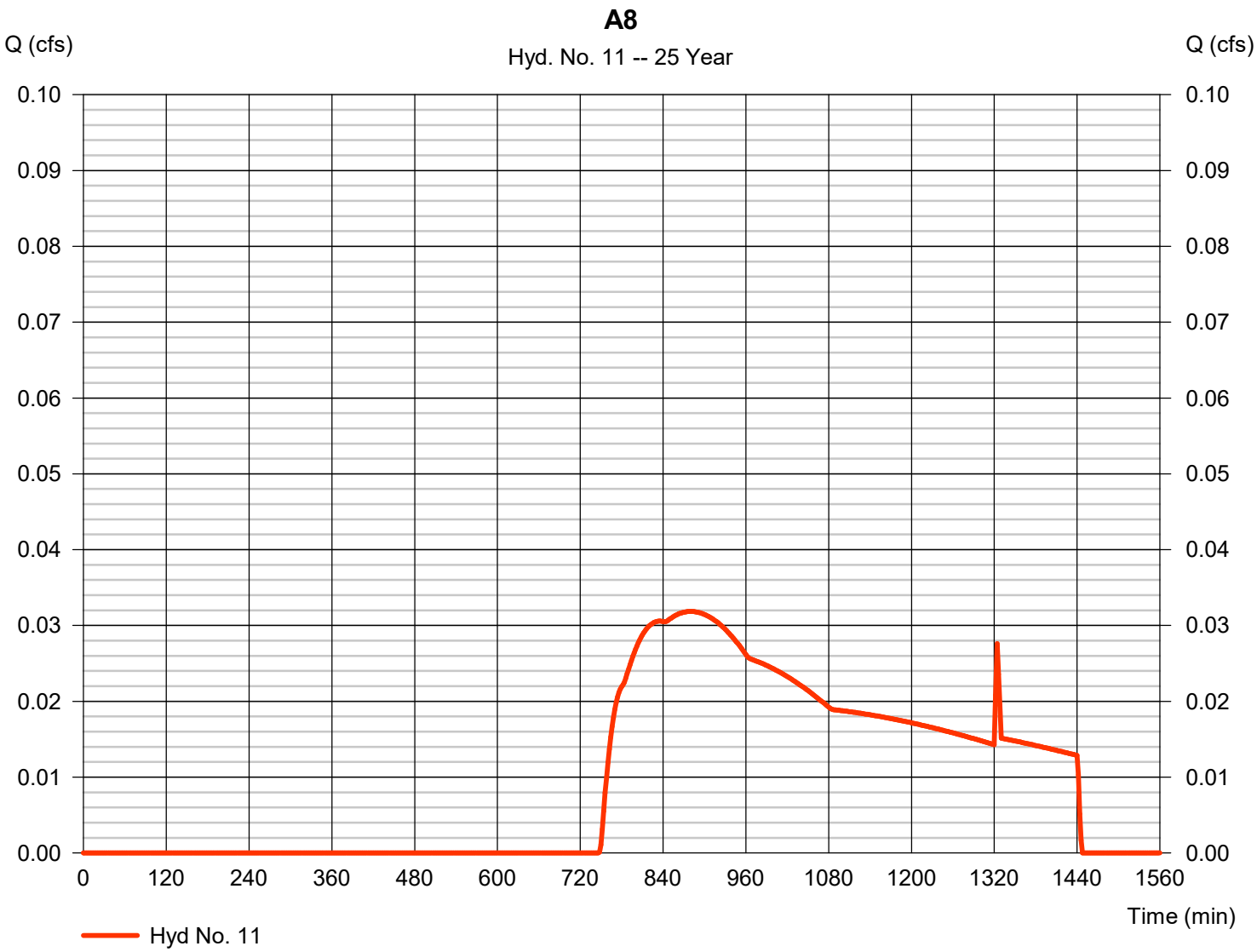
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 11

A8

Hydrograph type	= SCS Runoff	Peak discharge	= 0.032 cfs
Storm frequency	= 25 yrs	Time to peak	= 880 min
Time interval	= 2 min	Hyd. volume	= 863 cuft
Drainage area	= 1.750 ac	Curve number	= 33
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



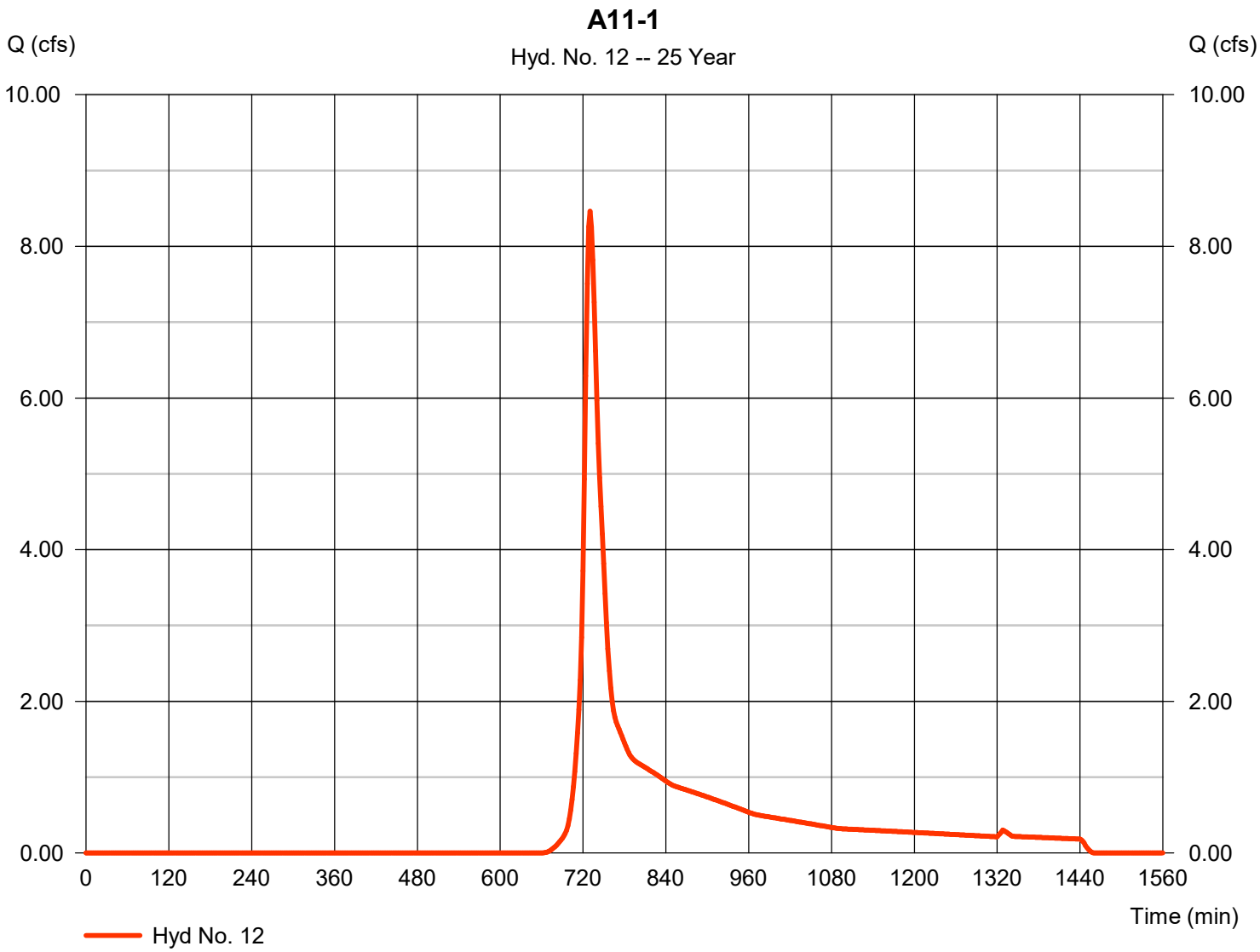
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 12

A11-1

Hydrograph type	= SCS Runoff	Peak discharge	= 8.463 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 35,259 cuft
Drainage area	= 5.660 ac	Curve number	= 58
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.00 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



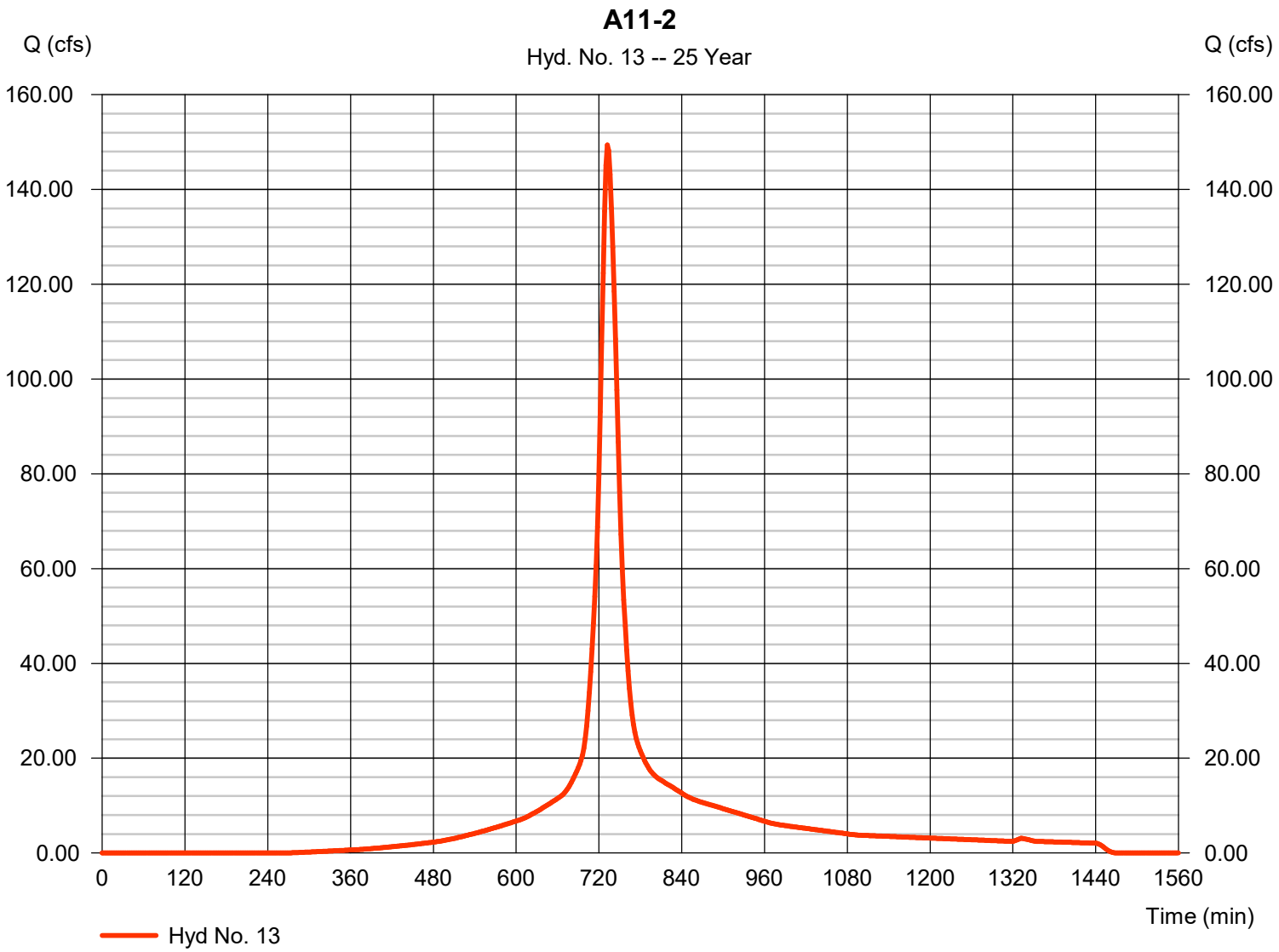
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 13

A11-2

Hydrograph type	= SCS Runoff	Peak discharge	= 149.37 cfs
Storm frequency	= 25 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 677,562 cuft
Drainage area	= 41.650 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.00 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



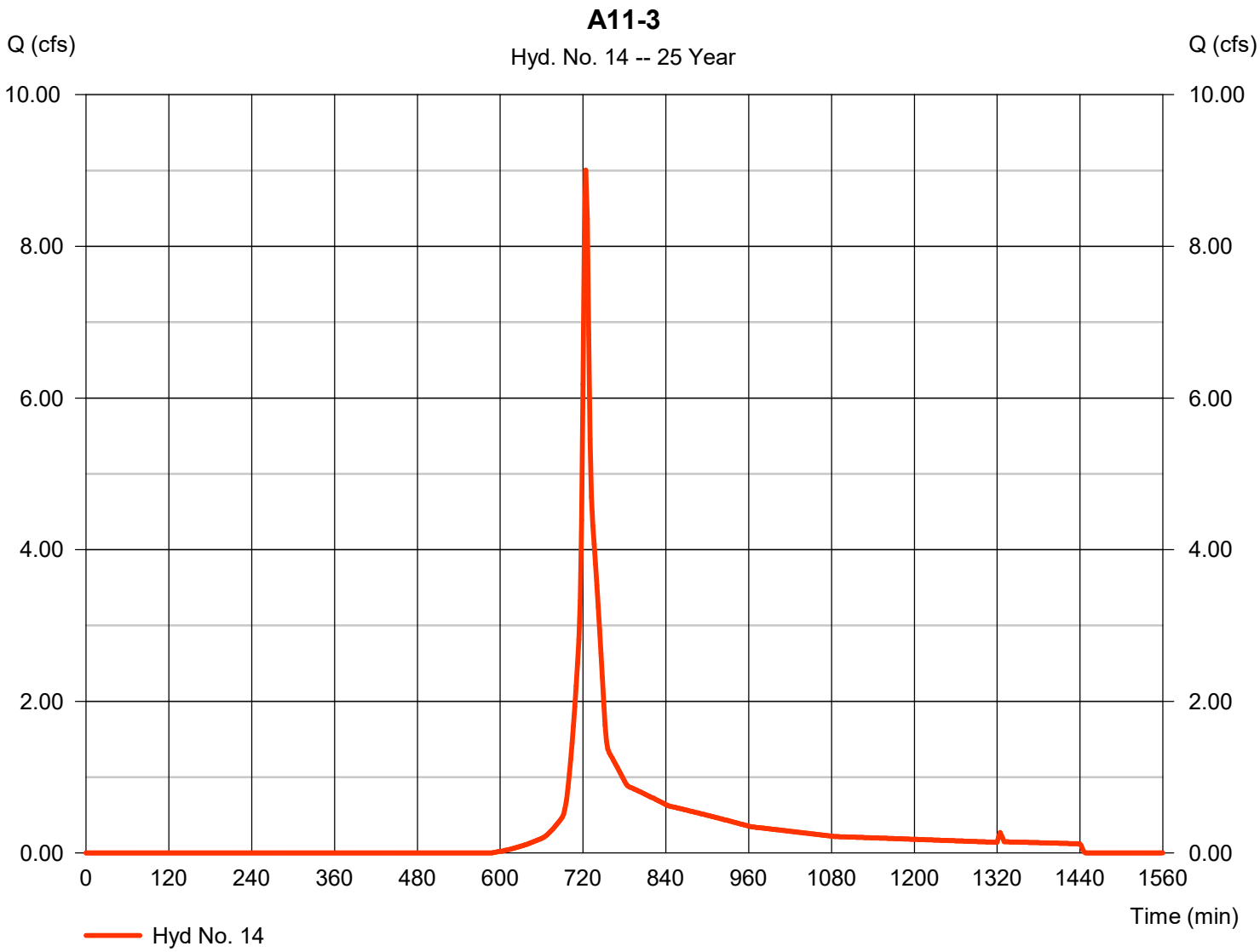
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 14

A11-3

Hydrograph type	= SCS Runoff	Peak discharge	= 9.006 cfs
Storm frequency	= 25 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 27,431 cuft
Drainage area	= 3.460 ac	Curve number	= 66
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



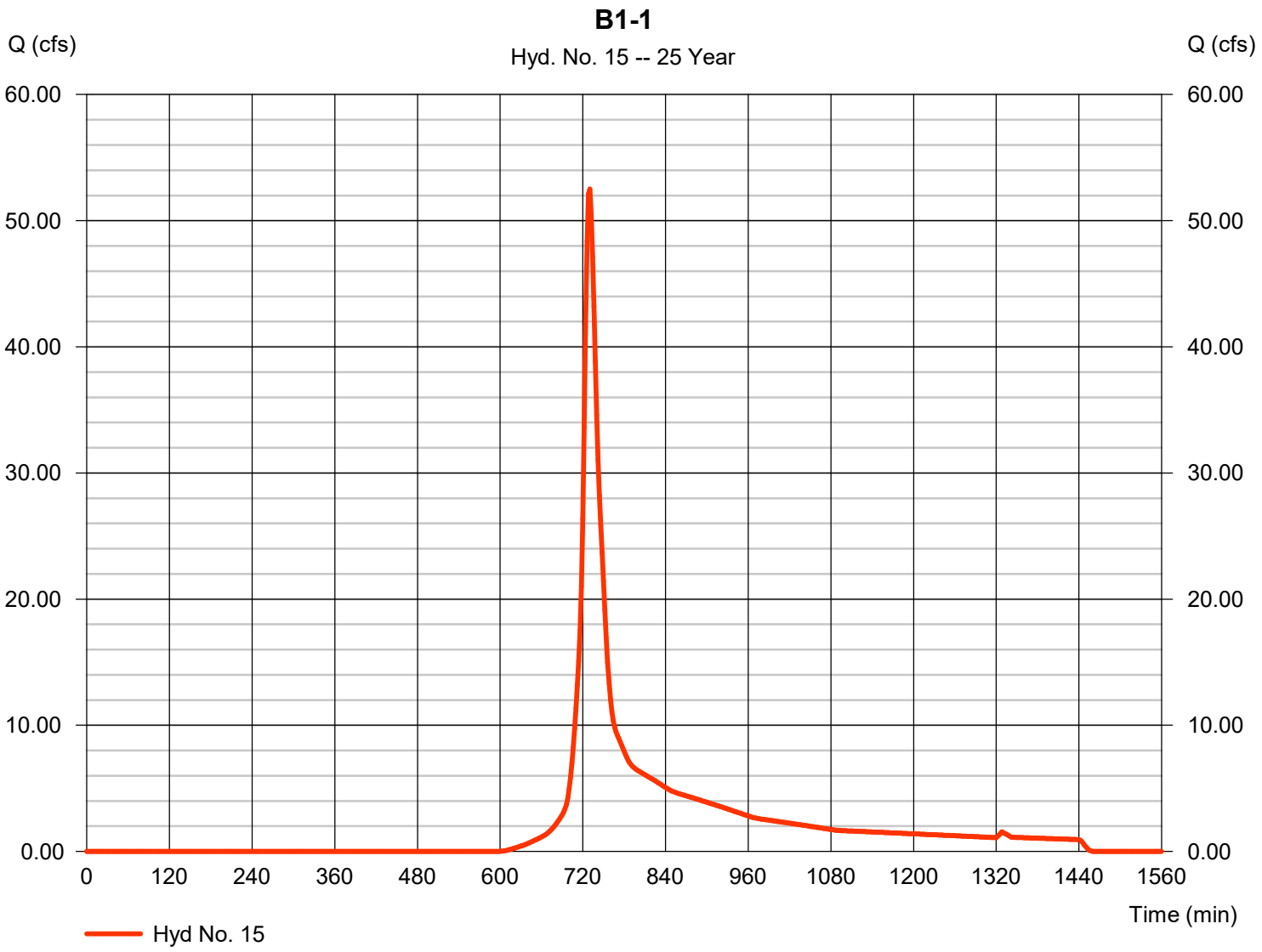
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 15

B1-1

Hydrograph type	= SCS Runoff	Peak discharge	= 52.52 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 207,045 cuft
Drainage area	= 24.660 ac	Curve number	= 65
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



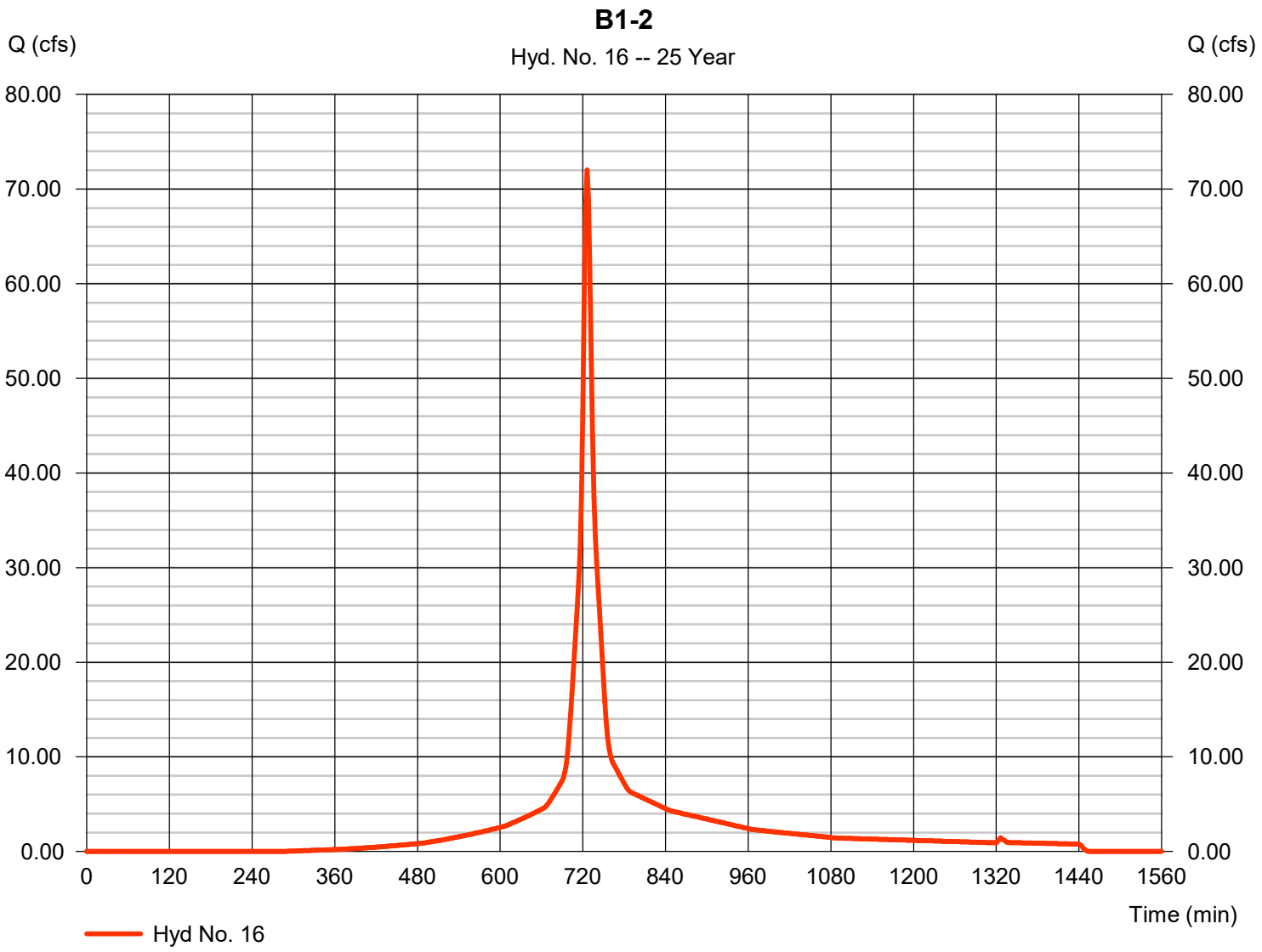
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 16

B1-2

Hydrograph type	= SCS Runoff	Peak discharge	= 72.02 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 252,443 cuft
Drainage area	= 15.900 ac	Curve number	= 87
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.00 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



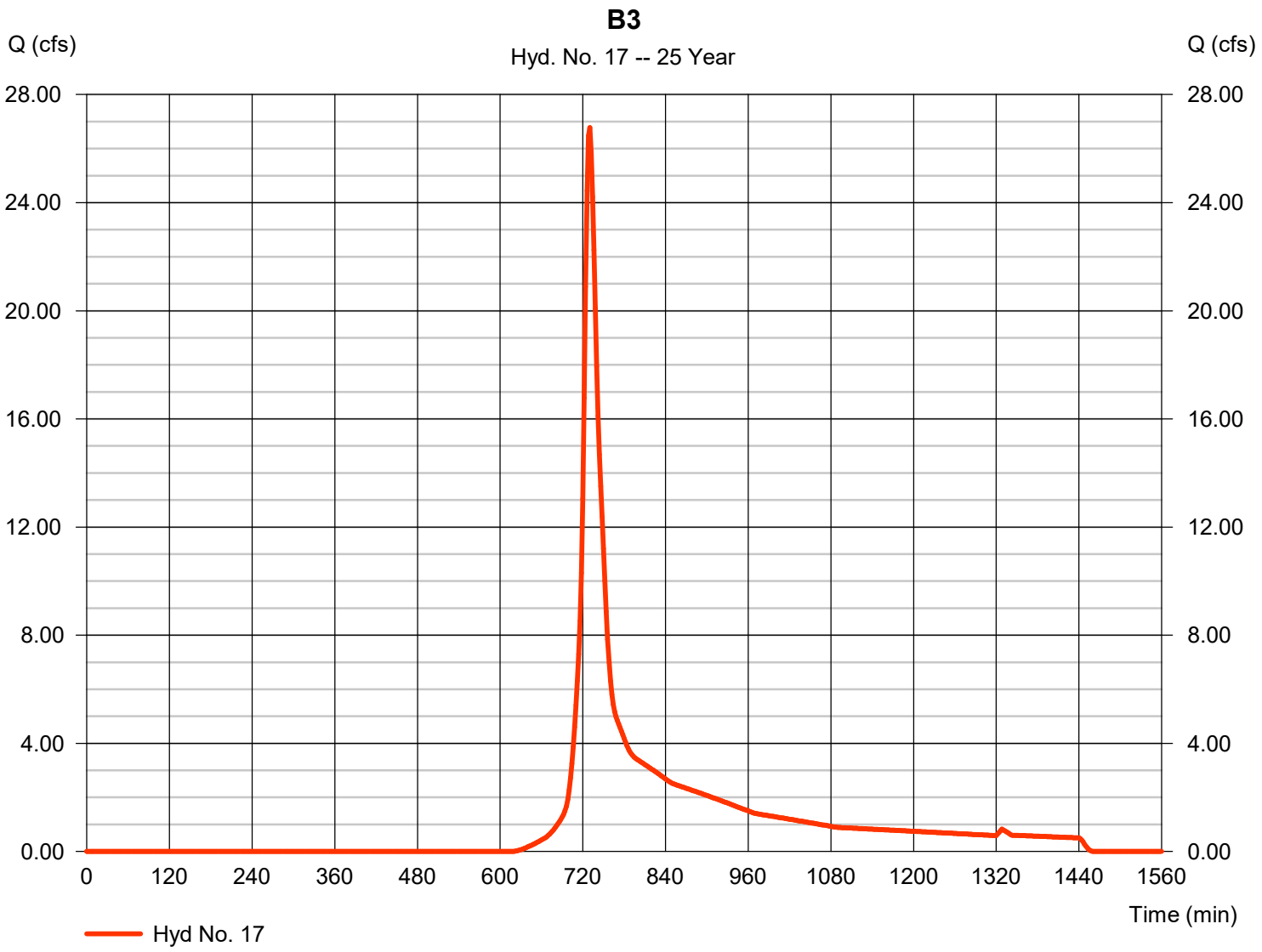
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 17

B3

Hydrograph type	= SCS Runoff	Peak discharge	= 26.78 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 106,743 cuft
Drainage area	= 13.760 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.00 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



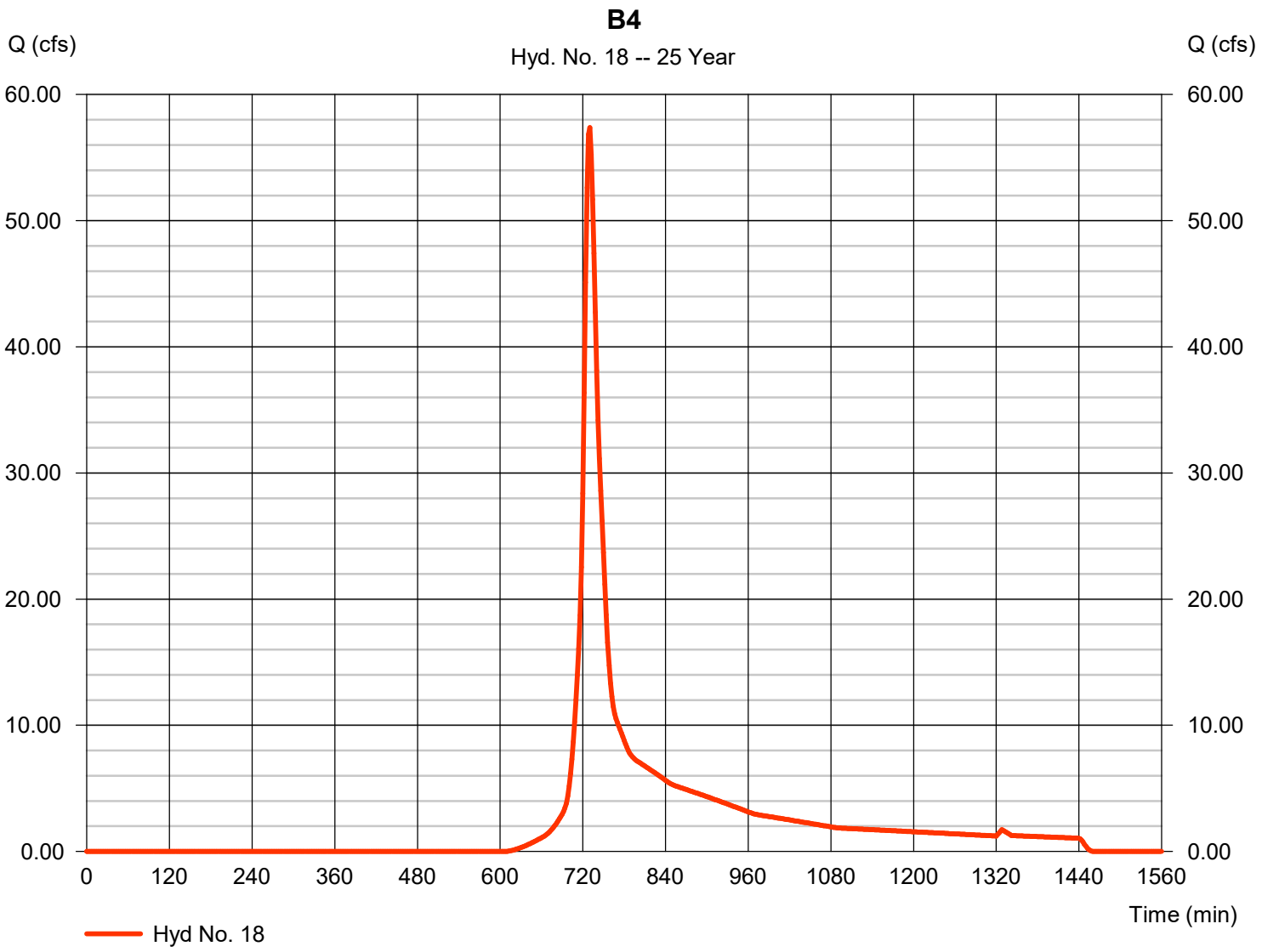
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 18

B4

Hydrograph type	= SCS Runoff	Peak discharge	= 57.38 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 227,387 cuft
Drainage area	= 28.160 ac	Curve number	= 64
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.80 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



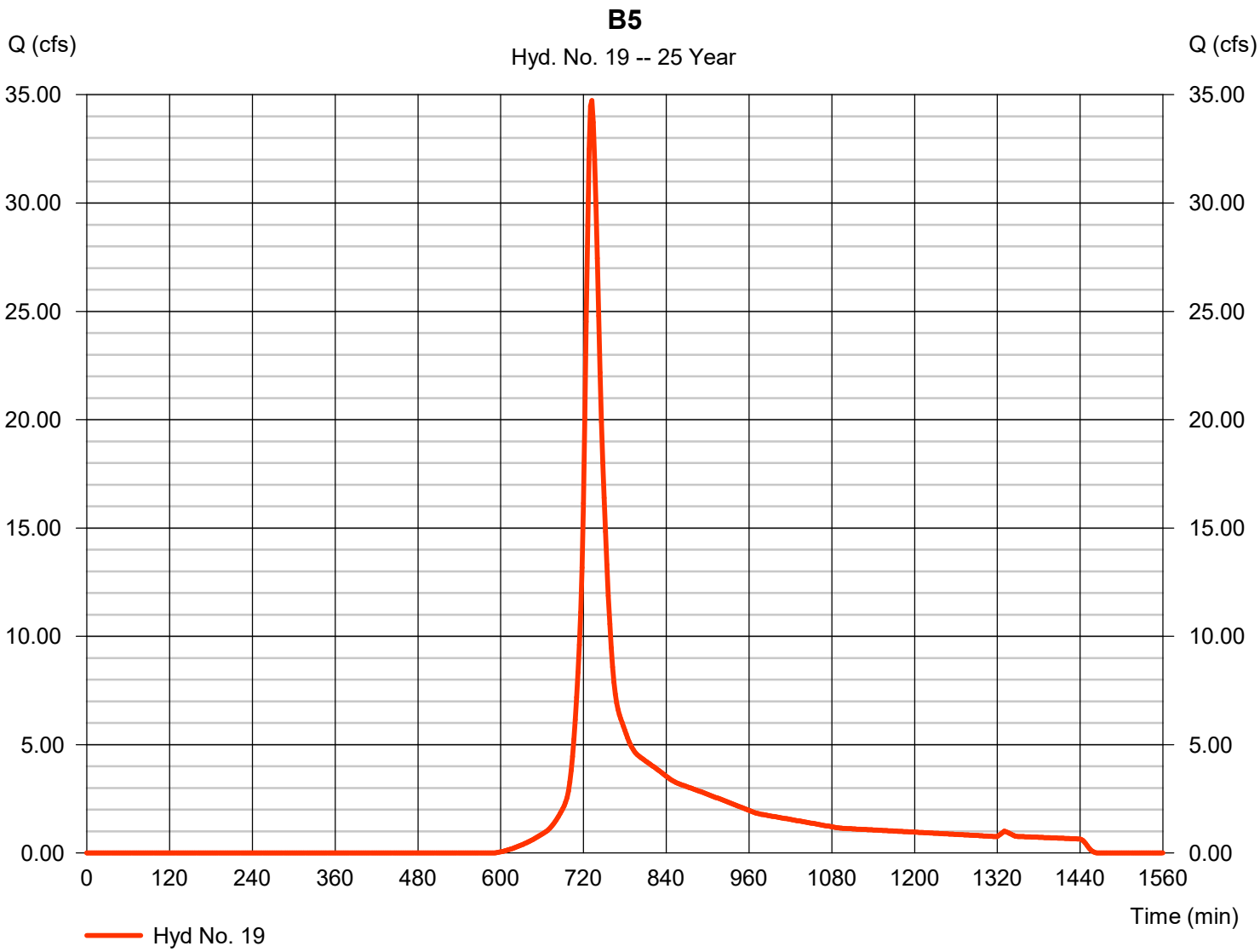
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 19

B5

Hydrograph type	= SCS Runoff	Peak discharge	= 34.73 cfs
Storm frequency	= 25 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 144,539 cuft
Drainage area	= 17.530 ac	Curve number	= 66
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.00 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



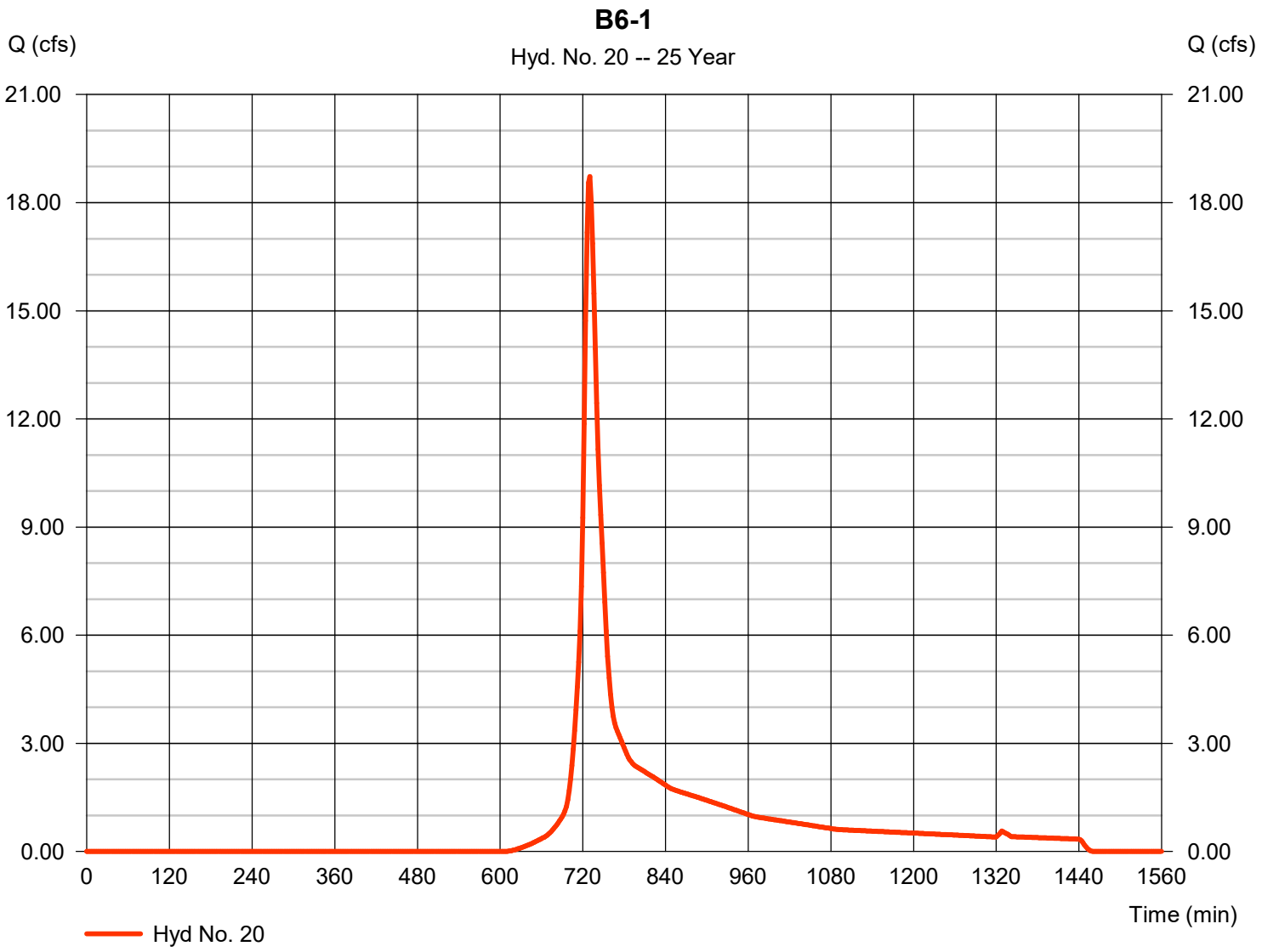
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 20

B6-1

Hydrograph type	= SCS Runoff	Peak discharge	= 18.73 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 74,208 cuft
Drainage area	= 9.190 ac	Curve number	= 64
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



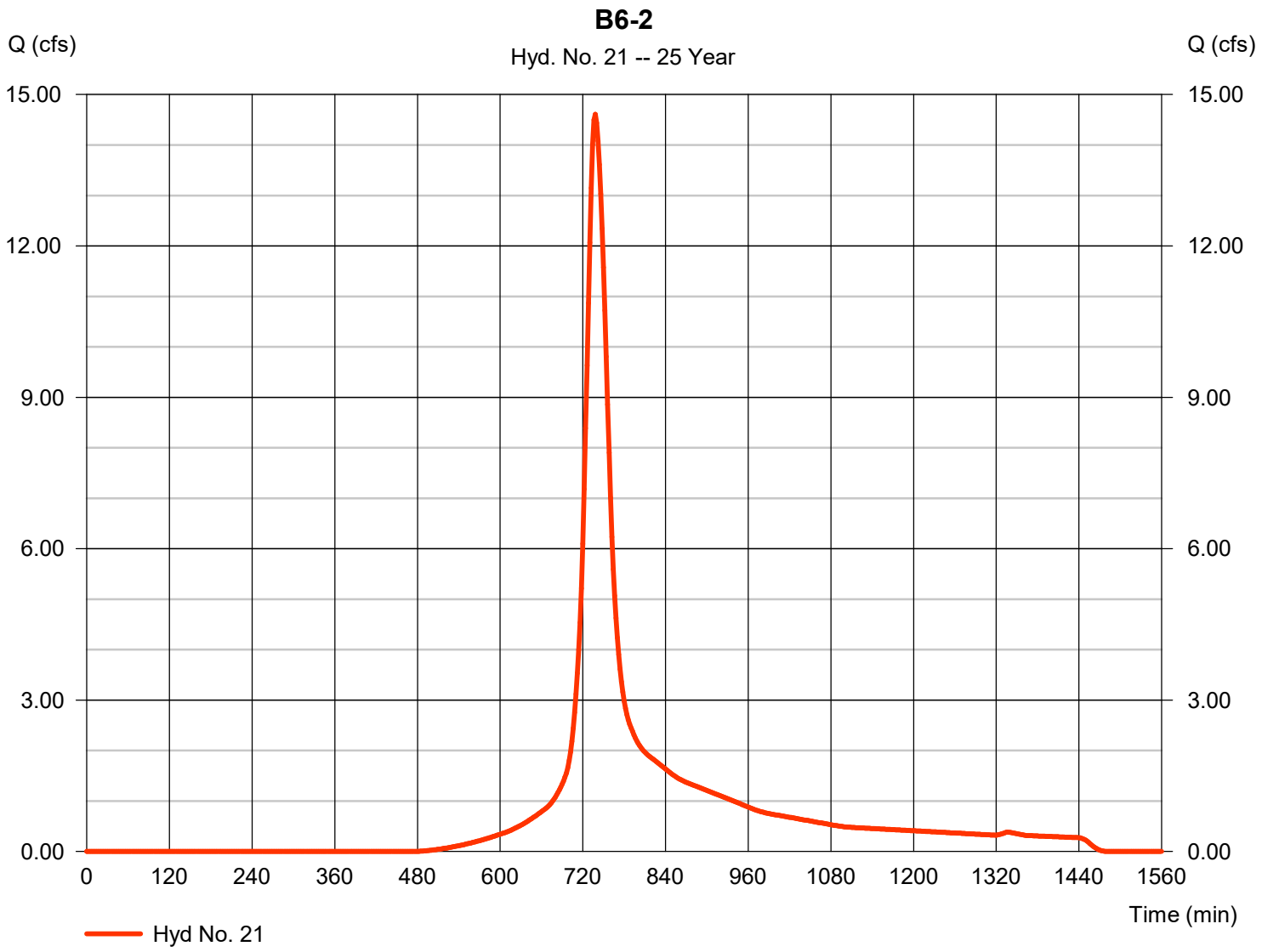
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 21

B6-2

Hydrograph type	= SCS Runoff	Peak discharge	= 14.61 cfs
Storm frequency	= 25 yrs	Time to peak	= 738 min
Time interval	= 2 min	Hyd. volume	= 71,909 cuft
Drainage area	= 6.190 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 24.00 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



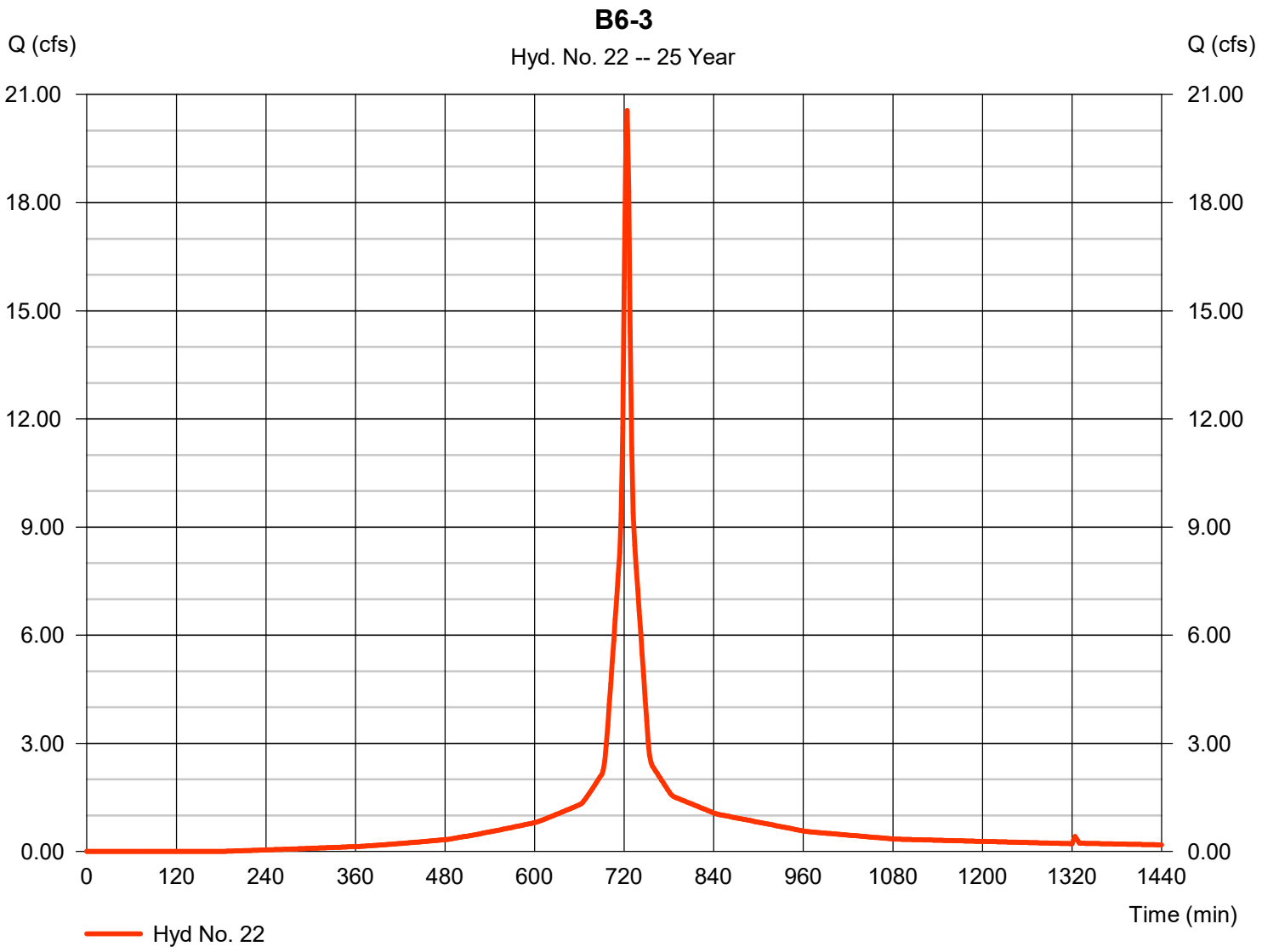
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 22

B6-3

Hydrograph type	= SCS Runoff	Peak discharge	= 20.56 cfs
Storm frequency	= 25 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 65,829 cuft
Drainage area	= 3.930 ac	Curve number	= 92
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



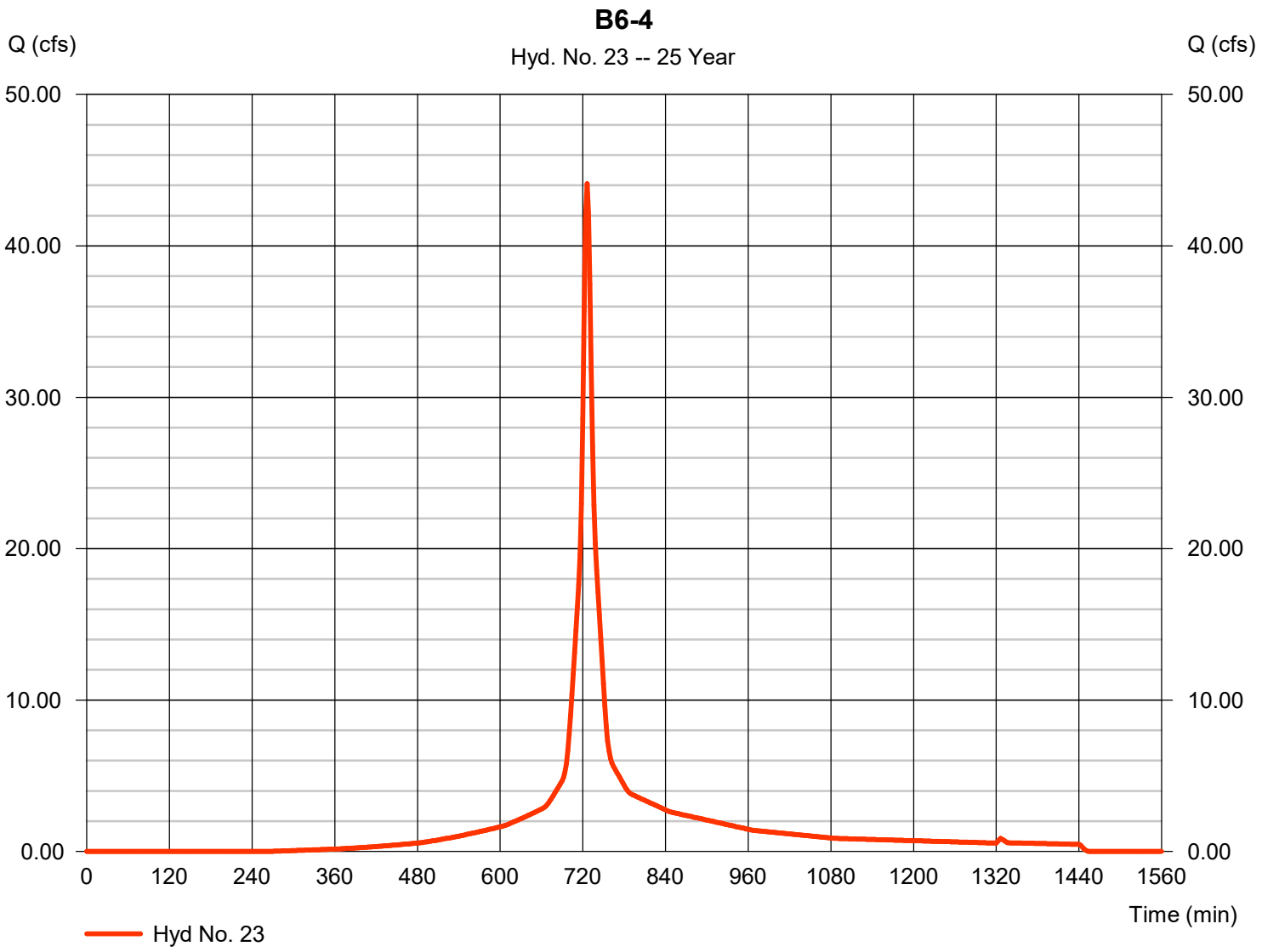
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 23

B6-4

Hydrograph type	= SCS Runoff	Peak discharge	= 44.12 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 155,522 cuft
Drainage area	= 9.560 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.00 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



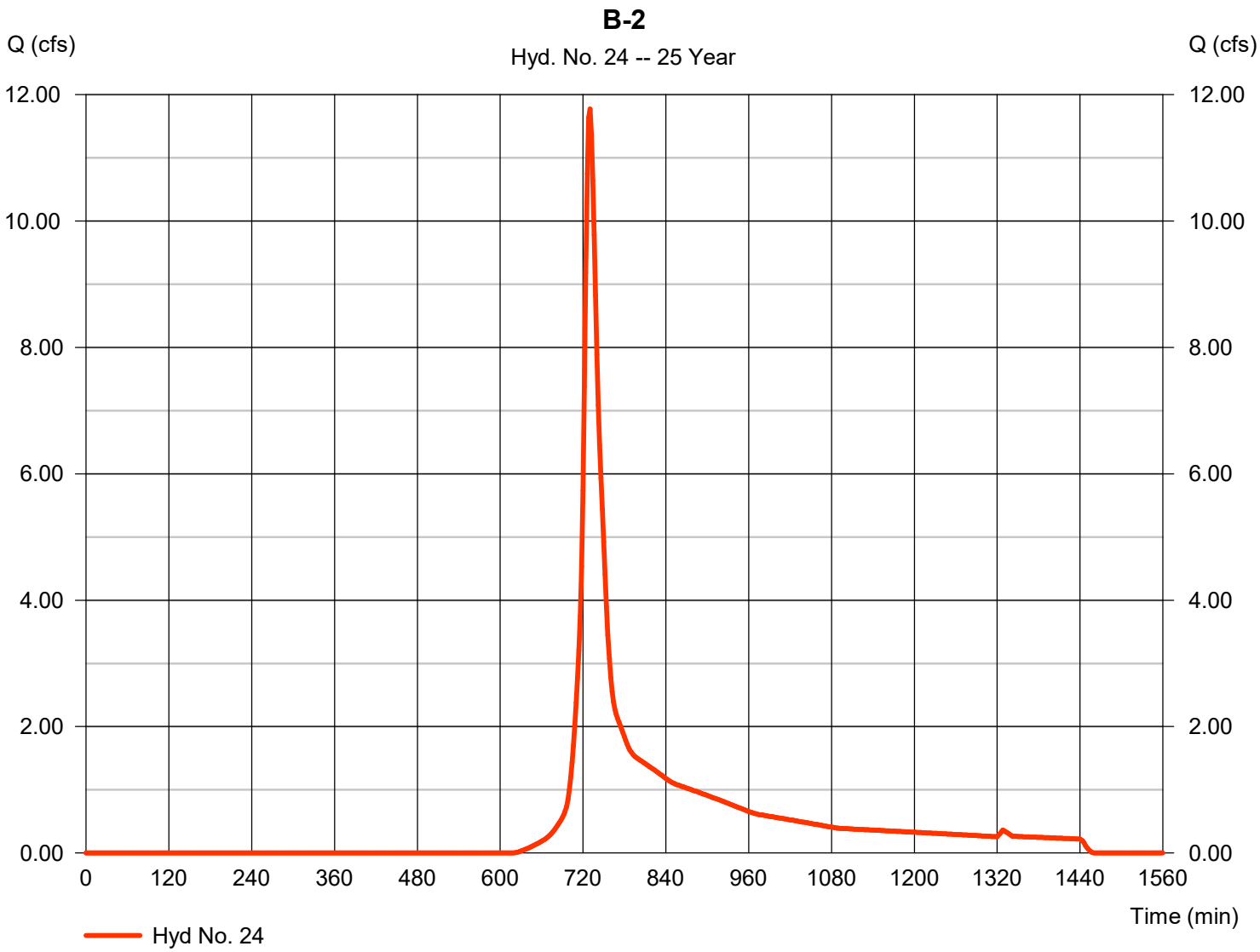
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 24

B-2

Hydrograph type	= SCS Runoff	Peak discharge	= 11.78 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 46,933 cuft
Drainage area	= 6.050 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.00 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



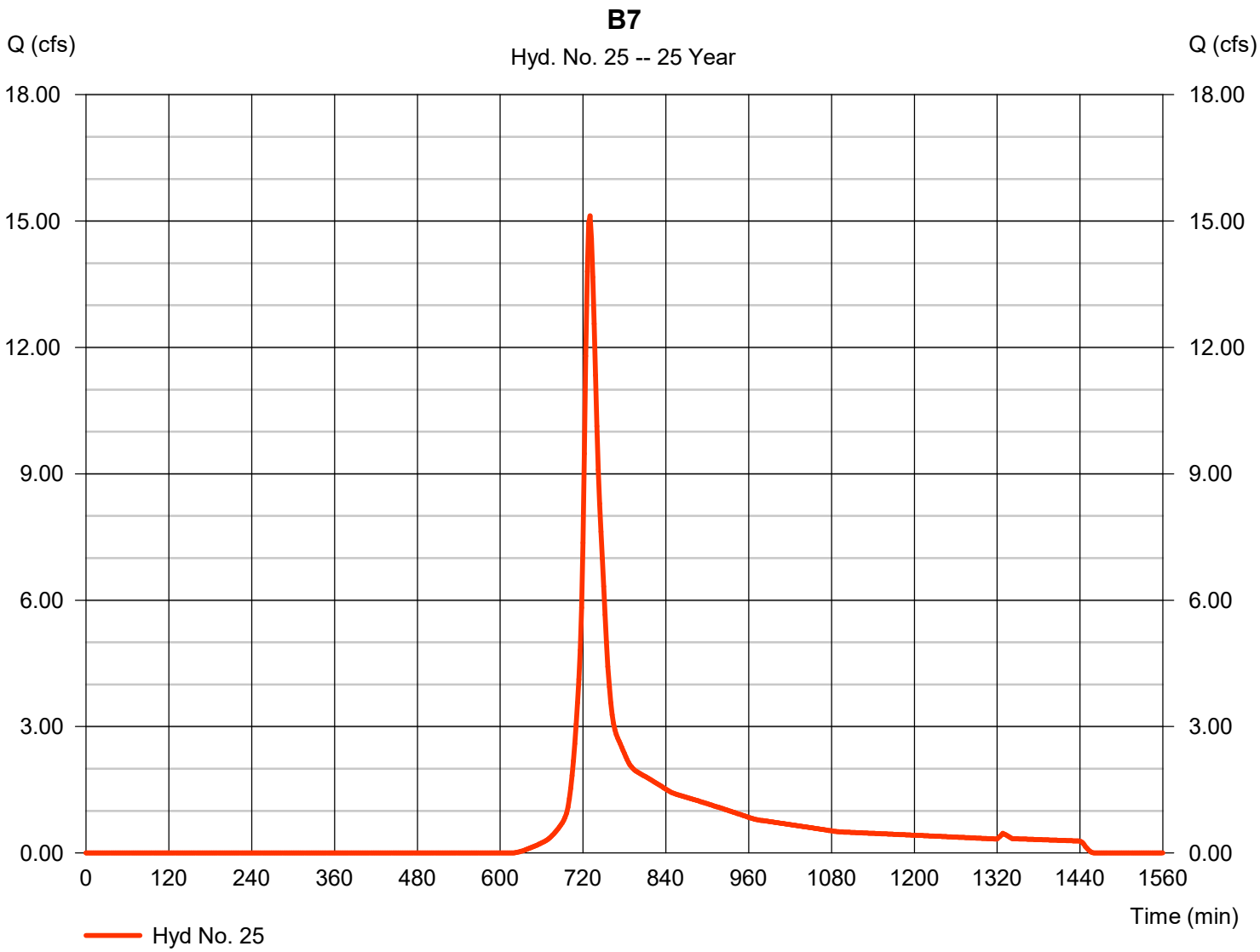
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 25

B7

Hydrograph type	= SCS Runoff	Peak discharge	= 15.12 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 60,276 cuft
Drainage area	= 7.770 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



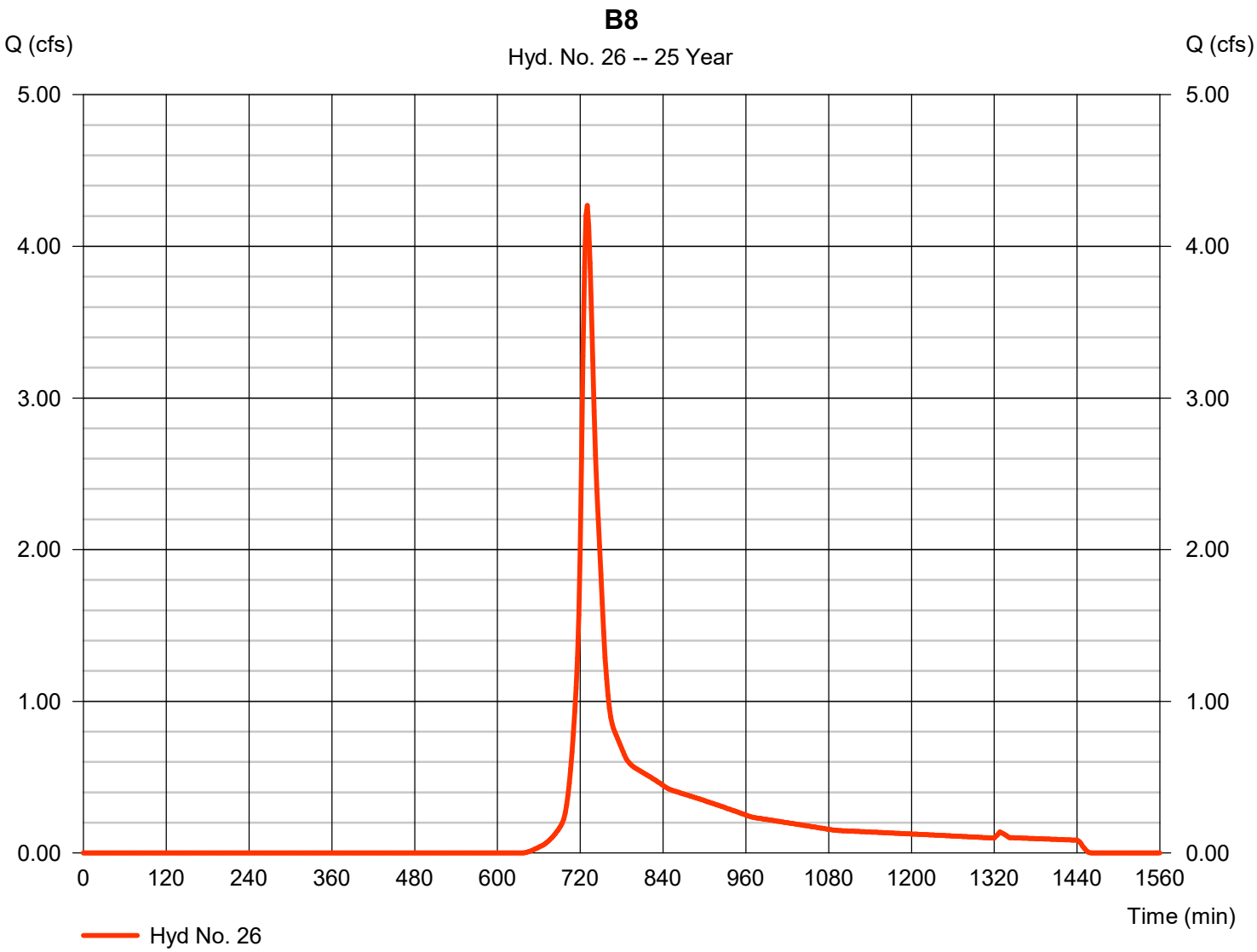
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 26

B8

Hydrograph type	= SCS Runoff	Peak discharge	= 4.270 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 17,265 cuft
Drainage area	= 2.420 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.00 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



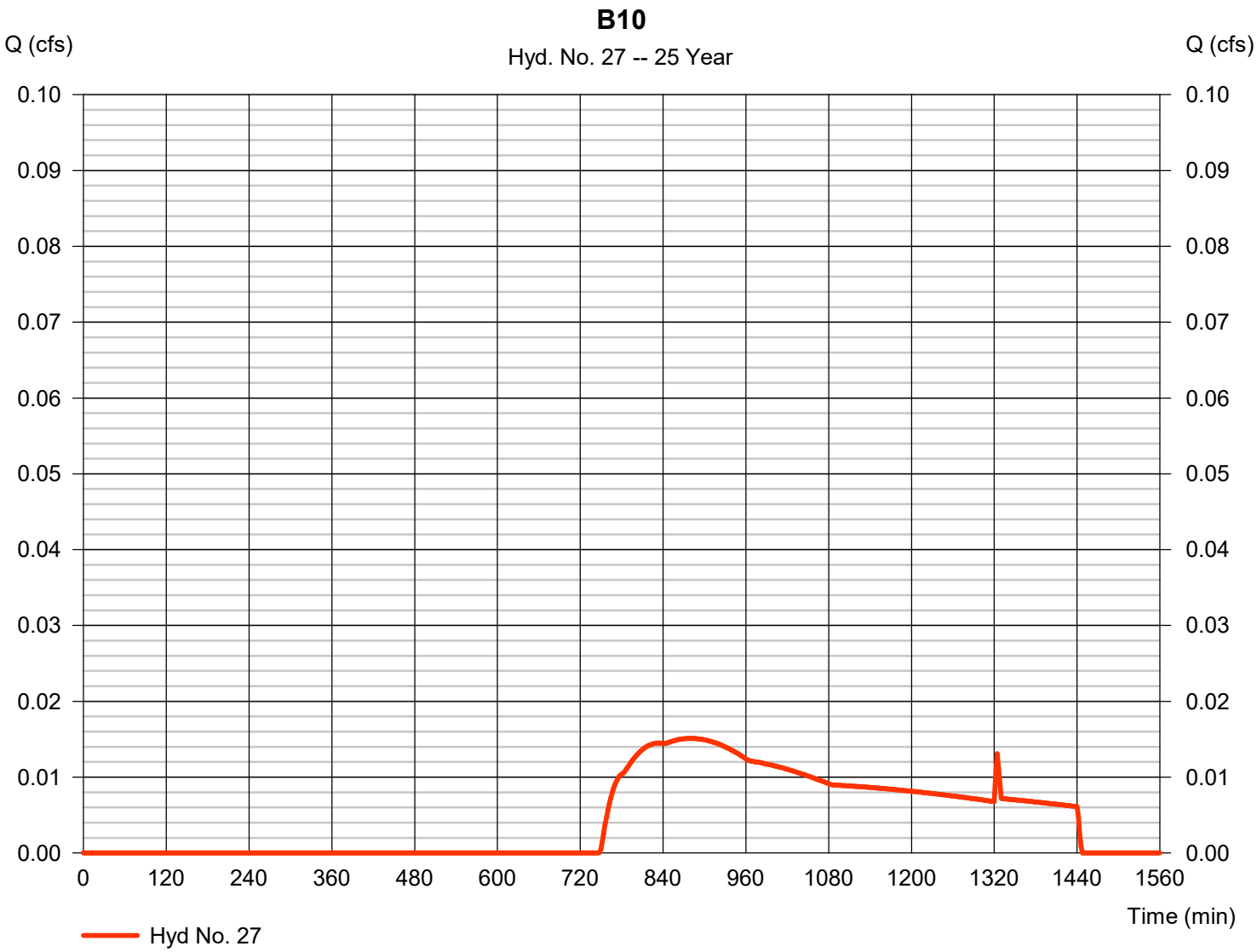
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 27

B10

Hydrograph type	= SCS Runoff	Peak discharge	= 0.015 cfs
Storm frequency	= 25 yrs	Time to peak	= 880 min
Time interval	= 2 min	Hyd. volume	= 409 cuft
Drainage area	= 0.830 ac	Curve number	= 33
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.60 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



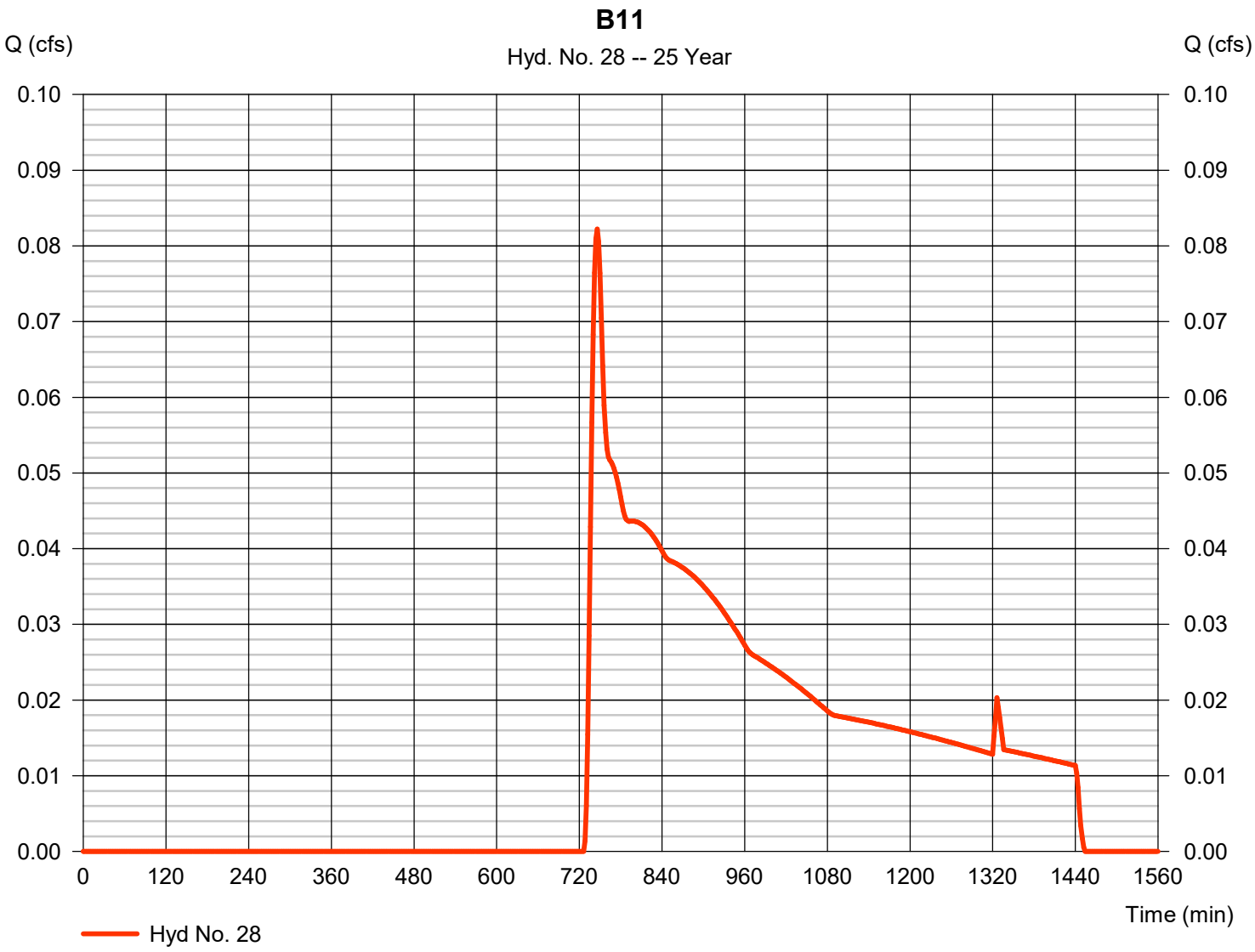
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 28

B11

Hydrograph type	= SCS Runoff	Peak discharge	= 0.082 cfs
Storm frequency	= 25 yrs	Time to peak	= 746 min
Time interval	= 2 min	Hyd. volume	= 1,058 cuft
Drainage area	= 0.950 ac	Curve number	= 37
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.00 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

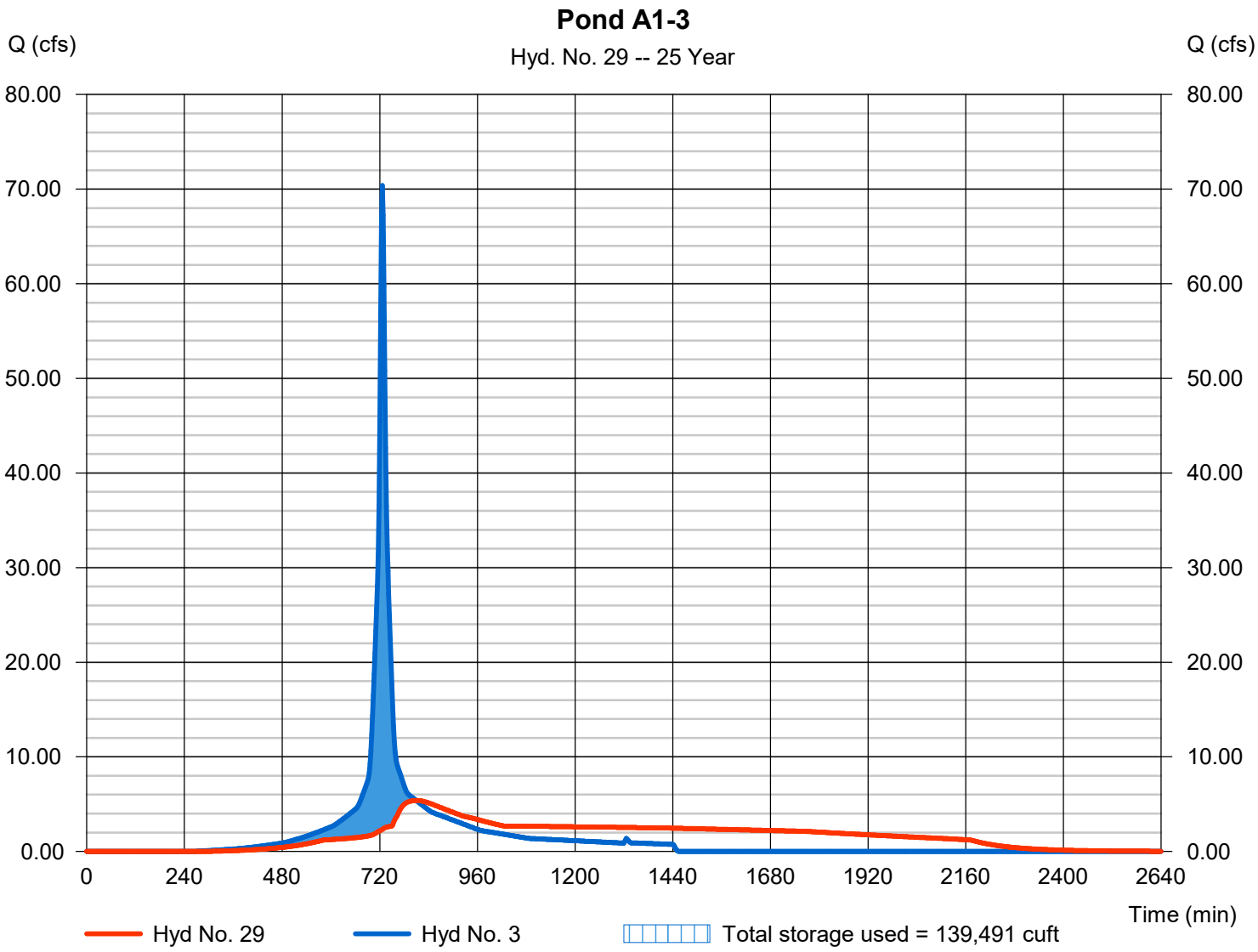
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 29

Pond A1-3

Hydrograph type	= Reservoir	Peak discharge	= 5.383 cfs
Storm frequency	= 25 yrs	Time to peak	= 810 min
Time interval	= 2 min	Hyd. volume	= 248,080 cuft
Inflow hyd. No.	= 3 - A1-3	Max. Elevation	= 133.69 ft
Reservoir name	= A1-3	Max. Storage	= 139,491 cuft

Storage Indication method used. Outflow includes exfiltration.



Hydrograph Report

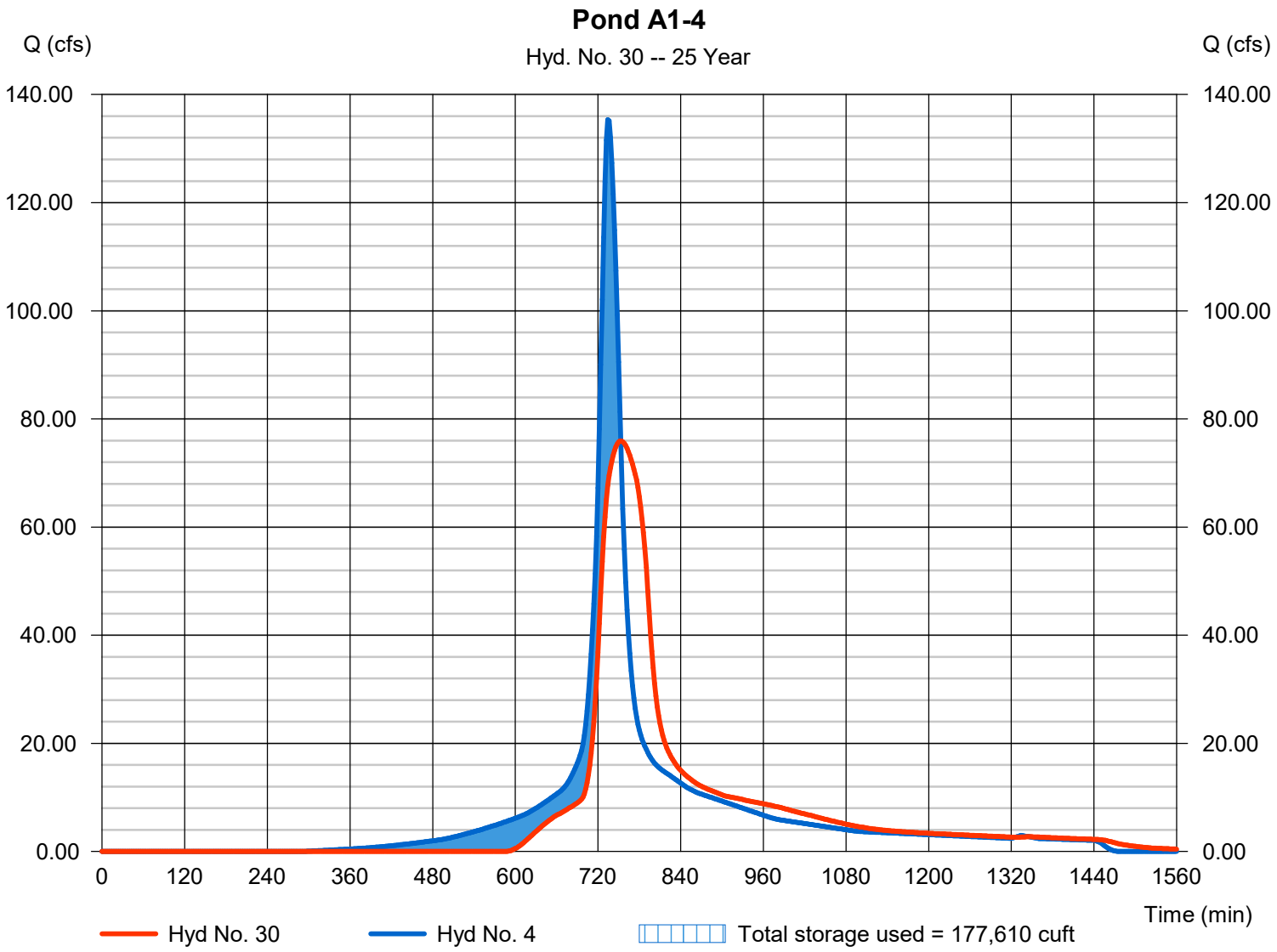
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 30

Pond A1-4

Hydrograph type	= Reservoir	Peak discharge	= 75.95 cfs
Storm frequency	= 25 yrs	Time to peak	= 754 min
Time interval	= 2 min	Hyd. volume	= 624,225 cuft
Inflow hyd. No.	= 4 - A1-4	Max. Elevation	= 137.99 ft
Reservoir name	= A1-4	Max. Storage	= 177,610 cuft

Storage Indication method used.



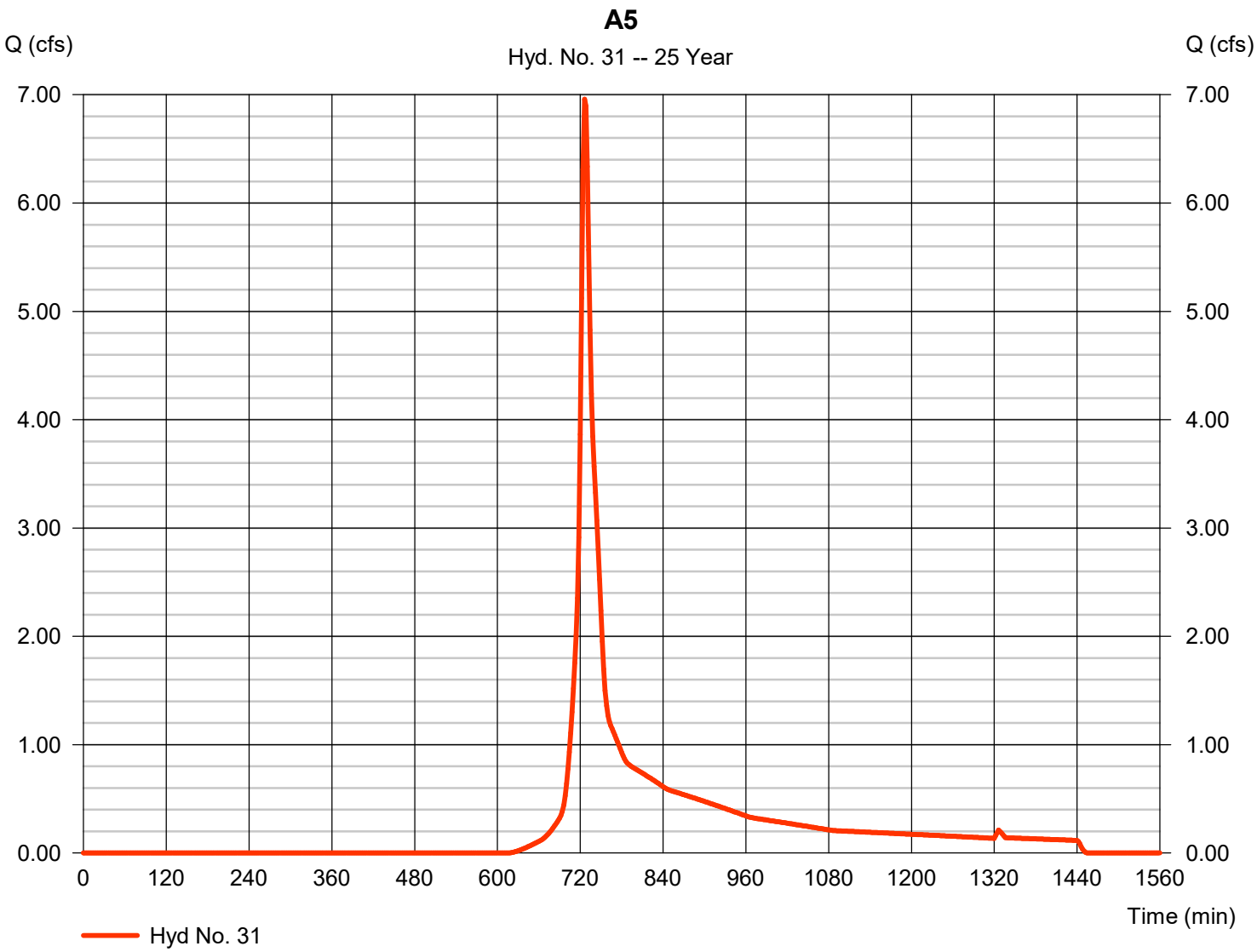
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 31

A5

Hydrograph type	= SCS Runoff	Peak discharge	= 6.957 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 24,824 cuft
Drainage area	= 3.300 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.00 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

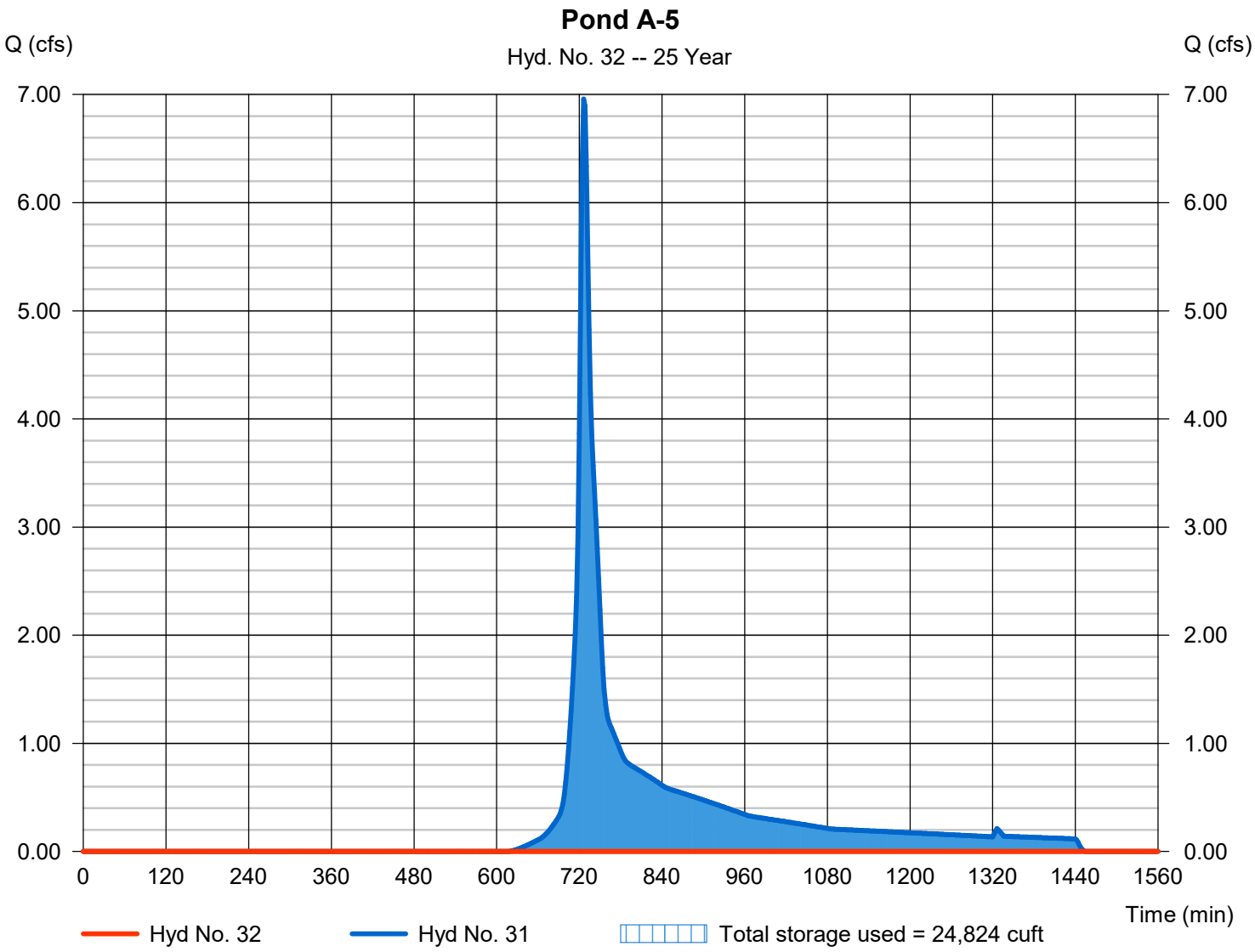
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 32

Pond A-5

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 25 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 31 - A5	Max. Elevation	= 107.01 ft
Reservoir name	= A5	Max. Storage	= 24,824 cuft

Storage Indication method used.



