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Civil, Environmental, & Geological Consultants

August 28, 2024
Uploaded via OnBase/email

Ms. Lisa Houser, P.E.
Environmental Engineer Manager
Department of Environmental Protection
Northcentral Regional Office
Waste Management
208 West Third Street, Suite 101
Williamsport, PA 17701

RE: Work Plan for Williamsport Ballpark Inc – Williamsport Ballpark Cleanup
PADEP Deficiency Response
eFACTS Site ID 847137
2 Rose Street, City of Williamsport, Lycoming County, Pennsylvania

Dear Lisa:

Please find attached response documentation relating to the Department's work plan review letter dated August 5, 2024, relating to the proposed Williamsport ballpark cleanup on behalf of our client Williamsport Ballpark Inc. The responses incorporate the discussions between representatives from the Department's Waste Management and Environmental Cleanup programs, BAI Group LLC (BAI), Hawbaker Engineering (Hawbaker), Ausley Construction, and Williamsport Ballpark Inc. (WBI) on an August 13, 2024, call. For ease of review, the Department's comments have been copied below, with the response following.

1. ***Page 4 of 10; The Work Plan for the Williamsport Ballpark Cleanup details some aspects of gas monitoring prior to, during and following construction of the Ballpark. The plan however does not detail how gas will be controlled as there are areas which were sampled that have high levels of gas that were encountered (i.e. the average concentration of methane across all sampling events was approximately 265,000 ppm). The Work Plan only proposes to have a passive gas collection system in limited areas underneath basins. Therefore, the Work Plan should be modified to include a gas monitoring and control plan. The plan should include at a minimum, the following:***
    a. ***A plan to monitor and record offsite gas migration and gas accumulation on and off the site, including structures. The plan should be designed such that there are measures in- place to control decomposition gases generated within the site to prevent danger to workers, structures and to occupants of adjacent properties.***
    b. ***Designs for a gas control system, indicating the location and scheduling of construction, and the design of vents, barriers, collection pipes, manifolds or other control measures that will be put in place.***

c. ***Plans and designs to address special storage, transportation, processing, treatment or disposal measures anticipated or required in the management of the generated gases, condensates or other residues.***

As discussed in the Work Plan for Williamsport Ballpark Inc. and in our call, methane concentrations were measured repeatedly during completion of subsurface investigation activities at the site. Although the average of detected concentrations noted in the Department's comment is 265,000 ppm, only 24 of the 853 measurements made inside the drill casing resulted in methane detections. More consistent concentrations were only noted when drill casings were removed from the borings and the boreholes were open over their entire length. Additionally, no methane was detected at the surface of the open boreholes; the concentrations noted in the Department's comment only resulted after the methane probe was lowered approximately six inches to one foot below the ground surface inside the open boreholes. Following grouting of the boreholes, no methane was detected at the surface at the boring locations, at stations approximately between each of the boring locations, or while taking continuous readings while traversing the site in two separate monitoring events.

Based on the information obtained during the subsurface investigation, placement of waste at the site ceased circa 1986, although the material that had been accepted for some time up to that point consisted mostly of soil, concrete, and/or landscaping debris. Remaining landfill gas within the waste mass appears to be isolated, appears to be generated very slowly when the waste mass is open to the atmosphere, and is well contained beneath the existing soil/fill cap.

As was discussed in our call and shown on the enclosed Figure 3 isopach map depicting the separation between the proposed development subgrade and the top of waste, the proposed redevelopment activities are designed to maintain at least three (3) feet of separation between the construction subgrade and the top of waste. As such, site grading activities are not anticipated to encounter significant waste aside from the limited areas where less than three feet of existing soil/fill cap will be in place (generally stormwater basins) and in utility trenches. Where less than 3 feet of soil/fill cap will remain after achieving subgrade elevations, either a geosynthetic liner, concrete, asphalt, packed gravel, or synthetic turf will be used to minimize stormwater infiltration into the waste mass and/or migration of LFG out of the waste mass.

Even though it is unlikely that significant LFG will migrate through the surface following construction, the existing gas collection piping and passive vents are a proactive measure to prevent LFG accumulation beneath the stormwater pond liners and potentially cause bubbling. It should be noted that a Perminator® EVOH Underslab Gas Vapor Barrier will also be installed beneath the slab of the concessions building. The vapor barrier is designed to prevent permeation of radon, methane, and volatile organic compounds, and will provide additional protection for the building in the unlikely event of LFG leakage.

As discussed in the Work Plan, methane monitoring is proposed both during construction activities and for a period of time following completion of construction activities. Post-construction monitoring will be conducted at the gas vents and within the concessions building as these are the areas most likely to witness LFG migration. If it is determined that concentrations at the gas vents are sufficient to warrant treatment of the LFG, granular activated carbon (GAC) canisters or similar treatment methods may be used and replaced as needed. Because the gas vents will not generate condensate or other wastes, no disposal measures other than disposal of the GAC canister are anticipated for the treatment of LFG. If unexpected persistent LFG concentrations are observed, the Department will be contacted to discuss appropriate measures.

2. ***Page 6, paragraph 2; The narrative indicates the following: The general design approach for the facility is to maintain a minimum 3-foot cap of soil materials in place over the surface of the waste. Has the existing in-place soil or proposed additional soil to be utilized as the final cover material been tested in order to meet performance standards, such as:***
    a. ***Be capable of controlling fires***
    b. ***Be capable of supporting the germination and propagation of vegetative cover and design requirements, such as:***
        i. ***textural classes of the soil(s)***
        ii. ***ensure permanent slope stability after placement***
        iii. ***control erosion on slopes along the perimeters of the ballfields***
        iv. ***ensure minimal percolation of precipitation into the underlying waste mass***
    c. ***Have fertility analyses been performed on the existing and proposed soil sources to demonstrate that they can meet b?***

    Testing has not been completed for the existing in-place soils at this time. However, based on aerial imagery and site reconnaissance, the existing soils are capable of maintaining vegetation, and have been stable for a number of years. These soils, which will primarily remain in place, have been successful in limiting percolation of precipitation into the underlying waste mass. Therefore, it is assumed that any existing soils used for final restoration at this facility will be capable of maintaining these standards. However, it should be noted that approximately 70% of the property will be covered by either artificial turf, paving, or aggregate. The remainder of the site will be covered with a layer of topsoil imported to the site. Testing of the topsoil is addressed in the NPDES permit prepared for the project, which includes fertility analysis of the soils to be vegetated. No testing is proposed for underlying soils that will be subsequently covered by turf, paving, gravel, or topsoil.

3. ***Page 7, paragraph 2; According to the narrative, "Stormwater basins will be lined with a geosynthetic liner system to minimize infiltration of stormwater into the waste and exfiltration of landfill gas through the basin floor. The liner system will consist of a minimum of 12" of subgrade soil on top of waste, covered by 200-mil geocomposite, 30- mil textured LLDPE geomembrane, and 10-oz/sy cushion geotextile, all overlain by at least 24 inches of cover soil, as shown on the Typical Liner System Profile (PCSM Details (Sheet 15 of 21)." As such, please submit a***

Quality Assurance and Quality Control (QA/QC) Plan for the construction and installation of the liner system. The plan shall include, at a minimum, the following:

a. Design of the liner system, including thickness and characteristics of the subbase, the thickness and characteristics of the detection zone, the design for the monitoring system in the detection zone, the nature and thickness of the liner material, the thickness and characteristics of the collection zone and the design for the collection system in the collection zone.

b. A plan for installing the liner system.

c. The application shall include a quality assurance and quality control plan for the construction and installation of the liner system. The plan shall include, at a minimum, the following:

i. A description of the testing procedures and construction methods proposed to be implemented during construction of the liner system.

ii. A description of the manner in which the cover and liner system will be maintained and protected in lined portions of the ballpark areas

iii. A description of the manner in which the cover and liner system will be protected from weather prior to and during the duration of use.

iv. A description of the qualifications of the quality assurance and quality control personnel, presented in terms of experience and training necessary to implement the plan.

v. A sampling plan for every component of the liner system, including sample size, methods for determining sample locations, sampling frequency, acceptance and rejection criteria and methods for ensuring that corrective measures are implemented as soon as possible.

vi. A plan for documenting compliance with the quality assurance and quality control plan.

d. The application shall include a complete description of the physical and mechanical properties for the proposed liner, based on ASTM methods when appropriate. Except to the extent that the Department waives in writing any of the following for nonsynthetic liners, these properties shall include, at a minimum:

i. Thickness.
ii. Tensile strength at yield.
iii. Elongation at yield.
iv. Elongation at break.
v. Density.
vi. Tear resistance.
vii. Carbon black content.
viii. Puncture resistance.
ix. Seam strength (percentage of liner strength).
x. Ultraviolet light resistance.

xi. *Carbon black dispersion.*
xii. *Permeability.*
xiii. *Liner friction angle in degrees.*
xiv. *Stress crack resistance.*
xv. *Oxidative induction time.*
xvi. *Percent recycled materials.*

A CQA Plan has been developed for the supply and installation of the liner system specific to the stormwater basins. Please refer to the enclosed plan.

4. ***Page 8, paragraph 5; According to the narrative, "Transco will take appropriate measures to address the odors such as minimizing exposure, odor control products, or tarping." Please expand on these methods. For example, "minimizing exposure." To what extent will the working area be minimized? What type of products will be used (i.e. foam, synthetic based, etc.) and duration the products will last? What is the thickness of the tarps and how will they be secured?***

Based on activities performed onsite to date, including drilling and site reconnaissance, odors are not anticipated to be an issue. Construction will not disturb the waste mass with the possible exceptions of trenching for utilities and footers as well as foundation construction. However, it is not expected that these minor excavations will be a significant source of odors since the upper layers of waste primarily consisted of construction/demolition debris. Regardless, if odors become an issue, several options may be used to mitigate the odors, depending on the activity generating the odor.

Primarily, if odors are generated, the working area generating the odors will be minimized. This may include excavating shorter sections of trench, installing utilities, and backfilling the trench promptly rather than excavating the entire trench before installing the utility and backfilling. This may not be possible when concrete foundations/footers are being poured. In these instances, 6 mil (minimum) plastic sheeting or canvas tarps may be used. Sheeting or tarps may be secured using soil, rocks, sandbags, lumber, brick, piping, or similar items.

If odors continue to be an issue despite best efforts to minimize work area and cover the waste, odor neutralizers/deodorizers may be applied to the area. These are typically granular absorbent materials that reduce the amount of odors escaping the site.

5. ***Understanding that the equipment, etc. will be handling exhumed waste from the dormant landfill, please provide a plan for the decontamination and removal of equipment at the facility. At a minimum, the staging area should be identified, how contaminated water and rinse water will be handled, etc.***

Although it is anticipated that handling of exhumed waste will be generally limited to stormwater basins and utility trenches, decontamination of equipment will occur before the equipment leaves the site. Temporary equipment decontamination areas will be constructed aboveground on a gently sloped area near the proposed stormwater basins or utility corridors. The decon area will be constructed of a wooden (railroad tie) frame securing 6-mil plastic in a collection basin. The excavator bucket or bulldozer blades (if applicable) will be decontaminated over the collection basin using a scrub brush and non-phosphate soap and then rinsed with distilled water. All wastewater collected in the basin will be pumped into 55-gallon drums or a holding tank for sampling and offsite disposal.

A vehicle drive through area will be constructed near the Rose Street construction entrance to facilitate the removal of gross waste or soil material from the vehicle tires/tracks prior to exiting the Site. This area will contain ballast material. All vehicles will be required to cross this area prior to exiting the Site. All vehicles will be checked for waste or grossly impacted soil material prior to leaving the Site. If waste or grossly impacted soil material is present, it will be removed from the vehicle prior to exiting the Site. All removed soil or waste materials will be segregated and staged either near the affected work areas, or in a segregated and secured area near the main Rose Street construction entrance. The exact location of the staging area will be determined prior to any excavation activities. All materials will be staged on poly material and covered with poly material or in roll offs for offsite disposal.

6. ***Please provide a Construction Schedule for the Work Plan. An estimate of the year in which the work will occur, including an explanation of the basis for the estimate.***

The anticipated construction schedule for the project is enclosed.

7. ***Details for the Erosion and Sedimentation (E&S) Control structures are provided for the Work Plan but no design calculations are provided. Please provide the design calculations for all E&S structures and the design basis for them (i.e. 24-hour precipitation event by inches to be expected once in 25-years). More stringent design standards may be required by the Department based on the most recent edition of the United States Department of Agriculture Soil Conservation Services' Engineering Field Manual for Conservation Practices.***

As discussed in our August 13th call, a copy of the project's NPDES Individual Permit for Discharges Associated with Construction Activities is included herein. Stormwater management devices are designed to convey the 100-year/24-hour storm.

8. ***A Revegetation Plan, including maintenance of the final cover should be prepared and provided to the Department for review and approval. Some details were provided on Drawing Sheet Number 13 (of 21) – PCSM Details but additional details are necessary. Such as, seedbed preparation, tilling and depth, standards for successful revegetation, pure live seed standards, etc. The Department recommends the Penn State Agronomy guide which provides essential background information for nutrient management planning in Pennsylvania. The plan should address soil testing, fertilizer recommendations, and nutrient requirements, use of fertilizer materials, manure nutrient management (if proposed), etc.***

A Revegetation Plan was included with the application for NPDES permit. Refer to Sheet E&S 2 of 4 of the E&S drawing set included herein.

9. ***A Preparedness, Prevention and Contingency (PPC) Plan should be prepared and submitted to the Department for review and approval. The most recent guidelines should be used to prepare the plan and address all potential aspects of an emergency such as fires, spills or other events that threaten the public health and safety, public welfare or the environment and personal injury.***

   A PPC Plan will be required of the contractor selected to complete the work. Per our discussions, Department approval of this Work Plan will include a condition that a copy of the PPC plan will be provided to the Department upon contractor selection.

10. ***Typical Liner System Profile Detail; Please specify what the maximum particle size is for the subgrade soils. Larger particle size material may affect the ability of the geocomposite to perform as designed.***

    The maximum particle size for the subgrade will be 1.5". A visual evaluation of the surface will be completed prior to placement of the geosynthetics.

If you have any comments or questions regarding this submittal, or require further information, please do not hesitate to contact us at (814) 238-2060.

Sincerely,

BAI Group LLC.

Patrick Wozinski, P.E.
Licensed Professional Engineer

Evan Teeters, P.G.
Licensed Professional Geologist

PW/ET

Enclosures (uploaded separately via OnBase):
- Figure 3 – Grading Plan and Top of Waste Isopach
- CQA Plan
- Construction Schedule
- NPDES Individual Permit and Application Package

KEY

DEPTH 0' TO 3'	
DEPTH 3' TO 4'	
DEPTH 4' TO 5'	
DEPTH 5' TO 15.58'	

SCALE

150 75 0 150

SCALE 1" =150'

NOTES

1. BASEMAP TOPOGRAPHY AND EXISTING SITE CONDITIONS PROVIDED BY HAWBAKER ENGINEERING (1952 WADDLE ROAD, SUITE 201, STATE COLLEGE PA 16803) "EX. CONDITIONS/DEMO/LOT CONSOLIDATION PLAN," SHEET NO. 2 OF 20; MAY 1, 2024.
2. PROPOSED REDEVELOPMENT FEATURES PROVIDED BY HAWBAKER ENGINEERING (1952 WADDLE ROAD, SUITE 201, STATE COLLEGE PA 16803) "PCSM PLAN," SHEET NO. 9 OF 21; MAY 1, 2024.

LEGEND

- EXISTING PROPERTY LINE/SITE BOUNDARY
- EXISTING RIGHT-OF-WAY
- EXISTING EASEMENT
- EXISTING RAILROAD
- EXISTING PAVED ROAD
- EXISTING FENCE
- EXISTING GRAVEL ROAD
- EXISTING CONCRETE AREA
- EXISTING BUILDING
- EXISTING ELECTRIC
- EXISTING UNDERGROUND ELECTRIC
- EXISTING GAS LINE
- EXISTING WATER
- EXISTING SANITARY
- EXISTING STORM SEWER
- EXISTING UNDERGROUND TELECOM
- EXISTING STORM INLET
- EXISTING SANITARY MANHOLE
- EXISTING POWER POLE
- EXISTING LIGHT POLE
- EXISTING MAJOR CONTOURS (C.I.=5')
- EXISTING MINOR CONTOURS (C.I.=1')
- EXISTING TREELINE
- EXISTING TRE
- PROPOSED PAVED ROAD
- PROPOSED GRAVEL AREA
- PROPOSED CONCRETE AREA
- PROPOSED BUILDING
- PROPOSED UNDERGROUND ELECTRIC
- PROPOSED STORM PIPE
- PROPOSED STORM INLET
- PROPOSED MAJOR CONTOURS (C.I.=5')
- PROPOSED MINOR CONTOURS (C.I.=1')
- STORM UNDERDRAIN PIPING
- GAS MITIGATION PIPING

BAI GROUP

REVISIONS

WILLIAMSPORT BALLPARK, INC.

FORMER WILLIAMSPORT LANDFILL PROPERTY

CITY OF WILLIAMSPORT LYCOMING COUNTY PENNSYLVANIA

GRADING PLAN AND TOP OF WASTE ISOPACH

State College Office (814) 238-2060 • Delaware Valley Office (610) 495-5585

DATE:	8/26/2024
DRAWN BY:	RHM
CHECKED:	ETT
BAI DRAWING NO:	AUSLEY-001B009
SHEET NO.	FIGURE 2

Construction Quality Assurance Plan

SECTION 1: SOILS

1.1 Introduction

Section 1 addresses the soil components to be used in conjunction with the geosynthetic components of the stormwater management ponds. The soils Construction Quality Assurance/Quality Control (CQA/CQC) program that will be implemented with regard to materials selection and evaluation, laboratory test requirements, field test requirements, and recognition and prevention of non-conformities is provided below.

1.2 Definition and Use of Terms

While explaining soils CQA/CQC procedures, the following terms and acronyms related to soils will be utilized.

- *American Society for Testing and Materials* (ASTM): A nonprofit organization devoted to developing voluntary, full consensus standards for materials, products, systems and services.
- *Atterburg Limits:* The numeric values for the Liquid Limit (LL) and the Plastic Limit (PL) of a soil.
- *Construction Window (Window of Acceptance):* The empirically derived acceptable zone of moisture/density combinations within which a soil component will achieve the performance objective. This window is typically superimposed over the compaction or proctor curve of the soil component and defines the range of moisture and dry density combinations required for the soil used in construction.
- *Density:* The mass density of a soil in weight per unit volume, usually reported in pounds per cubic foot (pcf).
- *Liquid Limit*: The water content which corresponds to the arbitrary limit between the liquid and plastic states of consistency of a soil.
- *Maximum Dry Density* (MDD) and *Optimum Moisture Content* (OMC): Theoretical values determined by laboratory procedures, each of which combine to provide what is commonly referred to as the moisture/density relationship or *Proctor.*
- *Maximum Particle Size* (MPS): The maximum rock particulate contained within a soil sample.
- *Modified Proctor:* The laboratory-determined values (both MDD and OMC) using a modified (increased) compactive effort (ASTM D1557).
- *Permeability:* The rate that water discharges under laminar flow conditions through a unit cross-sectional area of a porous medium under a unit hydraulic gradient and standard temperature conditions.
- *Plastic Limit*: The water content which corresponds to an arbitrary limit between the plastic and semisolid states of consistency of a soil.

- *Plasticity Index (PI)*: The numerical difference between the liquid limit and the plastic limit that indicates the range of moisture contents over which soil behavior is plastic.
- *Proctor:* The OMC of the soil at which it obtains its MDD; the point at which the soil's performance is at its peak. Proctor values are used for comparing field moisture and density readings.
- *Pumping:* The pronounced deformation of soils under the weight of construction equipment during proof-rolling, placement, or compaction.
- *Standard Proctor:* The laboratory-determined values (both MDD and OMC) using a standard compactive effort (ASTM D698).
- *Troxler Nuclear Gauge* (TNG): A device used to determine in-place soil density and moisture readings utilizing nuclear methods (ASTM D6938).

1.3 Subgrade

The subgrade surface consists of the 12 inch (min, compacted) layer directly below the liner system of the stormwater management facilities and is composed of either imported fill or in-situ soil and/or rock with a maximum particle size equal to or less than 1.5 inch (note that a small percentage of material larger than 1.5 inch is acceptable provided the subgrade surface is picked of these oversized particles prior to liner installation). Subgrade surface preparation is completed prior to placing the geosynthetics layer. The Quality Assurance Inspector (QAI) shall visually examine the subgrade for deleterious materials (i.e., rock fragments, stumps, etc.), making sure they are removed.

1.3.1 Placement Procedures

1.3.1.1 Installation

The QAI shall implement a inspection program to monitor subgrade placement. Grading shall be consistent with the design drawings, and all deleterious materials shall be removed. Subgrade placement shall occur in a single, 12-inch minimum, compacted lift. Subgrade will be compacted with a vibratory smooth-drum roller (CAT CS563 or equivalent). Subgrade will be compacted using a minimum of four (4) passes of the compaction equipment.

All soil used as subgrade material shall be inspected as it is delivered to the site to confirm that the characteristics of the borrow source have not changed and the conformance criteria need not be modified. The maximum allowable particle size of the subgrade surface shall be 1.5 inch in diameter.

1.3.2 CQA Testing and Inspection Requirements

1.3.2.1 CQA Monitoring

When visually monitoring subgrade placement, the monitor(s) shall ensure that:

- subgrade materials are adequately spread to ensure complete coverage at the specified loose lift thickness;
- oversized material, frozen soil, plant parts, and foreign objects are removed;
- the water content of the subgrade material is properly adjusted during times of prolonged rain or drought;
- significant water loss and desiccation/cracking are prevented both before and after compaction;
- compaction equipment is the proper type, configuration, and weight;
- the proper equipment speed and number of passes are used;
- uniformity of coverage is achieved by compaction equipment, particularly at fill edges, in equipment turn-around areas, and on slopes;
- penetrations from TNG testing equipment, verification testing, and/or conformance samples are properly repaired;
- separate lifts and cell transition areas are properly tied together;
- layer strength is capable of maintaining stable side walls and supporting overlying materials; and,
- protective covers and/or maintenance procedures (i.e., ongoing moisture conditioning, synthetic covers etc.) are used in a timely manner to prevent desiccation or other damage to the compacted subgrade.

1.3.2.2 CQA Field Testing Procedures

All testing used to evaluate the suitability or conformance of subgrade soils shall be carried out in accordance with current ASTM test procedures. Appropriate test methods, specifications, and frequencies are contained in Table 1-1. The QAI will determine the required field testing frequencies, taking into consideration the variability of the subgrade material being used.

TNG field density and moisture test methods (ASTM D6938) may be used during field testing at the discretion of the QAI. Subgrade soil will be compacted to a minimum 90 percent of the MDD, as determined from the Standard Proctor Compaction Test (ASTM D698). Compacted moisture content, also determined by ASTM D698, will be within 3% of the optimum moisture content unless otherwise approved by QAI. Alternatively, the subgrade may be visually inspected by the QAI for approval. QAI may visually evaluate the effectiveness of compaction based on non-movement of the material under suitable compaction equipment.

Compacted subgrade soil not meeting the required specifications shall be recompacted and/or moisture conditioned to meet the specifications, or it shall be removed and replaced with acceptable material. Any conflict with the results shall be resolved by the QAI. Corresponding test methods, specifications, and frequencies are contained in Table 1-1.

1.3.2.3 Laboratory Samples and Procedures

1.3.2.3.1 Pre-construction Samples

The subgrade material may be sampled in advance to ensure that the corresponding laboratory results are complete. These results will be evaluated by the QAI or QAI prior to the subgrade material being placed. Sample collection procedures shall ensure that representative samples are obtained. The corresponding test methods, specifications, and frequencies are contained in Table 1-1.

1.3.2.3.2 Conformance Samples

While placing subgrade material, conformance samples may be collected near TNG test locations to ensure the material meets project specifications and is consistent with pre-construction data. The corresponding test methods, specifications, and frequencies are contained in Table 1-1.

1.3.3 CQC Testing and Inspection Requirements

All CQC testing shall be conducted by the QAI in accordance with project specifications. Test results shall be documented in accordance with the requirements identified in this CQA Plan.

1.3.4 Deficiencies

If a defect is discovered during construction, the QAI shall immediately determine its extent and nature. If the defect is discovered due to an unsatisfactory test result or a visual observation, the QAI shall determine the extent of the deficient area through additional tests, observations, a review of records, or other means that the QAI deems appropriate.

1.3.4.1 Notifications

After determining the extent and nature of a defect, the QAI shall notify the Owner and the Contractor immediately to discuss the deficiency and possible solutions. Once the deficiency is corrected, the QAI shall schedule appropriate retesting.

1.3.4.2 Repairs and Retesting

Deficiencies will be corrected by the Contractor to the satisfaction of the Owner and the QAI. If project specifications cannot be met or adverse weather conditions hinder work, the QAI shall inform the Owner and discussions will be had to determine possible solutions.

Additional conformance testing must verify that the defect has been corrected before the Contractor performs additional work in the suspect area. If a deficiency goes unrepaired, the QAI shall discontinue construction activities until the problem is resolved. The QAI will immediately notify the Owner and schedule a meeting between all concerned parties. Repaired areas will be inspected by the QAI to verify that the construction specifications set forth in this CQA Plan have been met. The QAI shall document all deficiencies and corresponding corrective actions, a copy of which will be submitted to the Owner.

1.5 **Cover Soil**

Cover Soil for the stormwater management ponds may be obtained during regrading of the site or from off-site borrow areas and will meet the requirements in Table 1-2. Cover Soil will consist of clean material relatively free of rock, debris, frozen soils, and other deleterious matter.

4.6.1 Handling & Placement Procedures

4.6.1.1 Source Selection and Material Handling

Prior to their use, each source for Cover Soil material shall be sampled and tested. A minimum of one sample per potential source shall be tested. Soil analyses shall be performed by a qualified Soils QA Laboratory. At a minimum, testing shall be performed as outlined in Table 1-2.

The Operator or Contractor shall ensure that on-site soils to be used for Cover Soil material are handled using best management practices to minimize erosion and sedimentation of nearby waterways.

4.6.1.2 Installation

Cover Soil material will be placed over the entire surface of the stormwater management basins to a minimum thickness of 2 feet and to the lines and grades required by the project plans.

Cover Soil material will typically be placed in a single uniform layer unless otherwise directed by the QAI. Placement shall be done by low ground pressure, tracked earthmoving equipment in order to ensure that over-compaction of the cover does not occur. Equipment used to spread Cover Soil soils will not exert ground pressures exceeding the following:

Thickness of cover (inches)	Maximum Allowable Equipment Ground Pressure (PSI)
12”	5
18”	10
24”	15
36”	>15 (with approval by QAI)

Areas of heavy traffic, such as haul roads, will be required to have a soil thickness of 36 inches.

Cover Soil placement over the liner system shall be done with care by the Contractor or Operator so as not to damage or significantly impact the drainage layer material or underlying geomembrane layer. Cover Soil will be pushed upslope and spread out laterally to the extent practical. Grading Cover Soil downslope will not be permitted unless otherwise approved by the QAI.

4.6.2 **CQA Inspection Requirements**

4.6.2.1 Monitoring and Documentation

The QAI shall monitor and document the placement of the Cover Soil material for quality, lift thickness and compactive effort. The QAI may, at his/her discretion, conduct in-place density testing to verify that over-compaction is not occurring. The means of monitoring for over-compaction will typically be visual observation of the placement techniques being used as well as visual monitoring of the surface of the Cover Soil for signs of over-compaction. Particular attention will be paid to portions of the Cover Soil that may receive heavier than normal traffic during construction. Contractor shall immediately remove any pumping/rutting soils and replace it with suitable soils. The QAI will constantly monitor the placed material and will inform the Contractor of areas requiring rework.

The QAI shall monitor and document the revegetation of the Cover Soil material according to the Revegetation Plan (refer to NPDES Permit).

4.6.2.2 Testing Requirements

Cover Soil material shall be tested for conformance with pertinent specifications listed in the most recent version of the PaDEP regulations. Combustibility testing may be eliminated if it is demonstrated that the material to be used contains no combustible components. Testing shall conform to Table 1-2 of this section.