Hydrograph Report

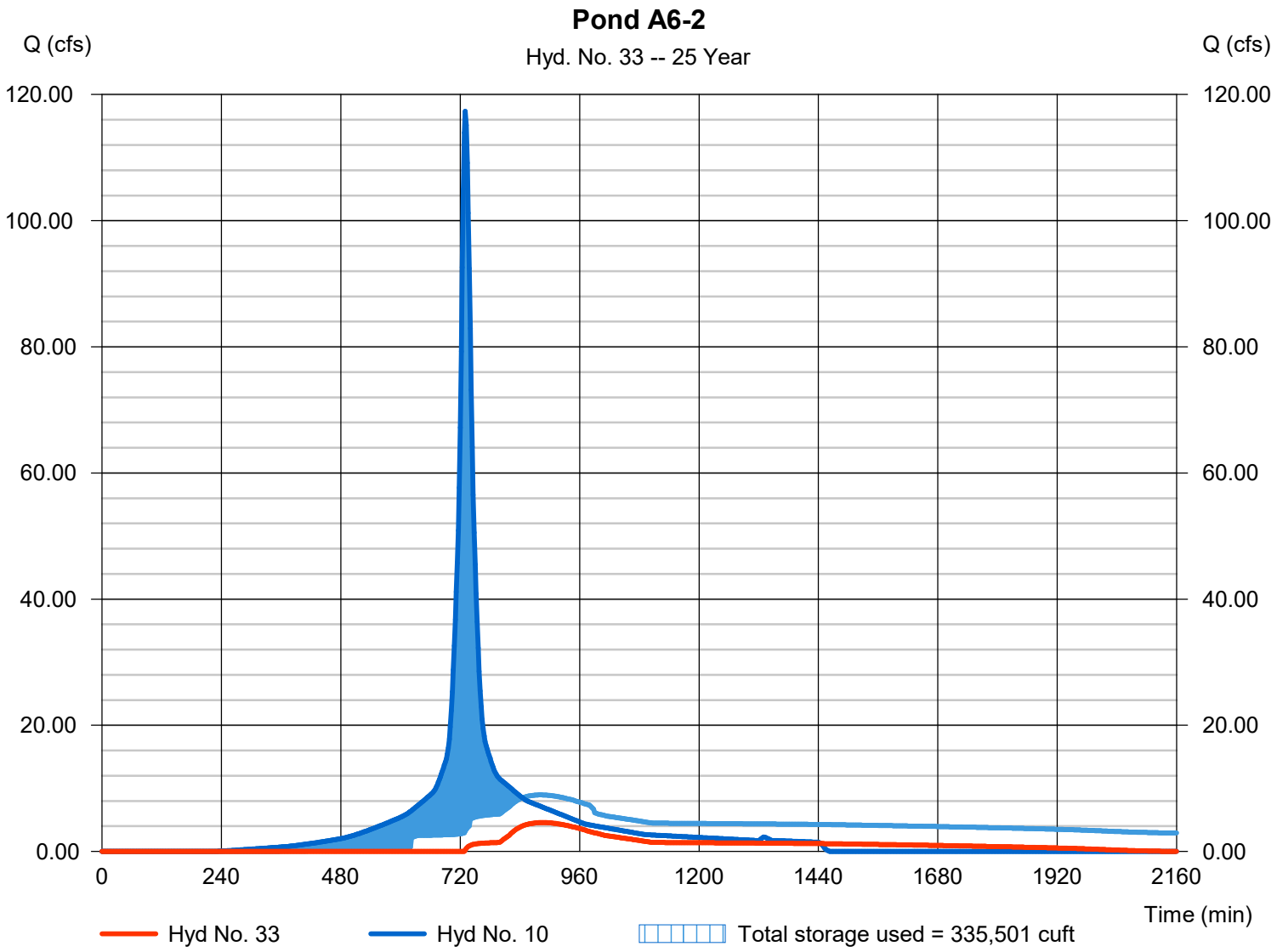
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 33

Pond A6-2

Hydrograph type	= Reservoir	Peak discharge	= 4.577 cfs
Storm frequency	= 25 yrs	Time to peak	= 886 min
Time interval	= 2 min	Hyd. volume	= 120,342 cuft
Inflow hyd. No.	= 10 - A6-2	Max. Elevation	= 118.21 ft
Reservoir name	= A6-2	Max. Storage	= 335,501 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

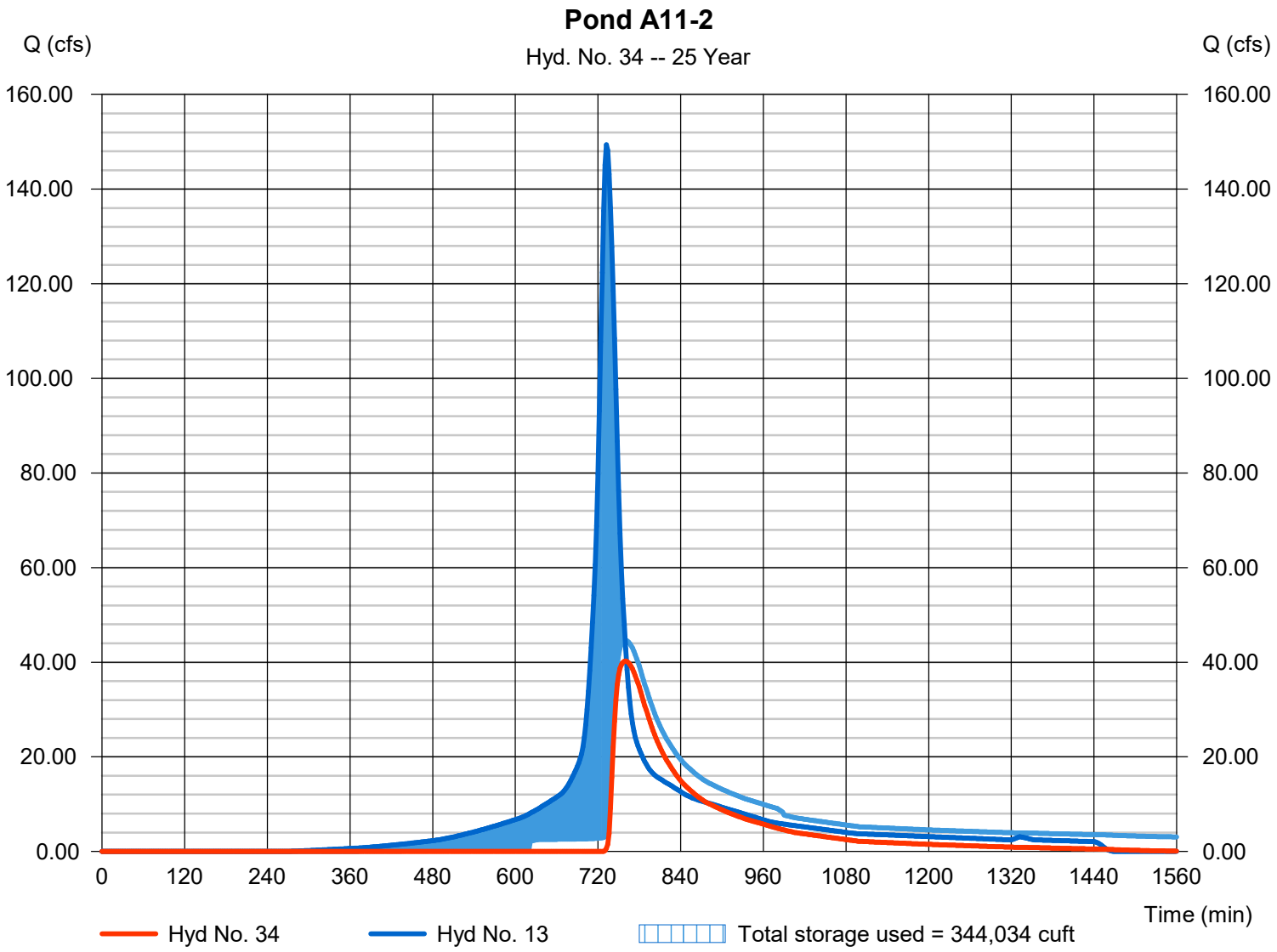
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 34

Pond A11-2

Hydrograph type	= Reservoir	Peak discharge	= 40.25 cfs
Storm frequency	= 25 yrs	Time to peak	= 760 min
Time interval	= 2 min	Hyd. volume	= 296,022 cuft
Inflow hyd. No.	= 13 - A11-2	Max. Elevation	= 118.46 ft
Reservoir name	= A11-2	Max. Storage	= 344,034 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

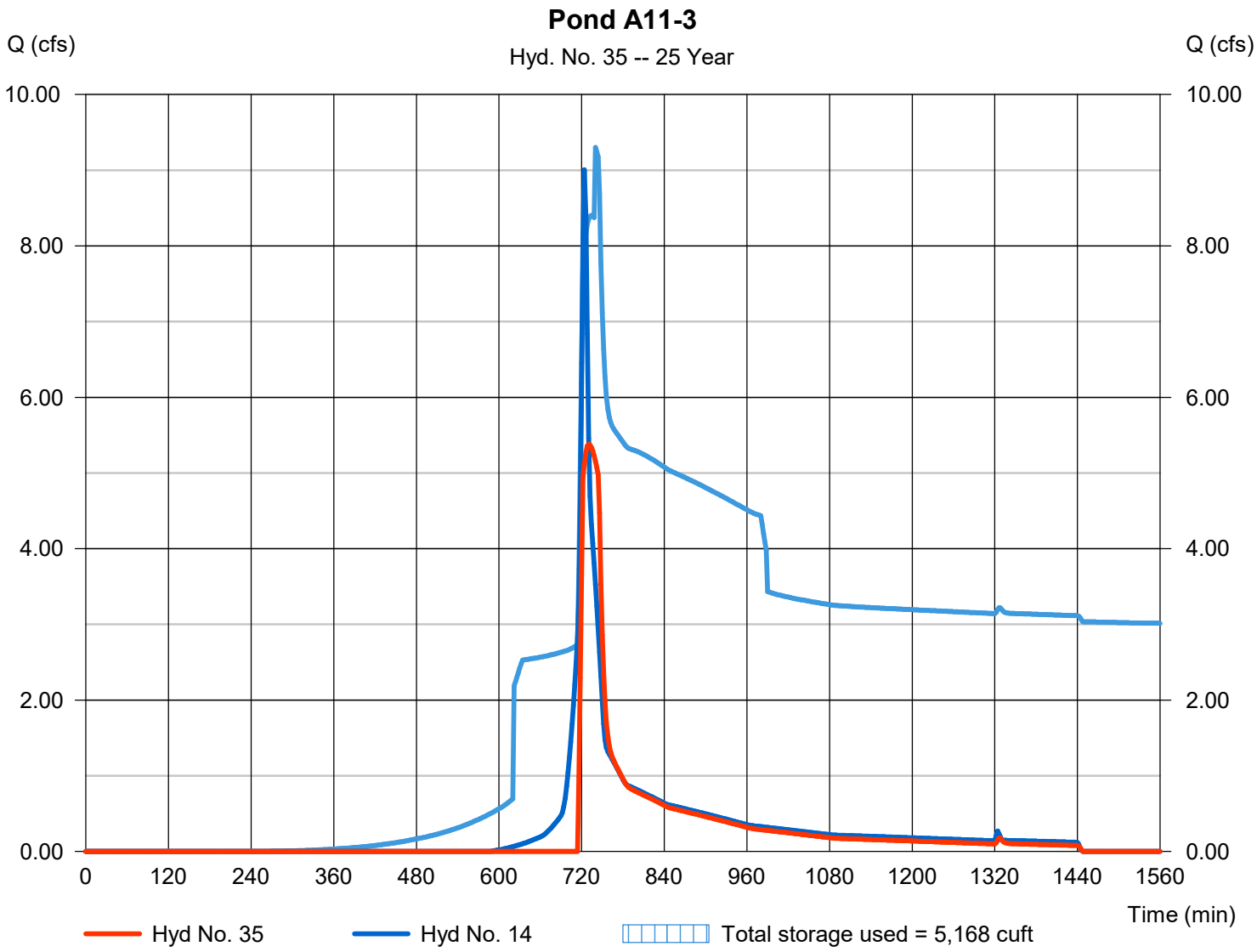
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 35

Pond A11-3

Hydrograph type	= Reservoir	Peak discharge	= 5.382 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 22,488 cuft
Inflow hyd. No.	= 14 - A11-3	Max. Elevation	= 110.12 ft
Reservoir name	= A11-3	Max. Storage	= 5,168 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



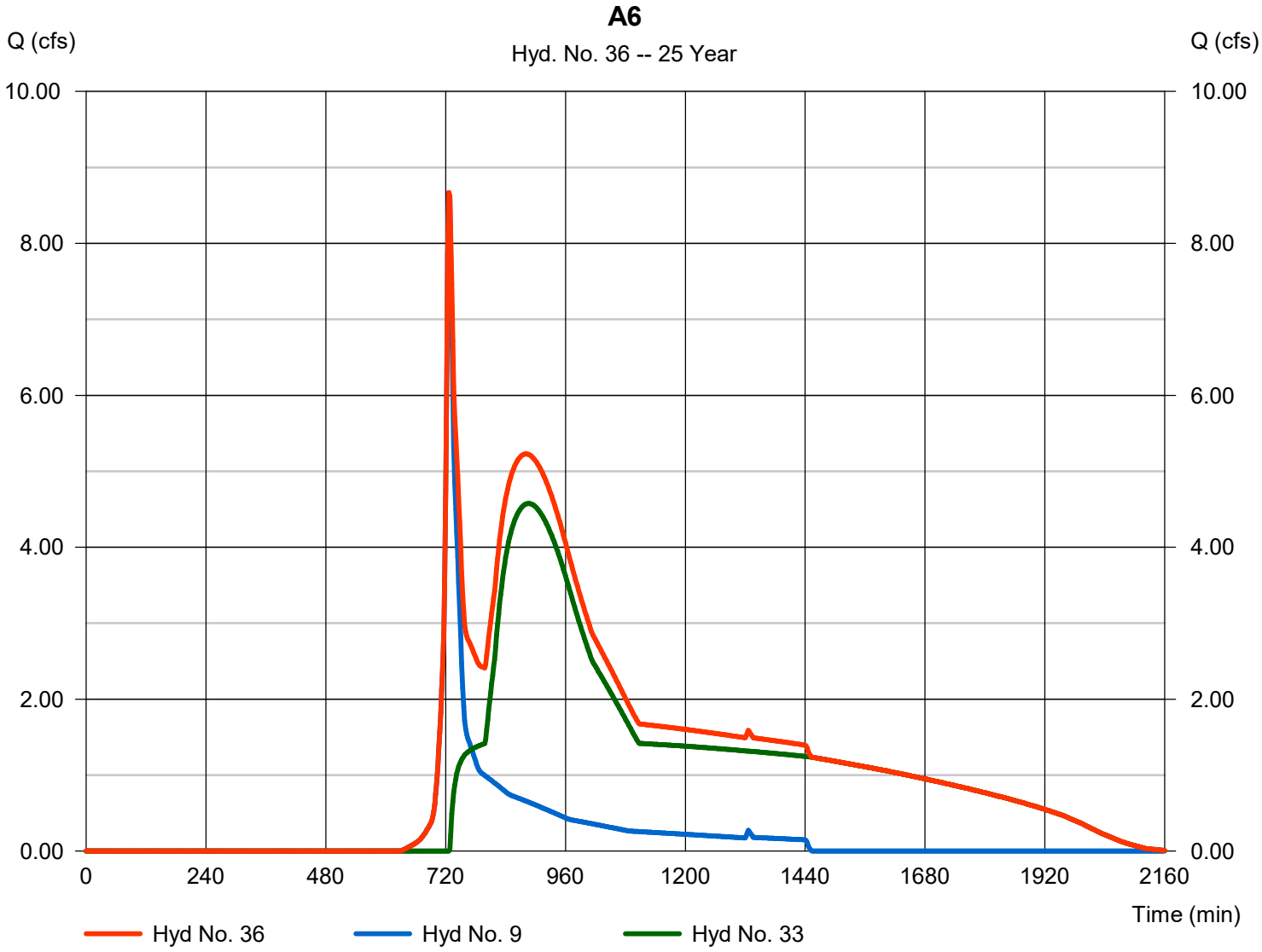
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 36

A6

Hydrograph type	= Combine	Peak discharge	= 8.668 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 151,525 cuft
Inflow hyds.	= 9, 33	Contrib. drain. area	= 4.320 ac



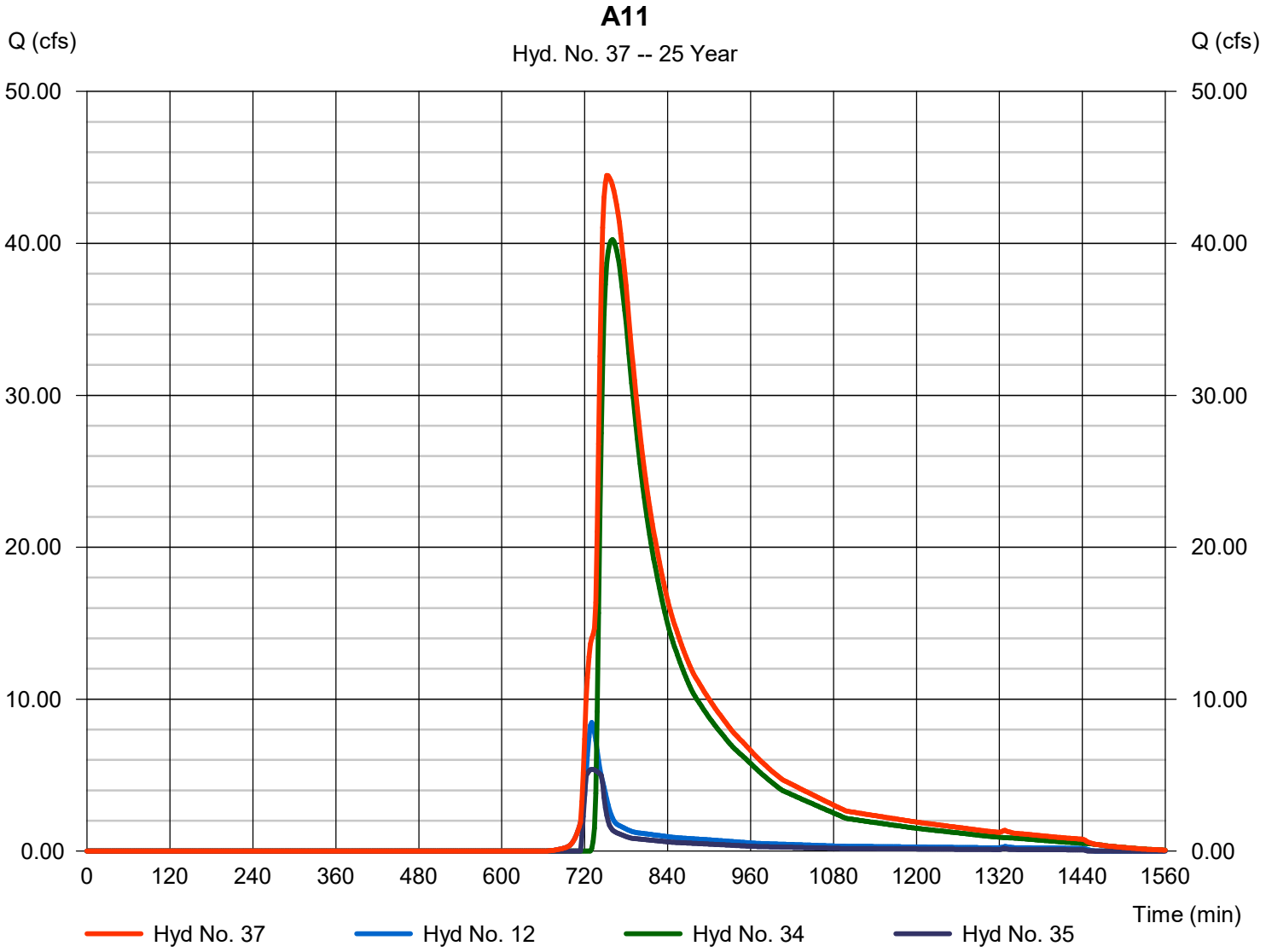
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 37

A11

Hydrograph type	= Combine	Peak discharge	= 44.48 cfs
Storm frequency	= 25 yrs	Time to peak	= 752 min
Time interval	= 2 min	Hyd. volume	= 353,769 cuft
Inflow hyds.	= 12, 34, 35	Contrib. drain. area	= 5.660 ac



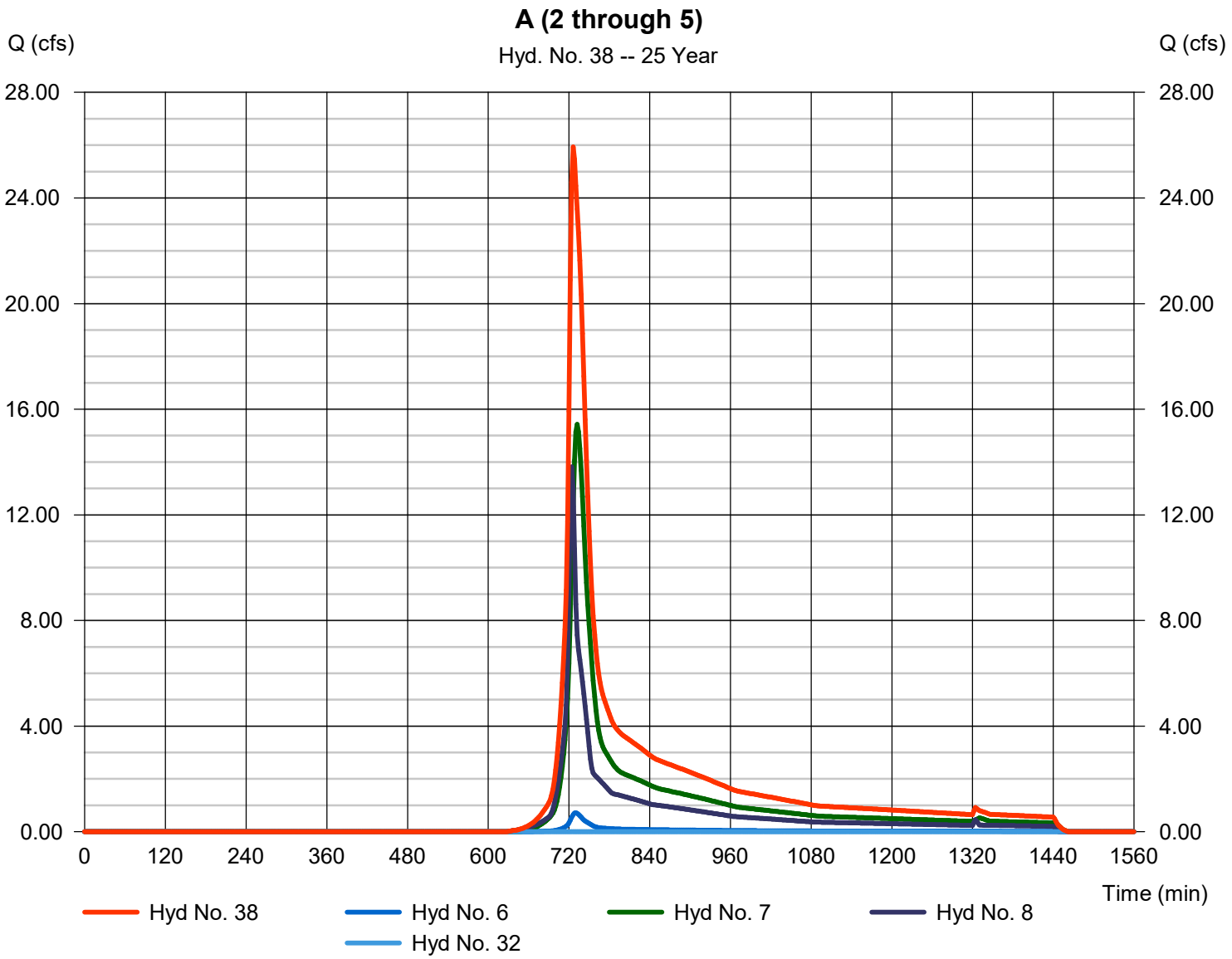
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 38

A (2 through 5)

Hydrograph type	= Combine	Peak discharge	= 25.93 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 112,800 cuft
Inflow hyds.	= 6, 7, 8, 32	Contrib. drain. area	= 17.140 ac



Hydrograph Report

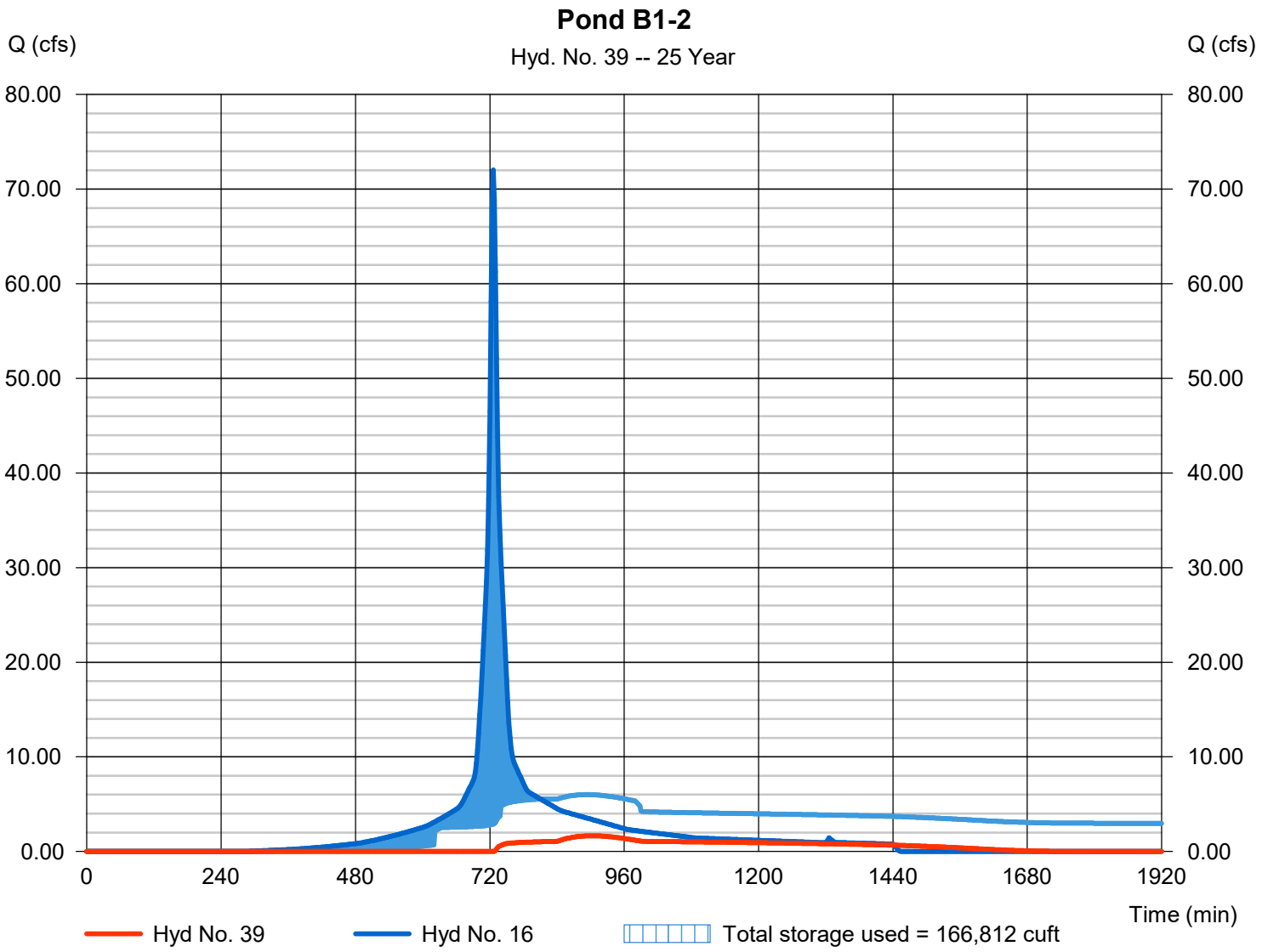
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 39

Pond B1-2

Hydrograph type	= Reservoir	Peak discharge	= 1.654 cfs
Storm frequency	= 25 yrs	Time to peak	= 904 min
Time interval	= 2 min	Hyd. volume	= 48,714 cuft
Inflow hyd. No.	= 16 - B1-2	Max. Elevation	= 133.55 ft
Reservoir name	= B1-2	Max. Storage	= 166,812 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



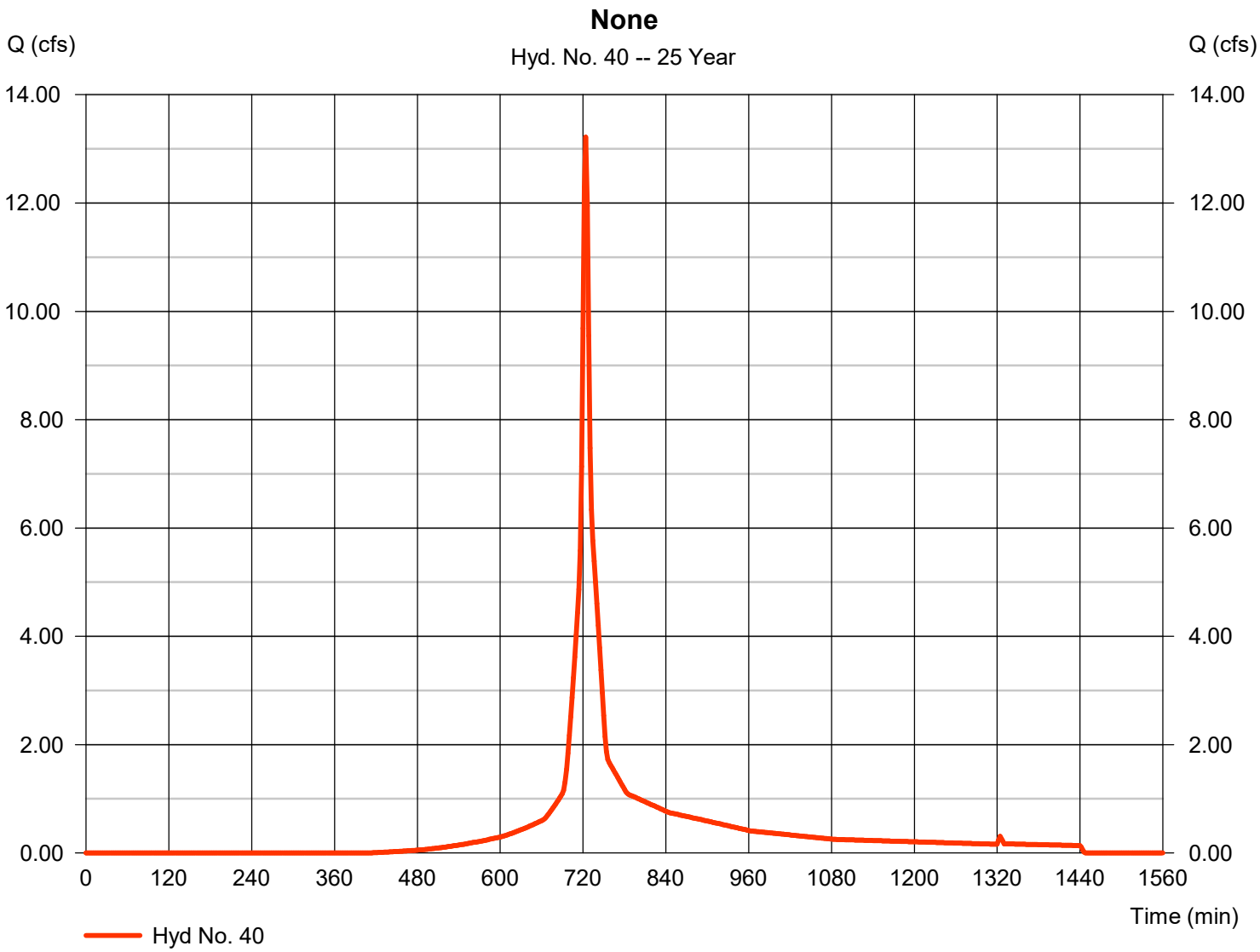
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 40

None

Hydrograph type	= SCS Runoff	Peak discharge	= 13.22 cfs
Storm frequency	= 25 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 39,707 cuft
Drainage area	= 3.200 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

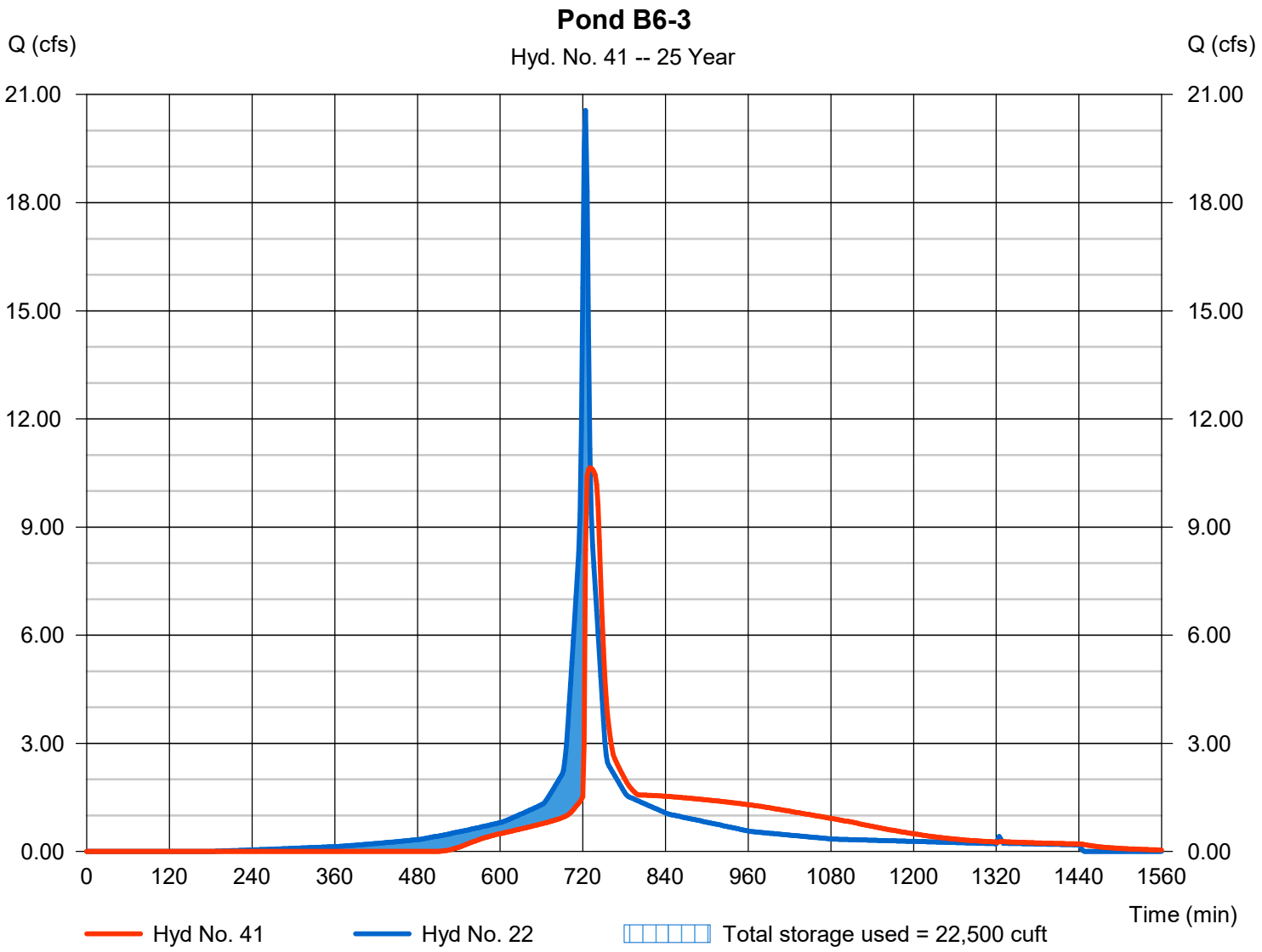
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 41

Pond B6-3

Hydrograph type	= Reservoir	Peak discharge	= 10.64 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 62,826 cuft
Inflow hyd. No.	= 22 - B6-3	Max. Elevation	= 138.66 ft
Reservoir name	= B6-3	Max. Storage	= 22,500 cuft

Storage Indication method used.



Hydrograph Report

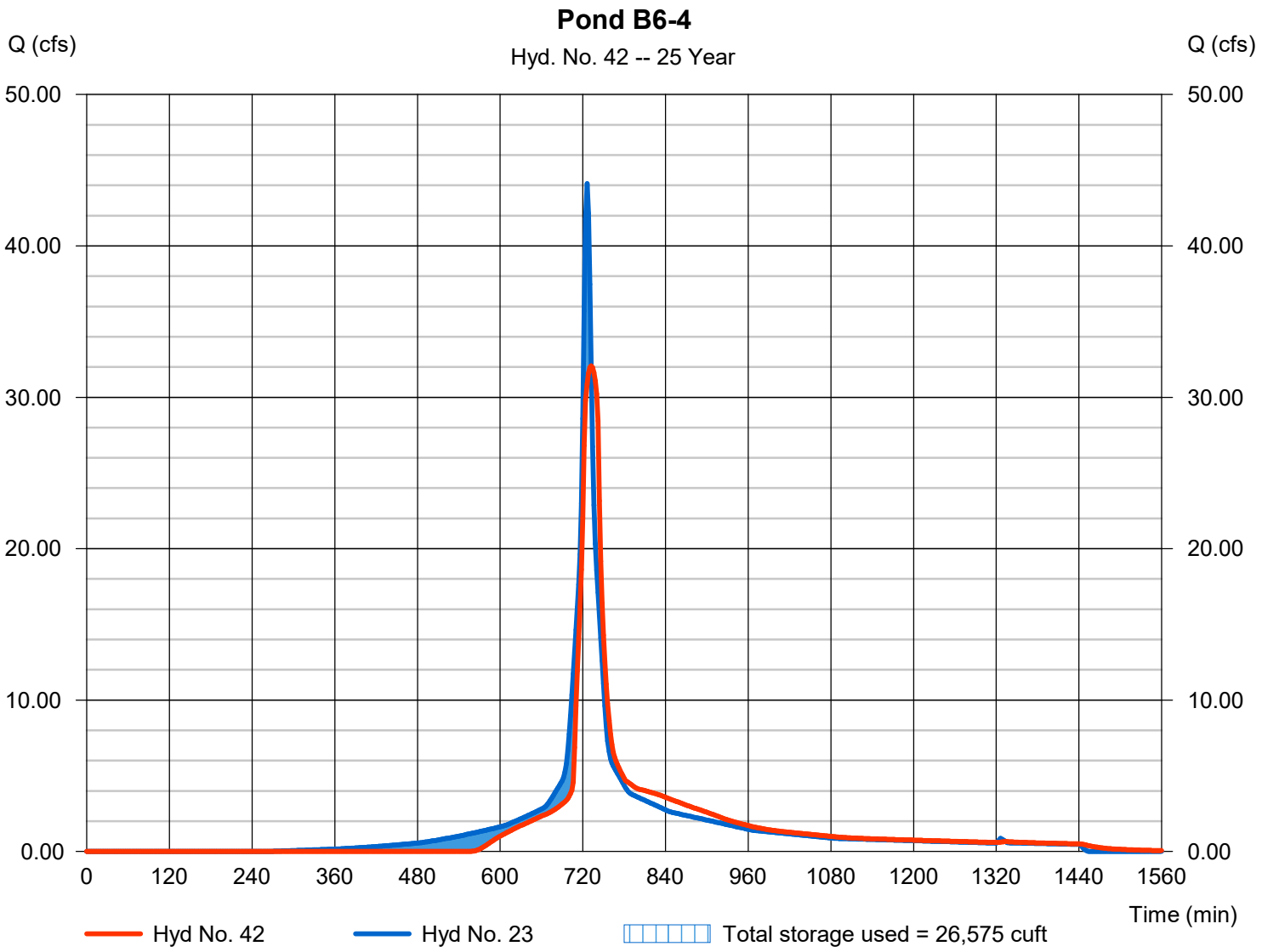
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 42

Pond B6-4

Hydrograph type	= Reservoir	Peak discharge	= 32.08 cfs
Storm frequency	= 25 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 148,732 cuft
Inflow hyd. No.	= 23 - B6-4	Max. Elevation	= 139.26 ft
Reservoir name	= B6-4	Max. Storage	= 26,575 cuft

Storage Indication method used.



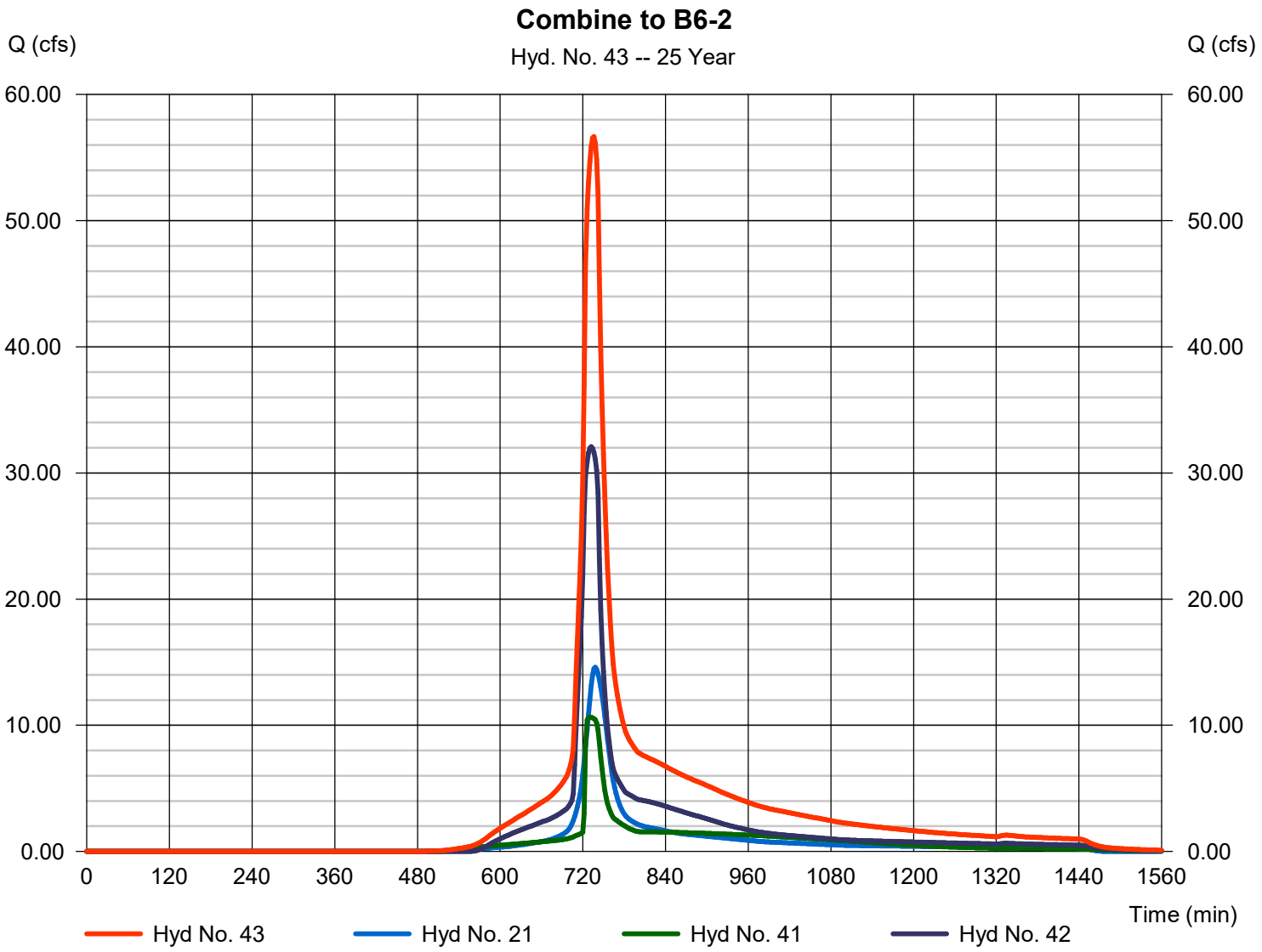
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 43

Combine to B6-2

Hydrograph type	= Combine	Peak discharge	= 56.66 cfs
Storm frequency	= 25 yrs	Time to peak	= 736 min
Time interval	= 2 min	Hyd. volume	= 283,467 cuft
Inflow hyds.	= 21, 41, 42	Contrib. drain. area	= 6.190 ac



Hydrograph Report

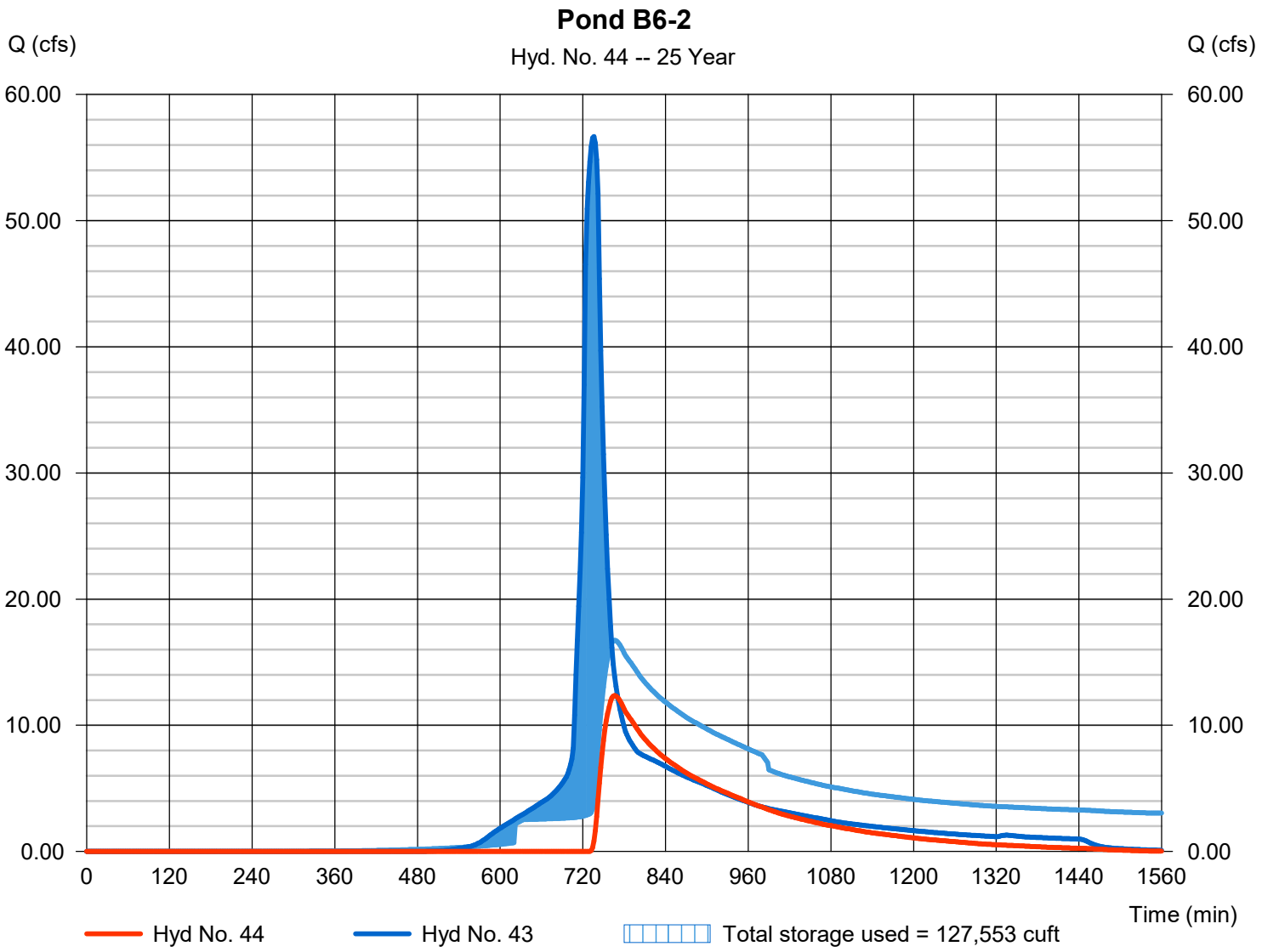
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 44

Pond B6-2

Hydrograph type	= Reservoir	Peak discharge	= 12.36 cfs
Storm frequency	= 25 yrs	Time to peak	= 766 min
Time interval	= 2 min	Hyd. volume	= 137,419 cuft
Inflow hyd. No.	= 43 - Combine to B6-2	Max. Elevation	= 133.54 ft
Reservoir name	= B6-2	Max. Storage	= 127,553 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

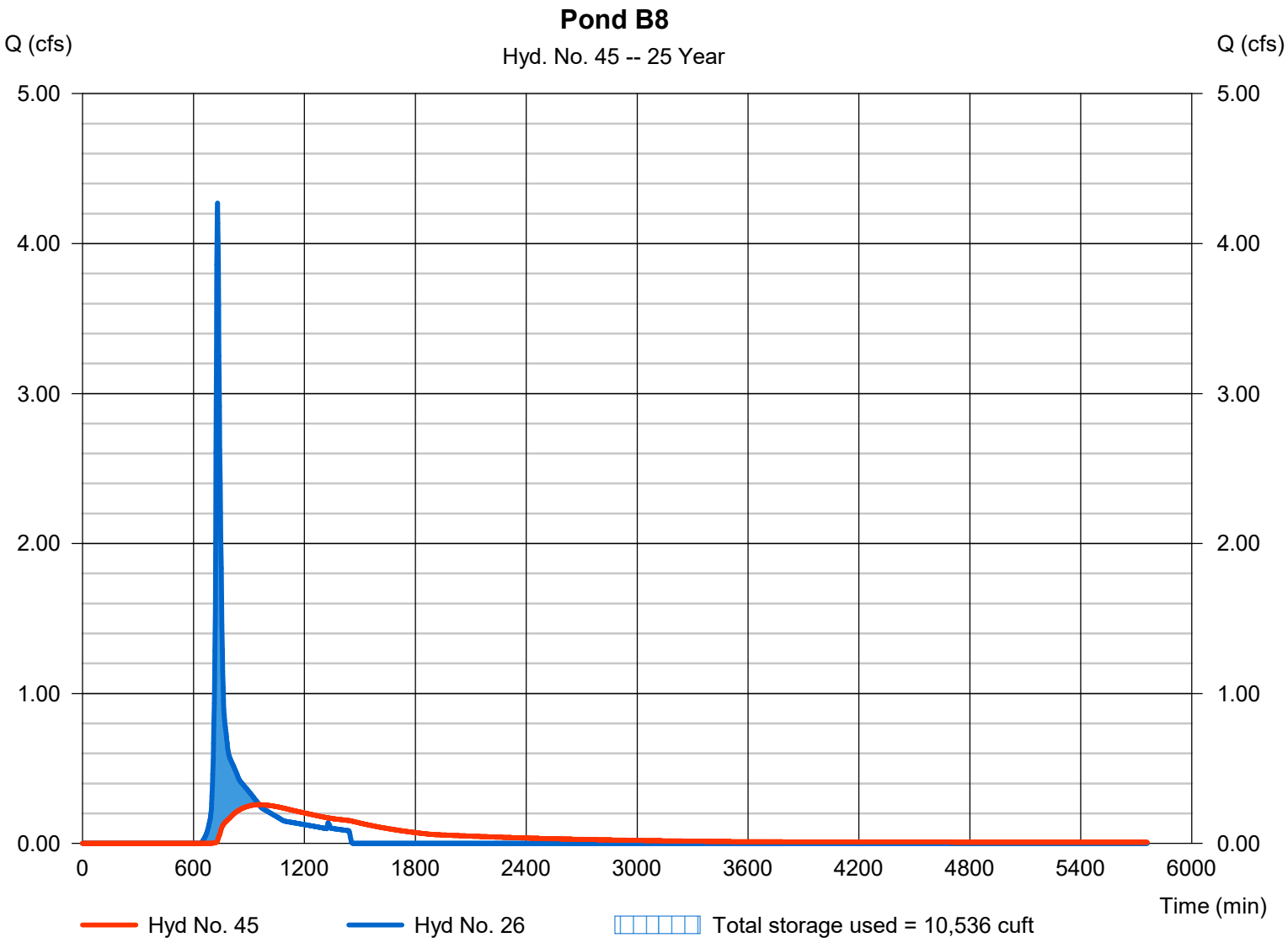
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 45

Pond B8

Hydrograph type	= Reservoir	Peak discharge	= 0.258 cfs
Storm frequency	= 25 yrs	Time to peak	= 954 min
Time interval	= 2 min	Hyd. volume	= 15,372 cuft
Inflow hyd. No.	= 26 - B8	Max. Elevation	= 132.35 ft
Reservoir name	= B8	Max. Storage	= 10,536 cuft

Storage Indication method used.



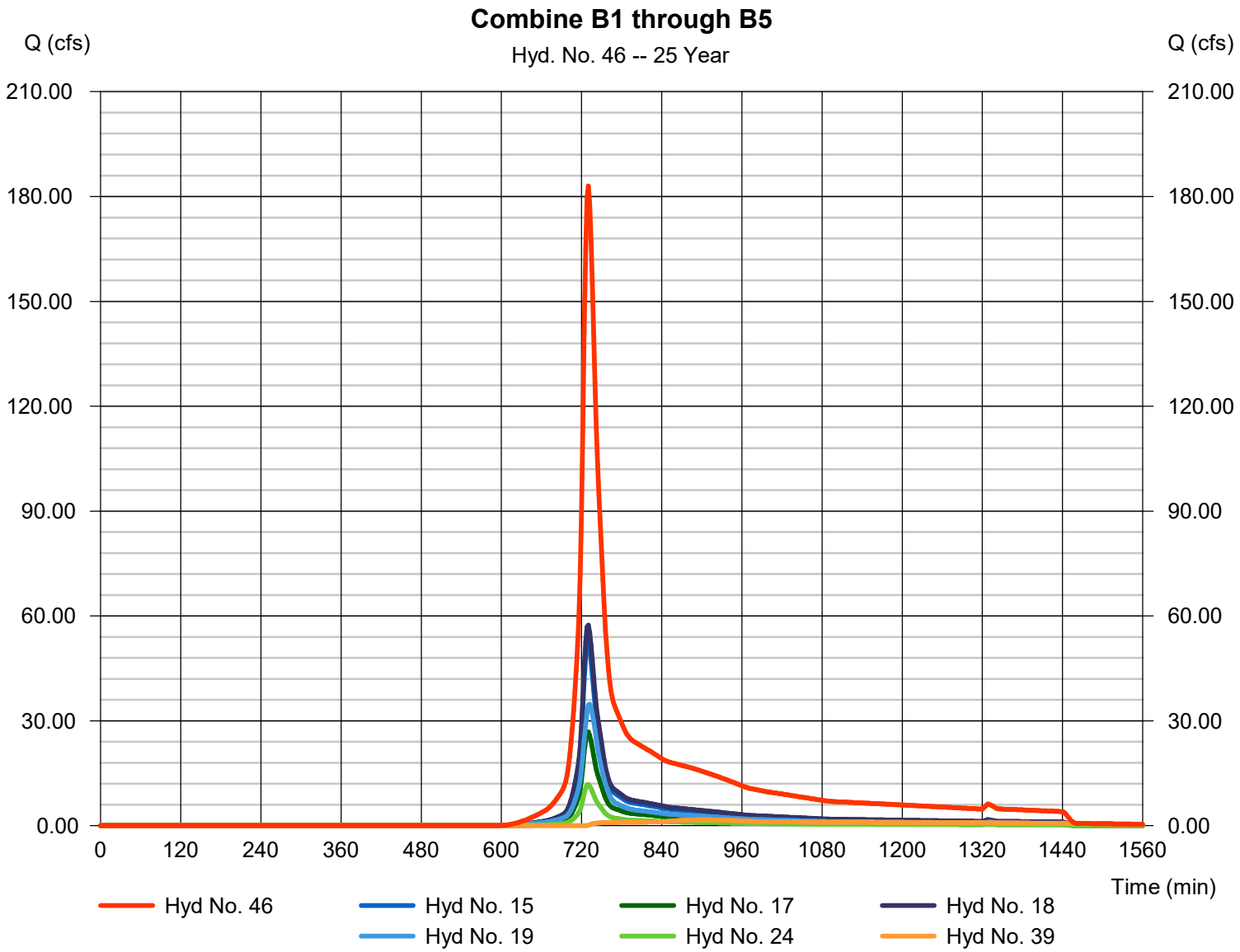
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 46

Combine B1 through B5

Hydrograph type	= Combine	Peak discharge	= 183.02 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 781,362 cuft
Inflow hyds.	= 15, 17, 18, 19, 24, 39	Contrib. drain. area	= 90.160 ac



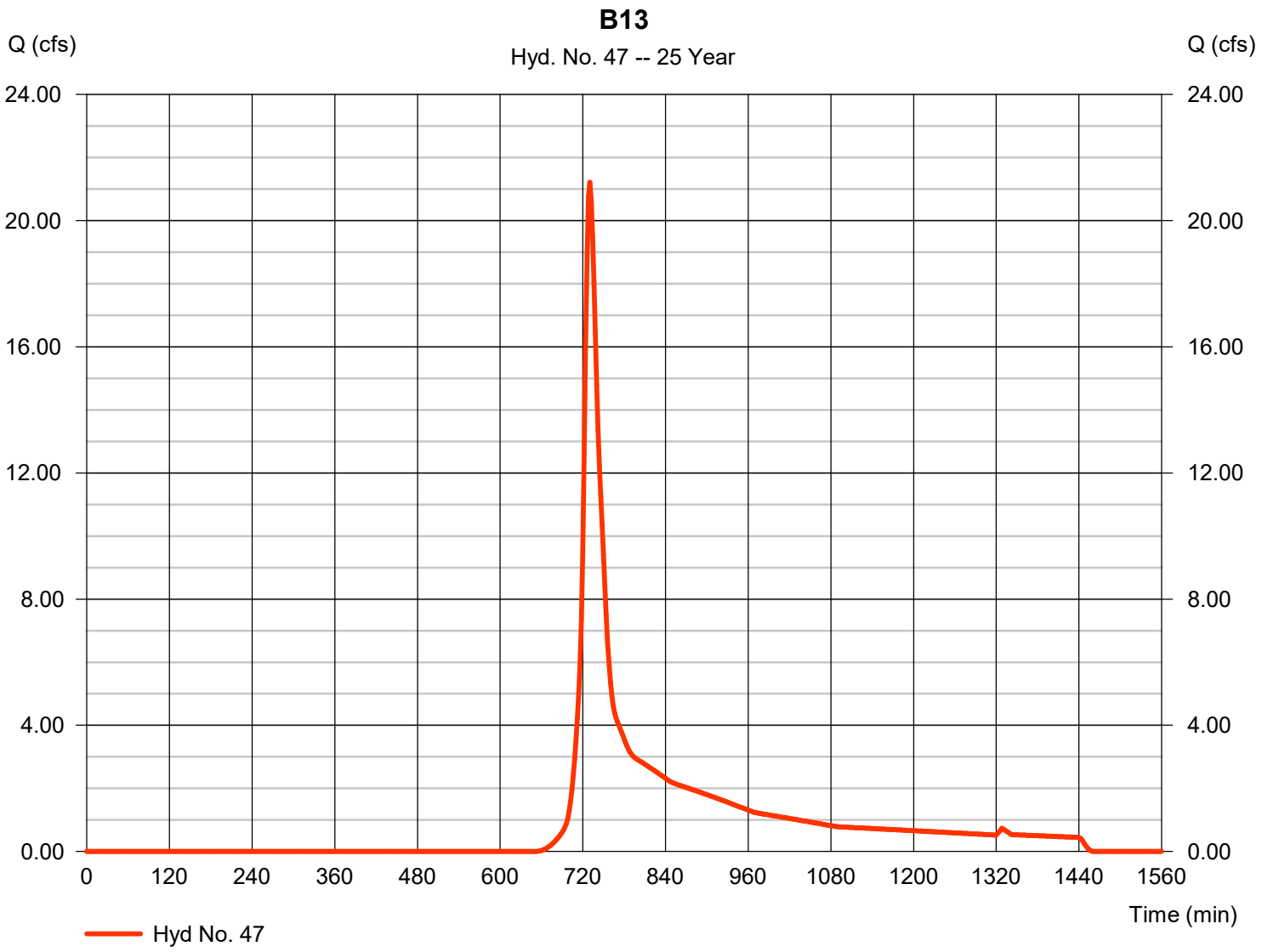
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 47

B13

Hydrograph type	= SCS Runoff	Peak discharge	= 21.22 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 87,396 cuft
Drainage area	= 13.390 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.40 min
Total precip.	= 5.85 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



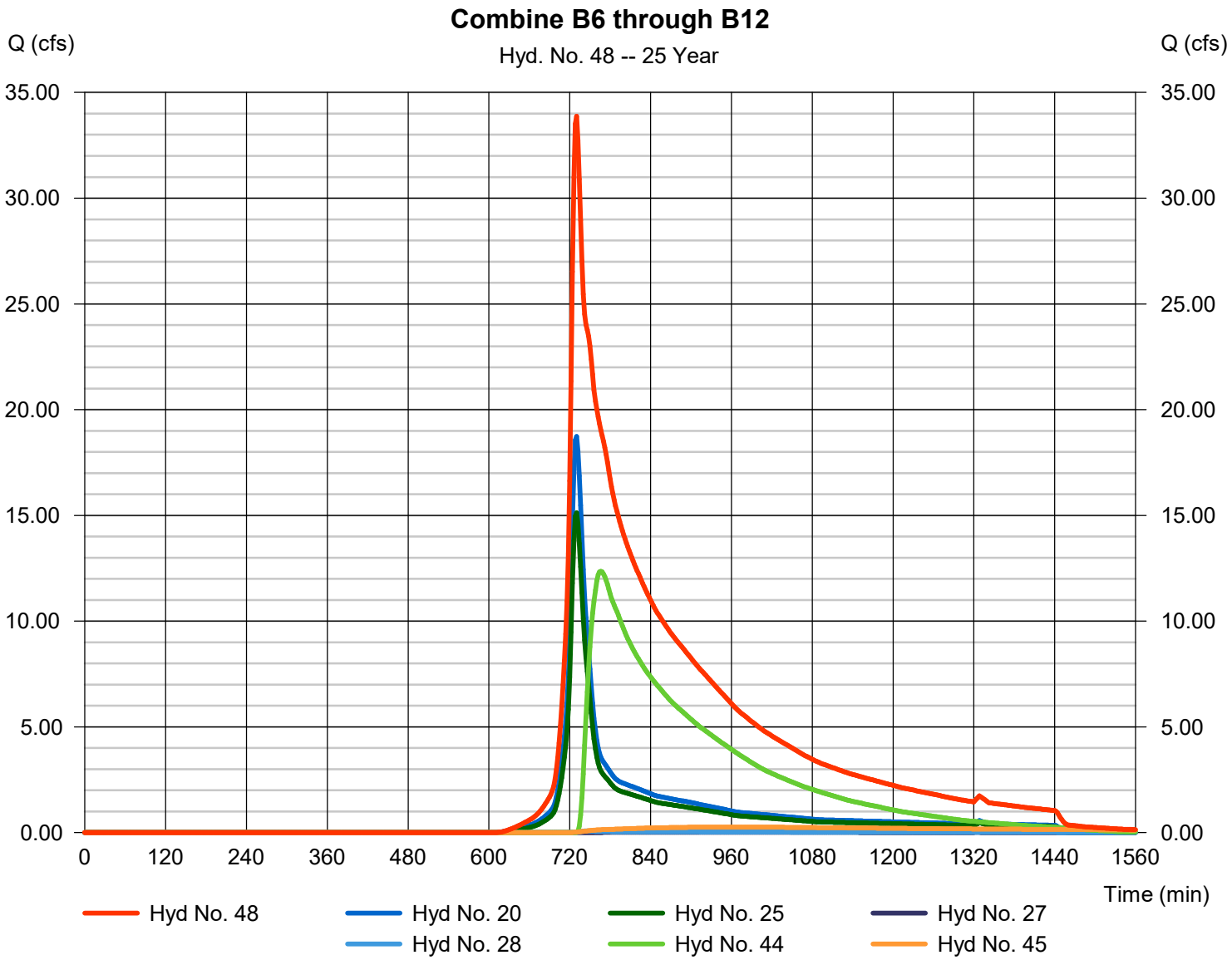
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 48

Combine B6 through B12

Hydrograph type	= Combine	Peak discharge	= 33.88 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 288,742 cuft
Inflow hyds.	= 20, 25, 27, 28, 44, 45	Contrib. drain. area	= 18.740 ac



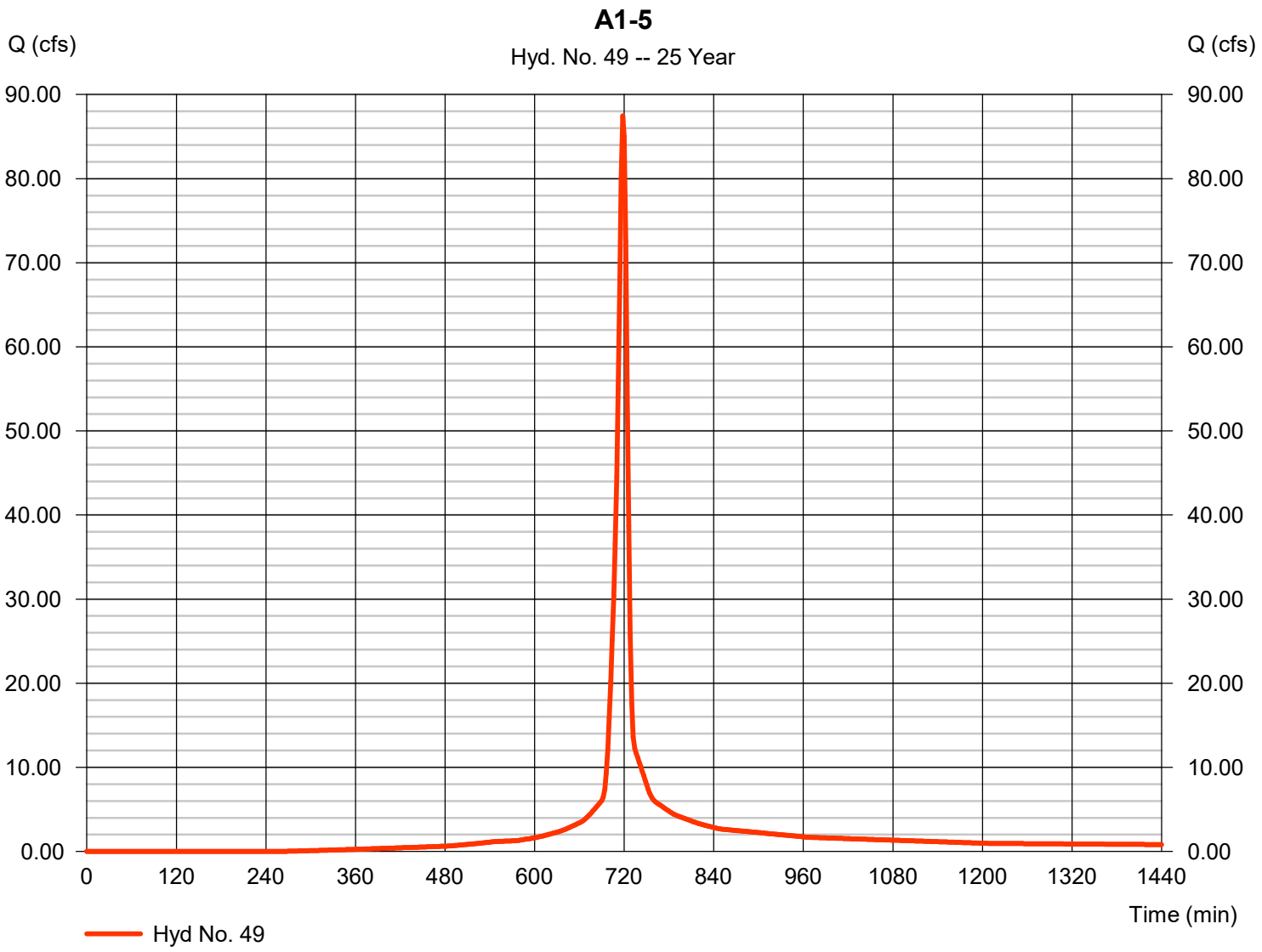
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 49

A1-5

Hydrograph type	= SCS Runoff	Peak discharge	= 87.48 cfs
Storm frequency	= 25 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 208,305 cuft
Drainage area	= 13.120 ac	Curve number	= 87
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.00 min
Total precip.	= 5.85 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

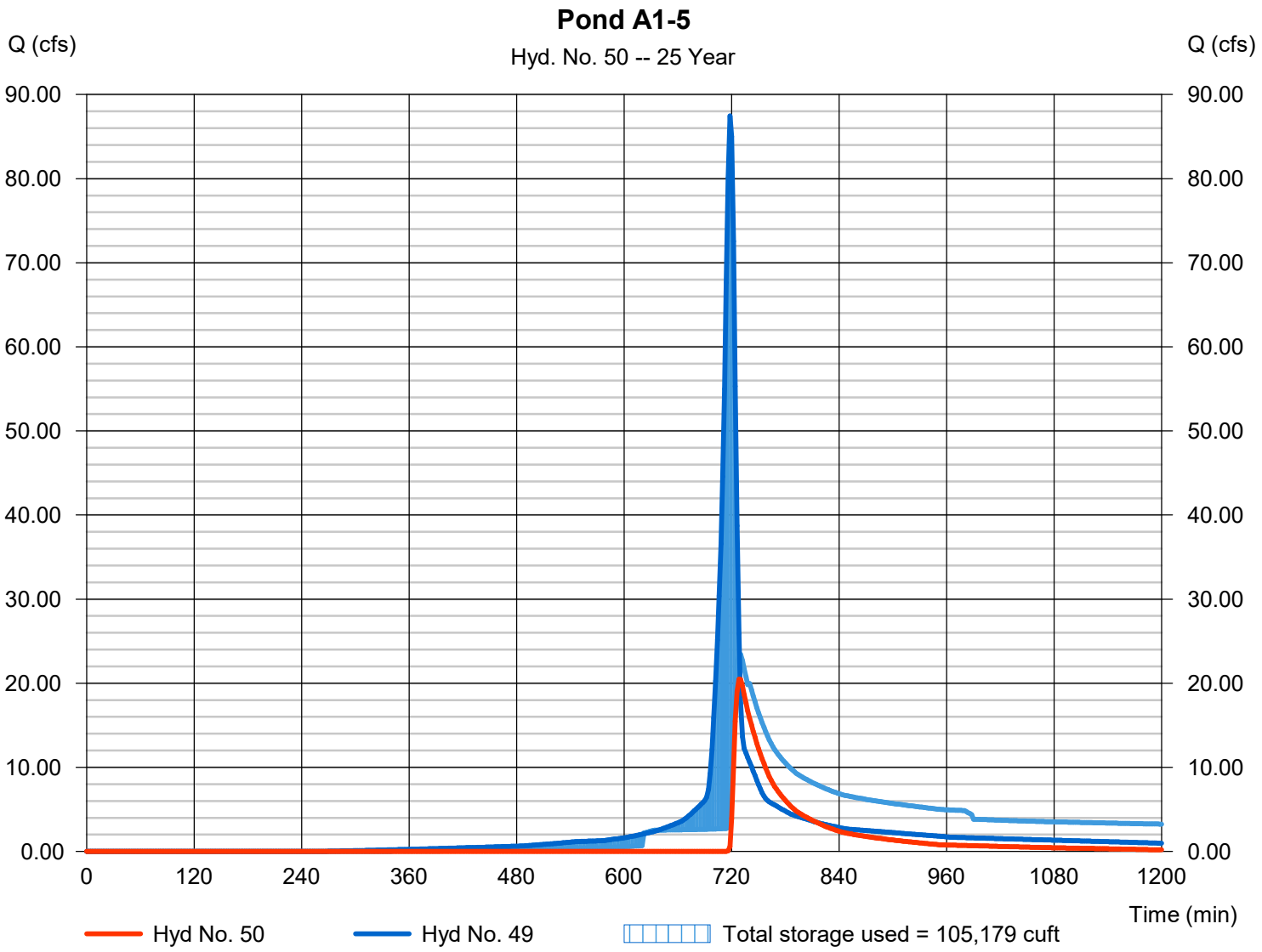
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 50

Pond A1-5

Hydrograph type	= Reservoir	Peak discharge	= 20.48 cfs
Storm frequency	= 25 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 75,993 cuft
Inflow hyd. No.	= 49 - A1-5	Max. Elevation	= 135.59 ft
Reservoir name	= A1-5	Max. Storage	= 105,179 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



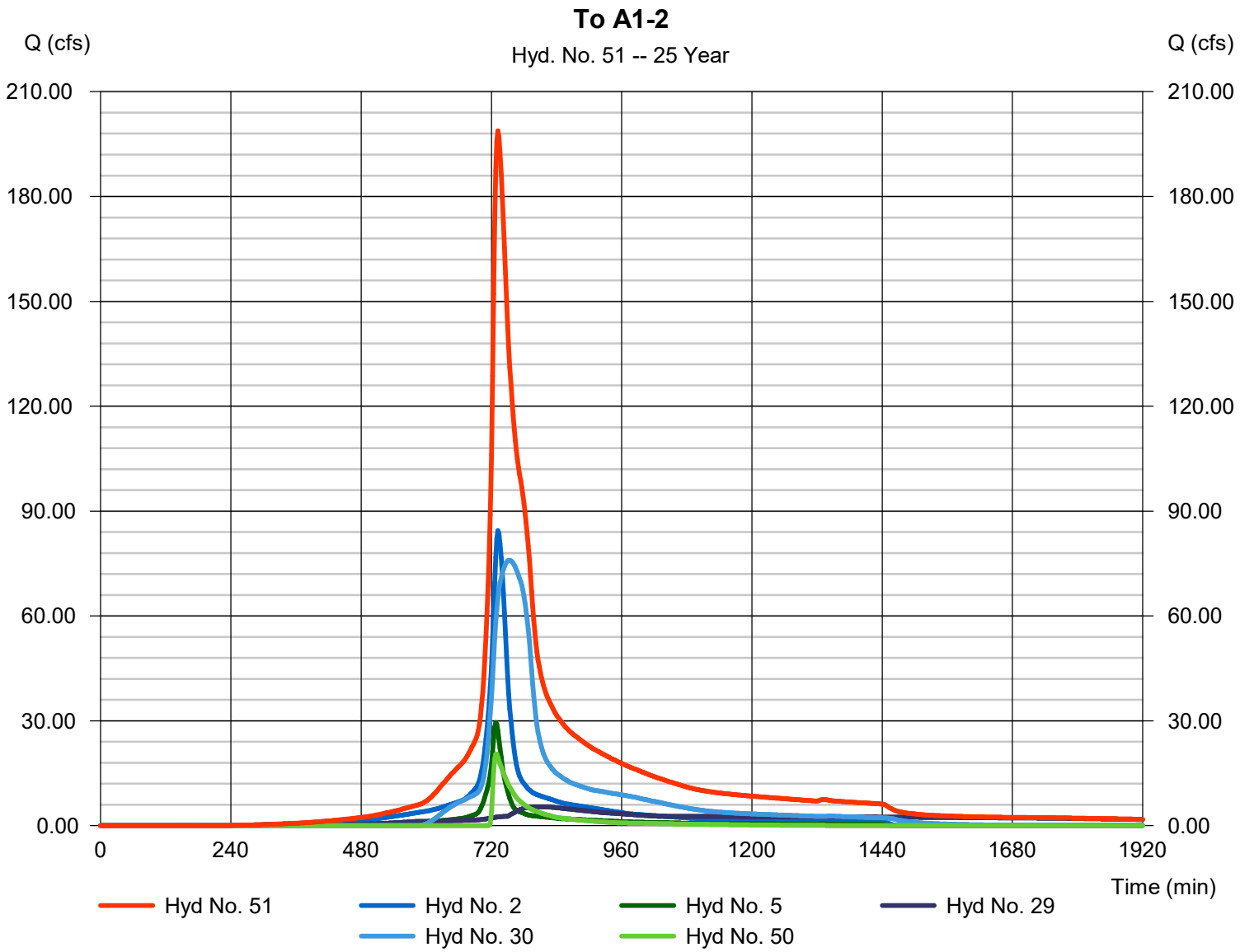
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 51

To A1-2

Hydrograph type	= Combine	Peak discharge	= 198.82 cfs
Storm frequency	= 25 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 1,450,910 cuft
Inflow hyds.	= 2, 5, 29, 30, 50	Contrib. drain. area	= 29.920 ac



Hydrograph Report

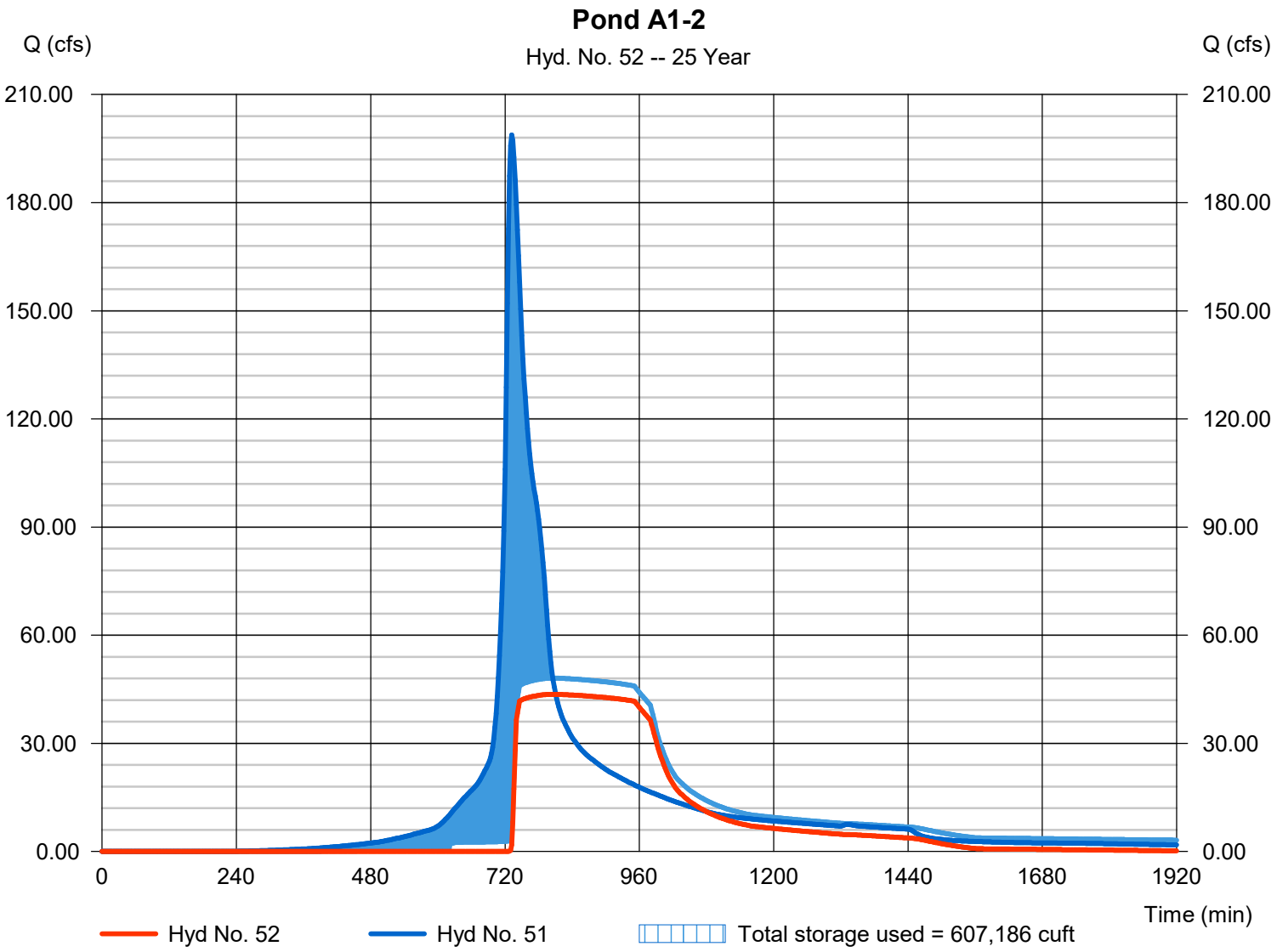
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 52

Pond A1-2

Hydrograph type	= Reservoir	Peak discharge	= 43.58 cfs
Storm frequency	= 25 yrs	Time to peak	= 806 min
Time interval	= 2 min	Hyd. volume	= 889,165 cuft
Inflow hyd. No.	= 51 - To A1-2	Max. Elevation	= 126.70 ft
Reservoir name	= A1-2	Max. Storage	= 607,186 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



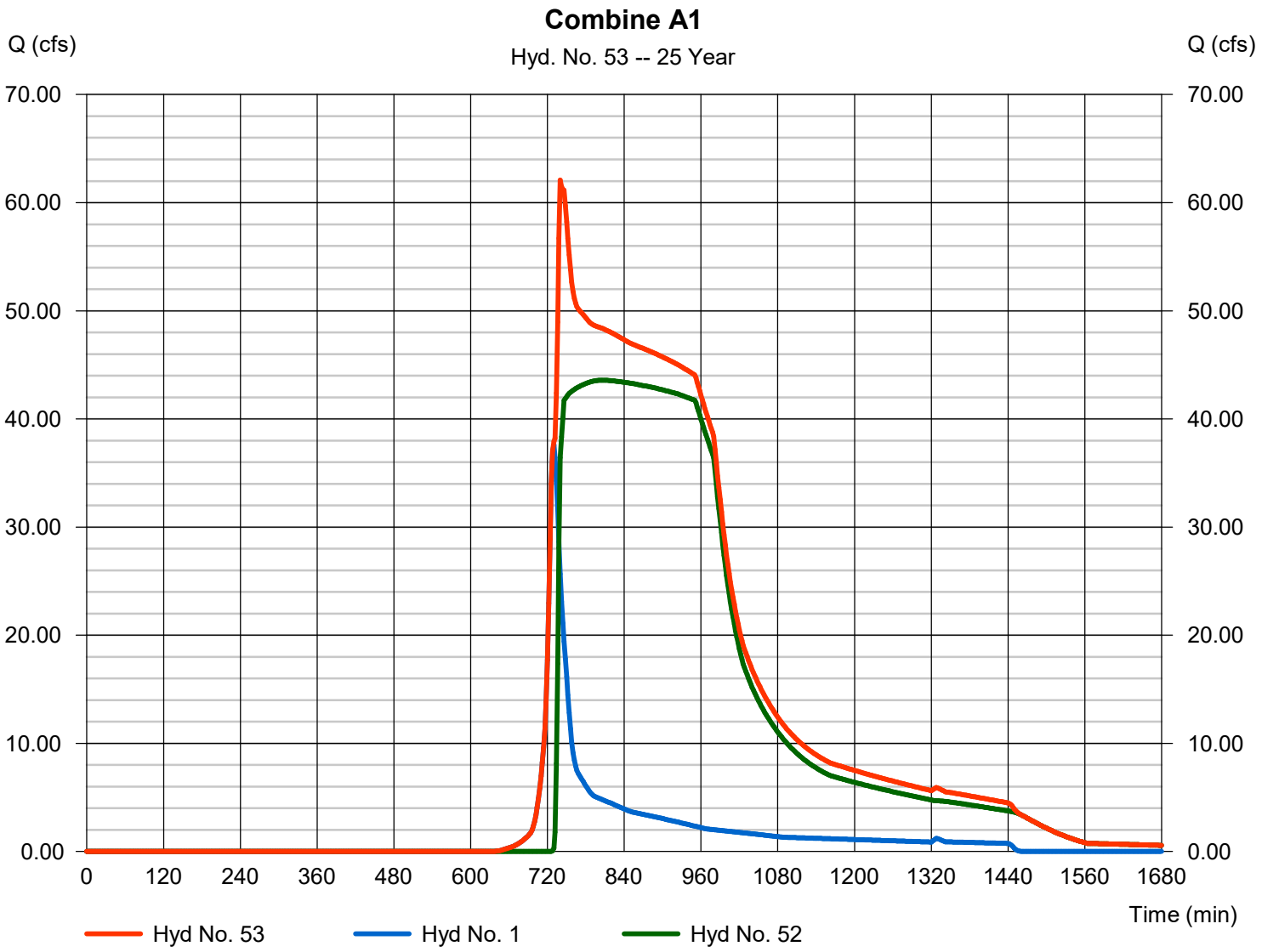
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 53

Combine A1

Hydrograph type	= Combine	Peak discharge	= 62.10 cfs
Storm frequency	= 25 yrs	Time to peak	= 740 min
Time interval	= 2 min	Hyd. volume	= 1,041,198 cuft
Inflow hyds.	= 1, 52	Contrib. drain. area	= 21.310 ac



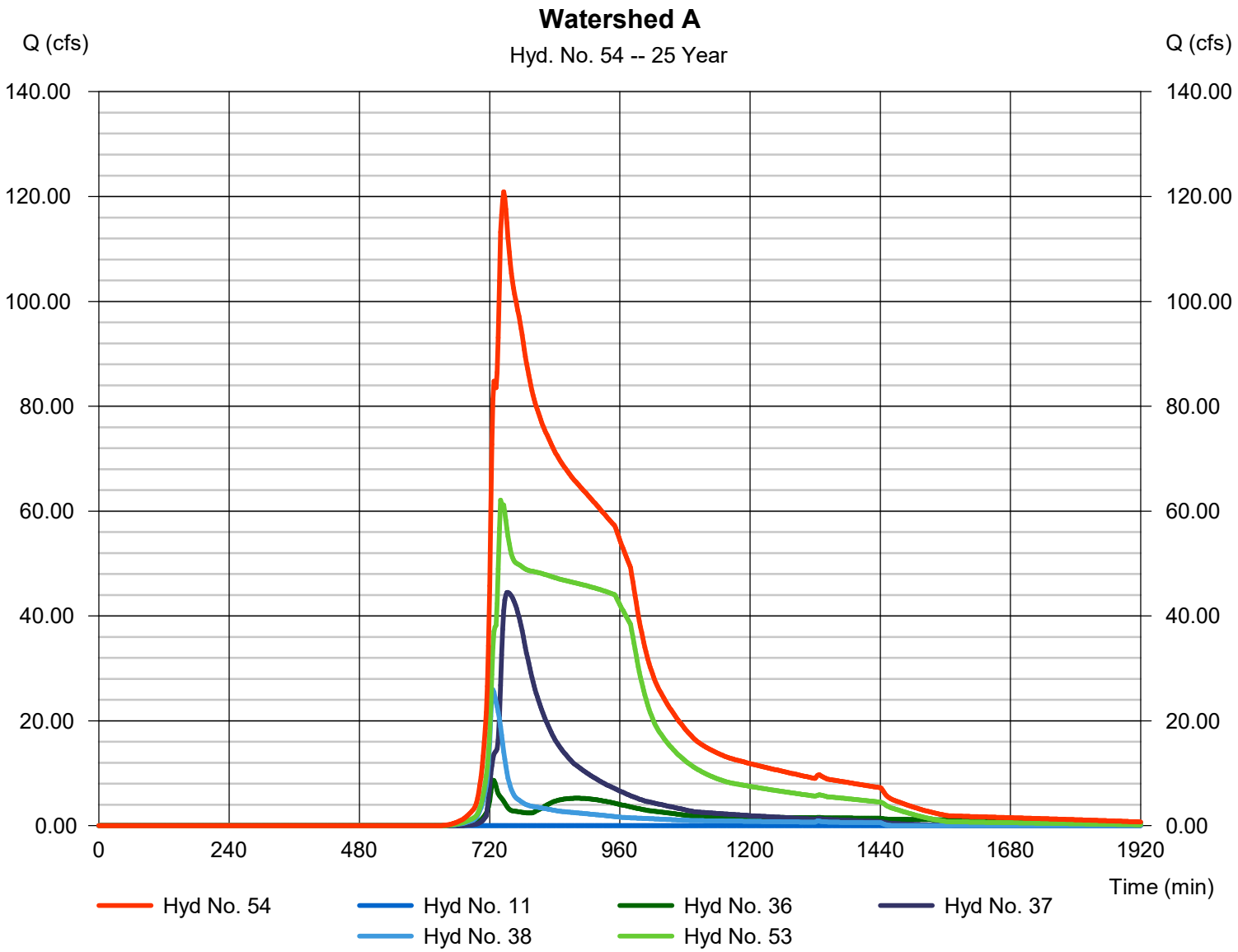
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 54

Watershed A

Hydrograph type	= Combine	Peak discharge	= 120.91 cfs
Storm frequency	= 25 yrs	Time to peak	= 746 min
Time interval	= 2 min	Hyd. volume	= 1,660,156 cuft
Inflow hyds.	= 11, 36, 37, 38, 53	Contrib. drain. area	= 1.750 ac



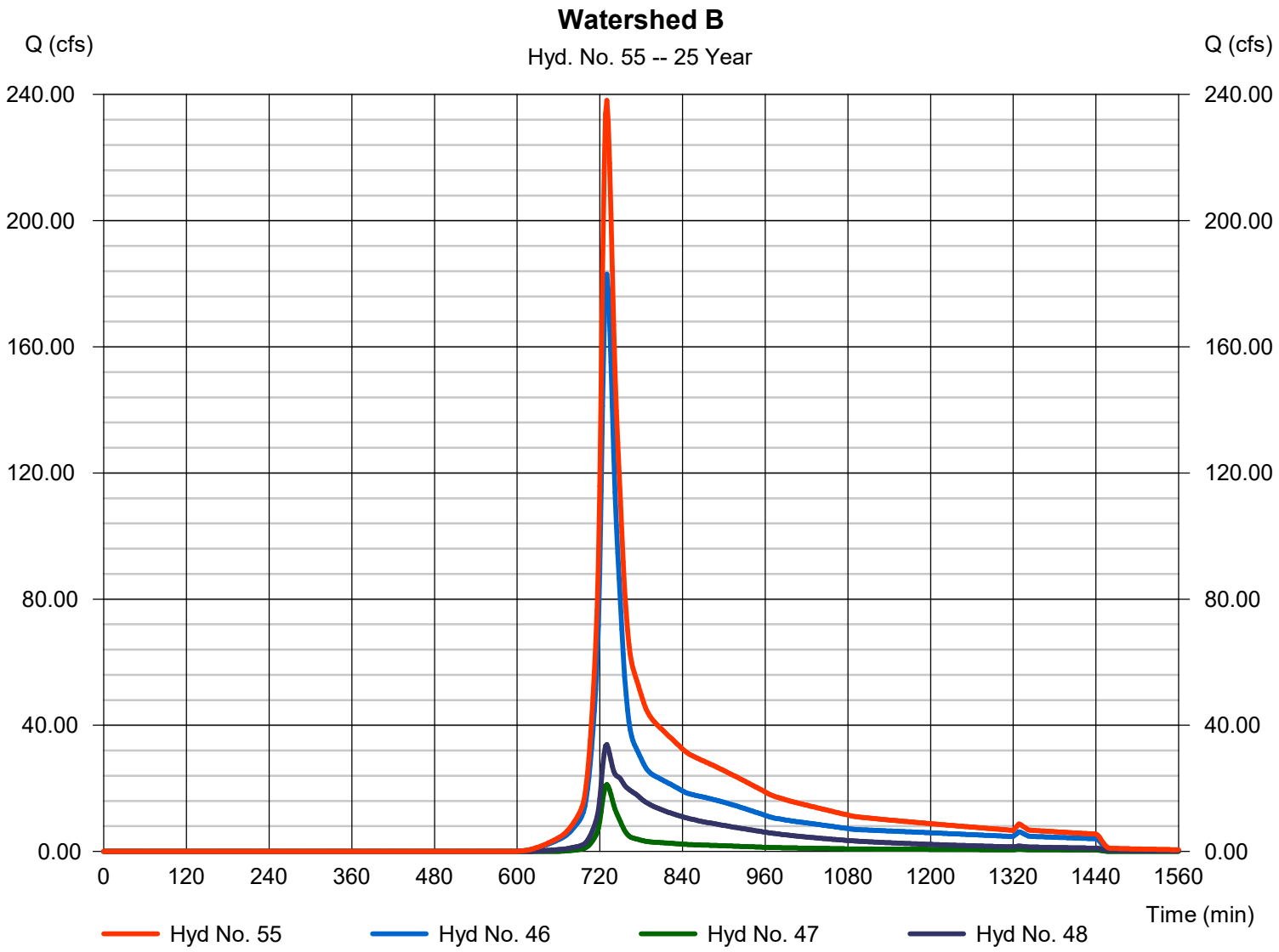
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 55

Watershed B

Hydrograph type	= Combine	Peak discharge	= 238.11 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 1,157,504 cuft
Inflow hyds.	= 46, 47, 48	Contrib. drain. area	= 13.390 ac



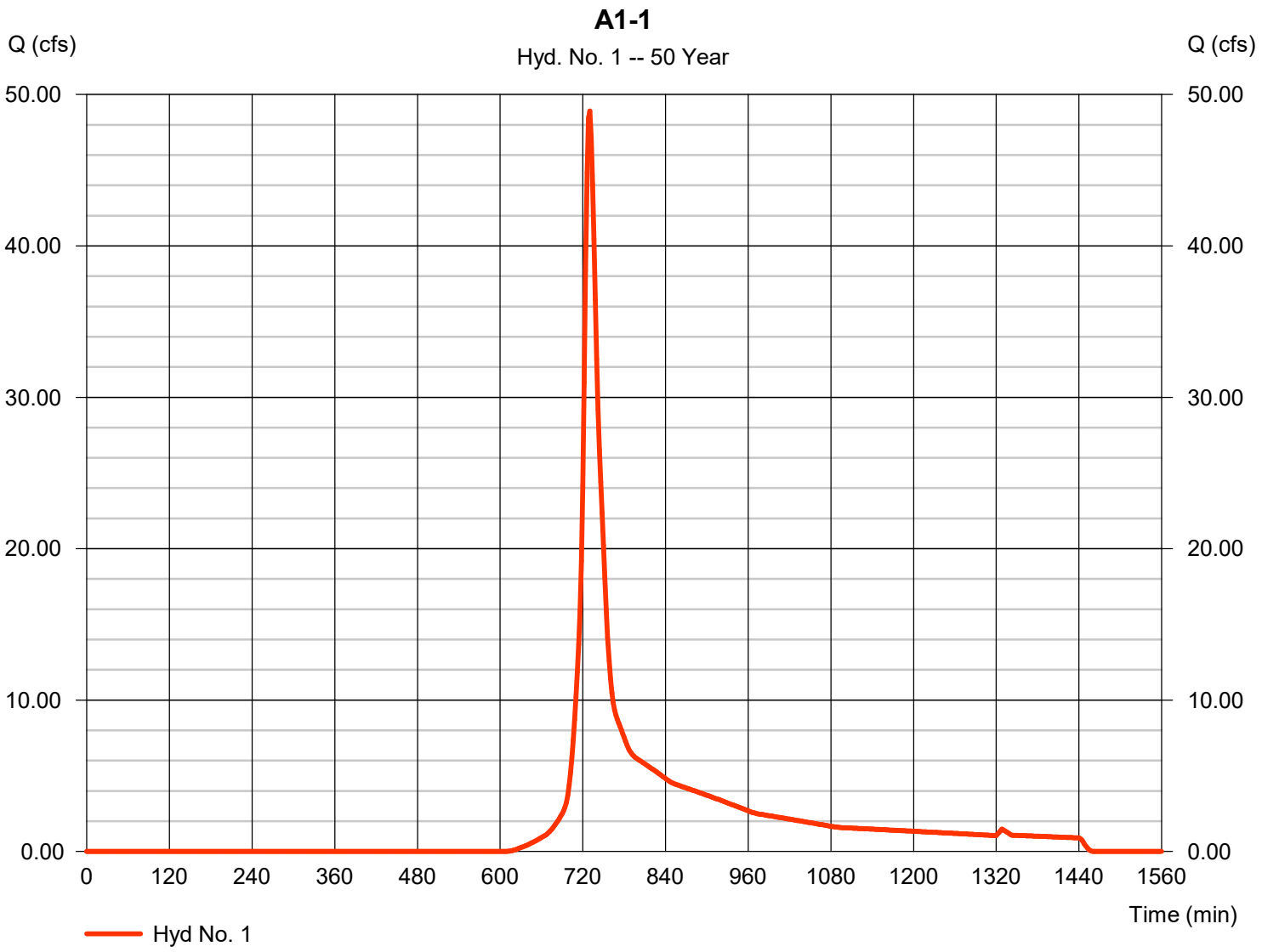
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 1

A1-1

Hydrograph type	= SCS Runoff	Peak discharge	= 48.92 cfs
Storm frequency	= 50 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 193,943 cuft
Drainage area	= 21.310 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.00 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



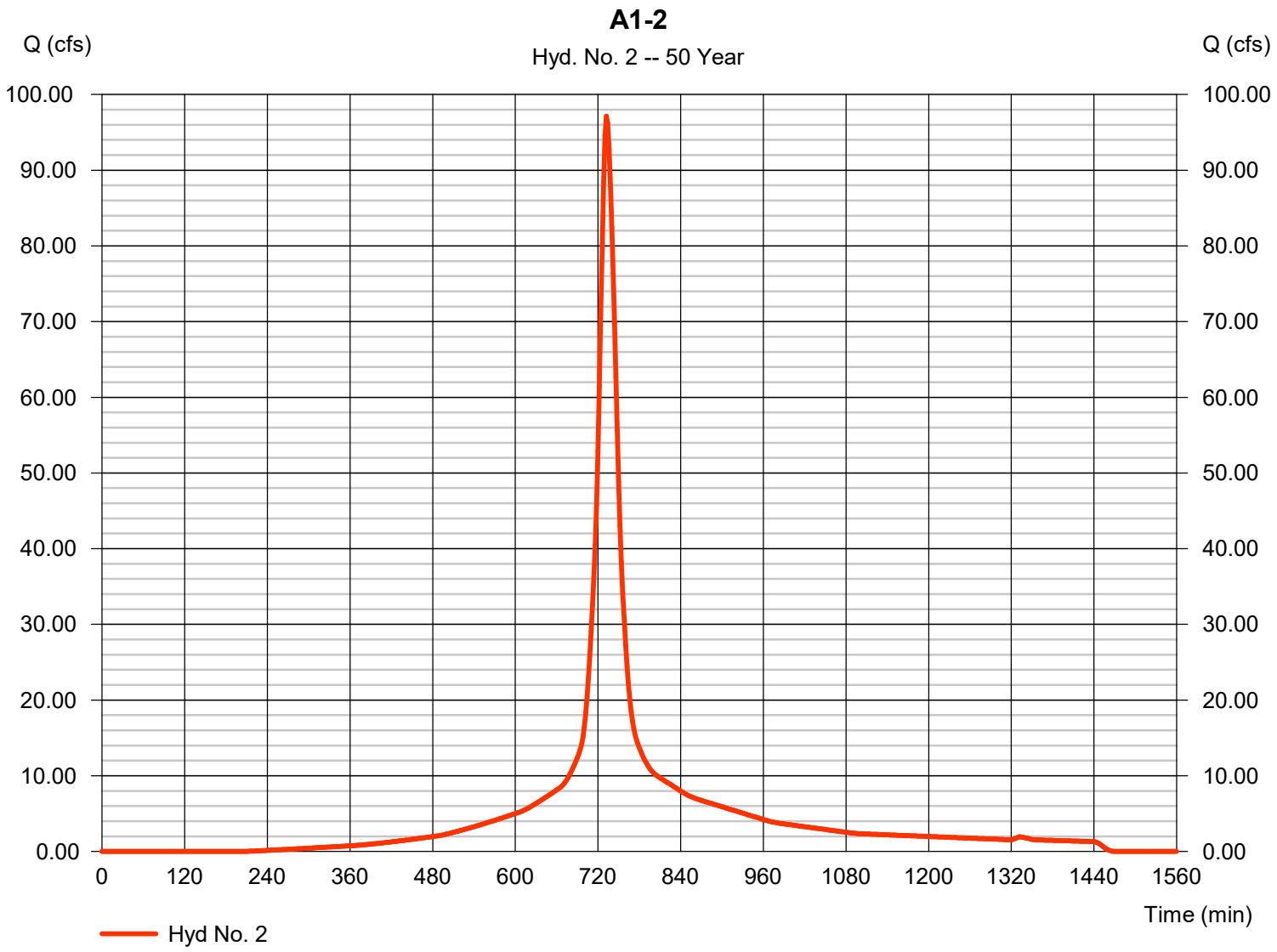
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 2

A1-2

Hydrograph type	= SCS Runoff	Peak discharge	= 97.13 cfs
Storm frequency	= 50 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 449,372 cuft
Drainage area	= 22.710 ac	Curve number	= 90
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.00 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



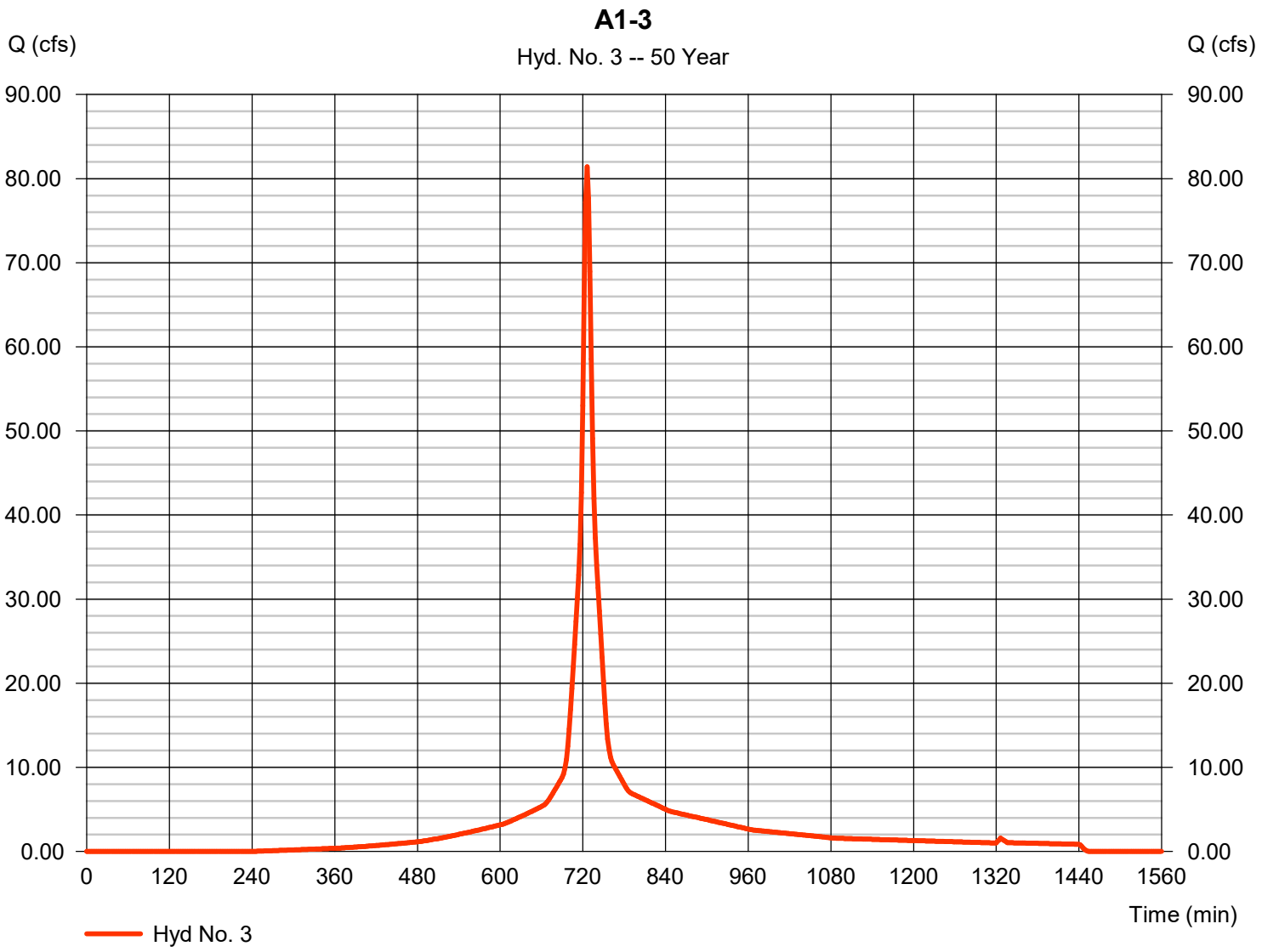
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 3

A1-3

Hydrograph type	= SCS Runoff	Peak discharge	= 81.40 cfs
Storm frequency	= 50 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 289,231 cuft
Drainage area	= 15.250 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.00 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



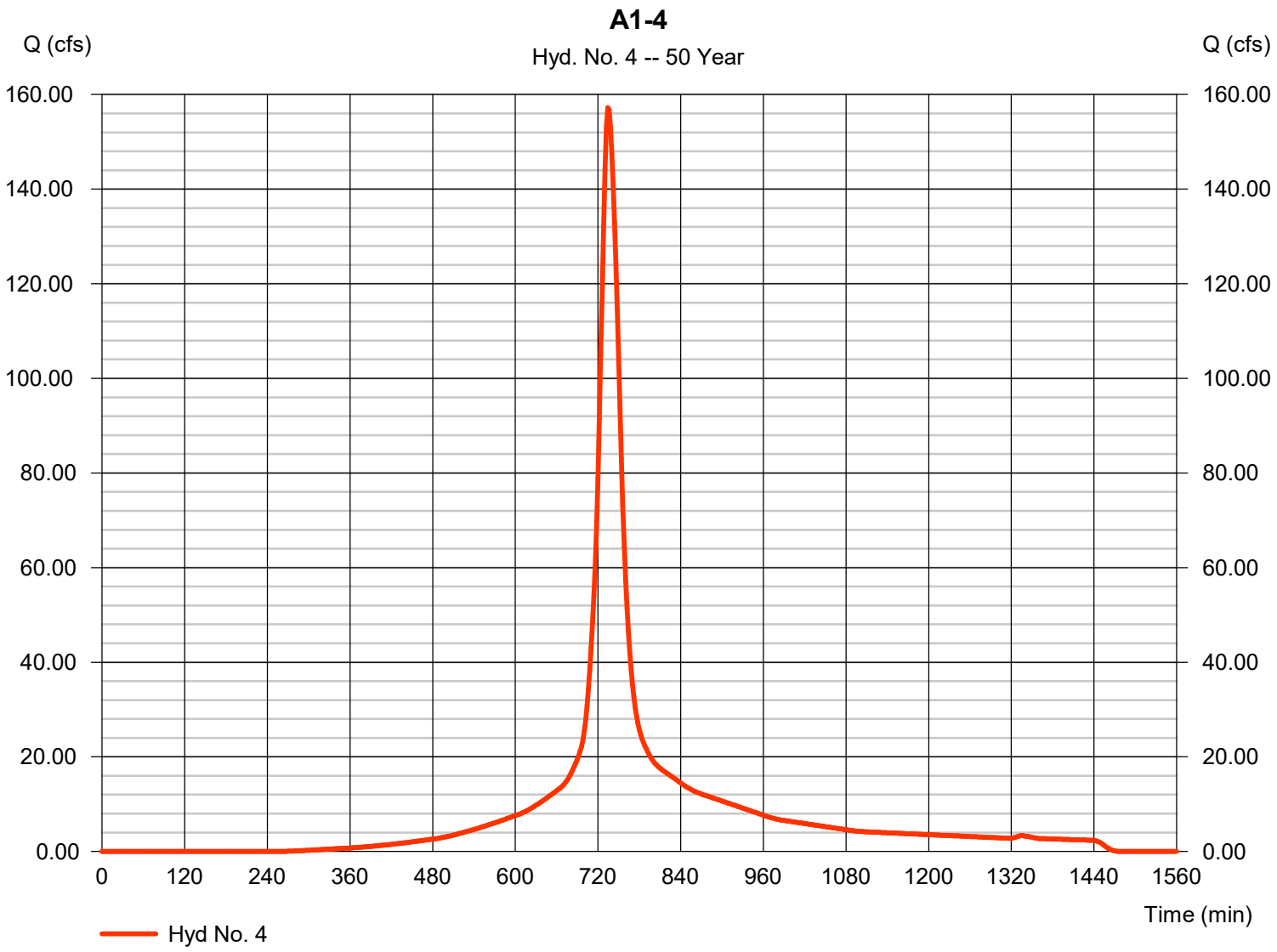
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 4

A1-4

Hydrograph type	= SCS Runoff	Peak discharge	= 157.21 cfs
Storm frequency	= 50 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 766,372 cuft
Drainage area	= 40.570 ac	Curve number	= 87
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 21.00 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



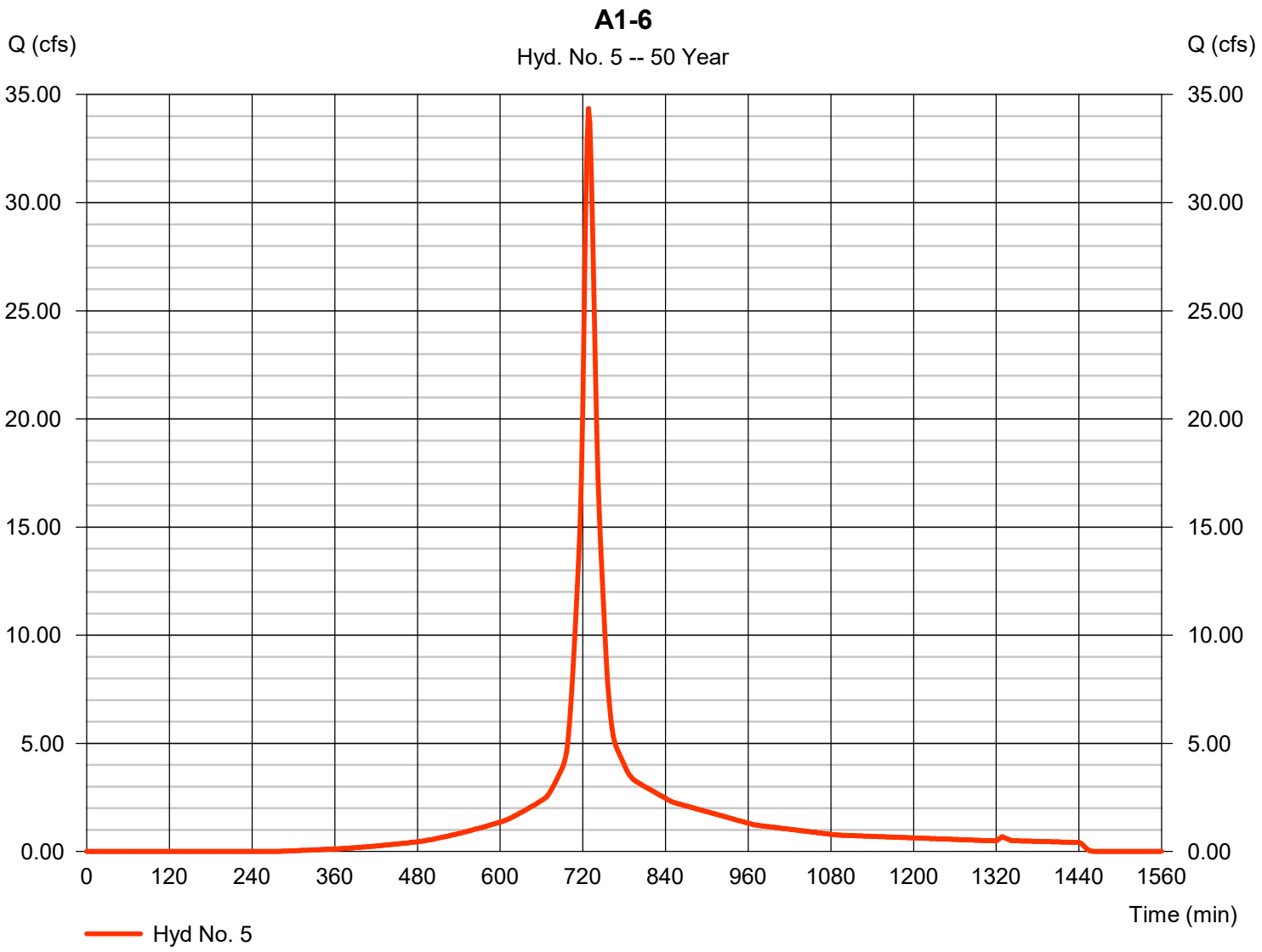
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 5

A1-6

Hydrograph type	= SCS Runoff	Peak discharge	= 34.36 cfs
Storm frequency	= 50 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 134,978 cuft
Drainage area	= 7.210 ac	Curve number	= 86
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



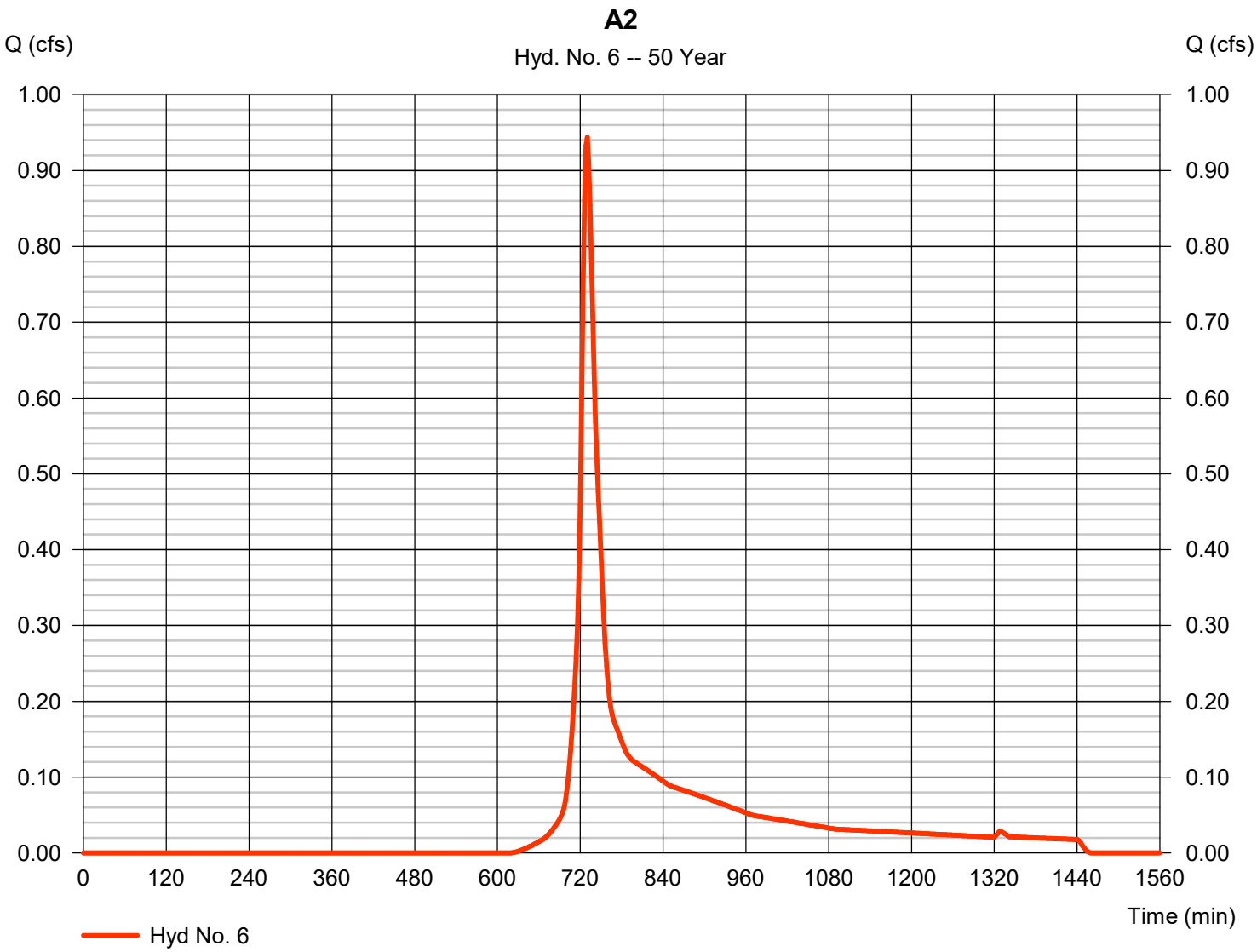
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 6