CONSTRUCTION QUALITY ASSURANCE PLAN
TEST METHODS, SPECIFICATIONS, AND FREQUENCIES

SUBGRADE

Table 1-1

Test Method to Determine	Test Procedures	Minimum QA Test Frequency	Minimum QC Test Frequency	Acceptance or Rejection Criteria
In-place density	*ASTM D6938* Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)	At the discretion of QAI	Not Applicable	≥ 95% of Standard MDD
In-place moisture	*ASTM D6938* Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)	At the discretion of QAI	Not Applicable	+/- 3% OMC (See Note 1)
Particle size distribution	*ASTM D422* Standard Test Method for Particle-Size Analysis of Soils	Visual	As needed	MPS ≤ 1.5 inch 40-100% ≤ No. 10 (See Note 2)
Proctor value	*ASTM D698* Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3))	At the discretion of QAI	As needed	N/A

1. Subgrade will be installed to within 3% of the Optimum Moisture Content. However, this window may be narrowed if the soil compaction is unsuitable, or the surface becomes overly desiccated or wet.
2. A small percentage of material larger than 1.5" is acceptable provided the subgrade surface is picked of these oversized particles prior to liner installation.

CONSTRUCTION QUALITY ASSURANCE PLAN
TEST METHODS, SPECIFICATIONS, AND FREQUENCIES

COVER SOILS (1)

Table 1-2

Test Method to Determine	Test Procedures	Minimum QA Test Frequency	Minimum QC Test Frequency	Acceptance or Rejection Criteria
Particle size distribution	*ASTM D422* Standard Test Method for Particle-Size Analysis of Soils	Visual	1 per source	MPS ≤ 3”; (See Note 2)
Layer Thickness	Visual Inspection	4 per 5,000 s.f.	As needed	$\geq$24”
Vegetative Fertility	Agricultural Laboratory	Each new material source, per 2,000 yd^3 placed, and significant changes in material	As needed	Refer to NPDES permit

Note:
1. Test frequencies indicated are “per source”. Additional samples will be necessary for significant changes in material from a source.
2. Cover Soil used in the stormwater management ponds will be a mixture of 40% topsoil, 35% coarse sand, and 25% coarse hardwood mulch. Refer to Sheet 12 of 21 – PCSM Details from the Preliminary/Final Lot Consolidation & Land Development Plan for additional requirements.

SECTION 2: GEOMEMBRANES

2.1 Introduction

This Section addresses the geomembrane materials that will be used in conjunction with the geosynthetic components of the stormwater management ponds. Section 2 contains information on: raw materials and manufacturing processes, shipping, handling, delivering and storing the finished product; and conformance testing, deployment, seaming, field testing, and acceptance procedures associated with installing geomembrane.

Geomembrane materials shall be manufactured by Solmax, Agru America, Skaps, or Polyflex.

2.2 Definitions and Use of Terms

While explaining geomembrane CQA/CQC procedures, the following terms and acronyms related to geomembranes will be used.

- *Drive Rollers*: The knurled or rubber rollers that grip two geomembrane sheets which are overlapped for seaming and propel the seaming device at a controlled rate of travel (also often referred to as “nip rollers”).
- *Extrudate*: Molten polymer that is discharged from an extruding machine during seaming operations. The polymer is initially in the form of a ribbon, rod, bead, or pellets.
- *Film Tear Bond (FTB)*: The description of a destructive seam test (shear or peel) wherein the geomembrane sheet on either side of the seam fails instead of the seam delineating.
- *Fishmouth*: The uneven mating of two overlapping geomembranes where the excessive length of the upper sheet that prevents it from being bonded flat to the lower sheet. The resulting opening is often referred to as a “fishmouth”.
- *Flexible Membrane Liner (FML)*: A term previously used in EPA literature as a more generic term for geomembrane.
- *Geomembrane*: An essentially impermeable geosynthetic material composed of one or more synthetic sheets.
- *Geosynthetic*: A planar product manufactured from polymeric material that is used in conjunction with soil, rock, earth, or other earthen materials as an integral part of a man-made project, structure, or system.
- *Minimum Average Roll Value (MARV)*: A statistical value of a particular test property, which embraces the 95 percent confidence level of all possible values of that property.
- *Trampolining*: The phenomenon that occurs when geomembranes contract (i.e., tighten) after installation whereby the geomembrane no longer lays directly on the underlying surface.

2.3 Manufacturing, Fabrication, and Delivery

2.3.1 Introduction

Manufactured geomembranes include linear low-density polyethylene (LLDPE).

2.3.1.1 Raw Material

The raw material used to manufacture geomembranes shall be first-quality resin containing no more than 2 percent clean, recycled polymer by weight, and a maximum of 1 percent by weight of additives, extenders, or fillers (not including carbon black). These materials shall meet the minimum specifications listed in Table 2-1.

Manufacturing quality control testing shall be carried out by the Resin Supplier and the Geomembrane Manufacturer to demonstrate that the product meets the minimum specifications. At the Owner's discretion and cost, additional testing may be carried out by the Geosynthetics CQA Laboratory. If the results of the Manufacturer's and the Geosynthetics CQA Laboratory's testing differ, the testing shall be repeated by the Geosynthetics CQA Laboratory under the observation of the Manufacturer. Providing that acceptable test methods have been followed the results of this series of tests shall prevail.

Prior to installing any geomembrane material, the Manufacturer shall provide the Project Manager or his/her designee and the QAI with the following information:

- The origin (Resin Supplier's name and resin production plant), identification (brand name, number) and production date of the resin;
- A copy of the Manufacturer's quality control certificates issued by the Resin Supplier;
- Quality control report tests conducted by the Geomembrane Manufacturer which verify the quality of the resin used to manufacture the geomembrane rolls and extrudate rods assigned to the project; and,
- A statement that no reclaimed polymer was added to the resin (however, the use of polymer recycled during the manufacturing process may be permitted if done with appropriate cleanliness and if the recycled polymer does not exceed 2 percent by weight).

The QAI shall review these documents and report any discrepancies in the requirements stated above to the Project Manager or his/her designee.

2.3.1.2 Geomembrane Manufacturing

Prior to the installing the geomembrane, the Geomembrane Manufacturer shall provide the Project Manager or his/her designee and the QAI with the following information:

- Material properties information which includes, at a minimum, the properties which are specified for the project determined using test methods indicated in these specifications, or an equivalent;

- A list of the materials and quantities, other than the base polymer, which comprise the geomembrane;
- The sampling procedure, test methods and frequencies used for the manufacturer's quality control (MQC) testing;
- A certification stating that the material properties provided by the manufacturer are minimum values which are guaranteed; and,
- The manufacturer's quality control certificates for the geomembrane to be used for construction on site. These certificates shall be signed by a responsible party employed by the Geomembrane Manufacturer, such as the production manager, and shall include:
  - Roll numbers and resin rail car identification;
  - Test methods used for MQC testing; and
  - Results of MQC tests.

The QAI shall verify that:

- The property values certified by the Geomembrane Manufacturer meet the minimum specifications listed in Table 2-1;
- The quality control certificates have been provided, as required, for all rolls, and that each certificate identifies the range of rolls the results account for; and,
- Material properties provided by the Geomembrane Manufacturer are properly documented and the test methods used are acceptable.

The QAI shall document any non-compliance and report it to the Project Manager or his/her designee.

2.3.1.3 Conformance Testing

2.3.1.3.1 Sampling Strategy

The geomembrane rolls may either be sampled prior to being shipped to the job site or upon being delivered. In either case, the sampling methods, descriptions, and frequencies for the QA testing (see Table 2-1) shall be met.

2.3.1.3.2 Sampling Procedures

Samples shall be taken across the entire width of the roll but shall not include the first 3 linear feet (0.9 m) of the roll. Unless otherwise specified, samples shall be 3 feet (0.9 m) long by the roll width. The QAI shall mark the machine and cross directions on the samples with an indelible marker.

2.3.1.3.3 Testing

All CQA conformance testing shall be conducted in accordance with the test methods and frequencies specified in Table 2-1. Where optional test methods are given within the procedure, the specifications contained herein shall prevail.

2.3.1.3.4 Test Results

The QAI shall examine all laboratory conformance testing results and report any non-conformance to the Project Manager or his/her designee. The minimum standards for all geomembranes are listed in Table 2-1.

2.3.1.3.5 Procedure for Conformance Test Failures

The following procedures shall apply whenever a conformance sample analyzed by the Geosynthetics CQA Laboratory does not meet the minimum specifications:

- The Manufacturer shall replace the roll of geomembrane that is in non-conformance with the specifications with a roll that conforms with the required specifications;
- The QAI shall collect conformance samples for CQA testing from the closest numerical roll, both ascending and descending, from the non-conforming roll. These samples must both conform to the project specifications. If either of these samples does not meet the minimum specifications, every roll of geomembrane from the same production batch must be tested by the Geosynthetics CQA Laboratory for conformance. Additionally, the QAI may increase testing frequencies to determine the limit of non-conformance. All additional conformance testing performed due to a non-conforming sample shall be conducted at the expense of the Manufacturer; and,
- As an alternative to the procedure described above, the Manufacturer may elect to remove all material from the suspect lot from the site, and replace it with material from another lot or production run. However, all new material shall be sampled and tested as a new sampling lot and as described previously in this section.

The QAI shall inform the Project Manager or his/her designee of any non-conforming samples.

2.3.1.4 Transportation and Handling

2.3.1.4.1 Delivery

All rolls shall be shipped with roll numbers clearly visible. Any roll arriving onsite without a roll number will not be allowed for use on the project.

Geomembrane transportation is the responsibility of the Geomembrane Manufacturer, Installer, or other party as agreed upon. All on-site handling is the responsibility of the Installer. The QAI shall verify that:

- Equipment used for handling the geomembrane on site is adequate and will not damage the geomembrane; and,

- The Installer's personnel or unloading personnel handle the geomembrane material with care.

Once the material reaches the site, the Installer and the QAI shall inspect the surface of all rolls for defects and damage. This inspection shall be conducted without unrolling the material unless defects or damage is found or suspected. The QAI shall inspect the rolls for the following:

- Any rolls, or portions thereof, that should be rejected and removed from the site because they have severe flaws; and
- Any rolls that have minor repairable flaws.

The QAI shall inform the Project Manager or his/her designee if any non-compliance exists.

2.3.1.4.2 Storage

The Installer and/or Owner shall be responsible for storing the geomembrane on-site. The Project Manager shall provide storage space in a location(s) where on-site transportation and handling are minimized. The storage space should protect the geomembrane from theft, vandalism, passing vehicles and other potential problems.

The QAI shall document whether geomembrane storage adequately protects against dirt, shock, and other sources of damage.

2.4 Underlying Surface

Prior to placing the geomembrane, the underlying surface must meet the project specifications and be accepted by the QAI and the Project Manager or his/her designee.

The Installer shall verify in writing that the surface on which the geomembrane will be installed is acceptable. A verification-of-acceptance form shall be signed by the QAI and Installer. A copy of this form shall be given to the QAI prior to installing the geomembrane on the approved surface.

After the underlying surface has been accepted by the Installer and QAI, the Installer is responsible for indicating, to the Project Manager or his/her designee any changes in the condition of the substrate that may require repair or maintenance. If the QAI concurs with the Installer, the Project Manager or his/her designee shall ensure that the underlying surface is properly repaired. All repaired areas shall meet the minimum specifications and conditions originally accepted by the Installer, QAI, and the Project Manager or his/her designee.

2.5 Geomembrane Placement

2.5.1 Qualifications of Geosynthetic Installer

The Geosynthetics Installer shall be trained and qualified to install geosynthetics. The Geomembrane Installer shall be approved and/or licensed by the Geosynthetics

Manufacturer and, if appropriate, the Geomembrane Fabricator. The Geosynthetics Installer shall submit a copy of the approval letter or license to the Project Manager.

Prior to bid opening, the Geomembrane Installer shall provide the Project Manager with the following written information:

- Installation capabilities, including:
  - Information regarding equipment and available personnel;
  - Anticipated daily production;
  - A quality control manual for installation; and,
  - Samples of field seams and certified test results.
- A list of at least ten completed facilities totaling a minimum of 5,000,000 square feet (465,000 m^2) that have used the Manufacturer's geomembrane that is specified for the project of interest. The following information shall be provided for each facility:
  - The name and purpose of the facility, its location and the date of installation;
  - The name of the Owner, Project Manager, Engineer, Manufacturer and Fabricator (if any);
  - The name and qualifications of the supervisor of the Installer's crew;
  - The type, thickness and surface area of the geosynthetic installation;
  - The type of seams and/or type of seaming apparatus used; and,
  - The duration of the installation.

The Geomembrane Installer shall provide the Project Manager with a list of proposed seaming personnel and their professional records. This document shall be reviewed by the Project Manager and the QAI. Personnel deemed to have insufficient experience will not be accepted by the Project Manager without passing a seaming test.

The Installer shall designate one representative as Superintendent. The Superintendent shall represent the Installer at all site meetings and be responsible for acting as the Installer's spokesperson on site. The Superintendent shall be qualified by experience, having supervised the installation of a minimum of 2 million square feet (185,800 m^2) of geomembrane, 500,000 square feet (46,450 m^2) of geotextile, and 500,000 square feet (46,450 m^2) of geocomposite. The Superintendent shall also exhibit good management skills and must be approved by the Project Manager and QAE.

2.5.2 Field Panel Identification

The QAI shall ensure that the Installer labels each field panel with an "identification code" (number or letter-number) that is consistent with the approved layout plan. This identification code shall be agreed upon by the Project Manager or his/her designee, Installer, and QAI. It will be the responsibility of the Installer to ensure that each field panel is also marked with the geomembrane roll number. The roll number shall be marked at a location or locations agreed upon by the Project Manager or his/her designee, Installer, and QAI.

The QAI shall establish a table or chart which shows that the roll numbers and field panel identification code(s) corresponds. The field panel identification code(s) shall be used for all quality assurance records.

2.5.3 Field Panel Placement

2.5.3.1 Location

The QAI shall verify that field panels are installed at the locations indicated by the Engineer's layout plan. Any deviations to the panel orientation shall be recorded by the QAI and brought to the Project Manager's or his/her designee's attention.

2.5.3.2 Installation Schedule

Field panels shall be placed one at a time unless otherwise designated by the QAI. Each field panel shall be seamed immediately after it is placed in order to minimize the number of un-seamed field panels.

Geomembrane panels shall be "shingled" or overlapped in a downgradient fashion that facilitates drainage and prevents damage to the underlying soils due to precipitation. It is also beneficial to "shingle" in the direction of prevailing winds, if possible.

The QAI shall evaluate changes in the construction schedule that are proposed by the Installer and advise the Project Manager or his/her designee as to the acceptability of the proposed change(s). The QAI shall verify that the condition of the underlying material did not degrade during geomembrane installation.

The QAI shall record the identification code, location, date of installation, and seam information of each field panel.

2.5.3.3 Weather Conditions

Geomembrane shall not be placed when the ambient temperature is below 40ºF (5ºC) or above 104ºF (40ºC), unless otherwise authorized by the Project Manager or his/her designee. Geomembrane will not be placed during precipitation events, in areas of ponded water, and/or in the presence of excessive winds.

The QAI shall verify that the above conditions are fulfilled and notify the Project Manager or his/her designee of any problems. The QAI and the Installer shall also verify that the underlying material has not been damaged by the weather.

2.5.3.4 Method of Placement

The Installer is responsible to ensure that:

- any equipment used during deployment does not damage the geomembrane via improper handling, excessive traffic, excessive heat, leaking hydrocarbons, or other means;

- any equipment or methods used for deployment does not have an adverse affect on the underlying soil layer. Particularly, equipment shall not cause excessive rutting or pumping of the soils. Deployment methods shall not dislodge stones within the soils. If necessary, rub sheets shall be used at the top of slopes and at the outside of terraces to prevent stones from becoming dislodged. All stones that are displaced during placement of the geomembrane shall be removed by the installer, and, if necessary, the geomembrane repaired.
- ATVs, Gators and other types of small low ground pressure rubber tired or rubber tracked equipment may be used for construction activities atop previously installed geosynthetics. In such instances, the equipment and techniques shall be approved by the QAI. No sharp turns are acceptable, and equipment shall be operated at a slow rate of speed. Any damage geosynthetics shall be repaired to the satisfaction of the QAI. QAI may suspend the use of equipment if it is deemed that it is having a detrimental effect on any layer of the soils or geosynthetics.
- the prepared surface underlying the geomembrane has not deteriorated since being accepted and is still in good condition for deploying geomembrane;
- any geosynthetic elements immediately underlying the geomembrane are clean and free of debris;
- all personnel working on the geomembrane do not smoke, wear shoes capable of damaging the geomembrane, or engage in other activities that could damage the geomembrane;
- straight bladed knifes are not allowed for use during construction of the liner system;
- propane or other flame torches are not permitted for use on the liner/cap system;
- the method and equipment used to unroll the panels does not cause scratches or crimps in the geomembrane and does not damage the underlying material;
- the method used to place the geomembrane panels minimizes wrinkles (especially differential wrinkles between adjacent panels);
- adequate temporary loading and/or anchoring (i.e., sandbags, tires, or other material which will not damage the geomembrane) has been placed to prevent uplift by the wind. In the presence of high winds, continuous loading by adjacent sandbags, is recommended along the edges of panels to minimize the risk of wind flowing under the panels. Sandbags shall be removed prior to placement of the next layer, and shall not be buried;
- direct contact with the geomembrane is minimized. Geomembrane shall be protected by geotextiles, extra geomembrane, or other suitable materials in areas where excessive traffic may be expected; and,

- a "chalk-line" or offset marks are applied to the geomembrane to ensure that the electric generator is placed on a smooth base so that it does not damage the geomembrane. Rub sheets will be used under all generators.
- generators are not re-fueled on the geomembrane;
- the geomembrane is adequately protected from damage in heavy traffic areas;
- the proper panel overlap has been achieved.

The QAI shall verify that the above conditions are fulfilled and shall inform the Project Manager or his/her designee if the above conditions are not met.

2.5.3.5 Damage

After placement and prior to being seamed, each panel will be inspected for damage by the QAI. The QAI shall advise the Project Manager or his/her designee as to which panels, or portions thereof, should be rejected, repaired, or accepted. Damaged panels or portions thereof which have been rejected shall be marked, removed from the work area, and recorded by the QAI. Repairs shall be made according to procedures described in Subsection 2.9.

At a minimum, the QAI shall document that:

- the panel is placed so that it is not likely to be damaged; and,
- any tears, punctures, holes, thin spots, etc. are either marked for repair or the entire panel rejected.

2.6 Field Seaming

2.6.1 Geomembrane Layout

The Installer shall provide the Project Manager or his/her designee and the QAI with a geomembrane layout drawing that shows the area to be lined and all anticipated seams. The QAI shall review the geomembrane layout drawing and verify that it is consistent with the accepted industry standards and with this CQA Plan. No panels may be seamed in the field without the Project Manager’s or his/her designee's approval. In addition, panels or panel orientation not specifically shown on the geomembrane layout drawing shall not be completed without the Project Manager or his/her designee's prior approval.

In general, seams shall be positioned parallel to the line of maximum slope (i.e., along, not across, the slope). In corners and odd-shaped locations, the number of seams shall be minimized. Horizontal seams will be minimized to the extent possible on slopes of greater than 10 percent. When horizontal seams are necessary, cross seams will be staggered a minimum of 10’. On slopes that are less than or equal to 10 percent, horizontal seams shall be at least 10 feet (3.0 m) from the toe of slope or other high-stress areas. The completed liner shall not exhibit any "trampolining" during daylight hours (7:00 a.m. to 8:00 p.m.).

A seam numbering system that is compatible with the panel numbering system shall be agreed upon by all parties at the pre-construction meeting. The seam numbering system shall be used for all CQA references throughout installation.

2.6.2 Seaming Equipment and Products

Processes approved for field seaming include extrusion seaming and fusion seaming. Should alternate processes be proposed, they must be documented and then submitted to the Project Manager or his/her designee and the QAI for approval. Only pre-approved equipment which can be identified by make and model shall be used. The Project Manager or his/her designee shall submit all documentation to the QAI for conformance.

2.6.2.1 Extrusion Process

Extrusion seaming apparatus shall be equipped with gauges that display the pre-heat extrudate, and nozzle temperatures.

The Installer shall certify that the extrudate is compatible with the project specifications and provide appropriate documentation to the QAI and Project Manager or his/her designee. This documentation must verify that the extrudate is composed of the same resin as the geomembrane.

The QAI shall document seaming apparatus, extrudate, and ambient temperatures at appropriate intervals. Ambient temperatures shall be measured 18 inches (450 mm) above the geomembrane surface. The QAI will verify that:

- the Installer maintains on-site an appropriate number of spare and operable seaming apparatus as determined at the pre-construction meeting;
- seaming equipment will not likely damage the geomembrane;
- prior to beginning a seam the extruder is purged until all heat-degraded extrudate is removed from the barrel;
- the electric generator is placed on a smooth base so that it does not damage the geomembrane;
- generators are not re-fueled on the geomembrane; and,
- the geomembrane is adequately protected from damage in heavy traffic areas.

2.6.2.2 Fusion Process

The fusion-seaming devices must be automated and vehicle-mounted. It shall be equipped with gauges that display the applicable temperatures. The Installer shall verify the pressure settings of the nip rollers prior to each seaming period.

The QAI shall log ambient temperatures, seaming apparatus and speeds. Ambient temperatures shall be measured 18 inches (450 mm) above the geomembrane surface.

The QAI shall also verify that:

- the Installer maintains on-site an appropriate number of spare and operable seaming apparatus as determined at the pre-construction meeting;

- Seaming equipment shall not damage the geomembrane;
- The electric generator is placed on a smooth base so that the geomembrane is not damaged;
- generators are not re-fueled on the geomembrane;
- the geomembrane is protected from damage in heavy traffic areas;
- seam overlaps are sufficient; and,
- moisture and other contaminants are prevented from building up between the geomembrane panels (a movable protective layer or rub sheet may be used directly below overlapping areas to assist in seaming the geomembrane).

2.6.3 Seam Preparation

The QAI shall verify that:

- the seam area is clean and free of moisture, dust, dirt, oils, greases, foreign material and debris prior to seaming;
- seam overlap conforms with project specifications;
- if seam overlap grinding is required, the process is completed according to the Geomembrane Manufacturer's instructions, within one hour of the seaming operation, and in a way that does not damage the geomembrane. The abraded area shall not extend more than 0.5 inch (12 mm) on either side of the extrusion seam;
- the applied extrudate completely covers the abraded area; and,
- seams are aligned to limit wrinkles and "fishmouths".

2.6.4 Weather Conditions for Seaming

Unless authorized in writing by the Project Manager or his/her designee, no seaming shall be attempted at an ambient temperature below 40ºF (5ºC) or above 104ºF (40ºC). The ambient temperatures shall be measured 18 inches (450 mm) above the geomembrane surface. The geomembrane shall be dry, protected from wind damage, clean of deleterious materials in the weld area, and shall not be seamed during periods of precipitation.

For temperatures below 40ºF, seaming can be performed in accordance with GRI Test Method GM9, Standard Practice for “Cold Weather Seaming of Geomembranes,” developed by the Geosynthetic Research Institute. In order to use other alternate seaming methods that work at ambient temperatures below 40ºF (5ºC) or above 104ºF (40ºC), the Installer shall first demonstrate and certify that such methods produce seams that are equivalent to seams produced at ambient temperatures between 40ºF (4ºC) and 104ºF (40ºC). The overall quality of the geomembrane shall not be adversely affected by any alternate methods. As such, the Installer shall supply a Seaming Procedures Addendum to the Project Manager or his/her designee and the QAI that specifically states that the alternate seaming procedure(s) will not cause any physical or chemical modification to the geomembrane or induce any short- or long-term damage. The Project Manager or his/her designee and the QAI must approve the alternative seaming procedure(s) before additional geomembrane can be deployed. Seaming shall not be attempted during times of precipitation. The QAI shall verify that the weather conditions are satisfactory and shall advise the Project Manager or his/her designee if they are not within the required limits.

2.6.5 Overlapping and Temporary Bonding

The Installer shall ensure and the QAI shall verify, that:

- the geomembrane panels have a minimum finished overlap of 3 inches (75 mm) for extrusion seaming and 4 inches (100 mm) for fusion seaming. Exceptions can be made in accordance with the manufacturers' specifications; but sufficient overlap shall be provided to allow the seams to be destructively tested;
- solvent or adhesive will not be used unless the product is approved by the Owner and the QAI; and,
- procedures used to temporarily bond adjacent panels together do not damage the geomembrane. In particular, the air temperature at the nozzle of any spot-seaming apparatus should be controlled so that the geomembrane is not damaged. No propane torches shall be used on any geosynthetic portion of the liner or cap system.

The QAI shall document appropriate temperatures and conditions and report any non-compliance to the Project Manager or his/her designee.

2.6.6 Trial Seams

Trial seams shall be completed on the same, approved geomembrane being used for the component being installed. Trial seams shall be completed at the beginning of each seaming period or every five hours (whichever is shortest) and after power outages or more than five minutes. An additional trial seam shall also be conducted in the event of an ambient temperature change of more than 18^{o}F (10^{o}C) since the last passing trial seam. The ambient temperature shall be measured 18 inches (450 mm) above the geomembrane.

Trial seams will be completed by each seamer with the specific seaming apparatus he or she will use in that specific seaming period. Trial seams shall be made under the same environmental conditions as the actual seams. Material preparation for the trial seam shall be identical to that of the production seams. If any seaming apparatus is turned off for more than five minutes, a new passing trial seam must be completed for that specific seaming apparatus before it can be used to seam additional geomembrane.

Trial seam samples shall be at least 3 feet (0.9 m) long and 1 foot (0.3 m) wide with the seam centered lengthwise. Seam overlap shall be as described in Subsection 2.6.5.

The Installer shall provide an approved, calibrated tensiometer for field testing trial welds. The tensiometer shall be automated and have a direct digital readout. A certificate of calibration verifying that the device has been calibrated within the last 12 months shall be kept with the tensiometer. The tensiometer must remain on-site for the duration of geomembrane installation.

Six 1-inch (24 mm) wide specimens shall be cut from each trial seam sample by the Installer via a die cutter. Three specimens shall be tested in shear and three in peel using the field tensiometer described above. A passing seam shall be achieved in peel and shear when the requirements indicated in Table 2-1 are achieved.

Trial seam failure is defined as failure of any one specimen tested in peel or shear. If a specimen fails, the entire operation shall be repeated. If the additional specimen fails, the seaming apparatus and seamer shall not be accepted or used for seaming until the deficiencies are corrected and two consecutive successful trial seam samples are achieved.

The QAI shall observe and document all trial seam procedures. The successful trial seam shall be numbered by the QAI, who will also log the date, hour, ambient temperature, the seaming unit serial number, the seamer's name, and pass/fail results. Each sample shall be cut into two pieces, one of which will be retained by the Owner, and the other by the Installer.

2.6.7 General Seaming Procedure

Unless otherwise specified, the seaming procedures used by the Installer shall be as follows:

- For fusion seaming, a movable protective layer (i.e., "rub sheet") can be placed directly below each seaming area to prevent contamination within the seam.
- If required, a firm substrate will be provided by placing a flat, hard surface (i.e., plywood, etc.) directly under the seam overlap for proper support.
- Fishmouths and wrinkles at seam overlaps shall be cut along their ridge to achieve a flat overlap. The fishmouth or wrinkle incision shall then be seamed, with all areas having inadequate overlap repaired with the same geomembrane. The repair shall extend a minimum of 6 inches (150 mm) beyond the incision in all directions.
- If seaming operations are carried out at night, adequate illumination shall be provided;
- Seaming shall conclude at the outside edge of geomembrane panels and extend into and beyond the anchor trench if necessary.

The QAI shall verify that the seaming procedures described above are followed and inform the Project Manager or his/her designee of any non-compliance.

2.7 Non-Destructive Seam Continuity Testing

The Installer shall non-destructively test the full length of all field seams using a vacuum test, air pressure test (for double fusion seams only), or other approved method(s). Non-destructive testing shall be carried out in accordance with ASTM standards or the accepted industry standards. Non-destructive tests provide information on seam continuity, but are not indicative of seam strength. Non-destructive testing will be carried out as the seaming work progresses, not when all seams are completed and the construction phase is over.

Nondestructive testing procedures are described below. Variations to these guidelines may be approved by the QAI based on industry standards or an Installers demonstration that variations will produce acceptable results. Non-destructive testing will not be permitted before sunrise or after sunset unless the Installer demonstrates capabilities to do so.

- Vacuum testing will primarily be used to test extrusion and single track welds. For welds tested by vacuum method, the weld is placed under suction utilizing a vacuum box constructed with rigid sides, a transparent top for viewing the seams, a neoprene rubber gasket attached to the bottom of the rigid sides, a vacuum gauge on the inside, and a valve assembly attached to a vacuum hose connection. The box is placed over a seam section which has been thoroughly saturated with a soapy water solution. The rubber gasket on the bottom of the box must fit snugly against the soaped seam section of the panel, to ensure a leak-tight seal. Gaskets shall be in good repair and not loose from the box.
- A vacuum box test shall be conducted on all single track wedge and extrusion seams.
- The CQA Monitor shall examine welds for approximately 10 seconds through window of vacuum box, 3 psig minimum.
- Air pressure testing shall be used to test dual track seams that have enclosed air space between them. Air pressure testing shall be conducted by pressurizing the air space to 27-30 psi for a 5-minute duration. The seam will be considered acceptable if the pressure drop does not exceed 3 psi in the 5-minute time period. Following a passing pressure test, the opposite end of the tested seam must be punctured to release the air. The pressure gauge must return to zero; if not, a blockage is likely in the seam channel. Locate the blockage and test the seam on both sides of the blockage. Penetration holes are sealed after testing.
- Where vacuum testing or air testing, an alternative method of testing will be performed, such as spark testing.

During nondestructive testing, the CQA Monitor will:

- Review technical specifications regarding test procedures.
- Verify that equipment operators are fully trained and qualified to perform their work.
- Verify that test equipment meets project specifications and this CQA Plan.
- Monitor and verify that the entire length of each seam is tested in accordance with the specifications.
- Monitor all continuity testing and record results on the panel/seam log.
- Verify that all testing is completed in accordance with the project specifications and this CQA Plan.
- Identify any failed areas by marking the area with a waterproof marker compatible with geomembrane, inform the contractor of any required repairs, and record the repair on the panel/seam log.
- Verify that all repairs are completed and tested in accordance with the project specifications and this CQA Plan.

- Record all completed and tested repairs on a repair sheet.

The Installer shall complete any required repairs in accordance with Subsection 2.9.

2.8 Destructive Testing

2.8.1 Concept

The purpose of destructive tests is to randomly evaluate seam strength. Destructive testing shall be completed as the seaming work progresses, not when field seams are completed for that particular phase of construction.

2.8.2 Location and Frequency

Destructive seam tests shall be performed at locations selected by the QAI. Sample locations shall be established as follows:

- at a minimum average frequency of one sample location per 500 feet (150 m) of seam length. The minimum frequency will be determined as an average taken over the entire facility;
- at a maximum frequency agreed upon by the Installer, Project Manager or his/her designee and QAI at the pre-construction meeting; and,
- during seaming and at the QAI's discretion due to suspicion of excess crystallinity, contamination, offset seams, or any other potential cause of imperfect seaming.

The Installer shall not be notified in advance as to where the destructive samples will be collected.

2.8.3 Sampling Procedure

Destructive samples shall be cut by the Installer as seaming progresses so that laboratory test results can be received prior to deploying the next liner or cap system component. The QAI shall:

- observe all sample cutting;
- assign an independent identification number to each sample;
- record each sample location on the layout drawing; and,
- record the reason for taking the sample(s) at the specific location(s) (i.e., statistically routine, suspicious feature of the geomembrane, etc.).

All holes in the geomembrane due to destructive seam sampling shall be immediately repaired in accordance with procedures described in Subsection 2.9 of this CQA Plan. Repaired areas shall be tested according to Subsection 2.7.

2.8.4 Sample Size

The collected sample shall be 12 inches (0.3 m) wide by 24 inches (0.6 m) long and have the seam centered lengthwise. Testing will be conducted by the Installer on site under the observation of the QAI.

2.8.5 Conformance Testing

Test samples shall be analyzed on-site by the Installer and QAI if a calibrated tensiometer is available. A certificate of calibration verifying that the tensiometer has been calibrated within the last 12 months shall be filed on-site. QA testing shall include "seam strength" and "peel adhesion" per ASTM D4437 or D6392. At least five specimens shall be tested in peel and in shear. Four out of five samples must meet minimum strength requirements, and the fifth sample must meet or exceed 80% of the specified strength. In addition, the peel separation (or incursion) for any sample may not exceed 25%. The pass/fail criteria for laboratory testing destructive seam coupons shall be the same as that for trial welds. A passing seam shall be achieved in peel and shear when the requirements indicated in Table 2-1 are achieved.

2.8.7 Procedures for Destructive Test Failure

Whether reported by the QAI, the Geosynthetics CQA Laboratory, the Installer's laboratory, or by field testing procedures, failing destructive results will require the Installer to follow one of the procedures listed below:

1) Re-construct the seam between any two passing destructive sample test locations of the same welder/technician, or

2) Trace the seaming path in both directions to an intermediate location at least 10 feet (3 m) from the point of the failed sample and collect an additional field sample at each location. Should these samples pass field testing, full destructive laboratory samples will be collected from each location. If the destructive samples meet minimum specifications, the seam will be reconstructed between each passing location by capping the original seam. If either sample fails, the process is repeated to establish the zone in which the seam shall be reconstructed. If the end of the seam is reached prior to obtaining a passing sample result, the next consecutive seam seamed by the welder/technician shall be tested until a passing result can be obtained.

If a seam fails destructive testing and the Installer chooses to cap the seam, the methods described in Subsection 2.9.3 must be followed. Applying extrudate topping over an existing fusion-welded seam is not an approved capping method. Capping must occur between two passing destructive samples from seams welded by the technician responsible for the failing destruct.

In cases where the reconstructed seam exceeds 150 feet (50 m), a sample shall be collected from the reconstructed seam. This sample must pass destructive testing or the procedure identified in this section must be repeated.

The QAI shall document all work associated with destructive test failures and submit the associated correspondence to the Project Manager or his/her designee.

2.9 Defects and Repairs

2.9.1 Identification

Geomembrane panels and seams shall be thoroughly examined by the QAI for defects, holes, blisters, undispersed raw materials, or other damage. The surface of the geomembrane shall be clean at the time of examination to aid in detecting defects. Cleaning the geomembrane surface shall be the responsibility of the Installer.

2.9.2 Evaluation

Each suspect location, both in seam and in non-seam areas, shall be non-destructively tested using the methods described in Subsection 2.7. Each location that fails non-destructive testing shall be marked by the QAI and repaired by the Installer. Additional work on subsequent layers shall not be performed prior to repairs being completed and successfully non-destructively and destructively tested.

2.9.3 Repair Procedures

Portions of the geomembrane exhibiting flaws, or failing destructive or non-destructive testing, shall be repaired. Several procedures exist for repairing these areas. The appropriate repair procedure shall be agreed upon by the Project Manager or his/her designee, Installer, and QAI. The procedures available include:

- Patching shall be used to repair holes, tears, undispersed raw materials, and contamination by foreign matter;
- Grinding and reseaming shall be used to repair small sections of extruded seams;
- Spot seaming (beading) shall be used to repair minor, localized flaws; and,
- Capping shall be used to repair large lengths of failed seams.

In addition, the following provisions shall be satisfied:

- Geomembrane surfaces needing to be repaired shall be abraded no more than 1 hour prior to the repair;
- Surfaces must be clean and dry at the time of the repair;
- Seaming equipment used in repair procedures must be approved;
- The repair procedures, materials and techniques shall be approved by the QAI in advance of completing the repair;
- All repairs shall extend at least 6 inches (150 mm) beyond the edge of the defect, and all corners shall be rounded to a radius of at least 3 inches (75 mm); and,
- Excess geomembrane within large repairs shall be carefully cut and removed to avoid water or gas accumulation between the two sheets.

The QAI shall:

- observe the repair procedures and associated retesting;

- mark on the geomembrane that the repair has been made and that non-destructive testing has been completed; and,
- document the results.

The Installer shall use the following procedures at locations where seams cannot be non-destructively tested:

- All such seams shall be repaired with geomembrane of the same type and thickness;
- If the seam is accessible to testing equipment prior to final installation, the seam will be non-destructively tested at an earlier time; and,
- If the seam cannot be tested prior to final installation, the seaming and repairing operations shall be visually inspected by the QAI and the Installer for uniformity and completeness.

The seam number, observation date, test monitor, and test outcome or observation shall be recorded by the QAI.

2.9.4 Verification of Repairs

Each repair shall be numbered and documented. Each repair shall be non-destructively tested using the methods described in Subsection 2.7. Large repairs may be of sufficient extent to require destructive testing, as specified in Subsection 2.8. Failed tests shall require the repair to be completed again and retested until a passing test results. The QAI shall observe all non-destructive testing of repairs and document the date and time of the repair and the test outcome.

2.9.5 Large Wrinkles

When geomembrane seaming is completed or when a significant area has been seamed, the QAI shall inspect the geomembrane for wrinkles. The QAI shall indicate to the Project Manager or his/her designee those wrinkles needing to be removed and reseamed by the Installer per Subsections 2.7 and 2.8.

2.10 Anchor Trench Excavation and Back-Filling

2.10.1 Excavation

Unless otherwise specified, anchor trenches shall be excavated by the Earthwork Contractor to the minimum dimensions shown on the design drawings and prior to geomembrane placement. The QAI shall verify that the anchor trenches have been constructed according to the design drawings.

Sharp bends in the geomembrane where it conforms to the trench will be avoided by rounding the edges of the trenches. Loose soil and rock shall not be allowed to underlie the geomembrane within the anchor trenches.

2.10.2 Backfilling

Anchor trenches shall be adequately drained to prevent ponding or softening of adjacent soils while the trench is open. Anchor trenches shall be backfilled and compacted in specified lifts by the Earthwork Contractor. Caution will be exercised when backfilling anchor trenches to prevent damaging the geosynthetics.

The QAI shall observe back-filling operations and inform the Project Manager of any deficiencies or non-conformities.

2.11 Certification and Acceptance

The Installer and the Manufacturer shall retain all ownership and responsibility for the geosynthetics until acceptance by the Owner. The liner system shall be accepted by the Owner when:

- The installation is finished;
- All seams, repairs, and associated testing is adequately completed and verified;
- The Installer's Representative furnishes the Project Manager or his/her designee with a certification that the geomembrane was installed in accordance with the Manufacturer's recommendations, the plans and the project specifications;
- All installation documentation is completed; and,
- All warranties are executed.

2.12 Materials in Contact with the Geomembrane

The quality assurance procedures discussed in this Subsection are intended to ensure that by installing these materials the geomembrane is not damaged. Additional quality assurance procedures are necessary to ensure that the systems built in conjunction with these materials are constructed in a way that enables them to perform properly.

2.12.1 Soil

The QAI shall verify that soil material is installed in accordance with the procedures described in Section 1. Caution shall be exercised to ensure that the geomembrane is not damaged while placing soil materials over it. The QAI shall inform the Project Manager or his/her designee if the above conditions are not fulfilled.

2.12.2 Appurtenances

The Project Manager or his/her designee shall provide the QAI with a copy of the specifications prepared by the QAI for review. The QAI shall verify that:

- installation and connection of the polyethylene geomembrane in appurtenance areas have been made according to the project specifications;
- caution is taken while seaming around appurtenances as neither non-destructive nor destructive testing may be feasible in these areas, and,

- polyethylene geomembrane has not been visibly damaged while making connections to the appurtenances.

The QAI shall inform the Project Manager or his/her designee if any of the above conditions are not fulfilled.

2.12.3 Geotextile

The QAI shall verify that geotextile is installed in accordance with the procedures described in Section 3. Caution shall be exercised to ensure that the geomembrane is not damaged while placing geotextile. The QAI shall inform the Project Manager or his/her designee if the above conditions are not fulfilled.

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Table 2-1

Property	Test Procedure	Minimum QA Test Frequency(1)	Minimum QC Test Frequency(1)	Acceptance or Rejection Criteria(2)
Thickness	*ASTM D5994* Standard Test Methods for Measuring Core Thickness of Textured Geomembrane	At the discretion of Owner/QAI	Every roll	28.5 mils (marv.); 80% of individual values ≥ 27 mils; lowest individual value ≥ 25.5 mils
Asperity Heights	*ASTM D 7466* Standard Test Method for Measuring the Asperity Height of Textured Geomembrane	At the discretion of Owner/QAI	Every 2nd roll	16 mils
Sheet Density	*ASTM D792* Standard Test Method for Density and Specific Gravity (Relative Density) of Plastics by Displacement **or** *ASTM D1505* Standard Test Method for Density-Gradient Technique	At the discretion of Owner/QAI	1 per 1,000,000 sf	≤ 0.939 g/cm^3
Tensile Properties -Break Strength -Break Elongation	*ASTM D6693 (Type IV)* Standard Test Method for Determining Tensile Properties of Nonreinforced Polyethylene and Nonreinforced Flexible Polypropylene Geomembranes (Machine and Cross Direction)	At the discretion of Owner/QAI	1 per 100,000 ft^2	≥ 45 lb/in ≥ 250 %
Tear Resistance	*ASTM D1004* Standard Test Method for Initial Tear Resistance of Plastic Film and Sheeting	At the discretion of Owner/QAI	1 per 225,000 ft^2	≥ 16 lbs
Puncture Resistance	*ASTM D4833* Test Method for Index Puncture Resistance of Geotextiles, Geomembranes and Related Products	At the discretion of Owner/QAI	1 per 225,000 ft^2	≥ 33 lbs
Carbon Black Content	*ASTM D4218* Standard Test Method for Determination of Carbon Black Content in Polyethylene Compounds By the Muffle-Furnace Technique	At the discretion of Owner/QAI	1 per 225,000 ft^2	2.0% to 3.0%
Carbon Black Dispersion	*ASTM D5596* Test Method for Microscopic Evaluation of the Dispersion of Carbon Black in Polyolefin Geosynthetics	At the discretion of Owner/QAI	1 per 225,000 ft^2	≥ 9 of 10 views in Categories 1 or 2, 1 may be in Cat. 3
Oxidative Induction Time	*ASTM D 8117* Test Method for Oxidative Induction Time of Polyolefins by Thermal Analysis **or** *ASTM D 5885* Test Method for Oxidative Induction Time of Polyolefin Geosynthetics by High Pressure Differential Scanning Calorimetry	At the discretion of Owner/QAI	1 per 1,000,000 sf	100 (ASTM D8117) Or 400 (ASTM D5885)
Resin Specific Gravity	*ASTM D792* Standard Test Method for Density and Specific Gravity (Relative Density) of Plastics by Displacement **or** *ASTM D1505* Standard Test Method for Density-Gradient Technique	Not applicable	1 per resin batch	≤ 0.926 g/cm^3
Resin Melt Index	*ASTM D1238* Test Method for Flow Rates of Thermoplastics by Extrusion Plastometer	Not applicable	1 per resin batch	≤ 1.0 gram per 10 minutes

CONSTRUCTION QUALITY ASSURANCE PLAN
TEST METHODS, SPECIFICATIONS, AND FREQUENCIES

30 MIL LINEAR LOW DENSITY POLYETHYLENE (TEXTURED)

Table 2-1 (cont'd)

Test Method to Determine	**Test Procedure**	**Minimum QA Test Frequency(1)**	**Minimum QC Test Frequency(1)**	**Acceptance or Rejection Criteria(2)**
GRI GM17 Certification	Manufacturer shall supply a certification that the production lots which produced the geomembrane shipped to the site were manufactured and tested in accordance with GRI Test Method GM17: Standard Specification for "Test Properties, Testing Frequency and Recommended Warranty for Linear Low Density Polyethylene (LLDPE) Smooth and Textured Geomembranes."			
Seam Strength Destructive Test Requirements				
Seam Strength (applies to Fusion & Extrusion Welds) -Shear Strength -Shear Elongation -Peel Strength -Peel Separation	*ASTM D6392* Standard Test Method for Determining the Integrity of Nonreinforced Geomembrane Seams Produced Using Thermo-Fusion Methods	1 per 500 lf	As Needed	≥57 ppi(4) ≥50%(3) ≥45 ppi(4)Fusion ≥39 ppi(4)Extrusion ≤25%
Seam Strength Non-Destructive Test Requirements				
Air Testing (applies to fusion welds)	*Not Applicable* See Note 6 below and follow industry standard procedures	Entire Seam	As Needed	See Note 5 below
Vacuum Testing (applies to extrusion welds)	*ASTM D5641* Standard Practice for Geomembrane Seam Evaluation by Vacuum Chamber	Entire Seam	As Needed	As specified in ASTM Standard, no bubbles present after 10 sec. of 4 to 8 psi vacuum applied.

Notes:

1. Minimum QA/QC test frequencies must be achieved for each distinct or identifiable manufacturing run or lot (i.e., one per lot or minimum test frequency, whichever is greater).
2. An effort has been made to bring QA/QC requirements in line with the most recent versions of the Geosynthetic Research Institute's GRI Test Method GM17 (Standard Specification for "Test Properties, Testing Frequency and Recommended Warranty for Linear Low Density Polyethylene (LLDPE) Smooth and Textured Geomembranes,", Test Method GM19(a) (Standard Specification for "Seam Strength and Related Properties of Thermally Bonded Homogeneous Polyolefin Geomembranes," and industry standards. If subsequent revisions to GRI Test Method GM17 or GM19(a) modify the Acceptance or Rejection Criteria indicated above or approved test methods, this table may be modified to be consistent with the new GRI standard by reference provided the changes will not adversely impact the liner system.
3. Trial Seam Testing is not required to consider Shear Elongation at Break. Shear elongation should be calculated by:
   $E = (L / L_o) \times 100$
   Where; E = elongation (%)
   L = extension at end of test (in. or mm)
   L_o = original average length (usually 1.0 in. or 25 mm, the assumed gage length is considered to be the unseamed sheet material on either side of the welded area. It generally will be 1.0 in. from the edge of the seam to the grip face.)
4. The following break codes are not acceptable: Fusion Welds – AD and AD-Brk >25%; Extrusion Welds – AD1, AD2 and AD-WLD (unless strength is achieved in the case of AD-WLD only). All Non-FTB breaks are failures.
5. Both ends of seam shall be sealed and pressure added to the seam at one end in the range of 27 to 30 psi. Following a 5 minute waiting period, the pressure drop shall be ≤ 3 psi. Then, it shall be confirmed that the entire seam has been pressurized by releasing the seal at the opposite side and observing the pressure drop in the gauge.

SECTION 3: GEOTEXTILES

3.1 Introduction

This Section addresses geotextiles that will be used in conjunction with the geosynthetic components of the stormwater management ponds. The following sections outline the procedures for manufacturing, shipping, handling, delivering, and storing geotextiles. Conformance testing, deployment, seaming, and placing cover are also addressed below.

Geotextile materials shall be manufactured by Solmax, Agru America, Polyflex, or Skaps.

3.2 Definitions and Use of Terms

While explaining geotextile CQA/CQC procedures, the following terms and acronyms will be utilized.

- *Apparent Opening Size (AOS):* The property which indicates the approximate largest particle (usually indicated in US Standard Sieve Sizes) that would effectively pass through a geotextile.
- *Chain of Custody:* A written record of sample possession that documents the history of the sample from its point of collection to its arrival at a laboratory.
- *Clogging:* A condition where soil particles move into and are retained in geotextile openings, thereby reducing hydraulic conductivity.
- *Cross-Machine Direction:* The direction in the plane of the fabric which is perpendicular to the direction of manufacture.
- *Geotextile:* A permeable geosynthetic material composed solely of textiles.
- *Machine Direction:* The direction in the plane of the fabric which is parallel to the direction of manufacture.
- *Permittivity:* The volumetric flow rate of water per unit of cross-sectional area, per unit head under laminar flow conditions in the normal direction through a geotextile.
- *Tensile Stresses:* The stresses developed by a specific material when it is subjected to tension from an external force.

3.3 Manufacturing, Shipping, and Handling

3.3.1 Manufacturing

The Geotextile Manufacturer shall provide the Project Manager or his/her designee or his/her designee with a list of guaranteed "minimum average roll value (MARV)" properties (as defined by the Federal Highway Administration) for the type of geotextile to be delivered to the site. The Geotextile Manufacturer shall provide the Project Manager or his/her designee or his/her designee with a written certification signed by a responsible party, which states that the materials actually delivered to the site have MARV properties, which meet or exceed all property values guaranteed for that type of geotextile. The QAI shall examine all manufacturer certifications to ensure that the property values listed on the certifications meet or exceed those specified for the particular type of geotextile. Any deviations shall be reported to the Project Manager or his/her designee or his/her designee. The test methods, descriptions, and frequencies, are included in Tables 3-1 and 3-2.

3.3.2 Shipping and Handling

7.3.2.1 Protective Covering

Prior to shipping the final product, the Manufacturer shall cover each geotextile roll with an opaque, waterproof protective plastic covering. The covering shall effectively protect the entire product from atmospheric exposure, moisture penetration and minor accidental damage. Clearly labeled rolls shall specify the name of the Manufacturer, date of manufacture, location where it was manufactured, style, roll number, lot number, dimensions, weight, and other important items necessary for proper identification.

3.3.2.2 Handling

3.3.2.2.1 Shipment

Geotextile rolls shall be shipped from the Manufacturer on flat bed trailers to facilitate unloading. Geotextile rolls shall be shipped by themselves to prevent damage from other cargo. Methods used to load and unload the geotextile shall not damage the geotextile, the core, or the protective wrapping. All rolls shall be shipped with roll numbers clearly visible. Any roll arriving onsite without a roll number will not be allowed for use on the project.

3.3.2.2.2 Storage

The Contractor shall be responsible for storing of the geotextiles on site. Storage space will be provided in a location that minimizes on-site transportation and handling. Geotextile rolls shall be stored in their original, unopened packaging. The storage area should be level and well drained. If possible, the rolls should be stored on pallets or similar structures to elevate the rolls from the ground and prevent ponding of surface water in and around the product. Each roll shall be protected from precipitation, ultraviolet radiation, chemical contamination, open flames, and vandalism. Protection shall be provided by tarpaulins or other weather-protective and light-proof material. Rolls of geotextile shall always be stored lying flat and never stood on end. Rolls may be stacked on top of each other provided they cannot slide or roll from the stack. The height of a stack shall not exceed that which causes the lower roll cores to collapse or exceed the Manufacturers' recommendations.

3.4 Conformance Testing

3.4.1 Sampling Strategy

Geotextile rolls may be sampled prior to being shipped to the job site or upon arriving at the job site. In either case, the minimum sampling frequency for conformance testing shall be met. Corresponding test methods, descriptions, and frequencies are included in Tables 3-1 and 3-2.

3.4.2 Sampling Procedures

Geotextile rolls are to be divided by the sampling frequency listed within Table 3-1, and clearly denoted by the sampling party. Samples shall be taken across the entire width of the roll and shall not include the first linear 3 feet (0.9 m). Unless otherwise specified, samples shall be 3 feet (0.9 m) long by the roll width.

Each sample shall be given a unique sample number that is clearly marked with an indelible marking device. Also marked will be the machine and cross directions of the geotextile roll.

Samples shall be rolled up and secured with wide packing tape. Plastic or paper sheeting shall be used during transport to prevent damaging the geotextile. When the samples are properly marked and packaged, the QAI shall forward them to the Geosynthetic CQA Laboratory with the completed chain of custody.

The remainder of the sampled roll shall be marked with the appropriate roll number, and rewrapped for storage.

3.4.3 Conformance Testing

All CQA conformance testing shall be conducted according to the test methods, descriptions, and frequencies listed in Tables 3-1 and 3-2.

3.4.4 Conformance Test Results

The QAI shall examine all laboratory conformance results and report any non-conformance to the Project Manager or his/her designee. The minimum specifications for geotextile samples are listed in Tables 3-1 and 3-2.

3.4.5 Procedure for Conformance Test Failure

The following procedure shall apply whenever a sample fails a conformance test conducted by the Geosynthetics CQA Laboratory.

- The Installer shall remove the roll from the storage area, and the QAI shall clearly mark the geotextile roll with “DO NOT USE”.
- The Manufacturer shall replace the non-conforming geotextile roll with a geotextile roll that meets the minimum specifications.
- The sampling party shall collect additional conformance samples to be tested by the Geosynthetics CQA Laboratory. These samples shall be collected from the closest numerical roll on both sides of the non-conforming roll. Procedures for collecting, delivery, and testing samples shall be completed according to the sections referenced above. Both bounding samples must conform to the minimum specifications located in Tables 3-1 and 3-2. If either of the bounding samples fails, every roll of geotextile from the same production batch must be tested by the Geosynthetics CQA Laboratory. The QAI may also increase testing

frequencies for future production batches to determine the limit of non-conformance. All additional conformance testing incurred due to non-conforming samples shall be at the expense of the Manufacturer.

- As an alternative to the procedure described above, the Manufacturer may elect to remove from the site all material associated with the suspect lot and replace it with material from another lot or production batch. The replacement material shall be sampled and tested as described in this section as a new sampling lot.

The QAI shall document work associated with conformance test failures on the non-conforming items report described in Section 3.

3.5 Installation Procedures

3.5.1 Substrate Condition

The Installer shall take necessary precautions to protect the component that underlies the geotextile. Under no circumstances shall the Installer employ methods that will damage the geotextile substrate. Prior to placing the geotextile, the Installer shall remove all foreign materials that may damage either the geotextile or the underlying component.

3.5.2 Panel Deployment

Geotextile rolls shall be delivered to the work area in their original packing and with roll identification tags intact. Packaging shall be removed by the Installer no more than one hour prior to deployment.

3.5.2.1 Handling

While placing the geotextile, the following items are the Installer's responsibility:

- Any equipment used during placement must not damage the geotextile by handling, excessive traffic, excessive heat, leaking hydrocarbons, or other means.
- ATVs, Gators and other types of small low ground pressure rubber tired or rubber tracked equipment may be used for construction activities atop previously installed geosynthetics. In such instances, the equipment and techniques must be approved by the QAI prior to use of the equipment. No sharp turns are acceptable. Any damaged geosynthetics shall be repaired to the satisfaction of the QAI.
- In the presence of wind, all geotextile panels shall be weighted with sandbags or an approved equivalent. Sandbags used during placement shall remain until just prior to placing the next component.
- The geotextile shall be cut using an approved geotextile cutter only. Special care must be taken to protect other components from being damaged by the cutting device. Straight bladed knifes are not allowed for use during construction of the liner system unless otherwise approved by QAI.

- The Installer shall take any precautions necessary to prevent damage to the underlying layers while placing the geotextile.
- Personnel working on the geotextile are not permitted to smoke, wear damaging shoes, or engage in other activities that could damage the geotextile.
- Fuels shall be stored outside the limits of the geotextile.
- Propane or other flame torches are not permitted for use on the liner system.
- Methods used to place panels should minimize wrinkles.
- While placing geotextile, care shall be taken not to entrap stones, excessive dust, or moisture that could damage the substrate, clog drains or filters, or hamper subsequent seaming.
- Geotextile shall not remain exposed for greater than 30 days unless approved otherwise by the QAI;
- The geotextile shall be visually examined over its entire surface after installation to ensure that potentially harmful foreign objects are not present.

The QAI shall note any non-compliance and report it to the Project Manager or his/her designee.

3.5.2.2 Field Panel Identification

The QAI shall ensure that the Installer labels each field panel with an "identification code" this is consistent with the layout plan. The identification code shall be agreed upon by the Project Manager or his/her designee, Installer, and the QAI. It shall be the Installer's responsibility to ensure that each field panel is also marked with the original roll number. The roll number shall be marked at a location(s) agreed upon by the Project Manager or his/her designee, Installer, and the QAI.

The QAI shall establish a table or chart which shows that the roll numbers and field panel identification codes correspond. The field panel identification code shall be used for all quality assurance records.

3.5.2.3 Placement

The QAI shall verify that field panels are installed at locations indicated in the Engineer's layout plan. Field panels shall be placed one at a time unless otherwise designated by the QAI. Each panel shall be seamed immediately after placement.

3.5.2.4 Seams and Overlaps

Geotextiles will be continuously sewn and overlapped a minimum of 6 inches (0.15 m) prior to seaming. Horizontal seams will be limited on side slopes steeper than 20 percent (i.e., seams will be along, not across, slopes steeper than 5H:1V), except as part of a patch. The Installer will use extreme caution at seam areas to ensure that foreign material is not entrapped below the geotextile (e.g., needles, stones, etc.).