A2

Hydrograph type	= SCS Runoff	Peak discharge	= 0.944 cfs
Storm frequency	= 50 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 3,764 cuft
Drainage area	= 0.430 ac	Curve number	= 60
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



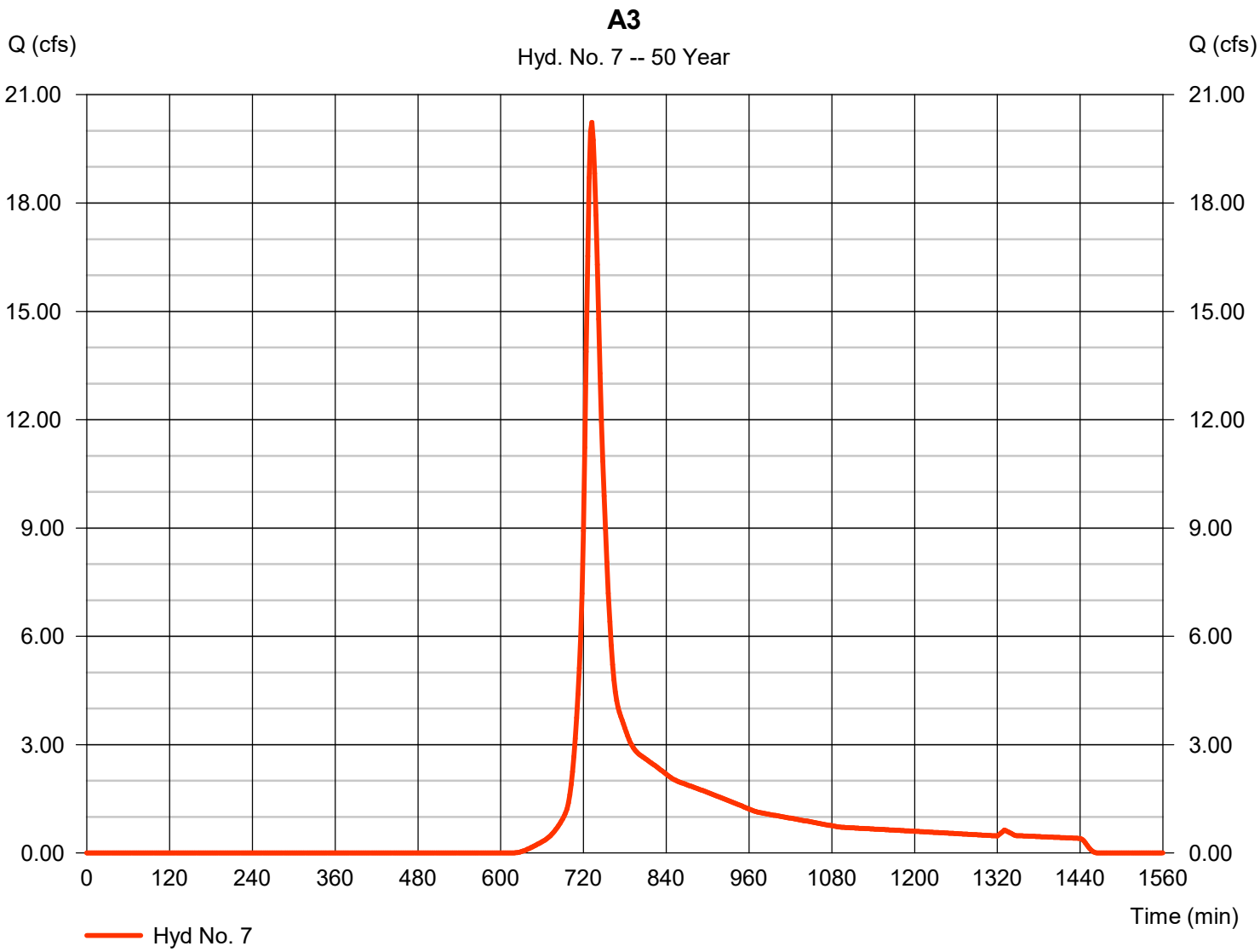
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 7

A3

Hydrograph type	= SCS Runoff	Peak discharge	= 20.23 cfs
Storm frequency	= 50 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 85,567 cuft
Drainage area	= 10.340 ac	Curve number	= 60
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 16.00 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



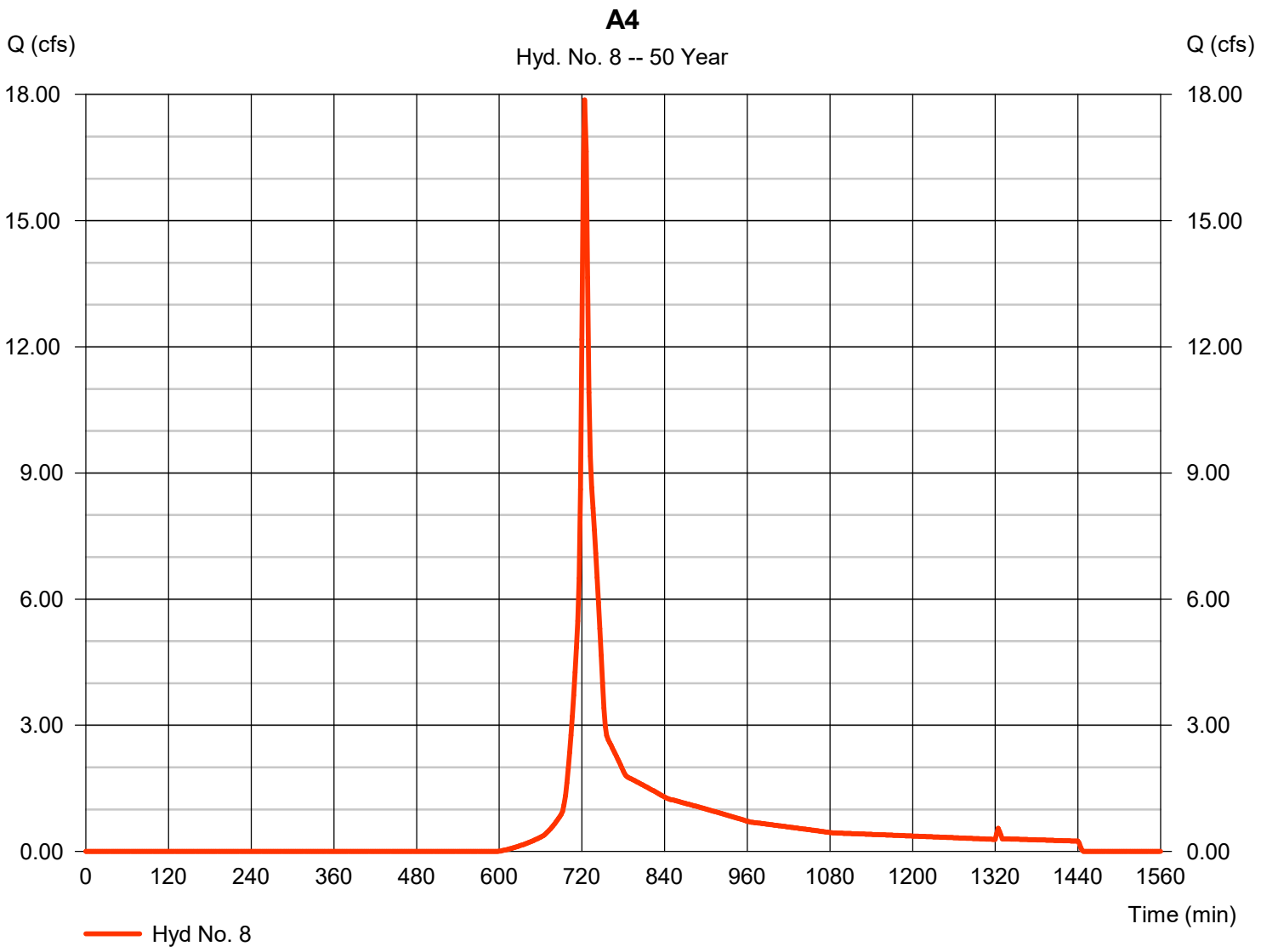
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 8

A4

Hydrograph type	= SCS Runoff	Peak discharge	= 17.87 cfs
Storm frequency	= 50 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 54,739 cuft
Drainage area	= 6.370 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



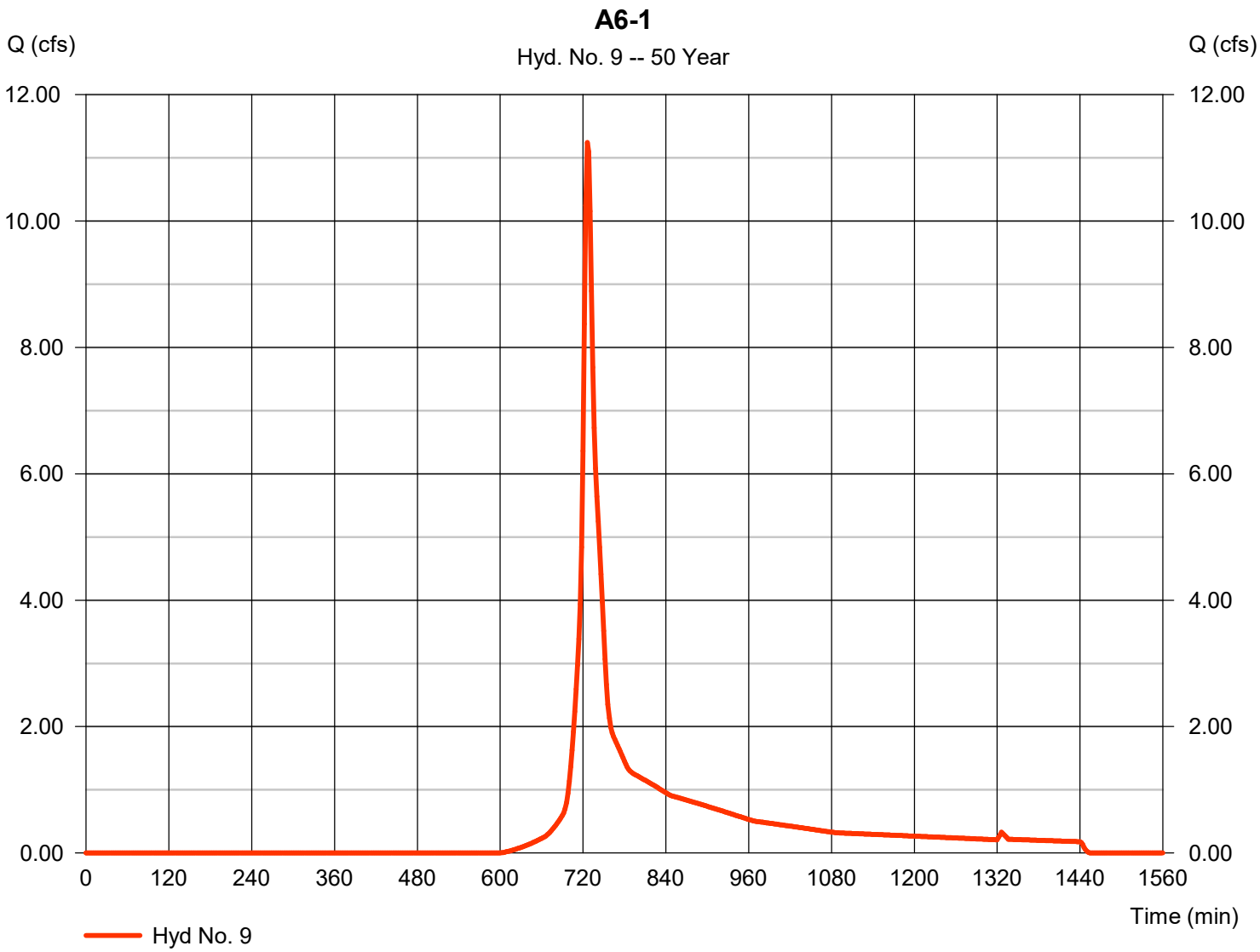
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 9

A6-1

Hydrograph type	= SCS Runoff	Peak discharge	= 11.24 cfs
Storm frequency	= 50 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 39,598 cuft
Drainage area	= 4.320 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.00 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



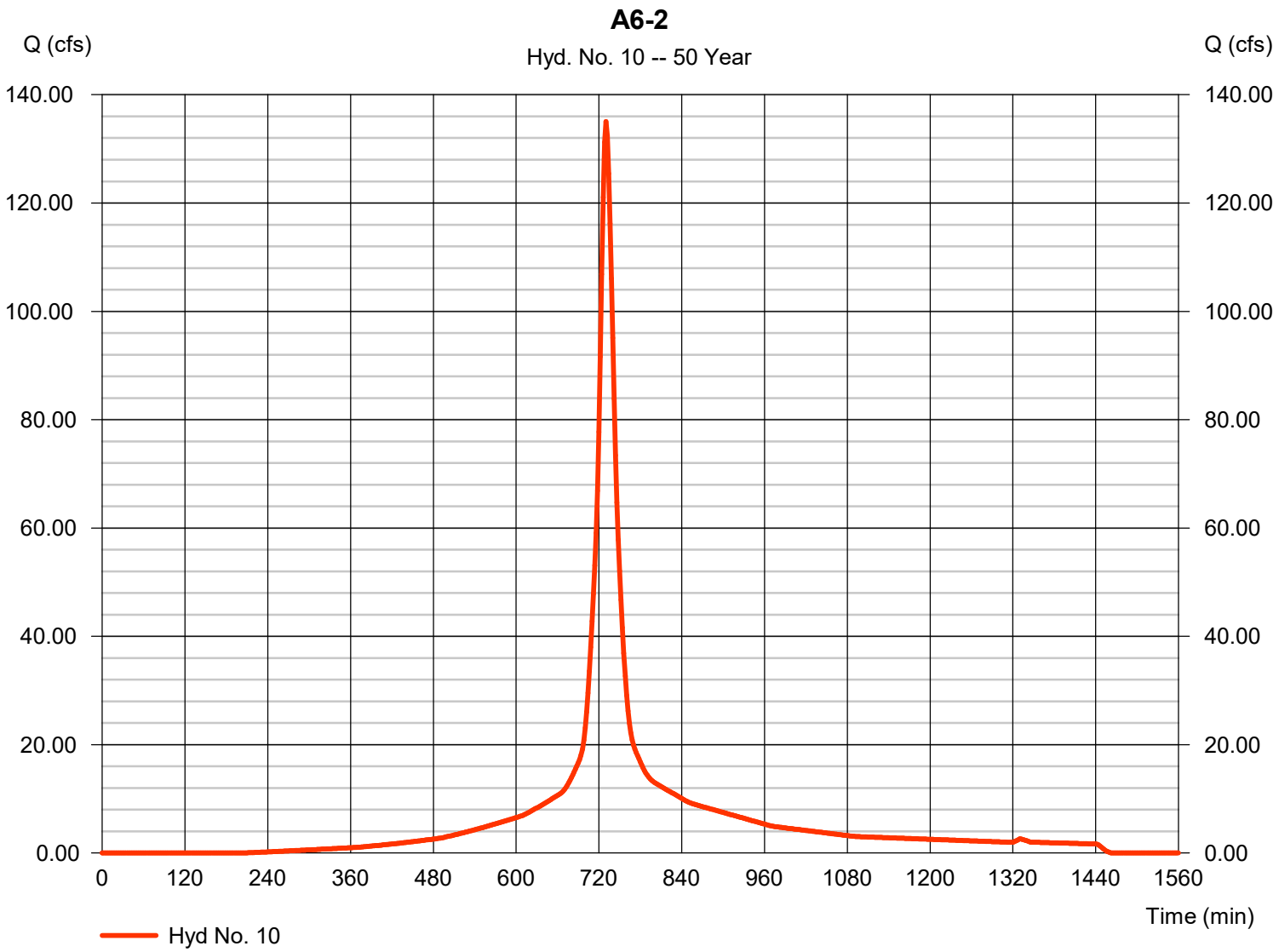
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 10

A6-2

Hydrograph type	= SCS Runoff	Peak discharge	= 135.05 cfs
Storm frequency	= 50 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 576,853 cuft
Drainage area	= 29.900 ac	Curve number	= 90
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.00 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



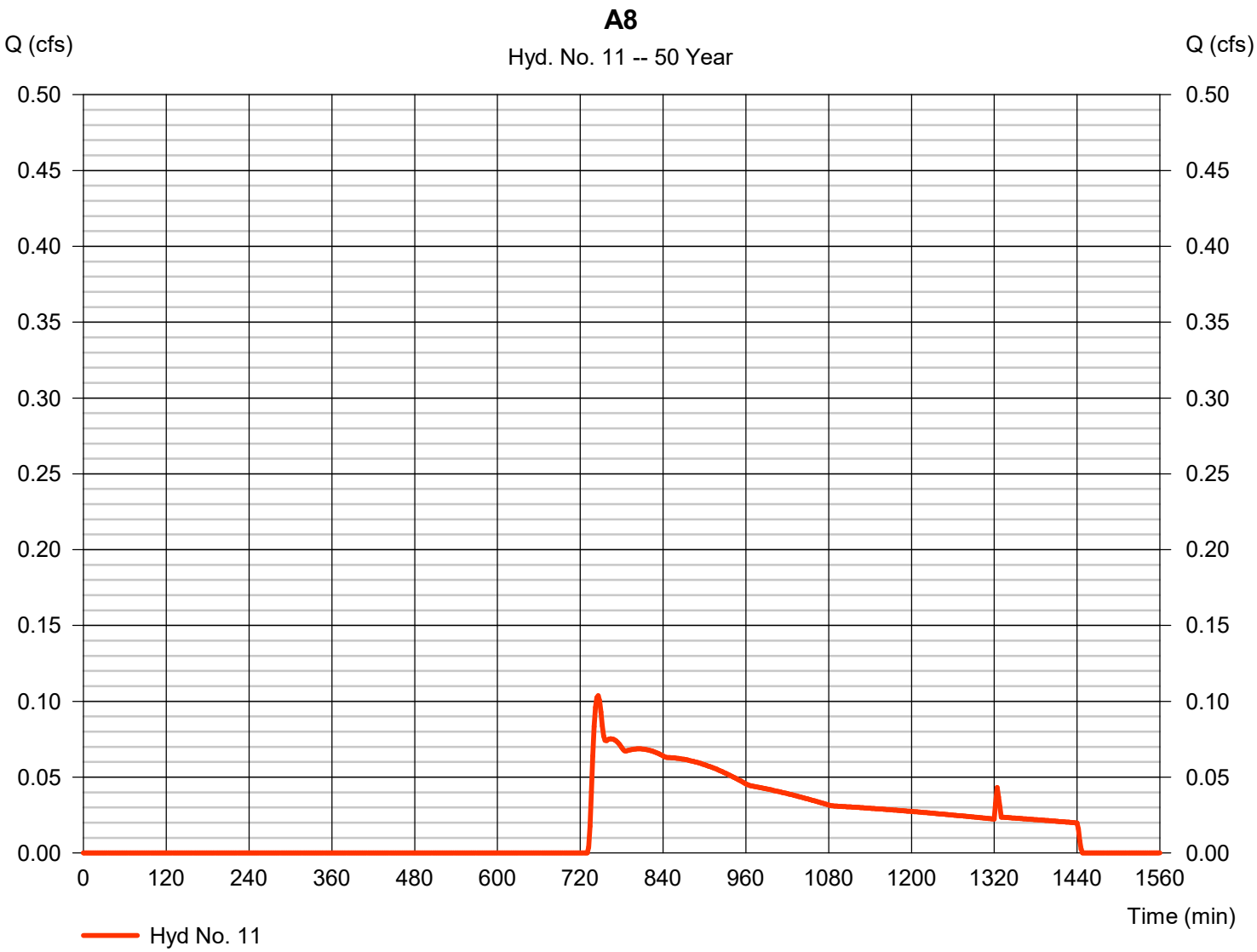
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 11

A8

Hydrograph type	= SCS Runoff	Peak discharge	= 0.104 cfs
Storm frequency	= 50 yrs	Time to peak	= 746 min
Time interval	= 2 min	Hyd. volume	= 1,706 cuft
Drainage area	= 1.750 ac	Curve number	= 33
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



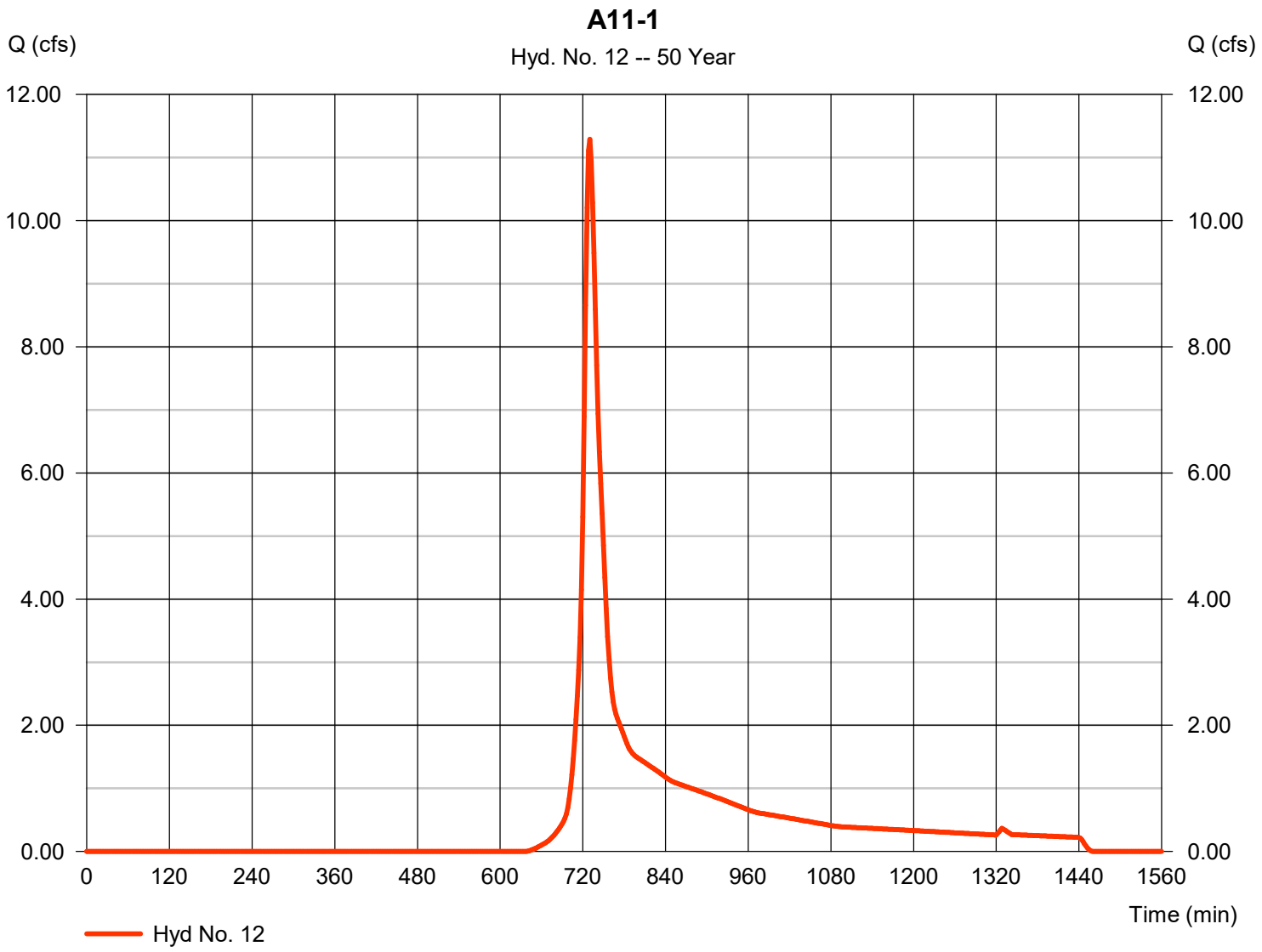
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 12

A11-1

Hydrograph type	= SCS Runoff	Peak discharge	= 11.29 cfs
Storm frequency	= 50 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 45,654 cuft
Drainage area	= 5.660 ac	Curve number	= 58
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.00 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



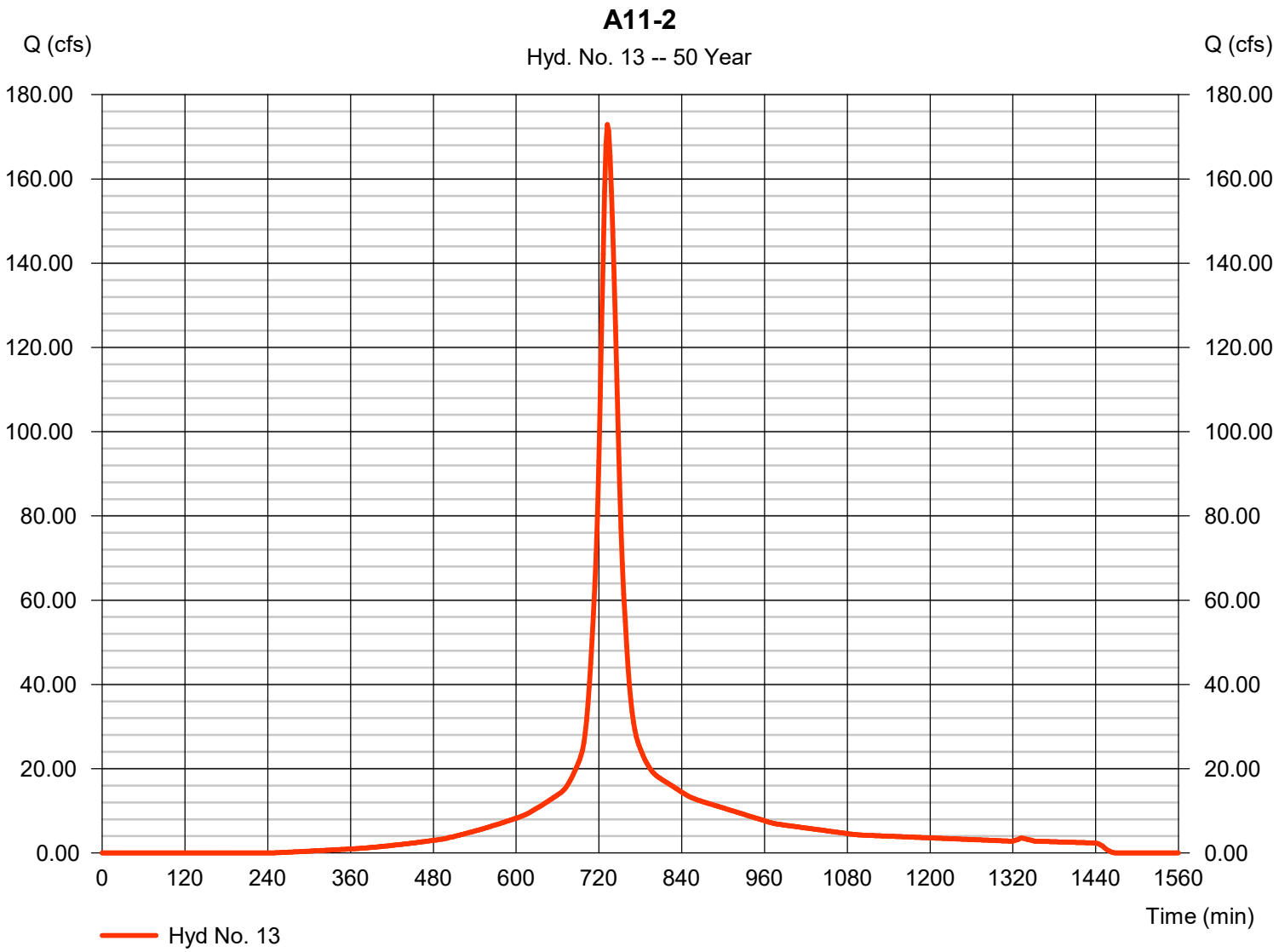
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 13

A11-2

Hydrograph type	= SCS Runoff	Peak discharge	= 172.90 cfs
Storm frequency	= 50 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 789,933 cuft
Drainage area	= 41.650 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.00 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



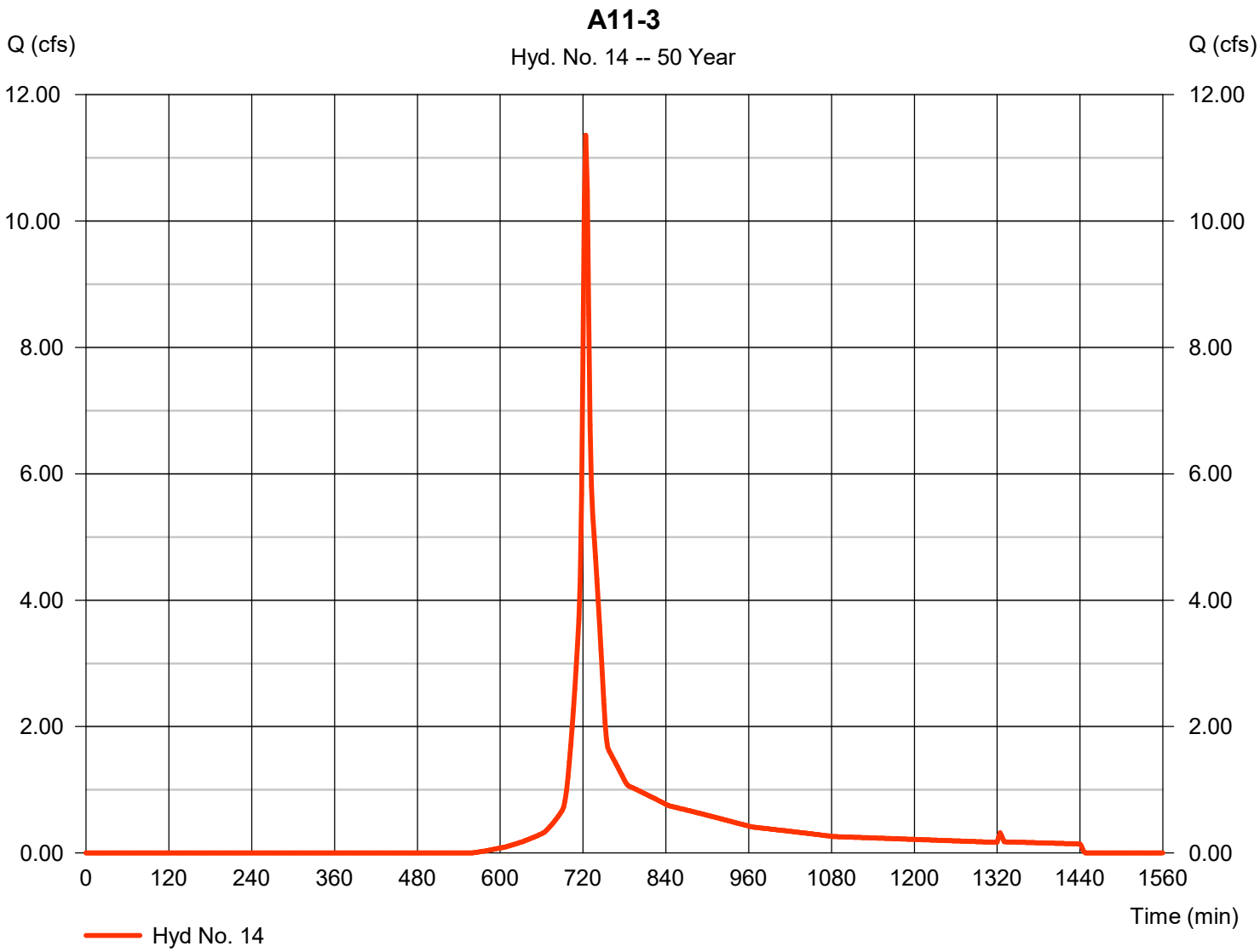
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 14

A11-3

Hydrograph type	= SCS Runoff	Peak discharge	= 11.36 cfs
Storm frequency	= 50 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 34,251 cuft
Drainage area	= 3.460 ac	Curve number	= 66
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



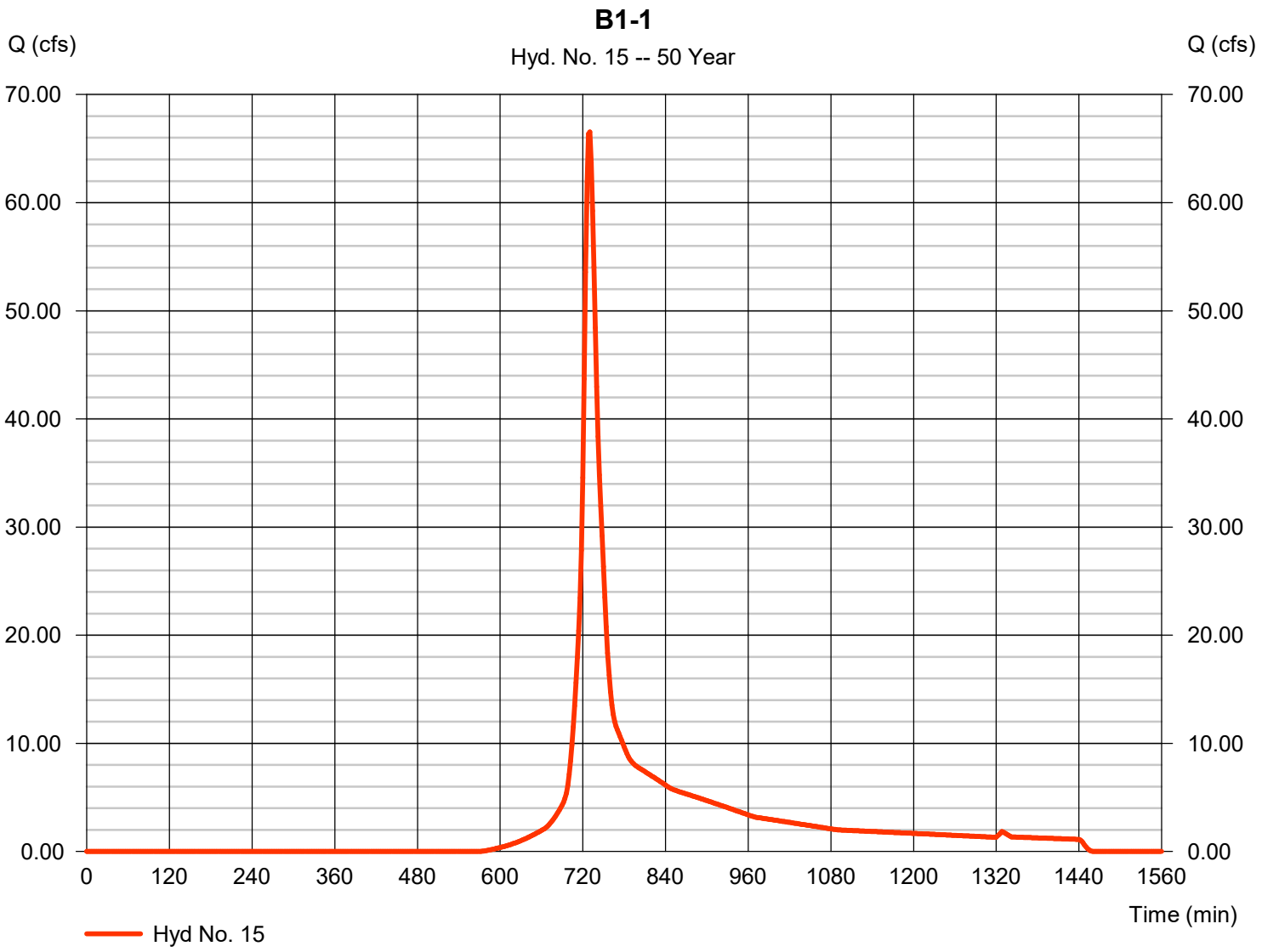
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 15

B1-1

Hydrograph type	= SCS Runoff	Peak discharge	= 66.54 cfs
Storm frequency	= 50 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 259,559 cuft
Drainage area	= 24.660 ac	Curve number	= 65
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



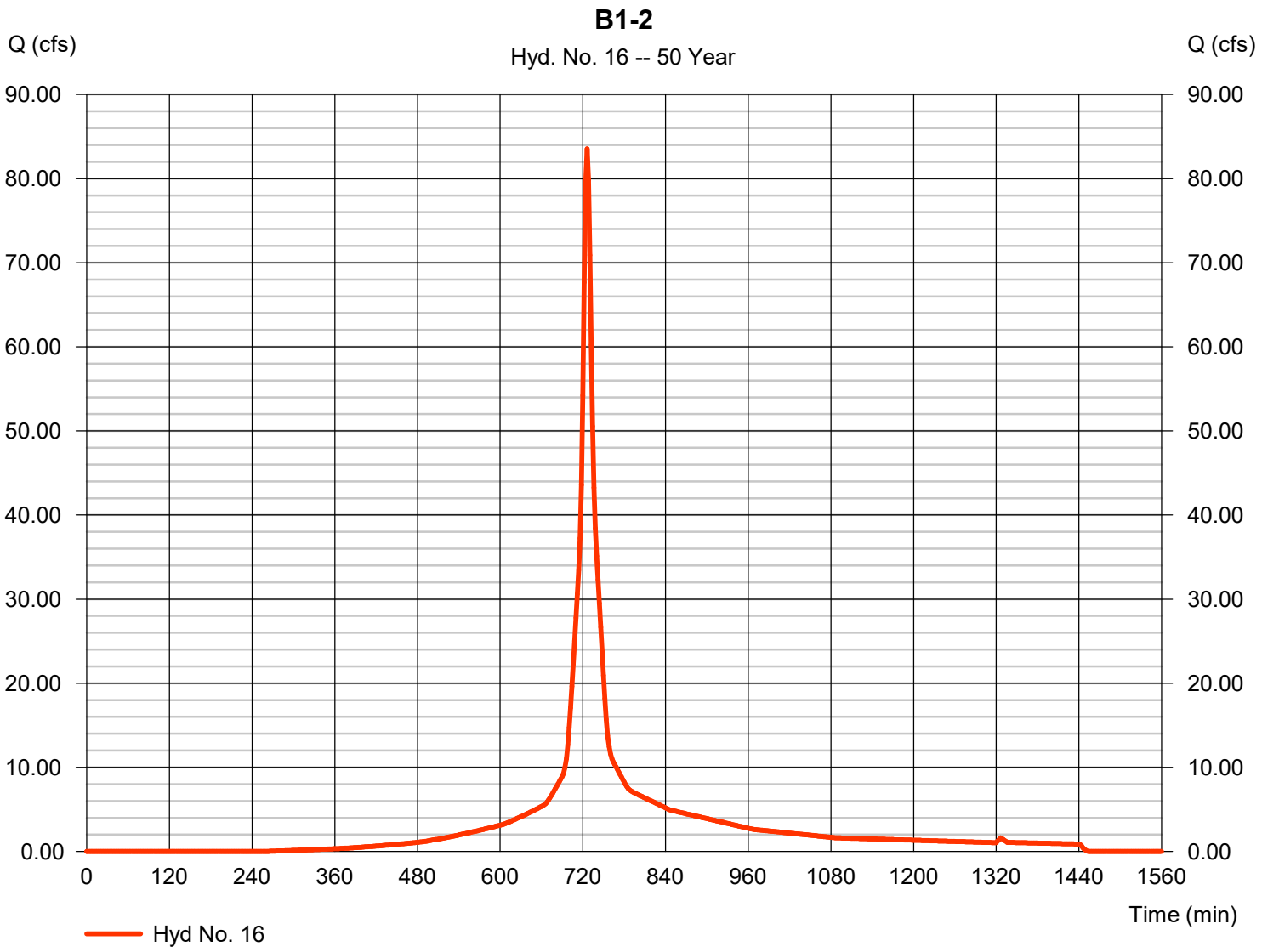
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 16

B1-2

Hydrograph type	= SCS Runoff	Peak discharge	= 83.54 cfs
Storm frequency	= 50 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 295,083 cuft
Drainage area	= 15.900 ac	Curve number	= 87
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.00 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



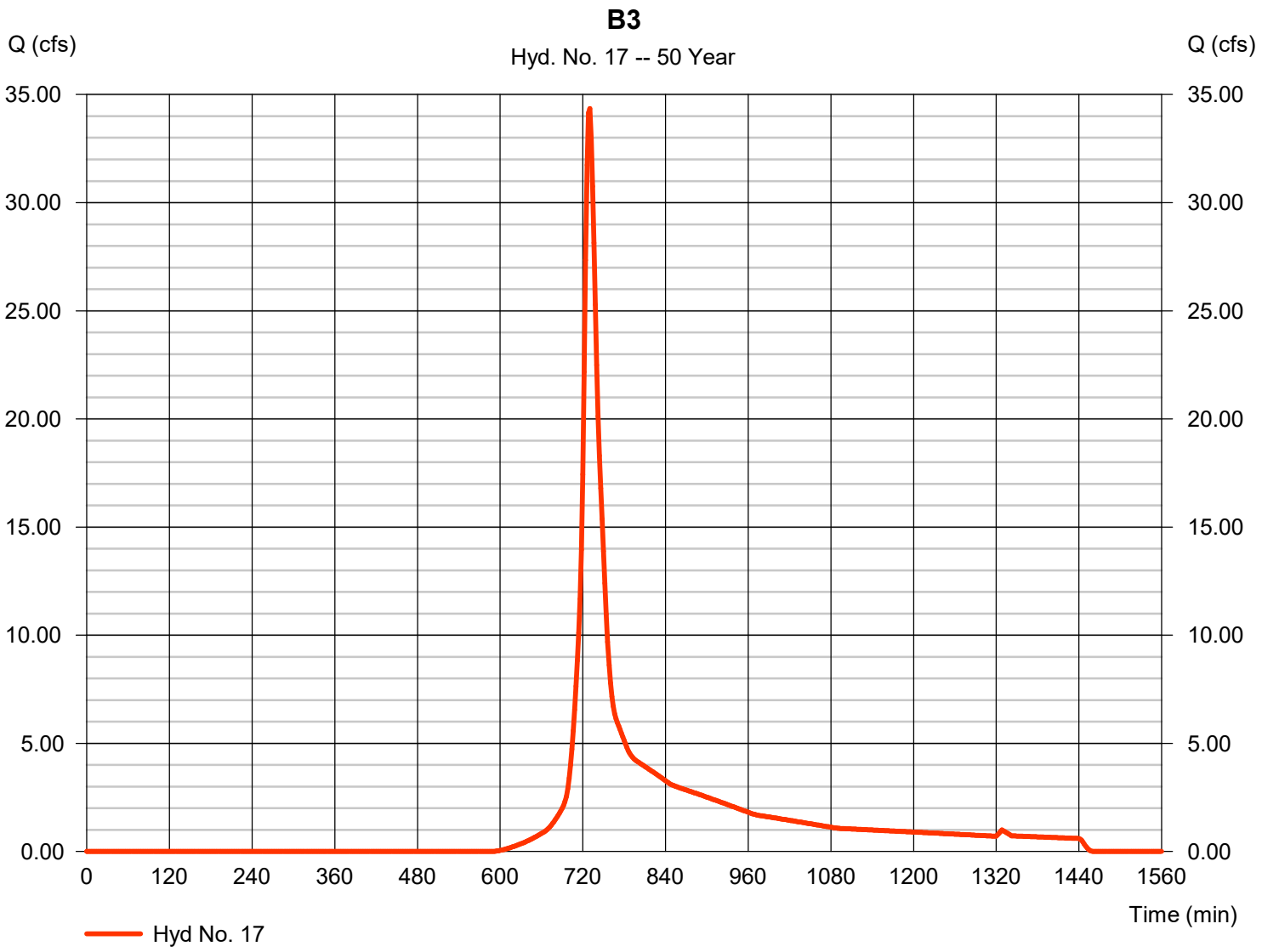
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 17

B3

Hydrograph type	= SCS Runoff	Peak discharge	= 34.35 cfs
Storm frequency	= 50 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 134,947 cuft
Drainage area	= 13.760 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.00 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



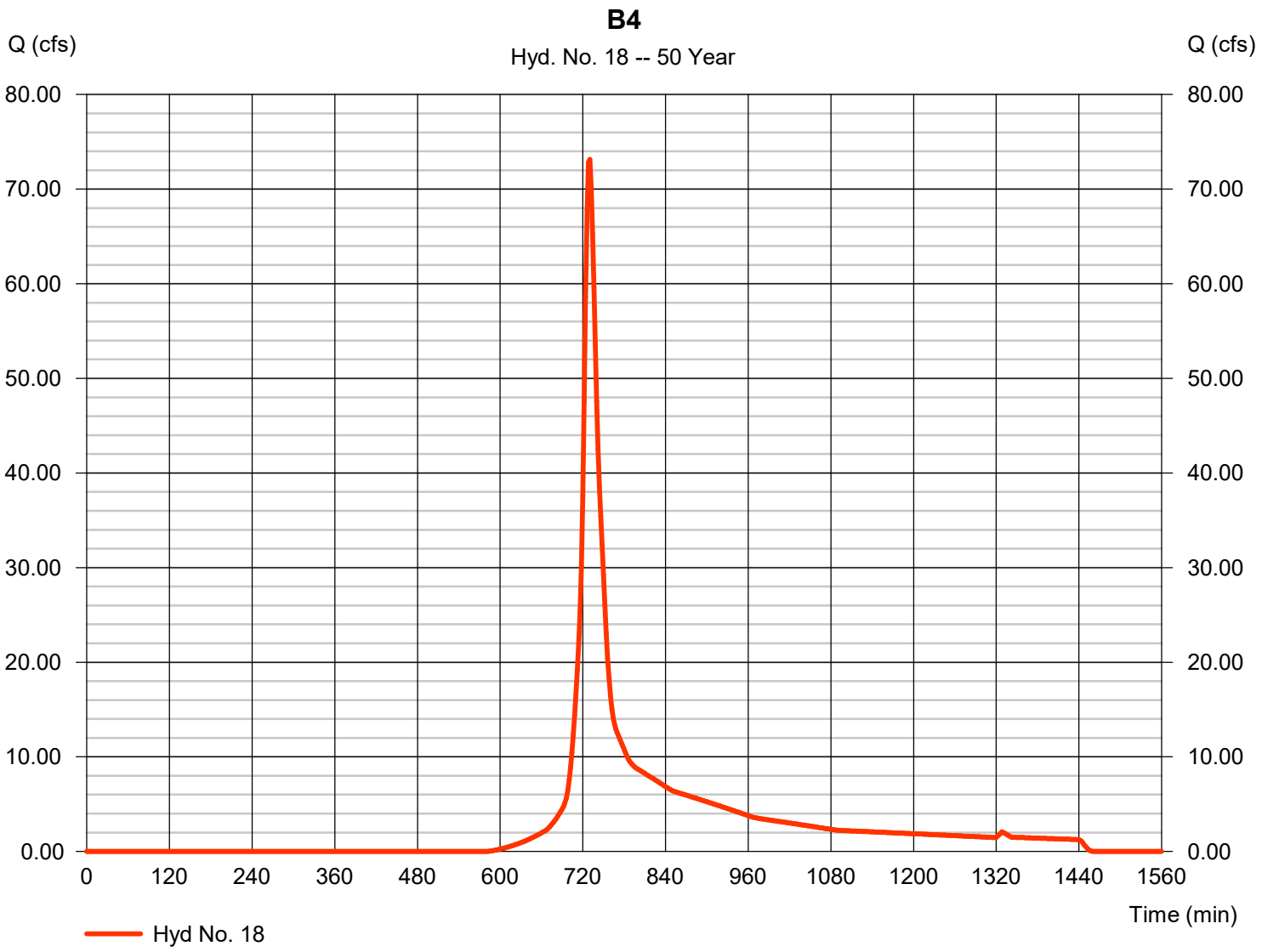
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 18

B4

Hydrograph type	= SCS Runoff	Peak discharge	= 73.14 cfs
Storm frequency	= 50 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 286,242 cuft
Drainage area	= 28.160 ac	Curve number	= 64
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.80 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



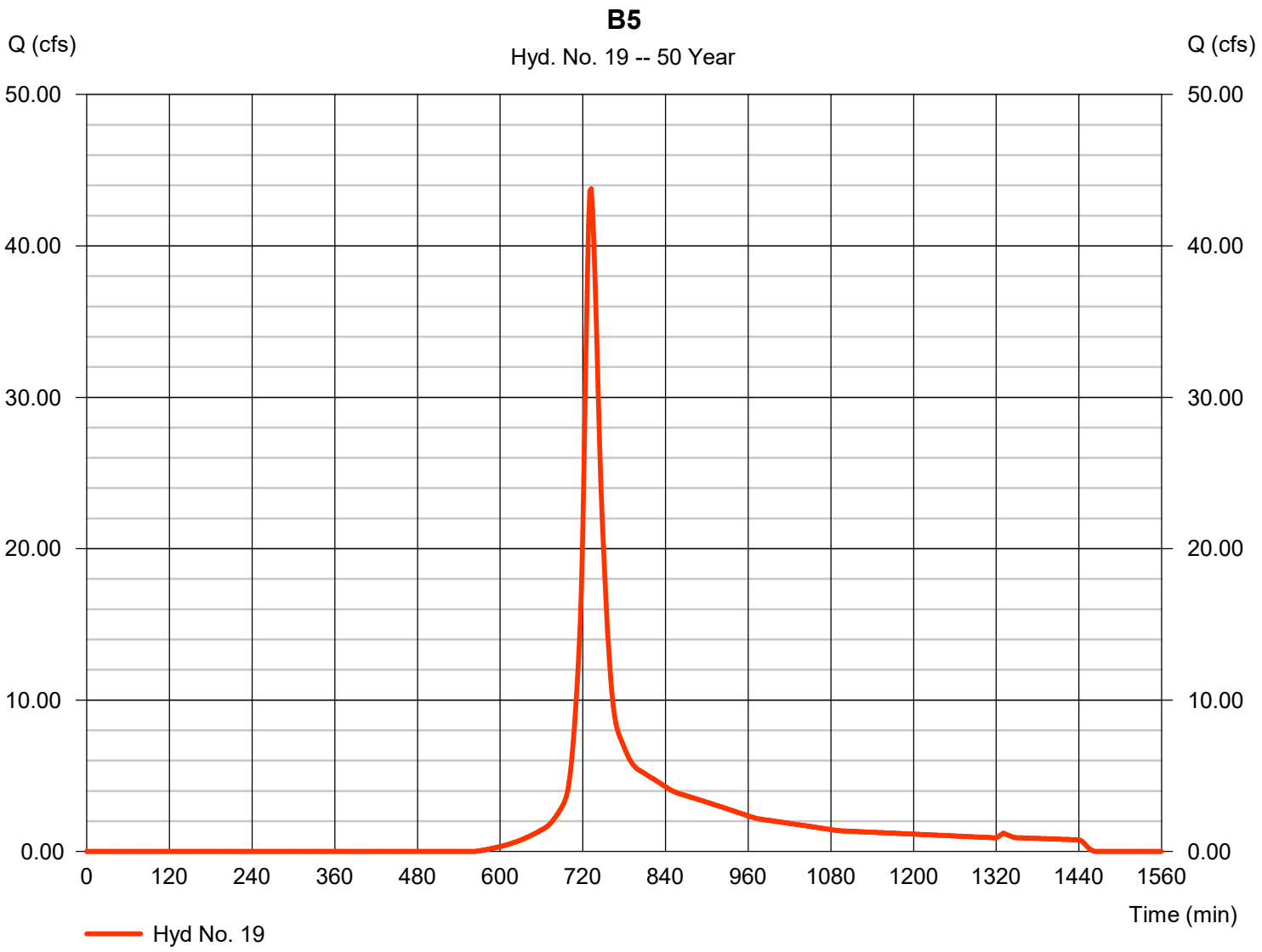
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 19

B5

Hydrograph type	= SCS Runoff	Peak discharge	= 43.77 cfs
Storm frequency	= 50 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 180,475 cuft
Drainage area	= 17.530 ac	Curve number	= 66
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.00 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



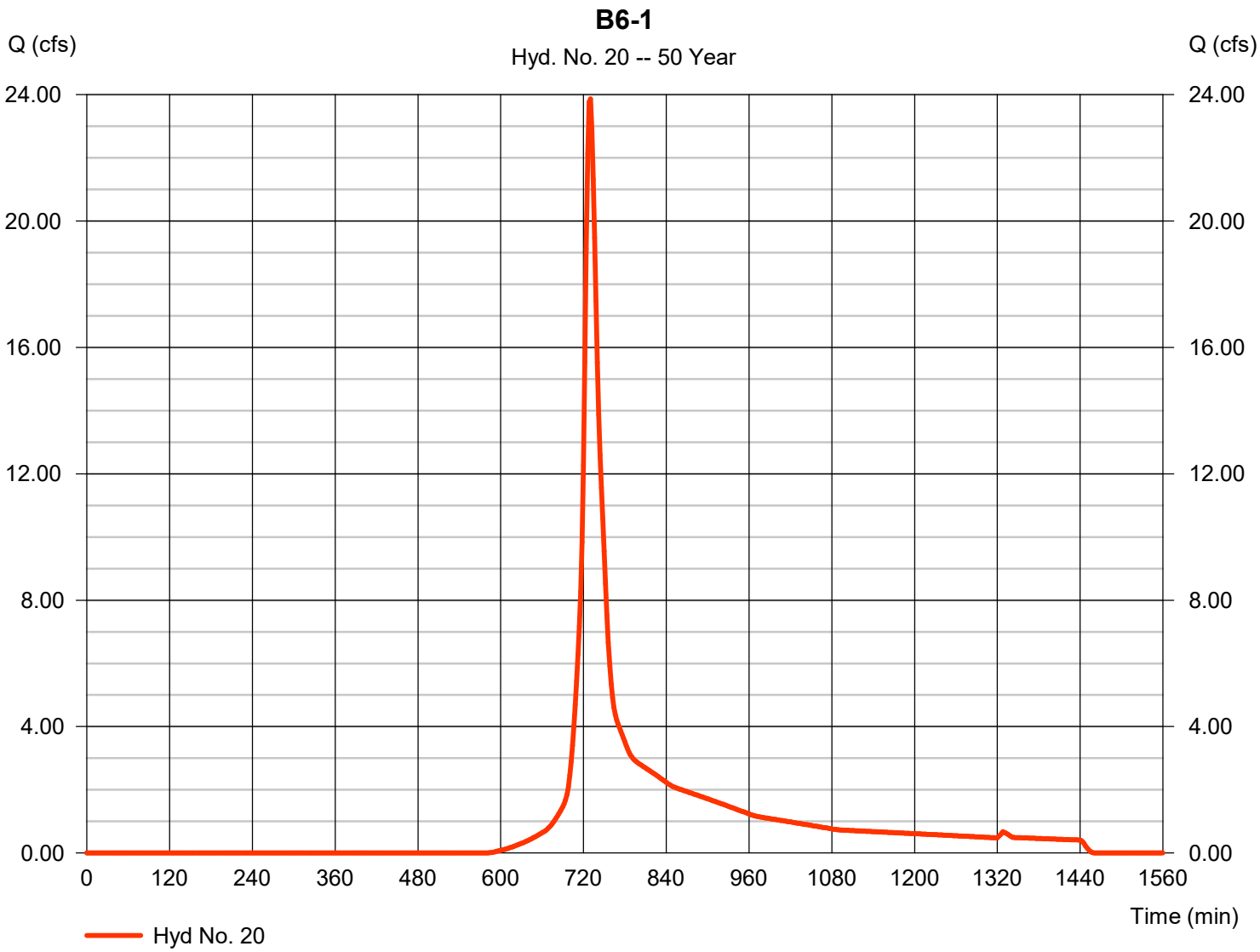
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 20

B6-1

Hydrograph type	= SCS Runoff	Peak discharge	= 23.87 cfs
Storm frequency	= 50 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 93,415 cuft
Drainage area	= 9.190 ac	Curve number	= 64
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



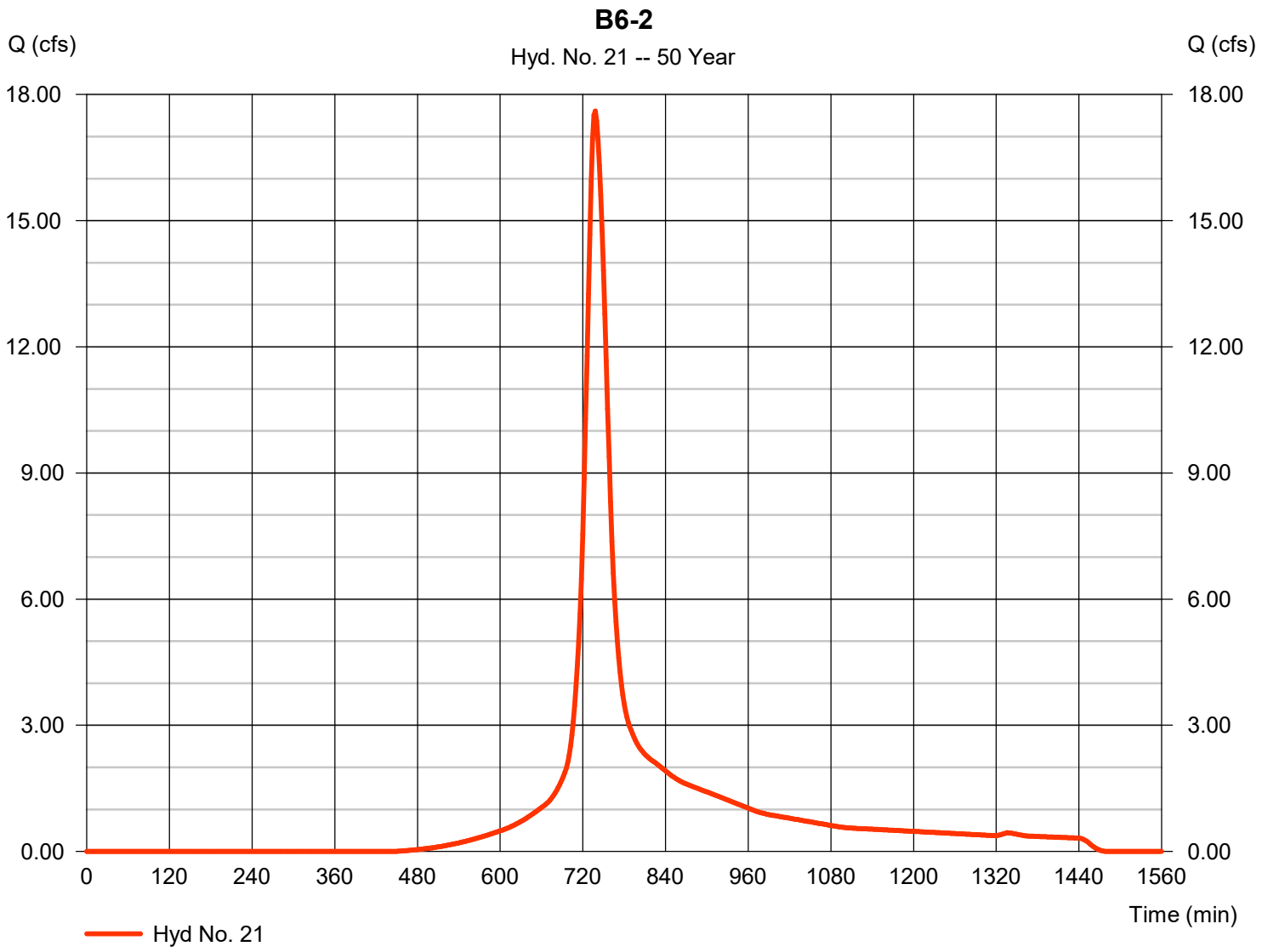
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 21

B6-2

Hydrograph type	= SCS Runoff	Peak discharge	= 17.61 cfs
Storm frequency	= 50 yrs	Time to peak	= 738 min
Time interval	= 2 min	Hyd. volume	= 86,723 cuft
Drainage area	= 6.190 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 24.00 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



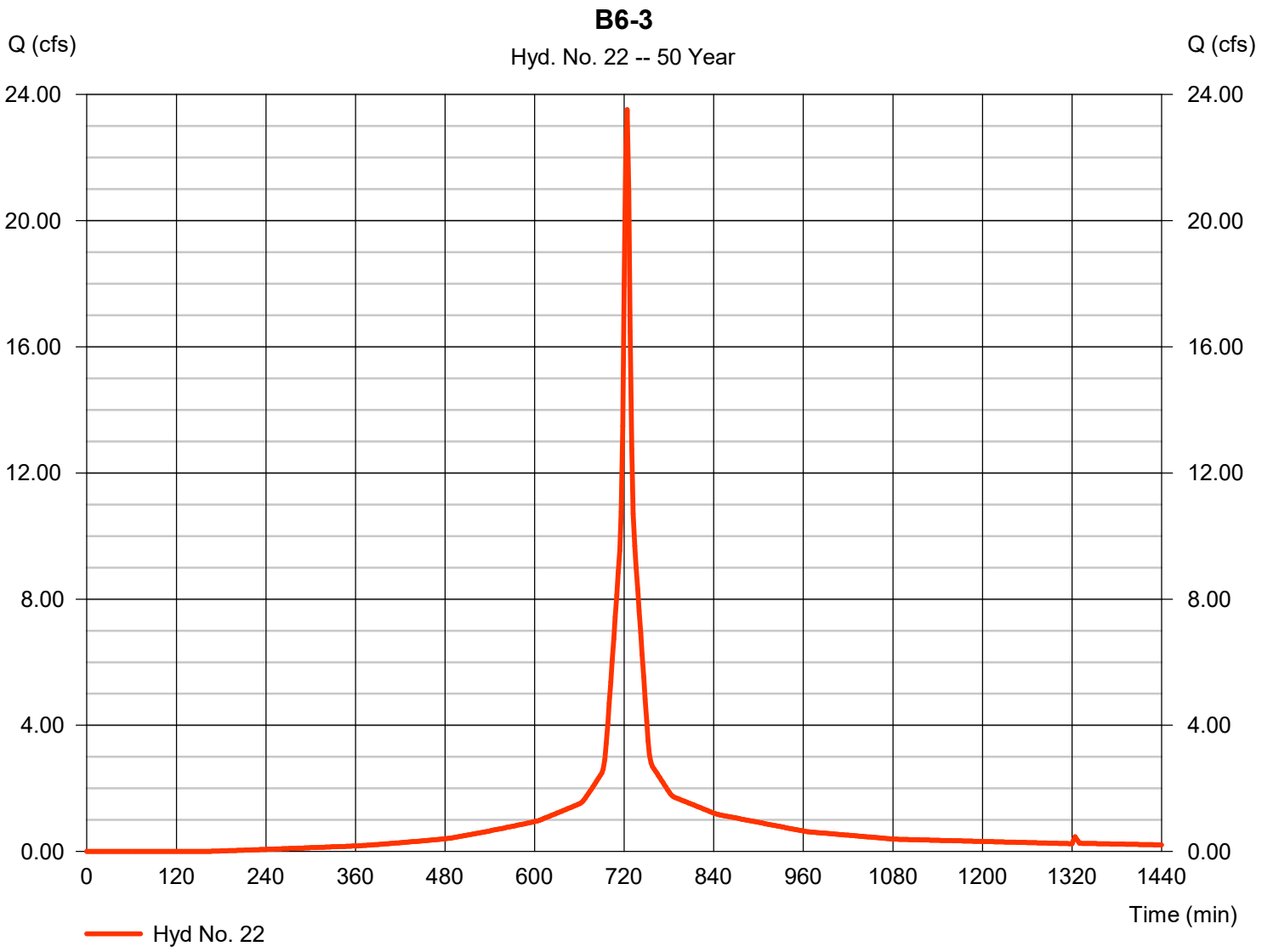
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 22

B6-3

Hydrograph type	= SCS Runoff	Peak discharge	= 23.52 cfs
Storm frequency	= 50 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 75,964 cuft
Drainage area	= 3.930 ac	Curve number	= 92
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



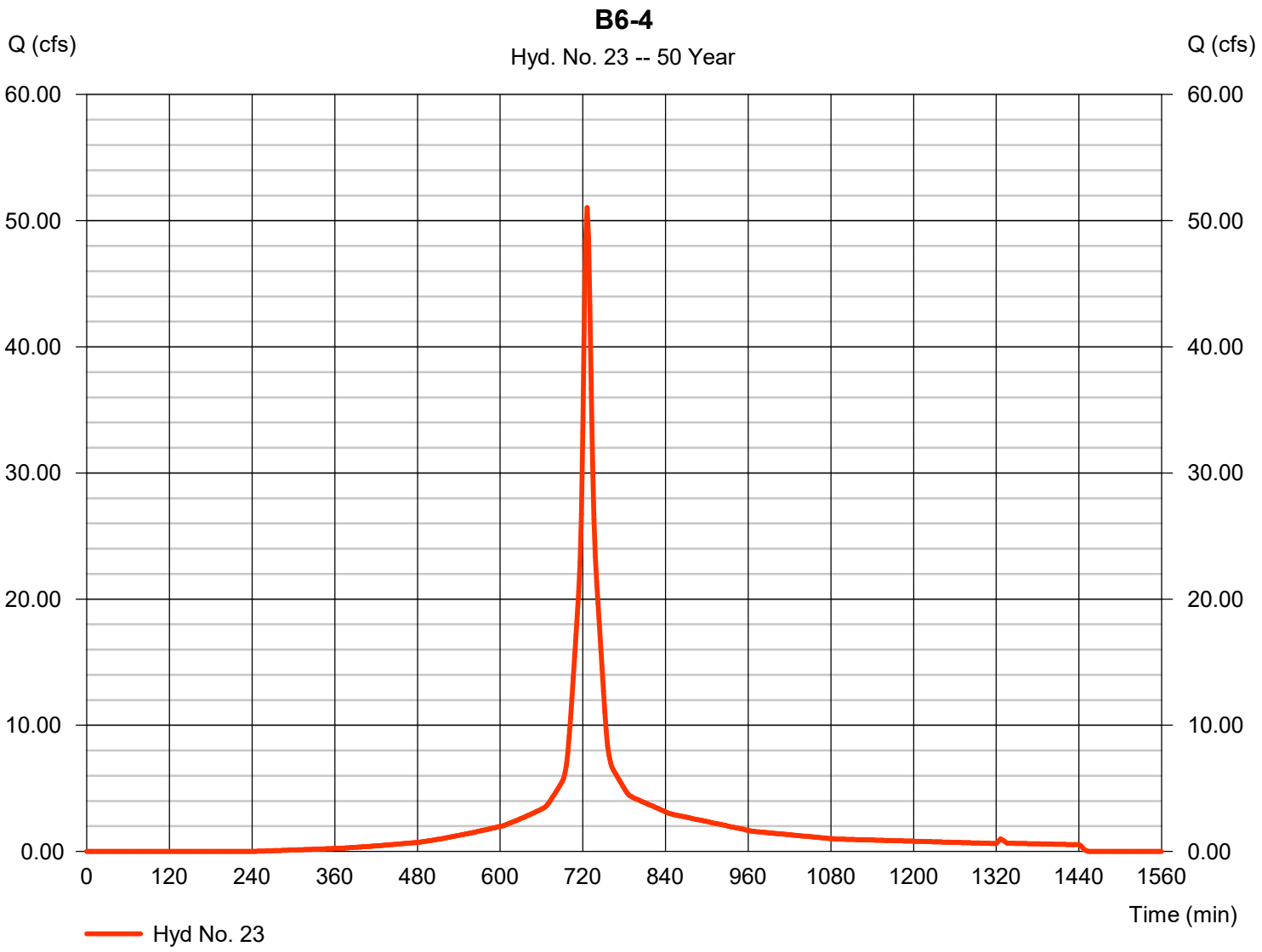
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 23

B6-4

Hydrograph type	= SCS Runoff	Peak discharge	= 51.03 cfs
Storm frequency	= 50 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 181,315 cuft
Drainage area	= 9.560 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.00 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



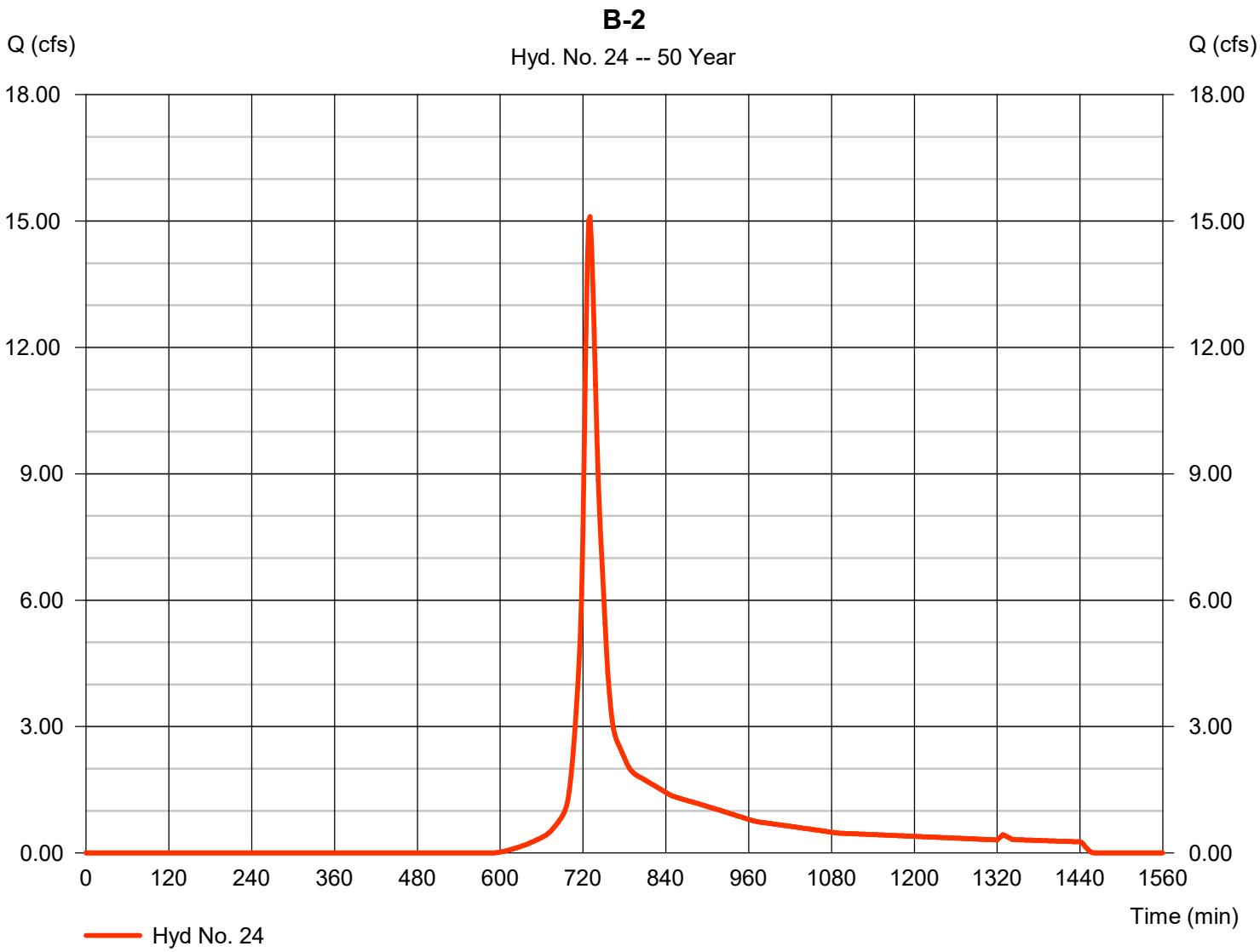
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 24

B-2

Hydrograph type	= SCS Runoff	Peak discharge	= 15.11 cfs
Storm frequency	= 50 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 59,333 cuft
Drainage area	= 6.050 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.00 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



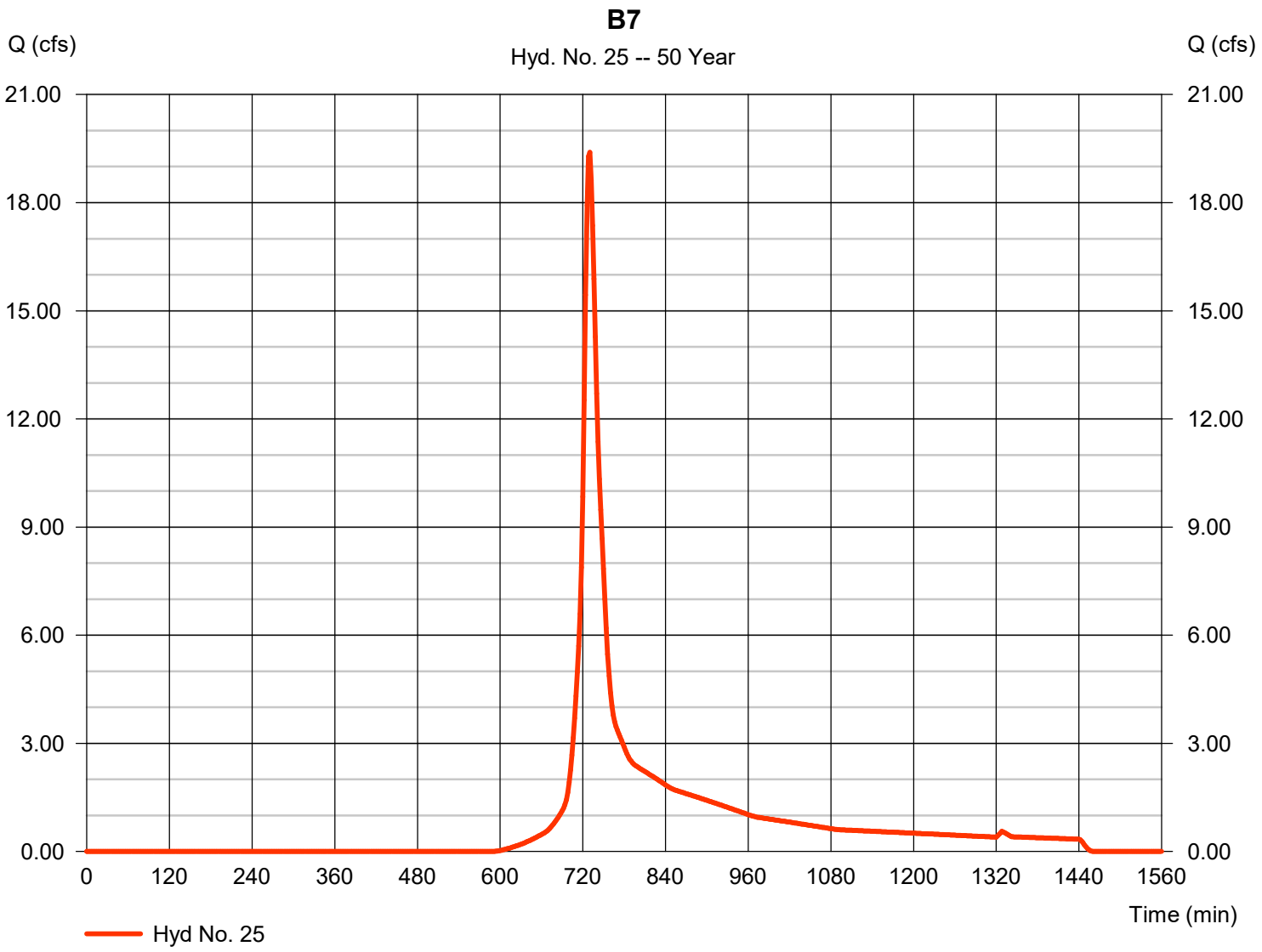
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 25

B7

Hydrograph type	= SCS Runoff	Peak discharge	= 19.40 cfs
Storm frequency	= 50 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 76,202 cuft
Drainage area	= 7.770 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



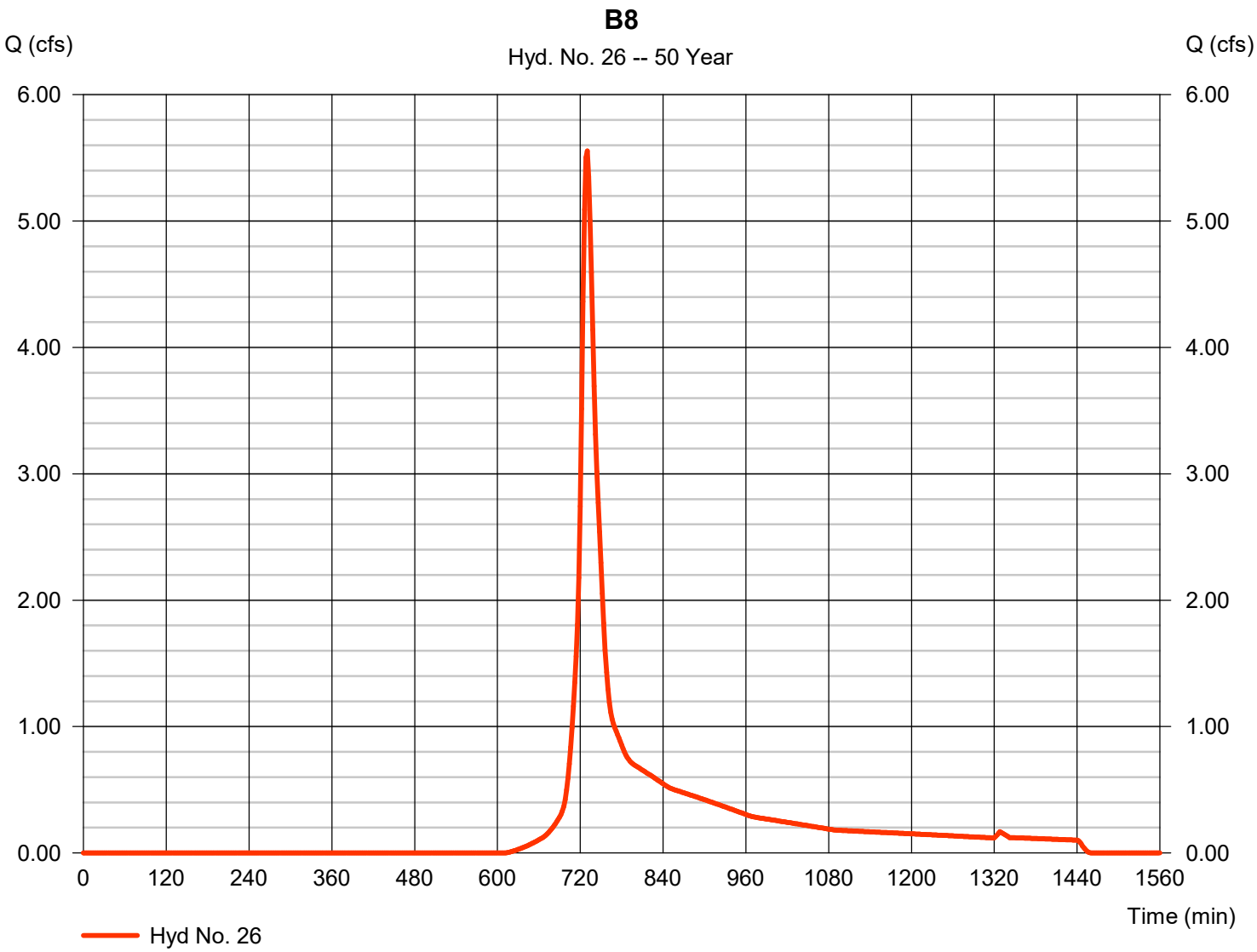
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 26

B8

Hydrograph type	= SCS Runoff	Peak discharge	= 5.555 cfs
Storm frequency	= 50 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 22,025 cuft
Drainage area	= 2.420 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.00 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



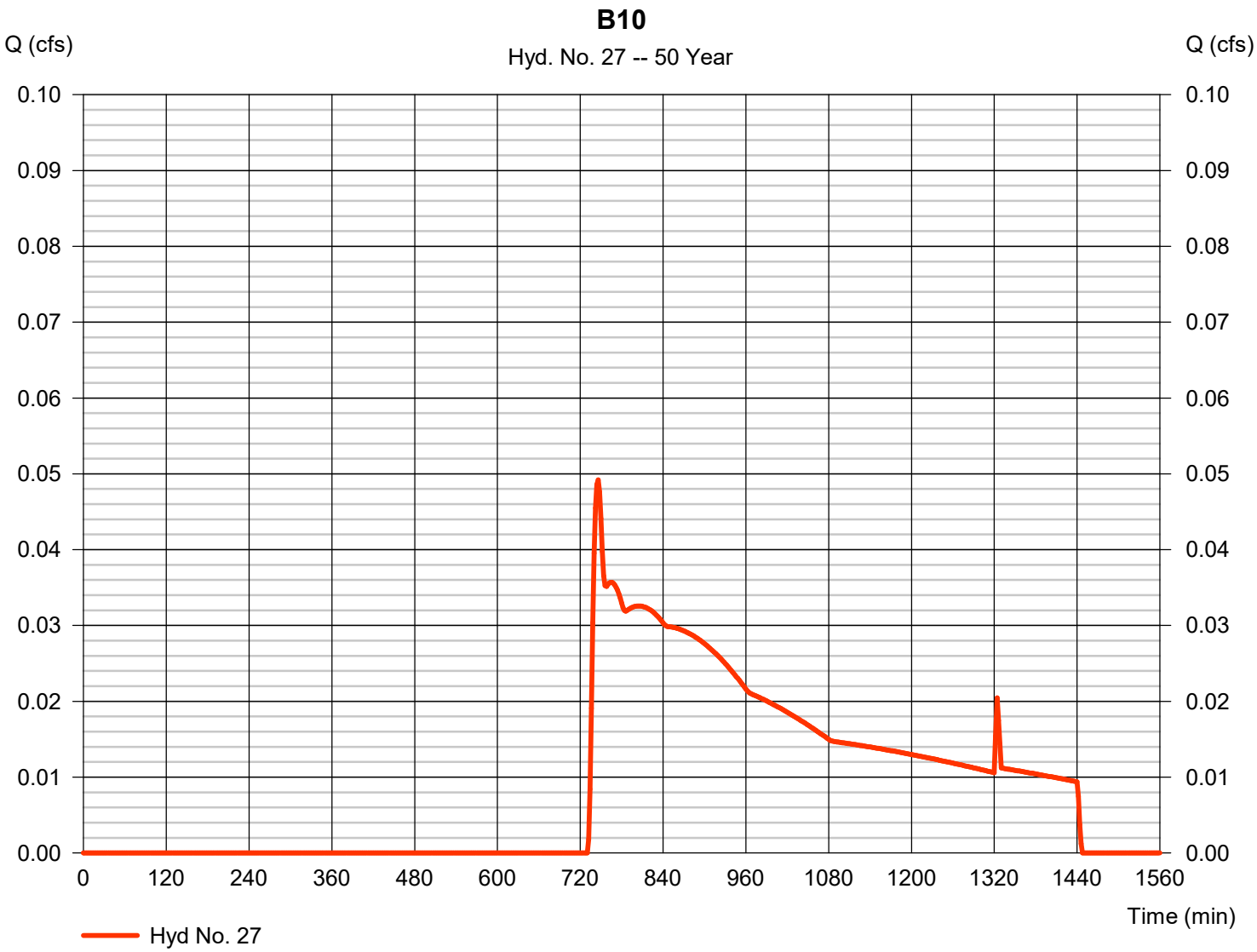
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 27

B10

Hydrograph type	= SCS Runoff	Peak discharge	= 0.049 cfs
Storm frequency	= 50 yrs	Time to peak	= 746 min
Time interval	= 2 min	Hyd. volume	= 809 cuft
Drainage area	= 0.830 ac	Curve number	= 33
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.60 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



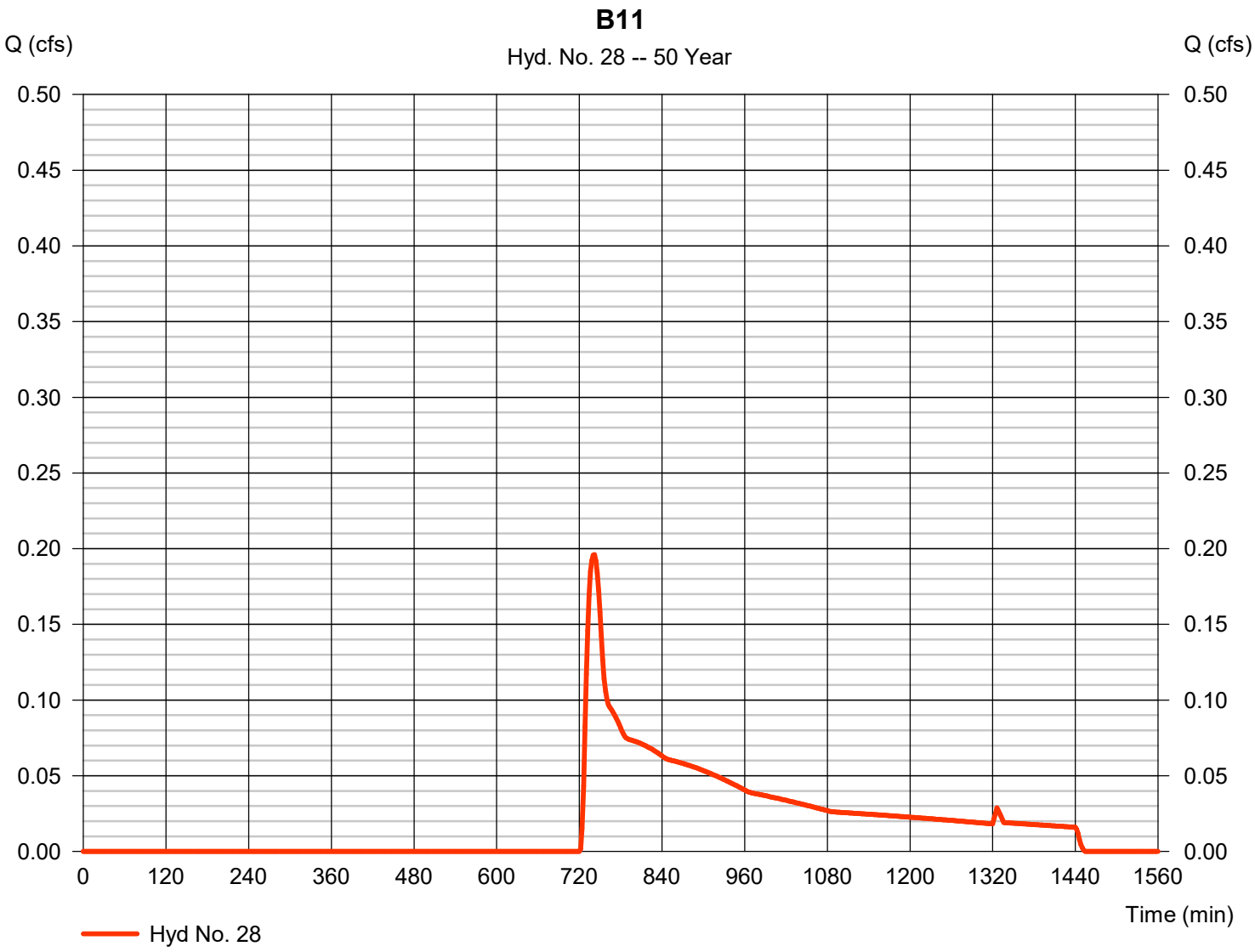
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 28

B11

Hydrograph type	= SCS Runoff	Peak discharge	= 0.196 cfs
Storm frequency	= 50 yrs	Time to peak	= 742 min
Time interval	= 2 min	Hyd. volume	= 1,759 cuft
Drainage area	= 0.950 ac	Curve number	= 37
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.00 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

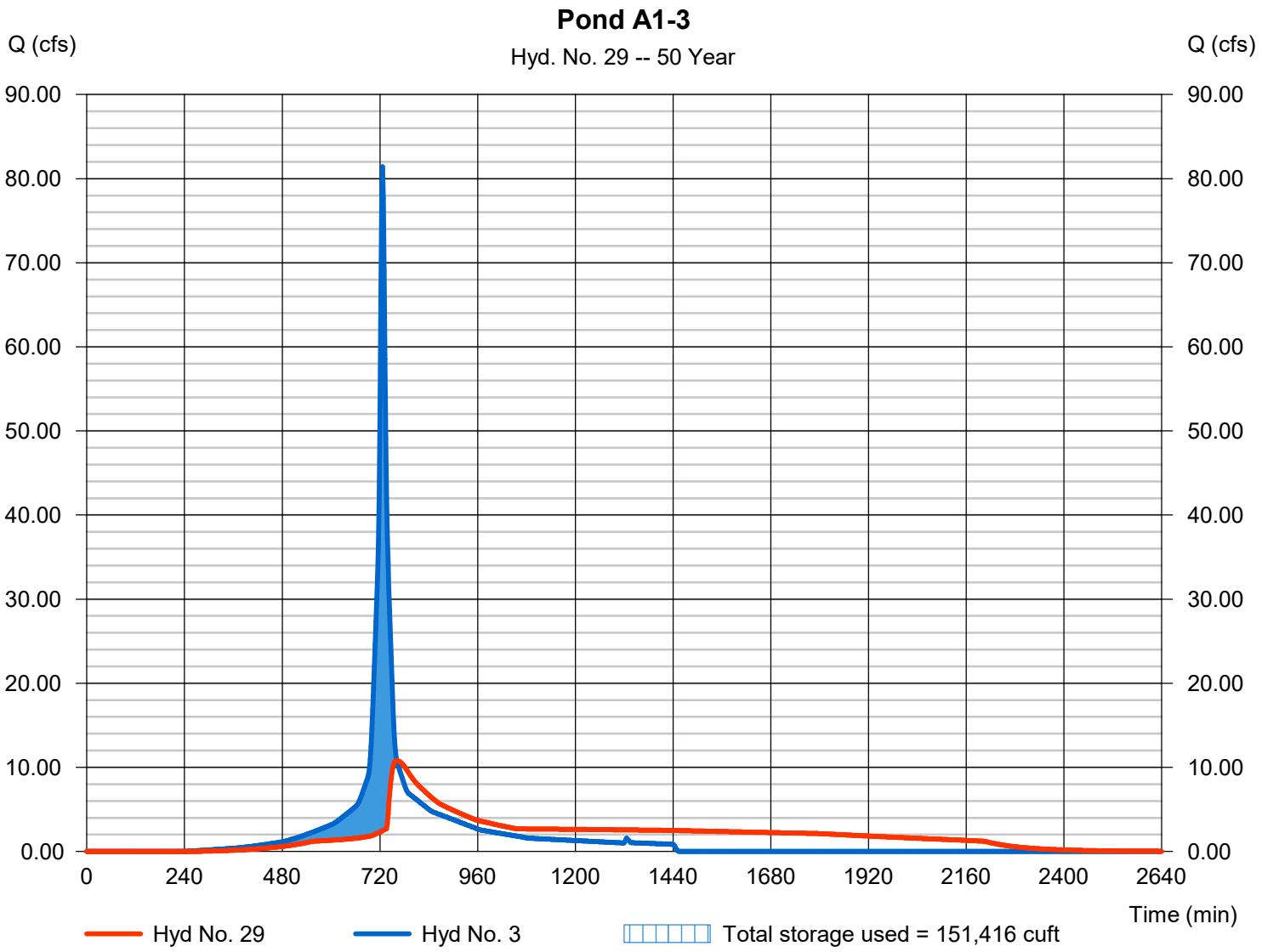
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 29

Pond A1-3

Hydrograph type	= Reservoir	Peak discharge	= 10.80 cfs
Storm frequency	= 50 yrs	Time to peak	= 762 min
Time interval	= 2 min	Hyd. volume	= 289,224 cuft
Inflow hyd. No.	= 3 - A1-3	Max. Elevation	= 133.89 ft
Reservoir name	= A1-3	Max. Storage	= 151,416 cuft

Storage Indication method used. Outflow includes exfiltration.



Hydrograph Report

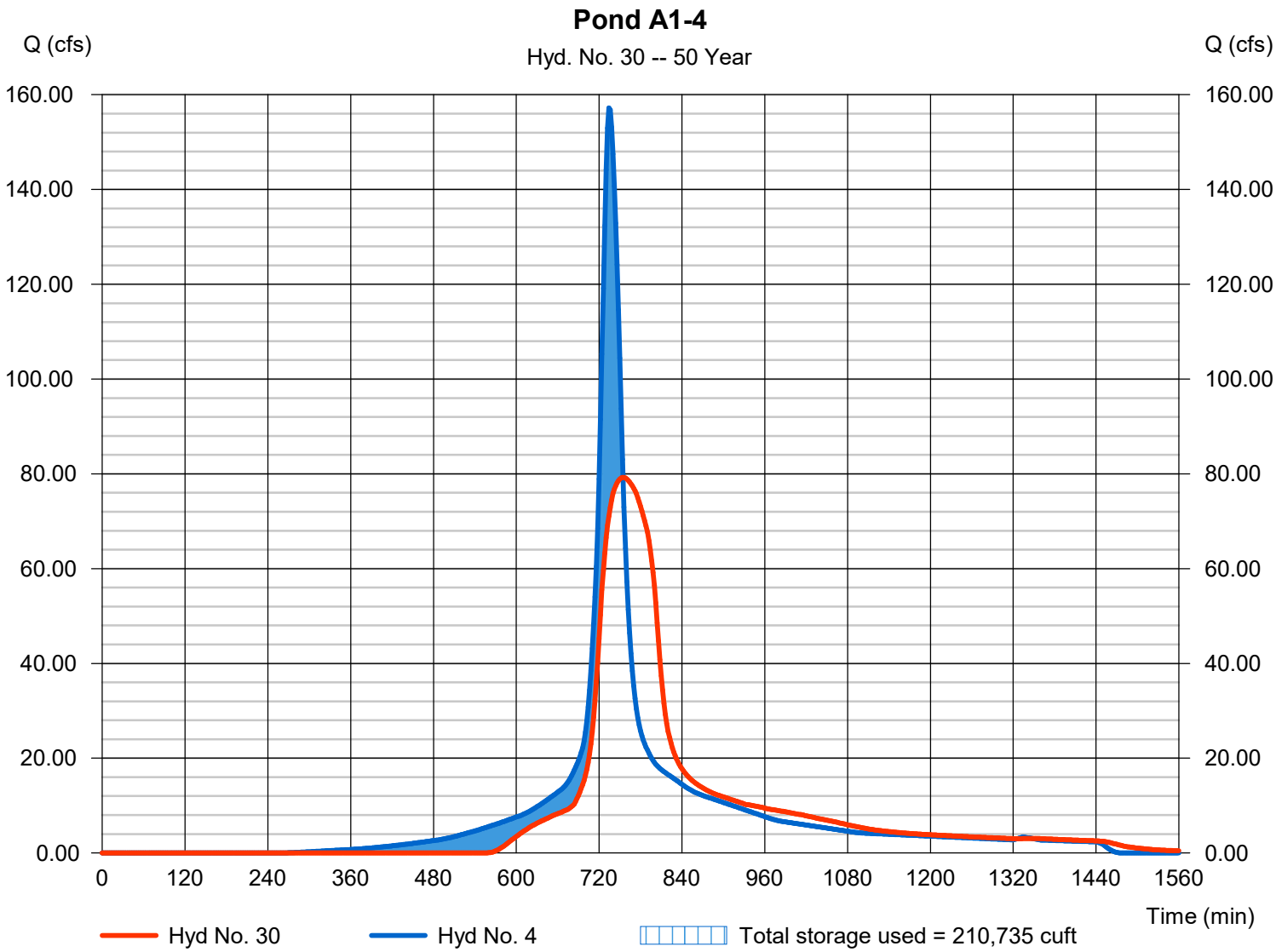
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 30

Pond A1-4

Hydrograph type	= Reservoir	Peak discharge	= 79.25 cfs
Storm frequency	= 50 yrs	Time to peak	= 754 min
Time interval	= 2 min	Hyd. volume	= 734,967 cuft
Inflow hyd. No.	= 4 - A1-4	Max. Elevation	= 138.38 ft
Reservoir name	= A1-4	Max. Storage	= 210,735 cuft

Storage Indication method used.