Geotextile rolls will be sewn utilizing a hand-held sewing device. Sewn seam configuration will be a double stitch "prayer" (SSa2) seam, or an approved equivalent, and be constructed to the Manufacturer's specifications. The QAI will visually monitor all seams for completeness and quality

3.5.3 Repairs

It is the Installer's responsibility to repair any holes, tears, or manufacturing flaws. The repairs shall meet the following requirements.

- On slopes steeper than 20 percent, a patch made from the same geotextile material shall be sewn into place no closer than 1 inch (25 mm) from any edge. Should a repair exceed 10 percent of the width of the roll, that roll shall be removed from the slope and replaced.
- On slopes less than or equal to 20 percent, a patch made from the same geotextile shall be spot seamed in place with a minimum of 24 inches (0.60 m) overlap in all directions.
- Prior to making a repair, caution shall be exercised to ensure that no foreign material is entrapped under the geotextile.

The QAI shall observe all repairs, note any non-compliance with the above requirements, and report them to the Project Manager.

3.6 <u>Cover Placement or Backfilling</u>

The Contractor shall place all soil and aggregate materials that are located directly atop the geotextile in such a manner as to ensure that:

- The geotextile is not exposed to UV degradation for a period longer than that recommended by the manufacturer (typically 30 days);
- no damage has occurred to the geotextile or the underlying geosynthetics;
- minimal geotextile slippage occurs on underlying layers;
- no excess tensile stresses are induced in the geotextile;
- equipment used for placing the cover material is not driven directly on the geotextile;
- placement thickness of soil or aggregate materials over geotextile shall conform to Section 2.6.1.2 of the CQA plan.
- Any non-compliance shall be noted by the QAI and reported to the Project Manager or his/her designee.

CUSHION GEOTEXTILE

TABLE 3-1

Test Method to Determine	Test Procedure	Minimum QA Test Frequency[2]	Minimum QC Test Frequency[2]	Acceptance / Rejection Criteria
Mass per Unit Area	*ASTM D5261* Standard Test Method for Measuring Mass per Unit Area of Geotextiles **or** *ASTM D3776* Standard Test Methods for Mass per Unit Area of Woven Fabric	At the discretion of Owner/QAI	1 per 100,000 ft^2	≥ 10.0 oz/sy
Grab Strength Grab Elongation	*ASTM D4632* Standard Test Method for Grab Breaking Load and Elongation of Geotextiles (Machine and Cross Direction)	At the discretion of Owner/QAI	1 per 100,000 ft^2	≥ 230 lbs. ≥ 50%
Trapezoidal Tear Strength	*ASTM D4533* Standard Test Method for Trapezoid Tearing Strength of Geotextiles (Machine and Cross Direction)	At the discretion of Owner/QAI	1 per 100,000 ft^2	≥ 95 lbs.
Puncture (CBR) Strength	*ASTM D6241* Standard Test Method for Static Puncture Strength of Geotextiles and Geotextile-Related Products	At the discretion of Owner/QAI	1 per 100,000 ft^2	≥ 700 lbs.
UV Resistance[3]	*ASTM D7238* Standard Test Method for Effect of Exposure of Unreinforced Polyolefin Geomembrane Using Fluorescent UV Condensation Apparatus	At the discretion of Owner/QAI	1 per Lot or Certification	≥ 70%

Notes:

1. Minimum QA/QC test frequencies must be achieved for each distinct or identifiable manufacturing run or lot (i.e., one per lot or minimum test frequency, whichever is greater).
2. All acceptance criteria are based on MARVs except U.V. Resistance which is a minimum value.
3. Evaluation to be on 2.0 inch strip tensile specimens per ASTM D5035 after 300 lt. hrs. exposure.
4. An effort has been made to bring QA/QC requirements in line with Geosynthetic Research Institute's GRI Test Method GT12(a) (Standard Specification for "Test Methods and Properties for Nonwoven Geotextiles Used as Protection (or Cushioning) Materials") and industry standards. If subsequent revisions to GRI Test Method GT12(a) modify the Acceptance or Rejection Criteria indicated above or approved test methods, this table may be modified to be consistent with the new GRI standard by reference provided the changes will not adversely impact the liner system.

CONSTRUCTION QUALITY ASSURANCE PLAN
TEST METHODS, SPECIFICATIONS, AND FREQUENCIES

FILTER GEOTEXTILE

TABLE 3-2

Test Method to Determine	**Test Procedure**	**Minimum QA Test Frequency^{2}**	**Minimum QC Test Frequency^{2}**	**Acceptance or Rejection Criteria**
Mass per Unit Area	*ASTM D5261* Standard Test Method for Measuring Mass per Unit Area of Geotextiles **or** *ASTM D3776* Standard Test Methods for Mass per Unit Area of Woven Fabric	At the discretion of Owner/QAI	1 per 100,000 ft^2	≥ 5.7 oz/sy
Grab Strength	*ASTM D4632* Standard Test Method for Grab Breaking Load and Elongation of Geotextiles (Machine and Cross Direction)	At the discretion of Owner/QAI	1 per 100,000 ft^2	≥ 160 lbs.
Trapezoidal Tear Strength	*ASTM D4533* Standard Test Method for Trapezoid Tearing Strength of Geotextiles (Machine and Cross Direction)	At the discretion of Owner/QAI	1 per 100,000 ft^2	≥ 65 lbs.
Puncture Strength	*ASTM D6241* Standard Test Method for Static Puncture Strength of Geotextiles and Geotextile-Related Products	At the discretion of Owner/QAI	1 per 100,000 ft^2	≥ 400 lbs.
Apparent Opening Size	*ASTM D4751* Standard Test Method for Determining Apparent Opening Size of a Geotextile	At the discretion of Owner/QAI	1 per lot	Min. No. 70 Sieve
UV Resistance[3]	*ASTM D7238* *Standard Test Method for Effect of Exposure of Unreinforced Polyolefin Geomembrane Using Fluorescent UV Condensation Apparatus*	At the discretion of Owner/QAI	1 per Lot or Certification	≥ 70%
Water Flow Rate	*ASTM D4491* Standard Test Methods for Water Permeability of Geotextiles by Permittivity	At the discretion of Owner/QAI	1 per 100,000 ft^2	≥ 110 gpm/sf

Notes:

1. Minimum QA/QC test frequencies must be achieved for each distinct or identifiable manufacturing run or lot (i.e., one per lot or minimum test frequency, whichever is greater).
2. All acceptance criteria are based on MARV except U.V. Resistance which is a minimum value.
3. Evaluation to be on 2.0 inch strip tensile specimens per ASTM D5035 after 300 lt. hrs. exposure.

SECTION 4: GEOCOMPOSITES

4.1 Introduction

This Section addresses the geocomposite drainage materials utilized in conjunction with the geosynthetic components of the stormwater management ponds. Included in this Section are: the requirements for raw resins and geonet manufacturing; procedures for shipping, handling, delivering and storing geocomposite; conformance testing the geocomposite shipment; and deploying, seaming and accepting the installed geocomposite.

Geocomposite materials shall be manufactured by Solmax, Agru America, Polyflex, or Skaps.

4.2 Definitions and Use of Terms

While explaining geocomposite CQA/CQC procedures, the following terms and acronyms associated with geocomposites will be utilized:

- *Cross-Machine Direction:* The direction in the plane of the fabric perpendicular to the direction of manufacture.
- *Geonet:* A geosynthetic material consisting of integrally connected parallel sets of ribs overlying similar sets at various angles for planer drainage of liquids or gases.
- *Geotextile:* A permeable geosynthetic material composed solely of textiles.
- *Machine Direction:* The direction in the plane of the fabric parallel to the direction of manufacture.

4.3 Geonet Manufacturing, Fabrication and Delivery

4.3.1 Raw Material

The raw material used for manufacturing geonets in the geocomposites shall be first quality polyethylene resin which contains: no more than 2 percent clean recycled polymer by weight, a maximum of 1 percent by weight of additives, extenders, or fillers (not including carbon black), and meets the minimum specifications found in Table 4-1.

Manufacturing QC testing shall be carried out by the resin supplier as well as the geonet and geotextile manufacturers to demonstrate that the product meets the project specifications. At the Owner's discretion and cost, additional conformance testing may be carried out by the Geosynthetics CQA Laboratory. If the results of the Manufacturer's and the Geosynthetics CQA Laboratory's conformance testing differ, the subject material shall be retested by the Geosynthetics CQA Laboratory. The Manufacturer shall be permitted to monitor this testing, the results of which shall prevail provided that applicable test methods have been followed.

Prior to installing the geonet material, the Manufacturer shall provide the Project Manager or his/her designee and the QAE with:

- the origin (Resin Supplier's name and resin production plant), identification (brand name, number) and production date of the resin;
- a copy of the Manufacturer's quality control certificates issued by the Resin Supplier;
- reports of the tests conducted by the Manufacturer that verify the quality of the resin used to manufacture the geonet assigned to the project; and,
- a statement that no reclaimed polymer is added to the resin. The use of polymer which is recycled during the manufacturing process may, however, be permitted if done with appropriate cleanliness and if the recycled polymer does not exceed 2 percent by weight.

The QAE shall review these documents and report any discrepancies with the above requirements to the Project Manager or his/her designee.

4.3.2 **Manufacturing**

4.3.2.1 Geonet

The Geonet Manufacturer shall provide the Project Manager or his/her designee with a list of guaranteed properties for the type of geonet to be supplied. The Geonet Manufacturer shall provide the Project Manager or his/her designee with a written certification signed by a responsible party that the geonet delivered to the site meets or exceeds the minimum specifications listed in Table 4-1.

The QAE shall examine all Manufacturer's certifications to ensure that the property values listed on the certifications fulfill the minimum specifications listed in Table 4-1. Any non-compliance shall be reported to the Project Manager or his/her designee.

4.3.2.2 Geocomposite

The geocomposite (i.e., geonet with geotextile heat bonded to both sides) Manufacturers and/or Fabricators shall provide the Project Manager or his/her designee with QC documentation from the Geotextile Manufacturer, as specified in Section 3, and the Geonet Manufacturer, as specified herein. The Fabricator shall supply a list showing that the individual geonet and geotextile roll numbers correlate with the corresponding geocomposite roll numbers.

4.3.3 **Shipping and Handling**

4.3.3.1 Protective Covering

Prior to shipping the final product, the Manufacturer shall cover the geocomposite rolls with a waterproof and opaque protective plastic covering. The covering shall effectively protect the product on all of its exposed surfaces and edges from atmospheric conditions, including sunlight and moisture, and minor superficial damage. Once the protective covering is removed, the geocomposites are not to be left exposed to atmospheric conditions, and be covered with a tarpaulin or other suitable means of covering.

4.3.3.2 Labeling

The Geocomposite Manufacturer shall identify all the rolls of geocomposite with the following:

- Manufacturer's name;
- Product identification;
- Lot number;
- Roll number;
- Roll dimensions; and,
- Corresponding geonet or geocomposite roll number (if applicable).

The QAE shall examine all rolls of geocomposite when they arrive on site. Any non-compliance from the above requirements shall be reported to the Project Manager or his/her designee.

4.3.4 Shipment

Geocomposite rolls are to be shipped from the Manufacturer on flat bed trailers to facilitate unloading. Geocomposite rolls should be shipped by themselves to prevent damage from other cargo. Methods used to load and unload each material shall not damage the rolls, core or protective wrapping. All rolls shall be shipped with roll numbers clearly visible.

4.3.5 Storage

The Contractor shall be responsible for storing the geocomposite rolls on site. Storage space shall be provided in a location that minimizes on-site transportation and handling. Geocomposite rolls shall be stored in their original, unopened packaging. The storage area shall be level and well drained. If possible, the rolls should be stored on pallets or similar structures to elevate the rolls from the ground and prevent ponding of surface water in and around the storage area. All geocomposite rolls shall be protected from precipitation, ultraviolet radiation, chemical contamination, open flames, and vandalism. Protection shall be provided by tarpaulins, or other weather-protective and light-proof material. Rolls of geocomposite shall always be stored lying flat and never stood on end. Rolls may be stacked on top of each other provided they cannot slide or roll from the stack. The height of a stack shall not exceed that which causes the lower roll cores to collapse or exceed the Manufacturers recommended height.

Geocomposite cleanliness is essential for proper performance. Individual rolls should be wrapped in polyethylene sheets or bags or otherwise protected against contamination during shipping and storage. The wrapping shall be removed no more than one hour before placement. The QAE shall verify that each roll of material is free of contamination prior to installation. The QAE shall report any non-compliance to the Project Manager or his/her designee. If the geocomposites are judged to be unacceptable, they shall be cleaned by the

Installer prior to installation. Cleaning operations will be observed by the QAE and any non-compliance shall be reported to the Project Manager or his/her designee.

4.4 Conformance Testing

4.4.1 Sampling Strategy

Geocomposite rolls may be sampled prior to being shipped to the job site, or upon arriving at the job site. In either case, the minimum sampling frequency for conformance testing shall be met. Corresponding test methods, descriptions, and frequencies for the geonet component are included in Table 3-1. Specifications for the filter geotextile heat bonded to the geonet are provided in Table 3-2. Conformance testing should be performed on the geonet and geotextile components prior to heat-bonding in the factory.

4.4.2 Sampling Procedures

Geocomposite rolls should be sampled prior to shipment to the site. When this is not feasible, geocomposite rolls may be sampled upon arriving at the job site. In either case, the minimum sampling frequency for conformance testing shall be met. Corresponding test methods, descriptions, and frequencies for the various components are included in Table 4-1. Conformance testing should be performed on the geonet and geotextile components prior to lamination in the factory.

4.4.3 Conformance Testing

All CQA conformance testing shall be conducted according to the test methods, descriptions, and frequencies listed in Table 3-2 (Geotextile) and Table 4-1 (Geonet).

4.4.4 Conformance Test Results

The QAE shall examine all laboratory conformance results and report any non-conformance to the Project Manager or his/her designee. The minimum specifications for geonet and geocomposite samples are listed in Table 3-2 (Filter Geotextile) and Table 4-1 (Geocomposite).

4.4.5 Procedure for Conformance Test Failure

The following procedure shall apply whenever a sample fails a conformance test conducted by the Geosynthetics CQA Laboratory.

- The Installer shall remove the roll from the storage area, and the QAE shall clearly mark the geocomposite roll with “DO NOT USE”.
- The Manufacturer shall replace the non-conforming geocomposite roll with a different roll that meets the minimum specifications.
- The sampling party shall collect additional conformance samples to be tested by the Geosynthetics CQA Laboratory. These samples shall be collected from the closest numerical roll on both sides of the non-conforming roll. Procedures for collecting, delivery, and testing the samples shall be completed according to the sections referenced above. Both bounding samples must conform to the

minimum specifications found in Table 4-1. If either of the bounding samples fails, every roll of the geocomposite (from the same production batch) must be tested by the Geosynthetics CQA Laboratory. The QAE may also increase testing frequencies for future production batches to determine the limit of non-conformance. All additional conformance testing incurred due to non-conforming samples shall be conducted at the expense of the Manufacturer.

- As an alternative to the procedure described above, the Manufacturer may elect to remove from the site all material from the suspect lot and replace it with material from another lot or production batch. The replacement material shall be sampled and tested as described in this section as a new sampling lot.

4.5 Installation Procedures

4.5.1 Substrate Condition

The Installer shall take necessary precautions to protect the component which underlies the geocomposite layer. Under no circumstances shall the Installer employ methods that will damage the substrate. Prior to placing the geocomposite rolls, the Installer shall remove all foreign materials that may damage either the geocomposite or the underlying component.

4.5.2 Panel Deployment

Geocomposite rolls shall be delivered to the work area in their original packing and with roll identification tags intact. Packaging shall be removed by the Installer no more than one hour prior to deployment.

4.5.2.1 Handling

While placing the geocomposite, the following items are the Installer's responsibility:

- Any equipment used during placement must not damage the geocomposite by handling, excessive traffic, excessive heat, leaking hydrocarbons, or other means.
- ATVs, Gators, and other types of small low ground pressure rubber tired or rubber tracked equipment may be used for construction activities atop previously installed geosynthetics. In such instances, the equipment and techniques shall be approved by the QAE prior to use. No sharp turns are acceptable, and equipment shall be operated at a slow rate of speed. Any damage geosynthetics shall be repaired to the satisfaction of the QAE. QAE may suspend the use of equipment if it is deemed that it is having a detrimental effect on any layer of the soils or geosynthetics.
- In the presence of high wind, all geocomposite panels shall be weighted with sandbags or an approved equivalent. Ballast used during placement shall remain until just prior to placing the next component or until such time that the geocomposite panels are joined together sufficiently to control wind uplift.

- The geocomposite rolls shall be cut using an approved cutting tool only. Special care must be taken to protect the underlying components from being damaged which could be caused by the cutting device.
- The Installer shall take any precautions necessary to prevent damage to the underlying layers while placing the geocomposite rolls.
- Personnel working on the geocomposite shall not smoke, wear damaging shoes, or engage in other activities that could damage the geocomposite.
- Methods used to place panels should minimize wrinkles.
- While placing the geocomposite rolls, care shall be taken not to entrap stones, excessive dust, or moisture that could damage the underlying substrate, clog drains or filters, or hamper subsequent joining. Generators shall be fueled off of geosynthetic components. Fuel canisters shall not be placed on the liner system.
- straight bladed knifes are not allowed for use during construction of the liner system;
- propane or other flame torches are not permitted for use on the liner/cap system;
- The geocomposite shall be visually examined over its entire surface and after installation to ensure that potentially harmful foreign objects are not present.
- Unless otherwise specified, geocomposites shall not be welded to geomembranes.

The QAE shall note any non-compliance and report it to the Project Manager or his/her designee.

4.5.2.2 Field Panel Identification

The QAE shall ensure that the Installer labels each field panel with an "identification code" that is consistent with the layout plan. The identification code shall be agreed upon by the Project Manager or his/her designee, Installer, and the QAE. It shall be the Installer's responsibility to ensure that each field panel is also marked with the original roll number. The roll number shall be marked at a location(s) agreed upon by the Project Manager or his/her designee, Installer, and the QAE.

The QAE shall establish a table or chart which shows the corresponding roll numbers and field panel identification codes. The field panel identification code shall be used for all quality assurance records.

4.5.2.3 Placement

The QAE shall verify that field panels are installed at locations indicated in the Engineer's layout plan. Field panels shall be placed one at a time unless otherwise designated by the QAE. Each panel shall be joined to the adjacent panel immediately after its placement.

When several layers of geocomposites are stacked, care shall be taken to prevent strands from one layer from penetrating the channels of the next layer, which can significantly reduce the transmissivity. Geocomposite field panels shall be placed facing in the same direction to prevent this from occurring. To the extent possible, cross seams shall not be installed on slopes greater than ten percent.

Adjacent geocomposites shall be joined according to the construction drawings and specifications. At a minimum, the following requirements shall be met.

- Adjacent rolls shall be overlapped by at least 4 inches (100 mm).
- All overlaps shall be secured by tying.
- Joining adjacent rolls shall be achieved by plastic fasteners or polymer braid. Tying devices shall be colored white or yellow for easy identification. Metal fasteners or fasteners that contain metal are not permitted.
- Joining adjacent rolls shall occur every 5 feet (1.5 m) along the slope, every 2 feet (0.6 m) across the slope, every 1 foot (0.15 m) within the anchor trench, and every 10 feet (3.0 m) on horizontal (less than 10 percent grade) surfaces.
- In the corners of the side slopes where overlaps between perpendicular drainage net strips are required, an extra layer of drainage net shall be unrolled along the slope and on top of the previously installed drainage nets, from top to bottom of the slope.
- Torches shall not be used to leister the geotextile. Only approved heat devices shall be used.
- When more than one layer of drainage net is installed, joints shall be staggered.
- Where butt seams are required, a strip of geotextile shall be leistered over the seam. Leistering shall be completed using an approved leistering device. No propane torches shall be used while leistering.
- Geotextile components shall be seamed using methods outlined in Section 3.

The QAE shall note any non-compliance and report it to the Project Manager or his/her designee.

4.5.3 Repairs

Any holes or tears in the geocomposite shall be repaired by placing a patch extending 2 feet (0.6 m) beyond all edges of the hole or tear. Patches shall be secured to the original drainage net via plastic fasteners or polymer braids every six (6) inches (0.15 m). If the width of the hole is more than 50% the width of the roll, the damaged area shall be cut out, and the two portions of the drainage net joined as indicated in Subsection 4.5.2.3.

Repairs to the geotextile component only shall follow the requirements of Section 3.

The QAE shall observe any repair, note any non-compliance with the above requirements and report them to the Project Manager or his/her designee.

4.6 Cover Placement or Backfilling

The Installer or Earthwork Contractor will ensure that soil materials are placed such that:

- The geocomposite is not exposed to UV degradation for a period longer than that recommended by the manufacturer (typically 30 days);
- the drainage net and underlying geomembrane are not damaged;
- no oversized or detrimental material is placed directly on the geocomposite;
- the drainage net does not slip on the underlying geomembrane. This should be prevented by pushing all soils upslope;
- excessive tensile stresses do not occur in the drainage net, and,

Any non-compliance shall be noted by the QAE and reported to the Project Manager or his/her designee.

CONSTRUCTION QUALITY ASSURANCE PLAN
TEST METHODS, SPECIFICATIONS, AND FREQUENCIES

GEOCOMPOSITE [(1)]

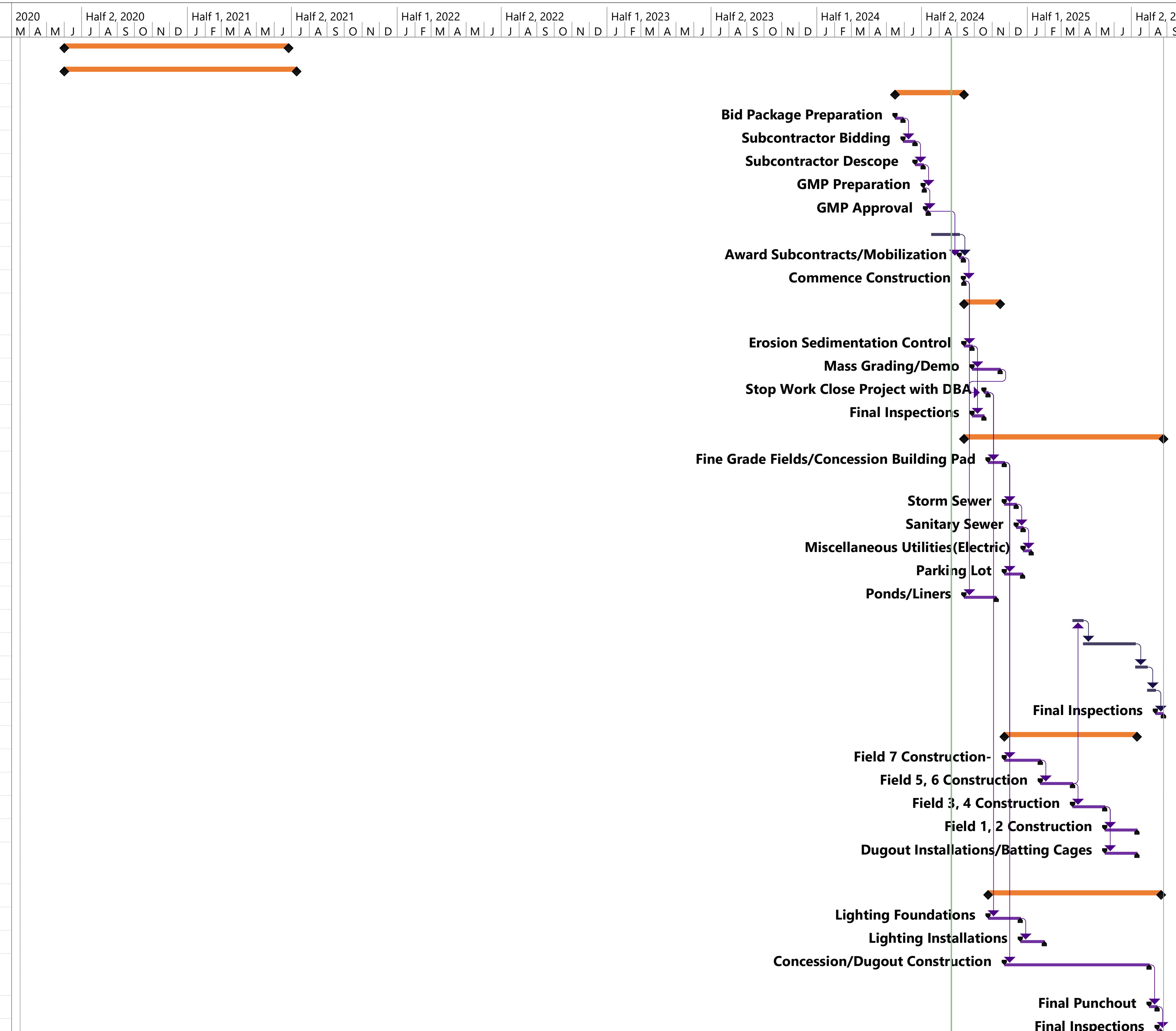
TABLE 4-1

Test Method to Determine	Test Procedure	Minimum QA Test Frequency[3]	Minimum QC Test Frequency	Acceptance or Rejection Criteria
Density[2]	*ASTM D792* Standard Test Method for Density and Specific Gravity (Relative Density) of Plastics by Displacement **or** *ASTM D1505* Standard Test Method for Density-Gradient Technique	At the discretion of Owner/QAI	1 per 50,000 ft^2	≥ 0.940 g/cm^3
Carbon Black Content[2]	*ASTM D4218(4)* Standard Test Method for Determination of Carbon Black Content in Polyethylene Compounds By the Muffle-Furnace Technique	At the discretion of Owner/QAI	1 per 50,000 ft^2	≥ 2.0%
Thickness[2]	*ASTM D5199* Standard Methods for Measuring the Nominal Thickness of Geosynthetics	At the discretion of Owner/QAI	1 per 50,000 ft^2	≥ 0.20 inch minimum
-Tensile Strength[2] (Machine Direction)	*ASTM D7179* Standard Test Method for Determining Geonet Breaking Force	At the discretion of Owner/QAI	1 per 50,000 ft^2	≥45 lb./inch
Transmissivity[3]	*ASTM D4716* Standard Test Method for Constant Head Hydraulic Transmissivity (In-Plane Flow) of Geotextiles and Geotextile Related Products	At the discretion of Owner/QAI	1 per 100,000 ft^2 (See 3)	See 3
Peel Strength[3]	*ASTM D7005* Standard Test Method for Determining the Bond Strength (Ply Adhesion) of Geocomposites	At the discretion of Owner/QAI	1 per 50,000 ft^2	≥ 1.0 ppi (marv) and ≥ 0.5 ppi (min)

Notes

1. This Table contains property requirements for the geonet core and finished geocomposite. See Table 3-2 for the Geotextile Component property requirements.
2. These tests shall be performed on the Geonet component only.
3. Tests shall be performed on the final geocomposite product. All other tests above shall be performed on the geonet before heat bonding. These tests shall be performed as an index test and shall be performed at the test set up conditions specified in the manufacturer's specification sheets to confirm quality of the material. If manufacturer's specifications change, these tests change to be consistent with the manufacturer's latest specification sheets.
4. Minimum QA test frequencies must be achieved for each distinct or identifiable manufacturing run or lot (i.e., one per lot or minimum test frequency, whichever is greater).

ID	Task Name	Duration	Start	Finish	Predecessors
1	**CIVIL DESIGN**	**280 days**	**Mon 6/1/20**	**Fri 6/25/21**	
21	**ACT 2 PROCESS TIMELINE**	**290 days**	**Mon 6/1/20**	**Fri 7/9/21**	
30	**PRECONSTRUCTION PHASE**	**86 days**	**Thu 5/16/24**	**Thu 9/12/24**	
31	Bid Package Preparation	10 days	Thu 5/16/24	Wed 5/29/24	
32	Subcontractor Bidding	15 days	Thu 5/30/24	Wed 6/19/24	31
33	Subcontractor Descope	10 days	Thu 6/20/24	Wed 7/3/24	32
34	GMP Preparation	2 days	Thu 7/4/24	Fri 7/5/24	33
35	GMP Approval	5 days	Mon 7/8/24	Fri 7/12/24	34
36	DEP Approval/Loan Approval	35 days	Thu 7/18/24	Wed 9/4/24	
37	Award Subcontracts/Mobilization	5 days	Thu 9/5/24	Wed 9/11/24	35,36
38	Commence Construction	1 day	Thu 9/12/24	Thu 9/12/24	37
39	**PHASE 1 STORMWATER PHASE (Davis Bacon)**	**45 days**	**Fri 9/13/24**	**Thu 11/14/24**	**28**
40	Erosion Sedimentation Control	10 days	Fri 9/13/24	Thu 9/26/24	38
41	Mass Grading/Demo	35 days	Fri 9/27/24	Thu 11/14/24	40
42	Stop Work Close Project with DBA	5 days	Fri 10/18/24	Thu 10/24/24	41FS-20 days
43	Final Inspections	15 days	Fri 9/27/24	Thu 10/17/24	40
44	**PHASE 2 Balance of Sitework (Open)**	**247 days**	**Fri 9/13/24**	**Mon 8/25/25**	**28**
45	Fine Grade Fields/Concession Building Pad	20 days	Fri 10/25/24	Thu 11/21/24	42
46	Storm Sewer	15 days	Fri 11/22/24	Thu 12/12/24	45
47	Sanitary Sewer	8 days	Fri 12/13/24	Tue 12/24/24	46
48	Miscellaneous Utilities(Electric)	10 days	Wed 12/25/24	Tue 1/7/25	47
49	Parking Lot	22 days	Fri 11/22/24	Mon 12/23/24	45
50	Ponds/Liners	40 days	Fri 9/13/24	Thu 11/7/24	38
51	Stone Prep for Sidewalks	12 days	Fri 3/21/25	Mon 4/7/25	58
52	Sidewalk Install	65 days	Tue 4/8/25	Mon 7/7/25	51
53	Install Fencing/Gates	15 days	Tue 7/8/25	Mon 7/28/25	52
54	Final Landscaping	10 days	Tue 7/29/25	Mon 8/11/25	53
55	Final Inspections	10 days	Tue 8/12/25	Mon 8/25/25	54
56	**PHASE 3 FIELD CONSTRUCTION (RACP)**	**165 days**	**Fri 11/22/24**	**Thu 7/10/25**	**28**
57	Field 7 Construction-	45 days	Fri 11/22/24	Thu 1/23/25	45
58	Field 5, 6 Construction	40 days	Fri 1/24/25	Thu 3/20/25	57
59	Field 3, 4 Construction	40 days	Fri 3/21/25	Thu 5/15/25	58
60	Field 1, 2 Construction	40 days	Fri 5/16/25	Thu 7/10/25	59
61	Dugout Installations/Batting Cages	40 days	Fri 5/16/25	Thu 7/10/25	59
62	**PHASE 4 CONCESSION/LIGHTING**	**215 days**	**Fri 10/25/24**	**Thu 8/21/25**	**28**
63	Lighting Foundations	40 days	Fri 10/25/24	Thu 12/19/24	42
64	Lighting Installations	30 days	Fri 12/20/24	Thu 1/30/25	63
65	Concession/Dugout Construction	180 days	Fri 11/22/24	Thu 7/31/25	45
66	Final Punchout	10 days	Fri 8/1/25	Thu 8/14/25	65
67	Final Inspections	5 days	Fri 8/15/25	Thu 8/21/25	66



Project: WBI 8-22-2024
Date: Thu 8/22/24

Task	Project Summary	Manual Task	Start-only	Deadline
Split	Inactive Task	Duration-only	Finish-only	Progress
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress
Summary	Inactive Summary	Manual Summary	External Milestone	

August 17, 2021

Williamsport Ballpark
Jason Fink
102 West Fourth Street
Williamsport, PA 17701

Re: Chapter 102 Individual NPDES Permit Issuance
Former Susquehanna Supply Company Site
NPDES Permit No. PAD410016
Williamsport City, Lycoming County

Dear Jason Fink:

Under the authority of the federal Clean Water Act and Pennsylvania's Clean Streams Law, the Department of Environmental Protection (DEP) approves your application for an Individual NPDES Permit for Stormwater Discharges Associated with Construction Activities under Chapter 102. Your permit is enclosed. The latest versions of the permit application and all supporting documents, including the Erosion and Sediment Control (E&S) Plan and Post-Construction Stormwater Management (PCSM) Plan, are incorporated into this approval.

Your Individual NPDES Permit, which has been assigned NPDES Permit No. PAD410016, is effective on August 17, 2021 and will expire on August 16, 2026. If stormwater discharges associated with construction activities are expected to continue beyond the expiration date of the Individual NPDES Permit, you must apply to renew your permit at least 180 days prior to the expiration date.

Please review the Individual NPDES Permit, any special conditions listed in Attachment A of the permit (if applicable), and the enclosed attachments carefully and contact this office if you have any questions. Please pay particular attention to the following requirements of the Individual Permit:

- In accordance with 25 Pa. Code § 102.5(h), operators who are not the permittee shall be co-permittees. An operator is a person who either has oversight responsibility of an earth disturbance activity on a project site who has the ability to make modifications to the E&S Plan, PCSM Plan or site specifications, or has day to day operational control over an earth disturbance activity on a project site. Please be advised that once an operator (contractor) has been selected for the project, the NPDES permit must either be transferred to the operator or the operator must be made a co-permittee and enter into an agreement with the permittee. Please use the enclosed Transferee/Co-Permittee Application form to transfer the permit or to add a co-permittee. This form must be received by this office at least 30 days prior to the co-permittee/transferee action taking place.

- A pre-construction conference is required as specified in 25 Pa. Code § 102.5(e), unless otherwise notified in writing by this office. The purpose of this conference is to review all aspects of the permit with the permittee, co-permittees, operators, consultants, inspectors and licensed professionals or their designees who will be responsible for the implementation of the critical stages of the approved PCSM Plan. You must provide at least seven days notice of the pre-construction meeting to all invited attendees.

- You must conduct inspections of all best management practices (BMPs) on a weekly basis and after each measurable stormwater event (including the repair or replacement of BMPs) to ensure effective and efficient operation. The Visual Site Inspection Report Form is enclosed and must be used to document these required site inspections.

- For any property containing a PCSM BMP, the permittee or co-permittee must record an instrument with the recorder of deeds which will assure disclosure of the PCSM BMP and the related obligations in the ordinary course of a title search of the subject property. The recorded instrument must identify the PCSM BMP, provide for necessary access related to long-term operation and maintenance (O&M) for PCSM BMPs, and provide notice that the responsibility for long-term O&M of the PCSM BMP is a covenant that runs with the land that is binding upon and enforceable by subsequent grantees. Unless a later date is approved by DEP in writing, the permittee shall record an instrument within 45 days from the date of this coverage approval letter. The permittee shall provide the county conservation district and DEP with the date and place of recording along with a reference to the docket, deed book or other record, within 90 days from the date of this coverage approval letter, unless a later date is approved by DEP in writing.

- The Notice of Termination (NOT) form is also enclosed and must be completed and filed when construction activities have ceased, and final stabilization has been achieved. The NOT must identify the responsible person(s) for the long-term O&M of the PCSM BMPs. Please be advised that the permittee and any co-permittees remain responsible for all operational maintenance for this project site until the NOT has been filed and acknowledged.

Persons aggrieved by an action may appeal that action to the Environmental Hearing Board (Board) under section 4 of the Environmental Hearing Board Act (35 P.S. § 7514) and 2 Pa.C.S. §§ 501-508 and 701-704 (relating to Administrative Agency Law). The appeal should be sent to the Environmental Hearing Board, Second Floor, Rachel Carson State Office Building, 400 Market Street, PO Box 8457, Harrisburg, PA 17105-8457, (717) 787-3483. TDD users may contact the Board through the Pennsylvania Relay Service, (800 654-5984. Appeals must be filed with the Board within 30 days of publication of this notice in the Pennsylvania Bulletin unless the appropriate statute provides a different time period. Copies of the appeal form and the Board's rules of practice and procedure may be obtained from the Board. The appeal form and the Board's rules of practice and procedure are also available in Braille or on audiotape from the Secretary to the Board at (717) 787-3483. This paragraph does not, in and of itself, create a right of appeal beyond that permitted by applicable statutes and decisional law.

For individuals who wish to challenge an action, the appeal must reach the Board within 30 days. A lawyer is not needed to file an appeal with the Board.

Important legal rights are at stake, however, so individuals should contact a lawyer at once. Persons who cannot afford a lawyer may qualify for free pro bono representation. Call the Secretary to the Board at (717) 787-3483 for more information.

The PCSM plan drawing for this project is dated March 2021 with last revision date of August 2021.

If you have additional questions, please contact James Cassidy at 570.855.9764 or email me at jacassidy@pa.gov.

Sincerely,

Steven S. Putt

Steve Putt, CPESC
Environmental Program Manager
Waterways and Wetlands Program

cc: Robert Myers
Hawbaker Engineering, LLC (letter only)
1952 Waddle Road, Suite 201
State College, Pa 16803
Lycoming County Conservation District (letter and permit only)
Williamsport City (letter only)
File

Attachments: Individual NPDES Permit
Visual Site Inspection Report Form
Transferee/Co-permittee Application Form
Notice of Termination Form

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF CLEAN WATER

AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) INDIVIDUAL PERMIT FOR DISCHARGES OF STORMWATER ASSOCIATED WITH CONSTRUCTION ACTIVITIES

NPDES PERMIT NO: PAD410016

In compliance with the provisions of the Clean Water Act, 33 U.S.C. Section 1251 et seq. (the Act) and Pennsylvania's Clean Streams Law, as amended, 35 P.S. Section 691.1 et seq.,

Permittee	Project Site
Williamsport Ballpark	**Former Susquehanna Supply Company Site**
102 West Fourth Street	**Williamsport City, Lycoming County**
Williamsport, PA 17701	**Earth Disturbance: 28.5 acres**

is authorized to discharge from an earth disturbance activity to **UNT to West Branch Susquehanna River TSF, MF** in accordance with effluent limitations, monitoring requirements and other conditions set forth in Parts A, B and C herein.

THIS PERMIT SHALL BECOME EFFECTIVE ON **August 17, 2021**

THIS PERMIT SHALL EXPIRE AT MIDNIGHT ON **August 16, 2026**

The authority granted by this permit is subject to the following further qualifications:

1. If there is a conflict between the application, its supporting documents and/or amendments and the terms and conditions of this permit, the terms and conditions shall apply.

2. Failure to comply with the terms, conditions or effluent limitations of this permit is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application. (40 CFR 122.41(a))

3. A complete application for renewal of this permit, or notice of intent to cease discharging by the expiration date, must be submitted to DEP at least 180 days prior to the above expiration date (unless permission has been granted by DEP for submission at a later date), using the appropriate NPDES permit application form. (40 CFR 122.41(b), 122.21(d))

   In the event that a timely and complete application for renewal has been submitted and DEP is unable, through no fault of the permittee, to reissue the permit before the above expiration date, the terms and conditions of this permit will be automatically continued and will remain fully effective and enforceable against the discharger until DEP takes final action on the pending permit application. (25 Pa. Code §§ 92a.7(b), (c))

ISSUANCE DATE:

08/17/2021

Steve S. Putt

Steve Putt
Environmental Program Manager
North Central Regional Office

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF CLEAN WATER

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) INDIVIDUAL PERMIT FOR DISCHARGES OF STORMWATER ASSOCIATED WITH CONSTRUCTION ACTIVITIES APPLICATION

Before completing this form, read the step-by-step instructions provided in the individual permit package.

DEP / CCD USE ONLY

Date Received: ______	Permit ID: ______
☐ Application Complete	Date of: ☐ Return ☐ Withdrawal ☐ Denial
Date Determined Complete: ______	______
Issuance Date: ______	Date Resubmission Received: ______
Effective Date: ______	Expiration Date: ______

GENERAL INFORMATION

1. Applicant Name(s): **Williamsport Ballpark, Inc.**
2. Appl. Type: ☒ New ☐ Renewal ☐ Major Amendment ☐ Minor Amendment Permit No. PA_____
3. Primary NAICS Code: 713990 4. Additional NAICS Codes:
5. Project Description: Construct 6 little league artifical turf fields and two collegiate artifical turf fields with associated parking, access and stormwater management
6. ☐ Site Restoration Project 7. ☐ Discharges to Special Protection Waters (Module 3 Attached)
8. ☐ Project Site Within 150 Feet of Special Protection Waters (Module 4 Attached)
9. ☐ Common Plan of Development or Sale No. phases: No. phases complete:

PROJECT SITE INFORMATION

1. Project Site Name: Former Susquehanna Supply Company property along the northern side of SR 220
2. Total Project Site Area: 28.51 acres
3. Project Site Impervious Area – Pre-Construction: 4.11 acres Percent of Total: 14 %
4. Project Site Impervious Area – Post-Construction: 5.43 acres Percent of Total: 19 %
5. Hydric soils or other wetland features are present within the Project Site. ☐ Yes ☒ No

   ☐ If Yes, the wetland determination is attached to the application.

	County Name	Municipality Name	City	Boro	Twp	State
6.	Lycoming County	Williamsport	☒	☐	☐	PA
7.			☐	☐	☐	PA

8. Site Location Address

   2 Rose Street

	Site Location City	State	ZIP+4
9.	Willaimsport	PA	17701

OPERATOR INFORMATION

1. Operator Name: Ausley Construction, Inc.
2. Contact Name: Dustin Magamoll
3. Operator Address: 1521 SE 36th Ave., Suite 1
4. Operator Phone: (352) 572-2668
5. Operator City, State, ZIP: Ocala, FL 34470
6. Operator's Role in Project: ☐ General Contractor ☐ Consultant ☐ Excavation Contractor ☒ Other
7. Operator's Responsibilities: Design/builder

1. Operator Name:
2. Contact Name:
3. Operator Address:
4. Operator Phone:
5. Operator City, State, ZIP:
6. Operator's Role in Project: ☐ General Contractor ☐ Consultant ☐ Excavation Contractor ☐ Other
7. Operator's Responsibilities:

EARTH DISTURBANCE INFORMATION

1. Total Earth Disturbance Area 28.51 acres 1,241,885 sf
2. Pre-Construction Impervious Area: 178,814 sf
3. Post-Construction Impervious Area: 236,531 sf
4. Pre-Construction/Present Land Use(s):
5. Post-Construction Land Use(s):

Pre-Construction/Present Land Use(s)	%	Post-Construction Land Use(s)	%
Meadow	39 %	fallow	38 %
Gravel	47 %	lawn	43 %
Impervious	14 %	impervious	19 %
	%		%

6. ☒ A map/drawing showing the site, LOD, surface waters, discharge points, BMPs and drainage is attached.
7. Report latitude and longitude at the center of the proposed disturbed area.

   Latitude: 41° 13' 56.3" Longitude: 77° 01' 42.3"
8. Horizontal Reference Datum: ☐ NAD of 1927 ☒ NAD of 1983 ☐ WGS of 1984 ☐ Unknown
9. There will be off-site construction support activities. ☐ Yes ☒ No
10. If Yes, identify the nature of known off-site support activities whose disturbance is included in #1, above:

Description of Off-Site Support Activity	Distance from Site	Disturbance Area
	mi	acres
	mi	acres

11. Identify any other off-site support activities whose disturbance is not included in #1, above (see instructions).

Description of Off-Site Support Activity	Distance from Site	Disturbance Area
	mi	acres
	mi	acres

12. Check the appropriate box concerning fill material (see instructions):

    ☒ No fill material is expected to be imported to the project site.

    ☐ It is expected that fill will be needed for this project. The source of fill has not yet been determined but will undergo environmental due diligence when identified.

    ☐ It is expected that fill will be needed for this project. The applicant has identified the source of the fill and has determined the material to be clean fill. DEP's online Certification of Clean Fill form has been submitted.

EARTH DISTURBANCE INFORMATION (CONTINUED)

☐ It is expected that fill will be needed for this project, which is located on a site that is being remediated to Act 2 standards and will be utilized in accordance with DEP standards under that program.

☐ It is expected that fill will be needed for this project. The applicant has identified the source of the fill and has determined it to be regulated fill. The regulated fill is authorized on the project site under a Waste Management General Permit No. WMGR096 authorization dated: ______.

☐ It is expected that fill will be needed for this project, which is not on an Act 2 site. The applicant has identified the fill and has determined that it does not meet criteria for clean fill. The applicant is seeking authorization to use the regulated fill from DEP's Waste Management Program.

13. The site is enrolled in DEP's Act 2 Program. ***(Not yet, but will be.)*** ☒ Yes ☐ No

14. The site was previously enrolled in DEP's Act 2 Program and cleanup standards have been met. ☐ Yes ☒ No

15. Is Act 537 sewage planning approval needed for this project? ☐ Yes ☒ No

The Act 537 approval letter is attached to the NOI. ☐ Yes ☐ No (will be submitted prior to approval) ☒ N/A

16. A Chapter 105 permit or authorization is required. ☐ Yes ☒ No

17. If Yes, identify the necessary authorization. ☐ Joint Permit ☐ General Permit ☐ Waiver

18. Other DEP/CCD permits or authorizations are required. ☐ Yes ☐ No

19. If Yes, identify the necessary authorizations. Erosion & Sedimentation Control

EXISTING PERMITS

Identify all environmental permits issued by DEP/CCD/EPA or are pending for this facility/project site within the past 5 years.

Type of Permit	Permit No.	Date Issued	Issued By

COMPLIANCE HISTORY

Was/Is the facility owner or operator in violation of any DEP regulation, permit, order, or schedule of compliance at this or any other facility or project site within the past 5 years? ☐ Yes ☒ No

If "Yes," list each permit, order or schedule of compliance and provide current compliance status. Use additional sheets to provide information on all permits.

Permit Program: Permit No.:

Brief Description of Non-Compliance:

Steps Taken to Achieve Compliance Date(s) Compliance Achieved

Current Compliance Status: ☐ In Compliance ☐ In Non-Compliance

STORMWATER DISCHARGE INFORMATION

1. List all stormwater discharge points **during construction** and provide the information requested below (see instructions). ☐ Not Applicable

Discharge Point No.	LATITUDE	LONGITUDE	RECEIVING WATERS					
	Degrees	Degrees	Name of Receiving Waters	Ches. Bay?	Non-Surface Waters	Ch. 93 Class.	Impaired?	TMDL?
1	41° 14' 00.79"	77° 01' 51.79"	UNT to West Branch Susquehanna River	☒	☒	WWF	☒	☒
2	41° 13' 59.68"	77° 01' 45.40"	UNT to West Branch Susquehanna River	☒	☒	WWF	☒	☒
3	41° 13' 58.38"	77° 01' 35.85"	UNT to West Branch Susquehanna River	☒	☒	WWF	☒	☒
4	41° 13' 51.86"	77° 01' 32.82"	UNT to West Branch Susquehanna River	☒	☒	WWF	☒	☒
5	41° 13' 52.50"	77° 01' 39.31"	UNT to West Branch Susquehanna River	☒	☒	WWF	☒	☒
7	41° 13' 54.96"	77° 01' 51.60"	UNT to West Branch Susquehanna River	☒	☒	WWF	☒	☒

2. List all stormwater discharge points **after construction and stabilization are complete** and provide the information requested below. ☐ Not Applicable

Discharge Point No.	LATITUDE	LONGITUDE	RECEIVING WATERS					
	Degrees	Degrees	Name of Receiving Waters	Ches. Bay?	Non-Surface Waters	Ch. 93 Class.	Impaired?	TMDL?
1	41° 14' 00.79"	77° 01' 51.79"	UNT to West Branch Susquehanna River	☒	☒	WWF	☒	☒
2	41° 13' 59.68"	77° 01' 45.40"	UNT to West Branch Susquehanna River	☒	☒	WWF	☒	☒
3	41° 13' 58.38"	77° 01' 35.85"	UNT to West Branch Susquehanna River	☒	☒	WWF	☒	☒
4	41° 13' 51.86"	77° 01' 32.82"	UNT to West Branch Susquehanna River	☒	☒	WWF	☒	☒
5	41° 13' 52.50"	77° 01' 39.31"	UNT to West Branch Susquehanna River	☒	☒	WWF	☒	☒
7	41° 13' 54.96"	77° 01' 51.60"	UNT to West Branch Susquehanna River	☒	☒	WWF	☒	☒

3. Will any of the points identified above discharge to a storm sewer system? ☐ Yes ☒ No   Is the storm sewer an MS4 or CSS? ☒ Yes ☐ No

Name of storm sewer owner/operator: City of Williamsport   Discharge points discharging to storm sewer: 0

4.	Identify and describe all non-stormwater discharges that are expected to occur during permit coverage. Describe the frequency and volume of all such discharges. ☒ No non-stormwater discharges are anticipated.
5.	Will there be any new or increased discharge to non-surface waters prior to reaching surface waters? ☐ Yes ☒ No *If Yes, the applicant is expected to 1) secure legal authority for the non-surface water discharge if the discharge will be to property not owned by the applicant, and 2) provide for adequate controls during and after earth disturbance activities to prevent accelerated erosion.*

DISCHARGES TO IMPAIRED WATERS

1. Are stormwater discharges anticipated to impaired waters during or following construction activities? ☒ Yes ☐ No
2. If Yes to #1, is Antidegradation Module 3 attached to the application? ☒ Yes ☐ No
3. Is there an EPA-approved TMDL for the impaired waters? ☐ Yes ☒ No
4. If Yes to #3, is there a WLA(s) in the TMDL that would apply to the applicant's discharges? ☐ Yes ☒ No
5. If Yes to #4, explain in the space provided or in a separate attachment how the discharges will comply with the WLA(s).

CERTIFICATION FOR APPLICANTS

I certify under penalty of law and subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities) that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I certify that I will abide by the terms and conditions of the permit until the Notice of Termination (NOT) is submitted. I will not commence in construction resulting in earth disturbance until all criteria specified in the permit are met for commencing construction. I will ensure that a licensed professional or a designee is present on-site and be responsible during critical stages of implementation of the PCSM Plan, as applicable. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Jason Fink
Applicant Name (type or print legibly)

President/CEO
Official Title

Applicant Signature

Date Signed

CERTIFICATION FOR OPERATORS

I understand that I am assuming joint and severable responsibility, coverage, and liability under the permit for all duties, responsibilities, and non-compliance with the Chapter 102 permit, as a co-permittee of this permit coverage. I certify that I will implement the requirements of the permit and the approved design plans and will notify the permittee and the agency that issued permit coverage prior to implementing changes to the plans.

Dustin Magamoll
Operator Name (type or print legibly)

Principal
Official Title

Operator Signature

Date Signed

Operator Name (type or print legibly)

Official Title

Operator Signature

Date Signed

DISCHARGES TO IMPAIRED WATERS

1. Are stormwater discharges anticipated to impaired waters during or following construction activities? ☒ Yes ☐ No
2. If Yes to #1, is Antidegradation Module 3 attached to the application? ☒ Yes ☐ No
3. Is there an EPA-approved TMDL for the impaired waters? ☐ Yes ☒ No
4. If Yes to #3, is there a WLA(s) in the TMDL that would apply to the applicant's discharges? ☐ Yes ☒ No
5. If Yes to #4, explain in the space provided or in a separate attachment how the discharges will comply with the WLA(s).

CERTIFICATION FOR APPLICANTS

I certify under penalty of law and subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities) that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I certify that I will abide by the terms and conditions of the permit until the Notice of Termination (NOT) is submitted. I will not commence in construction resulting in earth disturbance until all criteria specified in the permit are met for commencing construction. I will ensure that a licensed professional or a designee is present on-site and be responsible during critical stages of implementation of the PCSM Plan, as applicable. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Jason Fink
Applicant Name (type or print legibly)

President/CEO
Official Title

Jason Fink
Applicant Signature

March 4, 2021
Date Signed

CERTIFICATION FOR OPERATORS

I understand that I am assuming joint and severable responsibility, coverage, and liability under the permit for all duties, responsibilities, and non-compliance with the Chapter 102 permit, as a co-permittee of this permit coverage. I certify that I will implement the requirements of the permit and the approved design plans and will notify the permittee and the agency that issued permit coverage prior to implementing changes to the plans.

Dustin Magamoll
Operator Name (type or print legibly)

Principal
Official Title

3/11/2021
Operator Signature

Date Signed

Operator Name (type or print legibly)

Official Title

Operator Signature

Date Signed

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

GENERAL INFORMATION FORM – AUTHORIZATION APPLICATION

Before completing this General Information Form (GIF), read the step-by-step instructions provided in this application package. This form is used by the Department of Environmental Protection (DEP) to inform our programs regarding what other DEP permits or authorizations may be needed for the proposed project or activity. This version of the General Information Form (GIF) must be completed and returned with any program-specific application being submitted to the DEP.

Related ID#s (If Known)				DEP USE ONLY
Client ID#	360488	**APS ID#**		Date Received & General Notes
Site ID#	847137	**Auth ID#**		
Facility ID#	846735			

CLIENT INFORMATION

DEP Client ID#	Client Type / Code	Dun & Bradstreet ID#
360488	PACOR	

Legal Organization Name or Registered Fictitious Name	Employer ID# (EIN)	Is the EIN a SSN?
Williamsport Ballpark, Inc.	84-3632985	☒ Yes ☐ NO

State of Incorporation or Registration of Fictious Name
Pennsylvania

☒ Corporation ☐ LLC ☐ Partnership ☐ LLP ☐ LP
☐ Sole Proprietorship ☐ Association/Organization
☐ Estate/Trust ☐ Other

Individual Last Name	First Name	MI	Suffix

Additional Individual Last Name	First Name	MI	Suffix

Mailing Address Line 1	Mailing Address Line 2
102 West Fourth Street	

Address Last Line – City	State	ZIP+4	Country
Williamsport	PA	17701	USA

Client Contact Last Name	First Name	MI	Suffix
Fink	Jason		

Client Contact Title	Phone	Ext	Cell Phone
President/CEO	(570) 320-4213		

Email Address	FAX
jfink@williamsport.org	

SITE INFORMATION

DEP Site ID#	Site Name
847137	Former Susquehanna Supply Company Site

EPA ID# **Estimated Number of Employees to be Present at Site** 12

Description of Site
Former Susquehanna Supply Company property with existing buidlings, concrete slabs, compacted gravel etc over an old landfill.

Tax Parcel ID(s): 66-019-200 & 66-19-102 (Revised 66-019-200)

County Name(s)	Municipality(ies)	City	Boro	Twp	State
Lycoming	Williamsport	☒	☐	☐	PA
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	

Site Location Line 1	Site Location Line 2
2 Rose Street	

Site Location Last Line – City	State	ZIP+4
Williamsport	PA	17701

Detailed Written Directions to Site
From Third or Fourth Street in the City of Williamsport, turn and head south. The site is located at the southern end of Rose Street along the SR 180 right of way. Rose Street heads directly into the property.

Site Contact Last Name	First Name	MI	Suffix
Magamoll	Dustin		

Site Contact Title	Site Contact Firm
Construction Manager	Ausley Construction, Inc.
Mailing Address Line 1	**Mailing Address Line 2**
1521 SE 36th Ave, Suite 1	

Mailing Address Last Line – City	State	ZIP+4
Ocala	FL	34470

Phone	Ext	FAX	Email Address
(352) 572-2668		(352)629-6083	gmagamoll@ausleyconstruction.com

NAICS Codes (Two- & Three-Digit Codes – List All That Apply) **6-Digit Code** (Optional)
713990

Client to Site Relationship
OWN

FACILITY INFORMATION

Modification of Existing Facility	Yes	No
1. Will this project modify an existing facility, system, or activity?	☐	☒
2. Will this project involve an addition to an existing facility, system, or activity?	☐	☒

If "Yes", check all relevant facility types and provide DEP facility identification numbers below.