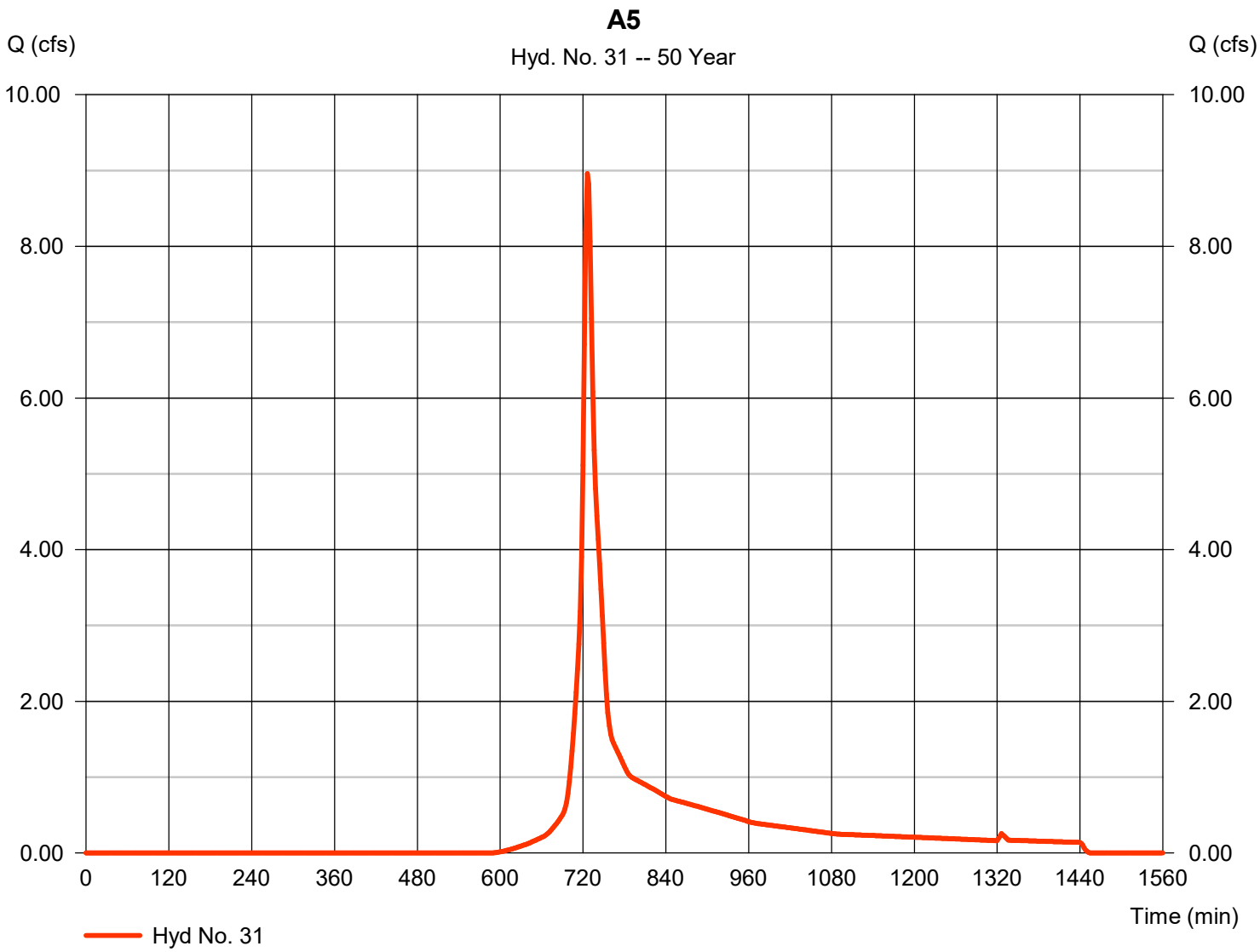
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 31

A5

Hydrograph type	= SCS Runoff	Peak discharge	= 8.959 cfs
Storm frequency	= 50 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 31,383 cuft
Drainage area	= 3.300 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.00 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

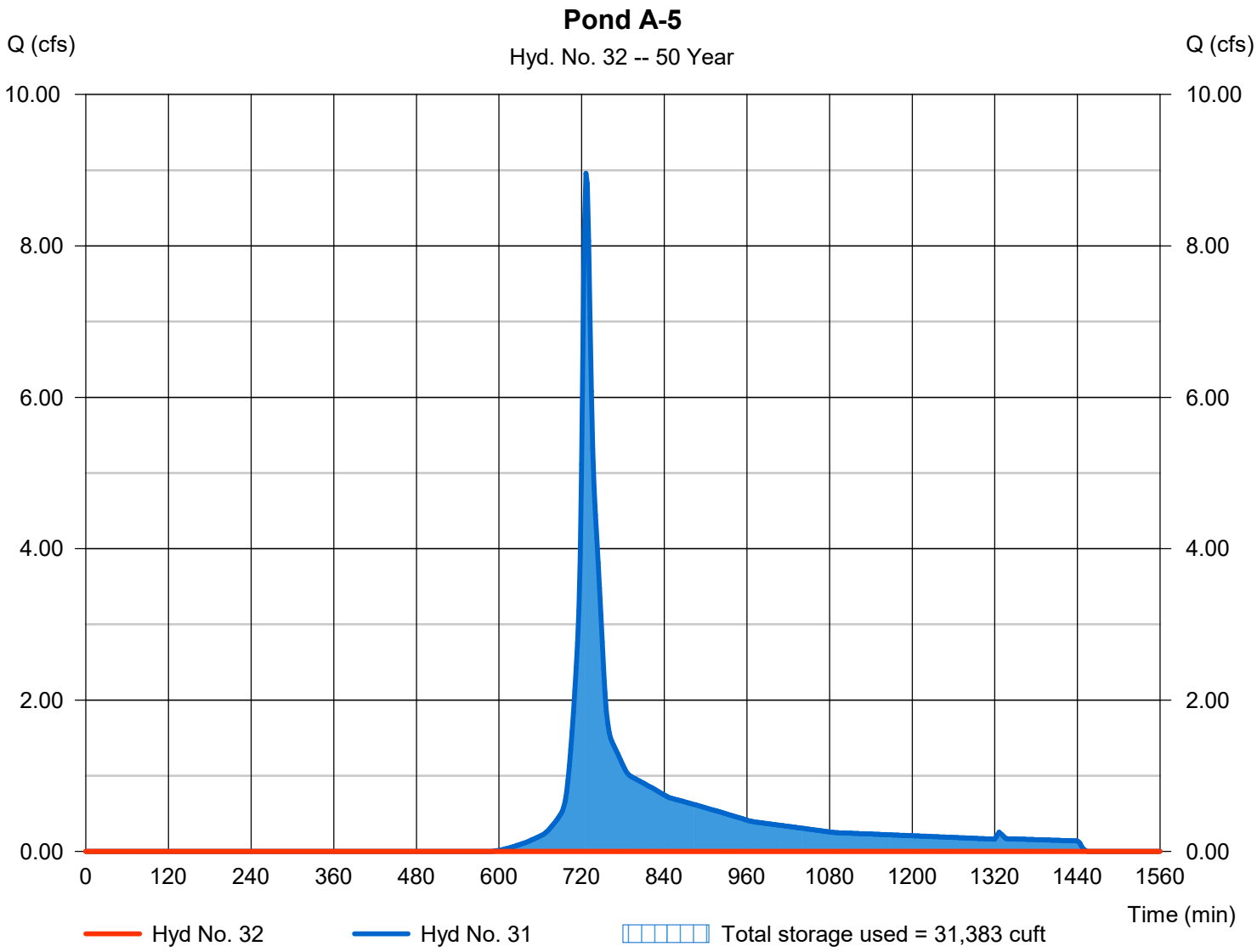
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 32

Pond A-5

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 50 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 31 - A5	Max. Elevation	= 107.87 ft
Reservoir name	= A5	Max. Storage	= 31,383 cuft

Storage Indication method used.



Hydrograph Report

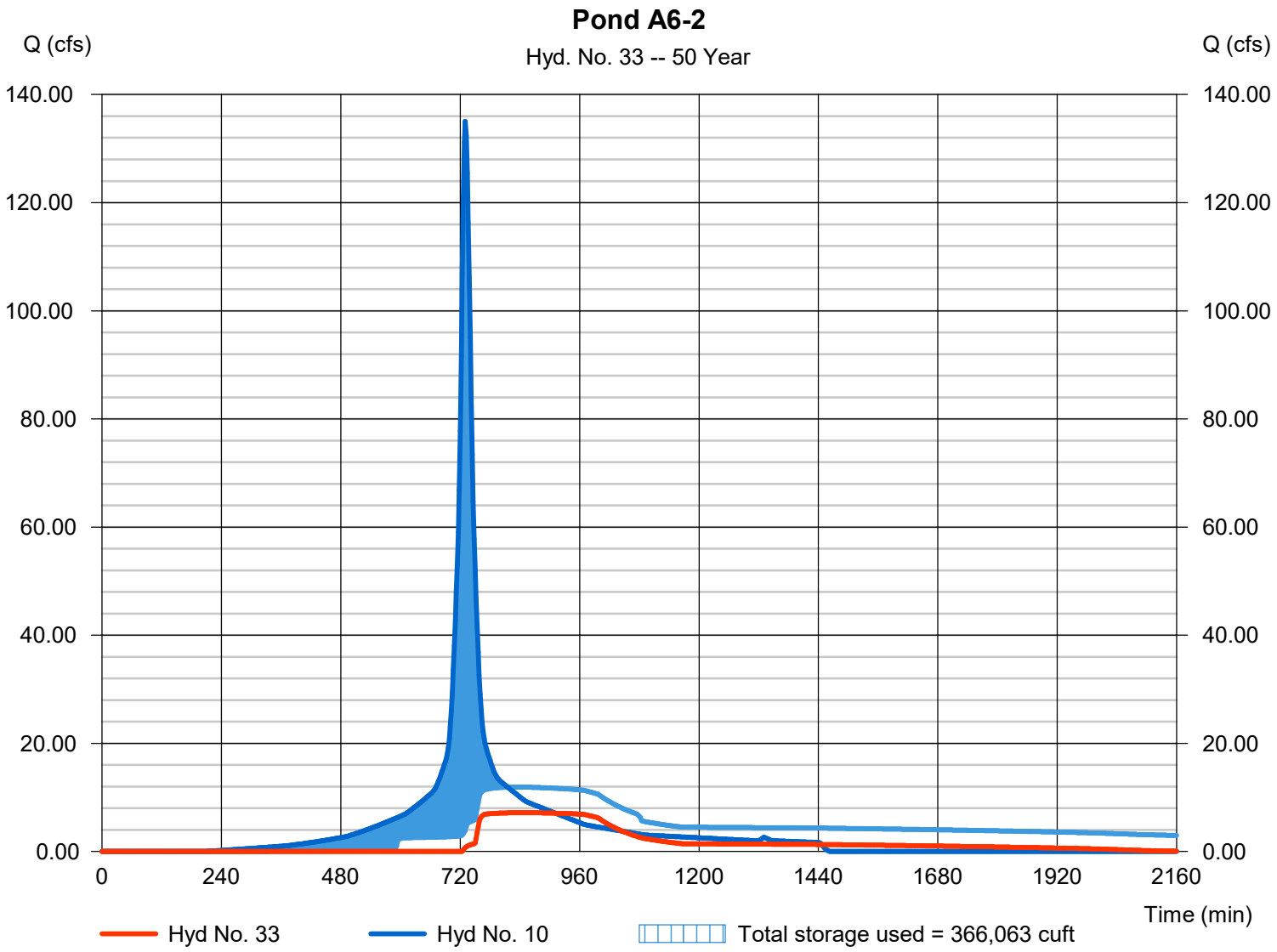
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 33

Pond A6-2

Hydrograph type	= Reservoir	Peak discharge	= 7.158 cfs
Storm frequency	= 50 yrs	Time to peak	= 846 min
Time interval	= 2 min	Hyd. volume	= 189,831 cuft
Inflow hyd. No.	= 10 - A6-2	Max. Elevation	= 118.64 ft
Reservoir name	= A6-2	Max. Storage	= 366,063 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

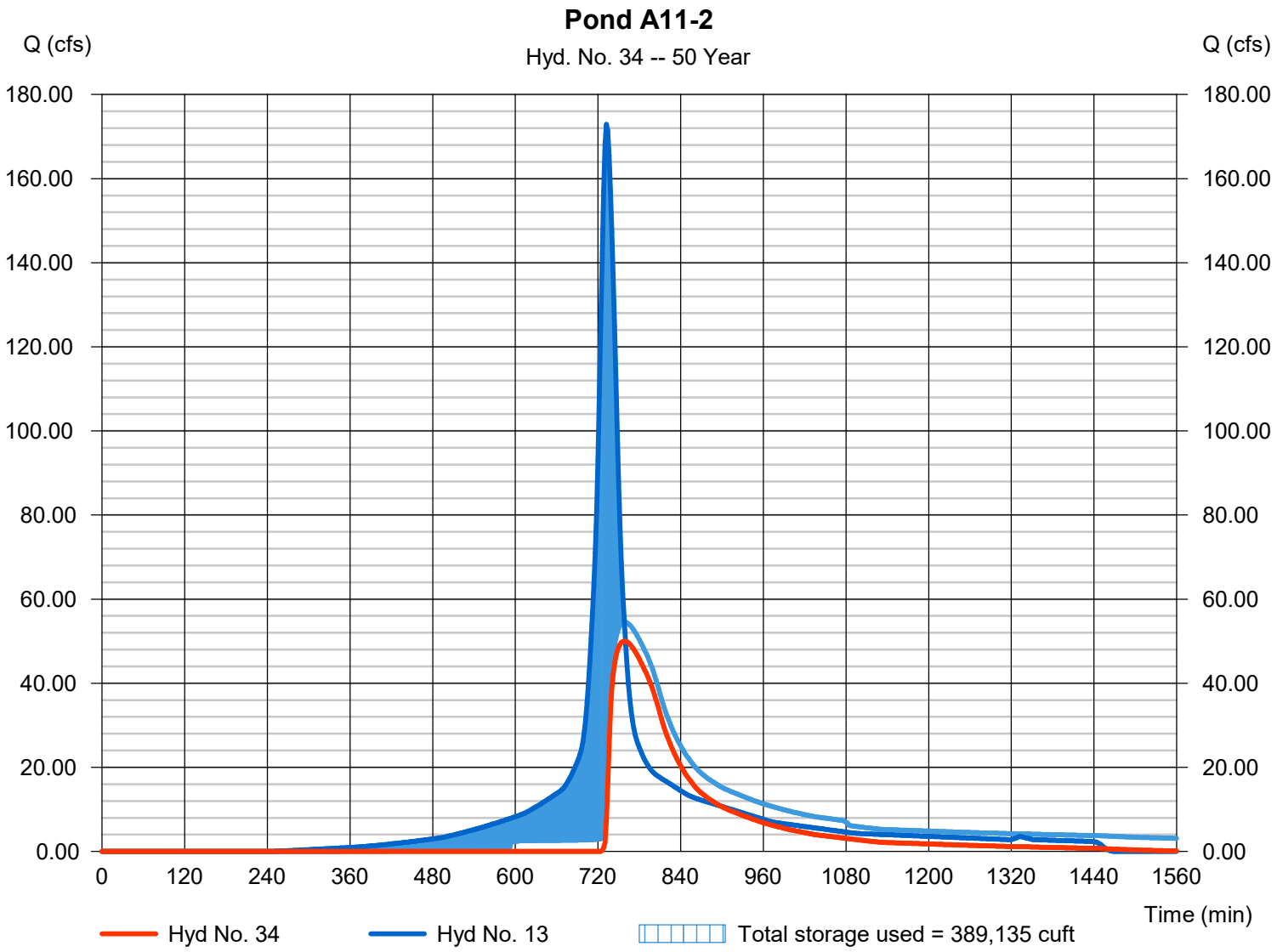
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 34

Pond A11-2

Hydrograph type	= Reservoir	Peak discharge	= 49.99 cfs
Storm frequency	= 50 yrs	Time to peak	= 758 min
Time interval	= 2 min	Hyd. volume	= 398,456 cuft
Inflow hyd. No.	= 13 - A11-2	Max. Elevation	= 118.93 ft
Reservoir name	= A11-2	Max. Storage	= 389,135 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

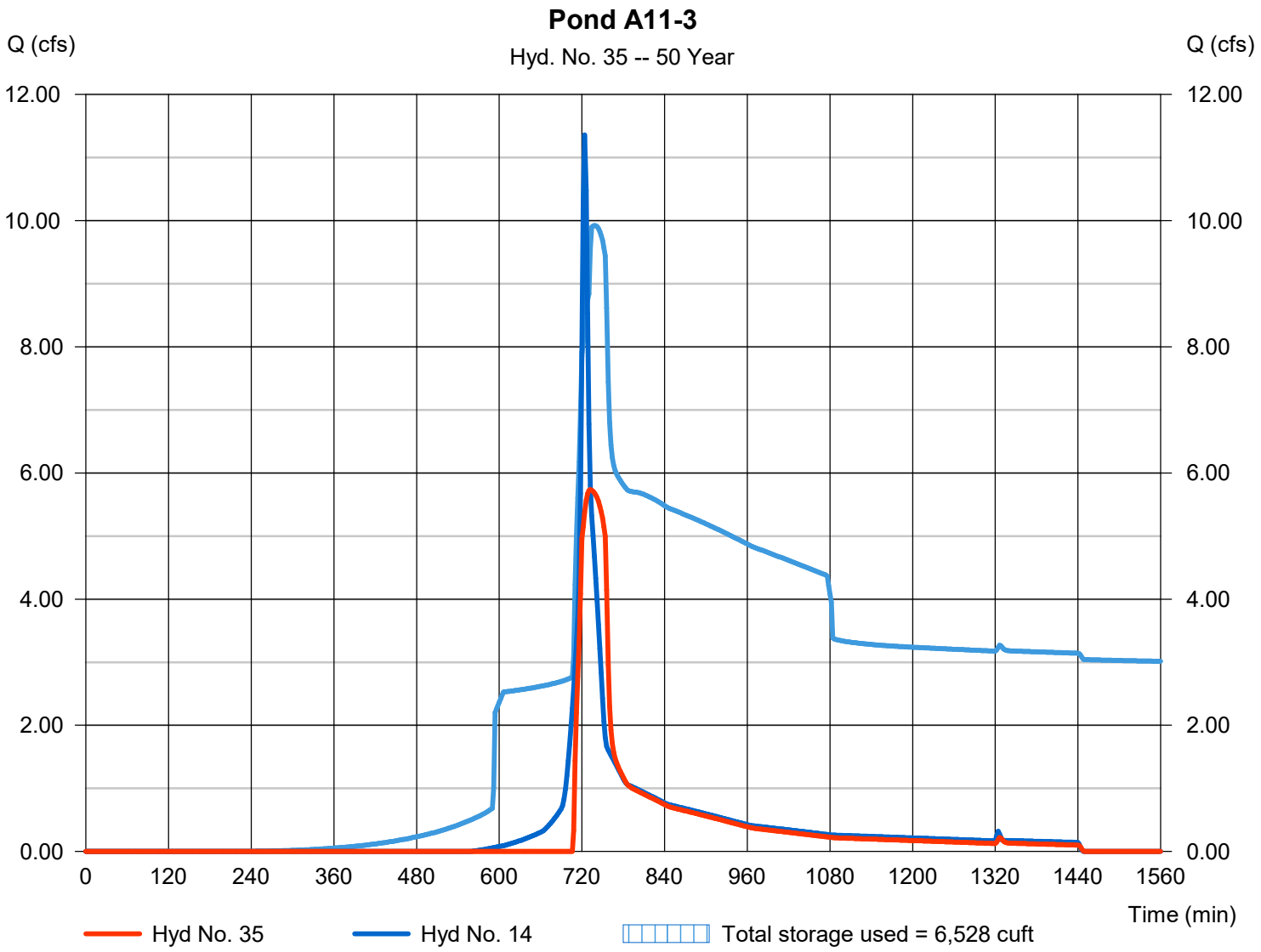
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 35

Pond A11-3

Hydrograph type	= Reservoir	Peak discharge	= 5.735 cfs
Storm frequency	= 50 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 29,214 cuft
Inflow hyd. No.	= 14 - A11-3	Max. Elevation	= 110.67 ft
Reservoir name	= A11-3	Max. Storage	= 6,528 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



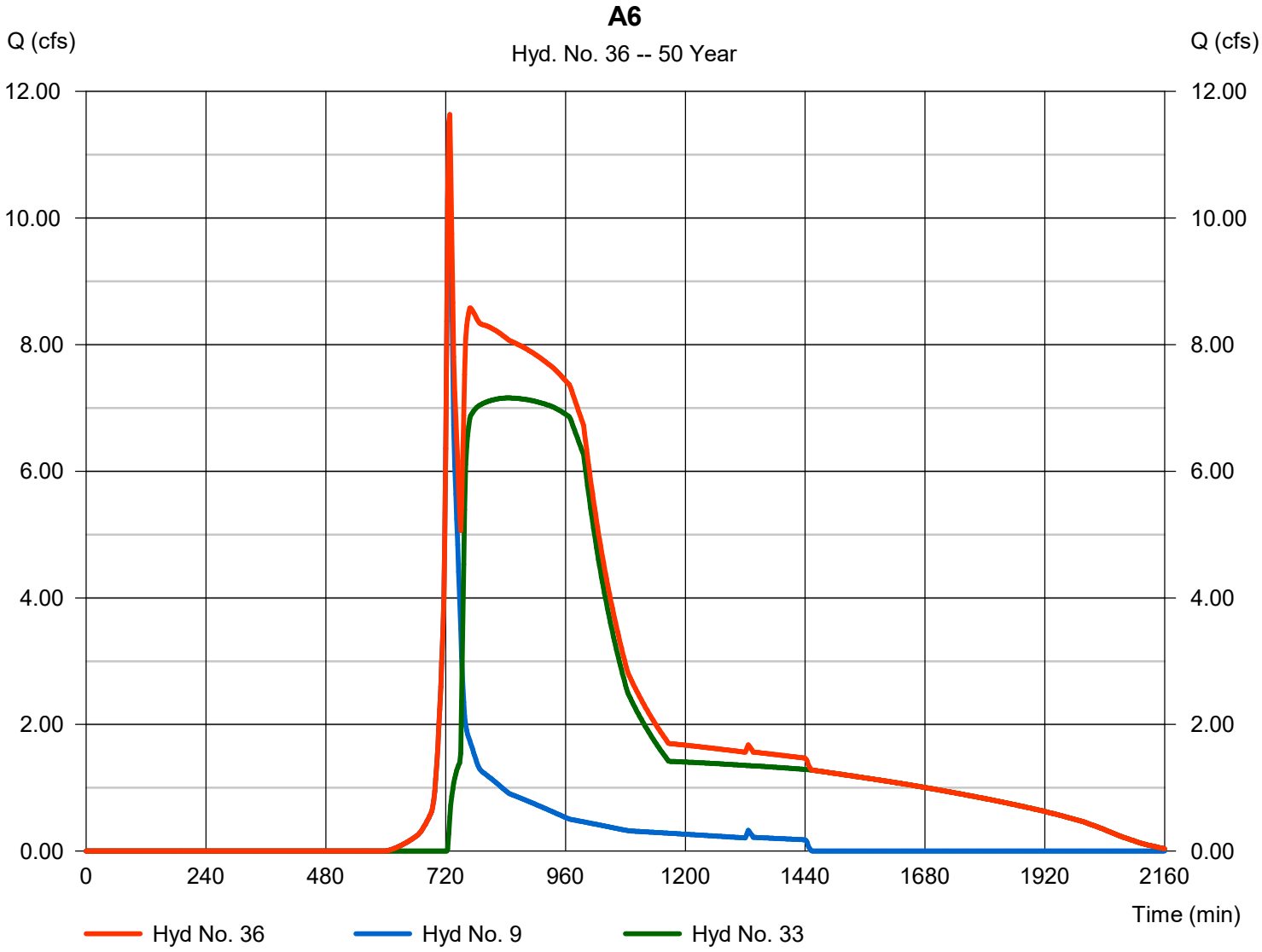
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 36

A6

Hydrograph type	= Combine	Peak discharge	= 11.64 cfs
Storm frequency	= 50 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 229,428 cuft
Inflow hyds.	= 9, 33	Contrib. drain. area	= 4.320 ac



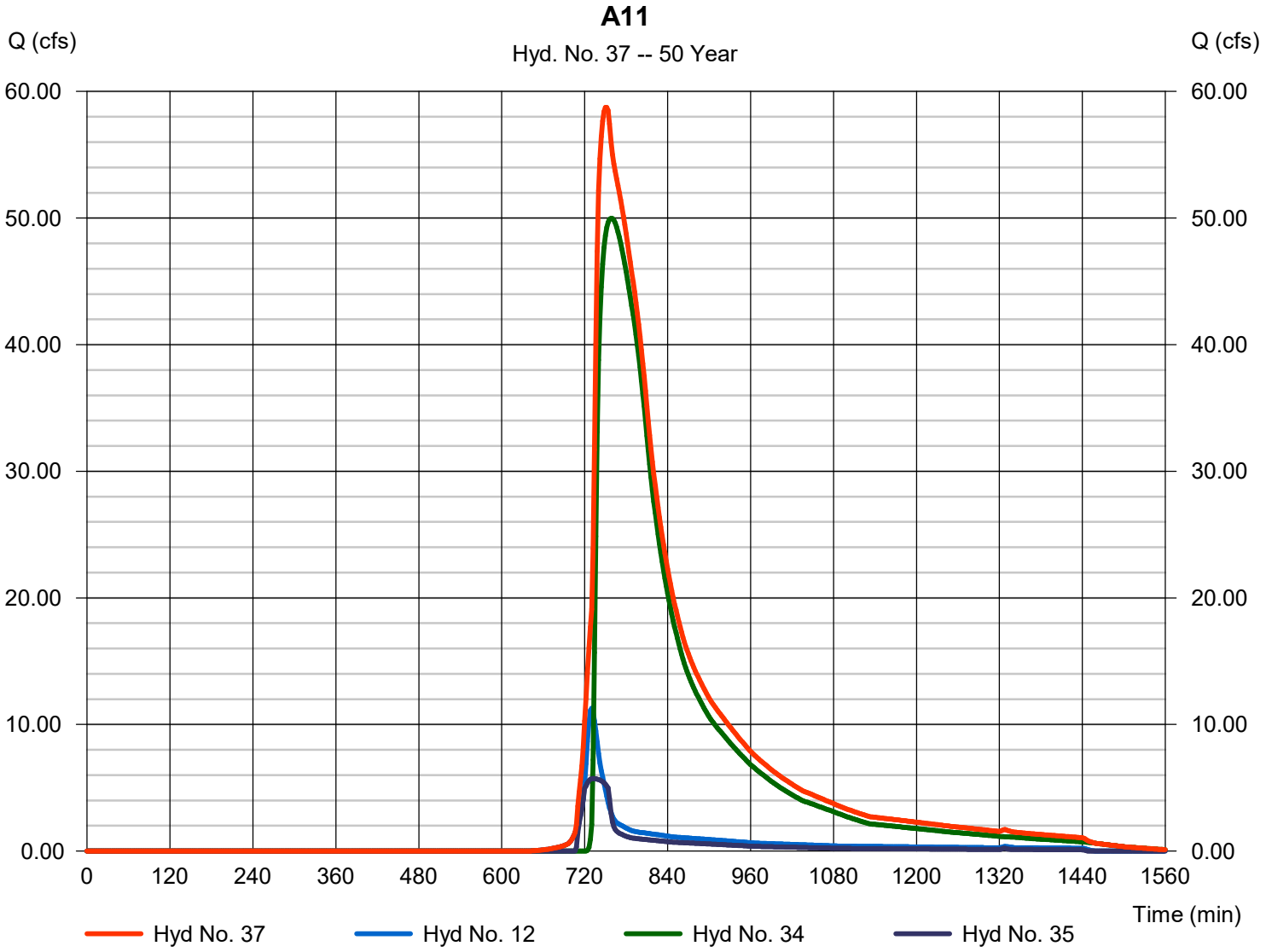
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 37

A11

Hydrograph type	= Combine	Peak discharge	= 58.74 cfs
Storm frequency	= 50 yrs	Time to peak	= 750 min
Time interval	= 2 min	Hyd. volume	= 473,324 cuft
Inflow hyds.	= 12, 34, 35	Contrib. drain. area	= 5.660 ac



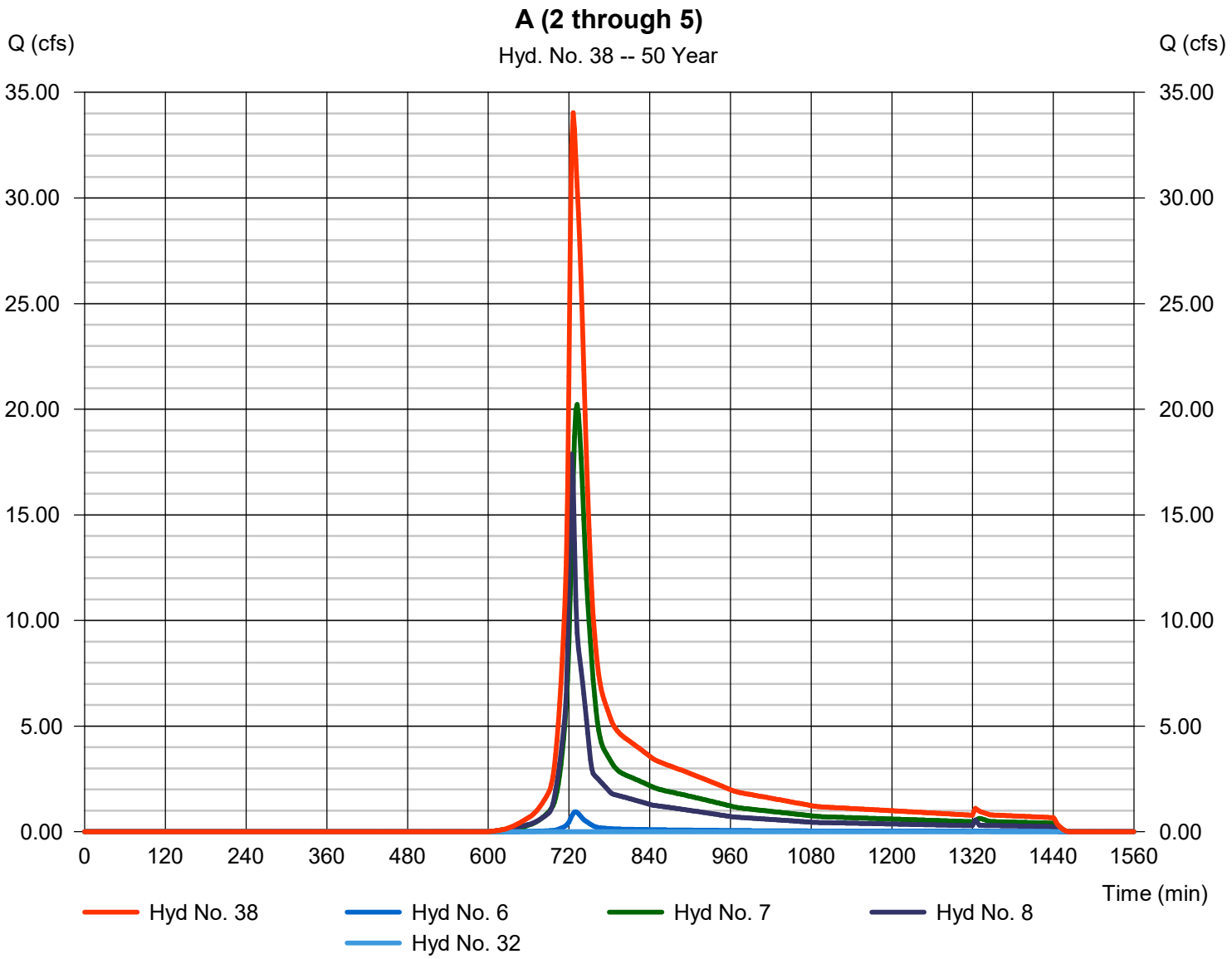
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 38

A (2 through 5)

Hydrograph type	= Combine	Peak discharge	= 34.03 cfs
Storm frequency	= 50 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 144,069 cuft
Inflow hyds.	= 6, 7, 8, 32	Contrib. drain. area	= 17.140 ac



Hydrograph Report

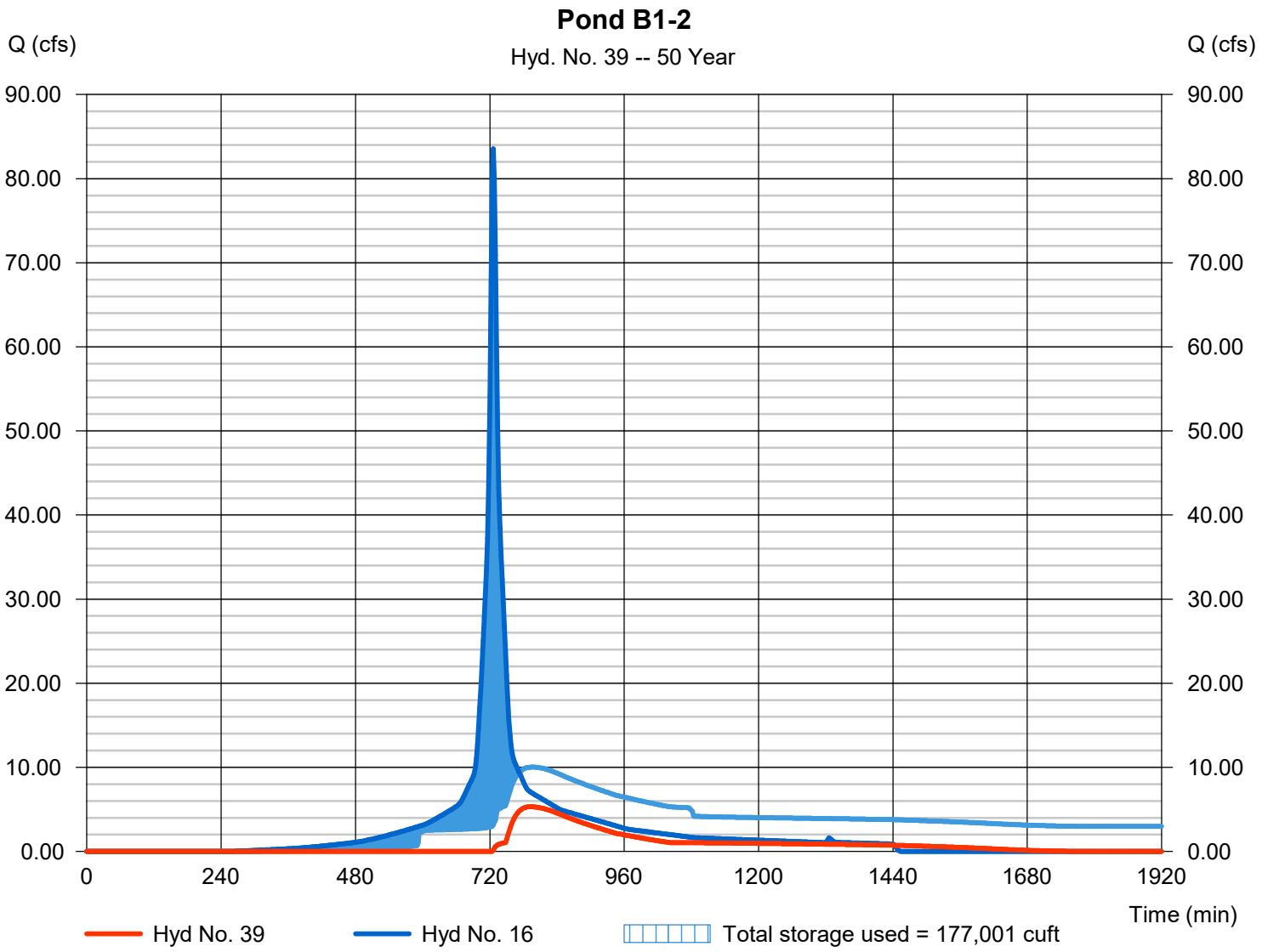
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 39

Pond B1-2

Hydrograph type	= Reservoir	Peak discharge	= 5.316 cfs
Storm frequency	= 50 yrs	Time to peak	= 792 min
Time interval	= 2 min	Hyd. volume	= 85,232 cuft
Inflow hyd. No.	= 16 - B1-2	Max. Elevation	= 133.76 ft
Reservoir name	= B1-2	Max. Storage	= 177,001 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



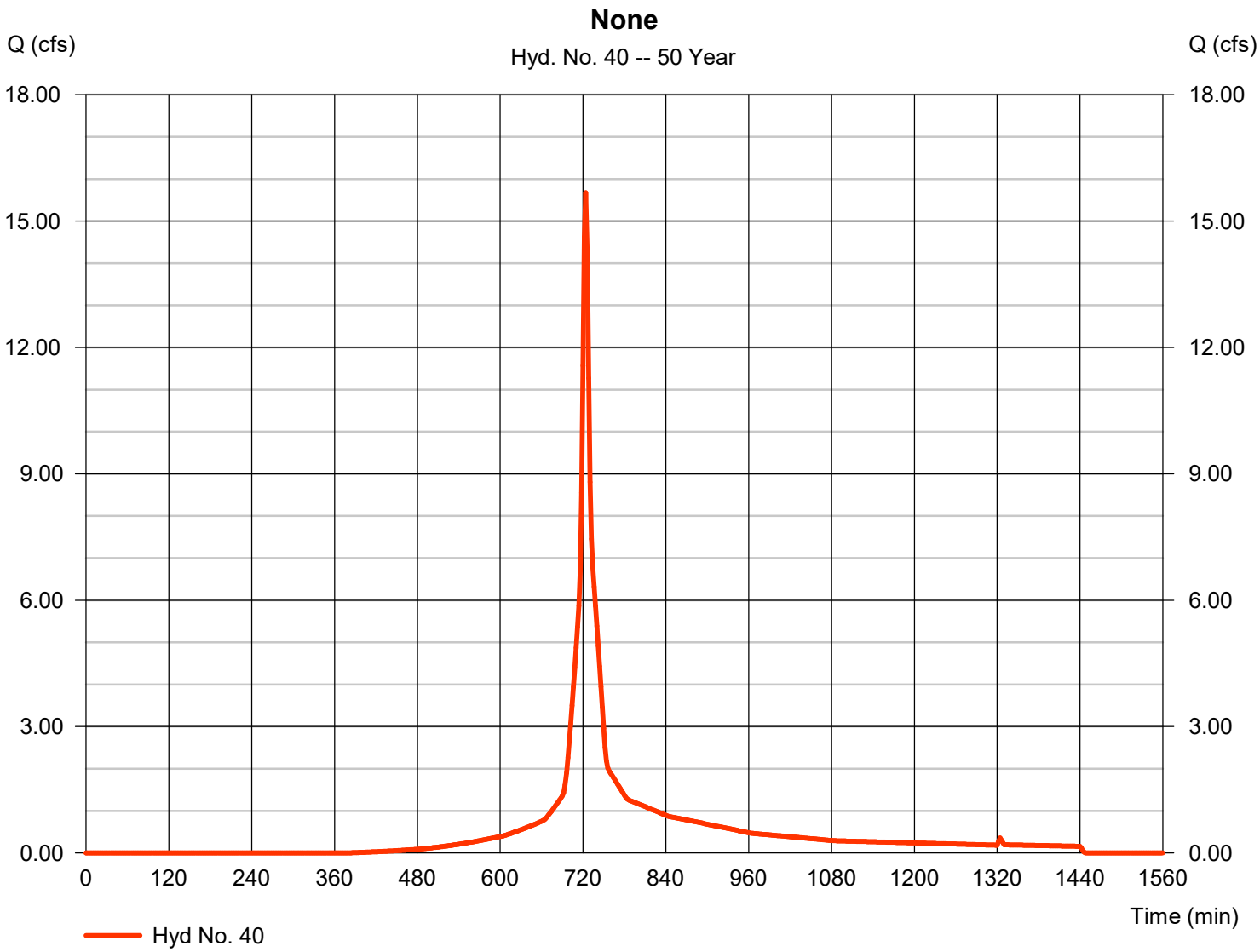
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 40

None

Hydrograph type	= SCS Runoff	Peak discharge	= 15.68 cfs
Storm frequency	= 50 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 47,318 cuft
Drainage area	= 3.200 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

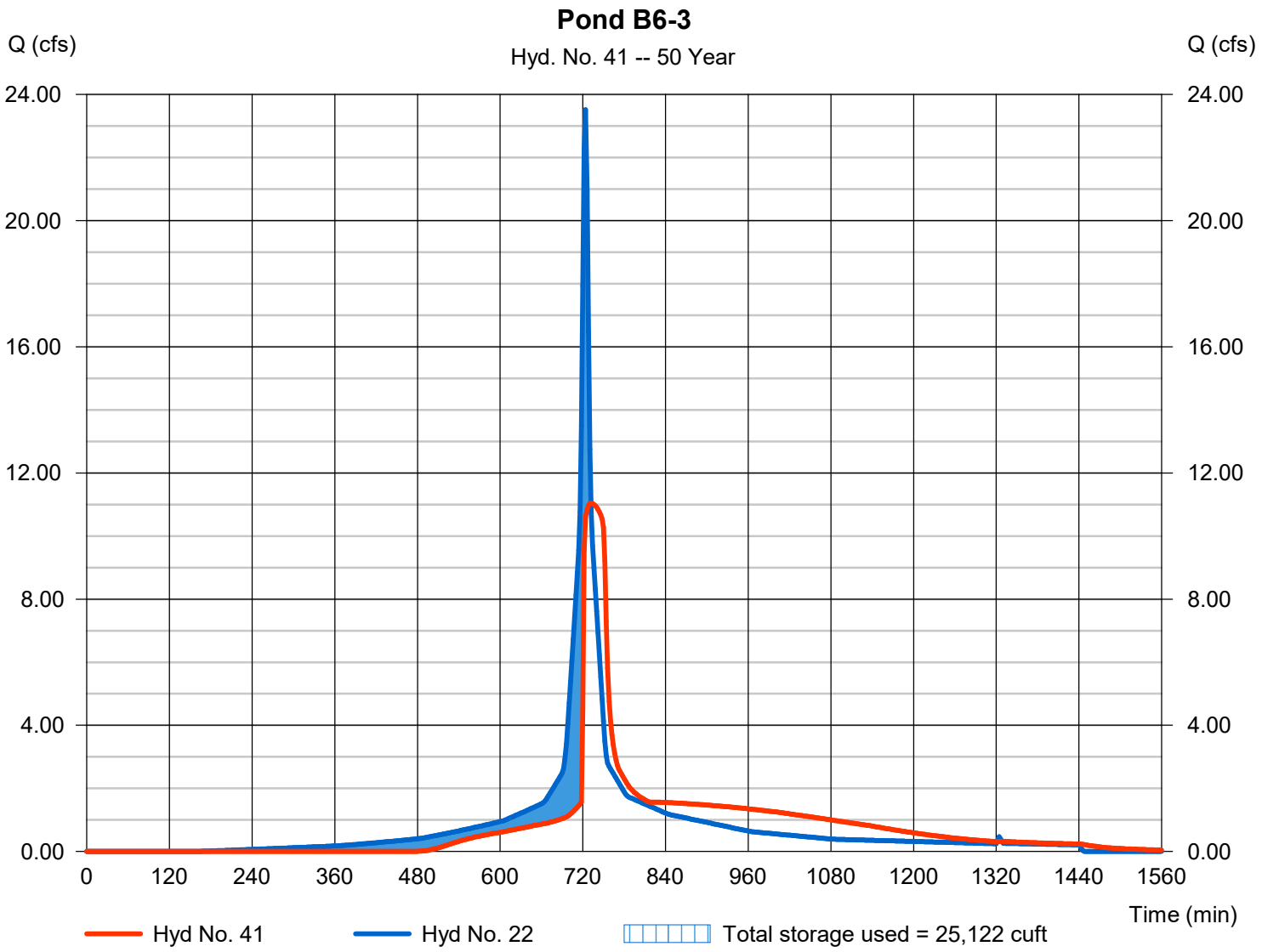
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 41

Pond B6-3

Hydrograph type	= Reservoir	Peak discharge	= 11.04 cfs
Storm frequency	= 50 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 72,961 cuft
Inflow hyd. No.	= 22 - B6-3	Max. Elevation	= 139.02 ft
Reservoir name	= B6-3	Max. Storage	= 25,122 cuft

Storage Indication method used.



Hydrograph Report

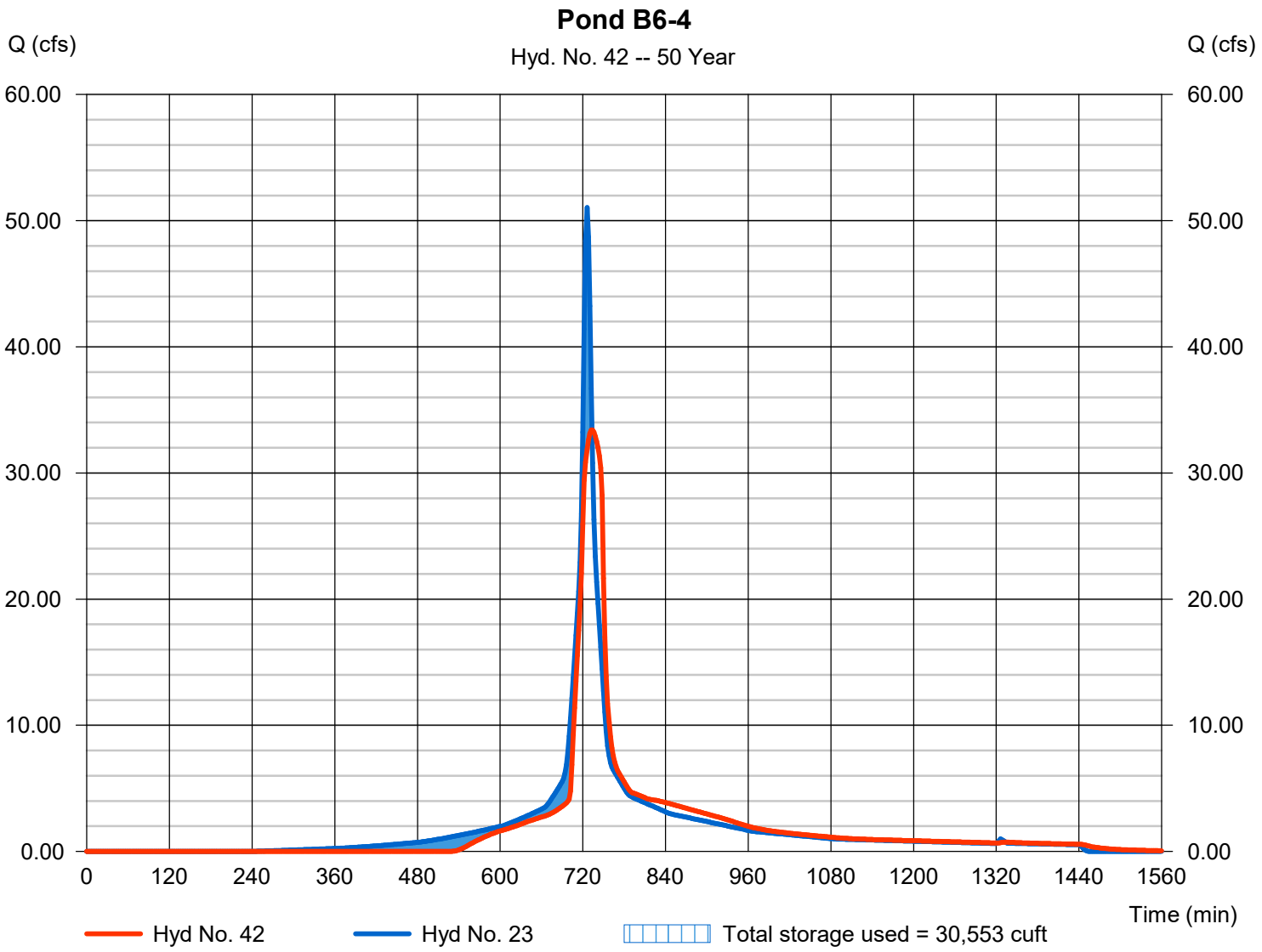
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 42

Pond B6-4

Hydrograph type	= Reservoir	Peak discharge	= 33.41 cfs
Storm frequency	= 50 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 174,525 cuft
Inflow hyd. No.	= 23 - B6-4	Max. Elevation	= 139.75 ft
Reservoir name	= B6-4	Max. Storage	= 30,553 cuft

Storage Indication method used.



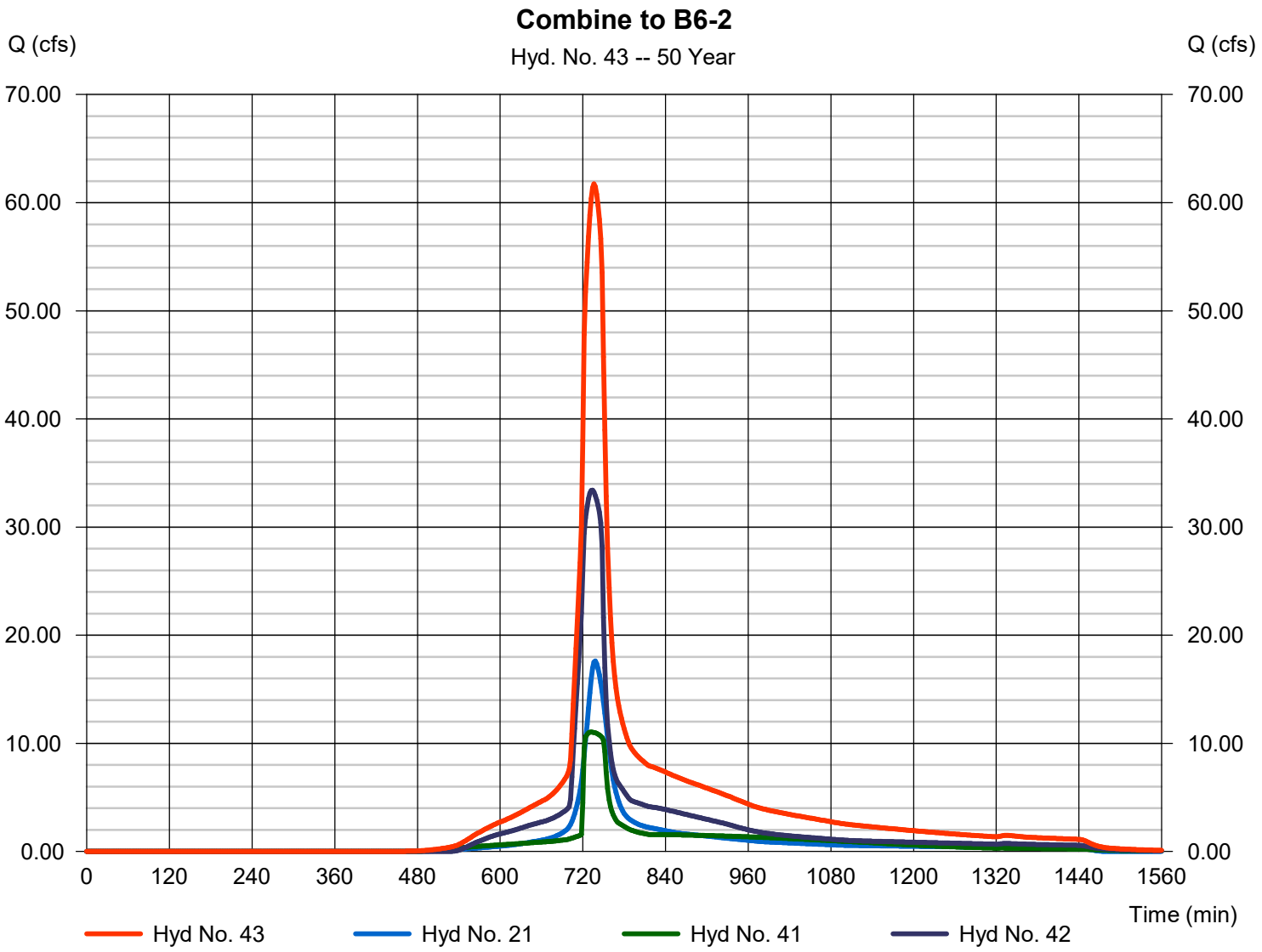
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 43

Combine to B6-2

Hydrograph type	= Combine	Peak discharge	= 61.74 cfs
Storm frequency	= 50 yrs	Time to peak	= 736 min
Time interval	= 2 min	Hyd. volume	= 334,209 cuft
Inflow hyds.	= 21, 41, 42	Contrib. drain. area	= 6.190 ac



Hydrograph Report

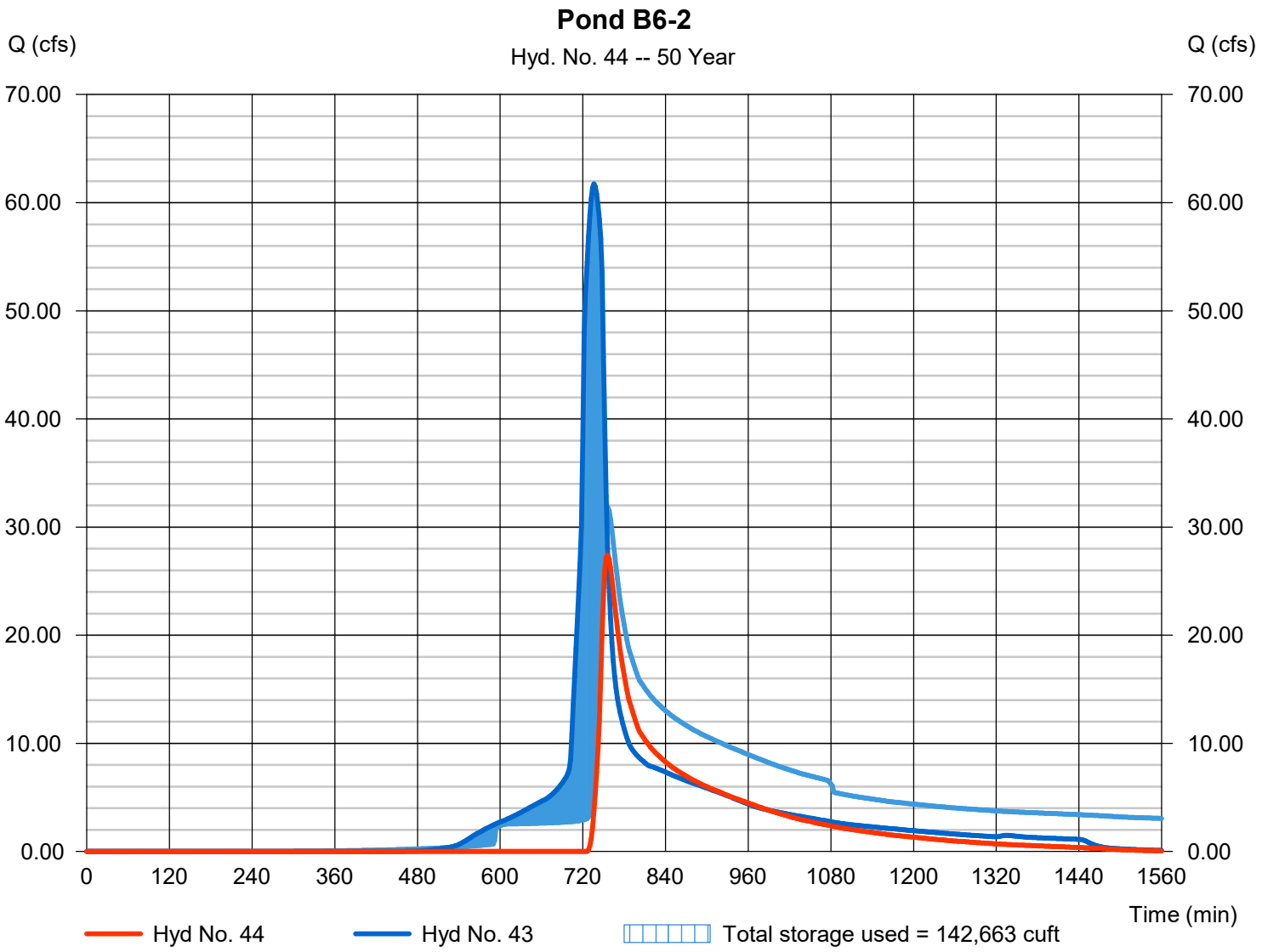
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 44

Pond B6-2

Hydrograph type	= Reservoir	Peak discharge	= 27.42 cfs
Storm frequency	= 50 yrs	Time to peak	= 756 min
Time interval	= 2 min	Hyd. volume	= 183,978 cuft
Inflow hyd. No.	= 43 - Combine to B6-2	Max. Elevation	= 133.87 ft
Reservoir name	= B6-2	Max. Storage	= 142,663 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

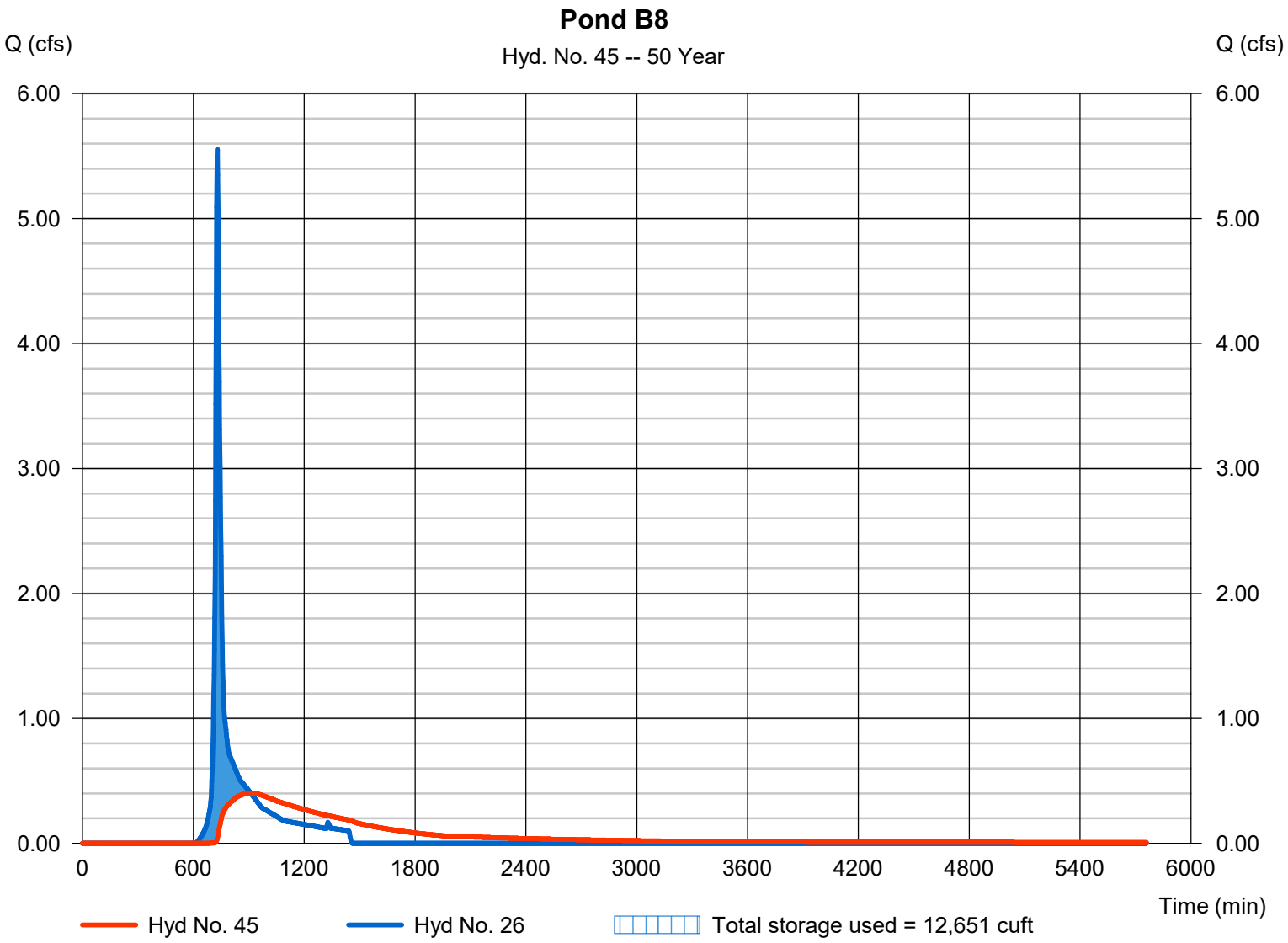
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 45

Pond B8

Hydrograph type	= Reservoir	Peak discharge	= 0.402 cfs
Storm frequency	= 50 yrs	Time to peak	= 910 min
Time interval	= 2 min	Hyd. volume	= 20,102 cuft
Inflow hyd. No.	= 26 - B8	Max. Elevation	= 132.43 ft
Reservoir name	= B8	Max. Storage	= 12,651 cuft

Storage Indication method used.



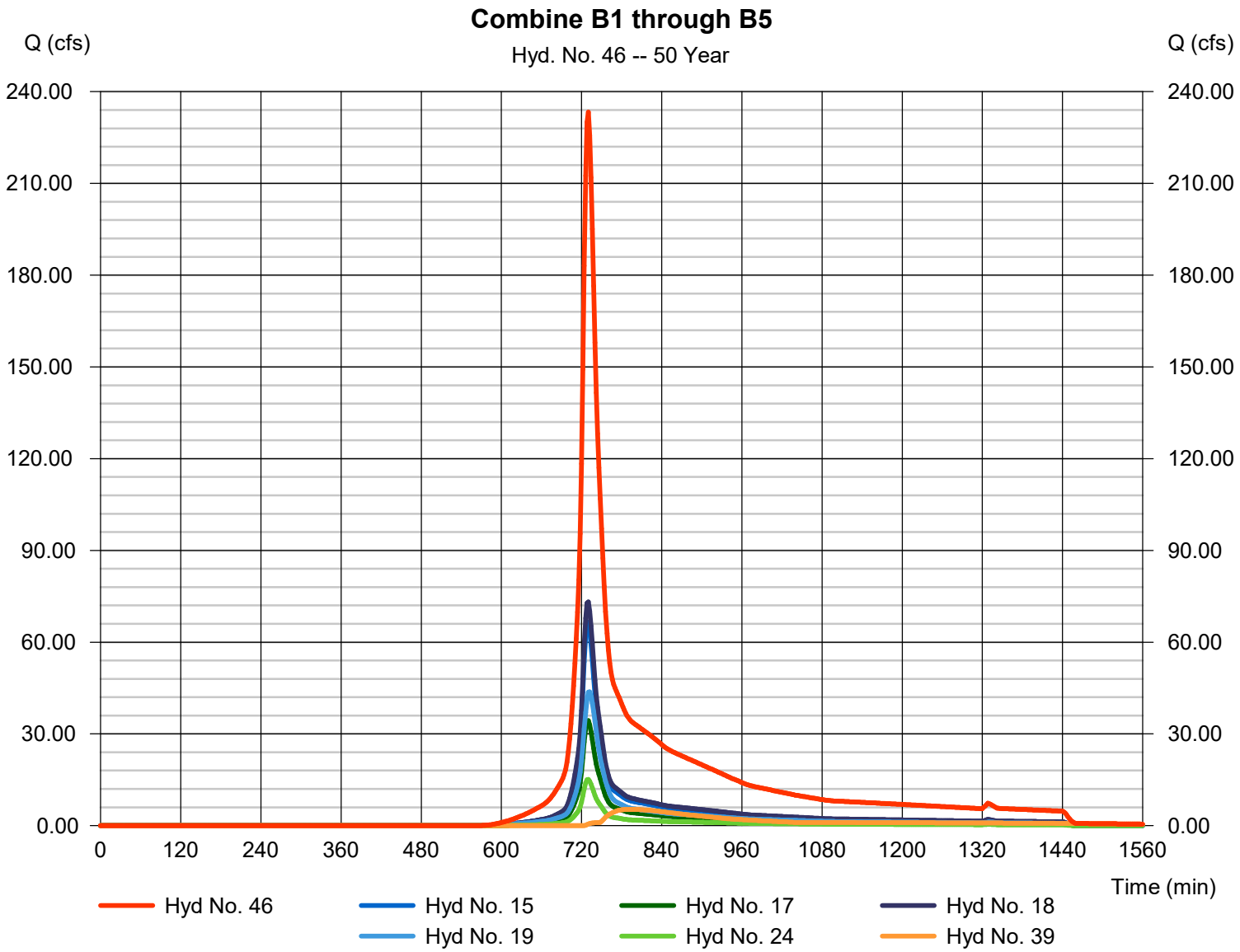
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 46

Combine B1 through B5

Hydrograph type	= Combine	Peak discharge	= 233.34 cfs
Storm frequency	= 50 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 1,005,789 cuft
Inflow hyds.	= 15, 17, 18, 19, 24, 39	Contrib. drain. area	= 90.160 ac



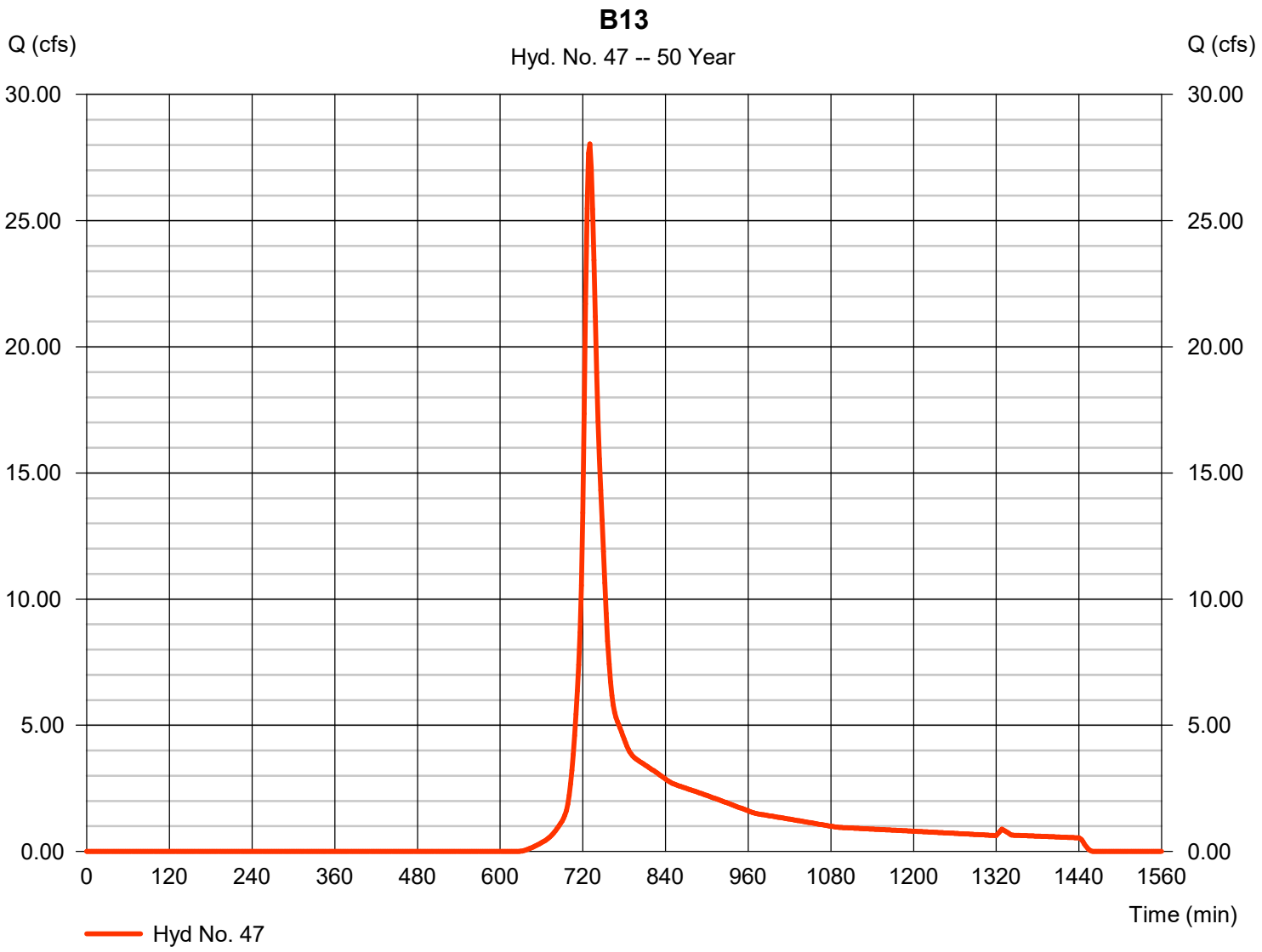
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 47

B13

Hydrograph type	= SCS Runoff	Peak discharge	= 28.05 cfs
Storm frequency	= 50 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 112,579 cuft
Drainage area	= 13.390 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.40 min
Total precip.	= 6.62 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



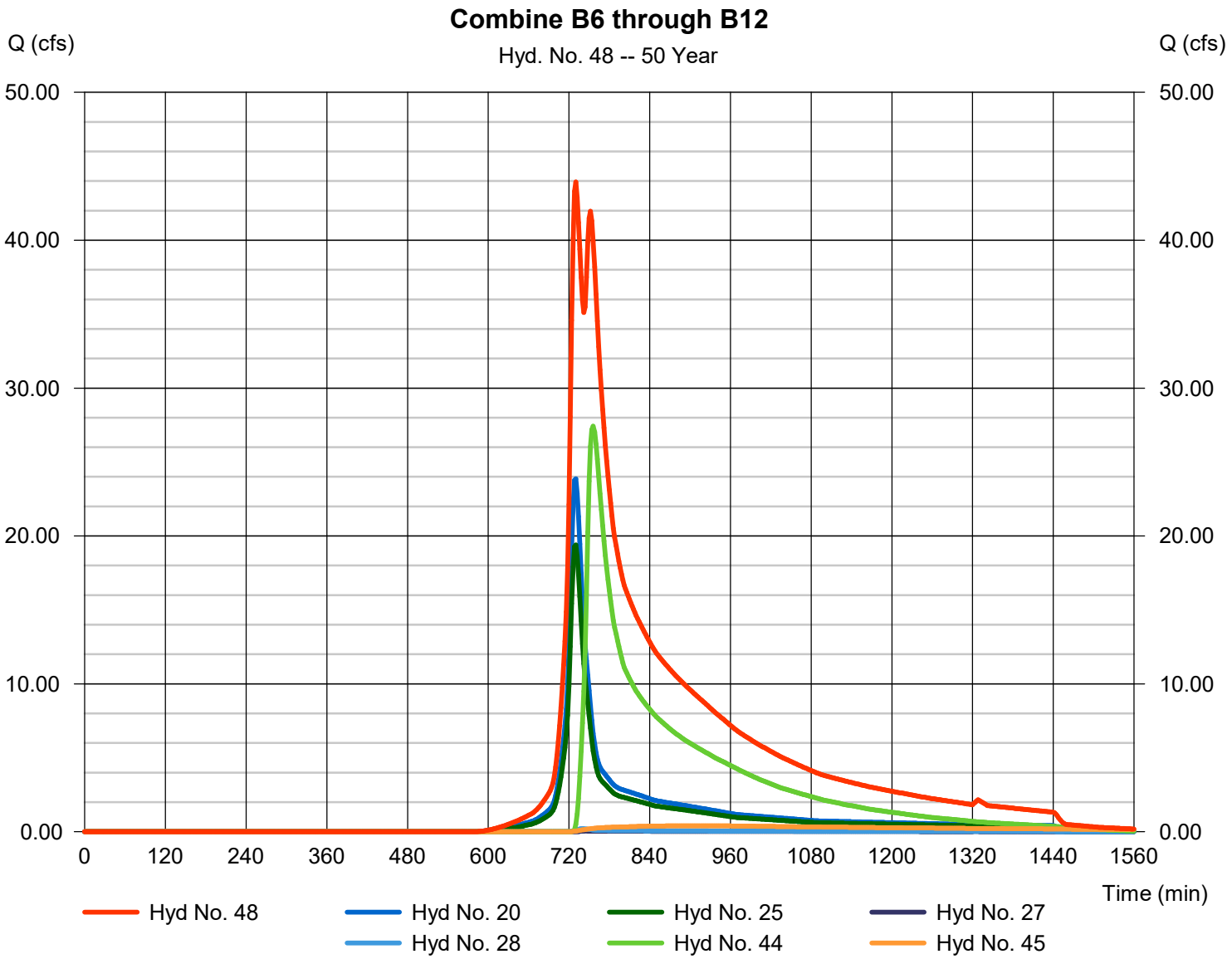
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 48

Combine B6 through B12

Hydrograph type	= Combine	Peak discharge	= 43.93 cfs
Storm frequency	= 50 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 376,264 cuft
Inflow hyds.	= 20, 25, 27, 28, 44, 45	Contrib. drain. area	= 18.740 ac



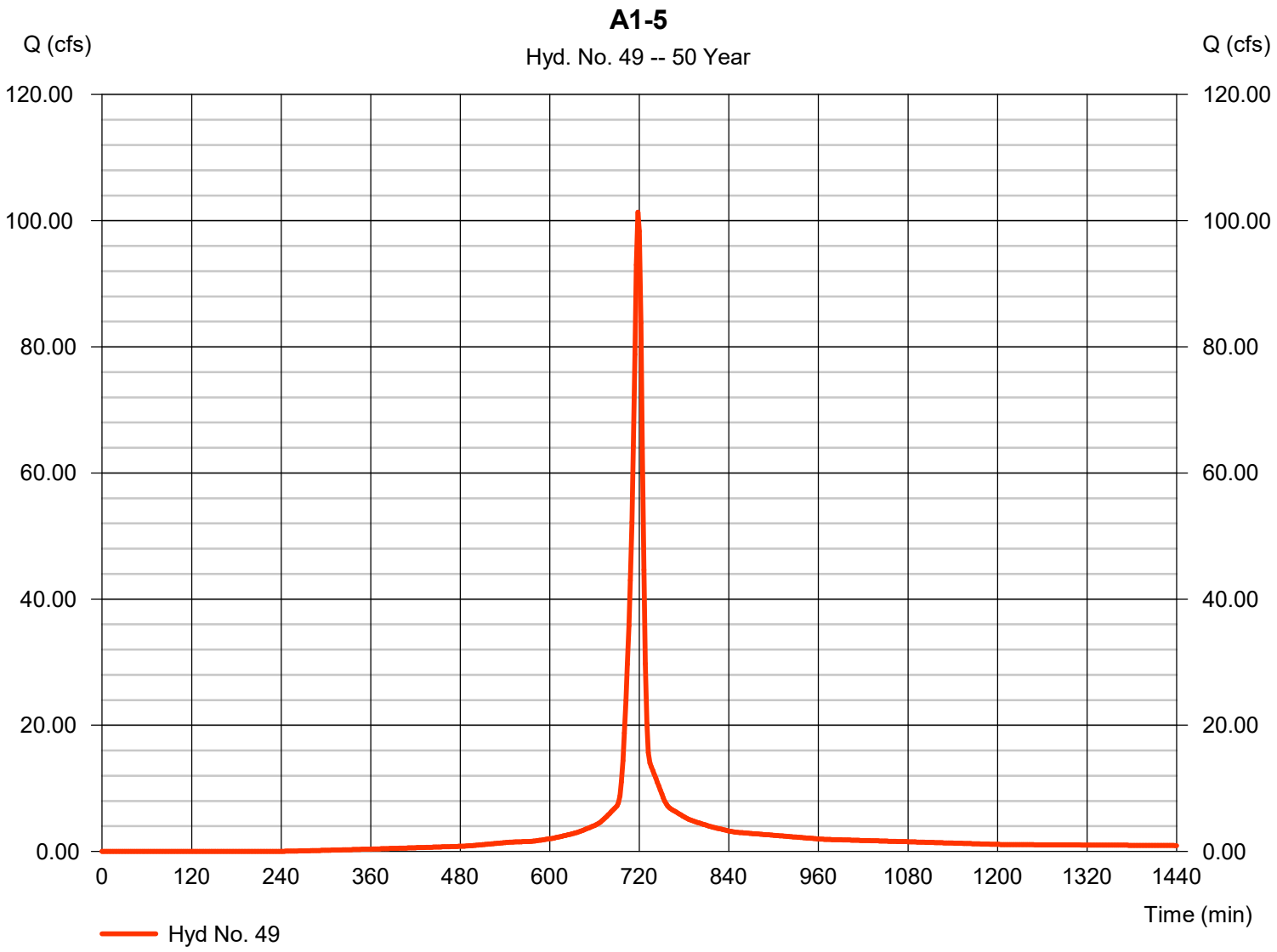
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 49

A1-5

Hydrograph type	= SCS Runoff	Peak discharge	= 101.36 cfs
Storm frequency	= 50 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 243,490 cuft
Drainage area	= 13.120 ac	Curve number	= 87
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.00 min
Total precip.	= 6.62 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

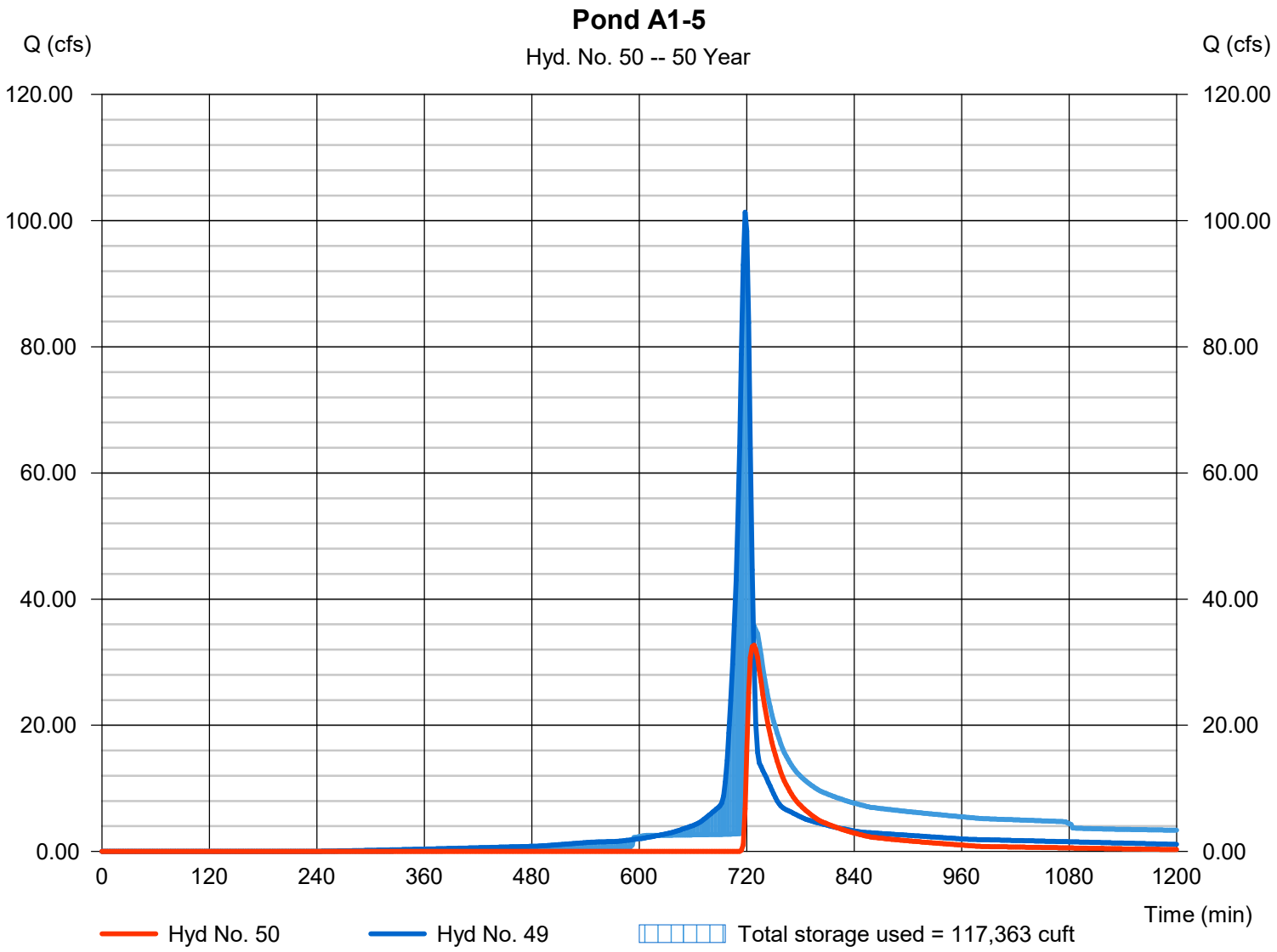
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 50

Pond A1-5

Hydrograph type	= Reservoir	Peak discharge	= 32.70 cfs
Storm frequency	= 50 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 106,156 cuft
Inflow hyd. No.	= 49 - A1-5	Max. Elevation	= 135.86 ft
Reservoir name	= A1-5	Max. Storage	= 117,363 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



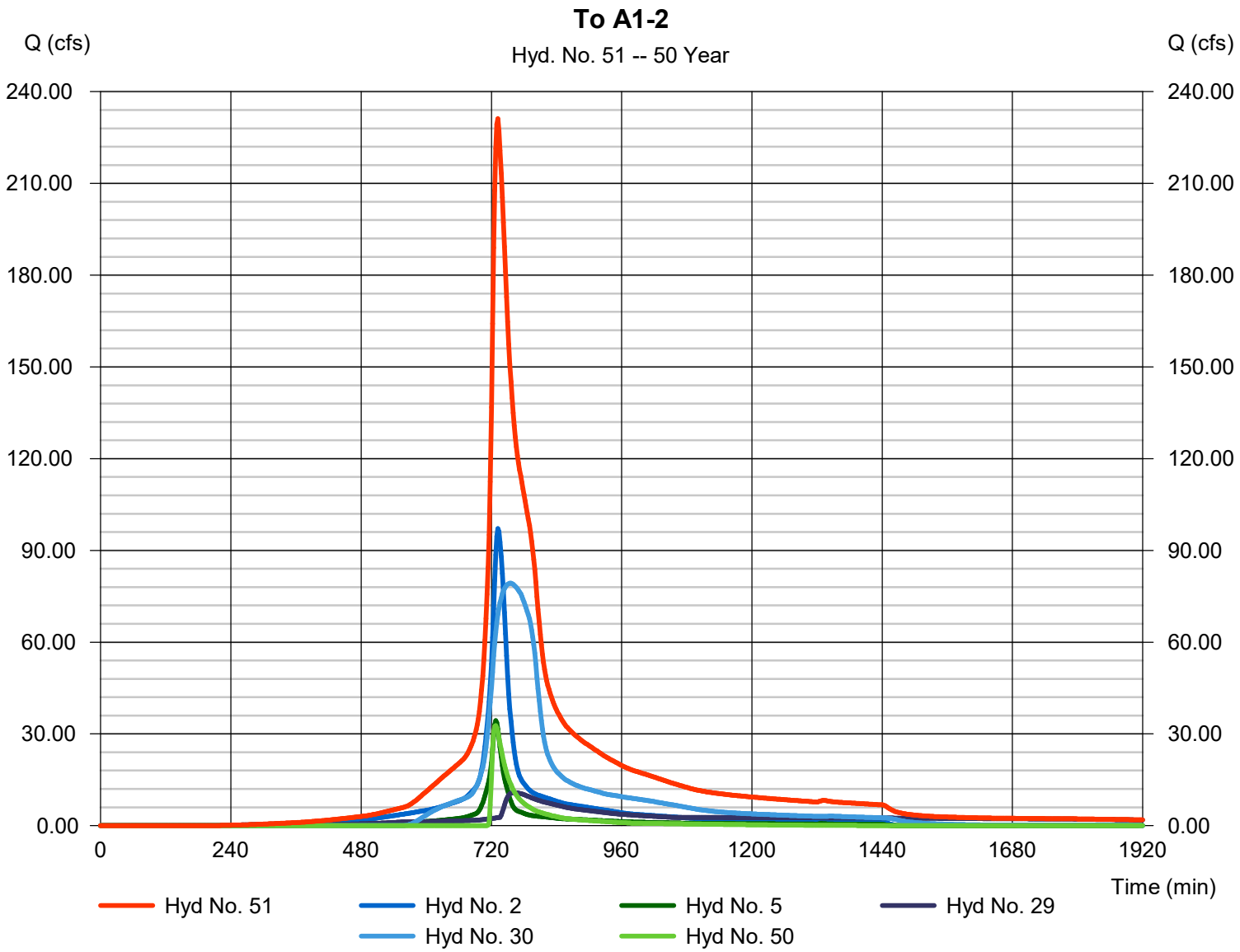
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 51

To A1-2

Hydrograph type	= Combine	Peak discharge	= 231.15 cfs
Storm frequency	= 50 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 1,714,700 cuft
Inflow hyds.	= 2, 5, 29, 30, 50	Contrib. drain. area	= 29.920 ac



Hydrograph Report

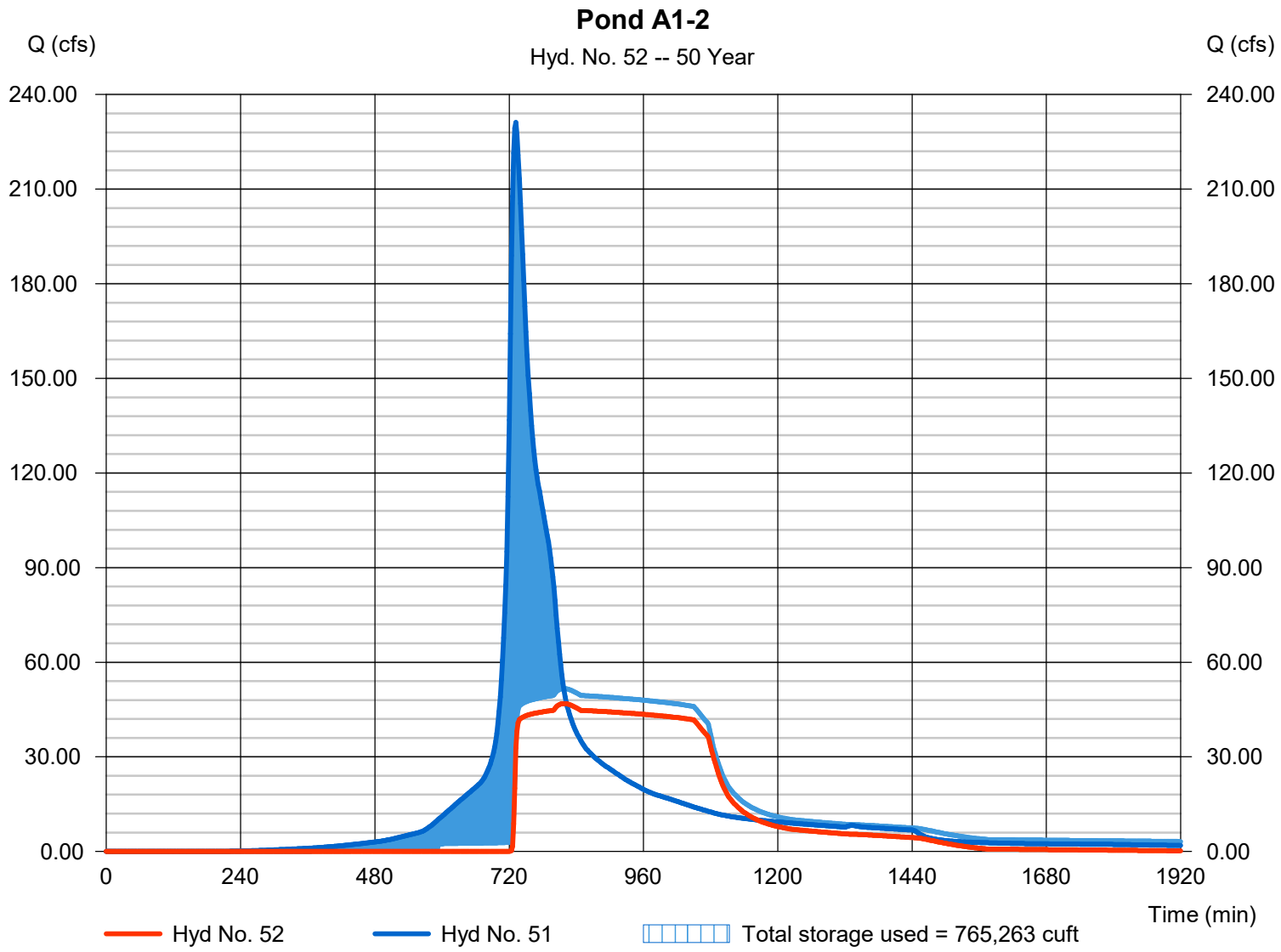
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 52

Pond A1-2

Hydrograph type	= Reservoir	Peak discharge	= 46.89 cfs
Storm frequency	= 50 yrs	Time to peak	= 818 min
Time interval	= 2 min	Hyd. volume	= 1,132,248 cuft
Inflow hyd. No.	= 51 - To A1-2	Max. Elevation	= 127.92 ft
Reservoir name	= A1-2	Max. Storage	= 765,263 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



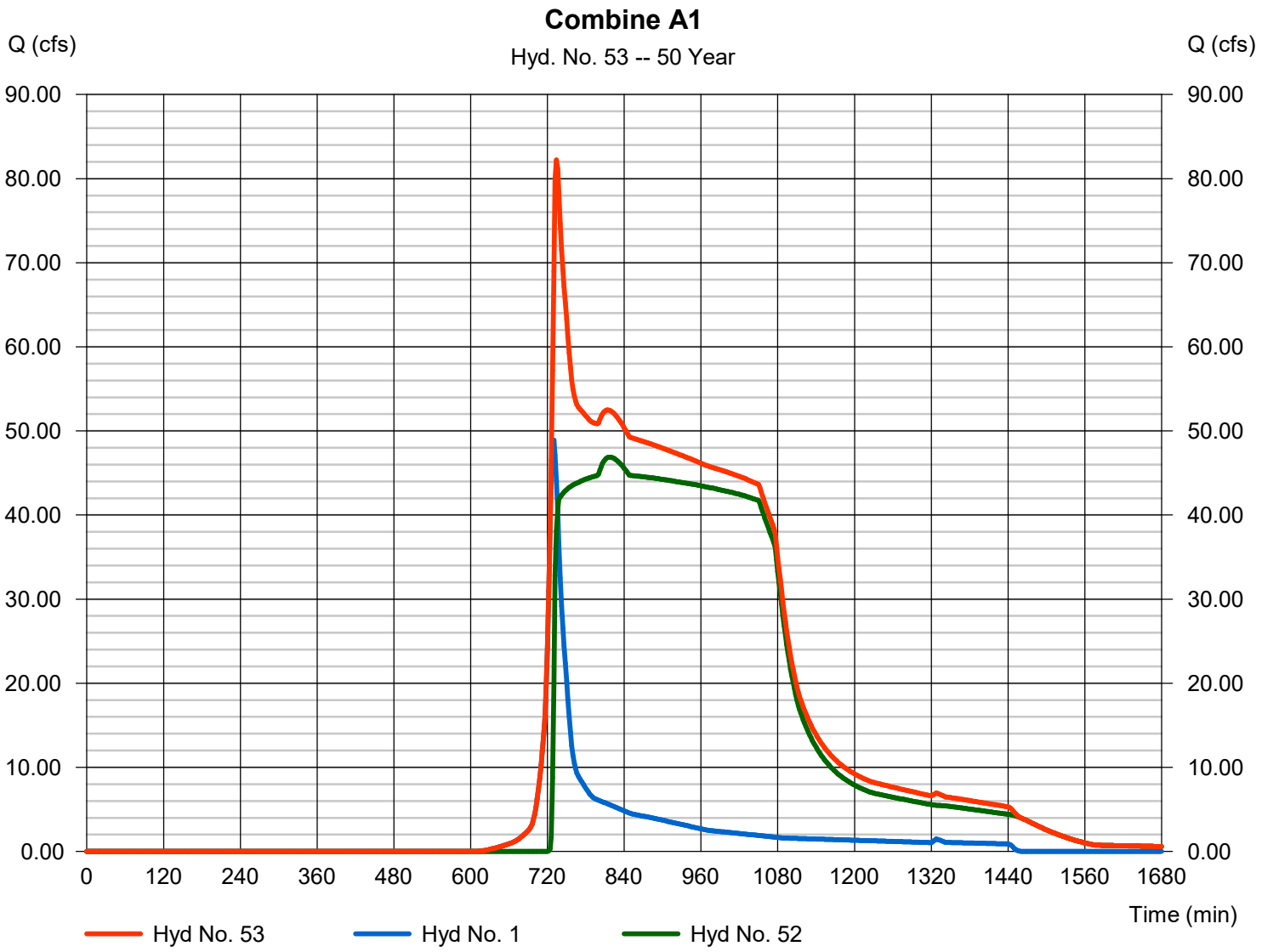
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 53

Combine A1

Hydrograph type	= Combine	Peak discharge	= 82.22 cfs
Storm frequency	= 50 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 1,326,193 cuft
Inflow hyds.	= 1, 52	Contrib. drain. area	= 21.310 ac



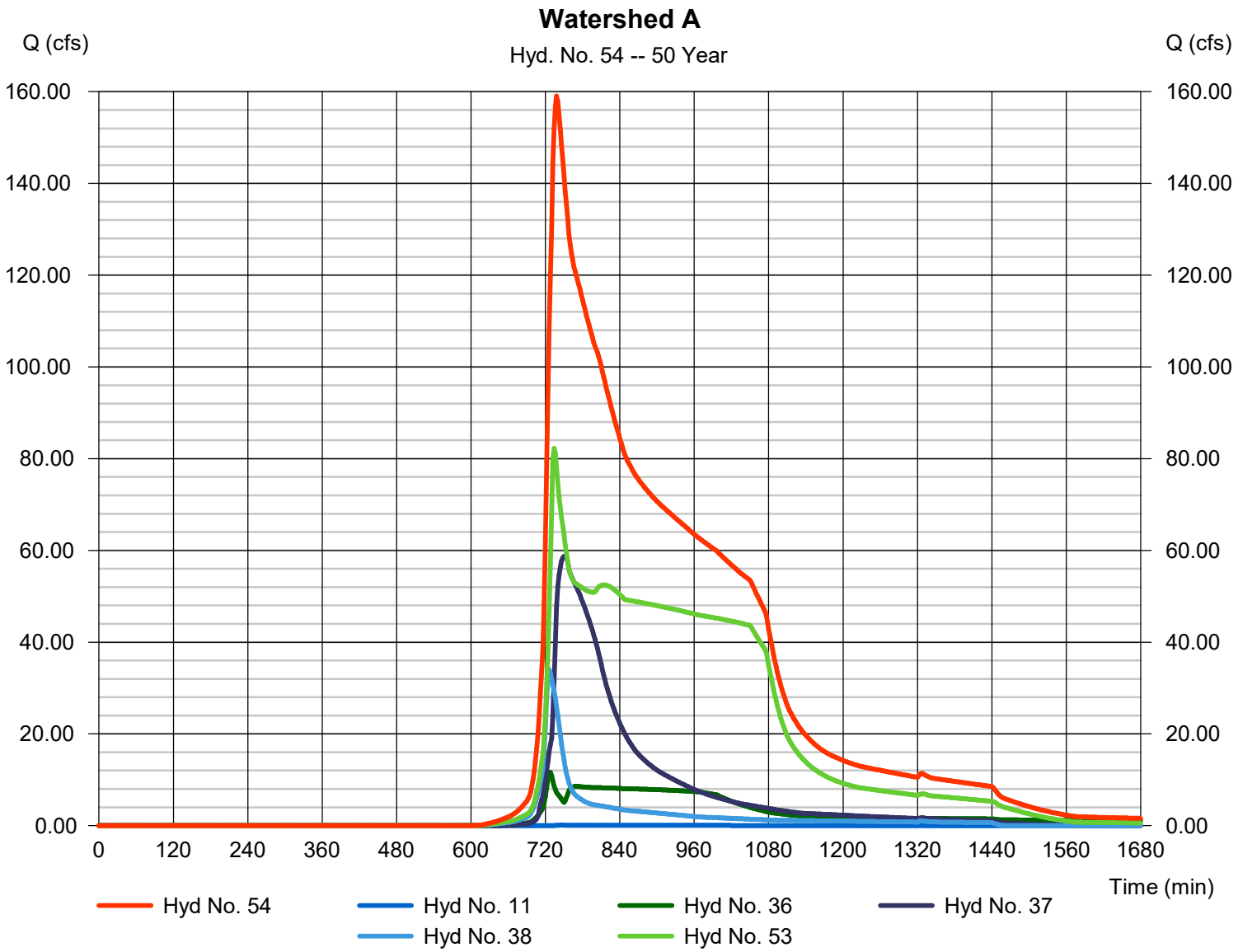
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 54

Watershed A

Hydrograph type	= Combine	Peak discharge	= 159.03 cfs
Storm frequency	= 50 yrs	Time to peak	= 738 min
Time interval	= 2 min	Hyd. volume	= 2,174,718 cuft
Inflow hyds.	= 11, 36, 37, 38, 53	Contrib. drain. area	= 1.750 ac



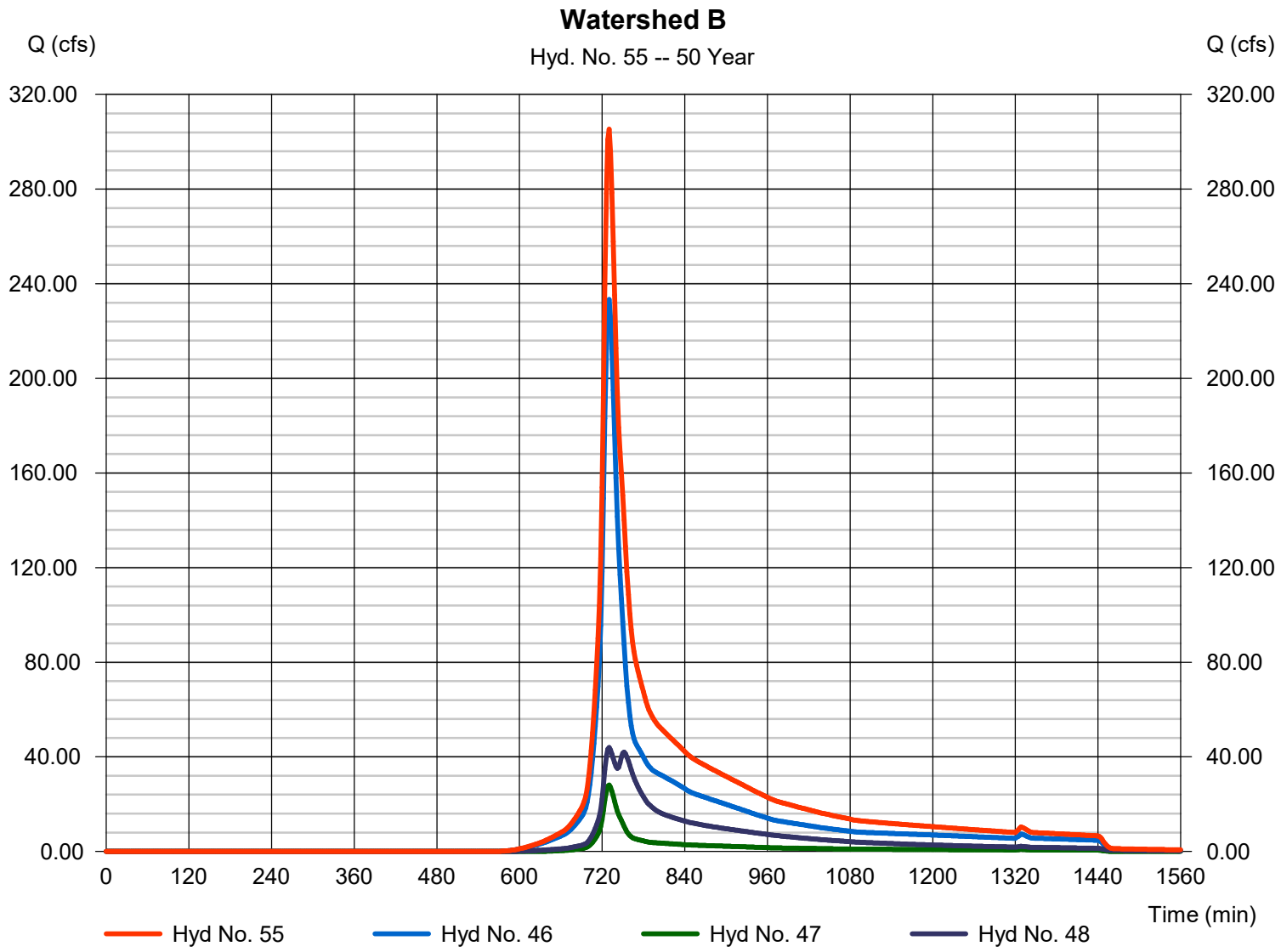
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Hyd. No. 55

Watershed B

Hydrograph type	= Combine	Peak discharge	= 305.32 cfs
Storm frequency	= 50 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 1,494,637 cuft
Inflow hyds.	= 46, 47, 48	Contrib. drain. area	= 13.390 ac



APPENDIX C

Stormwater Quality and Groundwater Recharge Calculations (NHDEDS BMP Worksheets)

LANGAN

INFILTRATION PRACTICE CRITERIA
(Env-Wq 1508.06)

Type/Node Name: **Infiltration Basin A1-2**

Enter the type of infiltration practice (e.g., basin, trench) and the node name in the drainage analysis, if applicable

Yes		Have you reviewed Env-Wq 1508.06(a) to ensure that infiltration is allowed?	
22.71	ac	A = Area draining to the practice	
13.00	ac	A_I = Impervious area draining to the practice	
0.57	decimal	I = percent impervious area draining to the practice, in decimal form	
0.57	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
12.84	ac-in	WQV= 1" x Rv x A	
46,593	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
11,648	cf	25% x WQV (check calc for sediment forebay volume)	
Sed. Forebay		Method of pretreatment? (not required for clean or roof runoff)	
12,114	cf	V_{SED} = sediment forebay volume, if used for pretreatment	← ≥ 25%WQV
251,423	cf	V = volume[1] (attach a stage-storage table)	← ≥ WQV
14,200	sf	A_{SA} = surface area of the bottom of the pond	
1.50	iph	$Ksat_{DESIGN}$ = design infiltration rate[2]	
26.2	hours	T_{DRAIN} = drain time = V / (A_{SA} * I_{DESIGN})	← ≤ 72-hrs
118.00	feet	E_{BTM} = elevation of the bottom of the basin	
114.75	feet	E_{SHWT} = elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
106.00	feet	E_{ROCK} = elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
3.25	feet	D_{SHWT} = separation from SHWT	← ≥ *[3]
12.0	feet	D_{ROCK} = separation from bedrock	← ≥ *[3]
	ft	D_{amend} = Depth of amended soil, if applicable due high infiltation rate	← ≥ 24"
	ft	D_T = depth of trench, if trench proposed	← 4 - 10 ft
	Yes/No	If a trench or underground system is proposed, observation well provided[4]	
		If a trench is proposed, material in trench	
On-site Soils		If a basin is proposed, basin floor material	
Yes	Yes/No	If a basin is proposed, the perimeter should be curvilinear, basin floor shall be flat.	
4.0	:1	If a basin is proposed, pond side slopes	← ≥3:1
125.41	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
127.92	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
129.00	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation ≤ Elevation of the top of the trench?[5]	← yes
YES		If a basin is proposed, 50-year peak elevation ≤ Elevation of berm?	← yes

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. $Ksat_{DESIGN}$ includes a factor of safety. See Env-Wq 1504.14 for requirements for determining the infiltr. rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.
4. Clean, washed well graded diameter of 1.5 to 3 inches above the in-situ soil.
5. If 50-year peak elevation exceeds top of trench, the overflow must be routed in HydroCAD as secondary discharge.

Designer's Notes:

Multiple Teirs in Pond, only lowest bottom of pond area (elevation 118) used in Drain Time calculation

Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Pond No. 1 - A1-2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 118.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	118.00	14,200	0	0
2.89	120.89	20,100	49,312	49,312
2.90	120.90	62,300	393	49,705
3.00	121.00	72,800	6,748	56,452
4.00	122.00	77,177	74,970	131,423
6.89	124.89	90,900	242,577	374,000
6.90	124.90	105,100	979	374,979
7.00	125.00	119,400	11,216	386,195
10.49	128.49	140,400	452,811	839,006
10.50	128.50	162,000	1,511	840,517
11.00	129.00	167,400	82,338	922,855

Culvert / Orifice Structures

		[A]	[B]	[C]	[PrfRsr]
Rise (in)	=	24.00	Inactive	0.00	0.00
Span (in)	=	24.00	12.00	0.00	0.00
No. Barrels	=	1	2	0	0
Invert El. (ft)	=	116.20	122.00	0.00	0.00
Length (ft)	=	620.00	0.50	0.00	0.00
Slope (%)	=	2.00	0.00	0.00	n/a
N-Value	=	.011	.013	.013	n/a
Orifice Coeff.	=	0.60	0.60	0.60	0.60
Multi-Stage	=	n/a	Yes	No	No

Weir Structures

		[A]	[B]	[C]	[D]
Crest Len (ft)	=	10.00	0.50	40.00	0.00
Crest El. (ft)	=	124.00	123.50	128.00	0.00
Weir Coeff.	=	3.33	3.33	2.60	3.33
Weir Type	=	1	Rect	Broad	---
Multi-Stage	=	Yes	Yes	No	No

Exfil.(in/hr) = 1.500 (by Contour)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	118.00	0.00	0.00	---	---	0.00	0.00	0.00	---	0.000	---	0.000
2.89	49,312	120.89	13.65 ic	0.00	---	---	0.00	0.00	0.00	---	0.698	---	0.698
2.90	49,705	120.90	13.65 ic	0.00	---	---	0.00	0.00	0.00	---	2.163	---	2.163
3.00	56,452	121.00	13.65 ic	0.00	---	---	0.00	0.00	0.00	---	2.528	---	2.528
4.00	131,423	122.00	13.65 ic	0.00	---	---	0.00	0.00	0.00	---	2.680	---	2.680
6.89	374,000	124.89	30.69 ic	0.00	---	---	27.96	2.73	0.00	---	3.156	---	33.84
6.90	374,979	124.90	31.19 ic	0.00	---	---	28.43	2.76	0.00	---	3.649	---	34.84
7.00	386,195	125.00	36.36 ic	0.00	---	---	33.30	3.06	0.00	---	4.146	---	40.50
10.49	839,006	128.49	45.46 oc	0.00	---	---	43.03 s	2.42 s	35.67	---	4.875	---	86.00
10.50	840,517	128.50	45.47 oc	0.00	---	---	42.96 s	2.42 s	36.77	---	5.625	---	87.77
11.00	922,855	129.00	45.98 oc	0.00	---	---	43.51 s	2.42 s	104.00	---	5.812	---	155.74

STORMWATER POND DESIGN CRITERIA

Env-Wq 1508.03

Type/Node Name: **A1-3 Dry Extended Detention Pond with Micro Pool**

Enter the type of stormwater pond (e.g., Wet Pond) and the node name in the drainage analysis, if applicable

15.25	ac	A = Area draining to the practice	
10.97	ac	A_I = Impervious area draining to the practice	
0.72	decimal	I = percent impervious area draining to the practice, in decimal form	
0.70	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
10.64	ac-in	WQV= 1" x Rv x A	
38,607	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
3,861	cf	10% x WQV (check calc for sediment forebay and micropool volume)	
19,303	cf	50% x WQV (check calc for extended detention volume)	
23,000	cf	V_{SED} = sediment forebay volume	← **≥ 10%WQV**
4,600	cf	V_{PP} = permanent pool volume (volume below the lowest invert of the outlet structure) Attach stage-storage table.	
yes	cf	Extended Detention?[1]	← **≤ 50% WQV**
34,007		V_{ED} = Volume of Extended detention (if "yes is given in box above)	
131.75		E_{ED} = elevation of WQV if "yes" is given in box above[2]	
0.79	cfs	$2Q_{avg}$ = 2* V_{ED} / 24 hrs * (1hr / 3600 sec) (used to check against Q_{EDmax} below)	
0.42	cfs	Q_{EDmax} = discharge at the E_{ED} (attach stage-discharge table)	← **<$2Q_{avg}$**
44.98	hours	T_{ED} = drawdown time of extended detention = $2V_{ED}/Q_{EDmax}$	← **≥ 24-hrs**
4.00	:1	Pond side slopes	← **≥3:1**
129.00	ft	Elevation of seasonal high water table	
130.75	ft	Elevation of lowest pond outlet	
124.00	ft	Max floor = maximum elevation of pond bottom (ft)	
121.00	ft	Minimum floor (to maintain depth at least than 8')	← **≤ 8 ft**
130.00	ft	Elevation of pond floor[3]	← **≤ Max floor and > Min floor**
415.00	ft	Length of the flow path between the inlet and outlet at mid-depth	
125.00	ft	Average Width ([average of the top width + average bottom width]/2)	
3.32	:1	Length to Average Width ratio	← **≥ 3:1**
Yes	Yes/No	The perimeter should be curvilinear.	
Yes	Yes/No	The inlet and outlet should be located as far apart as possible.	
No	Yes/No	Is there a manually-controlled drain to dewater the pond over a 24hr period?	
If no state why:		Small & Shallow perminate pond.	
Trash Rack over 4" low flow orifice		What mechanism is proposed to prevent the outlet structure from clogging (applicable for orifices/weirs with a dimension of <6")?	
133.89	ft	Peak elevation of the 50-year storm event	
135.00	ft	Berm elevation of the pond	
YES		50 peak elevation ≤ the berm elevation?	← **yes**

1. If the entire WQV is stored in the perm. pool, there is no extended det., and the following five lines do not apply.
2. This is the elevation of WQV if the hydrologic analysis is set up to include the permanent pool storage in the node description.
3. If the pond floor elevation is above the max floor elev., a hydrologic budget must be submitted to demonstrate that a minimum depth of 3 feet can be maintained. (First check whether a revised "lowest pond outlet" elev. will resolve the issue.)

Designer's Notes:

Average width = (34+34+218+218+100)/5 --> Multiple cross sections

Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Pond No. 2 - A1-3

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 130.75 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	130.75	27,700	0	0
0.25	131.00	31,540	7,399	7,399
1.25	132.00	48,973	39,934	47,333
2.25	133.00	55,428	52,162	99,495
3.25	134.00	61,331	58,349	157,844
4.25	135.00	66,021	63,655	221,499

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	4.00	0.00	0.00
Span (in)	= 24.00	4.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 130.75	130.75	0.00	0.00
Length (ft)	= 470.00	0.50	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

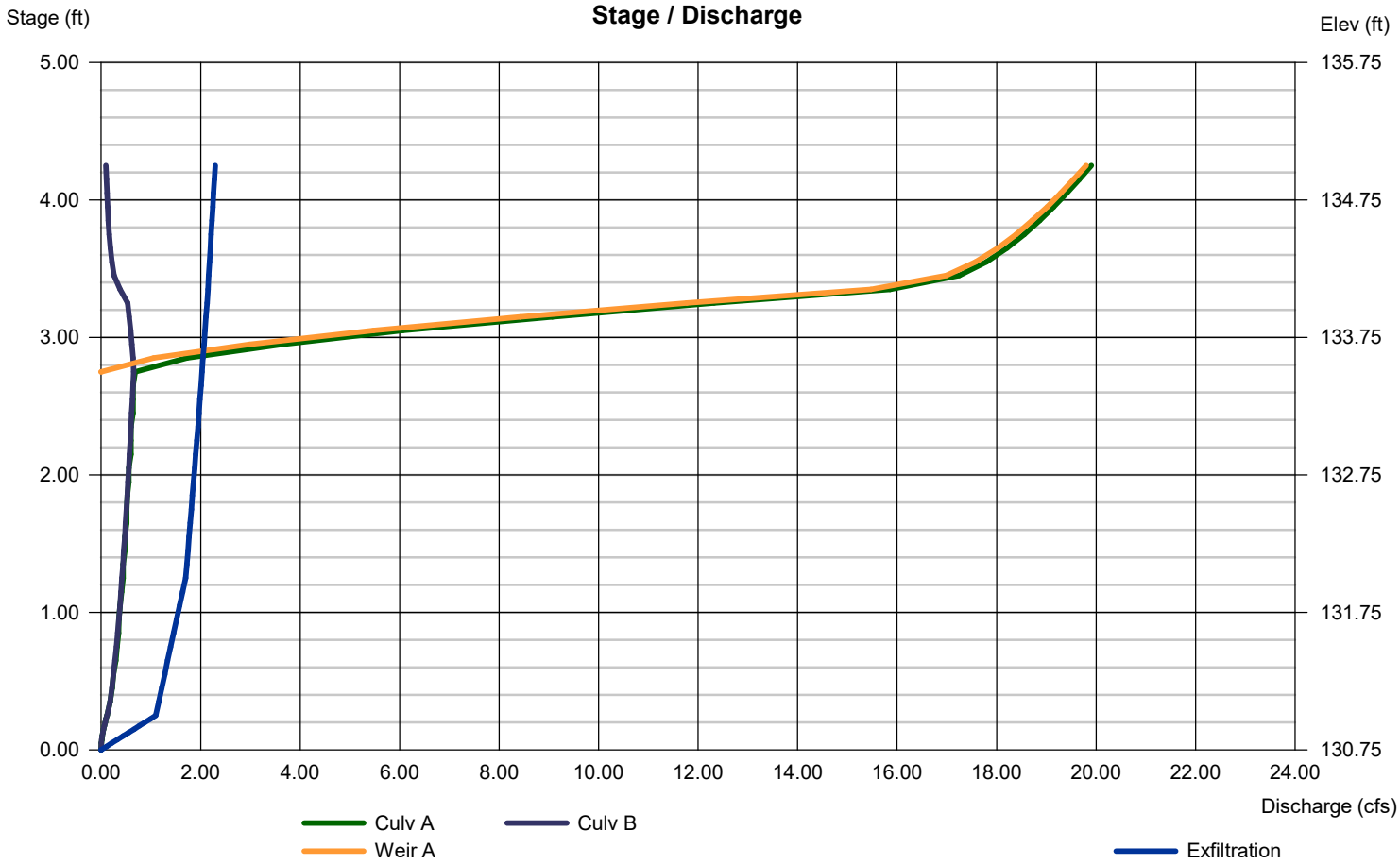
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 10.00	0.00	0.00	0.00
Crest El. (ft)	= 133.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 1.500 (by Contour)

TW Elev. (ft) = 0.00

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



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Pond No. 2 - A1-3

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 130.75 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	130.75	27,700	0	0
0.25	131.00	31,540	7,399	7,399
1.25	132.00	48,973	39,934	47,333
2.25	133.00	55,428	52,162	99,495
3.25	134.00	61,331	58,349	157,844
4.25	135.00	66,021	63,655	221,499

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	4.00	0.00	0.00
Span (in)	= 24.00	4.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 130.75	130.75	0.00	0.00
Length (ft)	= 470.00	0.50	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 10.00	0.00	0.00	0.00
Crest El. (ft)	= 133.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 1.500 (by Contour)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	130.75	0.00	0.00	---	---	0.00	---	---	---	0.000	---	0.000
0.25	7,399	131.00	0.12 ic	0.12 ic	---	---	0.00	---	---	---	1.095	---	1.212
1.25	47,333	132.00	0.44 ic	0.42 ic	---	---	0.00	---	---	---	1.700	---	2.118
2.25	99,495	133.00	0.60 ic	0.59 ic	---	---	0.00	---	---	---	1.925	---	2.511
3.25	157,844	134.00	12.32 ic	0.53 ic	---	---	11.77	---	---	---	2.130	---	14.43
4.25	221,499	135.00	19.90 oc	0.10 ic	---	---	19.80 s	---	---	---	2.292	---	22.19

INFILTRATION PRACTICE CRITERIA
(Env-Wq 1508.06)

Type/Node Name: **A1-4 FOREBAY FEATURE ONLY to Infiltration Basin**

Enter the type of infiltration practice (e.g., basin, trench) and the node name in the drainage analysis, if applicable

Yes		Have you reviewed Env-Wq 1508.06(a) to ensure that infiltration is allowed?	
40.57	ac	A = Area draining to the practice	
28.33	ac	A_I = Impervious area draining to the practice	
0.70	decimal	I = percent impervious area draining to the practice, in decimal form	
0.68	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
27.53	ac-in	WQV= 1" x Rv x A	
99,918	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
24,979	cf	25% x WQV (check calc for sediment forebay volume)	
Sed. Forebay		Method of pretreatment? (not required for clean or roof runoff)	
29,250	cf	V_{SED} = sediment forebay volume, if used for pretreatment	← ≥ 25%WQV
N/A	cf	V = volume[1] (attach a stage-storage table)	← ≥ WQV
N/A	sf	A_{SA} = surface area of the bottom of the pond	
N/A	iph	$Ksat_{DESIGN}$ = design infiltration rate[2]	
-	hours	T_{DRAIN} = drain time = V / (A_{SA} * I_{DESIGN})	← ≤ 72-hrs
132.25	feet	E_{BTM} = elevation of the bottom of the basin	
129.00	feet	E_{SHWT} = elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
130.00	feet	E_{ROCK} = elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
3.25	feet	D_{SHWT} = separation from SHWT	← ≥ *[3]
2.3	feet	D_{ROCK} = separation from bedrock	← ≥ *[3]
	ft	D_{amend} = Depth of amended soil, if applicable due high infiltation rate	← ≥ 24"
	ft	D_T = depth of trench, if trench proposed	← 4 - 10 ft
	Yes/No	If a trench or underground system is proposed, observation well provided[4]	
		If a trench is proposed, material in trench	
On-site Soils		If a basin is proposed, basin floor material	
Yes	Yes/No	If a basin is proposed, the perimeter should be curvilinear, basin floor shall be flat.	
4.0	:1	If a basin is proposed, pond side slopes	← ≥3:1
137.31	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
138.38	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
139.50	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation ≤ Elevation of the top of the trench?[5]	← yes
YES		If a basin is proposed, 50-year peak elevation ≤ Elevation of berm?	← yes

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. $Ksat_{DESIGN}$ includes a factor of safety. See Env-Wq 1504.14 for requirements for determining the infiltr. rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.
4. Clean, washed well graded diameter of 1.5 to 3 inches above the in-situ soil.
5. If 50-year peak elevation exceeds top of trench, the overflow must be routed in HydroCAD as secondary discharge.

Designer's Notes:

This feature is used only for attenuation and to accomidate, ata a minimum, the 25% pre-tretment volume of the watershed before dischargeing stormwater to Infiltration basin B6-2 for treatment and groundwater recharge.

Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Pond No. 3 - A1-4

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 132.25 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	132.25	13,450	0	0
0.75	133.00	17,300	11,500	11,500
1.75	134.00	22,600	19,889	31,389
2.75	135.00	28,000	25,249	56,638
3.75	136.00	33,700	30,803	87,441
4.75	137.00	39,700	36,655	124,097
5.00	137.25	41,100	10,098	134,195
5.75	138.00	78,100	43,960	178,155
6.75	139.00	95,100	86,452	264,607
7.25	139.50	102,000	49,260	313,867

Culvert / Orifice Structures

		[A]	[B]	[C]	[PrfRsr]
Rise (in)	=	36.00	10.00	0.00	0.00
Span (in)	=	36.00	10.00	0.00	0.00
No. Barrels	=	1	4	0	0
Invert El. (ft)	=	131.25	134.00	0.00	0.00
Length (ft)	=	144.00	0.50	0.00	0.00
Slope (%)	=	1.73	0.00	0.00	n/a
N-Value	=	.013	.013	.013	n/a
Orifice Coeff.	=	0.60	0.60	0.60	0.60
Multi-Stage	=	n/a	Yes	No	No

Weir Structures

		[A]	[B]	[C]	[D]
Crest Len (ft)	=	10.00	0.00	0.00	0.00
Crest El. (ft)	=	135.25	0.00	0.00	0.00
Weir Coeff.	=	3.33	3.33	3.33	3.33
Weir Type	=	1	---	---	---
Multi-Stage	=	Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	132.25	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.75	11,500	133.00	7.16 ic	0.00	---	---	0.00	---	---	---	---	---	0.000
1.75	31,389	134.00	7.16 ic	0.00	---	---	0.00	---	---	---	---	---	0.000
2.75	56,638	135.00	8.04 ic	8.02 ic	---	---	0.00	---	---	---	---	---	8.022
3.75	87,441	136.00	34.90 ic	13.22 ic	---	---	21.63	---	---	---	---	---	34.85
4.75	124,097	137.00	65.13 ic	8.05 ic	---	---	57.08 s	---	---	---	---	---	65.13
5.00	134,195	137.25	68.37 ic	7.15 ic	---	---	61.22 s	---	---	---	---	---	68.37
5.75	178,155	138.00	76.04 ic	5.33 ic	---	---	70.70 s	---	---	---	---	---	76.03
6.75	264,607	139.00	84.10 ic	3.97 ic	---	---	80.11 s	---	---	---	---	---	84.08
7.25	313,867	139.50	87.67 ic	3.53 ic	---	---	84.12 s	---	---	---	---	---	87.65

INFILTRATION PRACTICE CRITERIA
(Env-Wq 1508.06)

Type/Node Name: **A1-5 Infiltration Basin**

Enter the type of infiltration practice (e.g., basin, trench) and the node name in the drainage analysis, if applicable

Yes		Have you reviewed Env-Wq 1508.06(a) to ensure that infiltration is allowed?	
13.12	ac	A = Area draining to the practice	
9.11	ac	A_I = Impervious area draining to the practice	
0.69	decimal	I = percent impervious area draining to the practice, in decimal form	
0.67	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
8.86	ac-in	WQV= 1" x Rv x A	
32,144	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
8,036	cf	25% x WQV (check calc for sediment forebay volume)	
Sed. Forebay		Method of pretreatment? (not required for clean or roof runoff)	
11,544	cf	V_{SED} = sediment forebay volume, if used for pretreatment	← ≥ 25%WQV
57,995	cf	V = volume[1] (attach a stage-storage table)	← ≥ WQV
35,500	sf	A_{SA} = surface area of the bottom of the pond	
1.50	iph	$Ksat_{DESIGN}$ = design infiltration rate[2]	
7.2	hours	T_{DRAIN} = drain time = V / (A_{SA} * I_{DESIGN})	← ≤ 72-hrs
133.00	feet	E_{BTM} = elevation of the bottom of the basin	
130.00	feet	E_{SHWT} = elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
123.00	feet	E_{ROCK} = elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
3.00	feet	D_{SHWT} = separation from SHWT	← ≥ *[3]
10.0	feet	D_{ROCK} = separation from bedrock	← ≥ *[3]
	ft	D_{amend} = Depth of amended soil, if applicable due high infiltation rate	← ≥ 24"
	ft	D_T = depth of trench, if trench proposed	← 4 - 10 ft
	Yes/No	If a trench or underground system is proposed, observation well provided[4]	
		If a trench is proposed, material in trench	
On-site Soils		If a basin is proposed, basin floor material	
Yes	Yes/No	If a basin is proposed, the perimeter should be curvilinear, basin floor shall be flat.	
4.0	:1	If a basin is proposed, pond side slopes	← ≥3:1
135.22	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
135.86	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
137.00	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation ≤ Elevation of the top of the trench?[5]	← yes
YES		If a basin is proposed, 50-year peak elevation ≤ Elevation of berm?	← yes

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. $Ksat_{DESIGN}$ includes a factor of safety. See Env-Wq 1504.14 for requirements for determining the infiltr. rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.
4. Clean, washed well graded diameter of 1.5 to 3 inches above the in-situ soil.
5. If 50-year peak elevation exceeds top of trench, the overflow must be routed in HydroCAD as secondary discharge.

Designer's Notes:

Two Sediment Forebays are included in this pond.

Each forebay sub-watershed's WQV was calculated and the forebay sized to a capacity greater than 25%

The number above reflect the combine forebay volume.

Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Pond No. 4 - A1-5

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 133.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	133.00	35,500	0	0
1.00	134.00	39,300	37,380	37,380
2.00	135.00	43,200	41,231	78,611
3.00	136.00	47,200	45,181	123,791
4.00	137.00	51,300	49,231	173,022

Culvert / Orifice Structures

		[A]	[B]	[C]	[PrfRsr]
Rise (in)	=	24.00	Inactive	0.00	0.00
Span (in)	=	24.00	6.00	0.00	0.00
No. Barrels	=	1	4	0	0
Invert El. (ft)	=	132.00	134.50	0.00	0.00
Length (ft)	=	185.00	0.50	0.00	0.00
Slope (%)	=	1.06	0.00	0.00	n/a
N-Value	=	.012	.012	.013	n/a
Orifice Coeff.	=	0.60	0.60	0.60	0.60
Multi-Stage	=	n/a	Yes	No	No

Weir Structures

		[A]	[B]	[C]	[D]
Crest Len (ft)	=	10.00	0.00	30.00	0.00
Crest El. (ft)	=	135.00	134.50	136.00	0.00
Weir Coeff.	=	3.33	4.40	2.60	3.33
Weir Type	=	1	120 degV	Broad	---
Multi-Stage	=	Yes	No	No	No

Exfil.(in/hr) = 1.500 (by Contour)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	133.00	0.00	0.00	---	---	0.00	---	0.00	---	0.000	---	0.000
1.00	37,380	134.00	5.35 ic	0.00	---	---	0.00	---	0.00	---	1.365	---	1.365
2.00	78,611	135.00	5.35 ic	0.00	---	---	0.00	0.78	0.00	---	1.500	---	2.278
3.00	123,791	136.00	24.68 ic	0.00	---	---	24.68 s	12.12	0.00	---	1.639	---	38.44
4.00	173,022	137.00	29.99 ic	0.00	---	---	29.98 s	43.47	78.00	---	1.781	---	153.23

General Calculations - WQV and WQF
(optional worksheet)

This worksheet may be useful when designing a BMP that does not fit into one of the specific worksheets already provided (i.e. for a technology which is not a stormwater wetland, infiltration practice, etc.)

Water Quality Volume (WQV)

7.21	ac	A = Area draining to the practice
4.66	ac	A_I = Impervious area draining to the practice
0.65	decimal	I = percent impervious area draining to the practice, in decimal form
0.63	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)
4.55	ac-in	WQV= 1" x Rv x A
16,533	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")

Water Quality Flow (WQF)

1	inches	P = amount of rainfall. For WQF in NH, P = 1".
0.63	inches	Q = water quality depth. Q = WQV/A
96	unitless	CN = unit peak discharge curve number. CN =1000/(10+5P+10Q–10*[Q^2 + 1.25*Q*P] $^{0.5}$)
0.4	inches	S = potential maximum retention. S = (1000/CN) - 10
0.083	inches	Ia = initial abstraction. Ia = 0.2S
10.0	minutes	T_c = Time of Concentration
660.0	cfs/mi^2/in	qu is the unit peak discharge. Obtain this value from TR-55 exhibits 4-II and 4-III
4.697	cfs	WQF = q_u x WQV. Conversion: to convert "cfs/mi^2/in * ac-in" to "cfs" multiply by 1mi^2/640ac

Designer's Notes: Watershed A1-6

An 8 ft model, down stream defender hydrodynamic unit will be used to treat the water quality volume from this watershed.
The units is rated for 80% TSS removeal of OK-110 partical size for flows up to 8.82cfs
Product details are attached.

While this unit will treat 80% TSS removal, treated flows are discharged to Infiltration Basin A1-2, providing additional treatment at 90% TSS removal.

Technical Abstract
Downstream Defender®

Performance Verification of Fine Sediment Removal with US Silica OK-110

The Downstream Defender® is an advanced Hydrodynamic Vortex Separator intended for removing the bulk of the pollutant load from urban stormwater runoff. Flow modifying internal components (Fig.1) differentiate the Downstream Defender® from conventional gravity-based and other vortex separators. These internals are designed to facilitate high-rate separation of pollutants and minimize turbulence. The design also ensures that bypassing is prevented and the entire flow is treated. Compared to devices that have poorly designed internal components and/or an internal bypass that discharges a portion of flow with no treatment, the Downstream Defender® captures and retains more of the annual pollutant load.

Capable of providing high pollutant removals for a wide range of flow rates with minimal headlosses, the Downstream Defender® is an economical solution for constrained sites. Its proven efficiency ensures the longevity and simplifies the maintenance of subsurface storage, infiltration and filtration practices.

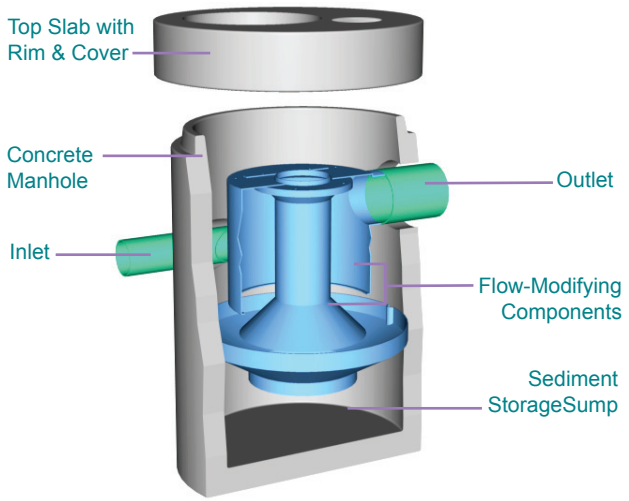


Fig.1 The unique internal components of the Downsream Defender® enhance pollutant removal performance and prevent washout.

Fine Sediment Removal

To quantify the pollutant removal efficacy, a full-scale 4-ft diameter Downstream Defender® was tested under controlled laboratory conditions. Test procedures were based on protocols used for regulatory approval throughout North America.

Commercially available U.S. Silica brand OK-110 (Fig.2) was used to determine the Downstream Defender® treatment loading rate that achieves an 80%-removal efficiency goal. OK-110 has a fine gradation primarily in the 75-150 micron range with a mean of 106-micron. Because about 20% of the particles are between 50-75 micron, use of OK-110 sediment provides a conservative estimate of annual load reductions.

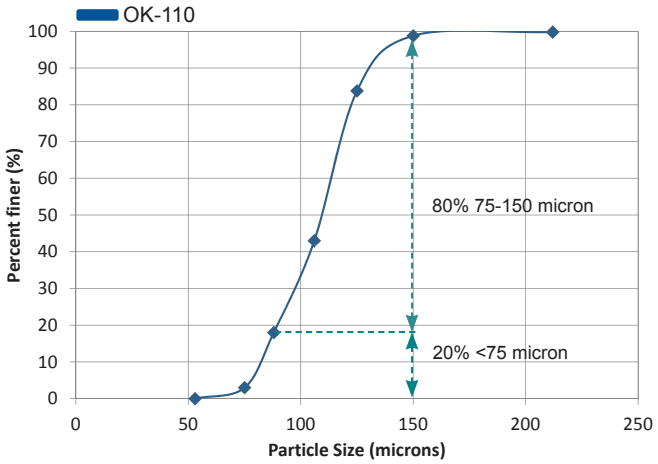


Fig.2 Particle size distribution of the U.S. Silica OK-110 test sediment.

For performance testing, clean water from a 23,000 gal. reservoir was pumped to the Downstream Defender® at flow rates varying from about 0.4 to 2.2 cfs (Fig.3). A concentrated slurry of test sediment was pumped into the inlet pipe at an injection rate that delivered influent concentrations ranging from 200-300 mg/L.

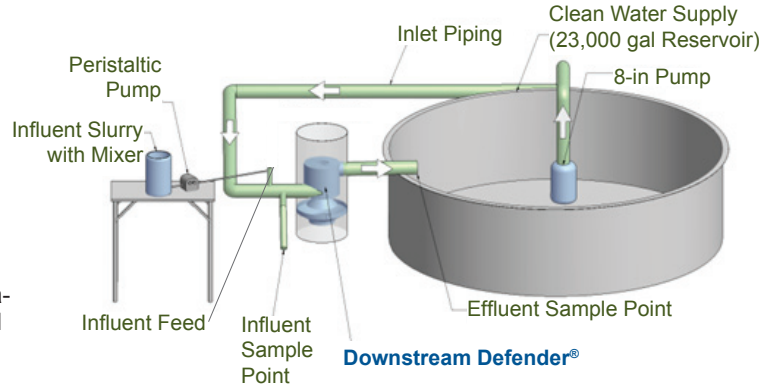


Fig.3 Set-up of the Portland, Maine hydraulic testing facility.

Downstream Defender®

Performance Test Procedures

Five influent and effluent grab samples were taken at 4 different flow rates for a total of 20 samples (Fig.4). All influent and effluent samples were analyzed for Total Suspended Solids (TSS) by APHA SM2540D.

Fig.4 Grab samples were collected from the influent (not pictured) and effluent (above) over a range of hydraulic loading rates.

Performance Results

The resulting test data demonstrates 80% removal of fine sediment for all flows up to 1.56 cfs and 65% efficiency at the highest flow rate tested at 2.2 cfs. As the Downstream Defender® does not incorporate an internal bypass, it will continue to capture sediment at all states of flow up to and including its rated peak treatment flow rate (PTFR). By way of contrast, internally bypassing units will begin to discharge untreated flows as soon as flows exceed their rated treatment flows. For example, tests for the 4-ft Downstream Defender® clearly show continual positive removal efficiencies for flows in excess of its rated treatment flow of 1.56 cfs and positive removals even at its peak rated flow of 3 cfs (Fig.5).

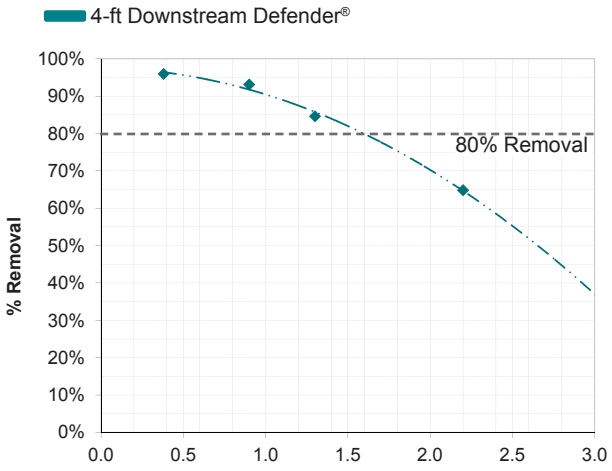


Fig.5 OK-110 silica sand removal efficiency results of the 4-ft Downstream Defender®.

These results confirm the efficacy of the Downstream Defender® for pollutant capture over a wide range of tested flow rates and highlight the benefits of its specially designed internal components that stabilize the flows and prevent bypassing of untreated flow.

Downstream Defender® Sizing

Test results were used to determine the treatment flow rates for larger Downstream Defender® models (see table below). For design purposes, the selected model's Treatment Flow Rate must be greater or equal to the site's Water Quality Flow Rate (WQf).

Model Unit Diameter	Maximum Pipe Diameter	Treatment Flow Rates for 80% TSS Removal	Peak Treatment Flow Rates
(ft)	(in)	(cfs)	(cfs)
4	12	1.56	3.0
6	18	4.25	8.0
8	24	8.82	15.0
10	30	15.42	25.0
12	36	24.32	38.0

The PTFR and maximum pipe size must be considered to determine whether the application of a given Downstream Defender® model is appropriate for the site. An offline configuration or arrangement may be used to overcome constraints presented by the Downstream Defender®'s maximum allowable pipe diameter or PTFR. Contact Hydro International for technical support and design assistance.

Fig.6 Model sizes range from 4-ft to 12-ft in diameter.

Hydro International, 94 Hutchins Drive, Portland, ME 04102
Tel: 207.756.6200 Fax: 207.756.6212
Email: stormwaterinquiry@hydro-int.com Web: www.hydro-int.com

Stormwater Solutions

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INFILTRATION PRACTICE CRITERIA
(Env-Wq 1508.06)

Type/Node Name: **A6-2 Infiltration Basin**

Enter the type of infiltration practice (e.g., basin, trench) and the node name in the drainage analysis, if applicable

Yes		Have you reviewed Env-Wq 1508.06(a) to ensure that infiltration is allowed?	
29.90	ac	A = Area draining to the practice	
23.47	ac	A_I = Impervious area draining to the practice	
0.78	decimal	I = percent impervious area draining to the practice, in decimal form	
0.76	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
22.62	ac-in	WQV= 1" x Rv x A	
82,103	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
20,526	cf	25% x WQV (check calc for sediment forebay volume)	
Sed. Forebay		Method of pretreatment? (not required for clean or roof runoff)	
21,812	cf	V_{SED} = sediment forebay volume, if used for pretreatment	← **≥ 25%WQV**
161,989	cf	V = volume[1] (attach a stage-storage table)	← **≥ WQV**
34,672	sf	A_{SA} = surface area of the bottom of the pond	
1.50	iph	$Ksat_{DESIGN}$ = design infiltration rate[2]	
18.9	hours	T_{DRAIN} = drain time = V / (A_{SA} * I_{DESIGN})	← **≤ 72-hrs**
129.00	feet	E_{BTM} = elevation of the bottom of the basin	
125.00	feet	E_{SHWT} = elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
109.00	feet	E_{ROCK} = elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
4.00	feet	D_{SHWT} = separation from SHWT	← **≥ *[3]**
20.0	feet	D_{ROCK} = separation from bedrock	← **≥ *[3]**
	ft	D_{amend} = Depth of amended soil, if applicable due high infiltation rate	← **≥ 24"**
	ft	D_T = depth of trench, if trench proposed	← **4 - 10 ft**
	Yes/No	If a trench or underground system is proposed, observation well provided[4]	
		If a trench is proposed, material in trench	
	On-site Soil:	If a basin is proposed, basin floor material	
Yes	Yes/No	If a basin is proposed, the perimeter should be curvilinear, basin floor shall be flat.	
4.0	:1	If a basin is proposed, pond side slopes	← **≥3:1**
117.29	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
118.64	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
120.00	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation ≤ Elevation of the top of the trench?[5]	← **yes**
YES		If a basin is proposed, 50-year peak elevation ≤ Elevation of berm?	← **yes**

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. $Ksat_{DESIGN}$ includes a factor of safety. See Env-Wq 1504.14 for requirements for determining the infiltr. rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.
4. Clean, washed well graded diameter of 1.5 to 3 inches above the in-situ soil.
5. If 50-year peak elevation exceeds top of trench, the overflow must be routed in HydroCAD as secondary discharge.

Designer's Notes:

Two Sediment Forebays are included in this pond.

Each forebay sub-watershed's WQV was calculated and the forebay sized to a capacity greater than 25%

The number above reflect the combine forebay volume.

Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Pond No. 8 - A6-2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 112.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	112.00	34,672	0	0
1.00	113.00	38,208	36,422	36,422
2.00	114.00	49,792	43,868	80,290
3.00	115.00	55,641	52,684	132,974
4.00	116.00	60,460	58,028	191,002
5.00	117.00	64,735	62,579	253,581
6.00	118.00	69,111	66,904	320,486
7.00	119.00	73,587	71,330	391,816
8.00	120.00	78,164	75,857	467,672

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	6.00	0.00	0.00
Span (in)	= 12.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 114.00	115.50	0.00	0.00
Length (ft)	= 55.00	0.50	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 10.00	30.00	0.00	0.00
Crest El. (ft)	= 118.00	119.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= Rect	Broad	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 1.500 (by Contour)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	112.00	0.00	0.00	---	---	0.00	0.00	---	---	0.000	---	0.000
1.00	36,422	113.00	0.00	0.00	---	---	0.00	0.00	---	---	1.327	---	1.327
2.00	80,290	114.00	0.00	0.00	---	---	0.00	0.00	---	---	1.729	---	1.729
3.00	132,974	115.00	0.00	0.00	---	---	0.00	0.00	---	---	1.932	---	1.932
4.00	191,002	116.00	0.48 ic	0.47 ic	---	---	0.00	0.00	---	---	2.099	---	2.572
5.00	253,581	117.00	1.07 ic	1.06 ic	---	---	0.00	0.00	---	---	2.248	---	3.305
6.00	320,486	118.00	1.44 ic	1.42 ic	---	---	0.00	0.00	---	---	2.400	---	3.818
7.00	391,816	119.00	7.49 oc	0.11 ic	---	---	7.38 s	0.00	---	---	2.555	---	10.05
8.00	467,672	120.00	8.29 oc	0.05 ic	---	---	8.13 s	78.00	---	---	2.714	---	88.89

INFILTRATION PRACTICE CRITERIA
(Env-Wq 1508.06)

Type/Node Name: **A11-2 Infiltration Basin**

Enter the type of infiltration practice (e.g., basin, trench) and the node name in the drainage analysis, if applicable

Yes		Have you reviewed Env-Wq 1508.06(a) to ensure that infiltration is allowed?	
41.65	ac	A = Area draining to the practice	
31.28	ac	A_I = Impervious area draining to the practice	
0.75	decimal	I = percent impervious area draining to the practice, in decimal form	
0.73	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
30.23	ac-in	WQV= 1" x Rv x A	
109,751	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
27,438	cf	25% x WQV (check calc for sediment forebay volume)	
Sed. Forebay		Method of pretreatment? (not required for clean or roof runoff)	
29,250	cf	V_{SED} = sediment forebay volume, if used for pretreatment	← **≥ 25%WQV**
151,585	cf	V = volume[1] (attach a stage-storage table)	← **≥ WQV**
60,871	sf	A_{SA} = surface area of the bottom of the pond	
1.50	iph	$Ksat_{DESIGN}$ = design infiltration rate[2]	
14.4	hours	T_{DRAIN} = drain time = V / (A_{SA} * I_{DESIGN})	← **≤ 72-hrs**
114.00	feet	E_{BTM} = elevation of the bottom of the basin	
94.00	feet	E_{SHWT} = elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
84.00	feet	E_{ROCK} = elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
20.00	feet	D_{SHWT} = separation from SHWT	← **≥ *[3]**
30.0	feet	D_{ROCK} = separation from bedrock	← **≥ *[3]**
	ft	D_{amend} = Depth of amended soil, if applicable due high infiltation rate	← **≥ 24"**
	ft	D_T = depth of trench, if trench proposed	← **4 - 10 ft**
	Yes/No	If a trench or underground system is proposed, observation well provided[4]	
		If a trench is proposed, material in trench	
On-site Soils		If a basin is proposed, basin floor material	
Yes	Yes/No	If a basin is proposed, the perimeter should be curvilinear, basin floor shall be flat.	
4.0	:1	If a basin is proposed, pond side slopes	← **≥3:1**
117.93	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
118.93	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
120.00	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation ≤ Elevation of the top of the trench?[5]	← **yes**
YES		If a basin is proposed, 50-year peak elevation ≤ Elevation of berm?	← **yes**

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. $Ksat_{DESIGN}$ includes a factor of safety. See Env-Wq 1504.14 for requirements for determining the infiltr. rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.
4. Clean, washed well graded diameter of 1.5 to 3 inches above the in-situ soil.
5. If 50-year peak elevation exceeds top of trench, the overflow must be routed in HydroCAD as secondary discharge.

Designer's Notes:

Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Pond No. 10 - A11-2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 113.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	114.00	60,871	0	0
1.00	115.00	66,010	63,417	63,417
2.00	116.00	71,182	68,573	131,990
3.00	117.00	85,827	78,383	210,372
4.00	118.00	93,006	89,384	299,756
5.00	119.00	99,952	96,449	396,204
6.00	120.00	105,628	102,767	498,971

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 36.00	Inactive	0.00	0.00
Span (in)	= 36.00	12.00	0.00	0.00
No. Barrels	= 1	3	0	0
Invert El. (ft)	= 115.00	116.50	0.00	0.00
Length (ft)	= 70.00	0.50	0.00	0.00
Slope (%)	= 5.67	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 10.00	0.00	30.00	0.00
Crest El. (ft)	= 117.50	116.75	119.00	0.00
Weir Coeff.	= 3.33	4.40	2.60	3.33
Weir Type	= 1	120 degV	Broad	---
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr) = 1.500 (by Contour)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	114.00	0.00	0.00	---	---	0.00	---	0.00	---	0.000	---	0.000
1.00	63,417	115.00	0.00	0.00	---	---	0.00	---	0.00	---	2.292	---	2.292
2.00	131,990	116.00	0.00	0.00	---	---	0.00	---	0.00	---	2.472	---	2.472
3.00	210,372	117.00	0.15 ic	0.00	---	---	0.00	0.14	0.00	---	2.980	---	3.118
4.00	299,756	118.00	19.74 ic	0.00	---	---	11.77	7.68 s	0.00	---	3.229	---	22.69
5.00	396,204	119.00	51.15 ic	0.00	---	---	34.80 s	16.35 s	0.00	---	3.471	---	54.61
6.00	498,971	120.00	62.97 ic	0.00	---	---	39.96 s	23.00 s	78.00	---	3.668	---	144.62

INFILTRATION PRACTICE CRITERIA
(Env-Wq 1508.06)

Type/Node Name: **A11-3 Infiltration Basin**

Enter the type of infiltration practice (e.g., basin, trench) and the node name in the drainage analysis, if applicable

Yes		Have you reviewed Env-Wq 1508.06(a) to ensure that infiltration is allowed?	
3.46	ac	A = Area draining to the practice	
0.45	ac	A_I = Impervious area draining to the practice	
0.13	decimal	I = percent impervious area draining to the practice, in decimal form	
0.17	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.58	ac-in	WQV= 1" x Rv x A	
2,098	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
525	cf	25% x WQV (check calc for sediment forebay volume)	
Sed. Forebay		Method of pretreatment? (not required for clean or roof runoff)	
886	cf	V_{SED} = sediment forebay volume, if used for pretreatment	← ≥ 25%WQV
12,205	cf	V = volume[1] (attach a stage-storage table)	← ≥ WQV
1,100	sf	A_{SA} = surface area of the bottom of the pond	
1.50	iph	$Ksat_{DESIGN}$ = design infiltration rate[2]	
15.3	hours	T_{DRAIN} = drain time = V / (A_{SA} * I_{DESIGN})	← ≤ 72-hrs
108.00	feet	E_{BTM} = elevation of the bottom of the basin	
94.00	feet	E_{SHWT} = elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
84.00	feet	E_{ROCK} = elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
14.00	feet	D_{SHWT} = separation from SHWT	← ≥ *[3]
24.0	feet	D_{ROCK} = separation from bedrock	← ≥ *[3]
	ft	D_{amend} = Depth of amended soil, if applicable due high infiltation rate	← ≥ 24"
	ft	D_T = depth of trench, if trench proposed	← 4 - 10 ft
	Yes/No	If a trench or underground system is proposed, observation well provided[4]	
		If a trench is proposed, material in trench	
On-site Soils		If a basin is proposed, basin floor material	
Yes	Yes/No	If a basin is proposed, the perimeter should be curvilinear, basin floor shall be flat.	
4.0	:1	If a basin is proposed, pond side slopes	← ≥3:1
109.56	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
110.67	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
112.00	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation ≤ Elevation of the top of the trench?[5]	← yes
YES		If a basin is proposed, 50-year peak elevation ≤ Elevation of berm?	← yes

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. $Ksat_{DESIGN}$ includes a factor of safety. See Env-Wq 1504.14 for requirements for determining the infiltr. rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.
4. Clean, washed well graded diameter of 1.5 to 3 inches above the in-situ soil.
5. If 50-year peak elevation exceeds top of trench, the overflow must be routed in HydroCAD as secondary discharge.

Designer's Notes:

Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Pond No. 11 - A11-3

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 108.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	108.00	1,100	0	0
4.00	112.00	4,100	9,764	9,764

Culvert / Orifice Structures

		[A]	[B]	[C]	[PrfRsr]
Rise (in)	=	12.00	0.00	0.00	0.00
Span (in)	=	12.00	0.00	0.00	0.00
No. Barrels	=	1	0	0	0
Invert El. (ft)	=	107.00	0.00	0.00	0.00
Length (ft)	=	110.00	0.00	0.00	0.00
Slope (%)	=	1.36	0.00	0.00	n/a
N-Value	=	.013	.013	.013	n/a
Orifice Coeff.	=	0.60	0.60	0.60	0.60
Multi-Stage	=	n/a	No	No	No

Weir Structures

		[A]	[B]	[C]	[D]
Crest Len (ft)	=	10.00	30.00	0.00	0.00
Crest El. (ft)	=	109.25	112.00	0.00	0.00
Weir Coeff.	=	3.33	2.60	3.33	3.33
Weir Type	=	1	Broad	---	---
Multi-Stage	=	Yes	No	No	No

Exfil.(in/hr) = 1.500 (by Contour)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	108.00	0.00	---	---	---	0.00	0.00	---	---	0.000	---	0.000
4.00	9,764	112.00	6.67 oc	---	---	---	6.44 s	0.00	---	---	0.142	---	6.584

INFILTRATION PRACTICE CRITERIA
(Env-Wq 1508.06)

Type/Node Name: **B1-2 Infiltration Basin**

Enter the type of infiltration practice (e.g., basin, trench) and the node name in the drainage analysis, if applicable

Yes		Have you reviewed Env-Wq 1508.06(a) to ensure that infiltration is allowed?	
15.90	ac	A = Area draining to the practice	
11.57	ac	A_I = Impervious area draining to the practice	
0.73	decimal	I = percent impervious area draining to the practice, in decimal form	
0.70	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
11.21	ac-in	WQV= 1" x Rv x A	
40,685	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
10,171	cf	25% x WQV (check calc for sediment forebay volume)	
Sed. Forebay		Method of pretreatment? (not required for clean or roof runoff)	
13,380	cf	V_{SED} = sediment forebay volume, if used for pretreatment	← ≥ 25%WQV
97,159	cf	V = volume[1] (attach a stage-storage table)	← ≥ WQV
23,219	sf	A_{SA} = surface area of the bottom of the pond	
1.50	iph	$Ksat_{DESIGN}$ = design infiltration rate[2]	
14.0	hours	T_{DRAIN} = drain time = V / (A_{SA} * I_{DESIGN})	← ≤ 72-hrs
129.00	feet	E_{BTM} = elevation of the bottom of the basin	
125.00	feet	E_{SHWT} = elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
118.00	feet	E_{ROCK} = elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
4.00	feet	D_{SHWT} = separation from SHWT	← ≥ *[3]
11.0	feet	D_{ROCK} = separation from bedrock	← ≥ *[3]
	ft	D_{amend} = Depth of amended soil, if applicable due high infiltation rate	← ≥ 24"
	ft	D_T = depth of trench, if trench proposed	← 4 - 10 ft
	Yes/No	If a trench or underground system is proposed, observation well provided[4]	
		If a trench is proposed, material in trench	
On-site Soils		If a basin is proposed, basin floor material	
Yes	Yes/No	If a basin is proposed, the perimeter should be curvilinear, basin floor shall be flat.	
4.0	:1	If a basin is proposed, pond side slopes	← ≥3:1
132.77	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
133.76	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
135.00	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation ≤ Elevation of the top of the trench?[5]	← yes
YES		If a basin is proposed, 50-year peak elevation ≤ Elevation of berm?	← yes

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. $Ksat_{DESIGN}$ includes a factor of safety. See Env-Wq 1504.14 for requirements for determining the infiltr. rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.
4. Clean, washed well graded diameter of 1.5 to 3 inches above the in-situ soil.
5. If 50-year peak elevation exceeds top of trench, the overflow must be routed in HydroCAD as secondary discharge.

Designer's Notes:

Two Sediment Forebays are included in this pond.

Each forebay sub-watershed's WQV was calculated and the forebay sized to a capacity greater than 25%

The number above reflect the combine forebay volume.

Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Pond No. 13 - B1-2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 129.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	129.00	23,219	0	0
1.00	130.00	26,154	24,669	24,669
2.00	131.00	36,456	31,160	55,829
3.00	132.00	41,922	39,153	94,982
4.00	133.00	47,300	44,580	139,562
5.00	134.00	51,019	49,143	188,705
6.00	135.00	54,834	52,910	241,615

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	6.00	0.00	0.00
Span (in)	= 12.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 128.00	132.00	0.00	0.00
Length (ft)	= 141.00	0.50	0.00	0.00
Slope (%)	= 0.71	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 10.00	30.00	0.00	0.00
Crest El. (ft)	= 133.50	134.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= 1	Broad	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 1.500 (by Contour)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	129.00	0.00	0.00	---	---	0.00	0.00	---	---	0.000	---	0.000
1.00	24,669	130.00	2.60 oc	0.00	---	---	0.00	0.00	---	---	0.908	---	0.908
2.00	55,829	131.00	2.60 oc	0.00	---	---	0.00	0.00	---	---	1.266	---	1.266
3.00	94,982	132.00	2.60 oc	0.00	---	---	0.00	0.00	---	---	1.456	---	1.456
4.00	139,562	133.00	2.60 oc	0.82 ic	---	---	0.00	0.00	---	---	1.642	---	2.461
5.00	188,705	134.00	6.34 oc	0.24 ic	---	---	6.10 s	0.00	---	---	1.771	---	8.108
6.00	241,615	135.00	6.88 oc	0.05 ic	---	---	6.81 s	78.00	---	---	1.904	---	86.77

INFILTRATION PRACTICE CRITERIA
(Env-Wq 1508.06)

Type/Node Name: **B6-2 Infiltration Basin**

Enter the type of infiltration practice (e.g., basin, trench) and the node name in the drainage analysis, if applicable

Yes		Have you reviewed Env-Wq 1508.06(a) to ensure that infiltration is allowed?	
6.19	ac	A = Area draining to the practice	
2.57	ac	A_I = Impervious area draining to the practice	
0.42	decimal	I = percent impervious area draining to the practice, in decimal form	
0.42	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
2.62	ac-in	WQV= 1" x Rv x A	
9,520	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
2,380	cf	25% x WQV (check calc for sediment forebay volume)	
Sed. Forebay		Method of pretreatment? (not required for clean or roof runoff)	
4,694	cf	V_{SED} = sediment forebay volume, if used for pretreatment	← **≥ 25%WQV**
63,409	cf	V = volume[1] (attach a stage-storage table)	← **≥ WQV**
27,364	sf	A_{SA} = surface area of the bottom of the pond	
1.50	iph	$Ksat_{DESIGN}$ = design infiltration rate[2]	
2.8	hours	T_{DRAIN} = drain time = V / (A_{SA} * I_{DESIGN})	← **≤ 72-hrs**
130.00	feet	E_{BTM} = elevation of the bottom of the basin	
126.00	feet	E_{SHWT} = elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
109.00	feet	E_{ROCK} = elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
4.00	feet	D_{SHWT} = separation from SHWT	← **≥ *[3]**
21.0	feet	D_{ROCK} = separation from bedrock	← **≥ *[3]**
	ft	D_{amend} = Depth of amended soil, if applicable due high infiltation rate	← **≥ 24"**
	ft	D_T = depth of trench, if trench proposed	← **4 - 10 ft**
	Yes/No	If a trench or underground system is proposed, observation well provided[4]	
		If a trench is proposed, material in trench	
On-site Soils		If a basin is proposed, basin floor material	
Yes	Yes/No	If a basin is proposed, the perimeter should be curvilinear, basin floor shall be flat.	
4.0	:1	If a basin is proposed, pond side slopes	← **≥3:1**
133.06	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
133.87	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
135.00	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation ≤ Elevation of the top of the trench?[5]	← **yes**
YES		If a basin is proposed, 50-year peak elevation ≤ Elevation of berm?	← **yes**

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. $Ksat_{DESIGN}$ includes a factor of safety. See Env-Wq 1504.14 for requirements for determining the infiltr. rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.
4. Clean, washed well graded diameter of 1.5 to 3 inches above the in-situ soil.
5. If 50-year peak elevation exceeds top of trench, the overflow must be routed in HydroCAD as secondary discharge.

Designer's Notes:

Two Sediment Forebays are included in this pond.

Each forebay sub-watershed's WQV was calculated and the forebay sized to a capacity greater than 25%

The number above reflect the combine forebay volume.

Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Pond No. 15 - B6-2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 130.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	130.00	27,364	0	0
1.00	131.00	31,150	29,234	29,234
2.00	132.00	37,300	34,175	63,409
3.00	133.00	42,164	39,703	103,112
4.00	134.00	48,484	45,283	148,395
5.00	135.00	54,100	51,261	199,656

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 30.00	Inactive	0.00	0.00
Span (in)	= 30.00	12.00	0.00	0.00
No. Barrels	= 1	2	0	0
Invert El. (ft)	= 129.00	132.05	0.00	0.00
Length (ft)	= 52.00	0.50	0.00	0.00
Slope (%)	= 7.69	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 10.00	0.00	30.00	0.00
Crest El. (ft)	= 133.50	132.05	134.00	0.00
Weir Coeff.	= 3.33	4.40	2.60	3.33
Weir Type	= 1	120 degV	Broad	---
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr) = 1.500 (by Contour)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	130.00	0.00	0.00	---	---	0.00	---	0.00	---	0.000	---	0.000
1.00	29,234	131.00	6.37 ic	0.00	---	---	0.00	---	0.00	---	1.082	---	1.082
2.00	63,409	132.00	6.37 ic	0.00	---	---	0.00	---	0.00	---	1.295	---	1.295
3.00	103,112	133.00	6.37 ic	0.00	---	---	0.00	3.87	0.00	---	1.464	---	5.334
4.00	148,395	134.00	34.49 ic	0.00	---	---	11.77	22.72 s	0.00	---	1.683	---	36.17
5.00	199,656	135.00	50.79 ic	0.00	---	---	27.72 s	23.07 s	78.00	---	1.878	---	130.67

INFILTRATION PRACTICE CRITERIA
(Env-Wq 1508.06)

Type/Node Name: **B6-3 FOREBAY FEATURE ONLY to Infiltration Basin**

Enter the type of infiltration practice (e.g., basin, trench) and the node name in the drainage analysis, if applicable

Yes		Have you reviewed Env-Wq 1508.06(a) to ensure that infiltration is allowed?	
3.93	ac	A = Area draining to the practice	
3.32	ac	A_I = Impervious area draining to the practice	
0.84	decimal	I = percent impervious area draining to the practice, in decimal form	
0.81	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
3.18	ac-in	WQV= 1" x Rv x A	
11,560	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
2,890	cf	25% x WQV (check calc for sediment forebay volume)	
Sed. Forebay		Method of pretreatment? (not required for clean or roof runoff)	
2,991	cf	V_{SED} = sediment forebay volume, if used for pretreatment	← ≥ 25%WQV
N/A	cf	V = volume[1] (attach a stage-storage table)	← ≥ WQV
N/A	sf	A_{SA} = surface area of the bottom of the pond	
N/A	iph	$Ksat_{DESIGN}$ = design infiltration rate[2]	
-	hours	T_{DRAIN} = drain time = V / (A_{SA} * I_{DESIGN})	← ≤ 72-hrs
134.00	feet	E_{BTM} = elevation of the bottom of the basin	
128.75	feet	E_{SHWT} = elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
120.00	feet	E_{ROCK} = elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
5.25	feet	D_{SHWT} = separation from SHWT	← ≥ *[3]
14.0	feet	D_{ROCK} = separation from bedrock	← ≥ *[3]
	ft	D_{amend} = Depth of amended soil, if applicable due high infiltation rate	← ≥ 24"
	ft	D_T = depth of trench, if trench proposed	← 4 - 10 ft
	Yes/No	If a trench or underground system is proposed, observation well provided[4]	
		If a trench is proposed, material in trench	
On-site Soils		If a basin is proposed, basin floor material	
Yes	Yes/No	If a basin is proposed, the perimeter should be curvilinear, basin floor shall be flat.	
4.0	:1	If a basin is proposed, pond side slopes	← ≥3:1
138.32	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
139.02	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
141.00	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation ≤ Elevation of the top of the trench?[5]	← yes
YES		If a basin is proposed, 50-year peak elevation ≤ Elevation of berm?	← yes

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. $Ksat_{DESIGN}$ includes a factor of safety. See Env-Wq 1504.14 for requirements for determining the infiltr. rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.
4. Clean, washed well graded diameter of 1.5 to 3 inches above the in-situ soil.
5. If 50-year peak elevation exceeds top of trench, the overflow must be routed in HydroCAD as secondary discharge.

Designer's Notes:

This feature is used only for attenuation and to accomidate, ata a minimum, the 25% pre-tretment volume of the watershed before dischargeing stormwater to Infiltration basin B6-2 for treatment and groundwater recharge.

Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Pond No. 16 - B6-3

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 134.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	134.00	2,600	0	0
1.00	135.00	3,400	2,991	2,991
2.00	136.00	4,400	3,889	6,880
3.00	137.00	5,400	4,891	11,771
4.00	138.00	6,600	5,989	17,760
5.00	139.00	7,900	7,240	25,000
6.00	140.00	9,200	8,541	33,540
7.00	141.00	10,700	9,940	43,480

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	6.00	0.00	0.00
Span (in)	= 15.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 133.00	135.00	0.00	0.00
Length (ft)	= 150.00	0.50	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 10.00	0.00	0.00	0.00
Crest El. (ft)	= 138.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	134.00	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
1.00	2,991	135.00	3.58 ic	0.00	---	---	0.00	---	---	---	---	---	0.000
2.00	6,880	136.00	3.58 ic	0.82 ic	---	---	0.00	---	---	---	---	---	0.819
3.00	11,771	137.00	3.58 ic	1.25 ic	---	---	0.00	---	---	---	---	---	1.251
4.00	17,760	138.00	3.58 ic	1.57 ic	---	---	0.00	---	---	---	---	---	1.568
5.00	25,000	139.00	11.03 oc	0.18 ic	---	---	10.85 s	---	---	---	---	---	11.03
6.00	33,540	140.00	11.91 oc	0.07 ic	---	---	11.79 s	---	---	---	---	---	11.86
7.00	43,480	141.00	12.71 oc	0.04 ic	---	---	12.46 s	---	---	---	---	---	12.50

INFILTRATION PRACTICE CRITERIA
(Env-Wq 1508.06)

Type/Node Name: **B6-4 FOREBAY FEATURE ONLY to Infiltration Basin**

Enter the type of infiltration practice (e.g., basin, trench) and the node name in the drainage analysis, if applicable

Yes		Have you reviewed Env-Wq 1508.06(a) to ensure that infiltration is allowed?	
9.56	ac	A = Area draining to the practice	
6.89	ac	A_I = Impervious area draining to the practice	
0.72	decimal	I = percent impervious area draining to the practice, in decimal form	
0.70	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
6.68	ac-in	WQV= 1" x Rv x A	
24,245	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
6,061	cf	25% x WQV (check calc for sediment forebay volume)	
Sed. Forebay		Method of pretreatment? (not required for clean or roof runoff)	
6,779	cf	V_{SED} = sediment forebay volume, if used for pretreatment	← ≥ 25%WQV
N/A	cf	V = volume[1] (attach a stage-storage table)	← ≥ WQV
N/A	sf	A_{SA} = surface area of the bottom of the pond	
N/A	iph	$Ksat_{DESIGN}$ = design infiltration rate[2]	
-	hours	T_{DRAIN} = drain time = V / (A_{SA} * I_{DESIGN})	← ≤ 72-hrs
134.00	feet	E_{BTM} = elevation of the bottom of the basin	
128.50	feet	E_{SHWT} = elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
122.00	feet	E_{ROCK} = elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
5.50	feet	D_{SHWT} = separation from SHWT	← ≥ *[3]
12.0	feet	D_{ROCK} = separation from bedrock	← ≥ *[3]
	ft	D_{amend} = Depth of amended soil, if applicable due high infiltation rate	← ≥ 24"
	ft	D_T = depth of trench, if trench proposed	← 4 - 10 ft
	Yes/No	If a trench or underground system is proposed, observation well provided[4]	
		If a trench is proposed, material in trench	
On-site Soils		If a basin is proposed, basin floor material	
Yes	Yes/No	If a basin is proposed, the perimeter should be curvilinear, basin floor shall be flat.	
4.0	:1	If a basin is proposed, pond side slopes	← ≥3:1
138.70	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
139.75	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
141.00	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation ≤ Elevation of the top of the trench?[5]	← yes
YES		If a basin is proposed, 50-year peak elevation ≤ Elevation of berm?	← yes

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. $Ksat_{DESIGN}$ includes a factor of safety. See Env-Wq 1504.14 for requirements for determining the infiltr. rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.
4. Clean, washed well graded diameter of 1.5 to 3 inches above the in-situ soil.
5. If 50-year peak elevation exceeds top of trench, the overflow must be routed in HydroCAD as secondary discharge.

Designer's Notes:

This feature is used only for attenuation and to accomidate, ata a minimum, the 25% pre-tretment volume of the watershed before dischargeing stormwater to Infiltration basin B6-2 for treatment and groundwater recharge.

Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Saturday, 05 / 9 / 2020

Pond No. 17 - B6-4

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 134.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	134.00	2,500	0	0
1.00	135.00	3,400	2,938	2,938
2.00	136.00	4,300	3,841	6,779
3.00	137.00	5,300	4,791	11,570
4.00	138.00	6,400	5,841	17,411
5.00	139.00	7,700	7,039	24,450
6.00	140.00	9,000	8,341	32,791
7.00	141.00	10,400	9,691	42,481

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 30.00	12.00	0.00	0.00
Span (in)	= 30.00	12.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 134.60	136.00	0.00	0.00
Length (ft)	= 920.00	0.50	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 10.00	0.00	0.00	0.00
Crest El. (ft)	= 137.75	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	134.00	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
1.00	2,938	135.00	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
2.00	6,779	136.00	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
3.00	11,570	137.00	2.73 ic	2.67 ic	---	---	0.00	---	---	---	---	---	2.674
4.00	17,411	138.00	8.79 ic	4.63 ic	---	---	4.16	---	---	---	---	---	8.794
5.00	24,450	139.00	31.22 oc	1.94 ic	---	---	29.27 s	---	---	---	---	---	31.21
6.00	32,791	140.00	34.09 oc	0.95 ic	---	---	33.13 s	---	---	---	---	---	34.08
7.00	42,481	141.00	36.39 oc	0.61 ic	---	---	35.73 s	---	---	---	---	---	36.34

Groundwater Recharge Volume (GRV) Calculation

6.78	ac	Area of HSG A soil that was replaced by impervious cover	0.40"
133.21	ac	Area of HSG B soil that was replaced by impervious cover	0.25"
-	ac	Area of HSG C soil that was replaced by impervious cover	0.10"
7.15	ac	Area of HSG D soil or impervious cover that was replaced by impervious cover	0.0"
0.24	inches	Rd = weighted groundwater recharge depth	
36.015	ac-in	GRV = AI * Rd	
130,733	cf	GRV conversion (ac-in x 43,560 sf/ac x 1ft/12")	

Provide calculations below showing that the project meets the groundwater recharge requirements (Env-Wq 1507.04):

Table 4: BMP Sizing Summary

BMP Sizing Summary Chart
(CF Unless otherwise noted)

Stormwater Feature	TSS Removal	Watershed	WQv (Required)	WQv (Provided)	Pre-treatment (Required)	Pre-treatment (Provided)	GRv (Provided)
Infiltration Basin	90%	**A1-2**	46,593	251,423	11,648	12,114	251,423
Dry Ext. Det. Pond w/ Micro Pool	TBD	**A1-3**	38,607	143,256	3,861	11,500	-
Sediment Forebay	TBD	**A1-4**	99,918	-	24,980	31,389	-
Infiltration Basin	90%	**A1-5**	32,144	57,995	8,036	11,544	57,995
Sediment Forebay		A1-5A	-	-	545	3,480	-
Sediment Forebay		A1-5B	-	-	7,493	8,064	-
Hydrodynamic Unit	80%	**A1-6**	4.697 CFS	8.82 CFS	-	-	-
			or	or			
			16,533	30,000			-
Infiltration Basin	90%	**A6-2**	82,103	161,989	20,526	21,812	161,989
Infiltration Basin	90%	**A11-2**	109,751	151,585	27,438	29,250	151,585
Infiltration Basin	90%	**A11-3**	2,098	12,205	525	886	12,205
Infiltration Basin	90%	**B1-2**	40,685	97,159	10,171	13,380	97,159
Sediment Forebay	TBD	B1-2A	-	-	1,381	3,480	-
Sediment Forebay	TBD	B1-2B	-	-	8,842	9,900	-
Infiltration Basin	90%	**B6-2**	9,520	63,409	2,380	4,694	63,409
Sediment Forebay	TBD	B6-2A	-	-	818	3,222	-
Sediment Forebay	TBD	B6-2B	-	-	1,562	1,472	-
Sediment Forebay	TBD	**B6-3**	11,560	-	2,890	2,991	-
Sediment Forebay	TBD	**B6-4**	24,245	-	6,061	6,779	-

Table 5: Water Quality Volume and Groundwater Recharge Volume Summary

Water Quality Volume &
Groundwater Recharge Compliance (CF)

	WQv	In Excess of Required
Required	**513,757**	
90% TSS Provided	795,765	282,008
80% TSS Provided	30,000	30,000
TBD% TSS Dry Ext. Det.	143,256	143,256

	GRv	
Required	**130,733**	
Total Provided	795,765	665,032

APPENDIX D

Stormwater Collection System Calculations

LANGAN

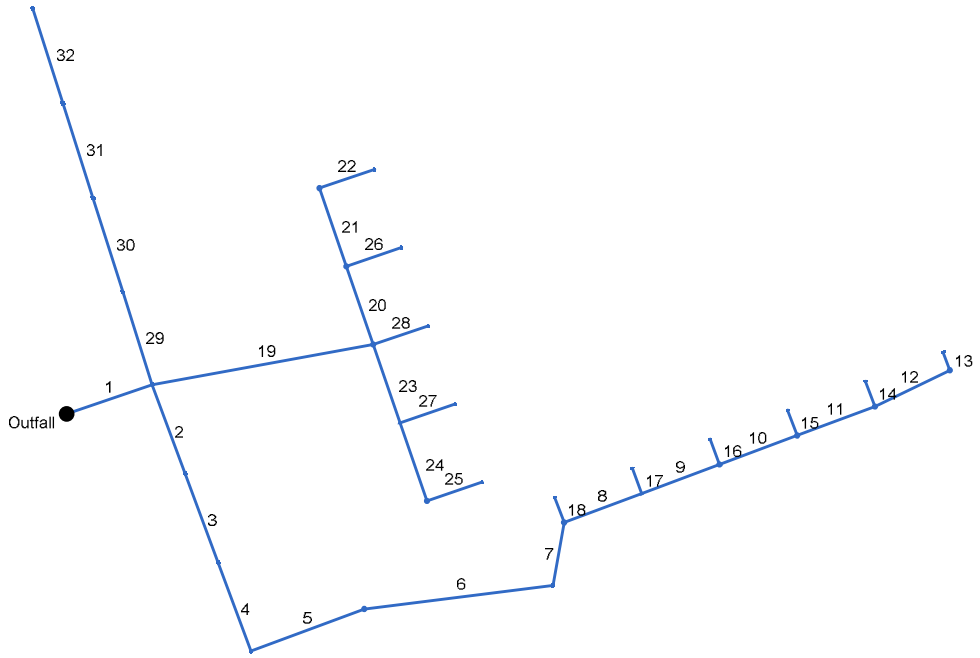
Project	HUDSON LOGISTICS CENTER	By	RJS	Date	5/21/2020
Location	LOWELL ROAD	Checked	TDO	Date	5/21/2020
Circle one:	Present (Developed)	Job No.	151010101		

1. Rational 'C' Runoff Coefficient & Area Calculations

Catchment Area	Total Area		Impervious (C=.9)		Pervious (C=0.3)		Percent Impervious	C
	SF	AC	SF	AC	SF	AC		
A1-2 CCB-1	42,918	0.985	41,160	0.945	1,758	0.040	96%	0.88
A1-2 CCB-2	42,931	0.986	41,160	0.945	1,771	0.041	96%	0.88
A1-4 CCB-3	43,352	0.995	39,170	0.899	4,183	0.096	90%	0.84
A1-2 CCB-4	29,905	0.687	23,222	0.533	6,683	0.153	78%	0.77
A1-2 DOUBLE CLCB-5	58,836	1.351	31,171	0.716	27,665	0.635	53%	0.62
A1-2 CCB-6	9,973	0.229	7,462	0.171	2,511	0.058	75%	0.75
A1-2 CCB-7	42,906	0.985	41,160	0.945	1,746	0.040	96%	0.88
A1-2 CCB-8	42,660	0.979	40,926	0.940	1,734	0.040	96%	0.88
A1-2 CCB-9	42,886	0.985	41,160	0.945	1,726	0.040	96%	0.88
A1-2 CCB-10	42,882	0.984	41,162	0.945	1,720	0.039	96%	0.88
A1-2 RL-1	9,707	0.223	9,707	0.223	0	0.000	100%	0.90
A1-2 RL-2	18,074	0.415	18,074	0.415	0	0.000	100%	0.90
A1-2 RL-3	288,069	6.613	288,069	6.613	0	0.000	100%	0.90
A1-2 RL-4	27,608	0.634	27,608	0.634	0	0.000	100%	0.90
A1-2 RL-5	17,608	0.404	17,608	0.404	0	0.000	100%	0.90
A1-2 RL-6	9,089	0.209	9,089	0.209	0	0.000	100%	0.90
A1-2 RL-7	26,019	0.597	26,019	0.597	0	0.000	100%	0.90
A1-2 RL-8	16,025	0.368	16,025	0.368	0	0.000	100%	0.90
A1-2 RL-9	4,828	0.111	4,828	0.111	0	0.000	100%	0.90
A1-2 RL-10	31,476	0.723	31,476	0.723	0	0.000	100%	0.90
A1-2 RL-11	31,487	0.723	31,487	0.723	0	0.000	100%	0.90
A1-3 DOUBLE CCB-1	63,383	1.455	49,748	1.142	13,635	0.313	78%	0.77
A1-3 CLCB-2	41,504	0.953	31,287	0.718	10,217	0.235	75%	0.75
A1-3 CLCB-3	41,711	0.958	32,000	0.735	9,711	0.223	77%	0.76
A1-3 CLCB-4	41,419	0.951	33,896	0.778	7,523	0.173	82%	0.79
A1-3 CLCB-5	29,457	0.676	23,803	0.546	5,654	0.130	81%	0.78
A1-3 CLCB-6	29,104	0.668	23,352	0.536	5,752	0.132	80%	0.78
A1-3 CCB-7	18,213	0.418	11,443	0.263	6,770	0.155	63%	0.68
A1-3 CCB-8	12,719	0.292	10,374	0.238	2,345	0.054	82%	0.79
A1-3 CCB-9	14,047	0.322	7,027	0.161	7,020	0.161	50%	0.60
A1-3 CCB-10	7,433	0.171	6,113	0.140	1,321	0.030	82%	0.79
A1-3 RL-1	31,500	0.723	31,500	0.723	0	0.000	100%	0.90
A1-3 RL-2	31,500	0.723	31,500	0.723	0	0.000	100%	0.90
A1-3 RL-3	24,780	0.569	24,780	0.569	0	0.000	100%	0.90
A1-3 RL-4	12,163	0.279	12,163	0.279	0	0.000	100%	0.90
A1-3 RL-5	21,375	0.491	21,375	0.491	0	0.000	100%	0.90
A1-3 RL-6	30,187	0.693	30,187	0.693	0	0.000	100%	0.90
A1-3 RL-7	31,500	0.723	31,500	0.723	0	0.000	100%	0.90
A1-3 RL-8	31,500	0.723	31,500	0.723	0	0.000	100%	0.90
A1-3 RL-9	31,500	0.723	31,500	0.723	0	0.000	100%	0.90
A6-2 CLCB-1	25,441	0.584	16,031	0.368	9,410	0.216	63%	0.68
A6-2 DOUBLE CLCB-2	80,516	1.848	45,959	1.055	34,557	0.793	57%	0.64
A6-2 CLCB-3	32,687	0.750	32,044	0.736	643	0.015	98%	0.89
A6-2 CLCB-4	18,045	0.414	12,584	0.289	5,461	0.125	70%	0.72
A6-2 CLCB-5	20,294	0.466	17,955	0.412	2,339	0.054	88%	0.83
A6-2 CLCB-6	20,294	0.466	17,954	0.412	2,339	0.054	88%	0.83
A6-2 CLCB-7	20,294	0.466	17,954	0.412	2,340	0.054	88%	0.83
A6-2 CLCB-8	36,623	0.841	20,865	0.479	15,759	0.362	57%	0.64

A6-2 CLCB-9	31,487	0.723	31,487	0.723	0	0.000	100%	0.90
A6-2 CLCB-10	31,487	0.723	31,487	0.723	0	0.000	100%	0.90
A6-2 CLCB-11	31,487	0.723	31,487	0.723	0	0.000	100%	0.90
A6-2 DOUBLE CLCB-12	61,610	1.414	40,272	0.925	21,339	0.490	65%	0.69
A6-2 CCB-13	11,580	0.266	9,999	0.230	1,581	0.036	86%	0.82
A6-2 CCB-14	8,730	0.200	7,005	0.161	1,725	0.040	80%	0.78
A6-2 CCB-15	12,165	0.279	8,823	0.203	3,342	0.077	73%	0.74
A6-2 DOUBLE CCB-16	47,433	1.089	42,402	0.973	5,032	0.116	89%	0.84
A6-2 CCB-17	42,787	0.982	41,160	0.945	1,627	0.037	96%	0.88
A6-2 CCB-18	42,807	0.983	41,160	0.945	1,647	0.038	96%	0.88
A6-2 CCB-19	42,593	0.978	40,926	0.940	1,667	0.038	96%	0.88
A6-2 CCB-20	42,847	0.984	41,160	0.945	1,687	0.039	96%	0.88
A6-2 CCB-21	42,633	0.979	40,926	0.940	1,706	0.039	96%	0.88
A6-2 RL-1	14,073	0.323	14,073	0.323	0	0.000	100%	0.90
A6-2 RL-2	5,273	0.121	5,273	0.121	0	0.000	100%	0.90
A6-2 RL-3	26,245	0.603	26,245	0.603	0	0.000	100%	0.90
A6-2 RL-4	32,251	0.740	32,251	0.740	0	0.000	100%	0.90
A6-2 RL-5	28,298	0.650	28,298	0.650	0	0.000	100%	0.90
A6-2 RL-6	21,453	0.493	21,453	0.493	0	0.000	100%	0.90
A6-2 RL-7	28,264	0.649	28,264	0.649	0	0.000	100%	0.90
A6-2 RL-8	8,097	0.186	8,097	0.186	0	0.000	100%	0.90
A6-2 RL-9	22,460	0.516	22,460	0.516	0	0.000	100%	0.90
A6-2 RL-10	31,385	0.720	31,385	0.720	0	0.000	100%	0.90
A6-2 RL-11	31,728	0.728	31,728	0.728	0	0.000	100%	0.90
A6-2 RL-12	31,487	0.723	31,487	0.723	0	0.000	100%	0.90
A6-2 RL-13	31,487	0.723	31,487	0.723	0	0.000	100%	0.90
A6-2 RL-14	31,728	0.728	31,728	0.728	0	0.000	100%	0.90
A6-2 RL-15	31,487	0.723	31,487	0.723	0	0.000	100%	0.90
A6-2 RL-16	31,487	0.723	31,487	0.723	0	0.000	100%	0.90
A6-2 RL-17	31,728	0.728	31,728	0.728	0	0.000	100%	0.90
B1-2 CLCB-1	34,416	0.790	32,075	0.736	2,341	0.054	93%	0.86
B1-2 CLCB-2	28,775	0.661	25,248	0.580	3,527	0.081	88%	0.83
B1-2 CLCB-3	23,552	0.541	21,102	0.484	2,450	0.056	90%	0.84
B1-2 CLCB-4	24,114	0.554	21,651	0.497	2,463	0.057	90%	0.84
B1-2 CLCB-5	26,065	0.598	22,876	0.525	3,189	0.073	88%	0.83
B1-2 DOUBLE CLCB-6	50,898	1.168	39,982	0.918	10,917	0.251	79%	0.77
B1-2 CLCB-7	31,930	0.733	26,120	0.600	5,810	0.133	82%	0.79
B1-2 CCB-8	22,353	0.513	11,546	0.265	10,806	0.248	52%	0.61
B1-2 CCB-9	12,740	0.292	10,498	0.241	2,243	0.051	82%	0.79
B1-2 CLCB-10	42,886	0.985	31,332	0.719	11,554	0.265	73%	0.74
B1-2 CCB-11	33,138	0.761	13,998	0.321	19,140	0.439	42%	0.55
B1-2 CCB-12	15,228	0.350	12,538	0.288	2,689	0.062	82%	0.79
B1-2 CCB-13	21,119	0.485	17,817	0.409	3,302	0.076	84%	0.81
B1-2 CCB-14	6,323	0.145	5,123	0.118	1,200	0.028	81%	0.79
B1-2 CCB-15	6,255	0.144	5,016	0.115	1,239	0.028	80%	0.78
B1-2 CCB-16	20,474	0.470	16,671	0.383	3,803	0.087	81%	0.79
B1-2 CCB-17	12,593	0.289	10,191	0.234	2,402	0.055	81%	0.79
B1-2 CCB-18	25,447	0.584	9,877	0.227	15,571	0.357	39%	0.53
B1-2 RL-1	20,632	0.474	20,632	0.474	0	0.000	100%	0.90
B1-2 RL-2	31,500	0.723	31,500	0.723	0	0.000	100%	0.90
B1-2 RL-3	38,220	0.877	38,220	0.877	0	0.000	100%	0.90
B1-2 RL-4	16,743	0.384	16,743	0.384	0	0.000	100%	0.90
B1-2 RL-5	30,146	0.692	30,146	0.692	0	0.000	100%	0.90
B1-2 RL-6	37,291	0.856	37,291	0.856	0	0.000	100%	0.90

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



Project File: New.stm	Number of lines: 32	Date: 5/12/2020

Network A1-2

Storm Sewers v2018.30

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	PIPE-30	85.71	72	Cir	108.920	118.90	123.26	4.000	126.70	126.43	1.12	127.55	End	Combination
2	PIPE-33	39.61	42	Cir	114.553	123.26	124.40	1.000	127.55	127.67	0.14	127.81	1	Combination
3	PIPE-32	33.79	42	Cir	114.606	124.40	125.55	1.000	127.81	127.35	0.36	127.35	2	Combination
4	PIPE-31	27.95	30	Cir	114.637	125.55	126.70	1.000	127.35	128.50	n/a	128.50	3	Combination
5	PIPE-157	24.37	30	Cir	145.500	126.70	128.15	1.000	128.50	129.83	n/a	129.83 j	4	Manhole
6	PIPE-156	18.57	30	Cir	229.412	128.15	132.74	2.000	129.83	134.20	n/a	134.20 j	5	Combination
7	PIPE-195	17.40	30	Cir	77.118	132.74	134.28	2.000	134.20	135.69	n/a	135.69 j	6	Manhole
8	PIPE-194	16.02	30	Cir	100.000	134.28	134.78	0.500	135.69	136.13	n/a	136.13 j	7	Manhole
9	PIPE-193	13.29	30	Cir	100.000	134.78	135.28	0.500	136.13	136.50	n/a	136.50 j	8	Manhole
10	PIPE-192	8.87	24	Cir	100.000	135.28	135.78	0.500	136.50	136.84	n/a	136.84 j	9	Manhole
11	PIPE-191	4.43	18	Cir	100.000	135.78	136.28	0.500	136.84	137.09	n/a	137.09 j	10	Manhole
12	PIPE-190	1.54	12	Cir	100.440	136.28	136.78	0.500	137.09	137.31	0.21	137.52	11	Manhole
13	PIPE-130	1.55	12	Cir	23.148	136.78	136.90	0.500	137.52	137.54	0.13	137.67	12	Combination
14	PIPE-135	3.00	15	Cir	32.543	136.28	136.90	1.899	137.09	137.59	n/a	137.59 j	11	Combination
15	PIPE-134	4.70	18	Cir	32.543	135.78	136.90	3.435	136.84	137.73	n/a	137.73 j	10	Combination
16	PIPE-133	4.78	15	Cir	32.543	135.28	136.90	4.972	136.50	137.78	n/a	137.78 j	9	Combination
17	PIPE-132	3.08	12	Cir	32.543	134.78	136.90	6.508	136.13	137.65	n/a	137.65 j	8	Combination
18	PIPE-124	1.65	12	Cir	32.543	134.28	136.90	8.045	135.69	137.44	n/a	137.44 j	7	Combination
19	PIPE-82	17.49	30	Cir	270.853	123.26	131.30	2.969	127.55	132.71	n/a	132.71 j	1	Manhole
20	PIPE-92	10.47	30	Cir	100.000	131.30	131.95	0.650	132.71	133.03	n/a	133.03 j	19	Manhole
21	PIPE-91	5.33	24	Cir	100.000	131.95	132.60	0.650	133.03	133.41	n/a	133.41 j	20	Manhole
22	PIPE-90	5.37	15	Cir	70.000	132.60	135.25	3.789	133.41	136.19	n/a	136.19	21	Combination
23	PIPE-81	3.39	15	Cir	100.000	131.30	131.95	0.650	132.71	132.91	0.17	133.08	19	Manhole
24	PIPE-80	0.81	15	Cir	100.000	131.95	132.60	0.650	133.08	132.95	n/a	132.95	23	Manhole

Project File: New.stm | Number of lines: 32 | Run Date: 5/12/2020

NOTES: Return period = 25 Yrs. ; j - Line contains hyd. jump.

Network A1-2

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
25	PIPE-79	0.82	12	Cir	70.000	132.60	135.25	3.789	132.95	135.63	n/a	135.63	24	Combination
26	PIPE-93	5.36	15	Cir	70.000	131.95	135.25	4.717	133.03	136.19	n/a	136.19 j	20	Combination
27	PIPE-89	2.73	12	Cir	70.000	131.95	135.25	4.717	133.08	135.96	n/a	135.96 j	23	Combination
28	PIPE-88	4.43	15	Cir	70.000	131.30	135.25	5.646	132.71	136.10	n/a	136.10 j	19	Combination
29	PIPE-29	26.27	42	Cir	117.382	123.26	123.84	0.500	127.55*	127.61*	0.06	127.67	1	Combination
30	PIPE-28	20.18	36	Cir	119.622	123.84	124.44	0.500	127.67*	127.76*	0.06	127.83	29	Combination
31	PIPE-27	13.83	30	Cir	120.378	124.44	125.04	0.500	127.83*	127.94*	0.06	128.01	30	Combination
32	PIPE-158	7.14	24	Cir	120.000	125.04	125.64	0.500	128.01*	128.11*	0.08	128.19	31	Combination

Project File: New.stm | Number of lines: 32 | Run Date: 5/12/2020

NOTES: Return period = 25 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	108.920	0.99	14.22	0.88	0.87	12.11	5.0	9.4	7.1	85.71	917.7	4.35	72	4.00	118.90	123.26	126.70	126.43	125.32	131.69	PIPE-30
2	1	114.553	0.99	6.78	0.88	0.87	5.52	5.0	9.0	7.2	39.61	109.0	4.18	42	1.00	123.26	124.40	127.55	127.67	131.69	132.33	PIPE-33
3	2	114.606	1.00	5.79	0.84	0.84	4.65	5.0	8.6	7.3	33.79	109.0	5.16	42	1.00	124.40	125.55	127.81	127.35	132.33	132.89	PIPE-32
4	3	114.637	0.69	4.80	0.77	0.53	3.81	5.0	8.3	7.3	27.95	44.43	7.39	30	1.00	125.55	126.70	127.35	128.50	132.89	133.49	PIPE-31
5	4	145.500	1.35	4.11	0.62	0.84	3.29	5.0	8.0	7.4	24.37	44.43	6.69	30	1.00	126.70	128.15	128.50	129.83	133.49	135.71	PIPE-157
6	5	229.412	0.23	2.76	0.75	0.17	2.45	5.0	7.3	7.6	18.57	62.83	5.77	30	2.00	128.15	132.74	129.83	134.20	135.71	139.03	PIPE-156
7	6	77.118	0.00	2.53	0.00	0.00	2.28	0.0	7.1	7.6	17.40	62.83	5.97	30	2.00	132.74	134.28	134.20	135.69	139.03	141.11	PIPE-195
8	7	100.000	0.00	2.31	0.00	0.00	2.08	0.0	6.8	7.7	16.02	31.42	5.77	30	0.50	134.28	134.78	135.69	136.13	141.11	141.66	PIPE-194
9	8	100.000	0.00	1.89	0.00	0.00	1.70	0.0	6.5	7.8	13.29	31.42	5.24	30	0.50	134.78	135.28	136.13	136.50	141.66	142.32	PIPE-193
10	9	100.000	0.00	1.25	0.00	0.00	1.12	0.0	6.1	7.9	8.87	17.33	4.82	24	0.50	135.28	135.78	136.50	136.84	142.32	142.87	PIPE-192
11	10	100.000	0.00	0.61	0.00	0.00	0.55	0.0	5.7	8.0	4.43	8.04	3.94	18	0.50	135.78	136.28	136.84	137.09	142.87	142.88	PIPE-191
12	11	100.440	0.00	0.21	0.00	0.00	0.19	0.0	5.1	8.2	1.54	2.73	2.96	12	0.50	136.28	136.78	137.09	137.31	142.88	142.55	PIPE-190
13	12	23.148	0.21	0.21	0.90	0.19	0.19	5.0	5.0	8.2	1.55	2.73	2.69	12	0.50	136.78	136.90	137.52	137.54	142.55	142.75	PIPE-130
14	11	32.543	0.40	0.40	0.90	0.36	0.36	5.0	5.0	8.2	3.00	9.64	3.93	15	1.90	136.28	136.90	137.09	137.59	142.88	142.75	PIPE-135
15	10	32.543	0.63	0.63	0.90	0.57	0.57	5.0	5.0	8.2	4.70	21.09	4.09	18	3.44	135.78	136.90	136.84	137.73	142.87	142.75	PIPE-134
16	9	32.543	0.64	0.64	0.90	0.58	0.58	5.0	5.0	8.2	4.78	15.60	4.53	15	4.97	135.28	136.90	136.50	137.78	142.32	142.75	PIPE-133
17	8	32.543	0.41	0.41	0.90	0.37	0.37	5.0	5.0	8.2	3.08	9.84	4.39	12	6.51	134.78	136.90	136.13	137.65	141.66	142.75	PIPE-132
18	7	32.543	0.22	0.22	0.90	0.20	0.20	5.0	5.0	8.2	1.65	10.94	2.94	12	8.04	134.28	136.90	135.69	137.44	141.11	142.75	PIPE-124
19	1	270.853	0.00	2.52	0.00	0.00	2.27	0.0	6.9	7.7	17.49	76.55	4.83	30	2.97	123.26	131.30	127.55	132.71	131.69	138.02	PIPE-82
20	19	100.000	0.00	1.45	0.00	0.00	1.30	0.0	5.6	8.1	10.47	35.82	4.40	30	0.65	131.30	131.95	132.71	133.03	138.02	138.05	PIPE-92
21	20	100.000	0.00	0.72	0.00	0.00	0.65	0.0	5.2	8.2	5.33	19.75	3.76	24	0.65	131.95	132.60	133.03	133.41	138.05	138.02	PIPE-91
22	21	70.000	0.72	0.72	0.90	0.65	0.65	5.0	5.0	8.2	5.37	13.62	5.89	15	3.79	132.60	135.25	133.41	136.19	138.02	138.77	PIPE-90

Project File: New.stm | Number of lines: 32 | Run Date: 5/12/2020

NOTES:Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period =Yrs. 25 ; c = cir e = ellip b = box

Network A1-2

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
23	19	100.000	0.00	0.48	0.00	0.00	0.43	0.0	6.3	7.9	3.39	5.64	3.06	15	0.65	131.30	131.95	132.71	132.91	138.02	137.98	PIPE-81
24	23	100.000	0.00	0.11	0.00	0.00	0.10	0.0	5.4	8.1	0.81	5.64	1.78	15	0.65	131.95	132.60	133.08	132.95	137.98	137.90	PIPE-80
25	24	70.000	0.11	0.11	0.90	0.10	0.10	5.0	5.0	8.2	0.82	7.51	3.17	12	3.79	132.60	135.25	132.95	135.63	137.90	138.75	PIPE-79
26	20	70.000	0.72	0.72	0.90	0.65	0.65	5.0	5.0	8.2	5.36	15.19	5.09	15	4.72	131.95	135.25	133.03	136.19	138.05	138.75	PIPE-93
27	23	70.000	0.37	0.37	0.90	0.33	0.33	5.0	5.0	8.2	2.73	8.38	4.04	12	4.72	131.95	135.25	133.08	135.96	137.98	138.75	PIPE-89
28	19	70.000	0.60	0.60	0.90	0.54	0.54	5.0	5.0	8.2	4.43	16.62	4.29	15	5.65	131.30	135.25	132.71	136.10	138.02	138.77	PIPE-88
29	1	117.382	0.98	3.93	0.88	0.87	3.46	5.0	7.3	7.6	26.27	77.07	2.73	42	0.50	123.26	123.84	127.55	127.61	131.69	131.09	PIPE-29
30	29	119.622	0.98	2.95	0.88	0.86	2.59	5.0	6.6	7.8	20.18	51.09	2.85	36	0.50	123.84	124.44	127.67	127.76	131.09	130.50	PIPE-28
31	30	120.378	0.98	1.97	0.88	0.87	1.73	5.0	5.9	8.0	13.83	31.42	2.82	30	0.50	124.44	125.04	127.83	127.94	130.50	129.89	PIPE-27
32	31	120.000	0.98	0.98	0.88	0.87	0.87	5.0	5.0	8.2	7.14	17.33	2.27	24	0.50	125.04	125.64	128.01	128.11	129.89	129.89	PIPE-158

Project File: New.stm | Number of lines: 32 | Run Date: 5/12/2020

NOTES:Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period =Yrs. 25 ; c = cir e = ellip b = box

Network A1-2

Storm Sewer Inlet Time Tabulation

Line No.	Line ID	Tc Method	Sheet Flow					Shallow Concentrated Flow					Channel Flow							Total Travel Time (min)
			n-Value	flow Length (ft)	2-yr 24h P (in)	Land Slope (%)	Travel Time (min)	flow Length (ft)	Water Slope (%)	Surf Descr	Ave Vel (ft/s)	Travel Time (min)	X-sec Area (sqft)	Wetted Perim (ft)	Chan Slope (%)	n-Value	Vel	flow Length (ft)	Travel Time (min)	
1	PIPE-30	User																		5.00
2	PIPE-33	User																		5.00
3	PIPE-32	User																		5.00
4	PIPE-31	User																		5.00
5	PIPE-157	User																		5.00
6	PIPE-156	User																		5.00
7	PIPE-195	User																		0.00
8	PIPE-194	User																		0.00
9	PIPE-193	User																		0.00
10	PIPE-192	User																		0.00
11	PIPE-191	User																		0.00
12	PIPE-190	User																		0.00
13	PIPE-130	User																		5.00
14	PIPE-135	User																		5.00
15	PIPE-134	User																		5.00
16	PIPE-133	User																		5.00
17	PIPE-132	User																		5.00
18	PIPE-124	User																		5.00
19	PIPE-82	User																		0.00
20	PIPE-92	User																		0.00
21	PIPE-91	User																		0.00
22	PIPE-90	User																		5.00
23	PIPE-81	User																		0.00
24	PIPE-80	User																		0.00

Project File: New.stm | Min. Tc used for intensity calculations = 5 min | Number of lines: 32 | Date: 5/12/2020

Network A1-2

Storm Sewer Inlet Time Tabulation

Line No.	Line ID	Tc Method	Sheet Flow n-Value	Sheet Flow flow Length (ft)	Sheet Flow 2-yr 24h P (in)	Sheet Flow Land Slope (%)	Sheet Flow Travel Time (min)	Shallow Concentrated Flow flow Length (ft)	Shallow Concentrated Flow Water Slope (%)	Shallow Concentrated Flow Surf Descr	Shallow Concentrated Flow Ave Vel (ft/s)	Shallow Concentrated Flow Travel Time (min)	Channel Flow X-sec Area (sqft)	Channel Flow Wetted Perim (ft)	Channel Flow Chan Slope (%)	Channel Flow n-Value	Channel Flow Vel	Channel Flow flow Length (ft)	Channel Flow Travel Time (min)	Total Travel Time (min)
25	PIPE-79	User																		5.00
26	PIPE-93	User																		5.00
27	PIPE-89	User																		5.00
28	PIPE-88	User																		5.00
29	PIPE-29	User																		5.00
30	PIPE-28	User																		5.00
31	PIPE-27	User																		5.00
32	PIPE-158	User																		5.00

Project File: New.stm | Min. Tc used for intensity calculations = 5 min | Number of lines: 32 | Date: 5/12/2020

Network A1-2

Hydraulic Grade Line Computations

Line	Size (in)	Q (cfs)	Downstream Invert elev (ft)	Downstream HGL elev (ft)	Downstream Depth (ft)	Downstream Area (sqft)	Downstream Vel (ft/s)	Downstream Vel head (ft)	Downstream EGL elev (ft)	Downstream Sf (%)	Len (ft)	Upstream Invert elev (ft)	Upstream HGL elev (ft)	Upstream Depth (ft)	Upstream Area (sqft)	Upstream Vel (ft/s)	Upstream Vel head (ft)	Upstream EGL elev (ft)	Upstream Sf (%)	Check Ave Sf (%)	Check Enrgy loss (ft)	JL coeff (K)	Minor loss (ft)
1	72	85.71	118.90	126.70	6.00	28.27	3.03	0.14	126.84	0.035	108.920	123.26	126.43	3.17	15.15	5.66	0.50	126.92	0.116	0.076	0.082	2.25	1.12
2	42	39.61	123.26	127.55	3.50	9.62	4.12	0.26	127.81	0.132	114.553	124.40	127.67	3.27	9.35	4.24	0.28	127.95	0.114	0.123	0.141	0.50	0.14
3	42	33.79	124.40	127.81	3.41	4.98	3.54	0.71	128.53	0.000	114.606	125.55	127.35	1.80**	4.98	6.78	0.71	128.06	0.000	0.000	n/a	0.50	0.36
4	30	27.95	125.55	127.35	1.80	3.78	7.39	0.85	128.20	0.000	114.637	126.70	128.50	1.80**	3.79	7.38	0.85	129.34	0.000	0.000	n/a	1.50	n/a
5	30	24.37	126.70	128.50	1.80	3.51	6.43	0.75	129.25	0.000	145.500	128.15	129.83 j	1.68**	3.51	6.95	0.75	130.58	0.000	0.000	n/a	0.27	n/a
6	30	18.57	128.15	129.83	1.68	2.97	5.29	0.61	130.44	0.000	229.412	132.74	134.20 j	1.46**	2.97	6.24	0.61	134.80	0.000	0.000	n/a	1.45	0.88
7	30	17.40	132.74	134.20	1.46	2.85	5.85	0.58	134.78	0.000	77.118	134.28	135.69 j	1.41**	2.85	6.09	0.58	136.27	0.000	0.000	n/a	0.89	0.51
8	30	16.02	134.28	135.69	1.41	2.71	5.61	0.55	136.24	0.000	100.000	134.78	136.13 j	1.35**	2.71	5.92	0.55	136.68	0.000	0.000	n/a	1.00	0.55
9	30	13.29	134.78	136.13	1.35	2.39	4.91	0.48	136.61	0.000	100.000	135.28	136.50 j	1.22**	2.39	5.56	0.48	136.99	0.000	0.000	n/a	1.00	0.48
10	24	8.87	135.28	136.50	1.22	1.69	4.40	0.43	136.93	0.000	100.000	135.78	136.84 j	1.06**	1.69	5.23	0.43	137.27	0.000	0.000	n/a	1.00	n/a
11	18	4.43	135.78	136.84	1.06	0.97	3.31	0.33	137.17	0.000	100.000	136.28	137.09 j	0.81**	0.97	4.57	0.33	137.41	0.000	0.000	n/a	1.00	n/a
12	12	1.54	136.28	137.09	0.81	0.42	2.27	0.08	137.17	0.164	100.440	136.78	137.31	0.53**	0.42	3.66	0.21	137.52	0.529	0.347	0.348	1.00	0.21
13	12	1.55	136.78	137.52	0.74	0.62	2.50	0.10	137.62	0.202	23.148	136.90	137.54	0.65	0.54	2.89	0.13	137.67	0.287	0.245	0.057	1.00	0.13
14	15	3.00	136.28	137.09	0.81	0.70	3.58	0.28	137.37	0.000	32.543	136.90	137.59 j	0.70**	0.70	4.27	0.28	137.88	0.000	0.000	n/a	1.00	n/a
15	18	4.70	135.78	136.84	1.06	1.01	3.52	0.34	137.18	0.000	32.543	136.90	137.73 j	0.83**	1.01	4.67	0.34	138.07	0.000	0.000	n/a	1.00	n/a
16	15	4.78	135.28	136.50	1.22	0.93	3.92	0.41	136.92	0.000	32.543	136.90	137.78 j	0.89**	0.93	5.14	0.41	138.20	0.000	0.000	n/a	1.00	n/a
17	12	3.08	134.78	136.13	1.00	0.63	3.92	0.24	136.37	0.638	32.543	136.90	137.65 j	0.75**	0.63	4.86	0.37	138.02	0.763	0.700	n/a	1.00	n/a
18	12	1.65	134.28	135.69	1.00	0.44	2.11	0.07	135.76	0.184	32.543	136.90	137.44 j	0.55**	0.44	3.77	0.22	137.67	0.549	0.366	n/a	1.00	n/a
19	30	17.49	123.26	127.55	2.50	2.86	3.56	0.20	127.74	0.155	270.853	131.30	132.71 j	1.41**	2.86	6.11	0.58	133.29	0.413	0.284	n/a	1.00	n/a
20	30	10.47	131.30	132.71	1.41	2.03	3.66	0.41	133.12	0.000	100.000	131.95	133.03 j	1.08**	2.03	5.15	0.41	133.44	0.000	0.000	n/a	1.00	n/a
21	24	5.33	131.95	133.03	1.08	1.20	3.07	0.31	133.34	0.000	100.000	132.60	133.41 j	0.81**	1.20	4.44	0.31	133.72	0.000	0.000	n/a	1.00	n/a
22	15	5.37	132.60	133.41	0.81	0.85	6.35	0.46	133.87	0.000	70.000	135.25	136.19	0.94**	0.99	5.43	0.46	136.65	0.000	0.000	n/a	1.00	n/a

Project File: New.stm | Number of lines: 32 | Run Date: 5/12/2020

Notes: ; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Network A1-2

Hydraulic Grade Line Computations

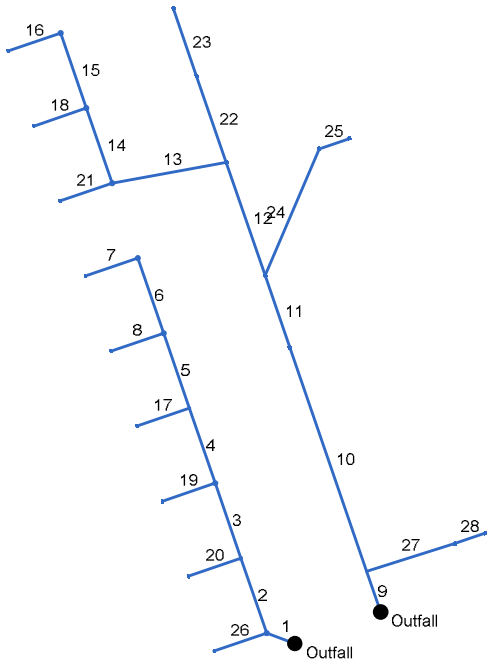
Line	Size (in)	Q (cfs)	Downstream Invert elev (ft)	Downstream HGL elev (ft)	Downstream Depth (ft)	Downstream Area (sqft)	Downstream Vel (ft/s)	Downstream Vel head (ft)	Downstream EGL elev (ft)	Downstream Sf (%)	Len (ft)	Upstream Invert elev (ft)	Upstream HGL elev (ft)	Upstream Depth (ft)	Upstream Area (sqft)	Upstream Vel (ft/s)	Upstream Vel head (ft)	Upstream EGL elev (ft)	Upstream Sf (%)	Check Ave Sf (%)	Check Enrgy loss (ft)	JL coeff (K)	Minor loss (ft)
23	15	3.39	131.30	132.71	1.25	1.23	2.76	0.12	132.83	0.234	100.000	131.95	132.91	0.96	1.01	3.35	0.17	133.08	0.268	0.251	0.251	1.00	0.17
24	15	0.81	131.95	133.08	1.13	0.28	0.69	0.13	133.21	0.000	100.000	132.60	132.95	0.35**	0.28	2.86	0.13	133.08	0.000	0.000	n/a	1.00	n/a
25	12	0.82	132.60	132.95	0.35	0.25	3.33	0.14	133.09	0.000	70.000	135.25	135.63	0.38**	0.27	3.01	0.14	135.77	0.000	0.000	n/a	1.00	n/a
26	15	5.36	131.95	133.03	1.08	0.99	4.75	0.46	133.49	0.000	70.000	135.25	136.19 j	0.94**	0.99	5.43	0.46	136.65	0.000	0.000	n/a	1.00	n/a
27	12	2.73	131.95	133.08	1.00	0.59	3.48	0.19	133.27	0.501	70.000	135.25	135.96 j	0.71**	0.59	4.59	0.33	136.29	0.694	0.598	n/a	1.00	0.33
28	15	4.43	131.30	132.71	1.25	0.89	3.61	0.20	132.92	0.402	70.000	135.25	136.10 j	0.85**	0.89	4.97	0.38	136.49	0.614	0.508	n/a	1.00	n/a
29	42	26.27	123.26	127.55	3.50	9.62	2.73	0.12	127.66	0.058	117.382	123.84	127.61	3.50	9.62	2.73	0.12	127.73	0.058	0.058	0.068	0.50	0.06
30	36	20.18	123.84	127.67	3.00	7.07	2.86	0.13	127.80	0.078	119.622	124.44	127.76	3.00	7.07	2.85	0.13	127.89	0.078	0.078	0.093	0.50	0.06
31	30	13.83	124.44	127.83	2.50	4.91	2.82	0.12	127.95	0.097	120.378	125.04	127.94	2.50	4.91	2.82	0.12	128.07	0.097	0.097	0.117	0.50	0.06
32	24	7.14	125.04	128.01	2.00	3.14	2.27	0.08	128.09	0.085	120.000	125.64	128.11	2.00	3.14	2.27	0.08	128.19	0.085	0.085	0.102	1.00	0.08

Project File: New.stm | Number of lines: 32 | Run Date: 5/12/2020

Notes: ; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Network A1-2

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



Project File: New.stm	Number of lines: 28	Date: 5/12/2020

Network A1-3

Storm Sewers v2018.30

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	PIPE-99	25.27	36	Cir	37.584	130.00	133.86	10.268	133.69	135.48	n/a	135.48 j	End	Manhole
2	PIPE-98	23.55	36	Cir	100.000	133.86	134.51	0.650	135.48	136.07	n/a	136.07 j	1	Manhole
3	PIPE-97	20.31	36	Cir	100.000	134.51	135.16	0.650	136.07	136.60	n/a	136.60 j	2	Manhole
4	PIPE-96	15.56	30	Cir	100.000	135.16	135.81	0.650	136.60	137.14	n/a	137.14 j	3	Manhole
5	PIPE-95	10.52	30	Cir	100.000	135.81	136.46	0.650	137.14	137.54	n/a	137.54 j	4	Manhole
6	PIPE-105	5.33	18	Cir	100.000	136.46	137.11	0.650	137.54	138.00	n/a	138.00 j	5	Manhole
7	PIPE-104	5.37	12	Cir	70.000	137.11	139.60	3.563	138.00	140.54	n/a	140.54	6	Combination
8	PIPE-94	5.37	12	Cir	70.000	136.46	139.60	4.491	137.54	140.54	n/a	140.54 j	5	Combination
9	PIPE-168	52.34	60	Cir	54.089	130.00	130.27	0.500	133.69	132.30	n/a	132.30	End	None
10	PIPE-167	42.59	48	Cir	298.589	130.27	131.76	0.500	132.30	133.71	n/a	133.71 j	9	Grate
11	PIPE-166	37.45	48	Cir	96.000	131.76	132.24	0.500	133.71	134.07	n/a	134.07 j	10	Grate
12	PIPE-165	28.29	42	Cir	150.750	132.24	133.00	0.500	134.07	134.64	n/a	134.64 j	11	Grate
13	PIPE-169	14.42	24	Cir	145.608	133.00	134.45	1.000	134.64	135.82	n/a	135.82 j	12	Manhole
14	PIPE-111	9.36	24	Cir	100.000	134.45	135.45	1.000	135.82	136.55	n/a	136.55 j	13	Manhole
15	PIPE-110	4.19	18	Cir	100.000	135.45	136.45	1.000	136.55	137.24	n/a	137.24 j	14	Manhole
16	PIPE-115	4.22	12	Cir	70.000	136.45	139.60	4.500	137.24	140.47	0.53	140.47	15	Combination
17	PIPE-103	5.37	12	Cir	70.000	135.81	139.60	5.420	137.14	140.54	n/a	140.54 j	4	Combination
18	PIPE-116	5.37	12	Cir	70.000	135.45	139.60	5.929	136.55	140.54	n/a	140.54 j	14	Combination
19	PIPE-102	5.14	12	Cir	70.000	135.16	139.60	6.349	136.60	140.53	n/a	140.53 j	3	Combination
20	PIPE-101	3.64	12	Cir	70.000	134.51	139.60	7.277	136.07	140.42	n/a	140.42 j	2	Combination
21	PIPE-117	5.37	12	Cir	70.000	134.45	139.60	7.357	135.82	140.54	n/a	140.54 j	13	Combination
22	PIPE-164	8.52	24	Cir	115.250	133.00	134.15	1.000	134.64	135.19	n/a	135.19 j	12	Grate
23	PIPE-163	4.30	18	Cir	90.000	134.15	135.05	1.000	135.19	135.84	n/a	135.84 j	22	Grate
24	PIPE-147	4.22	18	Cir	173.570	132.24	133.98	1.000	134.07	134.76	n/a	134.76 j	11	Combination

Project File: New.stm | Number of lines: 28 | Run Date: 5/12/2020

NOTES: Return period = 25 Yrs. ; j - Line contains hyd. jump.