	Facility Type	DEP Fac ID#		Facility Type	DEP Fac ID#
☐	Air Emission Plant		☐	Industrial Minerals Mining Operation	
☐	Beneficial Use (water)		☐	Laboratory Location	
☐	Blasting Operation		☐	Land Recycling Cleanup Location	
☐	Captive Hazardous Waste Operation		☐	Mine Drainage Treatment / Land Recycling Project Location	
☐	Coal Ash Beneficial Use Operation		☐	Municipal Waste Operation	
☐	Coal Mining Operation		☐	Oil & Gas Encroachment Location	
☐	Coal Pillar Location		☐	Oil & Gas Location	
☐	Commercial Hazardous Waste Operation		☐	Oil & Gas Water Poll Control Facility	
☐	Dam Location		☐	Public Water Supply System	
☐	Deep Mine Safety Operation -Anthracite		☐	Radiation Facility	
☐	Deep Mine Safety Operation -Bituminous		☐	Residual Waste Operation	
☐	Deep Mine Safety Operation -Ind Minerals		☐	Storage Tank Location	
☐	Encroachment Location (water, wetland)		☐	Water Pollution Control Facility	
☐	Erosion & Sediment Control Facility		☐	Water Resource	
☐	Explosive Storage Location		☐	Other:	

Latitude/Longitude Point of Origin	Latitude			Longitude		
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
CNTAR	41	13	55.46	77	**1**	51.6

Horizontal Accuracy Measure	Feet --or-- Meters
Horizontal Reference Datum Code	☐ North American Datum of 1927 ☒ North American Datum of 1983 ☐ World Geodetic System of 1984
Horizontal Collection Method Code	GPS
Reference Point Code	
Altitude	Feet --or-- Meters
Altitude Datum Name	☐ The National Geodetic Vertical Datum of 1929 ☒ The North American Vertical Datum of 1988 (NAVD88)
Altitude (Vertical) Location Datum Collection Method Code	
Geometric Type Code	
Data Collection Date	
Source Map Scale Number	Inch(es) = Feet
--or--	Centimeter(s) = Meters

PROJECT INFORMATION

Project Name
Williamsport Ballpark, Inc. - Synthetic Sports Fields Complex Project

Project Description
Construct new synthetic baseball fields that can be used by Little League and collegiate teams

Project Consultant Last Name	First Name	MI	Suffix
Myers	Robert	E.	

Project Consultant Title	Consulting Firm
Project Manager	Hawbaker Engineering, LLC

Mailing Address Line 1	Mailing Address Line 2
1952 Waddle Road, Suite 201	

Address Last Line – City	State	ZIP+4
State College	PA	16803

Phone	Ext	FAX	Email Address
(814) 272-0786		(814) 272-2440	rem2@hawbakerengineering.com

Time Schedules	Project Milestone (Optional)

1. Is the project located in or within a 0.5-mile radius of an Environmental Justice community as defined by DEP? ☐ Yes ☒ No

To determine if the project is located in or within a 0.5-mile radius of an environmental justice community, please use the online Environmental Justice Areas Viewer.

2. Have you informed the surrounding community prior to submitting the application to the Department? ☐ Yes ☒ No

Method of notification: ______________________________

3. Have you addressed community concerns that were identified? ☐ Yes ☐ No ☒ N/A

If no, please briefly describe the community concerns that have been expressed and not addressed.

4. Is your project funded by state or federal grants? ☒ Yes ☐ No

Note: If "Yes", specify what aspect of the project is related to the grant and provide the grant source, contact person and grant expiration date.

Aspect of Project Related to Grant
Grant Source: RACP (Redevelopment Assistance Capital Program
Grant Contact Person: Holli J Reidlinger, RACP Administrator
Grant Expiration Date: June 23. 2021

5. Is this application for an authorization on Appendix A of the Land Use Policy? (For referenced list, see Appendix A of the Land Use Policy attached to GIF instructions) ☒ Yes ☐ No

Note: If "No" to Question 5, the application is not subject to the Land Use Policy.
If "Yes" to Question 5, the application is subject to this policy and the Applicant should answer the additional questions in the **Land Use Information** section.

LAND USE INFORMATION

Note: Applicants should submit copies of local land use approvals or other evidence of compliance with local comprehensive plans and zoning ordinances.

1.	**Is there an adopted county or multi-county comprehensive plan?**	☒	Yes	☐	No
2.	**Is there a county stormwater management plan?**	☒	Yes	☐	No
3.	**Is there an adopted municipal or multi-municipal comprehensive plan?**	☒	Yes	☐	No
4.	**Is there an adopted county-wide zoning ordinance, municipal zoning ordinance or joint municipal zoning ordinance?** **Note:** If the Applicant answers "No" to either Questions 1, 3 or 4, the provisions of the PA MPC are not applicable and the Applicant does not need to respond to questions 5 and 6 below. If the Applicant answers "Yes" to questions 1, 3 and 4, the Applicant should respond to questions 5 and 6 below.	☒	Yes	☐	No
5.	**Does the proposed project meet the provisions of the zoning ordinance or does the proposed project have zoning approval?** If zoning approval has been received, attach documentation.	☒	Yes	☐	No
6.	**Have you attached Municipal and County Land Use Letters for the project?**	☒	Yes	☐	No

COORDINATION INFORMATION

Note: The PA Historical and Museum Commission must be notified of proposed projects in accordance with DEP Technical Guidance Document 012-0700-001 utilizing the Project Review Form.

If the activity will be a mining project (i.e., mining of coal or industrial minerals, coal refuse disposal and/or the operation of a coal or industrial minerals preparation/processing facility), respond to questions 1.0 through 2.5 below.

If the activity will not be a mining project, skip questions 1.0 through 2.5 and begin with question 3.0.

1.0	**Is this a coal mining project?** If "Yes", respond to 1.1-1.6. If "No", skip to Question 2.0.	☐	Yes	☒	No
1.1	**Will this coal mining project involve coal preparation/ processing activities in which the total amount of coal prepared/processed will be equal to or greater than 200 tons/day?**	☐	Yes	☐	No
1.2	**Will this coal mining project involve coal preparation/ processing activities in which the total amount of coal prepared/processed will be greater than 50,000 tons/year?**	☐	Yes	☐	No
1.3	**Will this coal mining project involve coal preparation/ processing activities in which thermal coal dryers or pneumatic coal cleaners will be used?**	☐	Yes	☐	No
1.4	**For this coal mining project, will sewage treatment facilities be constructed and treated waste water discharged to surface waters?**	☐	Yes	☐	No
1.5	**Will this coal mining project involve the construction of a permanent impoundment meeting one or more of the following criteria: (1) a contributory drainage area exceeding 100 acres; (2) a depth of water measured by the upstream toe of the dam at maximum storage elevation exceeding 15 feet; (3) an impounding capacity at maximum storage elevation exceeding 50 acre-feet?**	☐	Yes	☐	No
1.6	**Will this coal mining project involve underground coal mining to be conducted within 500 feet of an oil or gas well?**	☐	Yes	☐	No
2.0	**Is this a non-coal (industrial minerals) mining project?** If "Yes", respond to 2.1-2.6. If "No", skip to Question 3.0.	☐	Yes	☒	No
2.1	**Will this non-coal (industrial minerals) mining project involve the crushing and screening of non-coal minerals other than sand and gravel?**	☐	Yes	☐	No

2.2	**Will this non-coal (industrial minerals) mining project involve the crushing and/or screening of sand and gravel with the exception of wet sand and gravel operations (screening only) and dry sand and gravel operations with a capacity of less than 150 tons/hour of unconsolidated materials?**	☐ Yes	☐ No
2.3	**Will this non-coal (industrial minerals) mining project involve the construction, operation and/or modification of a portable non-metallic (i.e., non-coal) minerals processing plant under the authority of the General Permit for Portable Non-metallic Mineral Processing Plants (i.e., BAQ-PGPA/GP-3)?**	☐ Yes	☐ No
2.4	**For this non-coal (industrial minerals) mining project, will sewage treatment facilities be constructed and treated waste water discharged to surface waters?**	☐ Yes	☐ No
2.5	**Will this non-coal (industrial minerals) mining project involve the construction of a permanent impoundment meeting one or more of the following criteria: (1) a contributory drainage area exceeding 100 acres; (2) a depth of water measured by the upstream toe of the dam at maximum storage elevation exceeding 15 feet; (3) an impounding capacity at maximum storage elevation exceeding 50 acre-feet?**	☐ Yes	☐ No
3.0	**Will your project, activity, or authorization have anything to do with a well related to oil or gas production, have construction within 200 feet of, affect an oil or gas well, involve the waste from such a well, or string power lines above an oil or gas well?** If "Yes", respond to 3.1-3.3. If "No", skip to Question 4.0.	☐ Yes	☒ No
3.1	**Does the oil- or gas-related project involve any of the following: placement of fill, excavation within or placement of a structure, located in, along, across or projecting into a watercourse, floodway or body of water (including wetlands)?**	☐ Yes	☐ No
3.2	**Will the oil- or gas-related project involve discharge of industrial wastewater or stormwater to a dry swale, surface water, ground water or an existing sanitary sewer system or storm water system?** If "Yes", discuss in *Project Description*.	☐ Yes	☐ No
3.3	**Will the oil- or gas-related project involve the construction and operation of industrial waste treatment facilities?**	☐ Yes	☐ No
4.0	**Will the project involve a construction activity that results in earth disturbance?** If "Yes", specify the total disturbed acreage.	☒ Yes	☐ No
	4.0.1 Total Disturbed Acreage 28.51		
	4.0.2 Will the project discharge or drain to a special protection water (EV or HQ) or an EV wetland?	☐ Yes	☒ No
	4.0.3 Will the project involve a construction activity that results in earth disturbance in the area of the earth disturbance that are contaminated at levels exceeding residential or non-residential medium-specific concentrations (MSCs) in 25 Pa. Code Chapter 250 at residential or non-residential construction sites, respectively?	☒ Yes	☐ No
5.0	**Does the project involve any of the following: water obstruction and/or encroachment, wetland impacts, or floodplain project by the Commonwealth/political subdivision or public utility?** If "Yes", respond to 5.1-5.7. If "No", skip to Question 6.0.	☐ Yes	☒ No
5.1	**Water Obstruction and Encroachment Projects – Does the project involve any of the following: placement of fill, excavation within or placement of a structure, located in, along, across or projecting into a watercourse, floodway or body of water?**	☐ Yes	☒ No
5.2	**Wetland Impacts – Does the project involve any of the following: placement of fill, excavation within or placement of a structure, located in, along, across or projecting into a wetland?**	☐ Yes	☒ No

5.3	**Floodplain Projects by the Commonwealth, a Political Subdivision of the Commonwealth or a Public Utility – Does the project involve any of the following: placement of fill, excavation within or placement of a structure, located in, along, across or projecting into a floodplain?**	☐ Yes	☐ No
5.4	**Is your project an interstate transmission natural gas pipeline?**	☐ Yes	☒ No
5.5	**Does your project consist of linear construction activities which result in earth disturbance in two or more DEP regions AND three or more counties?**	☐ Yes	☒ No
5.6	**Does your project utilize Floodplain Restoration as a best management practice for Post Construction Stormwater Management?**	☐ Yes	☒ No
5.7	**Does your project utilize Class V Gravity / Injection Wells as a best management practice for Post Construction Stormwater Management?**	☐ Yes	☒ No
6.0	**Will the project involve discharge of construction related stormwater to a dry swale, surface water, ground water or separate storm water system?**	☒ Yes	☐ No
6.1	**Will the project involve discharge of industrial waste stormwater or wastewater from an industrial activity or sewage to a dry swale, surface water, ground water or an existing sanitary sewer system or separate storm water system?**	☐ Yes	☒ No
7.0	**Will the project involve the construction and operation of industrial waste treatment facilities?**	☐ Yes	☒ No
8.0	**Will the project involve construction of sewage treatment facilities, sanitary sewers, or sewage pumping stations?** If "Yes", indicate estimated proposed flow (gal/day). Also, discuss the sanitary sewer pipe sizes and the number of pumping stations/treatment facilities/name of downstream sewage facilities in the *Project Description*, where applicable. **8.0.1 Estimated Proposed Flow (gal/day)**	☐ Yes	☒ No
9.0	**Will the project involve the subdivision of land, or the generation of 800 gpd or more of sewage on an existing parcel of land or the generation of an additional 400 gpd of sewage on an already-developed parcel, or the generation of 800 gpd or more of industrial wastewater that would be discharged to an existing sanitary sewer system?**	☒ Yes	☐ No
	9.0.1 Was Act 537 sewage facilities planning submitted and approved by DEP? If "Yes" attach the approval letter. Approval required prior to 105/NPDES approval.	☐ Yes	☒ No
10.0	**Is this project for the beneficial use of biosolids for land application within Pennsylvania?** If "Yes" indicate how much (i.e. gallons or dry tons per year). **10.0.1 Gallons Per Year (residential septage)** ____ **10.0.2 Dry Tons Per Year (biosolids)**	☐ Yes	☒ No
11.0	**Does the project involve construction, modification or removal of a dam?** If "Yes", identify the dam. **11.0.1 Dam Name**	☐ Yes	☒ No
12.0	**Will the project interfere with the flow from, or otherwise impact, a dam?** If "Yes", identify the dam. **12.0.1 Dam Name**	☐ Yes	☒ No

13.0	**Will the project involve operations (excluding during the construction period) that produce air emissions (i.e., NOX, VOC, etc.)?**	☐ Yes	☒ No
	13.0.1 If "Yes", is the operation subject to the agricultural exemption in 35 P.S. § 4004.1?	☐ Yes	☐ No
	13.0.2 If the answer to 13.0.1 is "No", identify each type of emission followed by the estimated amount of that emission. **Enter all types & amounts of emissions; separate each set with semicolons.**		
14.0	**Does the project include the construction or modification of a drinking water supply to serve 15 or more connections or 25 or more people, at least 60 days out of the year?** If "Yes", check all proposed sub-facilities.	☐ Yes	☒ No
	14.0.1 Number of Persons Served		
	14.0.2 Number of Employee/Guests		
	14.0.3 Number of Connections		
	14.0.4 Sub-Fac: Distribution System	☐ Yes	☐ No
	14.0.5 Sub-Fac: Water Treatment Plant	☐ Yes	☐ No
	14.0.6 Sub-Fac: Source	☐ Yes	☐ No
	14.0.7 Sub-Fac: Pump Station	☐ Yes	☐ No
	14.0.8 Sub Fac: Transmission Main	☐ Yes	☐ No
	14.0.9 Sub-Fac: Storage Facility	☐ Yes	☐ No
15.0	**Will your project include infiltration of storm water or waste water to ground water within one-half mile of a public water supply well, spring or infiltration gallery?**	☐ Yes	☒ No
16.0	**Is your project to be served by an existing public water supply?** If "Yes", indicate name of supplier and attach letter from supplier stating that it will serve the project.	☒ Yes	☐ No
	16.0.1 Supplier's Name Williamsport Municipal Water Authority		
	16.0.2 Letter of Approval from Supplier is Attached	☐ Yes	☒ No
17.0	**Will this project be served by on-lot drinking water wells?**	☐ Yes	☒ No
18.0	**Will this project involve a new or increased drinking water withdrawal from a river, stream, spring, lake, well or other water bod(ies)?** If "Yes", reference Safe Drinking Water Program.	☐ Yes	☒ No
	18.0.1 Source Name		
19.0	**Will the construction or operation of this project involve treatment, storage, reuse, or disposal of waste?** If "Yes", indicate what type (i.e., hazardous, municipal (including infectious & chemotherapeutic), residual) and the amount to be treated, stored, re-used or disposed.	☐ Yes	☒ No
	19.0.1 Type & Amount		
20.0	**Will your project involve the removal of coal, minerals, contaminated media, or solid waste as part of any earth disturbance activities?**	☒ Yes	☐ No
21.0	**Does your project involve installation of a field constructed underground storage tank?** If "Yes", list each Substance & its Capacity. **<u>Note</u>:** Applicant may need a Storage Tank Site Specific Installation Permit.	☐ Yes	☒ No
	21.0.1 Enter all substances & capacity of each; separate each set with semicolons.		

22.0	**Does your project involve installation of an aboveground storage tank greater than 21,000 gallons capacity at an existing facility?** If "Yes", list each Substance & its Capacity. **Note:** Applicant may need a Storage Tank Site Specific Installation Permit. **22.0.1 Enter all substances & capacity of each; separate each set with semicolons.**	☐ Yes	☒ No
23.0	**Does your project involve installation of a tank greater than 1,100 gallons which will contain a highly hazardous substance as defined in DEP's Regulated Substances List, 2570-BK-DEP2724?** If "Yes", list each Substance & its Capacity. **Note:** Applicant may need a Storage Tank Site Specific Installation Permit. **23.0.1 Enter all substances & capacity of each; separate each set with semicolons.**	☐ Yes	☒ No
24.0	**Does your project involve installation of a storage tank at a new facility with a total AST capacity greater than 21,000 gallons?** If "Yes", list each Substance & its Capacity. **Note:** Applicant may need a Storage Tank Site Specific Installation Permit. **24.0.1 Enter all substances & capacity of each; separate each set with semicolons.**	☐ Yes	☒ No
	NOTE: If the project includes the installation of a regulated storage tank system, including diesel emergency generator systems, the project may require the use of a Department Certified Tank Handler. For a full list of regulated storage tanks and substances, please go to www.dep.pa.gov search term storage tanks		
25.0	**Will the intended activity involve the use of a radiation source?**	☐ Yes	☒ No

CERTIFICATION

I certify that I have the authority to submit this application on behalf of the applicant named herein and that the information provided in this application is true and correct to the best of my knowledge and information.

For applicants supplying an EIN number: I am applying for a permit or authorization from the Pennsylvania Department of Environmental Protection (DEP). As part of this application, I will provide DEP with an accurate EIN number for the applicant entity. By filing this application with DEP, I hereby authorize DEP to confirm the accuracy of the EIN number provided with the Pennsylvania Department of Revenue. As applicant, I further consent to the Department of Revenue discussing the same with DEP prior to issuance of the Commonwealth permit or authorization.

Type or Print Name Jason Fink

Jason Fink — **Signature**

President/CEO — **Title**

March 9, 2021 — **Date**

HAWBAKER ENGINEERING

March 9, 2021

Lycoming County Commissioners
48 West Third Street
Williamsport, PA 17701

CERTIFIED MAIL – RETURN RECEIPT *7018 1830 0001 4175 6727*

Dear County Commissioners:

The purpose of this notice is to inform you that the Pennsylvania Department of Environmental Protection (DEP) has received the following application(s):

Permit Application Type(s): ***Individual NDPES Permit for Stormwater Discharges Associated with Construction Activities***
Applicant Contact: ***Hawbaker Engineering – Robert Myers, Project Manager***
Project Location: ***2 Rose Street, Williamsport, PA 17701***
Project Description: ***Williamsport Ballpark, Inc. – Synthetic Sports Fields Complex Project***

DEP Office Contact Information: Acts 67, 68 and 127 of 2000, which amended the Municipalities Planning Code (MPC) to direct state agencies to consider comprehensive plans and zoning ordinances when reviewing applications for permitting of facilities or infrastructure, and specify that state agencies may rely upon comprehensive plans and zoning ordinances under certain conditions as described in Sections 619.2 and 1105 of the MPC.

Enclosed is a General Information Form (GIF) completed by the applicant for this project. DEP invites you to review the attached GIF and comment on the accuracy of answers provided with regard to land use aspects of this project; please be specific to DEP and focus on relationship to zoning ordinances. If you wish to submit comments to DEP to become part of a land use review of this project, you must respond within 30 days to the DEP regional office referenced in this letter. If there are no land use comments received by the end of the comment period, DEP will assume that there are no substantive land use conflicts and proceed with the normal application review process.

For more information about this land use review process, please visit www.dep.state.pa.us, Keyword: "DEP Land Use Reviews."

If you have any questions, please do not hesitate to contact me at (814) 272-0786 or by email at rem2@hawbakerengineering.com.

Sincerely,

Hawbaker Engineering, LLC

Robert E. Myers, PE PLS
Project Manager

Attachment – General Information Form (GIF)

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Lycoming County Commissioners
Street and Apt. No., or 48 West Third Street
City, State, ZIP+4® Williamsport, PA 17701

PS Form 3800, April 2015 PSN 7530-02-000-9047 — See Reverse for Instructions

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Williamsport, PA 17701

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PS Form 3811, April 2015 PSN 7530-02-000-9053 — Domestic Return Receipt

Lycoming County, Pennsylvania

LYCOMING COUNTY PLANNING COMMISSION

"Building Partnerships"

Shannon L. Rossman, AICP, Executive Director

McCormick Law Firm,
J. Michael Wiley, Solicitor

Voice: (570) 320-2130
Fax: (570) 320-2135

Location:
Executive Plaza - 330 Pine Street
Williamsport Pennsylvania 17701

Mailing Address:
48 West Third Street
Williamsport Pennsylvania 17701

3/15/2021

Hawbaker Engineering
2801 Canfields Lane
Montoursville, PA 17754

Robert Myers,

I have completed the review of this project on 3/15/2021. I found an error that needs to be corrected on the General Information Form. The Land Use Information Section: #2 Is there a county stormwater management plan? The answer is YES. The Lycoming County ACT 167 Stormwater Management Plan was adopted by Lycoming County on May 6, 2010 and approved by the PA DEP on September 16, 2010.

Sincerely,

Chris Hodges

Chris Hodges
Lycoming County Zoning Officer
570-320-2137
chodges@lyco.org
48 West Third Street
Williamsport, PA 17701

March 9, 2021

City of Williamsport
245 West Fourth Street
Williamsport, PA 17701

CERTIFIED MAIL – RETURN RECEIPT *7018 1830 0001 4175 6734*

Dear City Secretary:

The purpose of this notice is to inform you that the Pennsylvania Department of Environmental Protection (DEP) has received the following application(s):

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Applicant Contact: ***Hawbaker Engineering – Robert Myers, Project Manager***
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For more information about this land use review process, please visit www.dep.state.pa.us, Keyword: "DEP Land Use Reviews."

If you have any questions, please do not hesitate to contact me at (814) 272-0786 or by email at rem2@hawbakerengineering.com.

Sincerely,

Hawbaker Engineering, LLC

Robert E. Myers, PE PLS
Project Manager

Attachment – General Information Form (GIF)

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City of Williamsport
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Williamsport, PA 17701

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Williamsport, PA 17701

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pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF CLEAN WATER

MUNICIPAL NOTIFICATION OF PLANNED LAND DEVELOPMENT FOR CHAPTER 102 PERMITS

PROJECT INFORMATION (COMPLETED BY APPLICANT)

Applicant Name: **Williamsport Ballpark, Inc.**

Contact Name: **Jason Fink**

Applicant Address: **102 West Fourth Street**

Contact Phone: **(570) 320-4213**

Applicant City, State, ZIP: **Williamsport, PA 17701**

County: **Lycoming**

Description of Proposed Land Development and Stormwater Controls:

Construct 6 little league artifical turf fields and two collegiate artifical turf fields with associated parking, access and stormwater management facilities.

Municipality: **City of Williamsport**

Project Area: **28.51** acres ☐ Phased

Disturbance: **28.51** acres

Surface Waters Receiving Stormwater Discharges: **UNT Susquehanna River**

Tax Parcel ID(s) Affected by Proposed Land Development: **66-019-200; 66-19-102; Revised tax parcel 66-019-200**

Discharge to: ☐ MS4 ☐ Other SS ☐ CSS

The following information was submitted to the municipality for this project:

☒ Land Development / Subdivision Plan ☒ E&S Plan ☒ PCSM Plan ☐ Other:

MUNICIPAL PLAN / ORDINANCE INFORMATION (COMPLETED BY MUNICIPALITY)

1. Is there an adopted municipal or multi-municipal comprehensive plan? ☐ Yes ☐ No
2. Is there an enacted municipal or multi-municipal zoning ordinance? ☐ Yes ☐ No
3. If Yes to #2, is the proposed project consistent with the ordinance? ☐ Yes ☐ No
4. Is there a municipal stormwater management ordinance? ☐ Yes ☐ No
5. If Yes to #4, is the proposed project consistent with the ordinance, without waiver? ☐ Yes ☐ No
6. If Yes to #4, indicate type of ordinance: ☐ Act 167 Model Ordinance ☐ DEP Model Ordinance (MS4s) ☐ Other

APPLICANT CERTIFICATION

I certify under penalty of law (see 18 Pa.C.S. § 4904 (relating to unsworn falsification)) that the information reported herein was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the information, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

MUNICIPAL ACKNOWLEDGEMENT

The municipality acknowledges that a permit application for the above-referenced project has been submitted to a reviewing agency and that notification requirements of Act 14 of 1984 and Acts 67, 68, and 127 of 2000 have been satisfied. The information reported herein by the municipality is true and accurate. The municipality reserves the right to comment to the reviewing agency relative to comprehensive plans, zoning, and stormwater ordinance consistency. Municipal acknowledgment of receipt of notification shall not be construed as project approval.

Jason Fink
Applicant Name

Jason Fink
Applicant Signature

President/CEO
Applicant Title

March 4 2021
Date of Signature

Municipal Representative Name

Municipal Representative Signature

Municipal Representative Title

Date of Signature

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF CLEAN WATER

COUNTY NOTIFICATION OF PLANNED LAND DEVELOPMENT FOR CHAPTER 102 PERMITS

PROJECT INFORMATION (COMPLETED BY APPLICANT)

Applicant Name: **Williamsport Ballpark, Inc.**

Contact Name: **Jason Fink**

Applicant Address: **102 West Fourth Street**

Contact Phone: **(570) 320-4213**

Applicant City, State, ZIP: **Williamsport, PA 17701**

County: **Lycoming**

Description of Proposed Land Development and Stormwater Controls:

Construct 6 little league artifical turf fields and two collegiate artifical turf fields with associated parking, access and stormwater management facilities.

Municipality: **City of Williamsport**

Project Area: **28.51** acres ☐ Phased

Disturbance: **28.51** acres

Surface Waters Receiving Stormwater Discharges: **UNT Susquehanna River**

Tax Parcel ID(s) Affected by Proposed Land Development: **66-019-200; 66-19-102; Revised tax parcel 66-019-200**

Discharge to: ☐ MS4 ☐ Other SS ☐ CSS

The following information was submitted to the county for this project:

☒ Land Development / Subdivision Plan ☒ E&S Plan ☒ PCSM Plan ☐ Other:

COUNTY PLAN INFORMATION (COMPLETED BY COUNTY)

Name of county organization completing this assessment:

1. Is there an adopted county or multi-county comprehensive plan? ☐ Yes ☐ No
2. If Yes to #1, is the proposed project consistent with the county plan? ☐ Yes ☐ No
3. Is there a DEP-approved Act 167 stormwater management plan? ☐ Yes ☐ No ☐ CCD
4. If Yes to #3, is the proposed project consistent with the Act 167 plan, without waiver? ☐ Yes ☐ No ☐ CCD
5. If Yes to #3, list the date of the latest plan / update approved by DEP: ☐ CCD

APPLICANT CERTIFICATION	COUNTY ACKNOWLEDGEMENT
I certify under penalty of law (see 18 Pa.C.S. § 4904 (relating to unsworn falsification)) that the information reported herein was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the information, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	The county acknowledges that a permit application for the above-referenced project has been submitted to a reviewing agency and that notification requirements of Act 14 of 1984 and Acts 67, 68, and 127 of 2000 have been satisfied. The information reported herein by the county is true and accurate. County acknowledgment of receipt of notification shall not be construed as project approval.

Jason Fink

Applicant Name | **County Representative Name**

Jason Fink

Applicant Signature | **County Representative Signature**

President/CEO

Applicant Title | **County Representative Title**

March 4, 2021

Date of Signature | **Date of Signature**

HAWBAKER ENGINEERING

March 11, 2021

Lycoming County Commissioners
48 West Third Street
Williamsport, PA 17701-6519

CERTIFIED MAIL – RETURN RECEIPT *7018 1830 0001 4175 6703*

Dear County Commissioners:

Acts 14, 67, 68 and 127, which amended the Municipalities Planning Code, direct state agencies to consider comprehensive plans and zoning ordinances when reviewing applications for permitting of facilities and infrastructure, and specify that state agencies may rely upon comprehensive plans and zoning ordinances under certain conditions as described in Sections 619.2 and 1105 of the Municipalities Planning Code. The Pennsylvania Department of Environmental Protection's Policy for Consideration of Local Comprehensive Plans and Zoning Ordinances in DEP Review of Permits for Facilities and Infrastructure (DEP's Land Use Policy) provides direction and guidance to DEP staff, permit applicants, and local and county governments for the implementation of Acts 67, 68 and 127 of 2000. This policy can be found at www.depweb.state.pa.us; keyword: Land Use.