Network A1-3

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
25	PIPE-146	1.90	12	Cir	40.000	133.98	134.38	1.000	134.76	134.97	n/a	134.97 j	24	Combination
26	PIPE-100	2.07	12	Cir	70.000	133.86	139.60	8.206	135.48	140.22	n/a	140.22 j	1	Combination
27	PIPE-171	2.67	15	Cir	116.027	130.27	131.43	1.000	132.30	132.44	0.05	132.49	9	Combination
28	PIPE-170	1.11	12	Cir	40.000	131.43	131.83	1.000	132.49	132.51	0.06	132.57	27	Combination

Project File: New.stm | Number of lines: 28 | Run Date: 5/12/2020

NOTES: Return period = 25 Yrs. ; j - Line contains hyd. jump.

Network A1-3

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	37.584	0.00	3.63	0.00	0.00	3.27	0.0	6.8	7.7	25.27	231.5	5.03	36	10.27	130.00	133.86	133.69	135.48	133.33	139.78	PIPE-99
2	1	100.000	0.00	3.35	0.00	0.00	3.02	0.0	6.5	7.8	23.55	58.25	6.19	36	0.65	133.86	134.51	135.48	136.07	139.78	141.21	PIPE-98
3	2	100.000	0.00	2.86	0.00	0.00	2.58	0.0	6.2	7.9	20.31	58.25	5.74	36	0.65	134.51	135.16	136.07	136.60	141.21	141.20	PIPE-97
4	3	100.000	0.00	2.17	0.00	0.00	1.95	0.0	5.9	8.0	15.56	35.82	5.58	30	0.65	135.16	135.81	136.60	137.14	141.20	141.20	PIPE-96
5	4	100.000	0.00	1.45	0.00	0.00	1.30	0.0	5.5	8.1	10.52	35.82	4.56	30	0.65	135.81	136.46	137.14	137.54	141.20	141.21	PIPE-95
6	5	100.000	0.00	0.72	0.00	0.00	0.65	0.0	5.2	8.2	5.33	9.17	4.39	18	0.65	136.46	137.11	137.54	138.00	141.21	141.20	PIPE-105
7	6	70.000	0.72	0.72	0.90	0.65	0.65	5.0	5.0	8.2	5.37	7.28	7.15	12	3.56	137.11	139.60	138.00	140.54	141.20	142.75	PIPE-104
8	5	70.000	0.72	0.72	0.90	0.65	0.65	5.0	5.0	8.2	5.37	8.18	6.93	12	4.49	136.46	139.60	137.54	140.54	141.21	142.75	PIPE-94
9	End	54.089	1.45	8.88	0.77	1.12	7.02	5.0	7.8	7.5	52.34	199.5	5.19	60	0.50	130.00	130.27	133.69	132.30	135.38	137.59	PIPE-168
10	9	298.589	0.95	6.93	0.75	0.71	5.57	5.0	7.1	7.6	42.59	110.0	6.83	48	0.50	130.27	131.76	132.30	133.71	137.59	138.85	PIPE-167
11	10	96.000	0.96	5.98	0.76	0.73	4.86	5.0	6.8	7.7	37.45	110.0	6.44	48	0.50	131.76	132.24	133.71	134.07	138.85	138.79	PIPE-166
12	11	150.750	0.95	4.31	0.79	0.75	3.61	5.0	6.4	7.8	28.29	77.07	5.99	42	0.50	132.24	133.00	134.07	134.64	138.79	138.89	PIPE-165
13	12	145.608	0.00	2.02	0.00	0.00	1.81	0.0	6.0	7.9	14.42	24.50	5.77	24	1.00	133.00	134.45	134.64	135.82	138.89	141.21	PIPE-169
14	13	100.000	0.00	1.29	0.00	0.00	1.16	0.0	5.6	8.1	9.36	24.50	4.71	24	1.00	134.45	135.45	135.82	136.55	141.21	141.21	PIPE-111
15	14	100.000	0.00	0.57	0.00	0.00	0.51	0.0	5.2	8.2	4.19	11.38	3.76	18	1.00	135.45	136.45	136.55	137.24	141.21	141.21	PIPE-110
16	15	70.000	0.57	0.57	0.90	0.51	0.51	5.0	5.0	8.2	4.22	8.18	6.12	12	4.50	136.45	139.60	137.24	140.47	141.21	142.75	PIPE-115
17	4	70.000	0.72	0.72	0.90	0.65	0.65	5.0	5.0	8.2	5.37	8.98	6.93	12	5.42	135.81	139.60	137.14	140.54	141.20	142.75	PIPE-103
18	14	70.000	0.72	0.72	0.90	0.65	0.65	5.0	5.0	8.2	5.37	9.39	6.93	12	5.93	135.45	139.60	136.55	140.54	141.21	142.75	PIPE-116
19	3	70.000	0.69	0.69	0.90	0.62	0.62	5.0	5.0	8.2	5.14	9.72	6.67	12	6.35	135.16	139.60	136.60	140.53	141.20	142.75	PIPE-102
20	2	70.000	0.49	0.49	0.90	0.44	0.44	5.0	5.0	8.2	3.64	10.41	4.98	12	7.28	134.51	139.60	136.07	140.42	141.21	142.75	PIPE-101
21	13	70.000	0.72	0.72	0.90	0.65	0.65	5.0	5.0	8.2	5.37	10.46	6.93	12	7.36	134.45	139.60	135.82	140.54	141.21	142.75	PIPE-117
22	12	115.250	0.68	1.34	0.78	0.53	1.05	5.0	5.4	8.1	8.52	24.50	4.13	24	1.00	133.00	134.15	134.64	135.19	138.89	139.14	PIPE-164

Project File: New.stm | Number of lines: 28 | Run Date: 5/12/2020

NOTES:Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period =Yrs. 25 ; c = cir e = ellip b = box

Network A1-3

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
23	22	90.000	0.67	0.67	0.78	0.52	0.52	5.0	5.0	8.2	4.30	11.38	3.91	18	1.00	134.15	135.05	135.19	135.84	139.14	139.14	PIPE-163
24	11	173.570	0.42	0.71	0.68	0.28	0.51	5.0	5.2	8.2	4.22	11.38	3.44	18	1.00	132.24	133.98	134.07	134.76	138.79	139.09	PIPE-147
25	24	40.000	0.29	0.29	0.79	0.23	0.23	5.0	5.0	8.2	1.90	3.86	3.42	12	1.00	133.98	134.38	134.76	134.97	139.09	139.09	PIPE-146
26	1	70.000	0.28	0.28	0.90	0.25	0.25	5.0	5.0	8.2	2.07	11.05	3.37	12	8.21	133.86	139.60	135.48	140.22	139.78	142.75	PIPE-100
27	9	116.027	0.32	0.49	0.60	0.19	0.33	5.0	5.4	8.1	2.67	7.00	2.34	15	1.00	130.27	131.43	132.30	132.44	137.59	135.44	PIPE-171
28	27	40.000	0.17	0.17	0.79	0.13	0.13	5.0	5.0	8.2	1.11	3.86	1.69	12	1.00	131.43	131.83	132.49	132.51	135.44	135.44	PIPE-170

Project File: New.stm | Number of lines: 28 | Run Date: 5/12/2020

NOTES:Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period =Yrs. 25 ; c = cir e = ellip b = box

Storm Sewer Inlet Time Tabulation

Line No.	Line ID	Tc Method	Sheet Flow					Shallow Concentrated Flow					Channel Flow							Total Travel Time (min)
			n-Value	flow Length (ft)	2-yr 24h P (in)	Land Slope (%)	Travel Time (min)	flow Length (ft)	Water Slope (%)	Surf Descr	Ave Vel (ft/s)	Travel Time (min)	X-sec Area (sqft)	Wetted Perim (ft)	Chan Slope (%)	n-Value	Vel	flow Length (ft)	Travel Time (min)	
1	PIPE-99	User																		0.00
2	PIPE-98	User																		0.00
3	PIPE-97	User																		0.00
4	PIPE-96	User																		0.00
5	PIPE-95	User																		0.00
6	PIPE-105	User																		0.00
7	PIPE-104	User																		5.00
8	PIPE-94	User																		5.00
9	PIPE-168	User																		5.00
10	PIPE-167	User																		5.00
11	PIPE-166	User																		5.00
12	PIPE-165	User																		5.00
13	PIPE-169	User																		0.00
14	PIPE-111	User																		0.00
15	PIPE-110	User																		0.00
16	PIPE-115	User																		5.00
17	PIPE-103	User																		5.00
18	PIPE-116	User																		5.00
19	PIPE-102	User																		5.00
20	PIPE-101	User																		5.00
21	PIPE-117	User																		5.00
22	PIPE-164	User																		5.00
23	PIPE-163	User																		5.00
24	PIPE-147	User																		5.00

Project File: New.stm | Min. Tc used for intensity calculations = 5 min | Number of lines: 28 | Date: 5/12/2020

Network A1-3

Storm Sewer Inlet Time Tabulation

Line No.	Line ID	Tc Method	Sheet Flow n-Value	Sheet Flow flow Length (ft)	Sheet Flow 2-yr 24h P (in)	Sheet Flow Land Slope (%)	Sheet Flow Travel Time (min)	Shallow Concentrated Flow flow Length (ft)	Shallow Concentrated Flow Water Slope (%)	Shallow Concentrated Flow Surf Descr	Shallow Concentrated Flow Ave Vel (ft/s)	Shallow Concentrated Flow Travel Time (min)	Channel Flow X-sec Area (sqft)	Channel Flow Wetted Perim (ft)	Channel Flow Chan Slope (%)	Channel Flow n-Value	Channel Flow Vel	Channel Flow flow Length (ft)	Channel Flow Travel Time (min)	Total Travel Time (min)
25	PIPE-146	User																		5.00
26	PIPE-100	User																		5.00
27	PIPE-171	User																		5.00
28	PIPE-170	User																		5.00

Project File: New.stm | Min. Tc used for intensity calculations = 5 min | Number of lines: 28 | Date: 5/12/2020

Network A1-3

Hydraulic Grade Line Computations

Line	Size (in)	Q (cfs)	Downstream Invert elev (ft)	Downstream HGL elev (ft)	Downstream Depth (ft)	Downstream Area (sqft)	Downstream Vel (ft/s)	Downstream Vel head (ft)	Downstream EGL elev (ft)	Downstream Sf (%)	Len (ft)	Upstream Invert elev (ft)	Upstream HGL elev (ft)	Upstream Depth (ft)	Upstream Area (sqft)	Upstream Vel (ft/s)	Upstream Vel head (ft)	Upstream EGL elev (ft)	Upstream Sf (%)	Check Ave Sf (%)	Check Enrgy loss (ft)	JL coeff (K)	Minor loss (ft)
1	36	25.27	130.00	133.69	3.00	3.90	3.58	0.20	133.89	0.122	37.584	133.86	135.48 j	1.62**	3.90	6.48	0.65	136.13	0.378	0.250	n/a	0.81	n/a
2	36	23.55	133.86	135.48	1.62	3.72	6.04	0.62	136.10	0.000	100.000	134.51	136.07 j	1.56**	3.72	6.33	0.62	136.69	0.000	0.000	n/a	1.00	0.62
3	36	20.31	134.51	136.07	1.56	3.37	5.46	0.56	136.64	0.000	100.000	135.16	136.60 j	1.45**	3.37	6.03	0.56	137.17	0.000	0.000	n/a	1.00	0.56
4	30	15.56	135.16	136.60	1.45	2.65	5.29	0.53	137.14	0.000	100.000	135.81	137.14 j	1.33**	2.65	5.86	0.53	137.67	0.000	0.000	n/a	1.00	0.53
5	30	10.52	135.81	137.14	1.33	2.04	3.96	0.41	137.55	0.000	100.000	136.46	137.54 j	1.08**	2.04	5.16	0.41	137.96	0.000	0.000	n/a	1.00	0.41
6	18	5.33	136.46	137.54	1.08	1.09	3.90	0.37	137.91	0.000	100.000	137.11	138.00 j	0.89**	1.09	4.89	0.37	138.37	0.000	0.000	n/a	1.00	0.37
7	12	5.37	137.11	138.00	0.89	0.74	7.27	0.77	138.77	0.000	70.000	139.60	140.54	0.93**	0.76	7.03	0.77	141.31	0.000	0.000	n/a	1.00	n/a
8	12	5.37	136.46	137.54	1.00	0.76	6.84	0.73	138.27	1.936	70.000	139.60	140.54 j	0.93**	0.76	7.03	0.77	141.31	1.673	1.805	n/a	1.00	n/a
9	60	52.34	130.00	133.69	3.69	7.47	3.37	0.76	134.45	0.000	54.089	130.27	132.30	2.03**	7.47	7.01	0.76	133.06	0.000	0.000	n/a	1.00	n/a
10	48	42.59	130.27	132.30	2.03	6.08	6.66	0.76	133.06	0.000	298.589	131.76	133.71 j	1.95**	6.08	7.00	0.76	134.48	0.000	0.000	n/a	0.50	0.38
11	48	37.45	131.76	133.71	1.95	5.57	6.16	0.70	134.41	0.000	96.000	132.24	134.07 j	1.82**	5.57	6.72	0.70	134.77	0.000	0.000	n/a	1.07	n/a
12	42	28.29	132.24	134.07	1.82	4.42	5.59	0.64	134.70	0.000	150.750	133.00	134.64 j	1.64**	4.42	6.39	0.64	135.27	0.000	0.000	n/a	1.49	n/a
13	24	14.42	133.00	134.64	1.64	2.29	5.23	0.62	135.25	0.000	145.608	134.45	135.82 j	1.37**	2.29	6.30	0.62	136.44	0.000	0.000	n/a	0.99	0.61
14	24	9.36	134.45	135.82	1.37	1.76	4.09	0.44	136.26	0.000	100.000	135.45	136.55 j	1.09**	1.76	5.33	0.44	136.99	0.000	0.000	n/a	1.00	0.44
15	18	4.19	135.45	136.55	1.09	0.93	3.04	0.31	136.86	0.000	100.000	136.45	137.24 j	0.78**	0.93	4.49	0.31	137.55	0.000	0.000	n/a	1.00	0.31
16	12	4.22	136.45	137.24	0.78	0.66	6.39	0.53	137.77	0.000	70.000	139.60	140.47	0.87**	0.72	5.85	0.53	141.00	0.000	0.000	n/a	1.00	0.53
17	12	5.37	135.81	137.14	1.00	0.76	6.84	0.73	137.87	1.936	70.000	139.60	140.54 j	0.93**	0.76	7.03	0.77	141.31	1.673	1.805	n/a	1.00	n/a
18	12	5.37	135.45	136.55	1.00	0.76	6.84	0.73	137.27	1.936	70.000	139.60	140.54 j	0.93**	0.76	7.03	0.77	141.31	1.673	1.805	n/a	1.00	n/a
19	12	5.14	135.16	136.60	1.00	0.76	6.55	0.67	137.27	1.778	70.000	139.60	140.53 j	0.92**	0.76	6.79	0.72	141.24	1.541	1.660	n/a	1.00	0.72
20	12	3.64	134.51	136.07	1.00	0.68	4.64	0.33	136.41	0.892	70.000	139.60	140.42 j	0.81**	0.68	5.32	0.44	140.86	0.904	0.898	n/a	1.00	n/a
21	12	5.37	134.45	135.82	1.00	0.76	6.84	0.73	136.55	1.936	70.000	139.60	140.54 j	0.93**	0.76	7.03	0.77	141.31	1.673	1.805	n/a	1.00	n/a
22	24	8.52	133.00	134.64	1.64	1.65	3.09	0.41	135.05	0.000	115.250	134.15	135.19 j	1.04**	1.65	5.16	0.41	135.60	0.000	0.000	n/a	0.50	0.21

Project File: New.stm | Number of lines: 28 | Run Date: 5/12/2020

Notes: ; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Network A1-3

Hydraulic Grade Line Computations

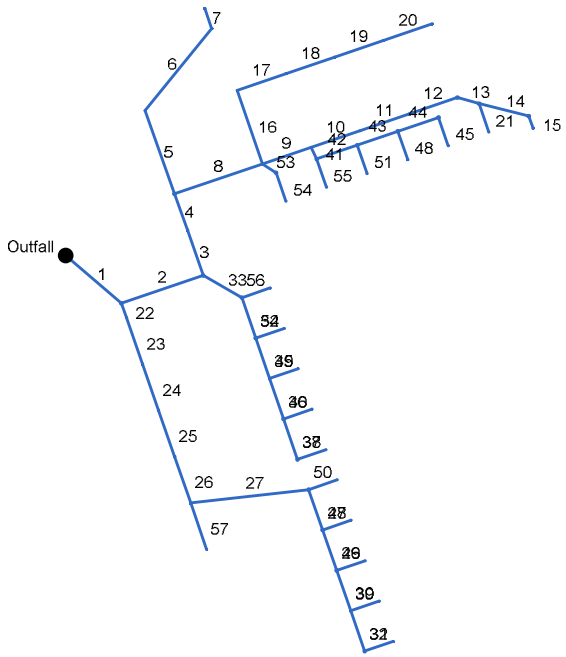
Line	Size (in)	Q (cfs)	Downstream Invert elev (ft)	Downstream HGL elev (ft)	Downstream Depth (ft)	Downstream Area (sqft)	Downstream Vel (ft/s)	Downstream Vel head (ft)	Downstream EGL elev (ft)	Downstream Sf (%)	Len (ft)	Upstream Invert elev (ft)	Upstream HGL elev (ft)	Upstream Depth (ft)	Upstream Area (sqft)	Upstream Vel (ft/s)	Upstream Vel head (ft)	Upstream EGL elev (ft)	Upstream Sf (%)	Check Ave Sf (%)	Check Enrgy loss (ft)	JL coeff (K)	Minor loss (ft)
23	18	4.30	134.15	135.19	1.04	0.95	3.29	0.32	135.51	0.000	90.000	135.05	135.84 j	0.79**	0.95	4.53	0.32	136.16	0.000	0.000	n/a	1.00	n/a
24	18	4.22	132.24	134.07	1.50	0.94	2.39	0.09	134.15	0.137	173.570	133.98	134.76 j	0.79**	0.94	4.50	0.31	135.08	0.469	0.303	n/a	1.17	n/a
25	12	1.90	133.98	134.76	0.79	0.48	2.87	0.24	135.01	0.000	40.000	134.38	134.97 j	0.59**	0.48	3.97	0.24	135.21	0.000	0.000	n/a	1.00	0.24
26	12	2.07	133.86	135.48	1.00	0.51	2.64	0.11	135.59	0.289	70.000	139.60	140.22 j	0.61**	0.51	4.10	0.26	140.48	0.595	0.442	n/a	1.00	0.26
27	15	2.67	130.27	132.30	1.25	1.23	2.17	0.07	132.37	0.145	116.027	131.43	132.44	1.01	1.07	2.50	0.10	132.54	0.148	0.147	0.170	0.50	0.05
28	12	1.11	131.43	132.49	1.00	0.79	1.42	0.03	132.52	0.083	40.000	131.83	132.51	0.68	0.57	1.96	0.06	132.57	0.130	0.106	0.043	1.00	0.06

Project File: New.stm | Number of lines: 28 | Run Date: 5/12/2020

Notes: ; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Network A1-3

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



Project File: New.stm	Number of lines: 57	Date: 5/12/2020

Network A6-2

Storm Sewers v2018.30

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	PIPE-151	157.5	72	Cir	171.301	110.00	115.14	3.000	118.21	118.55	1.25	118.55	End	Manhole
2	PIPE-189	98.18	60	Cir	201.533	115.14	123.20	4.000	118.55	126.02	n/a	126.02	1	Manhole
3	PIPE-34	80.10	60	Cir	112.159	123.20	124.32	1.000	126.02	126.85	0.50	126.85	2	Grate
4	PIPE-155	77.69	60	Cir	89.988	124.32	125.22	1.000	126.85	127.71	n/a	127.71	3	Manhole
5	PIPE-154	4.58	12	Cir	207.014	125.22	135.57	5.000	127.71	136.46	n/a	136.46 j	4	Combination
6	PIPE-153	2.96	12	Cir	246.982	135.57	141.75	2.500	136.46	142.49	n/a	142.49 j	5	Combination
7	PIPE-152	1.70	12	Cir	50.000	141.75	142.25	1.000	142.49	142.80	n/a	142.80 j	6	Combination
8	PIPE-21	65.84	60	Cir	216.737	125.22	127.39	1.000	127.71	129.68	n/a	129.68 j	4	Grate
9	PIPE-26	42.03	48	Cir	120.000	127.39	128.59	1.000	129.68	130.52	n/a	130.52 j	8	Grate
10	PIPE-25	20.49	36	Cir	120.000	128.59	129.79	1.000	130.52	131.24	n/a	131.24 j	9	Grate
11	PIPE-24	15.71	30	Cir	120.000	129.79	130.99	1.000	131.24	132.33	n/a	132.33 j	10	Grate
12	PIPE-23	10.83	30	Cir	120.000	130.99	132.19	1.000	132.33	133.29	n/a	133.29 j	11	Manhole
13	PIPE-50	3.17	12	Cir	52.636	132.19	134.03	3.500	133.29	134.79	n/a	134.79 j	12	Manhole
14	PIPE-49	0.89	12	Cir	119.269	134.03	138.21	3.500	134.79	138.60	n/a	138.60 j	13	Manhole
15	PIPE-48	0.90	12	Cir	30.916	138.21	139.60	4.519	138.60	140.00	0.15	140.00	14	Combination
16	PIPE-20	15.48	30	Cir	182.000	127.39	132.85	3.000	129.68	134.18	n/a	134.18 j	8	Grate
17	PIPE-19	13.34	30	Cir	120.000	132.85	134.05	1.000	134.18	135.28	n/a	135.28 j	16	Grate
18	PIPE-18	10.44	24	Cir	120.000	134.05	135.25	1.000	135.28	136.41	n/a	136.41 j	17	Grate
19	PIPE-17	7.49	24	Cir	120.000	135.25	136.45	1.000	136.41	137.42	n/a	137.42 j	18	Grate
20	PIPE-16	4.44	18	Cir	120.000	136.45	137.65	1.000	137.42	138.46	n/a	138.46 j	19	Grate
21	PIPE-62	2.40	12	Cir	70.000	134.03	135.25	1.741	134.79	135.91	n/a	135.91 j	13	Combination
22	PIPE-150	62.00	54	Cir	35.661	115.14	115.50	1.000	118.55	117.78	0.14	117.78	1	None
23	PIPE-42	55.82	54	Cir	114.513	115.50	116.64	1.000	117.78	118.81	n/a	118.81 j	22	Combination
24	PIPE-41	49.89	48	Cir	114.710	116.64	117.79	1.000	118.81	119.91	n/a	119.91 j	23	Combination

Project File: New.stm | Number of lines: 57 | Run Date: 5/12/2020

NOTES: Return period = 25 Yrs. ; j - Line contains hyd. jump.

Network A6-2

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
25	PIPE-40	43.88	48	Cir	114.712	117.79	118.94	1.000	119.91	120.91	n/a	120.91 j	24	Combination
26	PIPE-39	37.81	48	Cir	114.699	118.94	120.08	1.000	120.91	121.91	n/a	121.91 j	25	Combination
27	PIPE-78	25.39	36	Cir	276.659	120.08	131.15	4.000	121.91	132.77	n/a	132.77 j	26	Manhole
28	PIPE-77	20.54	36	Cir	100.000	131.15	131.80	0.650	132.77	133.25	n/a	133.25 j	27	Manhole
29	PIPE-76	15.56	30	Cir	100.000	131.80	132.45	0.650	133.25	133.78	n/a	133.78 j	28	Manhole
30	PIPE-75	10.51	24	Cir	100.000	132.45	133.10	0.650	133.78	134.26	n/a	134.26 j	29	Manhole
31	PIPE-74	5.37	24	Cir	100.000	133.10	133.75	0.650	134.26	134.56	n/a	134.56 j	30	Manhole
32	PIPE-73	5.41	15	Cir	70.000	133.75	135.25	2.146	134.56	136.19	n/a	136.19	31	Combination
33	PIPE-68	20.11	36	Cir	104.043	123.20	129.65	6.199	126.02	131.09	n/a	131.09 j	2	Manhole
34	PIPE-67	19.01	36	Cir	100.000	129.65	130.65	1.000	131.09	132.05	n/a	132.05 j	33	Manhole
35	PIPE-66	15.52	30	Cir	100.000	130.65	131.65	1.000	132.05	132.98	n/a	132.98 j	34	Manhole
36	PIPE-65	10.51	30	Cir	100.000	131.65	132.65	1.000	132.98	133.73	n/a	133.73 j	35	Manhole
37	PIPE-64	5.33	24	Cir	100.000	132.65	133.65	1.000	133.73	134.46	n/a	134.46 j	36	Manhole
38	PIPE-63	5.37	15	Cir	70.000	133.65	135.25	2.286	134.46	136.19	n/a	136.19	37	Combination
39	PIPE-84	5.37	15	Cir	70.000	133.10	135.25	3.074	134.26	136.19	n/a	136.19 j	30	Combination
40	PIPE-69	5.41	15	Cir	70.000	132.65	135.25	3.714	133.73	136.19	n/a	136.19 j	36	Combination
41	PIPE-54	17.56	36	Cir	30.176	128.59	129.65	3.516	130.52	130.99	n/a	130.99 j	9	Manhole
42	PIPE-53	13.47	36	Cir	100.000	129.65	130.65	1.000	130.99	131.82	n/a	131.82 j	41	Manhole
43	PIPE-52	8.28	24	Cir	100.000	130.65	131.65	1.000	131.82	132.67	n/a	132.67 j	42	Manhole
44	PIPE-51	3.63	15	Cir	100.000	131.65	132.65	1.000	132.67	133.42	n/a	133.42 j	43	Manhole
45	PIPE-60	3.66	12	Cir	70.000	132.65	135.25	3.714	133.42	136.06	n/a	136.06	44	Combination
46	PIPE-85	5.37	15	Cir	69.917	132.45	135.25	4.008	133.78	136.19	n/a	136.19 j	29	Combination
47	PIPE-86	5.41	15	Cir	70.000	131.80	135.25	4.931	133.25	136.19	n/a	136.19 j	28	Combination
48	PIPE-59	4.82	15	Cir	70.000	131.65	135.25	5.143	132.67	136.14	n/a	136.14 j	43	Combination

Project File: New.stm | Number of lines: 57 | Run Date: 5/12/2020

NOTES: Return period = 25 Yrs. ; j - Line contains hyd. jump.

Network A6-2

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
49	PIPE-70	5.35	15	Cir	70.000	131.65	135.25	5.143	132.98	136.19	n/a	136.19 j	35	Combination
50	PIPE-87	5.37	15	Cir	70.000	131.15	135.25	5.860	132.77	136.19	n/a	136.19 j	27	Combination
51	PIPE-58	5.50	15	Cir	70.000	130.65	135.25	6.571	131.82	136.20	n/a	136.20 j	42	Combination
52	PIPE-71	3.83	12	Cir	70.000	130.65	135.25	6.571	132.05	136.08	n/a	136.08 j	34	Combination
53	PIPE-55	4.77	15	Cir	37.955	127.39	130.35	7.801	129.68	131.24	n/a	131.24 j	8	Manhole
54	PIPE-56	4.81	15	Cir	70.000	130.35	135.25	7.000	131.24	136.14	0.41	136.14	53	Combination
55	PIPE-57	4.47	15	Cir	70.000	129.65	135.25	8.000	130.99	136.11	n/a	136.11 j	41	Combination
56	PIPE-72	1.38	12	Cir	70.000	129.65	135.25	8.000	131.09	135.75	n/a	135.75 j	33	Combination
57	PIPE-38	7.10	24	Cir	114.721	120.08	121.23	1.000	121.91	122.17	n/a	122.17 j	26	Combination

Project File: New.stm | Number of lines: 57 | Run Date: 5/12/2020

NOTES: Return period = 25 Yrs. ; j - Line contains hyd. jump.

Network A6-2

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	171.301	0.00	26.23	0.00	0.00	22.05	0.0	9.1	7.1	157.5	794.8	7.53	72	3.00	110.00	115.14	118.21	118.55	116.42	131.69	PIPE-151
2	1	201.533	0.00	16.61	0.00	0.00	13.56	0.0	8.7	7.2	98.18	564.3	7.75	60	4.00	115.14	123.20	118.55	126.02	131.69	136.61	PIPE-189
3	2	112.159	0.58	13.74	0.68	0.40	10.97	5.0	8.4	7.3	80.10	282.2	7.53	60	1.00	123.20	124.32	126.02	126.85	136.61	135.83	PIPE-34
4	3	89.988	1.85	13.16	0.64	1.18	10.58	5.0	8.3	7.3	77.69	282.2	7.87	60	1.00	124.32	125.22	126.85	127.71	135.83	136.18	PIPE-155
5	4	207.014	0.27	0.75	0.82	0.22	0.58	5.0	6.2	7.9	4.58	8.63	6.02	12	5.00	125.22	135.57	127.71	136.46	136.18	139.29	PIPE-154
6	5	246.982	0.20	0.48	0.78	0.16	0.36	5.0	5.3	8.2	2.96	6.10	4.39	12	2.50	135.57	141.75	136.46	142.49	139.29	146.01	PIPE-153
7	6	50.000	0.28	0.28	0.74	0.21	0.21	5.0	5.0	8.2	1.70	3.86	3.28	12	1.00	141.75	142.25	142.49	142.80	146.01	145.81	PIPE-152
8	4	216.737	0.75	10.56	0.89	0.67	8.81	5.0	7.7	7.5	65.84	282.2	7.13	60	1.00	125.22	127.39	127.71	129.68	136.18	137.15	PIPE-21
9	8	120.000	0.72	6.51	0.90	0.65	5.56	5.0	7.4	7.6	42.03	155.6	6.32	48	1.00	127.39	128.59	129.68	130.52	137.15	137.15	PIPE-26
10	9	120.000	0.72	3.30	0.90	0.65	2.68	5.0	7.0	7.7	20.49	72.25	5.15	36	1.00	128.59	129.79	130.52	131.24	137.15	137.15	PIPE-25
11	10	120.000	0.72	2.58	0.90	0.65	2.03	5.0	6.7	7.8	15.71	44.43	5.59	30	1.00	129.79	130.99	131.24	132.33	137.15	137.15	PIPE-24
12	11	120.000	1.41	1.86	0.69	0.98	1.38	5.0	6.2	7.9	10.83	44.43	4.63	30	1.00	130.99	132.19	132.33	133.29	137.15	137.15	PIPE-23
13	12	52.636	0.00	0.44	0.00	0.00	0.40	0.0	6.1	7.9	3.17	7.22	4.49	12	3.50	132.19	134.03	133.29	134.79	137.15	138.61	PIPE-50
14	13	119.269	0.00	0.12	0.00	0.00	0.11	0.0	5.2	8.2	0.89	7.22	2.24	12	3.50	134.03	138.21	134.79	138.60	138.61	142.73	PIPE-49
15	14	30.916	0.12	0.12	0.90	0.11	0.11	5.0	5.0	8.2	0.90	8.20	3.10	12	4.52	138.21	139.60	138.60	140.00	142.73	142.97	PIPE-48
16	8	182.000	0.41	2.65	0.72	0.30	2.00	5.0	6.7	7.8	15.48	76.95	4.57	30	3.00	127.39	132.85	129.68	134.18	137.15	141.81	PIPE-20
17	16	120.000	0.47	2.24	0.83	0.39	1.70	5.0	6.3	7.9	13.34	44.43	5.30	30	1.00	132.85	134.05	134.18	135.28	141.81	141.81	PIPE-19
18	17	120.000	0.47	1.77	0.83	0.39	1.31	5.0	5.9	8.0	10.44	24.50	5.36	24	1.00	134.05	135.25	135.28	136.41	141.81	141.81	PIPE-18
19	18	120.000	0.47	1.31	0.83	0.39	0.92	5.0	5.5	8.1	7.49	24.50	4.46	24	1.00	135.25	136.45	136.41	137.42	141.81	141.81	PIPE-17
20	19	120.000	0.84	0.84	0.64	0.54	0.54	5.0	5.0	8.2	4.44	11.38	4.12	18	1.00	136.45	137.65	137.42	138.46	141.81	141.81	PIPE-16
21	13	70.000	0.32	0.32	0.90	0.29	0.29	5.0	5.0	8.2	2.40	5.09	4.04	12	1.74	134.03	135.25	134.79	135.91	138.61	139.75	PIPE-62
22	1	35.661	1.09	9.62	0.84	0.91	8.49	5.0	8.4	7.3	62.00	213.1	6.21	54	1.00	115.14	115.50	118.55	117.78	131.69	129.90	PIPE-150

Project File: New.stm | Number of lines: 57 | Run Date: 5/12/2020

NOTES:Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period =Yrs. 25 ; c = cir e = ellip b = box

Network A6-2

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
23	22	114.513	0.98	8.53	0.88	0.86	7.58	5.0	8.2	7.4	55.82	213.1	7.12	54	1.00	115.50	116.64	117.78	118.81	129.90	129.89	PIPE-42
24	23	114.710	0.98	7.55	0.88	0.86	6.71	5.0	7.9	7.4	49.89	155.6	7.29	48	1.00	116.64	117.79	118.81	119.91	129.89	129.89	PIPE-41
25	24	114.712	0.98	6.57	0.88	0.86	5.85	5.0	7.6	7.5	43.88	155.6	6.79	48	1.00	117.79	118.94	119.91	120.91	129.89	129.89	PIPE-40
26	25	114.699	0.98	5.59	0.88	0.87	4.99	5.0	7.3	7.6	37.81	155.6	6.42	48	1.00	118.94	120.08	120.91	121.91	129.89	129.89	PIPE-39
27	26	276.659	0.00	3.63	0.00	0.00	3.26	0.0	6.6	7.8	25.39	144.5	6.06	36	4.00	120.08	131.15	121.91	132.77	129.89	138.05	PIPE-78
28	27	100.000	0.00	2.90	0.00	0.00	2.61	0.0	6.3	7.9	20.54	58.25	5.65	36	0.65	131.15	131.80	132.77	133.25	138.05	138.02	PIPE-77
29	28	100.000	0.00	2.17	0.00	0.00	1.96	0.0	6.0	8.0	15.56	35.82	5.56	30	0.65	131.80	132.45	133.25	133.78	138.02	137.98	PIPE-76
30	29	100.000	0.00	1.45	0.00	0.00	1.31	0.0	5.7	8.0	10.51	19.75	5.15	24	0.65	132.45	133.10	133.78	134.26	137.98	137.90	PIPE-75
31	30	100.000	0.00	0.73	0.00	0.00	0.66	0.0	5.2	8.2	5.37	19.75	3.64	24	0.65	133.10	133.75	134.26	134.56	137.90	137.97	PIPE-74
32	31	70.000	0.73	0.73	0.90	0.66	0.66	5.0	5.0	8.2	5.41	10.25	5.91	15	2.15	133.75	135.25	134.56	136.19	137.97	138.75	PIPE-73
33	2	104.043	0.00	2.87	0.00	0.00	2.59	0.0	6.6	7.8	20.11	179.9	4.46	36	6.20	123.20	129.65	126.02	131.09	136.61	138.02	PIPE-68
34	33	100.000	0.00	2.69	0.00	0.00	2.42	0.0	6.3	7.9	19.01	72.25	5.79	36	1.00	129.65	130.65	131.09	132.05	138.02	137.98	PIPE-67
35	34	100.000	0.00	2.17	0.00	0.00	1.95	0.0	6.0	7.9	15.52	44.43	5.68	30	1.00	130.65	131.65	132.05	132.98	137.98	137.90	PIPE-66
36	35	100.000	0.00	1.45	0.00	0.00	1.31	0.0	5.6	8.1	10.51	44.43	4.56	30	1.00	131.65	132.65	132.98	133.73	137.90	137.97	PIPE-65
37	36	100.000	0.00	0.72	0.00	0.00	0.65	0.0	5.2	8.2	5.33	24.50	3.75	24	1.00	132.65	133.65	133.73	134.46	137.97	138.02	PIPE-64
38	37	70.000	0.72	0.72	0.90	0.65	0.65	5.0	5.0	8.2	5.37	10.58	5.89	15	2.29	133.65	135.25	134.46	136.19	138.02	138.75	PIPE-63
39	30	70.000	0.72	0.72	0.90	0.65	0.65	5.0	5.0	8.2	5.37	12.27	4.97	15	3.07	133.10	135.25	134.26	136.19	137.90	138.75	PIPE-84
40	36	70.000	0.73	0.73	0.90	0.66	0.66	5.0	5.0	8.2	5.41	13.48	5.12	15	3.71	132.65	135.25	133.73	136.19	137.97	138.75	PIPE-69
41	9	30.176	0.00	2.49	0.00	0.00	2.24	0.0	6.3	7.9	17.56	135.5	4.70	36	3.52	128.59	129.65	130.52	130.99	137.15	137.91	PIPE-54
42	41	100.000	0.00	1.88	0.00	0.00	1.69	0.0	6.0	7.9	13.47	72.25	4.86	36	1.00	129.65	130.65	130.99	131.82	137.91	137.96	PIPE-53
43	42	100.000	0.00	1.14	0.00	0.00	1.03	0.0	5.6	8.1	8.28	24.50	4.73	24	1.00	130.65	131.65	131.82	132.67	137.96	138.02	PIPE-52
44	43	100.000	0.00	0.49	0.00	0.00	0.44	0.0	5.2	8.2	3.63	7.00	3.98	15	1.00	131.65	132.65	132.67	133.42	138.02	138.05	PIPE-51

Project File: New.stm | Number of lines: 57 | Run Date: 5/12/2020

NOTES:Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period =Yrs. 25 ; c = cir e = ellip b = box

Network A6-2

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
45	44	70.000	0.49	0.49	0.90	0.44	0.44	5.0	5.0	8.2	3.66	7.44	5.49	12	3.71	132.65	135.25	133.42	136.06	138.05	138.75	PIPE-60
46	29	69.917	0.72	0.72	0.90	0.65	0.65	5.0	5.0	8.2	5.37	14.00	4.90	15	4.01	132.45	135.25	133.78	136.19	137.98	138.75	PIPE-85
47	28	70.000	0.73	0.73	0.90	0.66	0.66	5.0	5.0	8.2	5.41	15.53	4.93	15	4.93	131.80	135.25	133.25	136.19	138.02	138.75	PIPE-86
48	43	70.000	0.65	0.65	0.90	0.58	0.58	5.0	5.0	8.2	4.82	15.86	4.82	15	5.14	131.65	135.25	132.67	136.14	138.02	138.75	PIPE-59
49	35	70.000	0.72	0.72	0.90	0.65	0.65	5.0	5.0	8.2	5.35	15.86	4.89	15	5.14	131.65	135.25	132.98	136.19	137.90	138.75	PIPE-70
50	27	70.000	0.72	0.72	0.90	0.65	0.65	5.0	5.0	8.2	5.37	16.93	4.90	15	5.86	131.15	135.25	132.77	136.19	138.05	138.75	PIPE-87
51	42	70.000	0.74	0.74	0.90	0.67	0.67	5.0	5.0	8.2	5.50	17.93	5.05	15	6.57	130.65	135.25	131.82	136.20	137.96	138.75	PIPE-58
52	34	70.000	0.52	0.52	0.90	0.46	0.46	5.0	5.0	8.2	3.83	9.89	5.18	12	6.57	130.65	135.25	132.05	136.08	137.98	138.75	PIPE-71
53	8	37.955	0.00	0.65	0.00	0.00	0.58	0.0	5.2	8.2	4.77	19.54	4.51	15	7.80	127.39	130.35	129.68	131.24	137.15	137.99	PIPE-55
54	53	70.000	0.65	0.65	0.90	0.58	0.58	5.0	5.0	8.2	4.81	18.51	5.17	15	7.00	130.35	135.25	131.24	136.14	137.99	138.75	PIPE-56
55	41	70.000	0.60	0.60	0.90	0.54	0.54	5.0	5.0	8.2	4.47	19.79	4.32	15	8.00	129.65	135.25	130.99	136.11	137.91	138.75	PIPE-57
56	33	70.000	0.19	0.19	0.90	0.17	0.17	5.0	5.0	8.2	1.38	10.91	2.65	12	8.00	129.65	135.25	131.09	135.75	138.02	138.75	PIPE-72
57	26	114.721	0.98	0.98	0.88	0.86	0.86	5.0	5.0	8.2	7.10	24.50	3.61	24	1.00	120.08	121.23	121.91	122.17	129.89	130.00	PIPE-38

Project File: New.stm | Number of lines: 57 | Run Date: 5/12/2020

NOTES:Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period =Yrs. 25 ; c = cir e = ellip b = box

Network A6-2

Storm Sewer Inlet Time Tabulation

Line No.	Line ID	Tc Method	Sheet Flow n-Value	Sheet Flow flow Length (ft)	Sheet Flow 2-yr 24h P (in)	Sheet Flow Land Slope (%)	Sheet Flow Travel Time (min)	Shallow Concentrated Flow flow Length (ft)	Shallow Concentrated Flow Water Slope (%)	Shallow Concentrated Flow Surf Descr	Shallow Concentrated Flow Ave Vel (ft/s)	Shallow Concentrated Flow Travel Time (min)	Channel Flow X-sec Area (sqft)	Channel Flow Wetted Perim (ft)	Channel Flow Chan Slope (%)	Channel Flow n-Value	Channel Flow Vel	Channel Flow flow Length (ft)	Channel Flow Travel Time (min)	Total Travel Time (min)
1	PIPE-151	User																		0.00
2	PIPE-189	User																		0.00
3	PIPE-34	User																		5.00
4	PIPE-155	User																		5.00
5	PIPE-154	User																		5.00
6	PIPE-153	User																		5.00
7	PIPE-152	User																		5.00
8	PIPE-21	User																		5.00
9	PIPE-26	User																		5.00
10	PIPE-25	User																		5.00
11	PIPE-24	User																		5.00
12	PIPE-23	User																		5.00
13	PIPE-50	User																		0.00
14	PIPE-49	User																		0.00
15	PIPE-48	User																		5.00
16	PIPE-20	User																		5.00
17	PIPE-19	User																		5.00
18	PIPE-18	User																		5.00
19	PIPE-17	User																		5.00
20	PIPE-16	User																		5.00
21	PIPE-62	User																		5.00
22	PIPE-150	User																		5.00
23	PIPE-42	User																		5.00
24	PIPE-41	User																		5.00

Project File: New.stm | Min. Tc used for intensity calculations = 5 min | Number of lines: 57 | Date: 5/12/2020

Network A6-2

Storm Sewer Inlet Time Tabulation

Line No.	Line ID	Tc Method	Sheet Flow n-Value	Sheet Flow flow Length (ft)	Sheet Flow 2-yr 24h P (in)	Sheet Flow Land Slope (%)	Sheet Flow Travel Time (min)	Shallow Concentrated Flow flow Length (ft)	Shallow Concentrated Flow Water Slope (%)	Shallow Concentrated Flow Surf Descr	Shallow Concentrated Flow Ave Vel (ft/s)	Shallow Concentrated Flow Travel Time (min)	Channel Flow X-sec Area (sqft)	Channel Flow Wetted Perim (ft)	Channel Flow Chan Slope (%)	Channel Flow n-Value	Channel Flow Vel	Channel Flow flow Length (ft)	Channel Flow Travel Time (min)	Total Travel Time (min)
25	PIPE-40	User																		5.00
26	PIPE-39	User																		5.00
27	PIPE-78	User																		0.00
28	PIPE-77	User																		0.00
29	PIPE-76	User																		0.00
30	PIPE-75	User																		0.00
31	PIPE-74	User																		0.00
32	PIPE-73	User																		5.00
33	PIPE-68	User																		0.00
34	PIPE-67	User																		0.00
35	PIPE-66	User																		0.00
36	PIPE-65	User																		0.00
37	PIPE-64	User																		0.00
38	PIPE-63	User																		5.00
39	PIPE-84	User																		5.00
40	PIPE-69	User																		5.00
41	PIPE-54	User																		0.00
42	PIPE-53	User																		0.00
43	PIPE-52	User																		0.00
44	PIPE-51	User																		0.00
45	PIPE-60	User																		5.00
46	PIPE-85	User																		5.00
47	PIPE-86	User																		5.00
48	PIPE-59	User																		5.00

Project File: New.stm | Min. Tc used for intensity calculations = 5 min | Number of lines: 57 | Date: 5/12/2020

Network A6-2

Storm Sewer Inlet Time Tabulation

Line No.	Line ID	Tc Method	Sheet Flow n-Value	Sheet Flow flow Length (ft)	Sheet Flow 2-yr 24h P (in)	Sheet Flow Land Slope (%)	Sheet Flow Travel Time (min)	Shallow Concentrated Flow flow Length (ft)	Shallow Concentrated Flow Water Slope (%)	Shallow Concentrated Flow Surf Descr	Shallow Concentrated Flow Ave Vel (ft/s)	Shallow Concentrated Flow Travel Time (min)	Channel Flow X-sec Area (sqft)	Channel Flow Wetted Perim (ft)	Channel Flow Chan Slope (%)	Channel Flow n-Value	Channel Flow Vel	Channel Flow flow Length (ft)	Channel Flow Travel Time (min)	Total Travel Time (min)
49	PIPE-70	User																		5.00
50	PIPE-87	User																		5.00
51	PIPE-58	User																		5.00
52	PIPE-71	User																		5.00
53	PIPE-55	User																		0.00
54	PIPE-56	User																		5.00
55	PIPE-57	User																		5.00
56	PIPE-72	User																		5.00
57	PIPE-38	User																		5.00

Project File: New.stm | Min. Tc used for intensity calculations = 5 min | Number of lines: 57 | Date: 5/12/2020

Network A6-2

Hydraulic Grade Line Computations

Line	Size (in)	Q (cfs)	Downstream Invert elev (ft)	Downstream HGL elev (ft)	Downstream Depth (ft)	Downstream Area (sqft)	Downstream Vel (ft/s)	Downstream Vel head (ft)	Downstream EGL elev (ft)	Downstream Sf (%)	Len (ft)	Upstream Invert elev (ft)	Upstream HGL elev (ft)	Upstream Depth (ft)	Upstream Area (sqft)	Upstream Vel (ft/s)	Upstream Vel head (ft)	Upstream EGL elev (ft)	Upstream Sf (%)	Check Ave Sf (%)	Check Enrgy loss (ft)	JL coeff (K)	Minor loss (ft)
1	72	157.5	110.00	118.21	6.00	16.59	5.57	0.48	118.69	0.118	171.301	115.14	118.55	3.41**	16.59	9.49	1.40	119.95	0.309	0.213	n/a	0.89	1.25
2	60	98.18	115.14	118.55	3.41	11.40	6.88	1.15	119.70	0.000	201.533	123.20	126.02	2.82**	11.40	8.61	1.15	127.17	0.000	0.000	n/a	1.00	n/a
3	60	80.10	123.20	126.02	2.82	9.98	7.03	1.00	127.02	0.000	112.159	124.32	126.85	2.53**	9.98	8.03	1.00	127.86	0.000	0.000	n/a	0.50	0.50
4	60	77.69	124.32	126.85	2.53	9.78	7.79	0.98	127.84	0.000	89.988	125.22	127.71	2.49**	9.78	7.95	0.98	128.70	0.000	0.000	n/a	1.00	n/a
5	12	4.58	125.22	127.71	1.00	0.74	5.84	0.53	128.24	1.412	207.014	135.57	136.46 j	0.89**	0.74	6.20	0.60	137.06	1.253	1.332	n/a	1.32	n/a
6	12	2.96	135.57	136.46	0.89	0.62	4.01	0.35	136.82	0.000	246.982	141.75	142.49 j	0.74**	0.62	4.77	0.35	142.84	0.000	0.000	n/a	1.31	n/a
7	12	1.70	141.75	142.49	0.74	0.45	2.75	0.23	142.71	0.000	50.000	142.25	142.80 j	0.55**	0.45	3.81	0.23	143.03	0.000	0.000	n/a	1.00	n/a
8	60	65.84	125.22	127.71	2.49	8.75	6.74	0.88	128.59	0.000	216.737	127.39	129.68 j	2.29**	8.75	7.53	0.88	130.56	0.000	0.000	n/a	1.85	1.63
9	48	42.03	127.39	129.68	2.29	6.02	5.66	0.76	130.43	0.000	120.000	128.59	130.52 j	1.94**	6.02	6.98	0.76	131.28	0.000	0.000	n/a	1.49	1.13
10	36	20.49	128.59	130.52	1.94	3.39	4.25	0.57	131.09	0.000	120.000	129.79	131.24 j	1.45**	3.39	6.04	0.57	131.81	0.000	0.000	n/a	0.50	0.28
11	30	15.71	129.79	131.24	1.45	2.67	5.31	0.54	131.78	0.000	120.000	130.99	132.33 j	1.34**	2.67	5.88	0.54	132.86	0.000	0.000	n/a	0.50	n/a
12	30	10.83	130.99	132.33	1.34	2.08	4.05	0.42	132.75	0.000	120.000	132.19	133.29 j	1.10**	2.08	5.20	0.42	133.71	0.000	0.000	n/a	0.62	0.26
13	12	3.17	132.19	133.29	1.00	0.64	4.04	0.25	133.54	0.675	52.636	134.03	134.79 j	0.76**	0.64	4.94	0.38	135.17	0.783	0.729	n/a	0.85	n/a
14	12	0.89	134.03	134.79	0.76	0.29	1.39	0.15	134.94	0.000	119.269	138.21	138.60 j	0.40**	0.29	3.09	0.15	138.75	0.000	0.000	n/a	0.86	n/a
15	12	0.90	138.21	138.60	0.40	0.29	3.11	0.15	138.75	0.000	30.916	139.60	140.00	0.40**	0.29	3.10	0.15	140.15	0.000	0.000	n/a	1.00	0.15
16	30	15.48	127.39	129.68	2.29	2.65	3.29	0.53	130.21	0.000	182.000	132.85	134.18 j	1.33**	2.65	5.85	0.53	134.71	0.000	0.000	n/a	1.50	n/a
17	30	13.34	132.85	134.18	1.33	2.40	5.04	0.48	134.66	0.000	120.000	134.05	135.28 j	1.23**	2.40	5.57	0.48	135.76	0.000	0.000	n/a	0.50	n/a
18	24	10.44	134.05	135.28	1.23	1.88	5.17	0.48	135.75	0.000	120.000	135.25	136.41 j	1.16**	1.88	5.55	0.48	136.88	0.000	0.000	n/a	0.50	0.24
19	24	7.49	135.25	136.41	1.16	1.51	3.98	0.38	136.79	0.000	120.000	136.45	137.42 j	0.97**	1.51	4.95	0.38	137.80	0.000	0.000	n/a	0.50	n/a
20	18	4.44	136.45	137.42	0.97	0.97	3.66	0.33	137.75	0.000	120.000	137.65	138.46 j	0.81**	0.97	4.58	0.33	138.78	0.000	0.000	n/a	1.00	n/a
21	12	2.40	134.03	134.79	0.76	0.55	3.73	0.29	135.09	0.000	70.000	135.25	135.91 j	0.66**	0.55	4.34	0.29	136.21	0.000	0.000	n/a	1.00	0.29
22	54	62.00	115.14	118.55	3.41	8.12	4.79	0.91	119.46	0.000	35.661	115.50	117.78	2.29**	8.12	7.63	0.91	118.69	0.000	0.000	n/a	0.15	0.14

Project File: New.stm | Number of lines: 57 | Run Date: 5/12/2020

Notes: ; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Network A6-2

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
	(in)	(cfs)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	(ft)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)	(K)	(ft)
23	54	55.82	115.50	117.78	2.29	7.57	6.87	0.85	118.63	0.000	114.513	116.64	118.81 j	2.16**	7.57	7.37	0.85	119.65	0.000	0.000	n/a	0.50	n/a
24	48	49.89	116.64	118.81	2.17	6.75	7.19	0.85	119.65	0.000	114.710	117.79	119.91 j	2.12**	6.75	7.39	0.85	120.75	0.000	0.000	n/a	0.50	0.42
25	48	43.88	117.79	119.91	2.12	6.20	6.50	0.78	120.68	0.000	114.712	118.94	120.91 j	1.98**	6.20	7.08	0.78	121.69	0.000	0.000	n/a	0.50	n/a
26	48	37.81	118.94	120.91	1.98	5.61	6.10	0.71	121.62	0.000	114.699	120.08	121.91 j	1.83**	5.61	6.74	0.71	122.62	0.000	0.000	n/a	1.47	n/a
27	36	25.39	120.08	121.91	1.83	3.91	5.62	0.66	122.57	0.000	276.659	131.15	132.77 j	1.62**	3.91	6.50	0.66	133.43	0.000	0.000	n/a	0.98	0.64
28	36	20.54	131.15	132.77	1.62	3.40	5.26	0.57	133.34	0.000	100.000	131.80	133.25 j	1.45**	3.40	6.05	0.57	133.82	0.000	0.000	n/a	1.00	n/a
29	30	15.56	131.80	133.25	1.45	2.65	5.25	0.53	133.79	0.000	100.000	132.45	133.78 j	1.33**	2.65	5.86	0.53	134.31	0.000	0.000	n/a	1.00	0.53
30	24	10.51	132.45	133.78	1.33	1.89	4.74	0.48	134.26	0.000	100.000	133.10	134.26 j	1.16**	1.89	5.56	0.48	134.74	0.000	0.000	n/a	1.00	0.48
31	24	5.37	133.10	134.26	1.16	1.21	2.84	0.31	134.57	0.000	100.000	133.75	134.56 j	0.82**	1.21	4.45	0.31	134.87	0.000	0.000	n/a	1.00	0.31
32	15	5.41	133.75	134.56	0.82	0.85	6.36	0.46	135.03	0.000	70.000	135.25	136.19	0.94**	0.99	5.45	0.46	136.65	0.000	0.000	n/a	1.00	n/a
33	36	20.11	123.20	126.02	2.82	3.35	2.92	0.56	126.58	0.000	104.043	129.65	131.09 j	1.44**	3.35	6.01	0.56	131.65	0.000	0.000	n/a	0.79	0.44
34	36	19.01	129.65	131.09	1.44	3.22	5.68	0.54	131.63	0.000	100.000	130.65	132.05 j	1.40**	3.22	5.90	0.54	132.59	0.000	0.000	n/a	1.00	0.54
35	30	15.52	130.65	132.05	1.40	2.65	5.51	0.53	132.58	0.000	100.000	131.65	132.98 j	1.33**	2.65	5.86	0.53	133.51	0.000	0.000	n/a	1.00	n/a
36	30	10.51	131.65	132.98	1.33	2.04	3.97	0.41	133.39	0.000	100.000	132.65	133.73 j	1.08**	2.04	5.15	0.41	134.15	0.000	0.000	n/a	1.00	0.41
37	24	5.33	132.65	133.73	1.08	1.20	3.06	0.31	134.04	0.000	100.000	133.65	134.46 j	0.81**	1.20	4.44	0.31	134.77	0.000	0.000	n/a	1.00	n/a
38	15	5.37	133.65	134.46	0.81	0.85	6.35	0.46	134.92	0.000	70.000	135.25	136.19	0.94**	0.99	5.43	0.46	136.65	0.000	0.000	n/a	1.00	n/a
39	15	5.37	133.10	134.26	1.16	0.99	4.52	0.46	134.72	0.000	70.000	135.25	136.19 j	0.94**	0.99	5.43	0.46	136.65	0.000	0.000	n/a	1.00	n/a
40	15	5.41	132.65	133.73	1.08	0.99	4.78	0.46	134.20	0.000	70.000	135.25	136.19 j	0.94**	0.99	5.45	0.46	136.65	0.000	0.000	n/a	1.00	n/a
41	36	17.56	128.59	130.52	1.94	3.05	3.64	0.51	131.04	0.000	30.176	129.65	130.99 j	1.34**	3.05	5.75	0.51	131.50	0.000	0.000	n/a	1.00	n/a
42	36	13.47	129.65	130.99	1.34	2.54	4.41	0.44	131.43	0.000	100.000	130.65	131.82 j	1.17**	2.54	5.30	0.44	132.25	0.000	0.000	n/a	1.00	0.44
43	24	8.28	130.65	131.82	1.17	1.62	4.35	0.41	132.22	0.000	100.000	131.65	132.67 j	1.02**	1.62	5.11	0.41	133.08	0.000	0.000	n/a	1.00	n/a
44	15	3.63	131.65	132.67	1.02	0.79	3.37	0.33	133.00	0.000	100.000	132.65	133.42 j	0.77**	0.79	4.58	0.33	133.74	0.000	0.000	n/a	1.00	n/a

Project File: New.stm | Number of lines: 57 | Run Date: 5/12/2020

Notes: ; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Network A6-2

Hydraulic Grade Line Computations

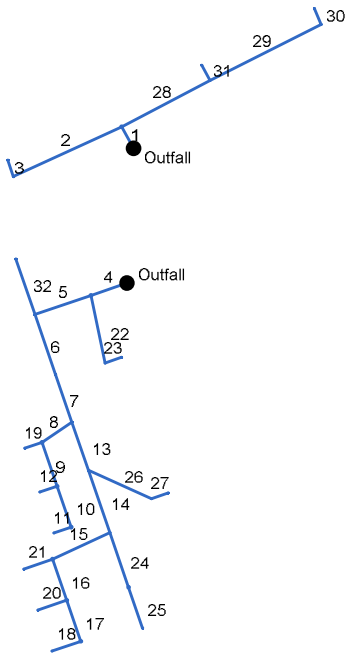
Line	Size (in)	Q (cfs)	Downstream Invert elev (ft)	Downstream HGL elev (ft)	Downstream Depth (ft)	Downstream Area (sqft)	Downstream Vel (ft/s)	Downstream Vel head (ft)	Downstream EGL elev (ft)	Downstream Sf (%)	Len (ft)	Upstream Invert elev (ft)	Upstream HGL elev (ft)	Upstream Depth (ft)	Upstream Area (sqft)	Upstream Vel (ft/s)	Upstream Vel head (ft)	Upstream EGL elev (ft)	Upstream Sf (%)	Check Ave Sf (%)	Check Enrgy loss (ft)	JL coeff (K)	Minor loss (ft)
45	12	3.66	132.65	133.42	0.77	0.65	5.64	0.44	133.86	0.000	70.000	135.25	136.06	0.81**	0.69	5.34	0.44	136.51	0.000	0.000	n/a	1.00	n/a
46	15	5.37	132.45	133.78	1.25	0.99	4.37	0.30	134.08	0.588	69.917	135.25	136.19 j	0.94**	0.99	5.43	0.46	136.65	0.706	0.647	n/a	1.00	n/a
47	15	5.41	131.80	133.25	1.25	0.99	4.41	0.30	133.55	0.598	70.000	135.25	136.19 j	0.94**	0.99	5.45	0.46	136.65	0.711	0.654	n/a	1.00	n/a
48	15	4.82	131.65	132.67	1.02	0.93	4.48	0.41	133.09	0.000	70.000	135.25	136.14 j	0.89**	0.93	5.16	0.41	136.55	0.000	0.000	n/a	1.00	0.41
49	15	5.35	131.65	132.98	1.25	0.99	4.36	0.30	133.27	0.585	70.000	135.25	136.19 j	0.94**	0.99	5.42	0.46	136.64	0.704	0.644	n/a	1.00	n/a
50	15	5.37	131.15	132.77	1.25	0.99	4.37	0.30	133.07	0.588	70.000	135.25	136.19 j	0.94**	0.99	5.43	0.46	136.65	0.706	0.647	n/a	1.00	n/a
51	15	5.50	130.65	131.82	1.17	1.00	4.61	0.47	132.29	0.000	70.000	135.25	136.20 j	0.95**	1.00	5.50	0.47	136.67	0.000	0.000	n/a	1.00	n/a
52	12	3.83	130.65	132.05	1.00	0.70	4.87	0.37	132.42	0.984	70.000	135.25	136.08 j	0.83**	0.70	5.48	0.47	136.55	0.960	0.972	n/a	1.00	n/a
53	15	4.77	127.39	129.68	1.25	0.93	3.89	0.24	129.91	0.466	37.955	130.35	131.24 j	0.89**	0.93	5.14	0.41	131.65	0.645	0.555	n/a	0.66	n/a
54	15	4.81	130.35	131.24	0.89	0.93	5.18	0.41	131.65	0.000	70.000	135.25	136.14	0.89**	0.93	5.16	0.41	136.55	0.000	0.000	n/a	1.00	0.41
55	15	4.47	129.65	130.99	1.25	0.90	3.64	0.21	131.20	0.409	70.000	135.25	136.11 j	0.86**	0.90	4.99	0.39	136.49	0.617	0.513	n/a	1.00	0.39
56	12	1.38	129.65	131.09	1.00	0.39	1.76	0.05	131.14	0.128	70.000	135.25	135.75 j	0.50**	0.39	3.54	0.20	135.94	0.524	0.326	n/a	1.00	0.20
57	24	7.10	120.08	121.91	1.83	1.46	2.36	0.37	122.28	0.000	114.721	121.23	122.17 j	0.95**	1.46	4.86	0.37	122.54	0.000	0.000	n/a	1.00	0.37

Project File: New.stm | Number of lines: 57 | Run Date: 5/12/2020

Notes: ; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Network A6-2

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



Project File: New.stm	Number of lines: 32	Date: 5/12/2020

Network B1-2

Storm Sewers v2018.30

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	PIPE-184	10.88	30	Cir	56.816	129.00	129.37	0.650	133.55*	133.58*	0.08	133.66	End	Manhole
2	PIPE-183	4.41	12	Cir	273.471	129.37	140.31	4.000	133.66	141.19	n/a	141.19 j	1	Combination
3	PIPE-142	2.55	12	Cir	40.000	140.31	141.91	4.000	141.19	142.59	n/a	142.59 j	2	Combination
4	PIPE-179	71.51	60	Cir	87.167	128.00	128.87	1.000	133.55	133.59	0.21	133.81	End	Manhole
5	PIPE-178	67.31	60	Cir	136.001	128.87	129.76	0.650	133.81	132.07	n/a	132.07	4	Grate
6	PIPE-177	57.48	60	Cir	146.299	129.76	130.71	0.650	132.07	132.84	n/a	132.84 j	5	Grate
7	PIPE-176	53.85	60	Cir	116.051	130.71	131.46	0.650	132.84	133.52	n/a	133.52	6	Grate
8	PIPE-182	13.89	30	Cir	82.710	131.46	136.01	5.500	133.52	137.26	n/a	137.26 j	7	Manhole
9	PIPE-120	11.28	30	Cir	106.785	136.01	136.70	0.650	137.26	137.83	n/a	137.83 j	8	Manhole
10	PIPE-119	6.33	24	Cir	99.527	136.70	137.35	0.650	137.83	138.24	n/a	138.24 j	9	Manhole
11	PIPE-118	6.35	12	Cir	42.001	137.35	139.60	5.362	138.24	140.57	n/a	140.57	10	Combination
12	PIPE-122	5.14	12	Cir	41.842	136.70	139.60	6.929	137.83	140.53	n/a	140.53 j	9	Combination
13	PIPE-175	37.49	48	Cir	116.739	131.46	132.22	0.650	133.52	134.04	n/a	134.04 j	7	Grate
14	PIPE-174	30.12	42	Cir	152.046	132.22	133.21	0.650	134.04	134.90	n/a	134.90 j	13	Grate
15	PIPE-198	14.90	30	Cir	144.796	133.21	134.66	1.000	134.90	135.96	n/a	135.96 j	14	Manhole
16	PIPE-197	11.64	30	Cir	100.000	134.66	135.66	1.000	135.96	136.80	n/a	136.80 j	15	Manhole
17	PIPE-196	6.48	24	Cir	100.000	135.66	136.66	1.000	136.80	137.56	n/a	137.56 j	16	Manhole
18	PIPE-114	6.51	12	Cir	70.000	136.66	139.60	4.210	137.56	140.57	n/a	140.57	17	Combination
19	PIPE-123	2.85	12	Cir	42.001	136.01	139.60	8.555	137.26	140.33	n/a	140.33 j	8	Combination
20	PIPE-113	5.37	12	Cir	70.000	135.66	139.60	5.639	136.80	140.54	n/a	140.54 j	16	Combination
21	PIPE-106	3.52	12	Cir	70.000	134.66	139.60	7.067	135.96	140.40	n/a	140.40 j	15	Combination
22	PIPE-188	5.69	18	Cir	158.885	128.87	134.43	3.500	133.81	135.35	n/a	135.35 j	4	Combination
23	PIPE-187	2.28	12	Cir	40.000	134.43	135.83	3.500	135.35	136.48	n/a	136.48 j	22	Combination
24	PIPE-173	12.00	30	Cir	132.848	133.21	134.07	0.650	134.90	135.23	n/a	135.23 j	14	Manhole

Project File: New.stm | Number of lines: 32 | Run Date: 5/12/2020

NOTES: Return period = 25 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

Network B1-2

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
25	PIPE-172	4.78	18	Cir	99.650	134.07	134.72	0.650	135.23	135.56	n/a	135.56 j	24	Grate
26	PIPE-180	4.45	18	Cir	158.943	132.22	133.81	1.000	134.04	134.62	n/a	134.62 j	13	Combination
27	PIPE-138	1.91	12	Cir	40.000	133.81	134.21	1.000	134.62	134.80	n/a	134.80 j	26	Combination
28	PIPE-186	7.44	24	Cir	229.590	129.37	130.86	0.650	133.66*	133.87*	0.13	134.00	1	Combination
29	PIPE-213	1.83	12	Cir	285.032	130.86	132.71	0.650	134.00*	134.64*	0.13	134.77	28	Combination
30	PIPE-212	0.92	12	Cir	39.922	132.71	133.11	1.000	134.77*	134.79*	0.02	134.82	29	Combination
31	PIPE-185	3.06	15	Cir	40.000	130.86	131.26	1.000	134.00*	134.08*	0.10	134.18	28	Combination
32	PIPE-181	6.01	15	Cir	135.000	129.76	130.63	0.650	132.07*	133.06*	0.37	133.44	5	Grate

Project File: New.stm | Number of lines: 32 | Run Date: 5/12/2020

NOTES: Return period = 25 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	56.816	0.00	2.12	0.00	0.00	1.53	0.0	9.2	7.1	10.88	35.82	2.22	30	0.65	129.00	129.37	133.55	133.58	131.83	140.00	PIPE-184
2	1	273.471	0.29	0.87	0.79	0.23	0.54	5.0	5.2	8.2	4.41	7.72	5.82	12	4.00	129.37	140.31	133.66	141.19	140.00	144.93	PIPE-183
3	2	40.000	0.58	0.58	0.53	0.31	0.31	5.0	5.0	8.2	2.55	7.72	3.98	12	4.00	140.31	141.91	141.19	142.59	144.93	145.07	PIPE-142
4	End	87.167	0.00	11.95	0.00	0.00	9.70	0.0	8.1	7.4	71.51	282.2	3.68	60	1.00	128.00	128.87	133.55	133.59	133.38	141.19	PIPE-179
5	4	136.001	0.79	10.84	0.86	0.68	9.00	5.0	7.7	7.5	67.31	227.5	5.51	60	0.65	128.87	129.76	133.81	132.07	141.19	140.33	PIPE-178
6	5	146.299	0.66	9.07	0.83	0.55	7.59	5.0	7.4	7.6	57.48	227.5	6.84	60	0.65	129.76	130.71	132.07	132.84	140.33	140.15	PIPE-177
7	6	116.051	0.54	8.41	0.84	0.45	7.04	5.0	7.1	7.6	53.85	227.5	6.91	60	0.65	130.71	131.46	132.84	133.52	140.15	140.15	PIPE-176
8	7	82.710	0.00	1.93	0.00	0.00	1.74	0.0	5.9	8.0	13.89	104.2	4.43	30	5.50	131.46	136.01	133.52	137.26	140.15	142.01	PIPE-182
9	8	106.785	0.00	1.55	0.00	0.00	1.39	0.0	5.5	8.1	11.28	35.82	4.93	30	0.65	136.01	136.70	137.26	137.83	142.01	141.59	PIPE-120
10	9	99.527	0.00	0.86	0.00	0.00	0.77	0.0	5.1	8.2	6.33	19.75	4.08	24	0.65	136.70	137.35	137.83	138.24	141.59	141.53	PIPE-119
11	10	42.001	0.86	0.86	0.90	0.77	0.77	5.0	5.0	8.2	6.35	8.93	8.39	12	5.36	137.35	139.60	138.24	140.57	141.53	142.75	PIPE-118
12	9	41.842	0.69	0.69	0.90	0.62	0.62	5.0	5.0	8.2	5.14	10.16	6.66	12	6.93	136.70	139.60	137.83	140.53	141.59	142.75	PIPE-122
13	7	116.739	0.55	5.93	0.84	0.47	4.85	5.0	6.8	7.7	37.49	125.5	6.24	48	0.65	131.46	132.22	133.52	134.04	140.15	140.14	PIPE-175
14	13	152.046	0.60	4.57	0.83	0.50	3.84	5.0	6.4	7.8	30.12	87.87	6.24	42	0.65	132.22	133.21	134.04	134.90	140.14	139.71	PIPE-174
15	14	144.796	0.00	2.07	0.00	0.00	1.87	0.0	5.9	8.0	14.90	44.43	4.99	30	1.00	133.21	134.66	134.90	135.96	139.71	142.50	PIPE-198
16	15	100.000	0.00	1.60	0.00	0.00	1.44	0.0	5.5	8.1	11.64	44.43	4.92	30	1.00	134.66	135.66	135.96	136.80	142.50	141.20	PIPE-197
17	16	100.000	0.00	0.88	0.00	0.00	0.79	0.0	5.1	8.2	6.48	24.50	4.11	24	1.00	135.66	136.66	136.80	137.56	141.20	141.72	PIPE-196
18	17	70.000	0.88	0.88	0.90	0.79	0.79	5.0	5.0	8.2	6.51	7.92	8.56	12	4.21	136.66	139.60	137.56	140.57	141.72	142.75	PIPE-114
19	8	42.001	0.38	0.38	0.90	0.35	0.35	5.0	5.0	8.2	2.85	11.28	4.16	12	8.55	136.01	139.60	137.26	140.33	142.01	142.75	PIPE-123
20	16	70.000	0.72	0.72	0.90	0.65	0.65	5.0	5.0	8.2	5.37	9.16	6.93	12	5.64	135.66	139.60	136.80	140.54	141.20	142.75	PIPE-113
21	15	70.000	0.47	0.47	0.90	0.43	0.43	5.0	5.0	8.2	3.52	10.26	4.85	12	7.07	134.66	139.60	135.96	140.40	142.50	142.75	PIPE-106
22	4	158.885	0.76	1.11	0.55	0.42	0.69	5.0	5.2	8.2	5.69	21.28	4.12	18	3.50	128.87	134.43	133.81	135.35	141.19	139.21	PIPE-188

Project File: New.stm | Number of lines: 32 | Run Date: 5/12/2020

NOTES:Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period =Yrs. 25 ; c = cir e = ellip b = box

Network B1-2

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
23	22	40.000	0.35	0.35	0.79	0.28	0.28	5.0	5.0	8.2	2.28	7.22	3.63	12	3.50	134.43	135.83	135.35	136.48	139.21	139.24	PIPE-187
24	14	132.848	1.17	1.90	0.77	0.90	1.48	5.0	5.4	8.1	12.00	35.82	4.38	30	0.65	133.21	134.07	134.90	135.23	139.71	138.95	PIPE-173
25	24	99.650	0.73	0.73	0.79	0.58	0.58	5.0	5.0	8.2	4.78	9.17	3.98	18	0.65	134.07	134.72	135.23	135.56	138.95	139.05	PIPE-172
26	13	158.943	0.51	0.81	0.61	0.31	0.54	5.0	5.2	8.2	4.45	11.38	3.55	18	1.00	132.22	133.81	134.04	134.62	140.14	138.60	PIPE-180
27	26	40.000	0.29	0.29	0.79	0.23	0.23	5.0	5.0	8.2	1.91	3.86	3.38	12	1.00	133.81	134.21	134.62	134.80	138.60	138.60	PIPE-138
28	1	229.590	0.48	1.24	0.81	0.39	0.99	5.0	7.6	7.5	7.44	19.75	2.37	24	0.65	129.37	130.86	133.66	133.87	140.00	134.80	PIPE-186
29	28	285.032	0.15	0.29	0.79	0.11	0.23	5.0	5.6	8.1	1.83	3.11	2.33	12	0.65	130.86	132.71	134.00	134.64	134.80	137.67	PIPE-213
30	29	39.922	0.14	0.14	0.78	0.11	0.11	5.0	5.0	8.2	0.92	3.86	1.18	12	1.00	132.71	133.11	134.77	134.79	137.67	138.00	PIPE-212
31	28	40.000	0.47	0.47	0.79	0.37	0.37	5.0	5.0	8.2	3.06	7.00	2.50	15	1.00	130.86	131.26	134.00	134.08	134.80	134.80	PIPE-185
32	5	135.000	0.98	0.98	0.74	0.73	0.73	5.0	5.0	8.2	6.01	5.64	4.90	15	0.65	129.76	130.63	132.07	133.06	140.33	141.57	PIPE-181

Project File: New.stm | Number of lines: 32 | Run Date: 5/12/2020

NOTES:Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period =Yrs. 25 ; c = cir e = ellip b = box

Storm Sewer Inlet Time Tabulation

Line No.	Line ID	Tc Method	Sheet Flow n-Value	Sheet Flow flow Length (ft)	Sheet Flow 2-yr 24h P (in)	Sheet Flow Land Slope (%)	Sheet Flow Travel Time (min)	Shallow Concentrated Flow flow Length (ft)	Shallow Concentrated Flow Water Slope (%)	Shallow Concentrated Flow Surf Descr	Shallow Concentrated Flow Ave Vel (ft/s)	Shallow Concentrated Flow Travel Time (min)	Channel Flow X-sec Area (sqft)	Channel Flow Wetted Perim (ft)	Channel Flow Chan Slope (%)	Channel Flow n-Value	Channel Flow Vel	Channel Flow flow Length (ft)	Channel Flow Travel Time (min)	Total Travel Time (min)
1	PIPE-184	User																		0.00
2	PIPE-183	User																		5.00
3	PIPE-142	User																		5.00
4	PIPE-179	User																		0.00
5	PIPE-178	User																		5.00
6	PIPE-177	User																		5.00
7	PIPE-176	User																		5.00
8	PIPE-182	User																		0.00
9	PIPE-120	User																		0.00
10	PIPE-119	User																		0.00
11	PIPE-118	User																		5.00
12	PIPE-122	User																		5.00
13	PIPE-175	User																		5.00
14	PIPE-174	User																		5.00
15	PIPE-198	User																		0.00
16	PIPE-197	User																		0.00
17	PIPE-196	User																		0.00
18	PIPE-114	User																		5.00
19	PIPE-123	User																		5.00
20	PIPE-113	User																		5.00
21	PIPE-106	User																		5.00
22	PIPE-188	User																		5.00
23	PIPE-187	User																		5.00
24	PIPE-173	User																		5.00

Project File: New.stm | Min. Tc used for intensity calculations = 5 min | Number of lines: 32 | Date: 5/12/2020

Network B1-2

Storm Sewer Inlet Time Tabulation

Line No.	Line ID	Tc Method	Sheet Flow n-Value	Sheet Flow flow Length (ft)	Sheet Flow 2-yr 24h P (in)	Sheet Flow Land Slope (%)	Sheet Flow Travel Time (min)	Shallow Concentrated Flow flow Length (ft)	Shallow Concentrated Flow Water Slope (%)	Shallow Concentrated Flow Surf Descr	Shallow Concentrated Flow Ave Vel (ft/s)	Shallow Concentrated Flow Travel Time (min)	Channel Flow X-sec Area (sqft)	Channel Flow Wetted Perim (ft)	Channel Flow Chan Slope (%)	Channel Flow n-Value	Channel Flow Vel	Channel Flow flow Length (ft)	Channel Flow Travel Time (min)	Total Travel Time (min)
25	PIPE-172	User																		5.00
26	PIPE-180	User																		5.00
27	PIPE-138	User																		5.00
28	PIPE-186	User																		5.00
29	PIPE-213	User																		5.00
30	PIPE-212	User																		5.00
31	PIPE-185	User																		5.00
32	PIPE-181	User																		5.00

Project File: New.stm | Min. Tc used for intensity calculations = 5 min | Number of lines: 32 | Date: 5/12/2020

Network B1-2

Hydraulic Grade Line Computations

Line	Size (in)	Q (cfs)	Downstream Invert elev (ft)	Downstream HGL elev (ft)	Downstream Depth (ft)	Downstream Area (sqft)	Downstream Vel (ft/s)	Downstream Vel head (ft)	Downstream EGL elev (ft)	Downstream Sf (%)	Len (ft)	Upstream Invert elev (ft)	Upstream HGL elev (ft)	Upstream Depth (ft)	Upstream Area (sqft)	Upstream Vel (ft/s)	Upstream Vel head (ft)	Upstream EGL elev (ft)	Upstream Sf (%)	Check Ave Sf (%)	Check Enrgy loss (ft)	JL coeff (K)	Minor loss (ft)
1	30	10.88	129.00	133.55	2.50	4.91	2.22	0.08	133.63	0.060	56.816	129.37	133.58	2.50	4.91	2.22	0.08	133.66	0.060	0.060	0.034	1.00	0.08
2	12	4.41	129.37	133.66	1.00	0.73	5.61	0.49	134.15	1.306	273.471	140.31	141.19 j	0.88**	0.73	6.03	0.56	141.75	1.176	1.241	n/a	1.50	0.85
3	12	2.55	140.31	141.19	0.88	0.57	3.49	0.31	141.50	0.000	40.000	141.91	142.59 j	0.68**	0.57	4.46	0.31	142.90	0.000	0.000	n/a	1.00	0.31
4	60	71.51	128.00	133.55	5.00	19.63	3.64	0.21	133.76	0.064	87.167	128.87	133.59	4.72	19.20	3.72	0.22	133.81	0.056	0.060	0.052	0.99	0.21
5	60	67.31	128.87	133.81	4.93	8.88	3.44	0.89	134.70	0.000	136.001	129.76	132.07	2.31**	8.88	7.58	0.89	132.96	0.000	0.000	n/a	1.50	n/a
6	60	57.48	129.76	132.07	2.31	7.97	6.47	0.81	132.88	0.000	146.299	130.71	132.84 j	2.13**	7.97	7.21	0.81	133.64	0.000	0.000	n/a	0.50	n/a
7	60	53.85	130.71	132.84	2.13	7.62	6.76	0.78	133.61	0.000	116.051	131.46	133.52	2.06**	7.62	7.07	0.78	134.30	0.000	0.000	n/a	1.46	n/a
8	30	13.89	131.46	133.52	2.06	2.46	3.21	0.49	134.01	0.000	82.710	136.01	137.26 j	1.25**	2.46	5.64	0.49	137.76	0.000	0.000	n/a	0.97	0.48
9	30	11.28	136.01	137.26	1.25	2.14	4.58	0.43	137.70	0.000	106.785	136.70	137.83 j	1.12**	2.14	5.27	0.43	138.26	0.000	0.000	n/a	1.00	n/a
10	24	6.33	136.70	137.83	1.12	1.35	3.48	0.34	138.17	0.000	99.527	137.35	138.24 j	0.89**	1.35	4.68	0.34	138.58	0.000	0.000	n/a	1.00	0.34
11	12	6.35	137.35	138.24	0.89	0.74	8.60	1.04	139.28	0.000	42.001	139.60	140.57	0.96**	0.78	8.19	1.04	141.61	0.000	0.000	n/a	1.00	n/a
12	12	5.14	136.70	137.83	1.00	0.76	6.54	0.67	138.49	1.774	41.842	139.60	140.53 j	0.92**	0.76	6.78	0.71	141.24	1.537	1.655	n/a	1.00	n/a
13	48	37.49	131.46	133.52	2.06	5.58	5.75	0.70	134.22	0.000	116.739	132.22	134.04 j	1.82**	5.58	6.72	0.70	134.75	0.000	0.000	n/a	1.16	0.81
14	42	30.12	132.22	134.04	1.82	4.62	5.94	0.66	134.71	0.000	152.046	133.21	134.90 j	1.69**	4.62	6.53	0.66	135.56	0.000	0.000	n/a	1.49	0.99
15	30	14.90	133.21	134.90	1.69	2.58	4.21	0.52	135.42	0.000	144.796	134.66	135.96 j	1.30**	2.58	5.77	0.52	136.47	0.000	0.000	n/a	1.00	n/a
16	30	11.64	134.66	135.96	1.30	2.19	4.51	0.44	136.40	0.000	100.000	135.66	136.80 j	1.14**	2.19	5.32	0.44	137.24	0.000	0.000	n/a	1.00	0.44
17	24	6.48	135.66	136.80	1.14	1.37	3.49	0.35	137.15	0.000	100.000	136.66	137.56 j	0.90**	1.37	4.72	0.35	137.90	0.000	0.000	n/a	1.00	n/a
18	12	6.51	136.66	137.56	0.90	0.75	8.74	1.09	138.65	0.000	70.000	139.60	140.57	0.97**	0.78	8.38	1.09	141.66	0.000	0.000	n/a	1.00	n/a
19	12	2.85	136.01	137.26	1.00	0.61	3.63	0.21	137.47	0.547	42.001	139.60	140.33 j	0.72**	0.61	4.69	0.34	140.67	0.717	0.632	n/a	1.00	n/a
20	12	5.37	135.66	136.80	1.00	0.76	6.84	0.73	137.53	1.936	70.000	139.60	140.54 j	0.93**	0.76	7.03	0.77	141.31	1.673	1.805	n/a	1.00	n/a
21	12	3.52	134.66	135.96	1.00	0.67	4.48	0.31	136.27	0.831	70.000	139.60	140.40 j	0.80**	0.67	5.22	0.42	140.83	0.868	0.850	n/a	1.00	n/a
22	18	5.69	128.87	133.81	1.50	1.14	3.22	0.16	133.97	0.250	158.885	134.43	135.35 j	0.92**	1.14	5.01	0.39	135.74	0.519	0.385	n/a	1.50	0.59

Project File: New.stm | Number of lines: 32 | Run Date: 5/12/2020

Notes: ; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Network B1-2

Hydraulic Grade Line Computations

Line	Size (in)	Q (cfs)	Downstream Invert elev (ft)	Downstream HGL elev (ft)	Downstream Depth (ft)	Downstream Area (sqft)	Downstream Vel (ft/s)	Downstream Vel head (ft)	Downstream EGL elev (ft)	Downstream Sf (%)	Len (ft)	Upstream Invert elev (ft)	Upstream HGL elev (ft)	Upstream Depth (ft)	Upstream Area (sqft)	Upstream Vel (ft/s)	Upstream Vel head (ft)	Upstream EGL elev (ft)	Upstream Sf (%)	Check Ave Sf (%)	Check Enrgy loss (ft)	JL coeff (K)	Minor loss (ft)
23	12	2.28	134.43	135.35	0.92	0.54	3.01	0.28	135.63	0.000	40.000	135.83	136.48 j	0.64**	0.54	4.25	0.28	136.76	0.000	0.000	n/a	1.00	0.28
24	30	12.00	133.21	134.90	1.69	2.23	3.39	0.45	135.35	0.000	132.848	134.07	135.23 j	1.16**	2.23	5.38	0.45	135.68	0.000	0.000	n/a	0.15	0.07
25	18	4.78	134.07	135.23	1.16	1.02	3.26	0.34	135.58	0.000	99.650	134.72	135.56 j	0.84**	1.02	4.70	0.34	135.90	0.000	0.000	n/a	1.00	0.34
26	18	4.45	132.22	134.04	1.50	0.97	2.52	0.10	134.14	0.153	158.943	133.81	134.62 j	0.81**	0.97	4.58	0.33	134.94	0.476	0.315	n/a	1.09	n/a
27	12	1.91	133.81	134.62	0.81	0.48	2.80	0.24	134.86	0.000	40.000	134.21	134.80 j	0.59**	0.48	3.97	0.24	135.04	0.000	0.000	n/a	1.00	0.24
28	24	7.44	129.37	133.66	2.00	3.14	2.37	0.09	133.75	0.092	229.590	130.86	133.87	2.00	3.14	2.37	0.09	133.96	0.092	0.092	0.212	1.50	0.13
29	12	1.83	130.86	134.00	1.00	0.79	2.33	0.08	134.09	0.225	285.032	132.71	134.64	1.00	0.79	2.33	0.08	134.73	0.225	0.225	0.641	1.50	0.13
30	12	0.92	132.71	134.77	1.00	0.79	1.18	0.02	134.79	0.057	39.922	133.11	134.79	1.00	0.79	1.18	0.02	134.82	0.057	0.057	0.023	1.00	0.02
31	15	3.06	130.86	134.00	1.25	1.23	2.50	0.10	134.10	0.192	40.000	131.26	134.08	1.25	1.23	2.50	0.10	134.18	0.192	0.192	0.077	1.00	0.10
32	15	6.01	129.76	132.07	1.25	1.23	4.90	0.37	132.44	0.738	135.000	130.63	133.06	1.25	1.23	4.90	0.37	133.44	0.738	0.738	0.996	1.00	0.37

Project File: New.stm | Number of lines: 32 | Run Date: 5/12/2020

Notes: ; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Network B1-2

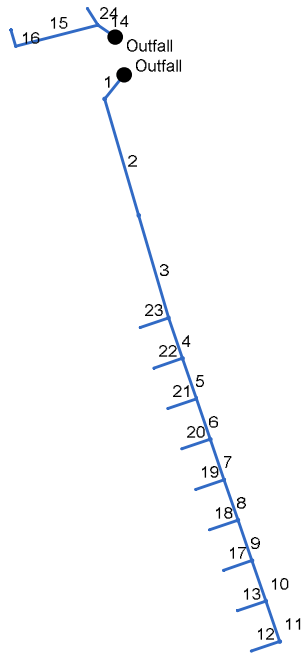
Project	HUDSON LOGISTICS CENTER	By	CLR	Date	5/21/2020
Location	LOWELL ROAD	Checked	TDO	Date	5/21/2020
Circle one:	Present (Developed)	Job No.	151010101		

1. Rational 'C' Runoff Coefficient & Area Calculations

Catchment Area	Total Area		Impervious (C=.9)		Pervious (C=0.3)		Percent Impervious	C
	SF	AC	SF	AC	SF	AC		
A1-4 CCB-1	22,773	0.523	17,119	0.393	5,654	0.130	75%	0.75
A1-4 CCB-2	7,722	0.177	6,064	0.139	1,658	0.038	79%	0.77
A1-4 CCB-3	29,062	0.667	6,172	0.142	22,890	0.525	21%	0.43
A1-4 DOUBLE CCB-4	34,672	0.796	12,813	0.294	21,859	0.502	37%	0.52
A1-4 RL-1	72,987	1.676	72,987	1.676	0	0.000	100%	0.90
A1-4 RL-2	68,405	1.570	68,405	1.570	0	0.000	100%	0.90
A1-4 RL-3	31,499	0.723	31,499	0.723	0	0.000	100%	0.90
A1-4 RL-4	31,499	0.723	31,499	0.723	0	0.000	100%	0.90
A1-4 RL-5	31,499	0.723	31,499	0.723	0	0.000	100%	0.90
A1-4 RL-6	31,499	0.723	31,499	0.723	0	0.000	100%	0.90
A1-4 RL-7	31,499	0.723	31,499	0.723	0	0.000	100%	0.90
A1-4 RL-8	31,499	0.723	31,499	0.723	0	0.000	100%	0.90
A1-4 RL-9	23,239	0.533	23,239	0.533	0	0.000	100%	0.90
A11-2 DOUBLE CCB-1	46,514	1.068	42,654	0.979	3,860	0.089	92%	0.85
A11-2 CCB-2	32,402	0.744	31,576	0.725	826	0.019	97%	0.88
A11-2 CCB-3	32,999	0.758	31,799	0.730	1,200	0.028	96%	0.88
A11-2 CCB-4	32,999	0.758	31,799	0.730	1,200	0.028	96%	0.88
A11-2 DOUBLE CCB-5	47,121	1.082	42,917	0.985	4,204	0.097	91%	0.85
A11-2 CCB-6	18,438	0.423	15,593	0.358	2,845	0.065	85%	0.81
A11-2 DOUBLE CCB-7	42,082	0.966	16,470	0.378	25,612	0.588	39%	0.53
A11-2 CCB-8	43,324	0.995	31,771	0.729	11,553	0.265	73%	0.74
A11-2 CLCB-9	41,711	0.958	30,671	0.704	11,040	0.253	74%	0.74
A11-2 CLCB-10	41,193	0.946	31,368	0.720	9,825	0.226	76%	0.76
A11-2 CLCB-11	43,879	1.007	33,560	0.770	10,319	0.237	76%	0.76
A11-2 CLCB-12	34,690	0.796	27,330	0.627	7,360	0.169	79%	0.77
A11-2 CCB-13	23,737	0.545	17,128	0.393	6,609	0.152	72%	0.73
A11-2 CCB-14	36,267	0.833	11,009	0.253	25,258	0.580	30%	0.48
A11-2 CCB-15	33,531	0.770	13,193	0.303	20,338	0.467	39%	0.54
A11-2 CCB-16	42,598	0.978	41,998	0.964	600	0.014	99%	0.89
A11-2 CCB-17	42,599	0.978	41,999	0.964	600	0.014	99%	0.89
A11-2 CCB-18	42,599	0.978	41,999	0.964	600	0.014	99%	0.89
A11-2 CCB-19	42,235	0.970	41,635	0.956	600	0.014	99%	0.89
A11-2 CCB-20	43,025	0.988	35,512	0.815	7,513	0.172	83%	0.80
A11-2 CCB-21	44,195	1.015	35,022	0.804	9,173	0.211	79%	0.78
A11-2 DOUBLE CCB-22	57,689	1.324	37,266	0.856	20,423	0.469	65%	0.69
A11-2 CCB-23	31,617	0.726	14,519	0.333	17,098	0.393	46%	0.58
A11-2 CCB-24	36,070	0.828	11,009	0.253	25,061	0.575	31%	0.48
A11-2 CLCB-25	32,030	0.735	4,274	0.098	27,756	0.637	13%	0.38
A11-2 CLCB-26	32,817	0.753	4,406	0.101	28,411	0.652	13%	0.38
A11-2 RL-1	31,499	0.723	31,499	0.723	0	0.000	100%	0.90
A11-2 RL-2	31,499	0.723	31,499	0.723	0	0.000	100%	0.90
A11-2 RL-3	31,499	0.723	31,499	0.723	0	0.000	100%	0.90
A11-2 RL-4	82,305	1.889	82,305	1.889	0	0.000	100%	0.90
A11-2 RL-5	22,864	0.525	22,864	0.525	0	0.000	100%	0.90
A11-2 RL-6	46,773	1.074	46,773	1.074	0	0.000	100%	0.90
A11-2 RL-7	46,770	1.074	46,770	1.074	0	0.000	100%	0.90
A11-2 RL-8	53,796	1.235	53,796	1.235	0	0.000	100%	0.90
A11-2 RL-9	22,881	0.525	22,881	0.525	0	0.000	100%	0.90
A11-2 RL-10	26,269	0.603	26,269	0.603	0	0.000	100%	0.90
A11-2 RL-11	31,499	0.723	31,499	0.723	0	0.000	100%	0.90
A11-2 RL-12	31,499	0.723	31,499	0.723	0	0.000	100%	0.90
A11-2 RL-13	31,499	0.723	31,499	0.723	0	0.000	100%	0.90

A11-2 RL-14	31,499	0.723	31,499	0.723	0	0.000	100%	0.90
A11-2 RL-15	31,499	0.723	31,499	0.723	0	0.000	100%	0.90
A11-2 RL-16	31,499	0.723	31,499	0.723	0	0.000	100%	0.90
A11-2 RL-17	31,499	0.723	31,499	0.723	0	0.000	100%	0.90
A11-2 RL-18	31,499	0.723	31,499	0.723	0	0.000	100%	0.90
A11-3 CLCB-1	35,014	0.804	3,530	0.081	31,484	0.723	10%	0.36
A11-3 CLCB-2	35,593	0.817	2,751	0.063	32,842	0.754	8%	0.35
A11-3 CLCB-3	37,813	0.868	4,196	0.096	33,617	0.772	11%	0.37
A1-4 RL-1	35,755	0.821	35,755	0.821	0	0.000	100%	0.90
A1-4 RL-2	20,012	0.459	20,012	0.459	0	0.000	100%	0.90
A1-4 RL-3	20,012	0.459	20,012	0.459	0	0.000	100%	0.90
A1-4 RL-4	20,012	0.459	20,012	0.459	0	0.000	100%	0.90
A1-4 RL-5	20,012	0.459	20,012	0.459	0	0.000	100%	0.90
A1-4 RL-6	20,012	0.459	20,012	0.459	0	0.000	100%	0.90
A1-4 RL-7	20,012	0.459	20,012	0.459	0	0.000	100%	0.90
A1-4 RL-8	20,012	0.459	20,012	0.459	0	0.000	100%	0.90
A1-4 RL-9	20,012	0.459	20,012	0.459	0	0.000	100%	0.90
A1-4 RL-10	20,012	0.459	20,012	0.459	0	0.000	100%	0.90
A1-4 RL-11	13,274	0.305	13,274	0.305	0	0.000	100%	0.90
A1-5 CCB-1	13,249	0.304	6,807	0.156	6,442	0.148	51%	0.61
A1-5 CCB-2	36,477	0.837	9,805	0.225	26,672	0.612	27%	0.46
A1-5 CCB-3	19,875	0.456	15,896	0.365	3,979	0.091	80%	0.78
A1-5 CCB-4	33,711	0.774	26,423	0.607	7,288	0.167	78%	0.77
A1-5 CCB-5	24,810	0.570	21,269	0.488	3,541	0.081	86%	0.81
A1-5 CCB-6	30,713	0.705	26,050	0.598	4,663	0.107	85%	0.81
A1-5 CCB-7	28,079	0.645	22,449	0.515	5,630	0.129	80%	0.78
A1-5 CCB-8	25,881	0.594	13,040	0.299	12,841	0.295	50%	0.60
A1-5 CCB-9	4,084	0.094	3,298	0.076	786	0.018	81%	0.78
A1-5 CCB-10	13,420	0.308	10,936	0.251	2,484	0.057	81%	0.79
A1-5 CCB-11	19,123	0.439	15,539	0.357	3,584	0.082	81%	0.79
A1-5 RL-1	14,008	0.322	14,008	0.322	0	0.000	100%	0.90
A1-5 RL-2	20,012	0.459	20,012	0.459	0	0.000	100%	0.90
A1-5 RL-3	20,012	0.459	20,012	0.459	0	0.000	100%	0.90
A1-5 RL-4	20,012	0.459	20,012	0.459	0	0.000	100%	0.90
A1-5 RL-5	20,012	0.459	20,012	0.459	0	0.000	100%	0.90
A1-5 RL-6	24,614	0.565	24,614	0.565	0	0.000	100%	0.90
A1-5 RL-7	24,614	0.565	24,614	0.565	0	0.000	100%	0.90
A1-5 RL-8	20,012	0.459	20,012	0.459	0	0.000	100%	0.90
A1-5 RL-9	20,012	0.459	20,012	0.459	0	0.000	100%	0.90
A1-5 RL-10	33,286	0.764	33,286	0.764	0	0.000	100%	0.90
A1-5 RL-11	8,198	0.188	8,198	0.188	0	0.000	100%	0.90
A1-5 RL-12	4,338	0.100	4,338	0.100	0	0.000	100%	0.90
B6-2 CCB-1	35,902	0.824	19,616	0.450	16,286	0.374	55%	0.63
B6-2 CCB-2	8,550	0.196	7,486	0.172	1,064	0.024	88%	0.83
B6-2 CCB-3	1,378	0.032	1,068	0.025	310	0.007	78%	0.77
B6-2 CCB-4	2,048	0.047	1,660	0.038	388	0.009	81%	0.79
B6-2 CCB-5	5,734	0.132	3,098	0.071	2,636	0.061	54%	0.62
B6-2 CCB-6	9,930	0.228	5,377	0.123	4,553	0.105	54%	0.62
B6-3 CCB-1	38,471	0.883	31,417	0.721	7,054	0.162	82%	0.79
B6-3 CCB-2	38,736	0.889	37,725	0.866	1,011	0.023	97%	0.88
B6-3 CCB-3	38,850	0.892	37,796	0.868	1,054	0.024	97%	0.88
B6-3 CCB-4	38,943	0.894	37,837	0.869	1,106	0.025	97%	0.88
B6-4 CCB-1	7,743	0.178	4,585	0.105	3,158	0.072	59%	0.66
B6-4 DOUBLE CCB-2	65,797	1.510	43,403	0.996	22,394	0.514	66%	0.70
B6-4 DOUBLE CCB-3	52,153	1.197	38,070	0.874	14,083	0.323	73%	0.74
B6-4 CCB-4	26,941	0.618	18,869	0.433	8,072	0.185	70%	0.72
B6-4 CCB-5	21,649	0.497	7,823	0.180	13,826	0.317	36%	0.52
B6-4 CCB-6	29,587	0.679	8,725	0.200	20,862	0.479	29%	0.48
B6-4 DOUBLE CCB-7	49,229	1.130	39,093	0.897	10,136	0.233	79%	0.78
B6-4 CCB-8	38,967	0.895	37,892	0.870	1,075	0.025	97%	0.88
B6-4 CCB-9	38,816	0.891	37,769	0.867	1,047	0.024	97%	0.88
B6-4 RL-1	16,000	0.367	16,000	0.367	0	0.000	100%	0.90
B6-4 RL-2	16,000	0.367	16,000	0.367	0	0.000	100%	0.90
B6-4 RL-3	16,000	0.367	16,000	0.367	0	0.000	100%	0.90
B6-4 RL-4	16,000	0.367	16,000	0.367	0	0.000	100%	0.90