In accordance with DEP's Land Use Policy, enclosed please find a Municipal Land Use Letter that is to be submitted with our permit application to DEP for an NPDES Permit for Stormwater Discharges Associated with Construction Activities. Please complete the attached form and return within 30 days to:

Name of Applicant:	Williamsport Ballpark, Inc.
Project Location:	Former Susquehanna Supply Company property along the northern side of SR 220 2 Rose Street City of Williamsport, Lycoming County, PA
Project Description:	Construct 6 little league artificial turf fields and two collegiate artificial turf fields with associated parking, access, and stormwater management facilities.

Please do not send this form to DEP, as we must include the Municipal Land Use Letter with our permit application. If we do not receive a response from you **within 30 days**, we shall proceed to submit our permit application to DEP without the Municipal Land Use Letter. If the Municipal Land Use Letter is not submitted with our permit application, and we provide proof to DEP that we attempted to obtain it, DEP will assume there are no substantive land use conflicts and proceed with the normal application review process.

If you have any questions, please do not hesitate to contact me at (814) 272-0786 or by email at rem2@hawbakerengineering.com.

Sincerely,

Hawbaker Engineering, LLC

Robert E. Myers, PE PLS
Project Manager

Attachments – County Notification of Planned Land Development for Chapter 102 Permits Letter
Geometry Plan
PCSM/Grading Plan
Erosion & Sedimentation Control Plan

7018 1830 0001 4175 6703

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HE-REM

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OFFICIAL USE

Williamsport, PA 17701

Certified Mail Fee $3.60 3.60	0068
$	14
Extra Services & Fees *(check box, add fee as appropriate)*	
☑ Return Receipt (hardcopy) $ $2.85 $0.00	Postmark Here
☐ Return Receipt (electronic) $ $0.00	MAR 11 2021
☐ Certified Mail Restricted Delivery $ $0.00	
☐ Adult Signature Required $ $0.00	
☐ Adult Signature Restricted Delivery $	
Postage $2.00 2.00	03/11/2021
$	
Total Postage and Fees $8.45 8.45	
$	

Sent To Lycoming County Commissioners

Street and Apt. No., or PO Box No. 48 W. Third St

City, State, ZIP+4® Williamsport, PA 17701-6519

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

---

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Lycoming County Commissioners
48 W. Third St
Williamsport, PA
17701-6519

9590 9401 0040 5071 0289 29

2. Article Number *(Transfer from service label)*

7018 1830 0001 4175 6703

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* Cov'r

C. Date of Delivery 3-15-21

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
- ☐ Adult Signature
- ☐ Adult Signature Restricted Delivery
- ☐ Certified Mail®
- ☐ Certified Mail Restricted Delivery
- ☐ Collect on Delivery
- ☐ Collect on Delivery Restricted Delivery
- ☐ Insured Mail
- ☐ Insured Mail Restricted Delivery (over $500)
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- ☐ Return Receipt for Merchandise
- ☐ Signature Confirmation™
- ☐ Signature Confirmation Restricted Delivery

PS Form 3811, April 2015 PSN 7530-02-000-9053 Domestic Return Receipt

March 11, 2021

City of Williamsport
245 West Fourth Street
Williamsport, PA 17701-6113

CERTIFIED MAIL – RETURN RECEIPT *7018 1830 0001 4175 6710*

Dear Township Supervisors:

Acts 14, 67, 68 and 127, which amended the Municipalities Planning Code, direct state agencies to consider comprehensive plans and zoning ordinances when reviewing applications for permitting of facilities and infrastructure, and specify that state agencies may rely upon comprehensive plans and zoning ordinances under certain conditions as described in Sections 619.2 and 1105 of the Municipalities Planning Code. The Pennsylvania Department of Environmental Protection's Policy for Consideration of Local Comprehensive Plans and Zoning Ordinances in DEP Review of Permits for Facilities and Infrastructure (DEP's Land Use Policy) provides direction and guidance to DEP staff, permit applicants, and local and county governments for the implementation of Acts 67, 68 and 127 of 2000. This policy can be found at www.depweb.state.pa.us; keyword: Land Use.

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If you have any questions, please do not hesitate to contact me at (814) 272-0786 or by email at rem2@hawbakerengineering.com.

Sincerely,

Hawbaker Engineering, LLC

Robert E. Myers, PE PLS
Project Manager

Attachment – Municipal Notification of Planned Land Development for Chapter 102 Permits Letter
Geometry Plan
PCSM/Grading Plan
Erosion & Sedimentation Control Plan

7018 1830 0001 4175 6710

U.S. Postal Service™
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For delivery information, visit our website at www.usps.com®.

OFFICIAL USE

Williamsport, PA 17701

Certified Mail Fee $3.60	$ 3.60
Extra Services & Fees (check box, add fee as appropriate)	
☑ Return Receipt (hardcopy)	$ $0.00
☐ Return Receipt (electronic)	$ $0.00
☐ Certified Mail Restricted Delivery	$ $0.00
☐ Adult Signature Required	$ $0.00
☐ Adult Signature Restricted Delivery	$
Postage $2.00	$ 2.00
Total Postage and Fees $8.45	$ 8.45

0068
14

Postmark Here

MAR 11 2021

03/11/2021

Sent To City of Williamsport

Street and Apt. No., or PO Box No. 245 W Fourth St

City, State, ZIP+4® Williamsport, PA 17701-6113

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

City of Williamsport
245 West Fourth St
Williamsport, PA
17701-6113

9590 9401 0040 5071 0289 12

2. Article Number *(Transfer from service label)*

7018 1830 0001 4175 6710

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X DL Bauer ☐ Agent ☐ Addressee

B. Received by *(Printed Name)*

C. Date of Delivery 3/15/21

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type

☐ Adult Signature
☐ Adult Signature Restricted Delivery
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☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, April 2015 PSN 7530-02-000-9053 Domestic Return Receipt

1. PROJECT INFORMATION

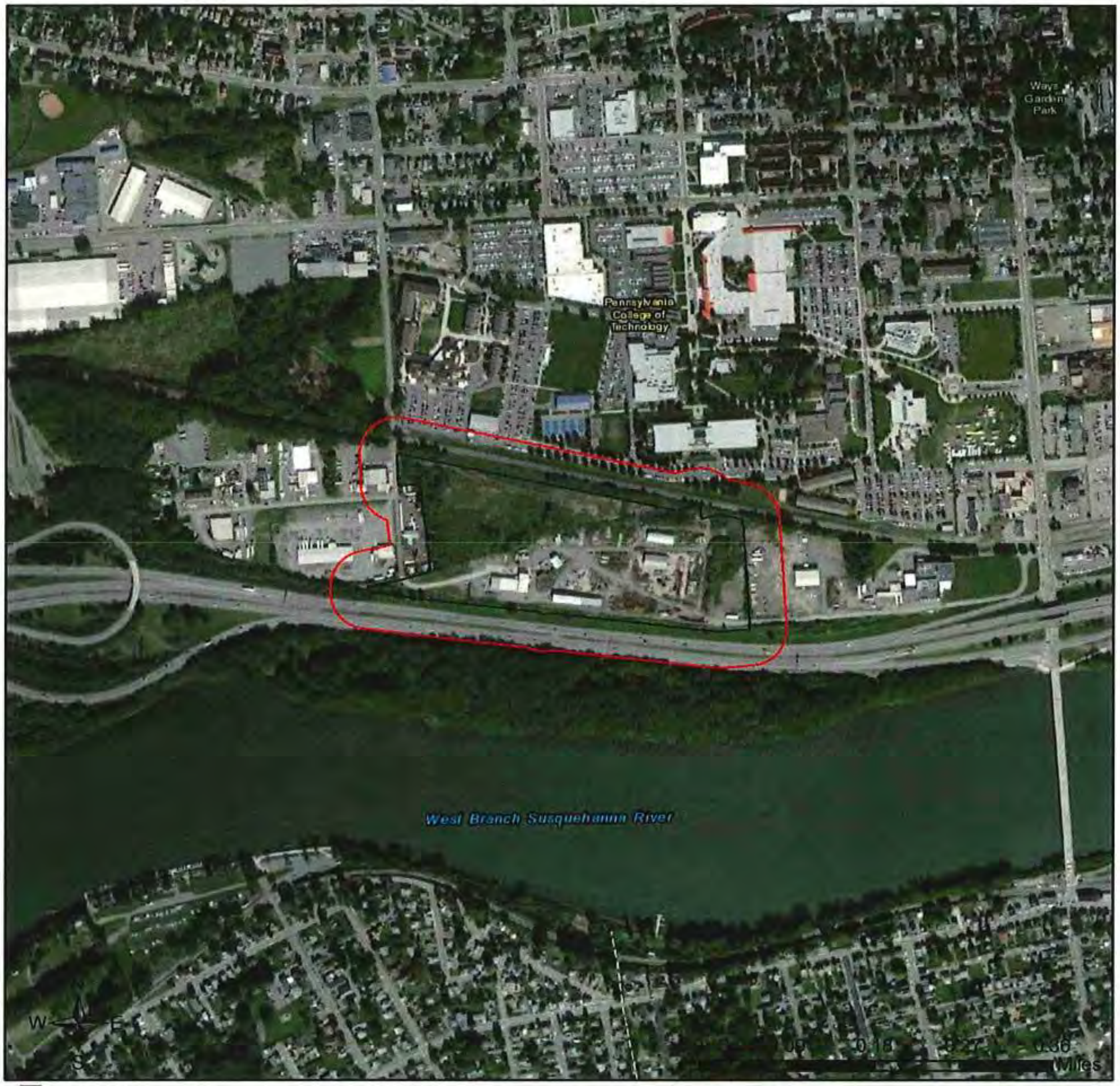
Project Name: **Williamsport Ballpark, Inc.**
Date of Review: **3/5/2021 01:54:46 PM**
Project Category: **Development, New public/community development (school, library, church, museum)**
Project Area: **28.51 acres**
County(s): **Lycoming**
Township/Municipality(s): **WILLIAMSPORT**
ZIP Code:
Quadrangle Name(s): **WILLIAMSPORT**
Watersheds HUC 8: **Lower West Branch Susquehanna**
Watersheds HUC 12: **Millers Run**
Decimal Degrees: **41.232279, -77.028586**
Degrees Minutes Seconds: **41° 13' 56.2030" N, 77° 1' 42.9112" W**

2. SEARCH RESULTS

Agency	Results	Response
PA Game Commission	No Known Impact	No Further Review Required
PA Department of Conservation and Natural Resources	No Known Impact	No Further Review Required
PA Fish and Boat Commission	No Known Impact	No Further Review Required
U.S. Fish and Wildlife Service	**Potential Impact**	**MORE INFORMATION REQUIRED, See Agency Response**

As summarized above, Pennsylvania Natural Diversity Inventory (PNDI) records indicate there may be potential impacts to threatened and endangered and/or special concern species and resources within the project area. If the response above indicates "No Further Review Required" no additional communication with the respective agency is required. If the response is "Further Review Required" or "See Agency Response," refer to the appropriate agency comments below. Please see the DEP Information Section of this receipt if a PA Department of Environmental Protection Permit is required.

Williamsport Ballpark, Inc.

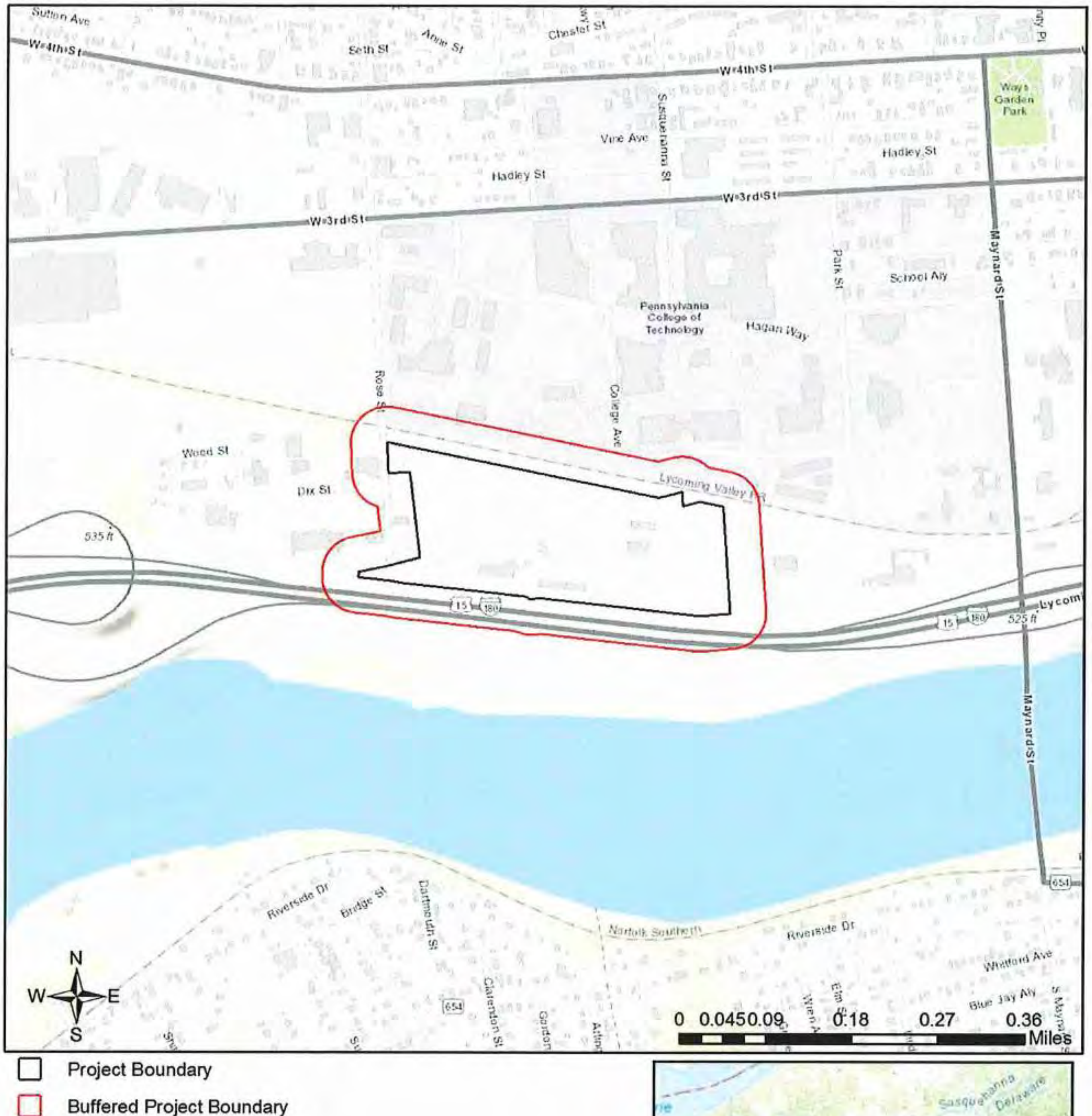


Project Boundary

Buffered Project Boundary

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China

Williamsport Ballpark, Inc.



Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

3. AGENCY COMMENTS

Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are **valid for two years** (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jursidictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

PA Game Commission
RESPONSE:

No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Department of Conservation and Natural Resources
RESPONSE:

No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Fish and Boat Commission
RESPONSE:

No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

U.S. Fish and Wildlife Service
RESPONSE:

Information Request: Due to the proximity of this project to a bald eagle nest, it is possible that project activities may disturb bald eagles, which is a form of "take" under the Bald and Golden Eagle Protection Act and may require a permit. The Service has prepared a project screening form to help you determine which specific measures may be necessary to avoid disturbing bald eagles and their nests, based on the type and scope of your proposed project or activity, and its distance from a bald eagle nest. Complete the "Bald Eagle Project Screening Form" (see https://www.fws.gov/northeast/ecologicalservices/pdf/eagle/NE_Bald-Eagle_Project-Screening-Form_rev20200416.pdf) and implement the measures identified on that form. Submit a copy of the completed Screening Form to the appropriate federal or state permitting agencies (e.g., PA DEP).

WHAT TO SEND TO JURISDICTIONAL AGENCIES

If project information was requested by one or more of the agencies above, upload* or email* the following information to the agency(s). Instructions for uploading project materials can be found here. This option provides the applicant with the convenience of sending project materials to a single location accessible to all three state agencies. Alternatively, applicants may email or mail their project materials (see AGENCY CONTACT INFORMATION). For projects showing "Potential Impacts" with USFWS, please send project information to that agency by email IR1_ESPenn@fws.gov *(preferred) or regular mail.*

Check-list of Minimum Materials to be submitted:

____Project narrative with a description of the overall project, the work to be performed, current physical characteristics of the site and acreage to be impacted.

____A map with the project boundary and/or a basic site plan(particularly showing the relationship of the project to the physical features such as wetlands, streams, ponds, rock outcrops, etc.)

In addition to the materials listed above, USFWS REQUIRES the following

____**SIGNED** copy of a Final Project Environmental Review Receipt

The inclusion of the following information may expedite the review process.

____Color photos keyed to the basic site plan (i.e. showing on the site plan where and in what direction each photo was taken and the date of the photos)

____Information about the presence and location of wetlands in the project area, and how this was determined (e.g., by a qualified wetlands biologist), if wetlands are present in the project area, provide project plans showing the location of all project features, as well as wetlands and streams.

4. DEP INFORMATION

The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. Two review options are available to permit applicants for handling PNDI coordination in conjunction with DEP's permit review process involving either T&E Species or species of special concern. Under sequential review, the permit applicant performs a PNDI screening and completes all coordination with the appropriate jurisdictional agencies prior to submitting the permit application. The applicant will include with its application, both a PNDI receipt and/or a clearance letter from the jurisdictional agency if the PNDI Receipt shows a Potential Impact to a species or the applicant chooses to obtain letters directly from the jurisdictional agencies. Under concurrent review, DEP, where feasible, will allow technical review of the permit to occur concurrently with the T&E species consultation with the jurisdictional agency. The applicant must still supply a copy of the PNDI Receipt with its permit application. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. The applicant and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at https://conservationexplorer.dcnr.pa.gov/content/resources.

5. ADDITIONAL INFORMATION

The PNDI environmental review website is a preliminary screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page (www.naturalheritage.state.pa.us). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

6. AGENCY CONTACT INFORMATION

PA Department of Conservation and Natural Resources
Bureau of Forestry, Ecological Services Section
400 Market Street, PO Box 8552
Harrisburg, PA 17105-8552
Email: RA-HeritageReview@pa.gov

PA Fish and Boat Commission
Division of Environmental Services
595 E. Rolling Ridge Dr., Bellefonte, PA 16823
Email: RA-FBPACENOTIFY@pa.gov

U.S. Fish and Wildlife Service
Pennsylvania Field Office
Endangered Species Section
110 Radnor Rd; Suite 101
State College, PA 16801
Email: IR1_ESPenn@fws.gov
NO Faxes Please

PA Game Commission
Bureau of Wildlife Habitat Management
Division of Environmental Planning and Habitat Protection
2001 Elmerton Avenue, Harrisburg, PA 17110-9797
Email: RA-PGC_PNDI@pa.gov
NO Faxes Please

7. PROJECT CONTACT INFORMATION

Name: Carissa Mann
Company/Business Name: Hawbaker Engineering
Address: 1952 Waddle Rd, Suite 201
City, State, Zip: State College PA 16803
Phone:(814) 591-7963 Fax:(814) 272-2440
Email: cmb@hawbaker-engineering.com

8. CERTIFICATION

I certify that ALL of the project information contained in this receipt (including project location, project size/configuration, project type, answers to questions) is true, accurate and complete. In addition, if the project type, location, size or configuration changes, or if the answers to any questions that were asked during this online review change, I agree to re-do the online environmental review.

Cari Mann
applicant/project proponent signature

3/5/2021
date

PROJECT INFORMATION

Project Name: Williamsport Ballpark, Inc.

City: Williamsport **County:** Lycoming **State:** PA

Lat/Long (decimal degrees; ex. *38.418310, -76.001096*): 41.232689° -77.028567°

Find Lat/Long via map

Size: 28.51 acres\miles

PROJECT CONTACT INFORMATION

Name: Jason Fink **Phone:** 570-320-4213

Address: 102 West Fourth Street
Williamsport, PA 17701

Email: jfink@williamsport.org

If your project has a Federal (ex. U.S. Army Corps), state (ex. PNDI), or other ID number, please list here: __________

PROJECT ACTIVITY CATEGORY(S)

Place a check next to all activities you plan to perform.

- [x] Construction and Development Activities → go to pages 5 - 7
- [ ] Maintenance and Restoration Activities → go to pages 8 - 9
- [ ] Timber Operation and Forestry Practices → go to page 10
- [ ] Use of Helicopters and Fixed-wing Aircraft → go to page 11
- [ ] Blasting and Other Loud, Intermittent Noises (including Fireworks) → go to page 12
- [ ] Recreational Activities → go to pages 13 – 14

Feedback? The Service is continuously looking to improve this form. If you have suggested changes, please feel free to email them to us at thomas_wittig@fws.gov. Include "Bald Eagle Project Screening Form – Feedback" in your subject line.

Construction and Development Activities

Which specific construction activities do you plan to perform? (check all that apply)

- ■ Building construction
- ■ Tree and land clearing
- ■ Construction of roads, trails, canals, power lines, pipelines and other linear utilities
- ☐ Agriculture or aquaculture – new or expanded operations
- ☐ Alteration of shorelines or wetlands
- ☐ Installation of docks, piers, or moorings (pile driving may qualify as loud noise, page 12)
- ☐ Water impoundment or withdrawal
- ☐ Mining
- ☐ Oil and natural gas drilling and refining
- ☐ Wind farm construction
- ☐ Installation or expansion of marinas with a capacity of 6 or more boats
- ☐ Communications tower construction (excluding maintenance and repairs)

Is your activity similar to an ongoing or previous activity that coincided with the breeding season <u>and</u> that bald eagles tolerated? Consider both construction and use/operation of your project.

Consider all of the following elements/factors in answering:

-duration	-time of season	-area/footprint
-frequency	-visibility	-magnitude
-time of day	-distance	-nature

- ☐ Yes → No avoidance measures recommended. Go to self-certification (page 7).
- ■ No → Go to next question.

Will your activities be visible to the bald eagle nest(s)?

- ☐ Yes → Stop. Implement Avoidance Measures (AM) 2, 4, and 5 (see page 7)
- ■ No → Go to the next question

CONSTRUCTION & DEVELOPMENT

Which of these categories most closely matches your proposed project or activity?
(check all that apply)

☐ Building construction, 1 or 2 story, with a project footprint of ½ acre or less ☐ Construction of roads, trails, canals, power lines, or other linear utilities ☐ Agriculture or aquaculture – new or expanded operations ☐ Alteration of shorelines or wetlands ☐ Installation of docks or moorings ☐ Water impoundment or withdrawal ☐ Construction of communication towers **→ Implement AM 3, 4 and 5 (page 7)**	☐ Building construction or expansion, 3 or more stories ☒ Building construction or expansion, 1 or 2 story, with project footprint more than ½ acre ☐ Mining ☐ Oil and natural gas drilling and refining ☐ Installation or expansion of marinas with a capacity of 6 or more boats **→ Go to the next question**

Is there a similar activity within 1 mile of the nest?

☒ Yes → Implement AM 3, 4 and 5 (see page 7)

☐ No → Implement AM 1 and 5 (see page 7)

AVOIDANCE MEASURES - Place a check mark next to each avoidance measure (AM) that this form instructed you to implement and that you can commit to following. The Service recommends you follow the applicable AMs to prevent your activities from disturbing nesting bald eagles.

☐ AM 1 – Maintain a distance buffer of at least 660 feet (200 meters) between all project activities and the nest.

☐ AM 2 – Maintain a distance buffer of at least 660 feet (200 meters) between all project activities and the nest. If there is an existing human-made feature (e.g., house, road, dock) similar to your project that is closer than 660 feet and tolerated by the nesting eagles, maintain a distance buffer equal to or greater than the distance separating that tolerated feature and the nest.

■ AM 3 – Maintain a distance buffer of at least 330 feet (100 meters) year-round between all project activities and the nest. If a similar activity (i.e., similar in kind and size) is closer than 330 feet and has been tolerated by eagles, the distance buffer will be the same or greater than that of the existing tolerated activity.

■ AM 4 – Do not perform disruptive project activities within 660 feet (200 meters) of the nest during the breeding season. This time-of-year restriction is in addition to your recommended distance buffer. Disruptive activities include, but are not limited to, external construction, excavation, use of heavy equipment, use of loud equipment or machinery, vegetation clearing, earth disturbance, planting, and landscaping.

■ AM 5 – Maintain existing landscape buffers that visually screen the activity from the nest.

Do you commit to following all recommended avoidance measures?

☒ YES – I certify that I have completed this form to the best of my ability, answered all questions completely and accurately, and committed to implementing all applicable avoidance measures.

Jason Fish ______ March 10, 2021

(signature) (date)

U.S. Fish and Wildlife Service Determination: Based on your responses and commitment to implementing all applicable avoidance measures, the Service has determined that your proposed activities are unlikely to disturb nesting bald eagles.

☐ NO – I am unable to follow one or more of the avoidance measures recommended by this form.

Go to page 15 for further instruction.

PA-SHARE System Generated Environmental Review SHPO Response Summary

This response was prepared by the PA-SHARE system and includes the PA SHPO Environmental Review (ER) staff review response and comments. If a SHPO response letter is referenced, you will need to view the letter in PA-SHARE, found under Attachments on the Response screen.

If you have questions about why you are receiving this email, please visit the PA-SHARE help page at https://share.phmc.pa.gov/pasharehelp.

Date of SHPO Response: March 12, 2021

Primary Contact Information:
Carissa Mann
Hawbaker Engineering
1952 Waddle Road
Suite 201
State College PA 16803

RE: ER Project # 2021PR03185, Williamsport Ballpark, Inc., Department of Environmental Protection, Williamsport City, Lycoming County

Above Ground Resources
More Information Requested - New Resource

The proposed project is demolition of a concrete plant/buildings complex as there was no information provided regarding the age of the buildings and/or photographs, -complete an inventory form. Include historic and current aerials, description of the site, function/buildings, dates of construction, history of the company, etc. Please submit the requested materials to the PA SHPO through PA-SHARE using the link under SHPO Requests More Information on the Response screen.

For questions concerning above ground resources, please Cheryl Nagle at chnagle@pa.gov.

Archaeological Resources
No Archaeological Concerns - Environmental Review - No Historic Properties - Archaeological

Thank you for submitting information concerning the above-referenced project. In our opinion and based on the information received and available in our files, there are no archaeological resources present. Should the scope of the project change and/or should you be made aware of historic property concerns, you will need to notify the PA SHPO at pashare@pa.gov and provide the revised designs for review and comment.

For questions concerning archaeological resources, please Kimberly Sebestyen at ksebestyen@pa.gov.

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF CLEAN WATER

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) DISCHARGES OF STORMWATER ASSOCIATED WITH CONSTRUCTION ACTIVITIES EROSION AND SEDIMENT CONTROL (E&S) MODULE 1

Applicant: **Williamsport Ballpark, Inc.** Project Site Name: **Former Susquehanna Supply Property**

Surface Water Name(s): **UNT Susquehanna River** Surface Water Use(s): **WWF**

E&S PLAN INFORMATION

1. Describe the existing topographic features of the project site and the immediate surrounding area.

The existing site drains in all four directions. The highest portion of the site is relatively level with steep slopes along the SR 220 corridor. Rose Street along the western side of the property is lower while the railroad grade along the northern side of the property is slightly higher. The property has commerical properties to the east and west, a railroad to the north and SR 220 on the south.

2. Complete the following table for soils present at the project site.

Map Unit Symbol	Map Unit Name	Acres	HSG	% of Disturbed Area	Depth (ft)	Hydric
Ur	**Urban Land**	**28.51**		**100**		☐
						☐
						☐

Discuss any soil limitations and how the E&S Plan was designed to address those limitations.

**** No soil limitations were indicated for this soil classification; however the following items are listed in case these conditions exist during construction.**

Cutbanks Cave – Appropriate precautions shall be taken to safeguard workers during trenching and excavation operations. All applicable OSHA standards and regulations shall be implemented.

Corrosive to Concrete – All underground piping shall be HDPE or coated conduit.

Droughty – Mix compost with topsoil to improve moisture holding ability in lawn areas.