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



Project File: New.stm	Number of lines: 24	Date: 5/11/2020

Network Lot B A1-4

Storm Sewers v2018.30

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	PIPE-83	50.42	48	Cir	72.399	132.25	132.61	0.500	137.99*	138.07*	0.21	138.28	End	Manhole
2	PIPE-82 (1)	52.26	48	Cir	283.525	132.61	134.03	0.500	138.28*	138.60*	0.04	138.64	1	Manhole
3	PIPE-82	53.90	48	Cir	250.000	134.03	135.28	0.500	138.64	138.89	0.32	139.21	2	Manhole
4	PIPE-81	43.24	48	Cir	100.000	135.28	135.78	0.500	139.21	137.74	0.77	137.74	3	Manhole
5	PIPE-80	32.99	42	Cir	100.000	135.78	136.28	0.500	137.74	138.06	n/a	138.06 j	4	Manhole
6	PIPE-79	28.36	42	Cir	100.000	136.28	136.78	0.500	138.06	138.42	n/a	138.42 j	5	Manhole
7	PIPE-78	23.64	36	Cir	100.000	136.78	137.28	0.500	138.42	138.84	n/a	138.84 j	6	Manhole
8	PIPE-77	18.85	36	Cir	100.000	137.28	137.78	0.500	138.84	139.18	0.53	139.71	7	Manhole
9	PIPE-76	14.02	30	Cir	100.000	137.78	138.28	0.500	139.71	139.84	0.29	140.14	8	Manhole
10	PIPE-75	9.07	24	Cir	100.000	138.28	138.78	0.500	140.14	140.30	0.20	140.49	9	Manhole
11	PIPE-103	3.93	15	Cir	100.000	138.78	139.28	0.500	140.49*	140.81*	0.16	140.97	10	Manhole
12	PIPE-102	3.96	12	Cir	70.000	139.28	139.63	0.500	140.97*	141.70*	0.40	142.10	11	Combination
13	PIPE-85	5.37	15	Cir	70.000	138.78	139.63	1.214	140.49	140.87	0.30	141.17	10	Combination
14	PIPE-60	9.77	24	Cir	49.203	132.25	135.30	6.208	137.99*	138.07*	0.18	138.25	End	Combination
15	PIPE-98	3.46	12	Cir	197.752	135.31	138.57	1.650	138.25*	139.84*	0.45	140.29	14	Combination
16	PIPE-97	2.37	12	Cir	40.000	138.57	139.23	1.650	140.29*	140.44*	0.14	140.59	15	Combination
17	PIPE-86	5.37	15	Cir	70.000	138.28	139.63	1.929	140.14	140.57	n/a	140.57 j	9	Combination
18	PIPE-87	5.37	15	Cir	70.000	137.78	139.63	2.643	139.71	140.57	n/a	140.57 j	8	Combination
19	PIPE-88	5.37	15	Cir	70.000	137.28	139.63	3.357	138.84	140.57	n/a	140.57 j	7	Combination
20	PIPE-89	5.37	15	Cir	70.000	136.78	139.63	4.071	138.42	140.57	n/a	140.57 j	6	Combination
21	PIPE-90	5.37	15	Cir	70.000	136.28	139.63	4.786	138.06	140.57	n/a	140.57 j	5	Combination
22	PIPE-91	11.65	18	Cir	70.000	135.78	139.63	5.500	137.74	140.93	n/a	140.93 j	4	Combination
23	PIPE-92	12.44	24	Cir	70.000	135.28	139.63	6.214	139.21	140.90	n/a	140.90 j	3	Combination
24	PIPE-59	3.41	15	Cir	46.346	135.31	136.07	1.650	138.25*	138.36*	0.12	138.48	14	None

Project File: New.stm | Number of lines: 24 | Run Date: 5/11/2020

NOTES: Return period = 25 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	72.399	0.00	8.12	0.00	0.00	7.31	0.0	10.2	6.9	50.42	110.0	4.01	48	0.50	132.25	132.61	137.99	138.07	136.58	141.44	PIPE-83
2	1	283.525	0.00	8.12	0.00	0.00	7.31	0.0	9.1	7.2	52.26	110.0	4.16	48	0.50	132.61	134.03	138.28	138.60	141.44	142.67	PIPE-82 (1)
3	2	250.000	0.00	8.12	0.00	0.00	7.31	0.0	8.1	7.4	53.90	110.0	4.40	48	0.50	134.03	135.28	138.64	138.89	142.67	142.80	PIPE-82
4	3	100.000	0.00	6.44	0.00	0.00	5.80	0.0	7.8	7.5	43.24	110.0	5.25	48	0.50	135.28	135.78	139.21	137.74	142.80	142.80	PIPE-81
5	4	100.000	0.00	4.87	0.00	0.00	4.38	0.0	7.5	7.5	32.99	77.07	6.33	42	0.50	135.78	136.28	137.74	138.06	142.80	142.80	PIPE-80
6	5	100.000	0.00	4.15	0.00	0.00	3.73	0.0	7.3	7.6	28.36	77.07	6.09	42	0.50	136.28	136.78	138.06	138.42	142.80	142.80	PIPE-79
7	6	100.000	0.00	3.43	0.00	0.00	3.08	0.0	7.0	7.7	23.64	51.09	6.16	36	0.50	136.78	137.28	138.42	138.84	142.80	142.80	PIPE-78
8	7	100.000	0.00	2.70	0.00	0.00	2.43	0.0	6.7	7.7	18.85	40.87	5.45	36	0.50	137.28	137.78	138.84	139.18	142.80	142.80	PIPE-77
9	8	100.000	0.00	1.98	0.00	0.00	1.78	0.0	6.3	7.9	14.02	25.13	3.90	30	0.50	137.78	138.28	139.71	139.84	142.80	142.80	PIPE-76
10	9	100.000	0.00	1.26	0.00	0.00	1.13	0.0	5.8	8.0	9.07	13.86	3.26	24	0.50	138.28	138.78	140.14	140.30	142.80	142.80	PIPE-75
11	10	100.000	0.00	0.53	0.00	0.00	0.48	0.0	5.2	8.2	3.93	4.95	3.20	15	0.50	138.78	139.28	140.49	140.81	142.80	142.80	PIPE-103
12	11	70.000	0.53	0.53	0.90	0.48	0.48	5.0	5.0	8.2	3.96	2.73	5.04	12	0.50	139.28	139.63	140.97	141.70	142.80	143.50	PIPE-102
13	10	70.000	0.72	0.72	0.90	0.65	0.65	5.0	5.0	8.2	5.37	7.71	4.38	15	1.21	138.78	139.63	140.49	140.87	142.80	143.50	PIPE-85
14	End	49.203	0.52	2.16	0.75	0.39	1.23	5.0	6.0	8.0	9.77	61.05	3.11	24	6.21	132.25	135.30	137.99	138.07	134.50	140.21	PIPE-60
15	14	197.752	0.18	0.84	0.77	0.14	0.42	5.0	5.2	8.2	3.46	4.96	4.41	12	1.65	135.31	138.57	138.25	139.84	140.21	143.46	PIPE-98
16	15	40.000	0.67	0.67	0.43	0.29	0.29	5.0	5.0	8.2	2.37	4.96	3.01	12	1.65	138.57	139.23	140.29	140.44	143.46	143.46	PIPE-97
17	9	70.000	0.72	0.72	0.90	0.65	0.65	5.0	5.0	8.2	5.37	9.72	4.90	15	1.93	138.28	139.63	140.14	140.57	142.80	143.50	PIPE-86
18	8	70.000	0.72	0.72	0.90	0.65	0.65	5.0	5.0	8.2	5.37	11.37	4.90	15	2.64	137.78	139.63	139.71	140.57	142.80	143.50	PIPE-87
19	7	70.000	0.72	0.72	0.90	0.65	0.65	5.0	5.0	8.2	5.37	12.82	4.90	15	3.36	137.28	139.63	138.84	140.57	142.80	143.50	PIPE-88
20	6	70.000	0.72	0.72	0.90	0.65	0.65	5.0	5.0	8.2	5.37	14.12	4.90	15	4.07	136.78	139.63	138.42	140.57	142.80	143.50	PIPE-89
21	5	70.000	0.72	0.72	0.90	0.65	0.65	5.0	5.0	8.2	5.37	15.30	4.90	15	4.79	136.28	139.63	138.06	140.57	142.80	143.50	PIPE-90
22	4	70.000	1.57	1.57	0.90	1.41	1.41	5.0	5.0	8.2	11.65	26.68	6.88	18	5.50	135.78	139.63	137.74	140.93	142.80	143.50	PIPE-91

Project File: New.stm | Number of lines: 24 | Run Date: 5/11/2020

NOTES:Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period =Yrs. 25 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
23	3	70.000	1.68	1.68	0.90	1.51	1.51	5.0	5.0	8.2	12.44	61.08	4.94	24	6.21	135.28	139.63	139.21	140.90	142.80	143.50	PIPE-92
24	14	46.346	0.80	0.80	0.52	0.41	0.41	5.0	5.0	8.2	3.41	8.99	2.78	15	1.65	135.31	136.07	138.25	138.36	140.21	139.72	PIPE-59

Project File: New.stm | Number of lines: 24 | Run Date: 5/11/2020

NOTES:Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period =Yrs. 25 ; c = cir e = ellip b = box

Storm Sewer Inlet Time Tabulation

Line No.	Line ID	Tc Method	Sheet Flow					Shallow Concentrated Flow					Channel Flow							Total Travel Time (min)
			n-Value	flow Length (ft)	2-yr 24h P (in)	Land Slope (%)	Travel Time (min)	flow Length (ft)	Water Slope (%)	Surf Descr	Ave Vel (ft/s)	Travel Time (min)	X-sec Area (sqft)	Wetted Perim (ft)	Chan Slope (%)	n-Value	Vel	flow Length (ft)	Travel Time (min)	
1	PIPE-83	User																		0.00
2	PIPE-82 (1)	User																		0.00
3	PIPE-82	User																		0.00
4	PIPE-81	User																		0.00
5	PIPE-80	User																		0.00
6	PIPE-79	User																		0.00
7	PIPE-78	User																		0.00
8	PIPE-77	User																		0.00
9	PIPE-76	User																		0.00
10	PIPE-75	User																		0.00
11	PIPE-103	User																		0.00
12	PIPE-102	User																		5.00
13	PIPE-85	User																		5.00
14	PIPE-60	User																		5.00
15	PIPE-98	User																		5.00
16	PIPE-97	User																		5.00
17	PIPE-86	User																		5.00
18	PIPE-87	User																		5.00
19	PIPE-88	User																		5.00
20	PIPE-89	User																		5.00
21	PIPE-90	User																		5.00
22	PIPE-91	User																		5.00
23	PIPE-92	User																		5.00
24	PIPE-59	User																		5.00

Project File: New.stm | Min. Tc used for intensity calculations = 5 min | Number of lines: 24 | Date: 5/11/2020

Network Lot B A1-4

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
	(in)	(cfs)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	(ft)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)	(K)	(ft)
1	48	50.42	132.25	137.99	4.00	12.56	4.01	0.25	138.24	0.105	72.399	132.61	138.07	4.00	12.57	4.01	0.25	138.32	0.105	0.105	0.076	0.85	0.21
2	48	52.26	132.61	138.28	4.00	12.56	4.16	0.27	138.55	0.113	283.525	134.03	138.60	4.00	12.57	4.16	0.27	138.87	0.113	0.113	0.320	0.15	0.04
3	48	53.90	134.03	138.64	4.00	12.56	4.29	0.29	138.93	0.120	250.000	135.28	138.89	3.61	11.94	4.51	0.32	139.21	0.105	0.113	0.282	1.00	0.32
4	48	43.24	135.28	139.21	3.93	6.14	3.45	0.77	139.98	0.000	100.000	135.78	137.74	1.96**	6.14	7.04	0.77	138.52	0.000	0.000	n/a	1.00	0.77
5	42	32.99	135.78	137.74	1.96	4.90	5.93	0.70	138.45	0.000	100.000	136.28	138.06 j	1.78**	4.90	6.73	0.70	138.76	0.000	0.000	n/a	1.00	0.70
6	42	28.36	136.28	138.06	1.78	4.43	5.78	0.64	138.69	0.000	100.000	136.78	138.42 j	1.64**	4.43	6.40	0.64	139.06	0.000	0.000	n/a	1.00	n/a
7	36	23.64	136.78	138.42	1.64	3.73	5.97	0.63	139.05	0.000	100.000	137.28	138.84 j	1.56**	3.73	6.34	0.63	139.47	0.000	0.000	n/a	1.00	n/a
8	36	18.85	137.28	138.84	1.56	3.20	5.06	0.40	139.24	0.369	100.000	137.78	139.18	1.40**	3.23	5.84	0.53	139.71	0.543	0.456	0.456	1.00	0.53
9	30	14.02	137.78	139.71	1.93	4.06	3.45	0.19	139.89	0.176	100.000	138.28	139.84	1.56	3.23	4.34	0.29	140.14	0.305	0.240	0.240	1.00	0.29
10	24	9.07	138.28	140.14	1.86	3.04	2.98	0.14	140.27	0.185	100.000	138.78	140.30	1.52	2.56	3.54	0.20	140.49	0.250	0.218	0.218	1.00	0.20
11	15	3.93	138.78	140.49	1.25	1.23	3.20	0.16	140.65	0.315	100.000	139.28	140.81	1.25	1.23	3.20	0.16	140.97	0.315	0.315	0.315	1.00	0.16
12	12	3.96	139.28	140.97	1.00	0.79	5.04	0.40	141.36	1.054	70.000	139.63	141.70	1.00	0.79	5.04	0.40	142.10	1.054	1.054	0.738	1.00	0.40
13	15	5.37	138.78	140.49	1.25	1.23	4.37	0.30	140.79	0.589	70.000	139.63	140.87	1.24	1.23	4.38	0.30	141.17	0.555	0.572	0.400	1.00	0.30
14	24	9.77	132.25	137.99	2.00	3.14	3.11	0.15	138.14	0.159	49.203	135.30	138.07	2.00	3.14	3.11	0.15	138.22	0.159	0.159	0.078	1.19	0.18
15	12	3.46	135.31	138.25	1.00	0.79	4.41	0.30	138.55	0.806	197.752	138.57	139.84	1.00	0.79	4.41	0.30	140.14	0.806	0.806	1.593	1.50	0.45
16	12	2.37	138.57	140.29	1.00	0.79	3.01	0.14	140.44	0.376	40.000	139.23	140.44	1.00	0.79	3.01	0.14	140.59	0.376	0.376	0.150	1.00	0.14
17	15	5.37	138.28	140.14	1.25	0.99	4.37	0.30	140.43	0.589	70.000	139.63	140.57 j	0.94**	0.99	5.43	0.46	141.03	0.706	0.648	n/a	1.00	0.46
18	15	5.37	137.78	139.71	1.25	0.99	4.37	0.30	140.01	0.589	70.000	139.63	140.57 j	0.94**	0.99	5.43	0.46	141.03	0.706	0.648	n/a	1.00	0.46
19	15	5.37	137.28	138.84	1.25	0.99	4.37	0.30	139.14	0.589	70.000	139.63	140.57 j	0.94**	0.99	5.43	0.46	141.03	0.706	0.648	n/a	1.00	0.46
20	15	5.37	136.78	138.42	1.25	0.99	4.37	0.30	138.72	0.589	70.000	139.63	140.57 j	0.94**	0.99	5.43	0.46	141.03	0.706	0.648	n/a	1.00	0.46
21	15	5.37	136.28	138.06	1.25	0.99	4.37	0.30	138.35	0.589	70.000	139.63	140.57 j	0.94**	0.99	5.43	0.46	141.03	0.706	0.648	n/a	1.00	0.46
22	18	11.65	135.78	137.74	1.50	1.63	6.60	0.68	138.42	1.050	70.000	139.63	140.93 j	1.30**	1.63	7.17	0.80	141.73	0.963	1.007	n/a	1.00	0.80

Project File: New.stm | Number of lines: 24 | Run Date: 5/11/2020

Notes: ; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Network Lot B A1-4

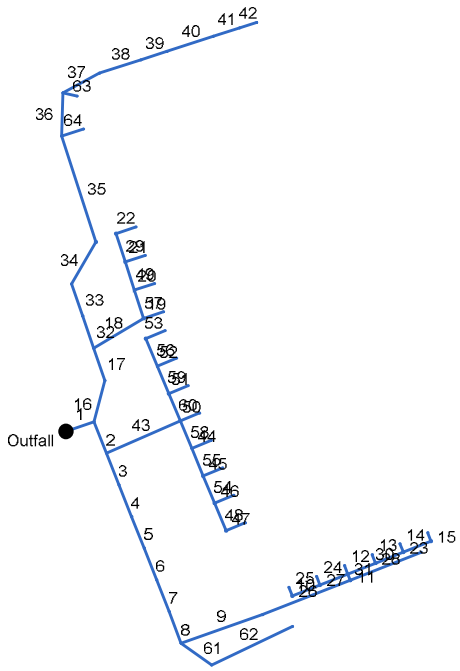
Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
	(in)	(cfs)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	(ft)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)	(K)	(ft)
23	24	12.44	135.28	139.21	2.00	2.10	3.96	0.24	139.45	0.258	70.000	139.63	140.90 j	1.27**	2.10	5.93	0.55	141.44	0.485	0.371	n/a	1.00	0.55
24	15	3.41	135.31	138.25	1.25	1.23	2.78	0.12	138.37	0.238	46.346	136.07	138.36	1.25	1.23	2.78	0.12	138.48	0.238	0.238	0.110	1.00	0.12

Project File: New.stm | Number of lines: 24 | Run Date: 5/11/2020

Notes: ; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

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



Project File: New.stm	Number of lines: 64	Date: 5/11/2020

Network A11-2

Storm Sewers v2018.30

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	PIPE-71	212.0	60	Cir	99.088	112.00	114.95	2.977	118.46	119.09	2.31	119.09	End	None
2	PIPE-70	121.3	60	Cir	112.667	114.95	117.66	2.403	119.09	120.80	n/a	120.80	1	Combination
3	PIPE-41	78.86	60	Cir	114.666	117.66	118.80	1.000	120.80	121.32	0.50	121.32	2	Combination
4	PIPE-40	73.22	60	Cir	114.666	118.81	119.95	1.000	121.32	122.37	n/a	122.37	3	Combination
5	PIPE-39	67.50	60	Cir	114.666	119.95	121.10	1.000	122.37	123.41	n/a	123.41 j	4	Combination
6	PIPE-38	61.76	60	Cir	114.666	121.10	122.25	1.000	123.41	124.46	n/a	124.46 j	5	Combination
7	PIPE-37 (1)	56.48	60	Cir	114.659	122.25	123.39	1.000	124.46	125.50	n/a	125.50 j	6	Combination
8	PIPE-37 (2)	51.09	60	Cir	113.649	123.39	124.53	1.000	125.50	126.53	n/a	126.53 j	7	None
9	PIPE-37	41.03	48	Cir	290.156	124.53	134.58	3.464	126.53	136.49	n/a	136.49 j	8	Combination
10	PIPE-108 (1)	38.88	48	Cir	315.053	134.58	137.73	1.000	136.49	139.59	n/a	139.59 j	9	Manhole
11	PIPE-113	36.03	48	Cir	22.144	137.73	137.84	0.501	139.59	139.63	n/a	139.63 j	10	Manhole
12	PIPE-112	24.45	36	Cir	100.000	137.84	138.34	0.500	139.63	139.93	n/a	139.93 j	11	Manhole
13	PIPE-111	16.88	30	Cir	100.000	138.34	138.84	0.500	139.93	140.23	n/a	140.23 j	12	Manhole
14	PIPE-110	9.15	24	Cir	100.000	138.84	139.34	0.500	140.23	140.42	n/a	140.42 j	13	Manhole
15	PIPE-109	9.17	12	Cir	30.723	139.34	139.57	0.736	140.42*	142.16*	2.12	144.27	14	Combination
16	PIPE-34	86.41	54	Cir	144.172	114.95	115.89	0.650	119.09	118.61	n/a	118.61	1	Combination
17	PIPE-33	82.36	54	Cir	114.666	115.89	116.63	0.650	118.61	119.29	2.13	119.29	16	Combination
18	PIPE-65	28.89	36	Cir	195.129	126.11	135.87	5.000	126.97	137.60	0.71	137.60	17	Manhole
19	PIPE-46 (1)	23.98	36	Cir	100.000	135.87	136.87	1.000	137.60	138.44	n/a	138.44 j	18	Manhole
20	PIPE-46 (2)	18.99	36	Cir	100.000	136.87	137.87	1.000	138.44	139.26	n/a	139.26 j	19	Manhole
21	PIPE-46	10.02	30	Cir	100.000	137.87	138.87	1.000	139.26	139.92	n/a	139.92 j	20	Manhole
22	PIPE-45	10.07	15	Cir	70.088	138.87	139.57	1.000	140.12*	141.57*	1.05	142.62	21	Combination
23	PIPE-120	7.97	12	Cir	30.723	138.84	139.57	2.363	140.23*	141.54*	1.60	143.14	13	Combination
24	PIPE-116	8.22	24	Cir	100.000	137.84	138.34	0.500	139.63	139.36	n/a	139.36	11	Manhole

Project File: New.stm | Number of lines: 64 | Run Date: 5/11/2020

NOTES: Return period = 25 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

Network A11-2

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
25	PIPE-115	4.46	18	Cir	100.000	138.34	138.84	0.500	139.36	139.65	n/a	139.65 j	24	Manhole
26	PIPE-114	4.48	12	Cir	30.723	138.84	139.57	2.363	139.65	140.45	0.58	140.45	25	Combination
27	PIPE-117	3.90	12	Cir	30.723	138.34	139.57	3.990	139.36	140.40	n/a	140.40 j	24	Combination
28	PIPE-119	7.97	12	Cir	30.723	138.34	139.57	3.990	139.93*	141.25*	1.60	142.85	12	Combination
29	PIPE-50	9.30	12	Cir	70.088	137.87	139.57	2.427	139.26*	143.34*	2.18	145.52	20	Combination
30	PIPE-108	3.28	15	Cir	255.098	137.73	140.28	1.000	139.59	141.01	n/a	141.01 j	10	Combination
31	PIPE-118	3.90	12	Cir	30.730	137.84	139.57	5.617	139.63	140.40	n/a	140.40 j	11	Combination
32	PIPE-32	51.98	54	Cir	114.666	116.63	117.38	0.650	119.29	119.46	n/a	119.46 j	17	Combination
33	PIPE-31	47.60	54	Cir	114.666	117.38	118.12	0.650	119.46	120.11	n/a	120.11	32	None
34	PIPE-30	41.48	54	Cir	163.176	118.12	119.18	0.650	120.11	121.04	n/a	121.04 j	33	Manhole
35	PIPE-29 (1)	42.52	36	Cir	373.542	119.18	121.61	0.650	121.09	123.73	1.48	123.73	34	Combination
36	PIPE-6	37.34	36	Cir	145.511	121.61	122.56	0.650	123.73	124.54	n/a	124.54 j	35	None
37	PIPE-28	30.56	30	Cir	139.261	122.56	126.92	3.135	124.54	128.81	n/a	128.81 j	36	Combination
38	PIPE-69	25.17	30	Cir	146.000	126.92	132.76	4.000	128.81	134.47	n/a	134.47 j	37	Grate
39	PIPE-68	19.76	24	Cir	92.000	132.76	135.99	3.510	134.47	137.59	n/a	137.59 j	38	Grate
40	PIPE-67	14.31	24	Cir	164.000	135.99	137.06	0.650	137.59	138.42	n/a	138.42 j	39	Grate
41	PIPE-66	8.25	24	Cir	92.000	137.06	137.66	0.650	138.42	138.68	n/a	138.68 j	40	Grate
42	PIPE-96	3.28	15	Cir	60.000	137.66	138.05	0.650	138.68	138.78	0.30	138.78	41	Combination
43	PIPE-44	40.37	48	Cir	270.067	117.66	134.66	6.296	120.80	136.56	n/a	136.56 j	2	Manhole
44	PIPE-43 (1)	20.42	36	Cir	100.000	134.66	135.31	0.650	136.56	136.76	n/a	136.76 j	43	Manhole
45	PIPE-43 (2)	15.50	36	Cir	100.000	135.31	135.96	0.650	136.76	137.22	n/a	137.22 j	44	Manhole
46	PIPE-43 (3)	10.47	30	Cir	100.000	135.96	136.61	0.650	137.22	137.69	n/a	137.69 j	45	Manhole
47	PIPE-43	5.32	24	Cir	100.000	136.61	137.26	0.650	137.69	138.07	n/a	138.07 j	46	Manhole
48	PIPE-42	5.37	15	Cir	70.088	137.26	137.72	0.650	138.24	138.69	0.43	139.12	47	Combination

Project File: New.stm | Number of lines: 64 | Run Date: 5/11/2020

NOTES: Return period = 25 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

Network A11-2

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
49	PIPE-49	5.37	15	Cir	70.000	136.87	139.57	3.859	138.44	140.51	n/a	140.51 j	19	Combination
50	PIPE-46 (1) (1) (1) (1) (1)	15.51	30	Cir	100.000	134.66	135.31	0.650	136.56	136.64	n/a	136.64 j	43	Manhole
51	PIPE-46 (1) (1) (1) (1)	10.48	30	Cir	100.000	135.31	135.96	0.650	136.64	137.04	n/a	137.04 j	50	Manhole
52	PIPE-46 (1) (1) (1)	5.33	24	Cir	100.000	135.96	136.61	0.650	137.04	137.42	n/a	137.42 j	51	Manhole
53	PIPE-52	5.37	15	Cir	70.000	136.61	139.57	4.223	137.42	140.51	0.46	140.51	52	Combination
54	PIPE-58	5.37	15	Cir	70.000	136.61	139.57	4.223	137.69	140.51	n/a	140.51 j	46	Combination
55	PIPE-57	5.37	15	Cir	70.088	135.96	139.57	5.145	137.22	140.51	n/a	140.51 j	45	Combination
56	PIPE-53	5.37	15	Cir	70.088	135.96	139.57	5.145	137.04	140.51	n/a	140.51 j	51	Combination
57	PIPE-51	5.37	12	Cir	70.088	135.87	139.57	5.281	137.60	140.50	n/a	140.50 j	18	Combination
58	PIPE-56	5.37	15	Cir	70.088	135.31	139.57	6.072	136.76	140.51	n/a	140.51 j	44	Combination
59	PIPE-54	5.37	15	Cir	70.088	135.31	139.57	6.072	136.64	140.51	n/a	140.51 j	50	Combination
60	PIPE-55	5.37	15	Cir	70.088	134.66	139.57	7.000	136.56	140.51	n/a	140.51 j	43	Combination
61	PIPE-62	4.44	12	Cir	126.287	124.53	130.84	5.000	126.53	131.73	n/a	131.73 j	8	Grate
62	PIPE-101	2.36	12	Cir	301.346	130.84	140.39	3.168	131.73	141.05	n/a	141.05 j	61	Grate
63	PIPE-61	3.43	30	Cir	48.129	122.56	124.48	4.000	124.54	125.09	n/a	125.09 j	36	Combination
64	PIPE-29	3.28	24	Cir	75.833	121.61	127.68	8.000	123.73	128.31	n/a	128.31 j	35	Combination

Project File: New.stm | Number of lines: 64 | Run Date: 5/11/2020

NOTES: Return period = 25 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	99.088	1.07	37.79	0.85	0.91	30.16	5.0	9.6	7.0	212.0	486.9	11.50	60	2.98	112.00	114.95	118.46	119.09	117.38	134.70	PIPE-71
2	1	112.667	0.98	21.09	0.89	0.87	17.09	5.0	9.3	7.1	121.3	437.4	8.15	60	2.40	114.95	117.66	119.09	120.80	134.70	134.70	PIPE-70
3	2	114.666	0.98	14.33	0.89	0.87	11.01	5.0	9.0	7.2	78.86	282.2	7.02	60	1.00	117.66	118.80	120.80	121.32	134.70	134.77	PIPE-41
4	3	114.666	0.98	13.35	0.89	0.87	10.14	5.0	8.8	7.2	73.22	282.2	7.60	60	1.00	118.81	119.95	121.32	122.37	134.77	134.76	PIPE-40
5	4	114.666	0.97	12.37	0.89	0.86	9.27	5.0	8.5	7.3	67.50	282.2	7.39	60	1.00	119.95	121.10	122.37	123.41	134.76	134.77	PIPE-39
6	5	114.666	0.99	11.40	0.80	0.79	8.41	5.0	8.3	7.3	61.76	282.2	7.16	60	1.00	121.10	122.25	123.41	124.46	134.77	134.76	PIPE-38
7	6	114.659	1.01	10.42	0.78	0.79	7.62	5.0	8.0	7.4	56.48	282.2	6.96	60	1.00	122.25	123.39	124.46	125.50	134.76	134.76	PIPE-37 (1)
8	7	113.649	1.32	9.40	0.69	0.91	6.83	5.0	7.7	7.5	51.09	282.2	6.72	60	1.00	123.39	124.53	125.50	126.53	134.76	134.83	PIPE-37 (2)
9	8	290.156	0.73	6.59	0.58	0.42	5.35	5.0	7.0	7.7	41.03	289.6	6.72	48	3.46	124.53	134.58	126.53	136.49	134.83	142.40	PIPE-37
10	9	315.053	0.00	5.86	0.00	0.00	4.93	0.0	6.2	7.9	38.88	155.6	6.68	48	1.00	134.58	137.73	136.49	139.59	142.40	145.57	PIPE-108 (1)
11	10	22.144	0.00	5.04	0.00	0.00	4.53	0.0	6.0	7.9	36.03	110.2	6.47	48	0.50	137.73	137.84	139.59	139.63	145.57	145.79	PIPE-113
12	11	100.000	0.00	3.38	0.00	0.00	3.04	0.0	5.7	8.0	24.45	51.09	5.99	36	0.50	137.84	138.34	139.63	139.93	145.79	145.94	PIPE-112
13	12	100.000	0.00	2.31	0.00	0.00	2.08	0.0	5.4	8.1	16.88	31.42	5.57	30	0.50	138.34	138.84	139.93	140.23	145.94	145.24	PIPE-111
14	13	100.000	0.00	1.24	0.00	0.00	1.11	0.0	5.0	8.2	9.15	17.33	4.61	24	0.50	138.84	139.34	140.23	140.42	145.24	144.54	PIPE-110
15	14	30.723	1.24	1.24	0.90	1.11	1.11	5.0	5.0	8.2	9.17	3.31	11.67	12	0.74	139.34	139.57	140.42	142.16	144.54	144.76	PIPE-109
16	1	144.172	0.74	15.63	0.88	0.65	12.17	5.0	9.3	7.1	86.41	171.8	7.12	54	0.65	114.95	115.89	119.09	118.61	134.70	137.15	PIPE-34
17	16	114.666	0.76	14.89	0.88	0.67	11.51	5.0	9.1	7.2	82.36	171.8	8.31	54	0.65	115.89	116.63	118.61	119.29	137.15	137.10	PIPE-33
18	17	195.129	0.00	4.06	0.00	0.00	3.65	0.0	6.1	7.9	28.89	161.6	12.04	36	5.00	126.11	135.87	126.97	137.60	137.10	142.80	PIPE-65
19	18	100.000	0.00	3.33	0.00	0.00	3.00	0.0	5.8	8.0	23.98	72.25	6.01	36	1.00	135.87	136.87	137.60	138.44	142.80	142.65	PIPE-46 (1)
20	19	100.000	0.00	2.61	0.00	0.00	2.35	0.0	5.5	8.1	18.99	72.25	5.47	36	1.00	136.87	137.87	138.44	139.26	142.65	142.68	PIPE-46 (2)
21	20	100.000	0.00	1.36	0.00	0.00	1.22	0.0	5.1	8.2	10.02	44.43	4.32	30	1.00	137.87	138.87	139.26	139.92	142.68	142.69	PIPE-46
22	21	70.088	1.36	1.36	0.90	1.22	1.22	5.0	5.0	8.2	10.07	7.00	8.21	15	1.00	138.87	139.57	140.12	141.57	142.69	143.50	PIPE-45

Project File: New.stm | Number of lines: 64 | Run Date: 5/11/2020

NOTES:Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period =Yrs. 25 ; c = cir e = ellip b = box

Network A11-2

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
23	13	30.723	1.07	1.07	0.90	0.97	0.97	5.0	5.0	8.2	7.97	5.93	10.15	12	2.36	138.84	139.57	140.23	141.54	145.24	147.25	PIPE-120
24	11	100.000	0.00	1.13	0.00	0.00	1.02	0.0	5.5	8.1	8.22	17.33	3.94	24	0.50	137.84	138.34	139.63	139.36	145.79	144.79	PIPE-116
25	24	100.000	0.00	0.60	0.00	0.00	0.54	0.0	5.1	8.2	4.46	8.04	4.04	18	0.50	138.34	138.84	139.36	139.65	144.79	143.79	PIPE-115
26	25	30.723	0.60	0.60	0.90	0.54	0.54	5.0	5.0	8.2	4.48	5.93	6.33	12	2.36	138.84	139.57	139.65	140.45	143.79	144.75	PIPE-114
27	24	30.723	0.53	0.53	0.90	0.47	0.47	5.0	5.0	8.2	3.90	7.71	5.26	12	3.99	138.34	139.57	139.36	140.40	144.79	145.75	PIPE-117
28	12	30.723	1.07	1.07	0.90	0.97	0.97	5.0	5.0	8.2	7.97	7.71	10.15	12	3.99	138.34	139.57	139.93	141.25	145.94	147.25	PIPE-119
29	20	70.088	1.25	1.25	0.90	1.13	1.13	5.0	5.0	8.2	9.30	6.01	11.85	12	2.43	137.87	139.57	139.26	143.34	142.68	143.50	PIPE-50
30	10	255.098	0.83	0.83	0.48	0.40	0.40	5.0	5.0	8.2	3.28	7.00	3.54	15	1.00	137.73	140.28	139.59	141.01	145.57	144.67	PIPE-108
31	11	30.730	0.52	0.52	0.90	0.47	0.47	5.0	5.0	8.2	3.90	9.14	5.25	12	5.62	137.84	139.57	139.63	140.40	145.79	146.75	PIPE-118
32	17	114.666	0.76	10.07	0.88	0.67	7.19	5.0	8.8	7.2	51.98	171.8	6.26	54	0.65	116.63	117.38	119.29	119.46	137.10	137.16	PIPE-32
33	32	114.666	1.08	9.31	0.85	0.92	6.53	5.0	8.5	7.3	47.60	171.8	6.80	54	0.65	117.38	118.12	119.46	120.11	137.16	137.10	PIPE-31
34	33	163.176	0.00	8.23	0.00	0.00	5.61	0.0	8.0	7.4	41.48	171.8	6.41	54	0.65	118.12	119.18	120.11	121.04	137.10	142.21	PIPE-30
35	34	373.542	0.42	8.23	0.81	0.34	5.61	5.0	7.3	7.6	42.52	58.25	8.47	36	0.65	119.18	121.61	121.09	123.73	142.21	135.39	PIPE-29 (1)
36	35	145.511	0.97	6.98	0.53	0.51	4.87	5.0	7.0	7.7	37.34	58.25	7.25	36	0.65	121.61	122.56	123.73	124.54	135.39	130.39	PIPE-6
37	36	139.261	0.99	5.25	0.74	0.74	3.94	5.0	6.7	7.8	30.56	78.67	7.51	30	3.14	122.56	126.92	124.54	128.81	130.39	135.47	PIPE-28
38	37	146.000	0.96	4.25	0.74	0.71	3.20	5.0	6.3	7.9	25.17	88.86	6.70	30	4.00	126.92	132.76	128.81	134.47	135.47	138.25	PIPE-69
39	38	92.000	0.95	3.29	0.76	0.72	2.50	5.0	6.1	7.9	19.76	45.91	7.13	24	3.51	132.76	135.99	134.47	137.59	138.25	140.39	PIPE-68
40	39	164.000	1.01	2.35	0.76	0.77	1.78	5.0	5.6	8.1	14.31	19.75	5.80	24	0.65	135.99	137.06	137.59	138.42	140.39	142.26	PIPE-67
41	40	92.000	0.80	1.34	0.77	0.61	1.01	5.0	5.3	8.2	8.25	19.75	4.36	24	0.65	137.06	137.66	138.42	138.68	142.26	141.82	PIPE-66
42	41	60.000	0.54	0.54	0.73	0.40	0.40	5.0	5.0	8.2	3.28	5.64	3.73	15	0.65	137.66	138.05	138.68	138.78	141.82	141.58	PIPE-96
43	2	270.067	0.00	5.78	0.00	0.00	5.21	0.0	6.7	7.8	40.37	390.5	5.35	48	6.30	117.66	134.66	120.80	136.56	134.70	142.69	PIPE-44
44	43	100.000	0.00	2.89	0.00	0.00	2.60	0.0	6.4	7.8	20.42	58.25	5.19	36	0.65	134.66	135.31	136.56	136.76	142.69	142.80	PIPE-43 (1)

Project File: New.stm | Number of lines: 64 | Run Date: 5/11/2020

NOTES:Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period =Yrs. 25 ; c = cir e = ellip b = box

Network A11-2

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
45	44	100.000	0.00	2.17	0.00	0.00	1.95	0.0	6.0	7.9	15.50	58.25	5.06	36	0.65	135.31	135.96	136.76	137.22	142.80	142.65	PIPE-43 (2)
46	45	100.000	0.00	1.45	0.00	0.00	1.30	0.0	5.7	8.0	10.47	35.82	4.69	30	0.65	135.96	136.61	137.22	137.69	142.65	142.76	PIPE-43 (3)
47	46	100.000	0.00	0.72	0.00	0.00	0.65	0.0	5.2	8.2	5.32	19.75	3.75	24	0.65	136.61	137.26	137.69	138.07	142.76	142.65	PIPE-43
48	47	70.088	0.72	0.72	0.90	0.65	0.65	5.0	5.0	8.2	5.37	5.64	5.23	15	0.65	137.26	137.72	138.24	138.69	142.65	143.50	PIPE-42
49	19	70.000	0.72	0.72	0.90	0.65	0.65	5.0	5.0	8.2	5.37	13.74	4.90	15	3.86	136.87	139.57	138.44	140.51	142.65	143.50	PIPE-49
50	43	100.000	0.00	2.17	0.00	0.00	1.95	0.0	6.0	7.9	15.51	35.82	4.87	30	0.65	134.66	135.31	136.56	136.64	142.69	142.65	PIPE-46 (1) (1) (1)
51	50	100.000	0.00	1.45	0.00	0.00	1.30	0.0	5.6	8.1	10.48	35.82	4.55	30	0.65	135.31	135.96	136.64	137.04	142.65	142.65	PIPE-46 (1) (1) (1)
52	51	100.000	0.00	0.72	0.00	0.00	0.65	0.0	5.2	8.2	5.33	19.75	3.76	24	0.65	135.96	136.61	137.04	137.42	142.65	142.76	PIPE-46 (1) (1) (1)
53	52	70.000	0.72	0.72	0.90	0.65	0.65	5.0	5.0	8.2	5.37	14.38	5.89	15	4.22	136.61	139.57	137.42	140.51	142.76	143.50	PIPE-52
54	46	70.000	0.72	0.72	0.90	0.65	0.65	5.0	5.0	8.2	5.37	14.38	5.09	15	4.22	136.61	139.57	137.69	140.51	142.76	143.50	PIPE-58
55	45	70.088	0.72	0.72	0.90	0.65	0.65	5.0	5.0	8.2	5.37	15.87	4.90	15	5.15	135.96	139.57	137.22	140.51	142.65	147.00	PIPE-57
56	51	70.088	0.72	0.72	0.90	0.65	0.65	5.0	5.0	8.2	5.37	15.87	5.09	15	5.15	135.96	139.57	137.04	140.51	142.65	147.00	PIPE-53
57	18	70.088	0.72	0.72	0.90	0.65	0.65	5.0	5.0	8.2	5.37	8.87	6.93	12	5.28	135.87	139.57	137.60	140.50	142.80	143.50	PIPE-51
58	44	70.088	0.72	0.72	0.90	0.65	0.65	5.0	5.0	8.2	5.37	17.24	4.90	15	6.07	135.31	139.57	136.76	140.51	142.80	147.00	PIPE-56
59	50	70.088	0.72	0.72	0.90	0.65	0.65	5.0	5.0	8.2	5.37	17.24	4.90	15	6.07	135.31	139.57	136.64	140.51	142.65	147.00	PIPE-54
60	43	70.088	0.72	0.72	0.90	0.65	0.65	5.0	5.0	8.2	5.37	18.51	4.90	15	7.00	134.66	139.57	136.56	140.51	142.69	147.00	PIPE-55
61	8	126.287	0.73	1.49	0.38	0.28	0.57	5.0	6.3	7.8	4.44	8.63	5.85	12	5.00	124.53	130.84	126.53	131.73	134.83	137.86	PIPE-62
62	61	301.346	0.75	0.75	0.38	0.29	0.29	5.0	5.0	8.2	2.36	6.87	3.77	12	3.17	130.84	140.39	131.73	141.05	137.86	144.03	PIPE-101
63	36	48.129	0.77	0.77	0.54	0.42	0.42	5.0	5.0	8.2	3.43	88.86	2.27	30	4.00	122.56	124.48	124.54	125.09	130.39	130.45	PIPE-61
64	35	75.833	0.83	0.83	0.48	0.40	0.40	5.0	5.0	8.2	3.28	69.30	2.44	24	8.00	121.61	127.68	123.73	128.31	135.39	135.79	PIPE-29

Project File: New.stm | Number of lines: 64 | Run Date: 5/11/2020

NOTES:Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period =Yrs. 25 ; c = cir e = ellip b = box

Network A11-2

Storm Sewer Inlet Time Tabulation

Line No.	Line ID	Tc Method	Sheet Flow n-Value	Sheet Flow flow Length (ft)	Sheet Flow 2-yr 24h P (in)	Sheet Flow Land Slope (%)	Sheet Flow Travel Time (min)	Shallow Concentrated Flow flow Length (ft)	Shallow Concentrated Flow Water Slope (%)	Shallow Concentrated Flow Surf Descr	Shallow Concentrated Flow Ave Vel (ft/s)	Shallow Concentrated Flow Travel Time (min)	Channel Flow X-sec Area (sqft)	Channel Flow Wetted Perim (ft)	Channel Flow Chan Slope (%)	Channel Flow n-Value	Channel Flow Vel	Channel Flow flow Length (ft)	Channel Flow Travel Time (min)	Total Travel Time (min)
1	PIPE-71	User																		5.00
2	PIPE-70	User																		5.00
3	PIPE-41	User																		5.00
4	PIPE-40	User																		5.00
5	PIPE-39	User																		5.00
6	PIPE-38	User																		5.00
7	PIPE-37 (1)	User																		5.00
8	PIPE-37 (2)	User																		5.00
9	PIPE-37	User																		5.00
10	PIPE-108 (1)	User																		0.00
11	PIPE-113	User																		0.00
12	PIPE-112	User																		0.00
13	PIPE-111	User																		0.00
14	PIPE-110	User																		0.00
15	PIPE-109	User																		5.00
16	PIPE-34	User																		5.00
17	PIPE-33	User																		5.00
18	PIPE-65	User																		0.00
19	PIPE-46 (1)	User																		0.00
20	PIPE-46 (2)	User																		0.00
21	PIPE-46	User																		0.00
22	PIPE-45	User																		5.00
23	PIPE-120	User																		5.00
24	PIPE-116	User																		0.00

Project File: New.stm | Min. Tc used for intensity calculations = 5 min | Number of lines: 64 | Date: 5/11/2020

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Storm Sewer Inlet Time Tabulation

Line No.	Line ID	Tc Method	Sheet Flow					Shallow Concentrated Flow					Channel Flow							Total Travel Time (min)
			n-Value	flow Length (ft)	2-yr 24h P (in)	Land Slope (%)	Travel Time (min)	flow Length (ft)	Water Slope (%)	Surf Descr	Ave Vel (ft/s)	Travel Time (min)	X-sec Area (sqft)	Wetted Perim (ft)	Chan Slope (%)	n-Value	Vel	flow Length (ft)	Travel Time (min)	
25	PIPE-115	User																		0.00
26	PIPE-114	User																		5.00
27	PIPE-117	User																		5.00
28	PIPE-119	User																		5.00
29	PIPE-50	User																		5.00
30	PIPE-108	User																		5.00
31	PIPE-118	User																		5.00
32	PIPE-32	User																		5.00
33	PIPE-31	User																		5.00
34	PIPE-30	User																		0.00
35	PIPE-29 (1)	User																		5.00
36	PIPE-6	User																		5.00
37	PIPE-28	User																		5.00
38	PIPE-69	User																		5.00
39	PIPE-68	User																		5.00
40	PIPE-67	User																		5.00
41	PIPE-66	User																		5.00
42	PIPE-96	User																		5.00
43	PIPE-44	User																		0.00
44	PIPE-43 (1)	User																		0.00
45	PIPE-43 (2)	User																		0.00
46	PIPE-43 (3)	User																		0.00
47	PIPE-43	User																		0.00
48	PIPE-42	User																		5.00

Project File: New.stm | Min. Tc used for intensity calculations = 5 min | Number of lines: 64 | Date: 5/11/2020

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Storm Sewer Inlet Time Tabulation

Line No.	Line ID	Tc Method	Sheet Flow n-Value	Sheet Flow flow Length (ft)	Sheet Flow 2-yr 24h P (in)	Sheet Flow Land Slope (%)	Sheet Flow Travel Time (min)	Shallow Concentrated Flow flow Length (ft)	Shallow Concentrated Flow Water Slope (%)	Shallow Concentrated Flow Surf Descr	Shallow Concentrated Flow Ave Vel (ft/s)	Shallow Concentrated Flow Travel Time (min)	Channel Flow X-sec Area (sqft)	Channel Flow Wetted Perim (ft)	Channel Flow Chan Slope (%)	Channel Flow n-Value	Channel Flow Vel	Channel Flow flow Length (ft)	Channel Flow Travel Time (min)	Total Travel Time (min)
49	PIPE-49	User																		5.00
50	PIPE-46 (1) (1) (1)	User																		0.00
51	PIPE-46 (1) (1) (1)	User																		0.00
52	PIPE-46 (1) (1) (1)	User																		0.00
53	PIPE-52	User																		5.00
54	PIPE-58	User																		5.00
55	PIPE-57	User																		5.00
56	PIPE-53	User																		5.00
57	PIPE-51	User																		5.00
58	PIPE-56	User																		5.00
59	PIPE-54	User																		5.00
60	PIPE-55	User																		5.00
61	PIPE-62	User																		5.00
62	PIPE-101	User																		5.00
63	PIPE-61	User																		5.00
64	PIPE-29	User																		5.00

Project File: New.stm | Min. Tc used for intensity calculations = 5 min | Number of lines: 64 | Date: 5/11/2020

Network A11-2

Hydraulic Grade Line Computations

Line	Size (in)	Q (cfs)	Downstream Invert elev (ft)	Downstream HGL elev (ft)	Downstream Depth (ft)	Downstream Area (sqft)	Downstream Vel (ft/s)	Downstream Vel head (ft)	Downstream EGL elev (ft)	Downstream Sf (%)	Len (ft)	Upstream Invert elev (ft)	Upstream HGL elev (ft)	Upstream Depth (ft)	Upstream Area (sqft)	Upstream Vel (ft/s)	Upstream Vel head (ft)	Upstream EGL elev (ft)	Upstream Sf (%)	Check Ave Sf (%)	Check Enrgy loss (ft)	JL coeff (K)	Minor loss (ft)
1	60	212.0	112.00	118.46	5.00	17.38	10.80	1.81	120.27	0.565	99.088	114.95	119.09	4.14**	17.38	12.20	2.31	121.40	0.554	0.559	n/a	1.00	2.31
2	60	121.3	114.95	119.09	4.14	13.01	6.98	1.35	120.44	0.000	112.667	117.66	120.80	3.15**	13.01	9.32	1.35	122.15	0.000	0.000	n/a	1.50	n/a
3	60	78.86	117.66	120.80	3.15	9.88	6.06	0.99	121.79	0.000	114.666	118.80	121.32	2.51**	9.88	7.98	0.99	122.31	0.000	0.000	n/a	0.50	0.50
4	60	73.22	118.81	121.32	2.51	9.39	7.41	0.94	122.26	0.000	114.666	119.95	122.37	2.42**	9.39	7.79	0.94	123.31	0.000	0.000	n/a	0.50	n/a
5	60	67.50	119.95	122.37	2.42	8.90	7.19	0.90	123.26	0.000	114.666	121.10	123.41 j	2.32**	8.90	7.59	0.90	124.31	0.000	0.000	n/a	0.50	0.45
6	60	61.76	121.10	123.41	2.32	8.37	6.94	0.85	124.26	0.000	114.666	122.25	124.46 j	2.21**	8.37	7.38	0.85	125.30	0.000	0.000	n/a	0.50	n/a
7	60	56.48	122.25	124.46	2.21	7.87	6.75	0.80	125.26	0.000	114.659	123.39	125.50 j	2.11**	7.87	7.17	0.80	126.30	0.000	0.000	n/a	0.50	0.40
8	60	51.09	123.39	125.50	2.11	7.35	6.49	0.75	126.25	0.000	113.649	124.53	126.53 j	2.00**	7.35	6.95	0.75	127.28	0.000	0.000	n/a	1.00	n/a
9	48	41.03	124.53	126.53	2.00	5.93	6.52	0.74	127.28	0.000	290.156	134.58	136.49 j	1.91**	5.93	6.92	0.74	137.24	0.000	0.000	n/a	0.50	n/a
10	48	38.88	134.58	136.49	1.91	5.72	6.56	0.72	137.21	0.000	315.053	137.73	139.59 j	1.86**	5.72	6.80	0.72	140.31	0.000	0.000	n/a	1.00	n/a
11	48	36.03	137.73	139.59	1.86	5.43	6.30	0.68	140.27	0.000	22.144	137.84	139.63 j	1.79**	5.43	6.64	0.68	140.31	0.000	0.000	n/a	1.00	n/a
12	36	24.45	137.84	139.63	1.79	3.81	5.57	0.64	140.27	0.000	100.000	138.34	139.93 j	1.59**	3.81	6.41	0.64	140.57	0.000	0.000	n/a	1.00	n/a
13	30	16.88	138.34	139.93	1.59	2.80	5.11	0.57	140.50	0.000	100.000	138.84	140.23 j	1.39**	2.80	6.03	0.57	140.79	0.000	0.000	n/a	1.00	0.57
14	24	9.15	138.84	140.23	1.39	1.73	3.93	0.44	140.66	0.000	100.000	139.34	140.42 j	1.08**	1.73	5.29	0.44	140.86	0.000	0.000	n/a	1.00	n/a
15	12	9.17	139.34	140.42	1.00	0.79	11.67	2.12	142.54	5.648	30.723	139.57	142.16	1.00**	0.79	11.67	2.12	144.27	5.646	5.647	1.735	1.00	2.12
16	54	86.41	114.95	119.09	4.14	10.06	5.65	1.15	120.24	0.000	144.172	115.89	118.61	2.72**	10.06	8.59	1.15	119.76	0.000	0.000	n/a	0.91	n/a
17	54	82.36	115.89	118.61	2.72	9.76	8.19	1.11	119.72	0.000	114.666	116.63	119.29	2.65**	9.76	8.44	1.11	120.39	0.000	0.000	n/a	1.92	2.13
18	36	28.89	126.11	126.97	0.86*	1.67	17.27	0.72	127.69	0.000	195.129	135.87	137.60	1.74**	4.25	6.80	0.72	138.32	0.000	0.000	n/a	0.98	0.71
19	36	23.98	135.87	137.60	1.74	3.76	5.65	0.63	138.24	0.000	100.000	136.87	138.44 j	1.58**	3.76	6.37	0.63	139.07	0.000	0.000	n/a	1.00	0.63
20	36	18.99	136.87	138.44	1.58	3.22	5.05	0.54	138.98	0.000	100.000	137.87	139.26 j	1.40**	3.22	5.90	0.54	139.80	0.000	0.000	n/a	1.00	0.54
21	30	10.02	137.87	139.26	1.40	1.97	3.56	0.40	139.66	0.000	100.000	138.87	139.92 j	1.06**	1.97	5.08	0.40	140.32	0.000	0.000	n/a	1.00	n/a
22	15	10.07	138.87	140.12	1.25*	1.23	8.21	1.05	141.16	2.074	70.088	139.57	141.57	1.25	1.23	8.21	1.05	142.62	2.074	2.074	1.454	1.00	1.05

Project File: New.stm | Number of lines: 64 | Run Date: 5/11/2020

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Network A11-2

Hydraulic Grade Line Computations

Line	Size (in)	Q (cfs)	Downstream Invert elev (ft)	Downstream HGL elev (ft)	Downstream Depth (ft)	Downstream Area (sqft)	Downstream Vel (ft/s)	Downstream Vel head (ft)	Downstream EGL elev (ft)	Downstream Sf (%)	Len (ft)	Upstream Invert elev (ft)	Upstream HGL elev (ft)	Upstream Depth (ft)	Upstream Area (sqft)	Upstream Vel (ft/s)	Upstream Vel head (ft)	Upstream EGL elev (ft)	Upstream Sf (%)	Check Ave Sf (%)	Check Enrgy loss (ft)	JL coeff (K)	Minor loss (ft)
23	12	7.97	138.84	140.23	1.00	0.79	10.15	1.60	141.83	4.269	30.723	139.57	141.54	1.00	0.79	10.15	1.60	143.14	4.267	4.268	1.311	1.00	1.60
24	24	8.22	137.84	139.63	1.79	1.61	2.78	0.40	140.03	0.000	100.000	138.34	139.36	1.02**	1.61	5.10	0.40	139.77	0.000	0.000	n/a	1.00	n/a
25	18	4.46	138.34	139.36	1.02	0.97	3.49	0.33	139.69	0.000	100.000	138.84	139.65 j	0.81**	0.97	4.58	0.33	139.98	0.000	0.000	n/a	1.00	0.33
26	12	4.48	138.84	139.65	0.81	0.68	6.57	0.58	140.23	0.000	30.723	139.57	140.45	0.88**	0.73	6.09	0.58	141.03	0.000	0.000	n/a	1.00	0.58
27	12	3.90	138.34	139.36	1.00	0.70	4.97	0.38	139.74	1.022	30.723	139.57	140.40 j	0.84**	0.70	5.55	0.48	140.88	0.984	1.003	n/a	1.00	n/a
28	12	7.97	138.34	139.93	1.00	0.79	10.15	1.60	141.54	4.267	30.723	139.57	141.25	1.00	0.79	10.15	1.60	142.85	4.266	4.267	1.311	1.00	1.60
29	12	9.30	137.87	139.26	1.00	0.79	11.85	2.18	141.44	5.817	70.088	139.57	143.34	1.00**	0.79	11.84	2.18	145.52	5.815	5.816	4.076	1.00	2.18
30	15	3.28	137.73	139.59	1.25	0.74	2.67	0.11	139.70	0.220	255.098	140.28	141.01 j	0.73**	0.74	4.41	0.30	141.31	0.531	0.375	n/a	1.00	n/a
31	12	3.90	137.84	139.63	1.00	0.70	4.96	0.38	140.01	1.020	30.730	139.57	140.40 j	0.84**	0.70	5.55	0.48	140.88	0.983	1.001	n/a	1.00	n/a
32	54	51.98	116.63	119.29	2.65	7.22	5.32	0.81	120.09	0.000	114.666	117.38	119.46 j	2.09**	7.22	7.20	0.81	120.27	0.000	0.000	n/a	0.50	n/a
33	54	47.60	117.38	119.46	2.09	6.79	6.60	0.76	120.23	0.000	114.666	118.12	120.11	1.99**	6.79	7.01	0.76	120.88	0.000	0.000	n/a	0.79	n/a
34	54	41.48	118.12	120.11	1.99	6.18	6.10	0.70	120.81	0.000	163.176	119.18	121.04 j	1.85**	6.18	6.71	0.70	121.74	0.000	0.000	n/a	0.78	0.55
35	36	42.52	119.18	121.09	1.90*	4.73	8.99	0.98	122.07	0.000	373.542	121.61	123.73	2.12**	5.35	7.95	0.98	124.72	0.000	0.000	n/a	1.50	1.48
36	36	37.34	121.61	123.73	2.12	4.97	6.99	0.88	124.61	0.000	145.511	122.56	124.54 j	1.99**	4.97	7.52	0.88	125.42	0.000	0.000	n/a	1.00	0.88
37	30	30.56	122.56	124.54	1.99	3.97	7.31	0.92	125.47	0.000	139.261	126.92	128.81 j	1.88**	3.97	7.71	0.92	129.73	0.000	0.000	n/a	0.50	n/a
38	30	25.17	126.92	128.81	1.88	3.57	6.35	0.77	129.58	0.000	146.000	132.76	134.47 j	1.71**	3.57	7.05	0.77	135.24	0.000	0.000	n/a	0.50	0.39
39	24	19.76	132.76	134.47	1.71	2.69	6.92	0.84	135.31	0.000	92.000	135.99	137.59 j	1.60**	2.69	7.35	0.84	138.43	0.000	0.000	n/a	0.50	0.42
40	24	14.31	135.99	137.59	1.60	2.28	5.33	0.61	138.20	0.000	164.000	137.06	138.42 j	1.36**	2.28	6.28	0.61	139.03	0.000	0.000	n/a	0.50	n/a
41	24	8.25	137.06	138.42	1.36	1.62	3.62	0.41	138.83	0.000	92.000	137.66	138.68 j	1.02**	1.62	5.11	0.41	139.08	0.000	0.000	n/a	0.50	n/a
42	15	3.28	137.66	138.68	1.02	0.74	3.05	0.30	138.98	0.000	60.000	138.05	138.78	0.73**	0.74	4.41	0.30	139.08	0.000	0.000	n/a	1.00	0.30
43	48	40.37	117.66	120.80	3.15	5.87	3.81	0.74	121.54	0.000	270.067	134.66	136.56 j	1.90**	5.87	6.88	0.74	137.29	0.000	0.000	n/a	1.00	n/a
44	36	20.42	134.66	136.56	1.90	3.38	4.34	0.57	137.12	0.000	100.000	135.31	136.76 j	1.45**	3.38	6.04	0.57	137.33	0.000	0.000	n/a	1.00	n/a

Project File: New.stm | Number of lines: 64 | Run Date: 5/11/2020

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Network A11-2

Hydraulic Grade Line Computations

Line	Size (in)	Q (cfs)	Downstream Invert elev (ft)	Downstream HGL elev (ft)	Downstream Depth (ft)	Downstream Area (sqft)	Downstream Vel (ft/s)	Downstream Vel head (ft)	Downstream EGL elev (ft)	Downstream Sf (%)	Len (ft)	Upstream Invert elev (ft)	Upstream HGL elev (ft)	Upstream Depth (ft)	Upstream Area (sqft)	Upstream Vel (ft/s)	Upstream Vel head (ft)	Upstream EGL elev (ft)	Upstream Sf (%)	Check Ave Sf (%)	Check Enrgy loss (ft)	JL coeff (K)	Minor loss (ft)
45	36	15.50	135.31	136.76	1.45	2.80	4.58	0.48	137.24	0.000	100.000	135.96	137.22 j	1.26**	2.80	5.53	0.48	137.69	0.000	0.000	n/a	1.00	n/a
46	30	10.47	135.96	137.22	1.26	2.03	4.24	0.41	137.63	0.000	100.000	136.61	137.69 j	1.08**	2.03	5.15	0.41	138.10	0.000	0.000	n/a	1.00	n/a
47	24	5.32	136.61	137.69	1.08	1.20	3.07	0.31	138.00	0.000	100.000	137.26	138.07 j	0.81**	1.20	4.44	0.31	138.38	0.000	0.000	n/a	1.00	n/a
48	15	5.37	137.26	138.24	0.97*	1.03	5.23	0.43	138.66	0.650	70.088	137.72	138.69	0.97	1.02	5.24	0.43	139.12	0.652	0.651	0.456	1.00	0.43
49	15	5.37	136.87	138.44	1.25	0.99	4.37	0.30	138.74	0.589	70.000	139.57	140.51 j	0.94**	0.99	5.43	0.46	140.96	0.706	0.648	n/a	1.00	0.46
50	30	15.51	134.66	136.56	1.90	2.65	3.88	0.53	137.09	0.000	100.000	135.31	136.64 j	1.33**	2.65	5.86	0.53	137.17	0.000	0.000	n/a	1.00	n/a
51	30	10.48	135.31	136.64	1.33	2.03	3.96	0.41	137.05	0.000	100.000	135.96	137.04 j	1.08**	2.03	5.15	0.41	137.45	0.000	0.000	n/a	1.00	n/a
52	24	5.33	135.96	137.04	1.08	1.20	3.07	0.31	137.35	0.000	100.000	136.61	137.42 j	0.81**	1.20	4.44	0.31	137.73	0.000	0.000	n/a	1.00	n/a
53	15	5.37	136.61	137.42	0.81	0.85	6.35	0.46	137.88	0.000	70.000	139.57	140.51	0.94**	0.99	5.43	0.46	140.96	0.000	0.000	n/a	1.00	0.46
54	15	5.37	136.61	137.69	1.08	0.99	4.76	0.46	138.15	0.000	70.000	139.57	140.51 j	0.94**	0.99	5.43	0.46	140.96	0.000	0.000	n/a	1.00	0.46
55	15	5.37	135.96	137.22	1.25	0.99	4.37	0.30	137.51	0.589	70.088	139.57	140.51 j	0.94**	0.99	5.43	0.46	140.96	0.706	0.648	n/a	1.00	0.46
56	15	5.37	135.96	137.04	1.08	0.99	4.76	0.46	137.50	0.000	70.088	139.57	140.51 j	0.94**	0.99	5.43	0.46	140.96	0.000	0.000	n/a	1.00	0.46
57	12	5.37	135.87	137.60	1.00	0.76	6.83	0.73	138.33	1.936	70.088	139.57	140.50 j	0.93**	0.76	7.03	0.77	141.27	1.673	1.805	n/a	1.00	n/a
58	15	5.37	135.31	136.76	1.25	0.99	4.37	0.30	137.06	0.589	70.088	139.57	140.51 j	0.94**	0.99	5.43	0.46	140.96	0.706	0.648	n/a	1.00	0.46
59	15	5.37	135.31	136.64	1.25	0.99	4.37	0.30	136.94	0.589	70.088	139.57	140.51 j	0.94**	0.99	5.43	0.46	140.96	0.706	0.648	n/a	1.00	0.46
60	15	5.37	134.66	136.56	1.25	0.99	4.37	0.30	136.85	0.589	70.088	139.57	140.51 j	0.94**	0.99	5.43	0.46	140.96	0.706	0.648	n/a	1.00	0.46
61	12	4.44	124.53	126.53	1.00	0.73	5.65	0.50	127.03	1.324	126.287	130.84	131.73 j	0.88**	0.73	6.05	0.57	132.30	1.189	1.257	n/a	1.35	n/a
62	12	2.36	130.84	131.73	0.88	0.55	3.22	0.29	132.01	0.000	301.346	140.39	141.05 j	0.66**	0.55	4.31	0.29	141.34	0.000	0.000	n/a	1.00	n/a
63	30	3.43	122.56	124.54	1.99	0.92	0.82	0.22	124.76	0.000	48.129	124.48	125.09 j	0.61**	0.92	3.72	0.22	125.30	0.000	0.000	n/a	1.00	0.22
64	24	3.28	121.61	123.73	2.00	0.85	1.04	0.02	123.75	0.018	75.833	127.68	128.31 j	0.63**	0.85	3.84	0.23	128.54	0.381	0.200	n/a	1.00	0.23

Project File: New.stm | Number of lines: 64 | Run Date: 5/11/2020

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Network A11-2

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

Project File: New.stm	Number of lines: 3	Date: 5/11/2020

Network A11-3

Storm Sewers v2018.30

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	PIPE-64	7.06	24	Cir	45.876	106.00	108.35	5.123	110.12	110.15	0.09	110.24	End	Grate
2	PIPE-63	4.88	12	Cir	214.426	108.35	118.47	4.720	110.24	119.38	n/a	119.38 j	1	Grate
3	PIPE-100	2.64	12	Cir	159.379	118.47	125.99	4.720	119.38	126.69	n/a	126.69 j	2	Grate

Project File: New.stm | Number of lines: 3 | Run Date: 5/11/2020

NOTES: Return period = 25 Yrs. ; j - Line contains hyd. jump.

Network A11-3

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	45.876	0.80	2.49	0.36	0.29	0.90	5.0	6.2	7.9	7.06	55.46	2.31	24	5.12	106.00	108.35	110.12	110.15	108.25	112.92	PIPE-64
2	1	214.426	0.82	1.68	0.35	0.29	0.61	5.0	5.7	8.0	4.88	8.38	6.36	12	4.72	108.35	118.47	110.24	119.38	112.92	122.01	PIPE-63
3	2	159.379	0.87	0.87	0.37	0.32	0.32	5.0	5.0	8.2	2.64	8.38	4.03	12	4.72	118.47	125.99	119.38	126.69	122.01	130.11	PIPE-100

Project File: New.stm | Number of lines: 3 | Run Date: 5/11/2020

NOTES:Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period =Yrs. 25 ; c = cir e = ellip b = box

Network A11-3

Storm Sewer Inlet Time Tabulation

Line No.	Line ID	Tc Method	Sheet Flow n-Value	Sheet Flow flow Length (ft)	Sheet Flow 2-yr 24h P (in)	Sheet Flow Land Slope (%)	Sheet Flow Travel Time (min)	Shallow Concentrated Flow flow Length (ft)	Shallow Concentrated Flow Water Slope (%)	Shallow Concentrated Flow Surf Descr	Shallow Concentrated Flow Ave Vel (ft/s)	Shallow Concentrated Flow Travel Time (min)	Channel Flow X-sec Area (sqft)	Channel Flow Wetted Perim (ft)	Channel Flow Chan Slope (%)	Channel Flow n-Value	Channel Flow Vel	Channel Flow flow Length (ft)	Channel Flow Travel Time (min)	Total Travel Time (min)
1	PIPE-64	User																		5.00
2	PIPE-63	User																		5.00
3	PIPE-100	User																		5.00

Project File: New.stm | Min. Tc used for intensity calculations = 5 min | Number of lines: 3 | Date: 5/11/2020

Network A11-3

Hydraulic Grade Line Computations

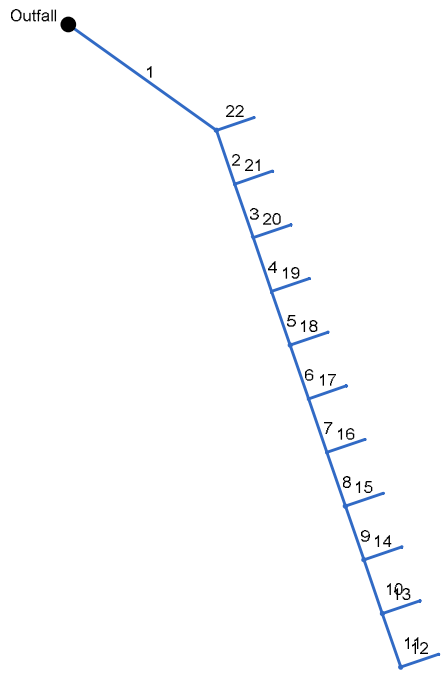
Line	Size (in)	Q (cfs)	Downstream Invert elev (ft)	Downstream HGL elev (ft)	Downstream Depth (ft)	Downstream Area (sqft)	Downstream Vel (ft/s)	Downstream Vel head (ft)	Downstream EGL elev (ft)	Downstream Sf (%)	Len (ft)	Upstream Invert elev (ft)	Upstream HGL elev (ft)	Upstream Depth (ft)	Upstream Area (sqft)	Upstream Vel (ft/s)	Upstream Vel head (ft)	Upstream EGL elev (ft)	Upstream Sf (%)	Check Ave Sf (%)	Check Enrgy loss (ft)	JL coeff (K)	Minor loss (ft)
1	24	7.06	106.00	110.12	2.00	3.14	2.25	0.08	110.20	0.083	45.876	108.35	110.15	1.80	2.97	2.37	0.09	110.23	0.073	0.078	0.036	1.08	0.09
2	12	4.88	108.35	110.24	1.00	0.75	6.21	0.60	110.84	1.601	214.426	118.47	119.38 j	0.91**	0.75	6.50	0.66	120.04	1.397	1.499	n/a	0.50	n/a
3	12	2.64	118.47	119.38	0.91	0.58	3.53	0.32	119.70	0.000	159.379	125.99	126.69 j	0.70**	0.58	4.53	0.32	127.01	0.000	0.000	n/a	1.00	n/a

Project File: New.stm | Number of lines: 3 | Run Date: 5/11/2020

Notes: ; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Network A11-3

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



Project File: New.stm	Number of lines: 22	Date: 5/11/2020

Network Lot C A1-4

Storm Sewers v2018.30

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	PIPE-181	34.24	42	Cir	320.059	132.25	136.41	1.299	137.99	138.23	n/a	138.83 j	End	Manhole
2	PIPE-180	29.17	36	Cir	100.000	136.41	136.91	0.500	138.83	138.66	0.72	138.66	1	Manhole
3	PIPE-179	26.38	36	Cir	100.000	136.91	137.41	0.500	138.66	139.07	n/a	139.07 j	2	Manhole
4	PIPE-178	23.55	36	Cir	100.000	137.41	137.91	0.500	139.07	139.47	n/a	139.47 j	3	Manhole
5	PIPE-177	20.67	36	Cir	100.000	137.91	138.41	0.500	139.47	139.87	n/a	139.87 j	4	Manhole
6	PIPE-176	17.74	30	Cir	100.000	138.41	138.91	0.500	139.87	140.33	n/a	140.33 j	5	Manhole
7	PIPE-175	14.76	30	Cir	100.000	138.91	139.41	0.500	140.33	140.70	n/a	140.70 j	6	Manhole
8	PIPE-215	11.73	30	Cir	100.000	139.41	139.91	0.500	140.70	141.06	n/a	141.06 j	7	Manhole
9	PIPE-214	8.64	24	Cir	100.000	139.91	140.41	0.500	141.06	141.46	0.42	141.46	8	Manhole
10	PIPE-218	5.47	18	Cir	100.000	140.41	140.91	0.500	141.46	141.81	n/a	142.19 j	9	Manhole
11	PIPE-217	2.23	12	Cir	100.000	140.91	141.41	0.500	142.19*	142.52*	0.13	142.65	10	Manhole
12	PIPE-216	2.26	12	Cir	69.913	141.41	141.88	0.667	142.65	142.87	0.13	143.00	11	Combination
13	PIPE-219	3.41	12	Cir	69.913	140.91	141.88	1.382	142.19	142.67	n/a	143.07 j	10	Combination
14	PIPE-213	3.41	12	Cir	69.913	140.41	141.88	2.097	141.46	142.66	n/a	142.66 j	9	Combination
15	PIPE-220	3.41	12	Cir	70.000	139.91	141.88	2.809	141.06	142.66	n/a	142.66 j	8	Combination
16	PIPE-182	3.41	12	Cir	70.000	139.41	141.88	3.523	140.70	142.66	n/a	142.66 j	7	Combination
17	PIPE-183	3.41	12	Cir	70.000	138.91	141.88	4.237	140.33	142.66	n/a	142.66 j	6	Combination
18	PIPE-184	3.41	12	Cir	70.000	138.41	141.88	4.951	139.87	142.66	n/a	142.66 j	5	Combination
19	PIPE-185	3.41	12	Cir	70.000	137.91	141.88	5.666	139.47	142.66	n/a	142.66 j	4	Combination
20	PIPE-186	3.41	12	Cir	70.000	137.41	141.88	6.380	139.07	142.66	n/a	142.66 j	3	Combination
21	PIPE-187	3.41	12	Cir	69.913	136.91	141.88	7.103	138.66	142.66	n/a	142.66 j	2	Combination
22	PIPE-188	6.09	15	Cir	69.913	136.41	141.88	7.818	138.83	142.87	n/a	142.87 j	1	Combination

Project File: New.stm | Number of lines: 22 | Run Date: 5/11/2020

NOTES: Return period = 25 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	320.059	0.00	5.26	0.00	0.00	4.73	0.0	8.7	7.2	34.24	124.2	5.17	42	1.30	132.25	136.41	137.99	138.23	136.08	144.66	PIPE-181
2	1	100.000	0.00	4.44	0.00	0.00	4.00	0.0	8.4	7.3	29.17	51.09	5.80	36	0.50	136.41	136.91	138.83	138.66	144.66	144.66	PIPE-180
3	2	100.000	0.00	3.98	0.00	0.00	3.58	0.0	8.2	7.4	26.38	51.09	6.38	36	0.50	136.91	137.41	138.66	139.07	144.66	144.66	PIPE-179
4	3	100.000	0.00	3.52	0.00	0.00	3.17	0.0	7.9	7.4	23.55	51.09	6.10	36	0.50	137.41	137.91	139.07	139.47	144.66	144.66	PIPE-178
5	4	100.000	0.00	3.06	0.00	0.00	2.76	0.0	7.6	7.5	20.67	51.09	5.81	36	0.50	137.91	138.41	139.47	139.87	144.66	144.66	PIPE-177
6	5	100.000	0.00	2.60	0.00	0.00	2.34	0.0	7.3	7.6	17.74	31.42	6.05	30	0.50	138.41	138.91	139.87	140.33	144.66	144.66	PIPE-176
7	6	100.000	0.00	2.14	0.00	0.00	1.93	0.0	7.0	7.7	14.76	31.42	5.43	30	0.50	138.91	139.41	140.33	140.70	144.66	144.66	PIPE-175
8	7	100.000	0.00	1.68	0.00	0.00	1.51	0.0	6.7	7.7	11.73	31.42	4.96	30	0.50	139.41	139.91	140.70	141.06	144.66	144.66	PIPE-215
9	8	100.000	0.00	1.22	0.00	0.00	1.10	0.0	6.4	7.8	8.64	17.33	4.91	24	0.50	139.91	140.41	141.06	141.46	144.66	144.66	PIPE-214
10	9	100.000	0.00	0.76	0.00	0.00	0.69	0.0	6.0	7.9	5.47	8.04	4.53	18	0.50	140.41	140.91	141.46	141.81	144.66	144.66	PIPE-218
11	10	100.000	0.00	0.30	0.00	0.00	0.27	0.0	5.4	8.1	2.23	2.73	2.84	12	0.50	140.91	141.41	142.19	142.52	144.66	144.66	PIPE-217
12	11	69.913	0.30	0.30	0.90	0.27	0.27	5.0	5.0	8.2	2.26	3.15	2.88	12	0.67	141.41	141.88	142.65	142.87	144.66	145.50	PIPE-216
13	10	69.913	0.46	0.46	0.90	0.41	0.41	5.0	5.0	8.2	3.41	4.53	4.73	12	1.38	140.91	141.88	142.19	142.67	144.66	145.50	PIPE-219
14	9	69.913	0.46	0.46	0.90	0.41	0.41	5.0	5.0	8.2	3.41	5.59	4.74	12	2.10	140.41	141.88	141.46	142.66	144.66	145.50	PIPE-213
15	8	70.000	0.46	0.46	0.90	0.41	0.41	5.0	5.0	8.2	3.41	6.47	4.74	12	2.81	139.91	141.88	141.06	142.66	144.66	145.50	PIPE-220
16	7	70.000	0.46	0.46	0.90	0.41	0.41	5.0	5.0	8.2	3.41	7.24	4.74	12	3.52	139.41	141.88	140.70	142.66	144.66	145.50	PIPE-182
17	6	70.000	0.46	0.46	0.90	0.41	0.41	5.0	5.0	8.2	3.41	7.94	4.74	12	4.24	138.91	141.88	140.33	142.66	144.66	145.50	PIPE-183
18	5	70.000	0.46	0.46	0.90	0.41	0.41	5.0	5.0	8.2	3.41	8.58	4.74	12	4.95	138.41	141.88	139.87	142.66	144.66	145.50	PIPE-184
19	4	70.000	0.46	0.46	0.90	0.41	0.41	5.0	5.0	8.2	3.41	9.18	4.74	12	5.67	137.91	141.88	139.47	142.66	144.66	145.50	PIPE-185
20	3	70.000	0.46	0.46	0.90	0.41	0.41	5.0	5.0	8.2	3.41	9.74	4.74	12	6.38	137.41	141.88	139.07	142.66	144.66	145.50	PIPE-186
21	2	69.913	0.46	0.46	0.90	0.41	0.41	5.0	5.0	8.2	3.41	10.28	4.74	12	7.10	136.91	141.88	138.66	142.66	144.66	145.50	PIPE-187
22	1	69.913	0.82	0.82	0.90	0.74	0.74	5.0	5.0	8.2	6.09	19.56	5.39	15	7.82	136.41	141.88	138.83	142.87	144.66	145.50	PIPE-188

Project File: New.stm | Number of lines: 22 | Run Date: 5/11/2020

NOTES:Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period =Yrs. 25 ; c = cir e = ellip b = box

Storm Sewer Inlet Time Tabulation

Line No.	Line ID	Tc Method	Sheet Flow					Shallow Concentrated Flow					Channel Flow							Total Travel Time (min)
			n-Value	flow Length (ft)	2-yr 24h P (in)	Land Slope (%)	Travel Time (min)	flow Length (ft)	Water Slope (%)	Surf Descr	Ave Vel (ft/s)	Travel Time (min)	X-sec Area (sqft)	Wetted Perim (ft)	Chan Slope (%)	n-Value	Vel	flow Length (ft)	Travel Time (min)	
1	PIPE-181	User																		0.00
2	PIPE-180	User																		0.00
3	PIPE-179	User																		0.00
4	PIPE-178	User																		0.00
5	PIPE-177	User																		0.00
6	PIPE-176	User																		0.00
7	PIPE-175	User																		0.00
8	PIPE-215	User																		0.00
9	PIPE-214	User																		0.00
10	PIPE-218	User																		0.00
11	PIPE-217	User																		0.00
12	PIPE-216	User																		5.00
13	PIPE-219	User																		5.00
14	PIPE-213	User																		5.00
15	PIPE-220	User																		5.00
16	PIPE-182	User																		5.00
17	PIPE-183	User																		5.00
18	PIPE-184	User																		5.00
19	PIPE-185	User																		5.00
20	PIPE-186	User																		5.00
21	PIPE-187	User																		5.00
22	PIPE-188	User																		5.00

Project File: New.stm | Min. Tc used for intensity calculations = 5 min | Number of lines: 22 | Date: 5/11/2020

Network Lot C A1-4

Hydraulic Grade Line Computations

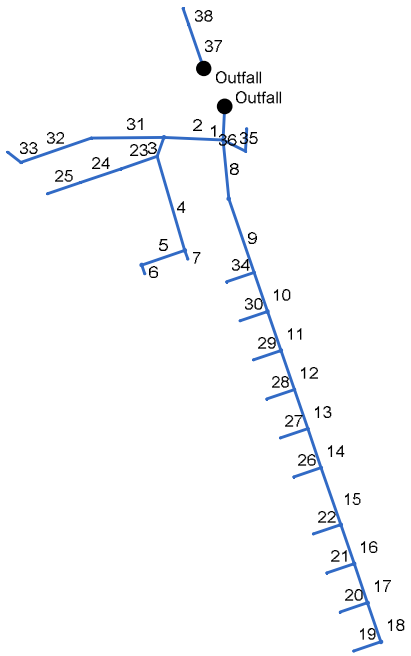
Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
	(in)	(cfs)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	(ft)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)	(K)	(ft)
1	42	34.24	132.25	137.99	3.50	5.03	3.56	0.20	138.19	0.099	320.059	136.41	138.23 j	1.82**	5.06	6.77	0.71	138.94	0.346	0.222	0.711	0.84	0.60
2	36	29.17	136.41	138.83	2.42	4.27	4.78	0.72	139.55	0.000	100.000	136.91	138.66	1.75**	4.27	6.83	0.72	139.38	0.000	0.000	n/a	1.00	0.72
3	36	26.38	136.91	138.66	1.75	4.01	6.17	0.67	139.33	0.000	100.000	137.41	139.07 j	1.66**	4.01	6.58	0.67	139.74	0.000	0.000	n/a	1.00	0.67
4	36	23.55	137.41	139.07	1.66	3.72	5.88	0.62	139.69	0.000	100.000	137.91	139.47 j	1.56**	3.72	6.33	0.62	140.09	0.000	0.000	n/a	1.00	0.62
5	36	20.67	137.91	139.47	1.56	3.41	5.56	0.57	140.04	0.000	100.000	138.41	139.87 j	1.46**	3.41	6.06	0.57	140.44	0.000	0.000	n/a	1.00	0.57
6	30	17.74	138.41	139.87	1.46	2.89	5.96	0.59	140.45	0.000	100.000	138.91	140.33 j	1.42**	2.89	6.14	0.59	140.92	0.000	0.000	n/a	1.00	n/a
7	30	14.76	138.91	140.33	1.42	2.56	5.11	0.52	140.85	0.000	100.000	139.41	140.70 j	1.29**	2.56	5.76	0.52	141.22	0.000	0.000	n/a	1.00	n/a
8	30	11.73	139.41	140.70	1.29	2.20	4.58	0.44	141.15	0.000	100.000	139.91	141.06 j	1.15**	2.20	5.34	0.44	141.50	0.000	0.000	n/a	1.00	n/a
9	24	8.64	139.91	141.06	1.15	1.67	4.63	0.42	141.48	0.000	100.000	140.41	141.46	1.05**	1.67	5.19	0.42	141.87	0.000	0.000	n/a	1.00	0.42
10	18	5.47	140.41	141.46	1.05	1.11	4.15	0.27	141.72	0.332	100.000	140.91	141.81 j	0.90**	1.11	4.91	0.37	142.19	0.504	0.418	0.418	1.00	0.37
11	12	2.23	140.91	142.19	1.00	0.79	2.84	0.13	142.31	0.334	100.000	141.41	142.52	1.00	0.79	2.84	0.13	142.65	0.333	0.333	0.333	1.00	0.13
12	12	2.26	141.41	142.65	1.00	0.79	2.88	0.13	142.78	0.344	69.913	141.88	142.87	1.00	0.79	2.88	0.13	143.00	0.329	0.337	0.235	1.00	0.13
13	12	3.41	140.91	142.19	1.00	0.66	4.34	0.29	142.48	0.782	69.913	141.88	142.67 j	0.79**	0.67	5.12	0.41	143.07	0.836	0.809	0.565	1.00	0.41
14	12	3.41	140.41	141.46	1.00	0.66	4.34	0.29	141.75	0.782	69.913	141.88	142.66 j	0.79**	0.66	5.13	0.41	143.07	0.840	0.811	n/a	1.00	0.41
15	12	3.41	139.91	141.06	1.00	0.66	4.34	0.29	141.35	0.782	70.000	141.88	142.66 j	0.79**	0.66	5.13	0.41	143.07	0.840	0.811	n/a	1.00	0.41
16	12	3.41	139.41	140.70	1.00	0.66	4.34	0.29	141.00	0.782	70.000	141.88	142.66 j	0.79**	0.66	5.13	0.41	143.07	0.840	0.811	n/a	1.00	0.41
17	12	3.41	138.91	140.33	1.00	0.66	4.34	0.29	140.63	0.782	70.000	141.88	142.66 j	0.79**	0.66	5.13	0.41	143.07	0.840	0.811	n/a	1.00	0.41
18	12	3.41	138.41	139.87	1.00	0.66	4.34	0.29	140.16	0.782	70.000	141.88	142.66 j	0.79**	0.66	5.13	0.41	143.07	0.840	0.811	n/a	1.00	0.41
19	12	3.41	137.91	139.47	1.00	0.66	4.34	0.29	139.76	0.782	70.000	141.88	142.66 j	0.79**	0.66	5.13	0.41	143.07	0.840	0.811	n/a	1.00	0.41
20	12	3.41	137.41	139.07	1.00	0.66	4.34	0.29	139.36	0.782	70.000	141.88	142.66 j	0.79**	0.66	5.13	0.41	143.07	0.840	0.811	n/a	1.00	0.41
21	12	3.41	136.91	138.66	1.00	0.66	4.34	0.29	138.95	0.782	69.913	141.88	142.66 j	0.79**	0.66	5.13	0.41	143.07	0.840	0.811	n/a	1.00	0.41
22	15	6.09	136.41	138.83	1.25	1.05	4.97	0.38	139.21	0.759	69.913	141.88	142.87 j	1.00**	1.05	5.81	0.52	143.40	0.799	0.779	n/a	1.00	0.52

Project File: New.stm | Number of lines: 22 | Run Date: 5/11/2020

Notes: ; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Network Lot C A1-4

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



Project File: New.stm	Number of lines: 38	Date: 5/11/2020

Network A1-5

Storm Sewers v2018.30

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	PIPE-81	58.75	48	Cir	81.998	130.00	131.51	1.835	135.59*	135.71*	0.34	136.05	End	Manhole
2	PIPE-191	25.13	36	Cir	142.804	131.50	132.93	1.000	136.05*	136.22*	0.19	136.41	1	Manhole
3	PIPE-21	18.23	36	Cir	48.795	132.93	136.84	8.000	136.41	138.20	n/a	138.20 j	2	Combination
4	PIPE-84	2.06	12	Cir	237.249	136.84	144.18	3.095	138.20	144.79	n/a	144.79 j	3	Manhole
5	PIPE-83 (1) (1)	0.74	12	Cir	109.899	144.18	145.28	1.000	144.79	145.64	n/a	145.64 j	4	Manhole
6	PIPE-86	0.74	12	Cir	22.000	145.28	145.50	1.000	145.64	145.86	n/a	145.86	5	Combination
7	PIPE-87	1.40	12	Cir	22.000	144.18	145.50	5.995	144.79	146.00	n/a	146.00 j	4	Combination
8	PIPE-196	32.53	48	Cir	142.713	131.51	135.18	2.573	136.05	136.87	n/a	136.87 j	1	Manhole
9	PIPE-195	33.05	48	Cir	188.722	135.18	136.12	0.500	136.87	137.83	0.65	137.83	8	Manhole
10	PIPE-194	31.19	48	Cir	100.000	136.12	136.62	0.500	137.83	138.28	n/a	138.28 j	9	Manhole
11	PIPE-193	28.34	36	Cir	100.000	136.62	137.12	0.500	138.28	138.84	0.71	138.84	10	Manhole
12	PIPE-192	25.47	36	Cir	100.000	137.12	137.62	0.500	138.84	139.25	0.66	139.25	11	Manhole
13	PIPE-159	22.55	36	Cir	100.000	137.62	138.12	0.500	139.25	139.65	n/a	139.65 j	12	Manhole
14	PIPE-169	19.58	36	Cir	100.000	138.12	138.62	0.500	139.65	140.04	n/a	140.04	13	Manhole
15	PIPE-168	15.91	36	Cir	145.958	138.62	139.35	0.500	140.04	140.62	n/a	140.62 j	14	Manhole
16	PIPE-167	12.05	30	Cir	100.000	139.35	139.85	0.500	140.62	141.01	n/a	141.01 j	15	Manhole
17	PIPE-166	8.87	24	Cir	100.000	139.85	140.35	0.500	141.01	141.41	n/a	141.41 j	16	Manhole
18	PIPE-165	5.62	15	Cir	100.000	140.35	140.85	0.500	141.60*	142.24*	0.33	142.57	17	Manhole
19	PIPE-132	5.67	15	Cir	70.000	140.85	141.88	1.464	142.57	142.95	0.40	143.35	18	Combination
20	PIPE-131	3.41	12	Cir	70.000	140.35	141.88	2.179	141.41	142.66	n/a	142.66 j	17	Combination
21	PIPE-130	3.41	12	Cir	70.000	139.85	141.88	2.893	141.01	142.66	n/a	142.66 j	16	Combination
22	PIPE-117	4.19	12	Cir	70.000	139.35	141.88	3.607	140.62	142.74	n/a	142.74 j	15	Combination
23	PIPE-20	12.34	24	Cir	92.000	136.84	137.76	1.000	138.20	139.02	n/a	139.02 j	3	Combination
24	PIPE-19	8.75	24	Cir	104.000	137.76	138.80	1.000	139.02	139.85	n/a	139.85 j	23	Combination

Project File: New.stm | Number of lines: 38 | Run Date: 5/11/2020

NOTES: Return period = 25 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
25	PIPE-18	4.15	15	Cir	84.000	138.80	139.64	1.000	139.85	140.46	n/a	140.46 j	24	Combination
26	PIPE-92	4.19	12	Cir	70.000	138.62	141.88	4.650	140.04	142.74	n/a	142.74 j	14	Combination
27	PIPE-106	3.41	12	Cir	70.000	138.12	141.88	5.364	139.65	142.66	n/a	142.66 j	13	Combination
28	PIPE-105	3.41	12	Cir	70.000	137.62	141.88	6.079	139.25	142.66	n/a	142.66 j	12	Combination
29	PIPE-98	3.41	12	Cir	70.000	137.12	141.88	6.793	138.84	142.66	n/a	142.66 j	11	Combination
30	PIPE-104	3.41	12	Cir	70.000	136.62	141.88	7.507	138.28	142.66	n/a	142.66 j	10	Combination
31	PIPE-126	7.34	24	Cir	175.422	132.93	134.69	1.000	136.41	136.55	0.05	136.60	2	Combination
32	PIPE-128	6.07	24	Cir	180.133	134.69	136.49	1.000	136.60	137.36	n/a	137.36 j	31	Combination
33	PIPE-127	2.93	12	Cir	40.000	136.49	136.89	1.000	137.36	137.62	n/a	137.62 j	32	Combination
34	PIPE-102	2.39	12	Cir	70.000	136.12	141.88	8.221	137.83	142.54	n/a	142.54 j	9	Combination
35	PIPE-197	3.47	15	Cir	60.440	131.51	134.53	5.000	136.05*	136.20*	0.19	136.38	1	Combination
36	PIPE-80	0.60	12	Cir	54.078	134.53	137.23	5.000	136.38	137.55	n/a	137.55 j	35	Combination
37	PIPE-124	4.81	18	Cir	113.858	130.00	133.30	2.898	135.59*	135.79*	0.06	135.85	End	Combination
38	PIPE-123	2.86	15	Cir	40.000	133.30	133.70	1.000	135.85*	135.92*	0.08	136.00	37	Combination

Project File: New.stm | Number of lines: 38 | Run Date: 5/11/2020

NOTES: Return period = 25 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	81.998	0.00	10.24	0.00	0.00	8.22	0.0	9.1	7.1	58.75	210.8	4.68	48	1.84	130.00	131.51	135.59	135.71	134.33	142.54	PIPE-81
2	1	142.804	0.00	4.58	0.00	0.00	3.32	0.0	7.3	7.6	25.13	72.25	3.56	36	1.00	131.50	132.93	136.05	136.22	142.54	144.69	PIPE-191
3	2	48.795	0.77	2.98	0.77	0.60	2.39	5.0	7.1	7.6	18.23	204.4	4.20	36	8.00	132.93	136.84	136.41	138.20	144.69	143.59	PIPE-21
4	3	237.249	0.00	0.29	0.00	0.00	0.26	0.0	6.0	8.0	2.06	6.79	3.36	12	3.10	136.84	144.18	138.20	144.79	143.59	148.52	PIPE-84
5	4	109.899	0.00	0.10	0.00	0.00	0.09	0.0	5.1	8.2	0.74	3.86	2.19	12	1.00	144.18	145.28	144.79	145.64	148.52	149.22	PIPE-83 (1) (1)
6	5	22.000	0.10	0.10	0.90	0.09	0.09	5.0	5.0	8.2	0.74	3.86	2.92	12	1.00	145.28	145.50	145.64	145.86	149.22	149.50	PIPE-86
7	4	22.000	0.19	0.19	0.90	0.17	0.17	5.0	5.0	8.2	1.40	9.45	3.17	12	6.00	144.18	145.50	144.79	146.00	148.52	149.50	PIPE-87
8	1	142.713	0.00	4.97	0.00	0.00	4.47	0.0	8.6	7.3	32.53	249.6	4.51	48	2.57	131.51	135.18	136.05	136.87	142.54	143.63	PIPE-196
9	8	188.722	0.00	4.97	0.00	0.00	4.47	0.0	8.1	7.4	33.05	110.0	6.50	48	0.50	135.18	136.12	136.87	137.83	143.63	144.60	PIPE-195
10	9	100.000	0.00	4.65	0.00	0.00	4.18	0.0	7.8	7.5	31.19	110.0	6.22	48	0.50	136.12	136.62	137.83	138.28	144.60	144.63	PIPE-194
11	10	100.000	0.00	4.19	0.00	0.00	3.77	0.0	7.6	7.5	28.34	51.09	6.92	36	0.50	136.62	137.12	138.28	138.84	144.63	144.60	PIPE-193
12	11	100.000	0.00	3.73	0.00	0.00	3.36	0.0	7.3	7.6	25.47	51.09	6.29	36	0.50	137.12	137.62	138.84	139.25	144.60	144.60	PIPE-192
13	12	100.000	0.00	3.27	0.00	0.00	2.94	0.0	7.0	7.7	22.55	51.09	6.00	36	0.50	137.62	138.12	139.25	139.65	144.60	144.60	PIPE-159
14	13	100.000	0.00	2.81	0.00	0.00	2.53	0.0	6.7	7.7	19.58	51.09	5.69	36	0.50	138.12	138.62	139.65	140.04	144.60	144.60	PIPE-169
15	14	145.958	0.00	2.25	0.00	0.00	2.02	0.0	6.3	7.9	15.91	51.09	5.21	36	0.50	138.62	139.35	140.04	140.62	144.60	144.61	PIPE-168
16	15	100.000	0.00	1.68	0.00	0.00	1.51	0.0	5.9	8.0	12.05	31.42	5.09	30	0.50	139.35	139.85	140.62	141.01	144.61	144.60	PIPE-167
17	16	100.000	0.00	1.22	0.00	0.00	1.10	0.0	5.6	8.1	8.87	17.33	4.96	24	0.50	139.85	140.35	141.01	141.41	144.60	144.60	PIPE-166
18	17	100.000	0.00	0.76	0.00	0.00	0.69	0.0	5.2	8.2	5.62	4.95	4.58	15	0.50	140.35	140.85	141.60	142.24	144.60	144.60	PIPE-165
19	18	70.000	0.76	0.76	0.90	0.69	0.69	5.0	5.0	8.2	5.67	8.47	4.84	15	1.46	140.85	141.88	142.57	142.95	144.60	145.50	PIPE-132
20	17	70.000	0.46	0.46	0.90	0.41	0.41	5.0	5.0	8.2	3.41	5.69	4.73	12	2.18	140.35	141.88	141.41	142.66	144.60	145.50	PIPE-131
21	16	70.000	0.46	0.46	0.90	0.41	0.41	5.0	5.0	8.2	3.41	6.56	4.74	12	2.89	139.85	141.88	141.01	142.66	144.60	145.50	PIPE-130
22	15	70.000	0.56	0.56	0.90	0.51	0.51	5.0	5.0	8.2	4.19	7.33	5.58	12	3.61	139.35	141.88	140.62	142.74	144.61	145.50	PIPE-117

Project File: New.stm | Number of lines: 38 | Run Date: 5/11/2020

NOTES:Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period =Yrs. 25 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
23	3	92.000	0.57	1.92	0.81	0.46	1.54	5.0	5.7	8.0	12.34	24.50	5.65	24	1.00	136.84	137.76	138.20	139.02	143.59	144.74	PIPE-20
24	23	104.000	0.71	1.35	0.81	0.57	1.07	5.0	5.3	8.1	8.75	24.50	4.70	24	1.00	137.76	138.80	139.02	139.85	144.74	144.74	PIPE-19
25	24	84.000	0.64	0.64	0.78	0.50	0.50	5.0	5.0	8.2	4.15	7.00	4.29	15	1.00	138.80	139.64	139.85	140.46	144.74	145.10	PIPE-18
26	14	70.000	0.57	0.57	0.90	0.51	0.51	5.0	5.0	8.2	4.19	8.32	5.58	12	4.65	138.62	141.88	140.04	142.74	144.60	145.50	PIPE-92
27	13	70.000	0.46	0.46	0.90	0.41	0.41	5.0	5.0	8.2	3.41	8.94	4.73	12	5.36	138.12	141.88	139.65	142.66	144.60	145.50	PIPE-106
28	12	70.000	0.46	0.46	0.90	0.41	0.41	5.0	5.0	8.2	3.41	9.51	4.74	12	6.08	137.62	141.88	139.25	142.66	144.60	145.50	PIPE-105
29	11	70.000	0.46	0.46	0.90	0.41	0.41	5.0	5.0	8.2	3.41	10.06	4.74	12	6.79	137.12	141.88	138.84	142.66	144.60	145.50	PIPE-98
30	10	70.000	0.46	0.46	0.90	0.41	0.41	5.0	5.0	8.2	3.41	10.57	4.74	12	7.51	136.62	141.88	138.28	142.66	144.63	145.50	PIPE-104
31	2	175.422	0.30	1.60	0.61	0.19	0.93	5.0	6.1	7.9	7.34	24.50	2.37	24	1.00	132.93	134.69	136.41	136.55	144.69	142.74	PIPE-126
32	31	180.133	0.84	1.29	0.46	0.38	0.74	5.0	5.2	8.2	6.07	24.50	3.29	24	1.00	134.69	136.49	136.60	137.36	142.74	140.65	PIPE-128
33	32	40.000	0.46	0.46	0.78	0.36	0.36	5.0	5.0	8.2	2.93	3.86	4.40	12	1.00	136.49	136.89	137.36	137.62	140.65	140.72	PIPE-127
34	9	70.000	0.32	0.32	0.90	0.29	0.29	5.0	5.0	8.2	2.39	11.06	3.69	12	8.22	136.12	141.88	137.83	142.54	144.60	145.50	PIPE-102
35	1	60.440	0.59	0.69	0.60	0.36	0.43	5.0	5.5	8.1	3.47	15.64	2.83	15	5.00	131.51	134.53	136.05	136.20	142.54	141.21	PIPE-197
36	35	54.078	0.09	0.09	0.78	0.07	0.07	5.0	5.0	8.2	0.60	8.63	1.76	12	5.00	134.53	137.23	136.38	137.55	141.21	141.07	PIPE-80
37	End	113.858	0.31	0.75	0.79	0.24	0.59	5.0	5.3	8.2	4.81	19.37	2.72	18	2.90	130.00	133.30	135.59	135.79	131.75	137.12	PIPE-124
38	37	40.000	0.44	0.44	0.79	0.35	0.35	5.0	5.0	8.2	2.86	7.00	2.33	15	1.00	133.30	133.70	135.85	135.92	137.12	137.12	PIPE-123

Project File: New.stm | Number of lines: 38 | Run Date: 5/11/2020

NOTES:Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period =Yrs. 25 ; c = cir e = ellip b = box

Storm Sewer Inlet Time Tabulation

Line No.	Line ID	Tc Method	Sheet Flow n-Value	Sheet Flow flow Length (ft)	Sheet Flow 2-yr 24h P (in)	Sheet Flow Land Slope (%)	Sheet Flow Travel Time (min)	Shallow Concentrated Flow flow Length (ft)	Shallow Concentrated Flow Water Slope (%)	Shallow Concentrated Flow Surf Descr	Shallow Concentrated Flow Ave Vel (ft/s)	Shallow Concentrated Flow Travel Time (min)	Channel Flow X-sec Area (sqft)	Channel Flow Wetted Perim (ft)	Channel Flow Chan Slope (%)	Channel Flow n-Value	Channel Flow Vel	Channel Flow flow Length (ft)	Channel Flow Travel Time (min)	Total Travel Time (min)
1	PIPE-81	User																		0.00
2	PIPE-191	User																		0.00
3	PIPE-21	User																		5.00
4	PIPE-84	User																		0.00
5	PIPE-83 (1) (1)	User																		0.00
6	PIPE-86	User																		5.00
7	PIPE-87	User																		5.00
8	PIPE-196	User																		0.00
9	PIPE-195	User																		0.00
10	PIPE-194	User																		0.00
11	PIPE-193	User																		0.00
12	PIPE-192	User																		0.00
13	PIPE-159	User																		0.00
14	PIPE-169	User																		0.00
15	PIPE-168	User																		0.00
16	PIPE-167	User																		0.00
17	PIPE-166	User																		0.00
18	PIPE-165	User																		0.00
19	PIPE-132	User																		5.00
20	PIPE-131	User																		5.00
21	PIPE-130	User																		5.00
22	PIPE-117	User																		5.00
23	PIPE-20	User																		5.00
24	PIPE-19	User																		5.00

Project File: New.stm | Min. Tc used for intensity calculations = 5 min | Number of lines: 38 | Date: 5/11/2020

Network A1-5

Storm Sewer Inlet Time Tabulation

Line No.	Line ID	Tc Method	Sheet Flow n-Value	Sheet Flow flow Length (ft)	Sheet Flow 2-yr 24h P (in)	Sheet Flow Land Slope (%)	Sheet Flow Travel Time (min)	Shallow Concentrated Flow flow Length (ft)	Shallow Concentrated Flow Water Slope (%)	Shallow Concentrated Flow Surf Descr	Shallow Concentrated Flow Ave Vel (ft/s)	Shallow Concentrated Flow Travel Time (min)	Channel Flow X-sec Area (sqft)	Channel Flow Wetted Perim (ft)	Channel Flow Chan Slope (%)	Channel Flow n-Value	Channel Flow Vel	Channel Flow flow Length (ft)	Channel Flow Travel Time (min)	Total Travel Time (min)
25	PIPE-18	User																		5.00
26	PIPE-92	User																		5.00
27	PIPE-106	User																		5.00
28	PIPE-105	User																		5.00
29	PIPE-98	User																		5.00
30	PIPE-104	User																		5.00
31	PIPE-126	User																		5.00
32	PIPE-128	User																		5.00
33	PIPE-127	User																		5.00
34	PIPE-102	User																		5.00
35	PIPE-197	User																		5.00
36	PIPE-80	User																		5.00
37	PIPE-124	User																		5.00
38	PIPE-123	User																		5.00

Project File: New.stm | Min. Tc used for intensity calculations = 5 min | Number of lines: 38 | Date: 5/11/2020

Network A1-5

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
	(in)	(cfs)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	(ft)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)	(K)	(ft)
1	48	58.75	130.00	135.59	4.00	12.56	4.68	0.34	135.93	0.143	81.998	131.51	135.71	4.00	12.57	4.67	0.34	136.05	0.143	0.143	0.117	1.00	0.34
2	36	25.13	131.50	136.05	3.00	7.07	3.56	0.20	136.24	0.121	142.804	132.93	136.22	3.00	7.07	3.56	0.20	136.42	0.121	0.121	0.173	0.97	0.19
3	36	18.23	132.93	136.41	3.00	3.13	2.58	0.10	136.51	0.064	48.795	136.84	138.20 j	1.37**	3.13	5.82	0.53	138.73	0.352	0.208	n/a	1.23	0.65
4	12	2.06	136.84	138.20	1.00	0.50	2.62	0.11	138.31	0.285	237.249	144.18	144.79 j	0.61**	0.50	4.09	0.26	145.05	0.594	0.440	n/a	1.00	0.26
5	12	0.74	144.18	144.79	0.61	0.25	1.46	0.13	144.93	0.000	109.899	145.28	145.64 j	0.36**	0.25	2.91	0.13	145.77	0.000	0.000	n/a	1.00	n/a
6	12	0.74	145.28	145.64	0.36	0.25	2.93	0.13	145.77	0.000	22.000	145.50	145.86	0.36**	0.25	2.92	0.13	145.99	0.000	0.000	n/a	1.00	n/a
7	12	1.40	144.18	144.79	0.61	0.39	2.77	0.20	144.99	0.000	22.000	145.50	146.00 j	0.50**	0.39	3.56	0.20	146.20	0.000	0.000	n/a	1.00	0.20
8	48	32.53	131.51	136.05	4.00	5.06	2.59	0.10	136.15	0.044	142.713	135.18	136.87 j	1.69**	5.06	6.43	0.64	137.51	0.314	0.179	n/a	0.28	0.18
9	48	33.05	135.18	136.87	1.69	5.06	6.53	0.65	137.52	0.000	188.722	136.12	137.83	1.71**	5.12	6.46	0.65	138.48	0.000	0.000	n/a	1.00	0.65
10	48	31.19	136.12	137.83	1.71	4.91	6.10	0.63	138.45	0.000	100.000	136.62	138.28 j	1.66**	4.91	6.35	0.63	138.90	0.000	0.000	n/a	1.00	n/a
11	36	28.34	136.62	138.28	1.66	4.00	7.08	0.71	138.99	0.000	100.000	137.12	138.84	1.72**	4.19	6.76	0.71	139.55	0.000	0.000	n/a	1.00	0.71
12	36	25.47	137.12	138.84	1.72	3.92	6.07	0.66	139.50	0.000	100.000	137.62	139.25	1.63**	3.92	6.50	0.66	139.91	0.000	0.000	n/a	1.00	0.66
13	36	22.55	137.62	139.25	1.63	3.61	5.76	0.61	139.85	0.000	100.000	138.12	139.65 j	1.53**	3.61	6.24	0.61	140.25	0.000	0.000	n/a	1.00	0.61
14	36	19.58	138.12	139.65	1.53	3.29	5.42	0.55	140.20	0.000	100.000	138.62	140.04	1.42**	3.29	5.96	0.55	140.59	0.000	0.000	n/a	1.00	n/a
15	36	15.91	138.62	140.04	1.42	2.85	4.84	0.48	140.52	0.000	145.958	139.35	140.62 j	1.27**	2.85	5.57	0.48	141.11	0.000	0.000	n/a	1.00	n/a
16	30	12.05	139.35	140.62	1.27	2.24	4.80	0.45	141.07	0.000	100.000	139.85	141.01 j	1.16**	2.24	5.39	0.45	141.46	0.000	0.000	n/a	1.00	n/a
17	24	8.87	139.85	141.01	1.16	1.69	4.68	0.43	141.44	0.000	100.000	140.35	141.41 j	1.06**	1.69	5.24	0.43	141.84	0.000	0.000	n/a	1.00	n/a
18	15	5.62	140.35	141.60	1.25*	1.23	4.58	0.33	141.93	0.645	100.000	140.85	142.24	1.25	1.23	4.58	0.33	142.57	0.644	0.645	0.645	1.00	0.33
19	15	5.67	140.85	142.57	1.25	1.23	4.62	0.33	142.90	0.657	70.000	141.88	142.95	1.07	1.12	5.06	0.40	143.35	0.610	0.633	0.443	1.00	0.40
20	12	3.41	140.35	141.41	1.00	0.66	4.34	0.29	141.70	0.780	70.000	141.88	142.66 j	0.79**	0.66	5.13	0.41	143.07	0.840	0.810	n/a	1.00	0.41
21	12	3.41	139.85	141.01	1.00	0.66	4.34	0.29	141.31	0.782	70.000	141.88	142.66 j	0.79**	0.66	5.13	0.41	143.07	0.840	0.811	n/a	1.00	0.41
22	12	4.19	139.35	140.62	1.00	0.72	5.34	0.44	141.07	1.182	70.000	141.88	142.74 j	0.86**	0.72	5.82	0.53	143.26	1.089	1.135	n/a	1.00	0.53

Project File: New.stm | Number of lines: 38 | Run Date: 5/11/2020

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Network A1-5

Hydraulic Grade Line Computations

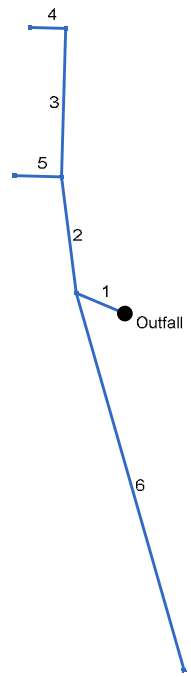
Line	Size (in)	Q (cfs)	Downstream Invert elev (ft)	Downstream HGL elev (ft)	Downstream Depth (ft)	Downstream Area (sqft)	Downstream Vel (ft/s)	Downstream Vel head (ft)	Downstream EGL elev (ft)	Downstream Sf (%)	Len (ft)	Upstream Invert elev (ft)	Upstream HGL elev (ft)	Upstream Depth (ft)	Upstream Area (sqft)	Upstream Vel (ft/s)	Upstream Vel head (ft)	Upstream EGL elev (ft)	Upstream Sf (%)	Check Ave Sf (%)	Check Enrgy loss (ft)	JL coeff (K)	Minor loss (ft)
23	24	12.34	136.84	138.20	1.37	2.09	5.40	0.54	138.75	0.000	92.000	137.76	139.02 j	1.26**	2.09	5.91	0.54	139.56	0.000	0.000	n/a	0.50	n/a
24	24	8.75	137.76	139.02	1.26	1.68	4.19	0.42	139.44	0.000	104.000	138.80	139.85 j	1.05**	1.68	5.21	0.42	140.27	0.000	0.000	n/a	0.50	0.21
25	15	4.15	138.80	139.85	1.05	0.86	3.76	0.36	140.21	0.000	84.000	139.64	140.46 j	0.82**	0.86	4.83	0.36	140.82	0.000	0.000	n/a	1.00	0.36
26	12	4.19	138.62	140.04	1.00	0.72	5.34	0.44	140.48	1.182	70.000	141.88	142.74 j	0.86**	0.72	5.82	0.53	143.26	1.089	1.136	n/a	1.00	0.53
27	12	3.41	138.12	139.65	1.00	0.66	4.34	0.29	139.94	0.781	70.000	141.88	142.66 j	0.79**	0.66	5.13	0.41	143.07	0.840	0.810	n/a	1.00	n/a
28	12	3.41	137.62	139.25	1.00	0.66	4.34	0.29	139.54	0.782	70.000	141.88	142.66 j	0.79**	0.66	5.13	0.41	143.07	0.841	0.811	n/a	1.00	n/a
29	12	3.41	137.12	138.84	1.00	0.66	4.34	0.29	139.13	0.782	70.000	141.88	142.66 j	0.79**	0.66	5.13	0.41	143.07	0.840	0.811	n/a	1.00	0.41
30	12	3.41	136.62	138.28	1.00	0.66	4.34	0.29	138.57	0.781	70.000	141.88	142.66 j	0.79**	0.66	5.13	0.41	143.07	0.840	0.811	n/a	1.00	n/a
31	24	7.34	132.93	136.41	2.00	3.14	2.34	0.08	136.50	0.090	175.422	134.69	136.55	1.87	3.05	2.41	0.09	136.64	0.078	0.084	0.147	0.55	0.05
32	24	6.07	134.69	136.60	1.92	1.31	1.96	0.33	136.93	0.000	180.133	136.49	137.36 j	0.87**	1.31	4.62	0.33	137.69	0.000	0.000	n/a	1.30	n/a
33	12	2.93	136.49	137.36	0.87	0.62	4.04	0.35	137.71	0.000	40.000	136.89	137.62 j	0.73**	0.62	4.75	0.35	137.97	0.000	0.000	n/a	1.00	n/a
34	12	2.39	136.12	137.83	1.00	0.55	3.04	0.14	137.97	0.383	70.000	141.88	142.54 j	0.66**	0.55	4.33	0.29	142.83	0.638	0.511	n/a	1.00	0.29
35	15	3.47	131.51	136.05	1.25	1.23	2.83	0.12	136.17	0.247	60.440	134.53	136.20	1.25	1.23	2.83	0.12	136.32	0.247	0.247	0.149	1.50	0.19
36	12	0.60	134.53	136.38	1.00	0.22	0.77	0.01	136.39	0.024	54.078	137.23	137.55 j	0.32**	0.22	2.75	0.12	137.67	0.481	0.253	n/a	1.00	n/a
37	18	4.81	130.00	135.59	1.50	1.77	2.72	0.12	135.71	0.179	113.858	133.30	135.79	1.50	1.77	2.72	0.12	135.91	0.179	0.179	0.204	0.50	0.06
38	15	2.86	133.30	135.85	1.25	1.23	2.33	0.08	135.94	0.167	40.000	133.70	135.92	1.25	1.23	2.33	0.08	136.00	0.167	0.167	0.067	1.00	0.08

Project File: New.stm | Number of lines: 38 | Run Date: 5/11/2020

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Network A1-5

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



Project File: New.stm	Number of lines: 6	Date: 5/11/2020

Network B6-2

Storm Sewers v2018.30

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	PIPE-149	6.31	24	Cir	57.812	130.00	130.49	0.848	133.54*	133.58*	0.09	133.67	End	Combination
2	PIPE-148	2.05	12	Cir	129.278	130.49	131.33	0.650	133.67*	134.04*	0.16	134.19	1	Combination
3	PIPE-147	0.48	12	Cir	163.956	131.33	132.40	0.650	134.19*	134.22*	0.01	134.23	2	Combination
4	PIPE-146	0.31	12	Cir	39.396	132.40	132.65	0.650	134.23*	134.23*	0.00	134.23	3	Combination
5	PIPE-151	0.67	12	Cir	51.708	131.33	133.92	5.000	134.19	134.26	0.12	134.38	2	Combination
6	PIPE-190	1.16	12	Cir	432.740	130.49	133.30	0.650	133.67	134.08	0.05	134.13	1	Combination

Project File: New.stm | Number of lines: 6 | Run Date: 5/11/2020

NOTES: Return period = 25 Yrs. ; *Surcharged (HGL above crown).

Network B6-2

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	57.812	0.82	1.46	0.63	0.52	0.97	5.0	12.0	6.5	6.31	22.56	2.01	24	0.85	130.00	130.49	133.54	133.58	132.25	135.40	PIPE-149
2	1	129.278	0.20	0.41	0.83	0.16	0.31	5.0	11.2	6.7	2.05	3.11	2.61	12	0.65	130.49	131.33	133.67	134.04	135.40	136.81	PIPE-148
3	2	163.956	0.03	0.08	0.77	0.02	0.06	5.0	6.7	7.8	0.48	3.11	0.61	12	0.65	131.33	132.40	134.19	134.22	136.81	135.77	PIPE-147
4	3	39.396	0.05	0.05	0.79	0.04	0.04	5.0	5.0	8.2	0.31	3.11	0.39	12	0.65	132.40	132.65	134.23	134.23	135.77	135.76	PIPE-146
5	2	51.708	0.13	0.13	0.62	0.08	0.08	5.0	5.0	8.2	0.67	8.63	1.83	12	5.00	131.33	133.92	134.19	134.26	136.81	137.51	PIPE-151
6	1	432.740	0.23	0.23	0.62	0.14	0.14	5.0	5.0	8.2	1.16	3.11	1.63	12	0.65	130.49	133.30	133.67	134.08	135.40	137.03	PIPE-190

Project File: New.stm | Number of lines: 6 | Run Date: 5/11/2020

NOTES:Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period =Yrs. 25 ; c = cir e = ellip b = box

Network B6-2

Storm Sewer Inlet Time Tabulation

Line No.	Line ID	Tc Method	Sheet Flow					Shallow Concentrated Flow					Channel Flow							Total Travel Time (min)
			n-Value	flow Length (ft)	2-yr 24h P (in)	Land Slope (%)	Travel Time (min)	flow Length (ft)	Water Slope (%)	Surf Descr	Ave Vel (ft/s)	Travel Time (min)	X-sec Area (sqft)	Wetted Perim (ft)	Chan Slope (%)	n-Value	Vel	flow Length (ft)	Travel Time (min)	
1	PIPE-149	User																		5.00
2	PIPE-148	User																		5.00
3	PIPE-147	User																		5.00
4	PIPE-146	User																		5.00
5	PIPE-151	User																		5.00
6	PIPE-190	User																		5.00

Project File: New.stm | Min. Tc used for intensity calculations = 5 min | Number of lines: 6 | Date: 5/11/2020

Network B6-2

Hydraulic Grade Line Computations

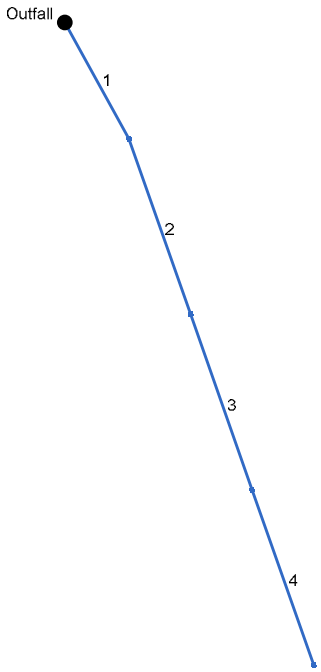
Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
	(in)	(cfs)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	(ft)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)	(K)	(ft)
1	24	6.31	130.00	133.54	2.00	3.14	2.01	0.06	133.60	0.066	57.812	130.49	133.58	2.00	3.14	2.01	0.06	133.64	0.066	0.066	0.038	1.50	0.09
2	12	2.05	130.49	133.67	1.00	0.79	2.61	0.11	133.78	0.283	129.278	131.33	134.04	1.00	0.79	2.61	0.11	134.14	0.282	0.282	0.365	1.48	0.16
3	12	0.48	131.33	134.19	1.00	0.79	0.61	0.01	134.20	0.015	163.956	132.40	134.22	1.00	0.79	0.61	0.01	134.23	0.015	0.015	0.025	1.50	0.01
4	12	0.31	132.40	134.23	1.00	0.79	0.39	0.00	134.23	0.006	39.396	132.65	134.23	1.00	0.79	0.39	0.00	134.23	0.006	0.006	0.002	1.00	0.00
5	12	0.67	131.33	134.19	1.00	0.24	0.86	0.01	134.21	0.030	51.708	133.92	134.26	0.34**	0.24	2.81	0.12	134.38	0.470	0.250	0.129	1.00	0.12
6	12	1.16	130.49	133.67	1.00	0.79	1.48	0.03	133.71	0.091	432.740	133.30	134.08	0.77	0.65	1.79	0.05	134.13	0.102	0.097	0.418	1.00	0.05

Project File: New.stm | Number of lines: 6 | Run Date: 5/11/2020

Notes: ; ** Critical depth. ; c = cir e = ellip b = box

Network B6-2

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



Project File: New.stm	Number of lines: 4	Date: 5/11/2020

Network B6-3

Storm Sewers v2018.30

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	PIPE-91	22.06	36	Cir	124.449	134.00	134.65	0.525	138.66*	138.78*	0.08	138.85	End	Combination
2	PIPE-90	17.69	36	Cir	174.666	134.65	135.53	0.500	138.85*	138.96*	0.05	139.01	1	Combination
3	PIPE-89	12.30	30	Cir	174.666	135.53	136.40	0.500	139.01*	139.14*	0.05	139.19	2	Combination
4	PIPE-88	6.49	24	Cir	174.649	136.40	137.27	0.500	139.19	139.27	0.07	139.34	3	Combination

Project File: New.stm | Number of lines: 4 | Run Date: 5/11/2020

NOTES: Return period = 25 Yrs. ; *Surcharged (HGL above crown).

Network B6-3

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	124.449	0.88	3.56	0.79	0.70	3.05	5.0	8.7	7.2	22.06	52.34	3.12	36	0.52	134.00	134.65	138.66	138.78	137.33	141.37	PIPE-91
2	1	174.666	0.89	2.67	0.88	0.78	2.35	5.0	7.6	7.5	17.69	51.09	2.50	36	0.50	134.65	135.53	138.85	138.96	141.37	141.37	PIPE-90
3	2	174.666	0.89	1.79	0.88	0.78	1.57	5.0	6.4	7.8	12.30	31.42	2.51	30	0.50	135.53	136.40	139.01	139.14	141.37	141.37	PIPE-89
4	3	174.649	0.89	0.89	0.88	0.79	0.79	5.0	5.0	8.2	6.49	17.33	2.06	24	0.50	136.40	137.27	139.19	139.27	141.37	141.37	PIPE-88

Project File: New.stm | Number of lines: 4 | Run Date: 5/11/2020

NOTES:Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period =Yrs. 25 ; c = cir e = ellip b = box

Network B6-3

Storm Sewer Inlet Time Tabulation

Line No.	Line ID	Tc Method	Sheet Flow					Shallow Concentrated Flow					Channel Flow							Total Travel Time (min)
			n-Value	flow Length (ft)	2-yr 24h P (in)	Land Slope (%)	Travel Time (min)	flow Length (ft)	Water Slope (%)	Surf Descr	Ave Vel (ft/s)	Travel Time (min)	X-sec Area (sqft)	Wetted Perim (ft)	Chan Slope (%)	n-Value	Vel	flow Length (ft)	Travel Time (min)	
1	PIPE-91	User																		5.00
2	PIPE-90	User																		5.00
3	PIPE-89	User																		5.00
4	PIPE-88	User																		5.00

Project File: New.stm | Min. Tc used for intensity calculations = 5 min | Number of lines: 4 | Date: 5/11/2020

Network B6-3

Hydraulic Grade Line Computations

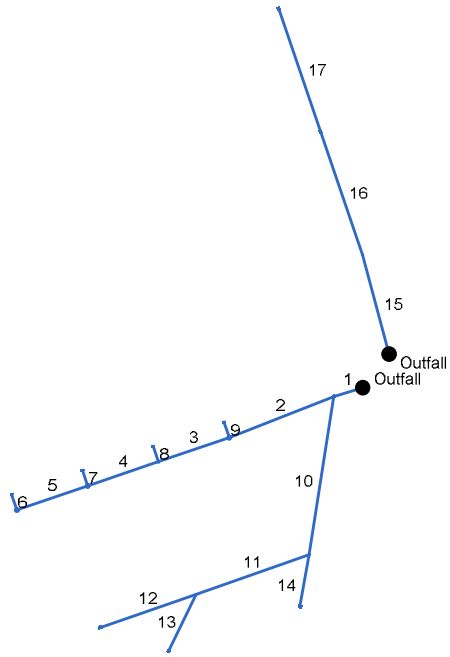
Line	Size (in)	Q (cfs)	Downstream Invert elev (ft)	Downstream HGL elev (ft)	Downstream Depth (ft)	Downstream Area (sqft)	Downstream Vel (ft/s)	Downstream Vel head (ft)	Downstream EGL elev (ft)	Downstream Sf (%)	Len (ft)	Upstream Invert elev (ft)	Upstream HGL elev (ft)	Upstream Depth (ft)	Upstream Area (sqft)	Upstream Vel (ft/s)	Upstream Vel head (ft)	Upstream EGL elev (ft)	Upstream Sf (%)	Check Ave Sf (%)	Check Enrgy loss (ft)	JL coeff (K)	Minor loss (ft)
1	36	22.06	134.00	138.66	3.00	7.07	3.12	0.15	138.81	0.093	124.449	134.65	138.78	3.00	7.07	3.12	0.15	138.93	0.093	0.093	0.116	0.50	0.08
2	36	17.69	134.65	138.85	3.00	7.07	2.50	0.10	138.95	0.060	174.666	135.53	138.96	3.00	7.07	2.50	0.10	139.05	0.060	0.060	0.105	0.50	0.05
3	30	12.30	135.53	139.01	2.50	4.91	2.51	0.10	139.10	0.077	174.666	136.40	139.14	2.50	4.91	2.51	0.10	139.24	0.077	0.077	0.134	0.50	0.05
4	24	6.49	136.40	139.19	2.00	3.14	2.06	0.07	139.25	0.070	174.649	137.27	139.27	2.00	3.14	2.06	0.07	139.34	0.069	0.070	0.122	1.00	0.07

Project File: New.stm | Number of lines: 4 | Run Date: 5/11/2020

; c = cir e = ellip b = box

Network B6-3

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



Project File: New.stm	Number of lines: 17	Date: 5/11/2020

Network B6-4

Storm Sewers v2018.30

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	PIPE-136	33.97	42	Cir	40.422	134.00	136.92	7.219	139.26	139.03	0.68	139.70	End	Combination
2	PIPE-206	10.39	24	Cir	150.159	136.92	143.51	4.390	139.70	144.66	n/a	144.66 j	1	Manhole
3	PIPE-201	7.89	24	Cir	100.000	143.51	144.01	0.500	144.66	145.01	n/a	145.01 j	2	Manhole
4	PIPE-200	5.34	24	Cir	100.000	144.01	144.51	0.500	145.01	145.32	n/a	145.32 j	3	Manhole
5	PIPE-199	2.72	15	Cir	100.000	144.51	145.01	0.500	145.32	145.67	n/a	145.67	4	Manhole
6	PIPE-198	2.73	12	Cir	22.000	145.01	145.50	2.232	145.67	146.21	n/a	146.21	5	Combination
7	PIPE-208	2.73	12	Cir	22.000	144.51	145.50	4.505	145.32	146.21	n/a	146.21 j	4	Combination
8	PIPE-209	2.73	12	Cir	22.000	144.01	145.50	6.777	145.01	146.21	n/a	146.21 j	3	Combination
9	PIPE-210	2.73	12	Cir	22.000	143.51	145.50	9.050	144.66	146.21	n/a	146.21 j	2	Combination
10	PIPE-135	23.56	42	Cir	214.628	136.92	139.06	1.000	139.70	140.55	n/a	140.55 j	1	None
11	PIPE-134	13.36	24	Cir	160.001	139.06	140.66	1.000	140.55	141.98	n/a	141.98 j	10	None
12	PIPE-221	3.67	15	Cir	136.000	140.66	142.02	1.000	141.98	142.80	n/a	142.80 j	11	Combination
13	PIPE-133	2.69	12	Cir	84.853	140.66	144.91	5.000	141.98	145.61	n/a	145.61 j	11	Combination
14	PIPE-137	2.13	12	Cir	70.711	139.06	142.60	5.000	140.55	143.22	n/a	143.22 j	10	Combination
15	PIPE-109	18.45	36	Cir	137.764	134.00	135.00	0.727	139.26*	139.35*	0.02	139.37	End	None
16	PIPE-108	12.32	30	Cir	174.666	135.00	136.14	0.650	139.37*	139.50*	0.05	139.55	15	Combination
17	PIPE-107	6.49	24	Cir	174.666	136.14	137.27	0.650	139.55*	139.67*	0.07	139.74	16	Combination

Project File: New.stm | Number of lines: 17 | Run Date: 5/11/2020

NOTES: Return period = 25 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

Network B6-4

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	40.422	0.18	6.15	0.66	0.12	4.41	5.0	6.9	7.7	33.97	292.8	4.57	42	7.22	134.00	136.92	139.26	139.03	137.83	144.80	PIPE-136
2	1	150.159	0.00	1.47	0.00	0.00	1.32	0.0	6.3	7.9	10.39	51.34	4.42	24	4.39	136.92	143.51	139.70	144.66	144.80	148.61	PIPE-206
3	2	100.000	0.00	1.10	0.00	0.00	0.99	0.0	6.0	8.0	7.89	17.33	4.62	24	0.50	143.51	144.01	144.66	145.01	148.61	148.61	PIPE-201
4	3	100.000	0.00	0.73	0.00	0.00	0.66	0.0	5.5	8.1	5.34	17.33	3.93	24	0.50	144.01	144.51	145.01	145.32	148.61	148.68	PIPE-200
5	4	100.000	0.00	0.37	0.00	0.00	0.33	0.0	5.1	8.2	2.72	4.95	3.67	15	0.50	144.51	145.01	145.32	145.67	148.68	148.69	PIPE-199
6	5	22.000	0.37	0.37	0.90	0.33	0.33	5.0	5.0	8.2	2.73	5.76	4.77	12	2.23	145.01	145.50	145.67	146.21	148.69	149.50	PIPE-198
7	4	22.000	0.37	0.37	0.90	0.33	0.33	5.0	5.0	8.2	2.73	8.19	4.28	12	4.50	144.51	145.50	145.32	146.21	148.68	149.50	PIPE-208
8	3	22.000	0.37	0.37	0.90	0.33	0.33	5.0	5.0	8.2	2.73	10.04	4.03	12	6.78	144.01	145.50	145.01	146.21	148.61	149.50	PIPE-209
9	2	22.000	0.37	0.37	0.90	0.33	0.33	5.0	5.0	8.2	2.73	11.61	4.03	12	9.05	143.51	145.50	144.66	146.21	148.61	149.50	PIPE-210
10	1	214.628	1.51	4.50	0.70	1.06	2.97	5.0	6.1	7.9	23.56	109.0	4.45	42	1.00	136.92	139.06	139.70	140.55	144.80	144.81	PIPE-135
11	10	160.001	1.20	2.49	0.74	0.89	1.66	5.0	5.6	8.1	13.36	24.50	5.71	24	1.00	139.06	140.66	140.55	141.98	144.81	145.62	PIPE-134
12	11	136.000	0.62	0.62	0.72	0.45	0.45	5.0	5.0	8.2	3.67	7.00	3.80	15	1.00	140.66	142.02	141.98	142.80	145.62	146.30	PIPE-221
13	11	84.853	0.68	0.68	0.48	0.33	0.33	5.0	5.0	8.2	2.69	8.63	3.99	12	5.00	140.66	144.91	141.98	145.61	145.62	147.81	PIPE-133
14	10	70.711	0.50	0.50	0.52	0.26	0.26	5.0	5.0	8.2	2.13	8.63	3.43	12	5.00	139.06	142.60	140.55	143.22	144.81	146.83	PIPE-137
15	End	137.764	1.13	2.92	0.78	0.88	2.46	5.0	7.6	7.5	18.45	61.62	2.61	36	0.73	134.00	135.00	139.26	139.35	137.33	141.37	PIPE-109
16	15	174.666	0.89	1.79	0.88	0.79	1.57	5.0	6.4	7.8	12.32	35.82	2.51	30	0.65	135.00	136.14	139.37	139.50	141.37	141.37	PIPE-108
17	16	174.666	0.89	0.89	0.88	0.79	0.79	5.0	5.0	8.2	6.49	19.75	2.06	24	0.65	136.14	137.27	139.55	139.67	141.37	141.37	PIPE-107

Project File: New.stm | Number of lines: 17 | Run Date: 5/11/2020

NOTES:Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period =Yrs. 25 ; c = cir e = ellip b = box

Network B6-4

Storm Sewer Inlet Time Tabulation

Line No.	Line ID	Tc Method	Sheet Flow					Shallow Concentrated Flow					Channel Flow							Total Travel Time (min)
			n-Value	flow Length (ft)	2-yr 24h P (in)	Land Slope (%)	Travel Time (min)	flow Length (ft)	Water Slope (%)	Surf Descr	Ave Vel (ft/s)	Travel Time (min)	X-sec Area (sqft)	Wetted Perim (ft)	Chan Slope (%)	n-Value	Vel	flow Length (ft)	Travel Time (min)	
1	PIPE-136	User																		5.00
2	PIPE-206	User																		0.00
3	PIPE-201	User																		0.00
4	PIPE-200	User																		0.00
5	PIPE-199	User																		0.00
6	PIPE-198	User																		5.00
7	PIPE-208	User																		5.00
8	PIPE-209	User																		5.00
9	PIPE-210	User																		5.00
10	PIPE-135	User																		5.00
11	PIPE-134	User																		5.00
12	PIPE-221	User																		5.00
13	PIPE-133	User																		5.00
14	PIPE-137	User																		5.00
15	PIPE-109	User																		5.00
16	PIPE-108	User																		5.00
17	PIPE-107	User																		5.00

Project File: New.stm | Min. Tc used for intensity calculations = 5 min | Number of lines: 17 | Date: 5/11/2020

Network B6-4

Hydraulic Grade Line Computations

Line	Size (in)	Q (cfs)	Downstream Invert elev (ft)	Downstream HGL elev (ft)	Downstream Depth (ft)	Downstream Area (sqft)	Downstream Vel (ft/s)	Downstream Vel head (ft)	Downstream EGL elev (ft)	Downstream Sf (%)	Len (ft)	Upstream Invert elev (ft)	Upstream HGL elev (ft)	Upstream Depth (ft)	Upstream Area (sqft)	Upstream Vel (ft/s)	Upstream Vel head (ft)	Upstream EGL elev (ft)	Upstream Sf (%)	Check Ave Sf (%)	Check Enrgy loss (ft)	JL coeff (K)	Minor loss (ft)
1	42	33.97	134.00	139.26	3.50	9.62	3.53	0.19	139.45	0.097	40.422	136.92	139.03	2.11	6.05	5.61	0.49	139.52	0.213	0.155	0.063	1.38	0.68
2	24	10.39	136.92	139.70	2.00	1.88	3.31	0.17	139.87	0.180	150.159	143.51	144.66 j	1.15**	1.88	5.54	0.48	145.14	0.451	0.315	n/a	1.00	n/a
3	24	7.89	143.51	144.66	1.15	1.57	4.21	0.39	145.06	0.000	100.000	144.01	145.01 j	1.00**	1.57	5.03	0.39	145.40	0.000	0.000	n/a	1.00	0.39
4	24	5.34	144.01	145.01	1.00	1.20	3.41	0.31	145.32	0.000	100.000	144.51	145.32 j	0.81**	1.20	4.44	0.31	145.63	0.000	0.000	n/a	1.00	0.31
5	15	2.72	144.51	145.32	0.82	0.66	3.21	0.16	145.48	0.261	100.000	145.01	145.67	0.66**	0.66	4.13	0.26	145.93	0.501	0.381	n/a	1.00	n/a
6	12	2.73	145.01	145.67	0.66	0.55	4.95	0.33	146.00	0.000	22.000	145.50	146.21	0.71**	0.59	4.59	0.33	146.53	0.000	0.000	n/a	1.00	n/a
7	12	2.73	144.51	145.32	0.82	0.59	3.98	0.33	145.65	0.000	22.000	145.50	146.21 j	0.71**	0.59	4.59	0.33	146.53	0.000	0.000	n/a	1.00	n/a
8	12	2.73	144.01	145.01	1.00	0.59	3.47	0.33	145.34	0.000	22.000	145.50	146.21 j	0.71**	0.59	4.59	0.33	146.53	0.000	0.000	n/a	1.00	n/a
9	12	2.73	143.51	144.66	1.00	0.59	3.47	0.19	144.85	0.500	22.000	145.50	146.21 j	0.71**	0.59	4.59	0.33	146.53	0.694	0.597	n/a	1.00	n/a
10	42	23.56	136.92	139.70	2.78	3.91	2.87	0.57	140.27	0.000	214.628	139.06	140.55 j	1.49**	3.91	6.03	0.57	141.12	0.000	0.000	n/a	0.90	n/a
11	24	13.36	139.06	140.55	1.49	2.19	5.32	0.58	141.13	0.000	160.001	140.66	141.98 j	1.31**	2.19	6.10	0.58	142.56	0.000	0.000	n/a	0.75	n/a
12	15	3.67	140.66	141.98	1.25	0.80	2.99	0.14	142.12	0.276	136.000	142.02	142.80 j	0.77**	0.80	4.61	0.33	143.13	0.556	0.416	n/a	1.00	0.33
13	12	2.69	140.66	141.98	1.00	0.59	3.42	0.18	142.16	0.486	84.853	144.91	145.61 j	0.70**	0.59	4.56	0.32	145.93	0.687	0.586	n/a	1.00	n/a
14	12	2.13	139.06	140.55	1.00	0.51	2.71	0.11	140.67	0.305	70.711	142.60	143.22 j	0.62**	0.51	4.14	0.27	143.49	0.603	0.454	n/a	1.00	n/a
15	36	18.45	134.00	139.26	3.00	7.07	2.61	0.11	139.37	0.065	137.764	135.00	139.35	3.00	7.07	2.61	0.11	139.46	0.065	0.065	0.090	0.15	0.02
16	30	12.32	135.00	139.37	2.50	4.91	2.51	0.10	139.46	0.077	174.666	136.14	139.50	2.50	4.91	2.51	0.10	139.60	0.077	0.077	0.134	0.50	0.05
17	24	6.49	136.14	139.55	2.00	3.14	2.06	0.07	139.62	0.070	174.666	137.27	139.67	2.00	3.14	2.06	0.07	139.74	0.070	0.070	0.122	1.00	0.07

Project File: New.stm | Number of lines: 17 | Run Date: 5/11/2020

Notes: ; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Network B6-4

Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Legend

Hyd.	Origin	Description
1	Rational	Watershed B6-2B
2	Rational	A11-2 Upper Swale
3	Rational	A11-2 Lower Swale

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	Rational	------	7.998	9.471	-------	-------	13.95	16.73	18.79	-------	Watershed B6-2B
2	Rational	------	1.055	1.250	-------	-------	1.841	2.207	2.479	-------	A11-2 Upper Swale
3	Rational	------	1.081	1.280	-------	-------	1.886	2.261	2.540	-------	A11-2 Lower Swale

Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, May 15 2020

A11-2 SWALE FLOW

Trapezoidal

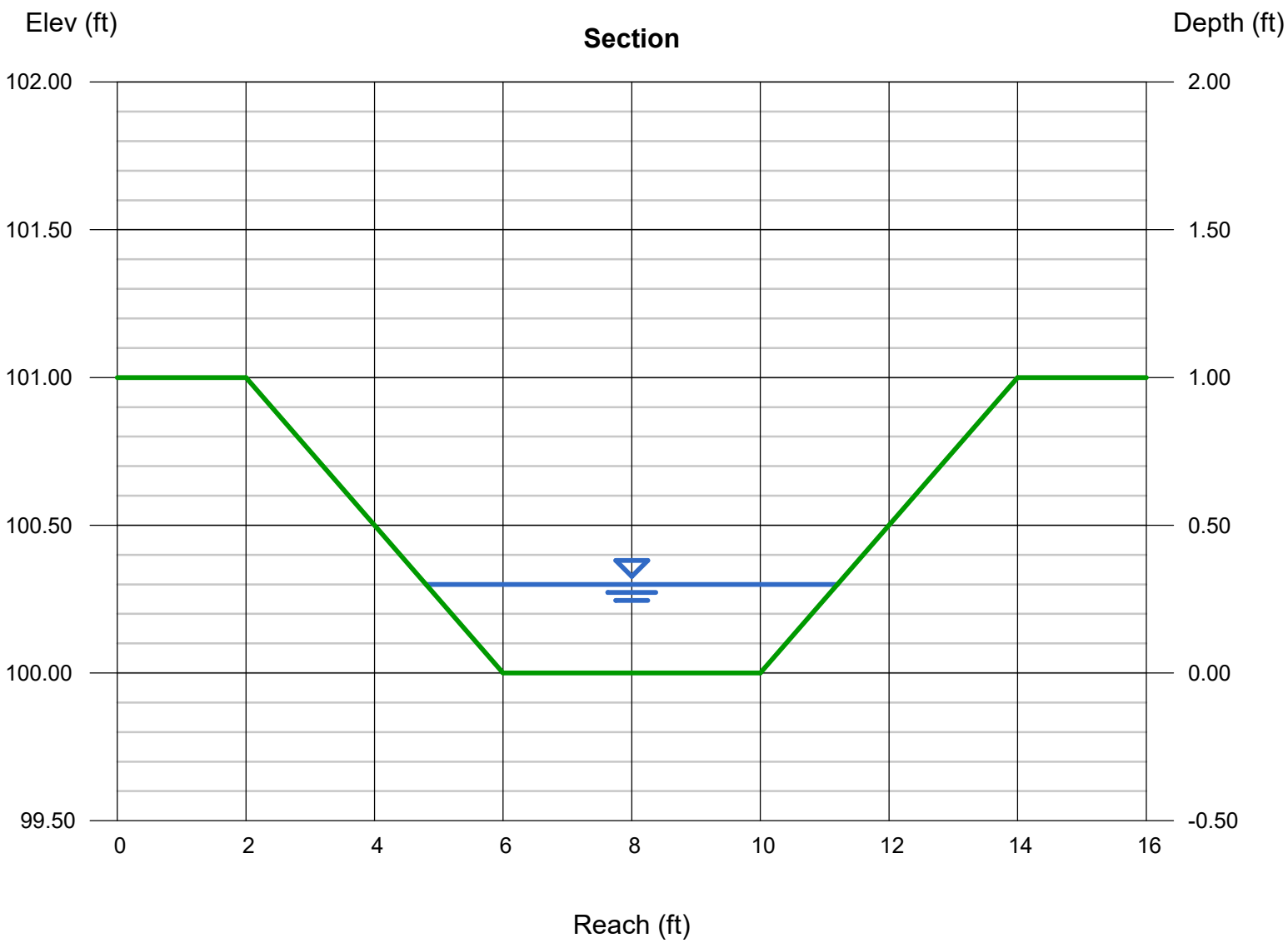
Bottom Width (ft)	= 4.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 100.00
Slope (%)	= 1.00
N-Value	= 0.030

Calculations

Compute by:	Q vs Depth
No. Increments	= 20

Highlighted

Depth (ft)	= 0.30
Q (cfs)	= 2.991
Area (sqft)	= 1.56
Velocity (ft/s)	= 1.92
Wetted Perim (ft)	= 6.47
Crit Depth, Yc (ft)	= 0.24
Top Width (ft)	= 6.40
EGL (ft)	= 0.36



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, May 15 2020

B6-2B SWALE FLOW

Trapezoidal

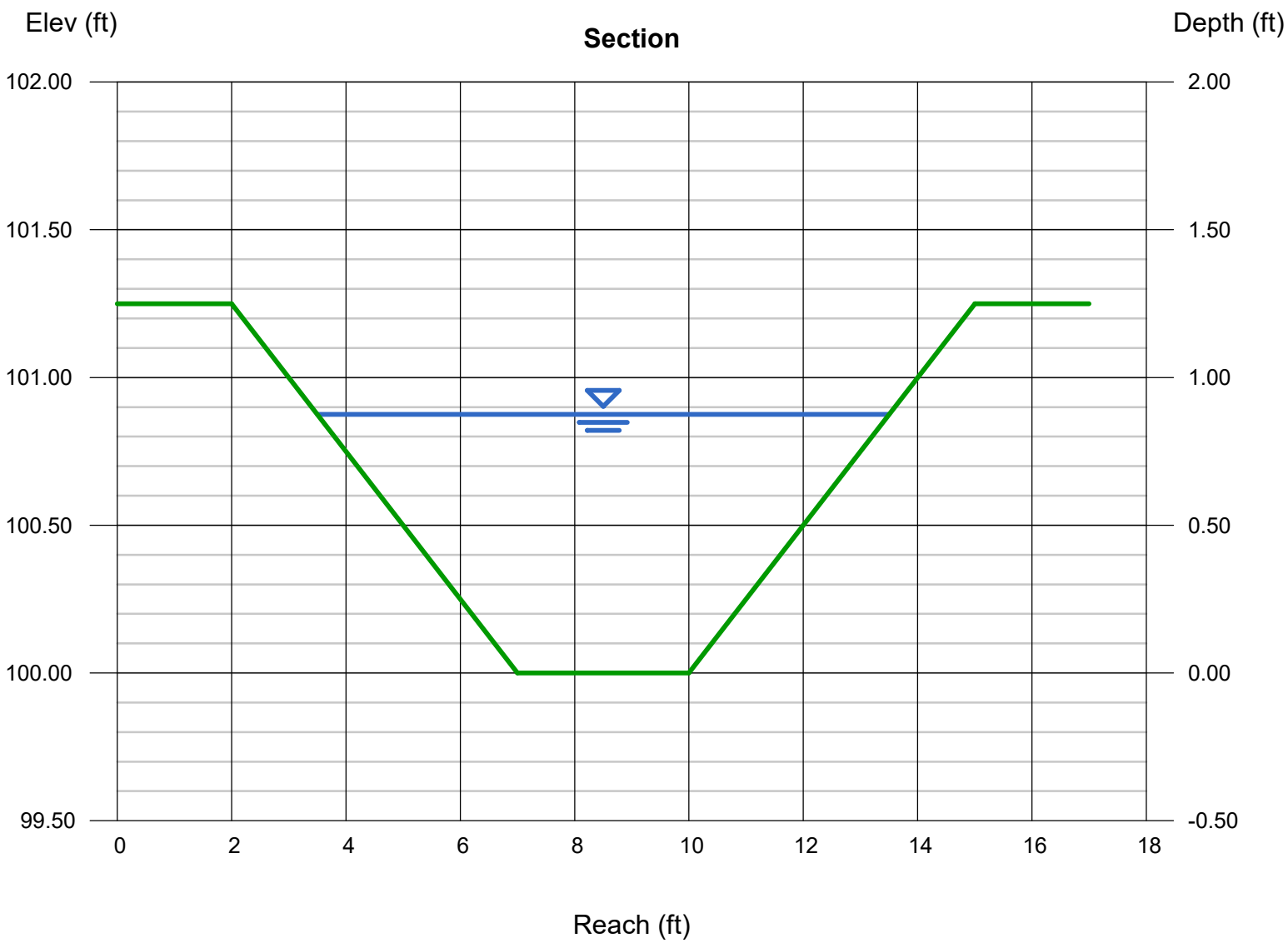
Bottom Width (ft)	= 3.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.25
Invert Elev (ft)	= 100.00
Slope (%)	= 1.00
N-Value	= 0.030

Calculations

Compute by:	Q vs Depth
No. Increments	= 20

Highlighted

Depth (ft)	= 0.88
Q (cfs)	= 19.06
Area (sqft)	= 5.69
Velocity (ft/s)	= 3.35
Wetted Perim (ft)	= 10.22
Crit Depth, Yc (ft)	= 0.78
Top Width (ft)	= 10.00
EGL (ft)	= 1.05



STORM DRAIN DESIGN

PROJECT:	PROPOSED GREEN MEADOW DRIVE, HUDSON, NH
HSI JOB #:	3867-DD
DESIGN METHOD:	RATIONAL METHOD
DESIGN STORM EVENT:	25-YR (PER TOWN OF HUDSON STORMWATER REGULATIONS)
COMPUTED BY:	JNP
DATE:	4/13/2020

HSI Hayner/Swanson, Inc.
Civil Engineers/Land Surveyors
Three Congress Street Nashua, New Hampshire 03062-3301
Tel (603) 883-2057 www.hayner-swanson.com Fax (603) 883-5057

FROM PIPE INLET				TO PIPE OUTLET				SUBCATCHMENT AREA					PIPE SIZE & MATERIAL					PIPE CAPACITY						
LOCATION	RIM	INVERT	COVER	LOCATION	RIM	INVERT	COVER	ACRES (ACRES)	C	CA (ACRES)	ΣCA (ACRES)	Tc (MIN)	LENGTH (FT)	SLOPE (FT/FT)	DIA. (IN)	MATERIAL	n	I (in/hr)	Q_{DESIGN} (cfs)	Q_{FULL} (cfs)	V_{FULL} (fps)	T_{FLOW} (min)	Q CHECK:	
CB 124	149.6	144.53	4.07	CB 123	148.7	143.60	4.05	0.25	0.66	0.17	0.17	5.0	46	0.020	12	RCP	0.012	7.0	1.16	5.46	6.96	0.1	OK	
CB 123	148.7	143.50	4.15	CB 121	139.3	134.30	4.00	0.37	0.79	0.29	0.46	5.1	216	0.042	12	RCP	0.012	6.9	3.15	7.92	10.09	0.4	OK	
CB 122	139.3	134.30	4.00	CB 121	139.5	134.13	4.17	0.18	0.63	0.11	0.11	5.0	34	0.005	12	RCP	0.012	7.0	0.79	2.73	3.48	0.2	OK	
CB 121	139.3	133.88	4.17	CB 119	136.2	131.03	3.92	0.18	0.73	0.13	0.70	5.5	250	0.011	15	RCP	0.012	6.7	4.69	7.35	5.99	0.7	OK	
CB 120	136.2	131.20	4.00	CB 119	136.2	131.03	4.17	0.19	0.68	0.13	0.13	5.0	34	0.005	12	RCP	0.012	7.0	0.91	2.73	3.48	0.2	OK	
CB 119	136.2	130.78	3.92	CB 117	134.9	130.16	3.24	0.19	0.71	0.13	0.96	6.1	154	0.004	18	RCP	0.012	6.5	6.24	7.20	4.07	0.6	OK	
CB 118	134.9	130.73	3.17	CB 117	134.9	130.56	3.34	0.24	0.72	0.17	0.17	5.0	34	0.005	12	RCP	0.012	7.0	1.19	2.73	3.48	0.2	OK	
CB 117	134.9	129.66	3.24	CB 115	136.4	129.15	5.25	0.24	0.67	0.16	1.29	6.7	169	0.003	24	RCP	0.012	6.4	8.26	13.42	4.27	0.7	OK	
CB 116	136.4	131.40	4.00	CB 115	136.3	131.23	4.07	0.16	0.64	0.10	0.10	5.0	34	0.005	12	RCP	0.012	7.0	0.70	2.73	3.48	0.2	OK	
CB 115	136.4	129.05	5.35	CB 114	138.4	128.38	8.02	0.16	0.71	0.11	1.65	7.4	222	0.003	24	RCP	0.012	6.0	9.90	13.42	4.27	0.9	OK	
CB 114	136.4	128.28	6.12	CB 112	135.2	127.57	5.63			0.00	1.65	8.3	236	0.003	24	RCP	0.012	5.7	9.41	13.42	4.27	0.9	OK	
																								TO SITE
CB 113	135.3	130.30	4.00	CB 112	135.2	130.13	4.07	0.18	0.63	0.11	0.11	5.0	34	0.005	12	RCP	0.012	7.0	0.79	2.73	3.48	0.2	OK	
CB 112	135.3	127.47	5.83	CB 110	132.9	126.91	3.99	0.18	0.70	0.13	1.89	9.2	188	0.003	24	RCP	0.012	5.4	10.21	13.42	4.27	0.7	OK	
CB 111	132.9	127.90	4.00	CB 110	132.9	127.73	4.17	0.38	0.63	0.24	0.24	5.0	34	0.005	12	RCP	0.012	7.0	1.68	2.73	3.48	0.2	OK	
CB 110	132.9	126.80	4.10	DMH 107	134.4	126.21	6.19	0.38	0.73	0.28	2.41	9.9	146	0.004	24	RCP	0.012	5.2	12.53	15.50	4.93	0.5	OK	
DMH 107	134.4	126.11	6.29	DMH 106	135.6	125.54	8.06	-	-	0.00	2.41	10.4	142	0.004	24	RCP	0.012	5.1	12.29	15.50	4.93	0.5	OK	
DMH 106	135.6	125.44	8.16	CB 104	133.2	124.72	6.48	-	-	0.00	2.41	10.9	178	0.004	24	RCP	0.012	5.0	12.05	15.50	4.93	0.6	OK	
CB 105	133.2	128.20	4.00	CB 104	133.2	128.03	4.17	0.14	0.64	0.09	0.09	5.0	34	0.005	12	RCP	0.012	7.0	0.63	2.73	3.48	0.2	OK	
CB 104	133.2	124.62	6.58	CB 103	129.6	123.49	4.11	0.14	0.73	0.10	2.60	11.5	226	0.005	24	RCP	0.012	4.9	12.74	17.33	5.52	0.7	OK	
CB 103	129.6	123.39	4.21	DMH 100	132.8	122.68	8.12	0.66	0.67	0.44	3.04	12.2	168	0.005	24	RCP	0.012	4.8	14.59	17.33	5.52	0.5	OK	
CB 102	129.7	124.35	4.10	DMH 101	132.0	123.76	7.00	0.66	0.63	0.42	0.42	5.0	119	0.005	15	RCP	0.012	7.0	2.91	4.96	4.04	0.5	OK	
DMH 101	132.0	123.65	7.10	DMH 100	132.8	122.95	8.61	-	-	0.00	0.42	5.4	141	0.005	15	RCP	0.012	6.8	2.86	4.96	4.04	0.6	OK	
DMH 100	132.8	122.58	8.22	SITE	132.0	122.38	7.62	-	-	0.00	3.46	12.7	40	0.005	24	RCP	0.012	4.7	16.26	17.33	5.52	0.1	OK	
CES 2	135.0	133.50	0.50	CES1	133.0	131.50	0.50	0.70	0.30	0.21	0.21	5.0	86	0.020	12	RCP	0.012	7.0	1.47	5.46	6.96	0.2	OK	TO CES 1
HW 131	131.5	128.75	1.50	HW 130	130.5	127.25	2.00	1.10	0.37	0.41	0.41	5.0	97	0.016	15	RCP	0.012	7.0	2.85	8.73	7.11	0.2	OK	TO HW 130
DMH 141	158.5	150.50	6.75	HW 140	153.0	150.01	1.74			0.00	0.00		98		15	RCP	0.012	#N/A	#N/A	0.00	0.00	#DIV/0!	#N/A	TO HW 140

INDIVIDUAL DRAIN LINE DESIGN - DRAINAGE AREAS

DRAINAGE AREA	AREA (AC)	Cw	WOODS (AC)	OPEN (AC)	ROOF (AC)	PAVED (AC)
102	0.66	0.63		0.30		0.36
103	0.66	0.67		0.25		0.41
104	0.14	0.73		0.04		0.10
105	0.14	0.64		0.06		0.08
110	0.38	0.73		0.11		0.27
111	0.38	0.63		0.17		0.21
112	0.18	0.70		0.06		0.12
113	0.18	0.63		0.08		0.10
114	0.00			0.00		0.00
115	0.16	0.71		0.05		0.11
116	0.16	0.64		0.07		0.09
117	0.24	0.68		0.09		0.15
118	0.24	0.73		0.07		0.17
119	0.19	0.74		0.05		0.14
120	0.19	0.71		0.06		0.13
121	0.18	0.73		0.05		0.13
122	0.18	0.63		0.08		0.10
123	0.37	0.79		0.07		0.30
124	0.25	0.66		0.10		0.15
CES 2	0.70	0.13		0.30		
HW 131	1.10	0.37		0.97		0.13

APPENDIX E

Inspection and Maintenance Manual

LANGAN

Inspection & Maintenance Schedule
Hudson Logistic Center – Hudson, NH

Regular inspection and maintenance of the stormwater management system and stormwater pond areas is necessary to ensure proper operation. Hillwood Enterprises, L.P. is the responsible party who will implement the required inspections and reporting. Responsibility will be transferred with the ownership of the property. Inspection and maintenance records must be provided to NHDES upon request. Inspections of the stormwater management system and pavement areas should be conducted monthly based on the following table:

Site Areas:

Inspection and Maintenance

Check for:	***Corrective Measure:***
Erosion	Install erosion control measures and provide stabilization measures
Spillage	Contain spill as close to source as possible with a dike of absorbent materials installed to protect drainage inlets, stormwater areas, or downstream wetlands and streams. All hazardous waste material, including absorbent materials must be disposed of by a licensed hazardous waste transporter and disposed of in an environmentally acceptable manner
Sediment Accumulation	Stabilize any disturbed areas uphill of where the sedimentation is occurring. Use temporary erosion control measures (i.e. silt fence, straw bales) to filter stormwater runoff.
Trash	Pick up and dispose of trash and litter in an environmentally acceptable manner.

At a minimum the following maintenance measures shall be provided at the frequency listed in the following table:

Routine Maintenance

Maintenance Measure:	***Frequency:***
Pavement Sweeping	Minimum two times per year: during spring cleanup (after last snow event) and during fall cleanup (to remove fallen leaves)
Pavement De-icing	Apply anti-icing treatment prior to storms according to the attached BMPs. Apply deicing treatments as needed during and after snow storms and mixed precipitation events to control ice and compact snow not removed during plowing.
Invasive Plants	Perform inspection activities and disposal procedures outlined in the attached "Methods for Disposing Non-Native Invasive Plants" a minimum of once per year.
Snow Disposal/ Chloride Management	See attached BMPs and environmental fact sheet titled "Snow Disposal Guidelines" developed by New Hampshire Department of Environmental Services for maintenance guidelines. Complete all bullet points included in the fact sheet. Only a New Hampshire Certified Green SnowPro Salt Applicator will be employed for winter snow and ice management activities.

Inspection & Maintenance Schedule
Hudson Logistic Center – Hudson, NH

Catch Basins, Pipe, Curb Leak-off, Conveyance Swales, Filter Strips:

Inspection and Maintenance

Check for:	***Corrective Measure:***
Trash, Sediment, and Debris at Grate	Remove trash, sediment, and debris and dispose of in an environmentally acceptable manner.
Trash, Sediment, and Debris in leak off, swale or filter strip	Remove sediment if depth impedes free low of run off or becomes deeper than 4 inches. Remove trash, sediment, and debris and dispose of in an environmentally acceptable manner.
Sediment & Trash Accumulation in Sump	Remove sediment from sumps if depth of deposits is greater than one-half the depth from the bottom of the catch basin to the invert of the lowest pipe in the basin.
Pipe blockages	Flush pipes to remove blockages. TV inspect as required.
Hydrodynamic Unit	Refer to attached Operations and Maintenance document provided by the manufacture

At a minimum the following maintenance measures shall be provided at the frequency listed in the following table:
Routine Maintenance

Maintenance Measure:	***Frequency:***
Sediment Removal	Minimum one time per year: Remove sediment and trash from catch basin sumps, hydrodynamic unit, curb leak offs, conveyance swales, inlet grates and pipe inverts. Dispose of sediment and trash in an environmentally acceptable manner.

Stormwater Ponds

(Infiltration basins, Dry extended detention pond with micro pool, sediment fore bays)

Inspection and Maintenance

Check for:	***Corrective Measure:***
Erosion / Scouring	Ensure the pond outfalls and inlets are operating as intended and that material is stabilized with no signs of deterioration. Upon identifying an issue, notify responsible parties for immediate repair.
Trash and Debris	Remove trash and debris and dispose of in an environmentally acceptable manner. Ensure Outlet Control Structures and all openings are free flowing.

At a minimum the following maintenance measures shall be provided at the frequency listed in the following table:
Routine Maintenance

Maintenance Measure:	***Frequency:***
Erosion / Scouring	Minimum once per year.
Trash and Debris	Minimum once per year.

*The shared Stormwater Ponds are a combined maintenance responsible of all property owners on the Hudson Logistic Center.. Any deficiencies identified in the maintenance or performance of these ponds should be made known to Hillwood Enterprises, L.P. , or subsequent owners, for corrective measures.

Spill Prevention and Response

Workers must follow basics for spill prevention, as well as specifics for certain materials. If a spill does occur, workers on site must follow procedures in this section.

1. Basics
    a. Quantity of Material - Only keep enough material on site that you need.
    b. Excavated Material – All soil not to be used for final grading/landscaping shall be removed from the site immediately, in accordance with applicable state and local law.
    c. Storage – All materials should be stored in appropriate containers and covered. If covering is not possible, the material must be covered with polyethylene or polypropylene sheeting.
    d. Label Products – Products will be stored with their original label from their manufacturer affixed in a legible way, to each container.
    e. Mixing – Products will only be mixed if recommended by manufacturer.
    f. Disposal – Products will try to be used entirely from each container prior to the disposal of container. Manufacturer's recommendations for proper disposal will be followed.
    g. Inspections – Site superintendent will do daily site inspections to insure proper storage, labeling and disposal of materials.

2. Specific Products
    a. Concrete – Concrete trucks will not wash out, discharge concrete, or drum wash water anywhere onside that could potentially reach a storm drainage system, waterway, or wetland. If washing occurs onsite, a sump basin is recommended and should be reinforced with silt fencing.
    b. Fertilizers – Fertilizer must be stored in a covered area, with any partially used bags stored in a sealed plastic bin. Fertilizer will only be applied in the minimum amounts based off manufacturer's recommendations, and will be worked into the soil when applied to avoid runoff.
    c. Paints – Containers will be clearly labeled, tightly sealed, and neatly stored. All extra paint will be disposed of based of manufacturer's recommendations.
    d. Petroleum Products – All vehicles onsite will be monitored for leaks and will regularly receive maintenance to reduce chance of leaks. Products must be labeled clearly and stored in tightly sealed containers or offsite. All asphalt substances used onsite will be applied according to the manufacturer's recommendations.

3. Spill Response

    a. Awareness and Materials – General contractor will inform all site personnel aware of all procedures, where all required materials are for clean-up. Required materials include shovels, brooms, rags, goggles, gloves, absorbent materials (sawdust, sand, etc.), and plastic/metal containers specifically there for this purpose. The materials needed will be present on site at all times.
    b. Response Time – Spills will be cleaned up immediately.
    c. Safety – The area the spill occurred in will be kept ventilated, and workers in the area will wear appropriate personal protective equipment.

Reporting – If the spill is toxic or hazardous, it must be reported to the appropriate state or local government agency, regardless of the size of the spill. The spill prevention plan will then change to prevent injury/contact with the toxic/hazardous substance.

Inspection & Maintenance Schedule
Hudson Logistic Center – Hudson, NH

STORMWATER MANAGEMENT SYSTEM INSPECTION AND MAINTENANCE CHECKLIST

Hudson Logistic Center - Hudson, NH Date: Date Since Last Precipitation Event:	Time:	Inspector: Site Conditions:
Inspection Item	**Satisfactory? Yes (Y) or No (N)**	**Comments or Corrective Measures Taken**
Site Areas		
Erosion	Y N	
Spillage	Y N	
Sediment Accumulation	Y N	
Trash	Y N	
Pavement Sweeping	Y N	
Pavement De-icing	Y N	
Invasive Plants	Y N	
Snow Disposal/ Chloride Management	Y N	
Catch Basins, Pipe, Curb Leak off, Conveyance Swale		
Trash, Sediment, and Debris at Inlet Grates	Y N	
Sediment & Trash Accumulation in Sump	Y N	
Pipe blockages	Y N	
Hydrodynamic Unit		
Performed Maintenance per Attached Documents	Y N	
Stormwater Pond		
Erosion / Souring	Y N	
Trash and Debris	Y N	

ENVIRONMENTAL
Fact Sheet

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

29 Hazen Drive, Concord, New Hampshire 03301 • (603) 271-3503 • www.des.nh.gov

WMB-3 2015

Snow Disposal Guidelines

Introduction

Each winter, the Department of Environmental Services receives numerous complaints related to snow disposal into and/or near surface water. There are several different concerns regarding disposal of snow cleared from streets and parking lots ranging from aesthetic concerns, such as minimizing the visibility of debris and huge snow piles, to environmental concerns, such as protection of groundwater quality, drinking water supplies, surface water quality and aquatic life.

The environmental impacts of disposed snow result from high levels of salt, sand, debris and trash, along with contaminants from automobiles including oil and exhaust. The debris and contaminants that inevitably end up in plowed snow make it illegal to dump snow directly into water bodies. RSA 485-A:13,I(a) prohibits discharging wastes to surface waters without a permit. In addition to water quality impacts, snow disposed in open water can cause dangerous ice jams.

Groundwater is sensitive to snow dumping due to the high levels of chloride and automotive waste in plowed snow. RSA 485-C:12 prohibits the siting or operation of snow dumps within classified wellhead protection areas.

Refer to the following guidelines for siting legal snow dumps and protecting New Hampshire's water.

Manchester NH sign prohibiting snow dumping. Photo: Robert Robinson, City of Manchester

Recommended Guidelines for Snow Disposal

These guidelines will assist in identifying snow disposal sites that minimize impact to the environment. Please note that snow dumps are kept out of water bodies due to waste materials, such as litter and debris. Waste does not belong on the land surface either; after the snow melts, all waste must be collected and disposed of properly.

- Disposed snow should be stored near flowing surface waters, but at least 25 feet from the high water mark of the surface water and/or top of stream bank. If a site cannot be found near a flowing surface water, then upland sites further from surface waters are acceptable, provided they do not impact water supply sources as described below.
- A silt fence or equivalent barrier should be securely placed between the snow storage area and the high water mark and/or the top of stream bank with care taken not to exceed the barrier with over-piling. This area should also be accessible for post-melt cleanup. Note: silt fence must be installed prior to the ground freezing.

- The snow storage area should be at least 75 feet from any private water supply wells, at least 200 feet from any community water supply wells, and at least 400 feet from any municipal wells. (Note: Snow storage areas are prohibited in wellhead protection areas.)
- All debris in the snow storage area should be cleared from the site prior to snow storage.
- By May 15 of each year, all debris from active snow storage areas should be cleared and properly disposed of.

Snow Disposal Site Selection Procedures

Municipal public works officials should consider consulting with the local health officer and conservation commission to identify sites. Securing sites prior to the winter season will help to alleviate capacity problems during winters with heavy snowfall. NHDES is available to help municipal officials identify appropriate snow disposal sites. The following are guidelines for site selection:

- Estimate how much snow disposal capacity is needed for the season so that an adequate number of sites can be selected and prepared.
- Sites lacking mature tree growth are preferred; trees make collection of debris more difficult after the winter season.
- Identify sites that could potentially be used for snow disposal such as municipal open space, parks, recreation fields and parking areas. If no additional municipal sites are available, consider securing permission from landowners of non-municipally owned sites.

For more information about snow storage contact the NHDES Watershed Management Bureau at (603) 271-3398.

Deicing Application Rate Guidelines

24' of pavement (typcial two-lane road)

These rates are not fixed values, but rather the middle of a range to be selected and adjusted by an agency according to its local conditions and experience.

			Pounds per two-lane mile			
Pavement Temp. (°F) and Trend (↑↓)	Weather Condition	Maintenance Actions	Salt Prewetted / Pretreated with Salt Brine	Salt Prewetted / Pretreated with Other Blends	Dry Salt*	Winter Sand (abrasives)
> 30° ↑	Snow	Plow, treat intersections only	80	70	100*	Not recommended
	Freezing Rain	Apply Chemical	80 - 160	70 - 140	100 - 200*	Not recommended
30° ↓	Snow	Plow and apply chemical	80 - 160	70 - 140	100 - 200*	Not recommended
	Freezing Rain	Apply Chemical	150 - 200	130 - 180	180 - 240*	Not recommended
25° - 30° ↑	Snow	Plow and apply chemical	120 - 160	100 - 140	150 - 200*	Not recommended
	Freezing Rain	Apply Chemical	150 - 200	130 - 180	180 - 240*	Not recommended
25° - 30° ↓	Snow	Plow and apply chemical	120 - 160	100 - 140	150 - 200*	Not recommended
	Freezing Rain	Apply Chemical	160 - 240	140 - 210	200 - 300*	400
20° - 25° ↑	Snow or Freezing Rain	Plow and apply chemical	160 - 240	140 - 210	200 - 300*	400
20° - 25° ↓	Snow	Plow and apply chemical	200 - 280	175 - 250	250 - 350*	Not recommended
	Freezing Rain	Apply Chemical	240 - 320	210 - 280	300 - 400*	400
15° - 20° ↑	Snow	Plow and apply chemical	200 - 280	175 - 250	250 - 350*	Not recommended
	Freezing Rain	Apply Chemical	240 - 320	210 - 280	300 - 400*	400
15° - 20° ↓	Snow or Freezing Rain	Plow and apply chemical	240 - 320	210 - 280	300 - 400*	500 for freezing rain
0° - 15° ↑↓	Snow	Plow, treat with blends, sand hazardous areas	Not recommended	300 - 400	Not recommended	500 - 750 spot treatment as needed
< 0°	Snow	Plow, treat with blends, sand hazardous areas	Not recommended	400 - 600**	Not recommended	500 - 750 spot treatment as needed

* Dry salt is not recommended. It is likely to blow off the road before it melts ice.

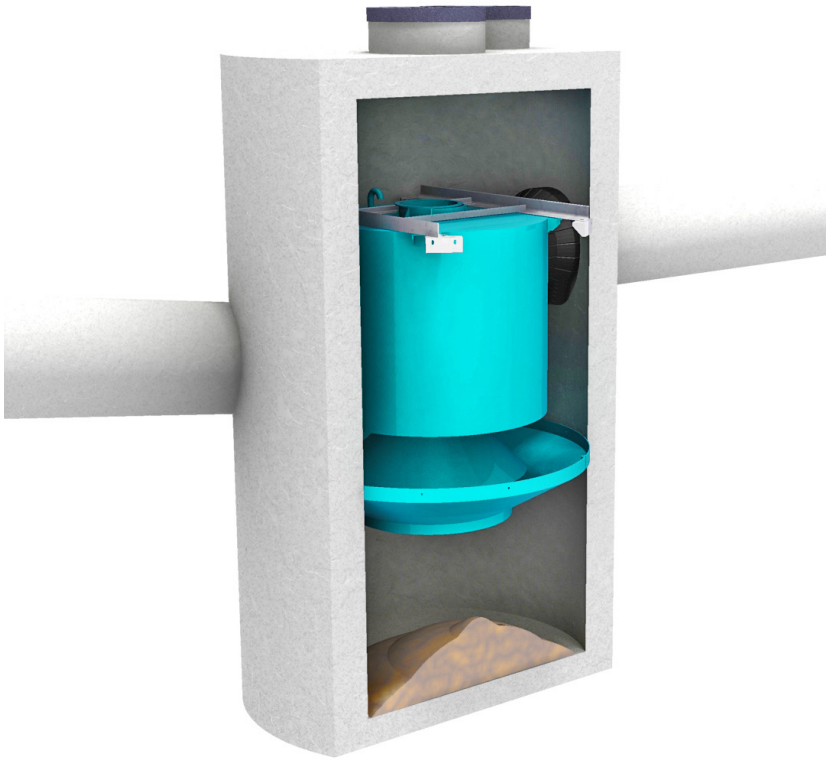
** A blend of 6 - 8 gal/ton $MgCl_2$ or $CaCl_2$ added to NaCl can melt ice as low as -10°.

Figure 4-1. Deicing Application Rate Guidelines

Anti-icing Route Data Form				
Truck Station:				
Date:				
Air Temperature	Pavement Temperature	Relative Humidity	Dew Point	Sky
Reason for applying:				
Route:				
Chemical:				
Application Time:				
Application Amount:				
Observation (first day):				
Observation (after event):				
Observation (before next application):				
Name:				

Figure 4-2. Example Documentation Form for Anti-Icing

Hydro International®



Operation and Maintenance Manual

Downstream Defender®

Vortex Separator for Stormwater Treatment

Turning Water Around ...®

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DISCLAIMER: Information and data contained in this manual is exclusively for the purpose of assisting in the operation and maintenance of Hydro International plc's Downstream Defender®. No warranty is given nor can liability be accepted for use of this information for any other purpose. Hydro International plc have a policy of continuous product development and reserve the right to amend specifications without notice.

Hydro International (Stormwater), 94 Hutchins Drive, Portland ME 04102
Tel: (207) 756-6200 Fax: (207) 756-6212 Web: www.hydro-int.com

Downstream Defender® by Hydro International

The Downstream Defender® is an advanced Hydrodynamic Vortex Separator designed to provide high removal efficiencies of settleable solids and their associated pollutants, oil, and floatables over a wide range of flow rates.

The Downstream Defender® has unique, flow-modifying internal components developed from extensive full-scale testing, CFD modeling and over thirty years of hydrodynamic separation experience in wastewater, combined sewer and stormwater applications. These internal components distinguish the Downstream Defender® from simple swirl-type devices and conventional oil/grit separators by minimizing turbulence and headlosses, enhancing separation, and preventing washout of previously stored pollutants.

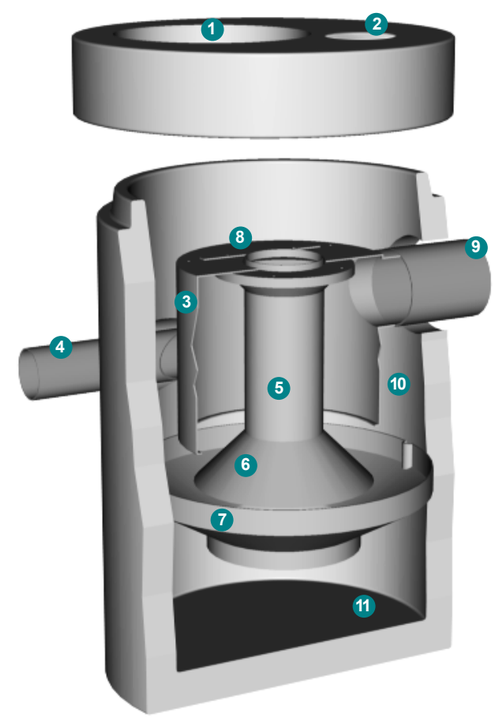
The high removal efficiencies and inherent low headlosses of the Downstream Defender® allow for a small footprint making it a compact and economical solution for the treatment of non-point source pollution.

Benefits of the Downstream Defender®

- Removes sediment, floatables, oil and grease
- No pollutant washouts
- Small footprint
- No loss of treatment capacity between clean-outs
- Low headloss
- Efficient over a wide ranges of flows
- Easy to install
- Low maintenance

Applications

- New developments and retrofits
- Utility yards
- Streets and roadways
- Parking lots
- Pre-treatment for filters, infiltration and storage
- Industrial and commercial facilities
- Wetlands protection



Downstream Defender® Components

1. Central Access Port
2. Floatables Access Port (6-ft., 8-ft. and 10-ft. models only)
3. Dip Plate
4. Tangential Inlet
5. Center Shaft
6. Center Cone
7. Benching Skirt
8. Floatables Lid
9. Outlet Pipe
10. Floatables Storage
11. Isolated Sediment Storage Zone

Hydro Maintenance Services

Hydro International has been engineering stormwater treatment systems for over 30 years. We understand the mechanics of removing pollutants from stormwater and how to keep systems running at an optimal level.

Nobody Knows our Systems Better than we do

Avoid Service Negligence

Sanitation services providers not intimately familiar with stormwater treatment systems are at risk of the following:

- Inadvertently breaking parts or failing to clean/replace system components appropriately.
- Charging you for more frequent maintenance because they lacked the tools to service your system properly in the first place.
- Billing you for replacement parts that might have been covered under your Hydro warranty plan
- Charging for maintenance that may not yet have been required.

Leave the Dirty Work to us

Trash, sediment and polluted water is stored inside treatment systems until they are removed by our team with a vactor truck. Sometimes teams must physically enter the system chambers in order to prepare the system for maintenance and install any replacement parts. Services include but are not limited to:

- Solids removal
- Removal of liquid pollutants
- Replacement media installation (when applicable)

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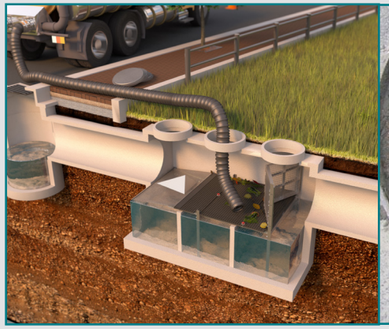
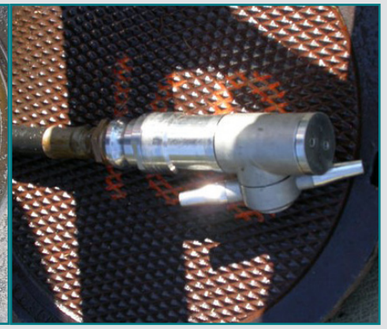
Downstream Defender® Operation and Maintenance Manual

Better Tools, Better Results

Not all vactor trucks are created equal. Appropriate tools and suction power are needed to service stormwater systems appropriately. Companies who don't specialize in stormwater treatment won't have the tools to properly clean systems or install new parts.





Service Warranty

Make sure you're not paying for service that is covered under your warranty plan. Only Hydro International's service teams can identify tune-ups that should be on us, not you.

Treatment Systems Serviced by Hydro:

- Stormwwater filters
- Stormwater separators
- Baffle boxes
- Biofilters/biorention systems
- Storage structures
- Catch basins
- Stormwater ponds
- Permeable pavement

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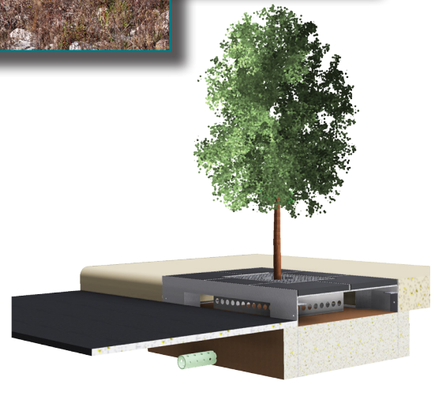

Operation

Introduction

The Downstream Defender® operates on simple fluid hydraulics. It is self-activating, has no moving parts, no external power requirement and is fabricated with durable non-corrosive components. No manual procedures are required to operate the unit and maintenance is limited to monitoring accumulations of stored pollutants and periodic clean-outs. The Downstream Defender® has been designed to allow for easy and safe access for inspection/monitoring and clean-out procedures. Entry into the unit or removal of the internal components is not necessary for maintenance, thus safety concerns related to confined-space-entry are avoided.

Pollutant Capture and Retention

The internal components of the Downstream Defender® have been designed to protect the oil, floatables and sediment storage volumes so that separator performance is not reduced as pollutants accumulate between clean-outs. Additionally, the Downstream Defender® is designed and installed into the storm drain system so that the vessel remains wet between storm events. Oil and floatables are stored on the water surface in the outer annulus separate from the sediment storage volume in the sump of the unit providing the option for separate oil disposal, and accessories such as adsorbant pads. Since the oil/floatables and sediment storage volumes are isolated from the active separation region, the potential for re-suspension and washout of stored pollutants between clean-outs is minimized.

Wet Sump

The sump of the Downstream Defender® retains a standing water level between storm events. The water in the sump prevents stored sediment from solidifying in the base of the unit. The clean-out procedure becomes more difficult and labor intensive if the system allows fine sediment to dry-out and consolidate. Dried sediment must be manually removed by maintenance crews. This is a labor intensive operation in a hazardous environment.

Blockage Protection

The Downstream Defender® has large clear openings and no internal restrictions or weirs, minimizing the risk of blockage and hydraulic losses. In addition to increasing the system headloss, orifices and internal weirs can increase the risk of blockage within the unit.

Maintenance

Overview

The Downstream Defender® protects the environment by removing a wide range of pollutants from stormwater runoff. Periodic removal of these captured pollutants is essential to the continuous, long-term functioning of the Downstream Defender®. The Downstream Defender® will capture and retain sediment and oil until the sediment and oil storage volumes are full to capacity. When sediment and oil storage capacities are reached, the Downstream Defender® will no longer be able to store removed sediment and oil. Maximum pollutant storage capacities are provided in Table 1.

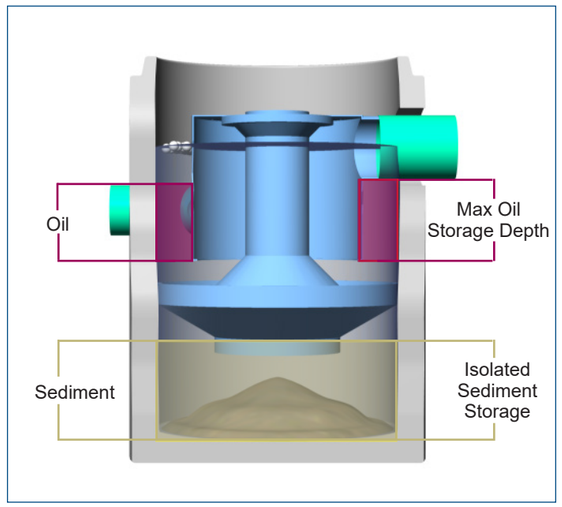

Fig.1 Pollutant storage volumes of the Downswtream Defender®.

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The Downstream Defender® allows for easy and safe inspection, monitoring and clean-out procedures. A commercially or municipally owned sump-vac is used to remove captured sediment and floatables. Access ports are located in the top of the manhole. On the 6-ft, 8-ft and 10-ft units, the floatables access port is above the outlet pipe between the concrete manhole wall and the dip plate. The sediment removal access ports for all Downstream Defender® models are located directly over the hollow center shaft.

Maintenance events may include Inspection, Oil & Floatables Removal, and Sediment Removal. Maintenance events do not require entry into the Downstream Defender®, nor do they require the internal components of the Downstream Defender® to be removed. In the case of inspection and floatables removal, a vactor truck is not required. However, a vactor truck is required if the maintenance event is to include oil removal and/or sediment removal.

Determining Your Maintenance Schedule

The frequency of cleanout is determined in the field after installation. During the first year of operation, the unit should be inspected every six months to determine the rate of sediment and floatables accumulation. A simple probe such as a Sludge Judge® can be used to determine the level of accumulated solids stored in the sump. This information can be recorded in the maintenance log (see page 9) to establish a routine maintenance schedule.

The vactor procedure, including both sediment and oil/flotables removal, for a 6-ft Downstream Defender® typically takes less than 30 minutes and removes a combined water/oil volume of about 500 gallons.

Inspection Procedures

Inspection is a simple process that does not involve entry into the Downstream Defender®. Maintenance crews should be familiar with the Downstream Defender® and its components prior to inspection.

Scheduling

- It is important to inspect your Downstream Defender® every six months during the first year of operation to determine your site-specific rate of pollutant accumulation
- Typically, inspection may be conducted during any season of the year
- Sediment removal is not required unless sediment depths exceed 75% of maximum clean-out depths stated in Table 1

Recommended Equipment

- Safety Equipment and Personal Protective Equipment (traffic cones, work gloves, etc.)
- Crow bar or other tool to remove grate or lid
- Pole with skimmer or net
- Sediment probe (such as a Sludge Judge®)
- Trash bag for removed floatables
- Downstream Defender® Maintenance Log

Table 1. Downstream Defender® Pollutant Storage Capacities and Max. Cleanout Depths.

Unit Diameter	Total Oil Storage	Oil Clean-out Depth	Total Sediment Storage	Sediment Clean-out Depth	Max. Liquid Volume Removed
(feet)	(gallons)	(inches)	(gallons)	(inches)	(gallons)
4	70	<16	141	<18	384
6	216	<23	424	<24	1,239
8	540	<33	939	<30	2,884
10	1,050	<42	1,757	<36	5,546
12	1,770	<49	2,970	<42	9,460

NOTES

1. Refer to Dowmstream Defender® Clean-out Detail (Fig. 1) for measurement of depths.

2. Oil accumulation is typically less than sediment, however, removal of oil and sediment during the same service is recommended.

3. Remove floatables first, then remove sediment storage volume.

4. Sediment removal is not required unless sediment depths exceed 75% of maximum clean-out depths stated in Table 1.

Fig.4

Fig.5

Fig.6

Inspection Procedures

1. Set up any necessary safety equipment around the access port or grate of the Downstream Defender® as stipulated by local ordinances. Safety equipment should notify passing pedestrian and road traffic that work is being done.

2. Remove the lids to the manhole (Fig. 4). NOTE: The 4-ft Downstream Defender® will only have one lid.

3. Without entering the vessel, look down into the chamber to inspect the inside. Make note of any irregularities. See Fig.7 and 8 for typical inspection views.

4. Without entering the vessel, use the pole with the skimmer net to remove floatables and loose debris from the outer annulus of the chamber.

5. Using a sediment probe such as a Sludge Judge®, measure the depth of sediment that has collected in the sump of the vessel (Fig.5).

6. On the Maintenance Log (see page 9), record the date, unit location, estimated volume of floatables and gross debris removed, and the depth of sediment measured. Also note any apparent irregularities such as damaged components or blockages.

7. Securely replace the grate or lid.

8. Take down safety equipment.

9. Notify Hydro International of any irregularities noted during inspection.

Floatables and Sediment Cleanout

Floatables cleanout is typically done in conjunction with sediment removal. A commercially or municipally owned sump-vac is used to remove captured sediment and floatables (Fig.6).

Floatables and loose debris can also be netted with a skimmer and pole. The access port located at the top of the manhole provides unobstructed access for a vactor hose and skimmer pole to be lowered to the base of the sump.

Scheduling

- Floatables and sump cleanout are typically conducted once a year during any season.
- If sediment depths are greater than 75% of maximum clean-out depths stated in Table 1, sediment removal is required.
- Floatables and sump cleanout should occur as soon as possible following a spill in the contributing drainage area.

Fig.7 View over center shaft into sediment storage zone.

Fig.8 View of outer annulus of floatables and oil collection zone.

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Recommended Equipment

- Safety Equipment (traffic cones, etc)
- Crow bar or other tool to remove grate or lid
- Pole with skimmer or net (if only floatables are being removed)
- Sediment probe (such as a Sludge Judge®)
- Vactor truck (6-inch flexible hose recommended)
- Downstream Defender® Maintenance Log

1. Set up any necessary safety equipment around the access port or grate of the Downstream Defender® as stipulated by local ordinances. Safety equipment should notify passing pedestrian and road traffic that work is being done.

2. Remove the lids to the manhole (NOTE: The 4-ft Downstream Defender® will only have one lid).

3. Without entering the vessel, look down into the chamber to inspect the inside. Make note of any irregularities.

4. Using the Floatables Port for access, remove oil and floatables stored on the surface of the water with the vactor hose or the skimmer net (Fig.9).

5. Using a sediment probe such as a Sludge Judge®, measure the depth of sediment that has collected in the sump of the vessel and record it in the Maintenance Log (Pg.9).

6. Once all floatables have been removed, drop the vactor hose to the base of the sump via the Central Access Port. Vactor out the sediment and gross debris off the sump floor (Fig.6).

7. Retract the vactor hose from the vessel.

8. On the Maintenance Log provided by Hydro International, record the date, unit location, estimated volume of floatables and gross debris removed, and the depth of sediment measured. Also note any apparent irregularities such as damaged components or blockages.

9. Securely replace the grate or lid.

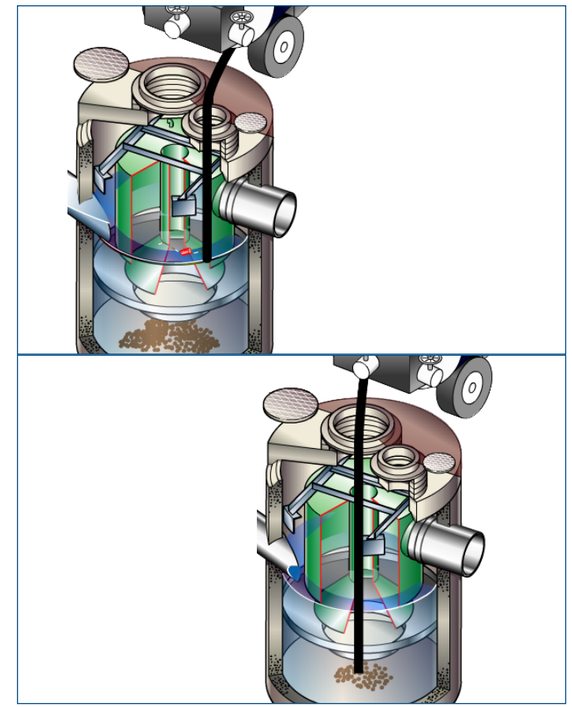

Fig.9 Floatables and sediment are removed with a vactor hose

Maintenance at a Glance

Activity	Frequency
Inspection	- Regularly during first year of installation - Every 6 months after the first year of installation
Oil and Floatables Removal	- Once per year, with sediment removal - Following a spill in the drainage area
Sediment Removal	- Once per year or as needed - Following a spill in the drainage area
NOTE: For most cleanouts it is not necessary to remove the entire volume of liquid in the vessel. Only removing the first few inches of oils/floatables and the sediment storage volume is required.	

Downstream Defender® Installation Log

HYDRO INTERNATIONAL REFERENCE NUMBER:	
SITE NAME:	
SITE LOCATION:	
OWNER:	CONTRACTOR:
CONTACT NAME:	CONTACT NAME:
COMPANY NAME:	COMPANY NAME:
ADDRESS:	ADDRESS:
TELEPHONE:	TELEPHONE:
FAX:	FAX:

INSTALLATION DATE: / /

MODEL (CIRCLE ONE): **4-FT** **6-FT** **8-FT** **10-FT** **CUSTOM**

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Downstream Defender® Inspection and Maintenance Log

Date	Initials	Depth of Floatables and Oils	Sediment * Depth Measured	Volume of Sediment Removed	Site Activity and Comments

*Note: Sediment removal is not required unless sediment depths exceed 75% of maximum clean-out depths stated in Table 1.

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Notes

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APPENDIX F

Infiltration Feasibility
(To Be Completed During Construction)

LANGAN

Infiltration Feasibility Report

Hudson Logistic Center
Hudson New Hampshire
[Date of Report]

To be completed during construction

TABLE OF CONTENTS:

I. Location of the practice

II. Existing topography at the location of the practice

III. Test pit or boring locations

IV. Seasonal high water table (SHWT) and bedrock elevations

V. Profile descriptions

VI. Soil plan in the area of the proposed practice(s)

VII. Summary of [Default, Field Testing, or Lab Testing] data used to determine the infiltration rate

The project proposes seven systems that require infiltration to function properly. These systems are identified on the plans as Infiltration Basin A1-2, A1-5, A6-2, A11-2, A11-3, B1-2, and B6-2.

I. Location of the practice

Infiltration Basin A1-2 – this basin is located

Infiltration Basin A1-5 – this basin is located

Infiltration Basin A6-2 – this basin is located

Infiltration Basin A11-2 – this basin is located

Infiltration Basin A11-3 – this basin is located

Infiltration Basin B1-2 – this basin is located

Infiltration Basin B6-2 – this basin is located

II. Existing topography at the location of the practice

Infiltration Basin A1-2 – the existing topography within the area of the infiltration basin is

Infiltration Basin A1-5 – the existing topography within the area of the infiltration basin is

Infiltration Basin A6-2 – the existing topography within the area of the infiltration basin is

Infiltration Basin A11-2 – the existing topography within the area of the infiltration basin is

Infiltration Basin A11-3 – the existing topography within the area of the infiltration basin is

Infiltration Basin B1-2 – the existing topography within the area of the infiltration basin is

Infiltration Basin B6-2 – the existing topography within the area of the infiltration basin is

III. Test pit or boring locations

In accordance with Env-Wq 1504.12(c), NHDES requires that a minimum number of test pits or borings be dug or drilled in the location of the system, depending on the size of the proposed system.

Infiltration Basin A1-2 – this basin is

Infiltration Basin A1-5 – this basin is

Infiltration Basin A6-2 – this basin is

Infiltration Basin A11-2 – this basin is

Infiltration Basin A11-3 – this basin is

Infiltration Basin B1-2 – this basin is

Infiltration Basin B6-2 – this basin is

IV. Seasonal high water table (SHWT) and bedrock elevations

The following test pit data was collected on.

Infiltration Basin A1-2 –
Bottom of Pond Elevation =

TP#: Existing Surface Elevation of TP =
SHWT =
BEDROCK =
Deepest Elevation of TP =

TP#: Existing Surface Elevation of TP =
SHWT =
BEDROCK =
Deepest Elevation of TP =

Infiltration Basin A1-5 –
Bottom of Pond Elevation =

TP#: Existing Surface Elevation of TP =
SHWT =
BEDROCK =
Deepest Elevation of TP =

TP#: Existing Surface Elevation of TP =
SHWT =
BEDROCK =
Deepest Elevation of TP =

Infiltration Basin A6-2 –
Bottom of Pond Elevation =

TP#: Existing Surface Elevation of TP =
SHWT =
BEDROCK =
Deepest Elevation of TP =

TP#: Existing Surface Elevation of TP =
SHWT =

BEDROCK =
Deepest Elevation of TP =

Infiltration Basin A11-2 –
Bottom of Pond Elevation =

TP#: Existing Surface Elevation of TP =
SHWT =
BEDROCK =
Deepest Elevation of TP =

TP#: Existing Surface Elevation of TP =
SHWT =
BEDROCK =
Deepest Elevation of TP =

Infiltration Basin A11-3 –
Bottom of Pond Elevation =

TP#: Existing Surface Elevation of TP =
SHWT =
BEDROCK =
Deepest Elevation of TP =

TP#: Existing Surface Elevation of TP =
SHWT =
BEDROCK =
Deepest Elevation of TP =

Infiltration Basin B1-2 –
Bottom of Pond Elevation =

TP#: Existing Surface Elevation of TP =
SHWT =
BEDROCK =
Deepest Elevation of TP =

TP#: Existing Surface Elevation of TP =
SHWT =

BEDROCK =
Deepest Elevation of TP =

Infiltration Basin B6-2 –
Bottom of Pond Elevation =

TP#: Existing Surface Elevation of TP =
SHWT =
BEDROCK =
Deepest Elevation of TP =

TP#: Existing Surface Elevation of TP =
SHWT =
BEDROCK =
Deepest Elevation of TP =

V. Profile descriptions

VI. Soil plan in the area of the proposed practice(s)

VII. Summary of [Default, Field Testing, or Lab Testing] data used to determine the infiltration rate

Infiltration Basin A1-2– the infiltration rate was determined using the Field Measurement method described in Env-Wq 1504.13.

The basin is located within native material identified in the Soil Series survey as _____.

Using Ksat Values for New Hampshire Soils, Society of Soil Scientist of Northern New England, Special Publication No.5, September 2009, the lowest value under the basin floor elevation is: _____.

After applying a factor of safety, the design rate used in the drainage analysis is _____.

Infiltration Basin A1-5– the infiltration rate was determined using the Field Measurement method described in Env-Wq 1504.13.

The basin is located within native material identified in the Soil Series survey as _____.

Using Ksat Values for New Hampshire Soils, Society of Soil Scientist of Northern New England, Special Publication No.5, September 2009, the lowest value under the basin floor elevation is: _____.

After applying a factor of safety, the design rate used in the drainage analysis is _____.

Infiltration Basin A6-2– the infiltration rate was determined using the Field Measurement method described in Env-Wq 1504.13.

The basin is located within native material identified in the Soil Series survey as _____.

Using Ksat Values for New Hampshire Soils, Society of Soil Scientist of Northern New England, Special Publication No.5, September 2009, the lowest value under the basin floor elevation is: _____.

After applying a factor of safety, the design rate used in the drainage analysis is _____.

Infiltration Basin A11-2– the infiltration rate was determined using the Field Measurement method described in Env-Wq 1504.13.

The basin is located within native material identified in the Soil Series survey as _____.

Using Ksat Values for New Hampshire Soils, Society of Soil Scientist of Northern New England, Special Publication No.5, September 2009, the lowest value under the basin floor elevation is: _____.

After applying a factor of safety, the design rate used in the drainage analysis is _____.

Infiltration Basin A11-3– the infiltration rate was determined using the Field Measurement method described in Env-Wq 1504.13.

The basin is located within native material identified in the Soil Series survey as _____.

Using Ksat Values for New Hampshire Soils, Society of Soil Scientist of Northern New England, Special Publication No.5, September 2009, the lowest value under the basin floor elevation is: _____.

After applying a factor of safety, the design rate used in the drainage analysis is _____.

Infiltration Basin B6-2– the infiltration rate was determined using the Field Measurement method described in Env-Wq 1504.13.

The basin is located within native material identified in the Soil Series survey as _____.

Using Ksat Values for New Hampshire Soils, Society of Soil Scientist of

Northern New England, Special Publication No.5, September 2009, the lowest value under the basin floor elevation is: _____.

After applying a factor of safety, the design rate used in the drainage analysis is _____.

APPENDIX G

Preliminary Geotechnical Engineering Study
(Under Separate Cover)

LANGAN

APPENDIX H

Site-Specific Soil Survey Report

LANGAN

SITE-SPECIFIC SOIL SURVEY REPORT
HUDSON LOGISTICS CENTER
LOWELL AND STEEL ROADS
HUDSON, NH
GES # 2019216

1. MAPPING STANDARDS

Site-Specific Soil Mapping Standards for New Hampshire and Vermont. SSSNNE Special Publication No. 3, Version 5.0, December 2017. This map product is within the technical standards of the National Cooperative Soil Survey. It is a special product, intended for the submission to NH DES Alteration of Terrain. It was produced by a professional soil scientist and is not a product of the USDA Natural Resource Conservation Service.

The site specific soil survey was produced May 4, 2020, and was prepared by James P. Gove, CSS # 004, Gove Environmental Services, Inc. The location of the soil survey is at Lowell and Steele Roads in Hudson, NH.

Soils were identified with the New Hampshire State-wide Numerical Soils Legend, USDA NRCS, Durham, NH. Issue # 10, January 2011.

High Intensity Soil Survey (HISS) conversion is determined by the soil properties identified in "High Intensity Soil Mapping Standard for NH", SSSNNE Special Publication Number 1, December, 2017.

Hydrologic Soil Groups are determined from SSSNNE Special Publication Number 5, "Ksat Values for New Hampshire Soils", September, 2009.

2. DATE SOIL MAP PRODUCED

May 4, 2020

3. GEOGRAPHIC LOCATION AND SIZE OF SITE

Approximately 300 acres was soil mapped. Tax map 234, Lots 5, 34 & 35 and Tax Map 239, Lot 1. The site is located in Hudson, NH.

4. PURPOSE OF THE SOIL MAP

The preparation of this map was requested by LANGAN. The purpose was to meet the requirements of NH Alteration of Terrain.

8 Continental Dr Bldg 2 Unit H, Exeter, NH 03833-7526
Ph (603) 778 0644 / *Fax* (603) 778 0654
info@gesinc.biz
www.gesinc.biz

5. SOIL IDENTIFICATION LEGEND

SOIL SYMBOL	SOIL MAP UNIT NAME	HISS CONVERSION	HSG
4	POOTATUCK VFSL	371	B
24	AGAWAM FSL	211	B
115	SCARBORO MUCK	611	D
400	UDORTHENTS, SANDY	211	A
513	NINIGRET FSL	311	B
540	RAYPOL LFS	511	D
699	URBAN LAND	N/A	IMPERVIOUS
917	NINIGRET VARIANT (swpd)	411	C
PONDS	OPEN WATER	N/A	N/A

SLOPE PHASES: 0-8% = B 8-15% = C 15-25% = D 25%+ = E

6. SOIL MAP UNIT DESCRIPTIONS

4 POOTATUCK VERY FINE SANDY LOAM occurs on flood plains that flood sporadically. These are fine textured soils that are moderately well drained. In this case, the Pootatuck series is found adjacent the Merrimac River.

24 AGAWAM FINE SANDY LOAM occurs on glacial outwash plains and alluvial deposits. The Agawam series has a fine sandy loam topsoil and subsoil, then becomes loamy sand in the substratum. This is a well-drained soil with estimated seasonal high water tables deeper than 40 inches. While this soil map unit is in a golf course that has undergone significant grading, the essential soil characteristics are present to identify the soil series. Common inclusions in depressions and swales is the soil series Ninigret.

115 SCARBORO MUCK occurs in the wetlands on the site. Scarboro is very poorly drained and has an organic topsoil. Common inclusions are the poorly drained Raypol series and the Borohemists that have deeper organic deposits.

400 UDORTHENTS, SANDY represent areas on the site where excavation and filling have occurred to the extent that no soil characteristics remain to classify as a soil series. These are typically sandy or gravelly areas that are well to excessively drained.

513 NINIGRET FINE SANDY LOAM is the moderately well drained analog of the Agawam soil series. This is a moderately well drained soil that has an estimated seasonal high water table 20 to 30 inches below the soil surface. Like Agawam, the topsoil is fine sandy loam, the subsoil is fine sandy loam, and the substratum becomes coarser such as loamy sand or fine sand. It occurs on the same glacial outwash landforms as Agawam,

but is found more in the flat areas, drainage ways and swales. Inclusions are Deerfield loamy sand and the Ninigret Variant.

917 NINIGRET VARIANT (SOMEWHAT POORLY DRAINED) is the wetter analog of the Ninigret series. This is a somewhat poorly drained soil that has a seasonal high water table from 0 to 15 inches below the soil surface, but has high chroma matrices that do not make the soil hydric. This most occurs on this site as an inclusion to the Ninigret map unit.

540 RAYPOL LOAMY FINE SAND is a hydric soil that is found on glacial outwash plains. It is found in conjunction with Agawam, Ninigret and Ninigret variant. It is found between the upland moderately well drained and somewhat poorly drained soils and the very poorly drained Scarboro muck. It is typically identified as wetlands.

699 URBAN LAND is a map unit that represents impervious areas of buildings, pavement and packed gravel parking areas.

7. RESPONSIBLE SOIL SCIENTIST

James P. Gove, C.S.S. #004

8. OTHER DISTINGUISHING FEATURES OF SITE

It is clear that a significant amount of soil disturbance took place on the site. In addition to greens being constructed, as well as sand traps, there has been significant grading of some of the fairways,

9. MAXIMUM SIZE OF LIMITING INCLUSIONS

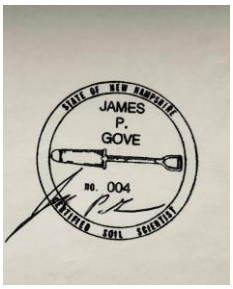
Scitico may have up to 15% inclusions of very poorly drained Maybid.

Filled areas of Udorthents commonly have inclusions of 15 to 40%.

Eldridge may have up to 15% inclusions of Newfields.

10. SPECIAL FEATURE SYMBOLS

Open water areas were identified as ponds.


STATE OF NEW HAMPSHIRE
JAMES
P.
GOVE
no. 004
CERTIFIED SOIL SCIENTIST

May 5, 2020

APPENDIX I

NH DES Wetland Bureau Major Impact Dredge & Fill Application
(Under Separate Cover)

LANGAN