Easily Erodible – Limit the duration that exposed earth is not stabilized. Use silt sock and seeding to minimize erosion.

Depth to saturated zone/seasonal high water – It should be assumed that excavations will encounter water and appropriate means shall be provided to handle such water as determined necessary by the engineer. Provide trench plugs in utility trenches to prevent water migration along pipe lines. Provide underdrains around building foundations in these zones.

Hydric/Hydric Inclusions – Possible means of lowering the water table shall be sought if necessary by installing drains around and below building foundations of any newly constructed buildings.

Low Strength/Landslide Prone – Obtain Geotechnical testing results for areas of significant cut or steep slopes.

Slow Percolation – Spread stormwater out to minimize depth in infiltration facilities.

Piping – Anti-seep collars shall be installed on pipes which are subject to high volumes and high rates of flow as determined by the engineer.

Topsoil – Soil testing is strongly recommended to determine the proper application of soil amendments to promote the growth of the desired vegetation.

Frost Action – Precautions shall be set in place to prevent damage to soils from frost, especially soils which serve as the base to a roadway.

Sinkhole – Avoid concentrating stormwater storage above limestone soils with minimal soil coverage.

Wetness – Direct stormwater runoff away from areas of wetness to allow areas to dry if construction in the area is required and wetness is not the result of a wetland. Provide foundation drains to convey areas of wetness away from the foundation.

If Hydric soils are present, is a wetland determination attached to this module? ☐ Yes ☐ No ☒ N/A

If soils are known to be contaminated, 1) identify the pollutants exceeding Act 2 standards in the space provided below, 2) identify the extent of soil contamination on an E&S Plan Drawing that is attached to this module, and 3) describe the methods that will be used to avoid or minimize disturbance of the contaminated soils in the space provided below.

The property is located over top of an old landfill. Encountered trash will be transported and disposed off at a permitted landfill. Act 2 permitting is being conducted for the property concurrently with the NDPES approval process.

3. Describe the characteristics of the earth disturbance activity, including the past, present and proposed land uses and the proposed alteration to the project site.

   The previous land owner was a concrete/contruction company……prior to that the property was used for a landfill to cleanup the area.

4. Describe the volume and rate of runoff from the project site and its upstream watershed area.

   Since the site is on top of the hill, there is no upstream water to content with during the development of the lot. The onsite runoff will be captured and released at a rate that meets the requirements of the NDPES permit for the project.

5. Check boxes to indicate all BMPs that will be installed or implemented, identify plan numbers for the BMPs, and describe any deviations from the E&S Manual.

E&S BMPs	Plan No(s). Identified	Plan No(s). for O&M	Deviation(s) from E&S Manual
☒ Rock Construction Entrance	**E&S 1**	**E&S 2**	**None**
☐ Rock Construction Entrance with Wash Rack			
☐ Rumble Pad			
☐ Wheel Wash			
☐ Temporary and Permanent Access Roads			
☐ Waterbar			
☐ Broad-based Dip			
☐ Open-top Culvert			
☐ Water Deflector			
☐ Roadside Ditch			
☐ Ditch Relief Culvert			
☐ Turnout			
☐ Compost Sock Sediment Trap			
☐ Temporary Stream Crossing			
☐ Temporary Wetland Crossing			
☐ Turbidity Barrier (Silt Curtain)			
☐ Dewatering Work Areas			
☐ Pumped Water Filter Bag			
☐ Sump Pit			
☐ Waste Management			
☐ Concrete Washout			
☒ Compost Filter Sock	**E&S 1**	**E&S 2**	**None**
☐ Compost Filter Berm			
☐ Weighted Sediment Filter Tube			
☐ Rock Filter Outlet			
☐ Silt Fence (Filter Fabric Fence)			
☐ Reinforced Silt Fence			
☐ Super Silt Fence (Super Filter Fabric Fence)			

E&S BMPs	Plan No(s). Identified	Plan No(s). for O&M	Deviation(s) from E&S Manual
☐ Sediment Filter Log (Fiber Log)			
☐ Wood Chip Filter Berm			
☐ Straw Bale Barrier			
☐ Rock Filter			
☐ Vegetative Filter Strip			
☒ Inlet Filter Bag	**E&S 1**	**E&S 2**	**None**
☐ Stone Inlet Protection			
☐ Runoff Conveyance (Channel)			
☐ Bench			
☐ Top-of-Slope Berm			
☐ Temporary Slope Pipe			
☐ Sediment Basin			
☐ Sediment Trap			
☒ Riprap Apron	**E&S 1**	**E&S 2**	**None**
☐ Flow Transition Mat			
☐ Stilling Basin (Plunge Pool)			
☐ Stilling Well			
☐ Energy Dissipater			
☐ Drop Structure			
☐ Earthen Level Spreader			
☐ Structural Level Spreader			
☐ Surface Roughening			
☒ Vegetative Stabilization	**E&S 1**	**E&S 2**	**None**
☒ Erosion Control Blanket	**E&S 1**	**E&S 2**	**None**
☐ Soil Binders			
☐ Sodding			
☐ Cellular Confinement Systems			
☐ Alternative:			
☐ Alternative:			

Table 1 – For PAG-01 applicants, complete the requested information for each selected E&S BMP, where applicable.

Site Access BMPs

BMP Name	No.	Length (ft)	Width (ft)	% Slope	Spacing (ft)	Length of Upslope Drainage (ft)	Culvert Diameter (in)	Soil Type in Ditch	E&S Manual Figure/Detail No.
Rock Construction Entrance (RCE)									
RCE with Wash Rack									
Temporary and Permanent Access Roads – Crowned Roadway									
Temporary and Permanent Access Roads – Insloped Roadway									
Waterbar									
Broad-based Dip									
Open-top Culvert									
Water Deflector									
Roadside Ditch									
Ditch Relief Culvert									

Sediment Barriers / Filters

BMP Name	DA (ac)	Diameter (in)	Storage Capacity (cf)	Trap Height (in)	% Slope	Slope Length Above Barrier (ft)	Barrier Height (in)	E&S Manual Figure/Detail No.
Compost Sock Sediment Trap								
Compost Filter Sock								
Compost Filter Berm								
Silt Fence (Filter Fabric Fence)								
Super Silt Fence								
Sediment Filter Log								
Weighted Sediment Filter Tube								
Straw Bale Barrier								
Wood Chip Filter Berm								
Toe-of-Slope Berm								

Table 1 – For PAG-01 applicants, complete the requested information for each selected E&S BMP, where applicable.

Runoff Conveyance BMPs

BMP Name	Temporary	Design Storm	DA (ac)	Multiplier	Qr (cfs)	Q (cfs)	Manning's n	Va (fps)	V (fps)	D (ft)	d (ft)	Flow Depth Ratio	E&S Manual Figure/Detail No.
Vegetated Channel	☐												
Sodded Channel	☐												
Riprap Channel	☐												

Energy Reduction BMPs

BMP Name	Downstream Distance to Drainage Course (ft)	Downstream % Slope	DA (ac)	Discharge (cfs)	Manhole Depth (ft)	Inflow Pipe Diameter (in)	Outlet Pipe Diameter (in)	E&S Manual Figure/Detail No.
Level Spreader								
Drop Structure								

Stilling Basins / Wells

BMP Name	Pipe Diameter (in)	Discharge (cfs)	Well Diameter (in)	Depth of Well Below Invert (ft)	Basin Depth (ft)	Median Riprap Size (in)	Distance from Discharge Pipe to Basin Center (ft)	E&S Manual Figure/Detail No.
Stilling Basin								
Stilling Well								

Other BMPs

BMP Name	DA (ac)	Pipe Diameter (in)	Berm Height (in)	Length (ft)	% Slope	Vertical Spacing (ft)	Channel Depth (ft)	Riprap Size	Riprap Thickness (in)	Initial Width (ft)	Terminal Width (ft)	E&S Manual Figure/Detail No.
Temporary Slope Pipe												
Bench												
Rock Filter												
Riprap Apron												

For selected BMPs not identified in Table 1, report the name of the BMP and the Figure or Detail No. from the E&S Manual that will be used for design and implementation (PAG-01 only).

BMP Name	E&S Manual Figure/Detail No.	BMP Name	E&S Manual Figure/Detail No.

6. ☒ All applicable Standard E&S Worksheets from Appendix B of the E&S Manual have been completed and are attached.

7. ☒ Other worksheets or calculations equivalent to Appendix B of the E&S Manual have been completed and are attached.

8. Identify the E&S Plan Drawing number(s) that describes the sequence of BMP installation and removal in relation to the scheduling of earth disturbance activities, prior to, during and after earth disturbance activities that ensure the proper functioning of all BMPs.

9. ☐ Supporting E&S calculations have been completed and are available upon request (PAG-01 only).

10. ☒ Supporting E&S calculations are attached to the NOI/application.

11. ☐ Plan drawings consist of standard Figures/Construction Details in E&S Manual (PAG-01 only).

12. ☒ Plan drawings have been developed for the project and are attached to the NOI/application.

13. ☒ BMPs will be inspected on a weekly basis and after measurable storm events (i.e., at least 0.25 inch).

14. Identify the following information relating to temporary stabilization measures on an E&S Plan Drawing and identify the Drawing No. below: 1) vegetative species, 2) % pure live seed, 3) seed application rate, 4) fertilizer type, 5) fertilizer application rate, 6) mulch type, 7) mulching rate, and 8) liming rate.

    E&S Plan Drawing No(s).: **See Temporary Seeding on E&S Notes sheet of the plan set.**

15. Identify the following information relating to permanent stabilization measures on an E&S Plan Drawing and identify the Drawing No. below: 1) vegetative species, 2) % pure live seed, 3) seed application rate, 4) fertilizer type, 5) fertilizer application rate, 6) mulch type, 7) mulching rate, 8) liming rate, 9) anchor material, 10) anchoring method, 11) rate of anchor material application, 12) topsoil placement depth, and 13) seeding season dates.

    E&S Plan Drawing No(s).: **See Permanent Seeding on E&S Notes sheet of the plan set.**

16. Describe the procedures that will be taken to ensure that recycling or disposal of materials associated with or from the project site will be conducted properly.

    Individuals responsible for earth disturbance activities must ensure that proper mechanisms are in place to control waste material. Construction waste includes, but is not limited to:

    1. Excess soil materials

    2. Trees, shrubs and brush removed during clearing and grubbing

    3. Sanitary wastes

    4. Concrete wash water

    5. Packaging materials (wood, paper, plastic, styrofoam, etc.)

    6. Scrap or surplus building materials (metals, rubber, plastic, glass, masonry products, and other solid waste materials)

    7. Petroleum products, paint and thinners, cleaning solvents, curing compounds and similar materials

    8. Demolition debris

    9. Unless otherwise directed, excess soil and excavated material may be used for fill material on site or off site. Coordinate with owner and the Conservation District. Any material that is imported or exported from site will be classified as clean fill per the Pennsylvania Department of Environmental Protections.

    10. Trees, shrubs and brush shall be chipped when possible and reused as mulch. Do not burn without permission.

    11. Where possible wastes shall be recycled. Where not practical wastes shall be properly disposed of at a

permitted landfill facility. The contractor is encouraged to consult the recycling hotline or local solid waste management agency.

12. Contractor shall practice good housekeeping, including but limited to the following:

a. Neat, orderly and centralized storage of materials and wastes

b. Control of litter providing containers with lids if needed

c. Regular disposal

d. Prompt cleanup of any spills in accordance with manufacturer's instructions or in accordance with regulatory requirements. Utilize a specialty firm if required.

e. Prompt cleanup of sediments within the site and onto adjacent roadways

f. Keep dust within tolerable limits by using water or other approved dust suppressors.

Measures should be planned and implemented for housekeeping, materials management, and litter control. Whenever possible, recycling of excess materials is preferred, rather than disposal. Recycle and/or dispose of all excess material in accordance with all Federal, State and Local regulations. Comply with air quality, water quality, solid waste management policies, etc.

17. Identify the presence of any naturally occurring geologic formations or soil conditions that may have the potential to cause pollution during earth disturbance activities. If such formations or conditions exist, identify BMPs that will be implemented to avoid or minimize potential pollution.

    Any underlying trash encountered will be loaded onto trucks and tank to an approved landfill fo propoper disposal.

18. Identify whether the potential exists for thermal impacts to surface waters from the earth disturbance activity. If such potential exists, identify BMPs that will be implemented to avoid, minimize, or mitigate potential thermal impacts.

    Thermal impacts will be mitigated by directing runoff from impervious areas to grassed areas. The infiltration basin will infiltrate the first flush from all impervious areas. Grass lines swales and underground stormwater piping will also aid in cooling the runoff.

19. ☐ The E&S Plan has been planned, designed, and will be implemented to be consistent with the PCSM Plan.

20. If applicable, identify existing and proposed riparian forest buffers on E&S and PCSM Plan Drawings and identify the Drawing No(s) below (select N/A if not applicable).

E&S Plan Drawing No(s): ☒ N/A

PCSM Plan Drawing No(s):

E&S PLAN DEVELOPER

☒ I am trained and experienced in E&S control methods. ☒ I am a licensed professional.

Name:	**Robert E. Myers**	Title:	**Project Manager**
Company:	**Hawbaker Engineering, LLC**	Phone No.:	**(814) 272-0786**
Address:	**1952 Waddle Road, Suite 201**	Email:	**rem2@hawbakerengineering.com**
City, State, ZIP:	**State College, PA 16803**	License No.:	**PE075926**
License Type:	**Professional Engineer**	Exp. Date:	**09/30/2021**

Robert E Myers

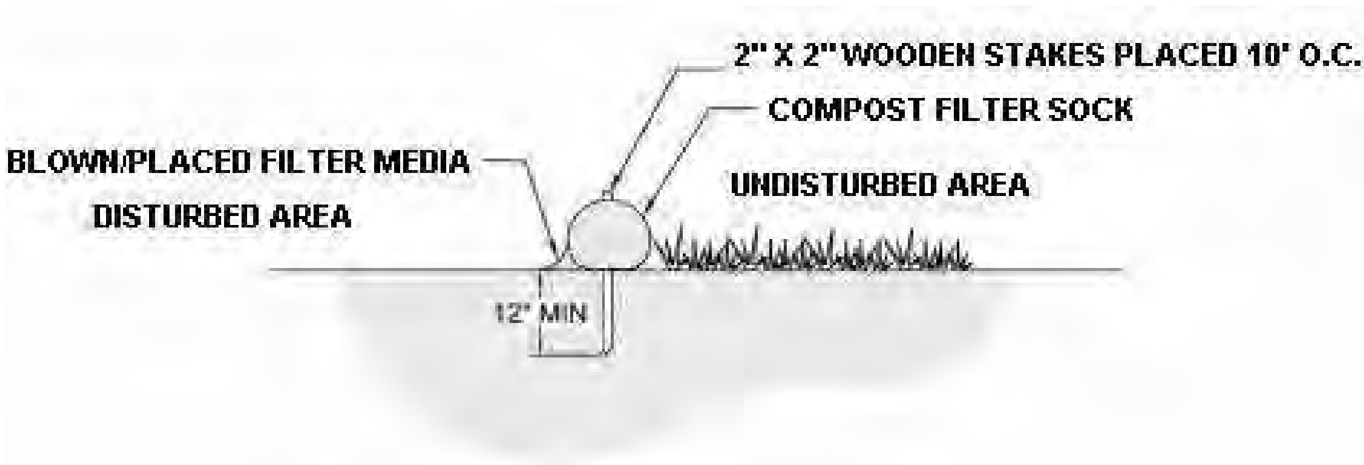
E&S Plan Developer Signature

March 17, 2021

Date

STANDARD E&S WORKSHEET #1
Compost Filter Socks

PROJECT NAME: Williamsport Ballpark, Inc.
LOCATION: 2 Rose Street, Williamsport, PA 17701
PREPARED BY: CMB DATE: March 9, 2021
CHECKED BY: DATE:



SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
1	12	NW corner/parallel to Rose St.	6	158
2	12	NW corner / W of topsoil stockpile/Basin A	11	96
3	12	NW corner/N of Basin A	13	56
4	12	Northern boundary/ N of Basin A	9	68
5	12	Northern boundary/N of Basin B	9	34
6	12	Northern boundary	33	12
7	12	Northeastern boundary/N of Basin C	33	34
8	12	Northeastern boundary/E of Basin C	8	98
9	12	Eastern boundary	19	26
10	12	Eastern boundary/E of Basin D	14	36
11	12	Southeastern boundary/south of Basin D	21	34
12	12	Southern boundary/South of Parking lot	10	88
13	12	Southern boundary/South of Parking lot	9	138
14	12	Southwest corner	3	146
15	12	Southwest corner	13	88
16	12	Southwest corner	5	142
17	12	Western boundary	14	110
18	12	Western boundary	11	44

WORKSHEET #11
Channel Design Data

PROJECT NAME: Williamsport Ballpark, Inc.
LOCATION: City of Williamsport, Lycoming County
PREPARED BY: REM DATE: March 9, 2021

CHANNEL OR CHANNEL SECTION	Basin A Spillway	Basin B Spillway	Basin C Spillway	Basin D Spillway	Basin G Spillway
PROTECTIVE LINING **	ECP-2 10oznv	ECP-2 10oznv	ECP-2 10oznv	ECP-2 10oznv	ECP-2 10oznv
T CHANNEL TOP WIDTH (FT) @ D	26.60	25.22	26.06	25.46	20.58
t CHANNEL TOP WIDTH (FT) @ d	23.6	22.22	23.06	22.46	17.58
Z CHANNEL SIDE SLOPES (H:V)	3 : 1	3 : 1	3 : 1	3 : 1	3 : 1
B CHANNEL BOTTOM WIDTH (FT)	20.0	20.0	20.0	20.0	15.0
d (FLOW DEPTH)	0.60	0.37	0.51	0.41	0.43
BOTTOM WIDTH:DEPTH RATIO (12:1 MAX) (B:d)	33.3 : 1	54.1 : 1	39.2 : 1	48.8 : 1	34.9 : 1
A (AREA IN SQ. FT.)	14.16	8.22	11.76	9.21	7.56
P (WETTED PERIMETER IN FT)	23.79	22.34	23.23	22.59	17.72
R (HYDRAULIC RADIUS)	0.60	0.37	0.51	0.41	0.43
S (BED SLOPE, FT/FT)*	0.333	0.333	0.333	0.333	0.333
VEGETATIVE LINING RETARDANCE	N/A	N/A	N/A	N/A	N/A
N (MANNING'S COEFFICIENT)**	0.024	0.024	0.024	0.024	0.024
Q (AT FLOW DEPTH d, CFS)	358.12	150.88	267.06	181.00	153.16
Q_r (REQUIRED CAPACITY) CFS	30.59	11.53	18.88	13.55	10.91
S_c (CRITICAL SLOPE)	0.010	0.012	0.011	0.011	0.011
.7 S_c	0.007	0.008	0.007	0.008	0.008
1.3 S_c	0.013	0.015	0.014	0.015	0.015
STABLE FLOW (Y/N)	YES	YES	YES	YES	YES
FREEBOARD BASED ON UNSTABLE FLOW FT	N/A	N/A	N/A	N/A	N/A
FREEBOARD BASED ON STABLE FLOW FT	0.15	0.09	0.13	0.10	0.11
MINIMUM REQUIRED FREEBOARD FT	0.50	0.50	0.50	0.50	0.50
D (TOTAL DEPTH) FT REQUIRED	1.10	0.87	1.01	0.91	0.93
d_{50} STONE SIZE (IN)	N/A	N/A	N/A	N/A	N/A
DESIGN METHOD FOR PROTECTIVE LINING **** PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)	S	S	S	S	S
V (AT FLOW DEPTH d, FPS)	25.29	18.36	22.71	19.65	20.26
Va (ALLOWABLE VELOCITY) FPS	N/A	N/A	N/A	N/A	N/A
T_d (SHEAR STRESS AT FLOW DEPTH d) LB/FT^2	12.48	7.70	10.61	8.53	8.94
T_a (MAX ALLOWABLE SHEAR STRESS) LB/FT^2	2.3	2.3	2.3	2.3	2.3

* SLOPES MAY NOT BE AVERAGED.
** For vegetated channels, provide data for temporary linings and vegetated conditions in separate columns.
*** Minimum Freeboard, F, is 0.5 ft.
**** Permissible velocity lining design method is not acceptable for channels with a bde slope of 10% or greater. Shear stress lining design method is recommended for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

NOTE: "nv" stands for "not vegetated" meaning the unvegetated state PRIOR to 70% stabilization and "v" stand for "vegetated" meaning the vegetated state AFTER 70% stabilization

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Material and Performance Specification

ECP-2 10 oz.™ Polypropylene Turf Reinforcement Mat

Description:

The ECP-2 10 oz™ is made with uniformly distributed 100% polypropylene fiber and two medium weight polypropylene nets securely sewn together with UV stabilized thread. The tightly compressed blankets are wrapped and include a product label, code and installation guide. The blankets are palletized for easy transportation. The ECP-2 10 oz™ is a permanent turf reinforcement mat and is suitable for 1:1 slopes and high-flow channels. The ECP-2 10 oz™ meets Type 5.A, 5.B & 5.C specification requirements established by the Erosion Control Technology Council (ECTC) and Federal Highway Administration's (FHWA) FP-03 Section 713.18.

Matrix:	1	2
	Green or Tan Polypropylene Fiber	N/A

Netting:	Type	Net Color
Top:	Medium weight 5# PMSF UV Stabilized Polypropylene	Black
Middle:	None	
Bottom:	Medium weight 5# PMSF UV Stabilized Polypropylene	

Net Opening:	Top	Middle	Bottom
	0.5" x 0.5"	N/A	0.5" x 0.5"

Thread:	Type	Color
	UV Stabilized Thread	Black

Roll Sizes:	Standard		"A" Size		Mega	
Width:	8 ft	2.4 m	4.00 ft	1.2 m	16 ft	4.9 m
Length:	112.5 ft	34.3 m	225 ft	68.6 m	112.5 ft	34.3 m
Weight:*	62 lbs	28.1 kg	62 lbs	28.1 kg	124 lbs	56.2 kg
Area:	100 yd^2	83.6 m^2	100 yd^2	83.6 m^2	200 yd^2	167.2 m^2
#/Pallet:	16		9		16	

*Weight at time of manufacturing within specified tolerances.

Index Value Properties*:

Property	Test Method	Typical	
Mass/Unit Area	ASTM D6566	10.00 oz/yd^2	339.1 g/m2
Thickness	ASTM D6525	0.40 in	10.16 mm
Tensile Strength-MD	ASTM D6818	370 lb/ft	5.40 kN/m
Elongation-MD	ASTM D6818	24 %	
Tensile Strength-TD	ASTM D6818	315 lb/ft	4.60 kN/m
Elongation-TD	ASTM D6818	20.0 %	
Light Penetration	ASTM D6567	25 %	
Density / Specific Gravity	ASTM D792	0.917 g/cm^3	
Water Absorption	ASTM D1117	0 %	
Resiliency	ASTM D6524	80 %	
UV Resistance	ASTM D4355	82 %	1000 hours

*May differ depending upon raw material variations

Bench-Scale Testing* (NTPEP***):

Test Method	Parameters	Results
ECTC Method 2 Rainfall	50mm (2in) / hr-30 min	SLR**=4.58
	100mm (4in) / hr-30 min	SLR**=8.80
	150mm (6in) / hr-30 min	SLR**=16.92
ECTC Method 3 Shear Resistance	Shear at .50 in soil loss	2.42 lb/ft^2
ECTC Method 4 Germination	Top soil; Fescue; 21 day incubation	482 %

*Bench scale tests should not be used for design purposes.

**Soil Loss Ratio=Soil Loss Bare Soil/Soil Loss with RECP=1/C-Factor

***The preceding test data excerpts were reproduced with the permission of AASHTO, however, this does not constitute endorsement or approval of the product, material or device by AASHTO

Slope Performance Design Values*:

Property	Test Method		Value
C-Factors	ASTM D6459		0.01
Slope Length (L)	**≤ 3:1**	**3:1-2:1**	**≥ 2:1**
< 50 ft (15 m)	0.005	0.012	0.058
50 ft – 100 ft	0.012	0.025	0.062
>100 ft (30 m)	0.020	0.036	0.071

*Large-Scale Results obtained by 3rd Party GAI Accredited Independent Laboratory

Channel Performance Design Values*:

Property	Test Method	Value			
Unvegetated Shear Stress	ASTM D 6460	2.30	lbs/ft^2	110.12	Pa
Unvegetated Velocity	ASTM D 6460	9.0	ft/s	2.74	m/s
Vegetated Shear Stress	ASTM D 6460	10.0	lbs/ft^2	478.80	Pa
Vegetated Velocity	ASTM D 6460	18.0	ft/s	5.49	m/s
Manning's N (Value Represents a Range)		0.024			

*Large-Scale Results obtained by 3rd Party GAI Accredited Independent Laboratory

The values presented are for guidance purposes and do not constitute the practice of engineering. East Coast Erosion Blankets LLC (ECEB) ascertains that at the time of manufacture, all information presented herein is accurate and reliable and falls within the ECEB manufacturing product specification variances. If the product does not meet the stated values and ECEB is notified in writing prior to installation, the product will be replaced at no cost to the purchaser. ECEB will not be held liable for any type of damage or losses, directly, or indirectly for failure of this product. Current revision supersedes all previous versions for this product.

Revised 01/01/2020

ROLLMAX™
ROLLED EROSION CONTROL

Specification Sheet – BioNet® S75BN™ Erosion Control Blanket

DESCRIPTION

The short-term single net erosion control blanket shall be a machine-produced mat of 100% agricultural straw with a functional longevity of up to 12 months. (NOTE: functional longevity may vary depending upon climatic conditions, soil, geographical location, and elevation). The blanket shall be of consistent thickness with the straw evenly distributed over the entire area of the mat. The blanket shall be covered on the top side with a 100% biodegradable woven natural organic fiber net. The netting shall consist of machine directional strands formed from two intertwined yarns with across directional strands interwoven through the twisted machine strands (commonly referred to as a Leno weave) to form approximate 0.50 x 1.0 in. (1.27 x 2.54 cm) mesh. The blanket shall be sewn together on 1.50 inch (3.81 cm) centers with degradable thread. The blanket shall be manufactured with a colored thread stitched along both outer edges (approximately 2-5 inches [5-12.5 cm] from the edge) as an overlap guide for adjacent mats.

The S75BN shall meet Type 2.C specification requirements established by the Erosion Control Technology Council (ECTC) and Federal Highway Administration's (FHWA) FP-03 Section 713.17

Material Content		
Matrix	100% straw fiber	0.5 lbs/sq yd (0.27 kg/sm)
Netting	Top side only: Leno woven 100% biodegradable natural organic fiber	9.3 lbs/1000 sq ft (4.5 kg/100 sm)
Thread	Biodegradable	

Standard Roll Size	
Width	6.67 ft (2.0 m)
Length	108 ft (32.92 m)
Weight ± 10%	46.4 lbs (21.05 kg)
Area	80 sq yd (66.9 sm)

Design Permissible Shear Stress	
Unvegetated Shear Stress	1.60 psf (76 Pa)
Unvegetated Velocity	5.00 fps (1.52 m/s)

Index Property	Test Method	Typical
Thickness	ASTM D6525	0.29 in. (7.37 mm)
Resiliency	ECTC Guidelines	81.4%
Water Absorbency	ASTM D1117	440%
Mass/Unit Area	ASTM D6475	9.12 oz/sy (310 g/sm)
Swell	ECTC Guidelines	15.7%
Smolder Resistance	ECTC Guidelines	Yes
Stiffness	ASTM D1388	6.92 oz-in
Light Penetration	ASTM D6567	9.1%
Tensile Strength - MD	ASTM D6818	146.4 lbs/ft (2.17 kN/m)
Elongation - MD	ASTM D6818	10.9%
Tensile Strength - TD	ASTM D6818	109.2 lbs/ft (1.62 kN/m)
Elongation - TD	ASTM D6818	14.3%
Biomass Improvement	ASTM D7322	398%

Slope Design Data: C Factors			
	Slope Gradients (S)		
Slope Length (L)	≤ 3:1	3:1 – 2:1	≥ 2:1
≤ 20 ft (6 m)	0.029	N/A	N/A
20-50 ft	0.11	N/A	N/A
≥ 50 ft (15.2 m)	0.19	N/A	N/A

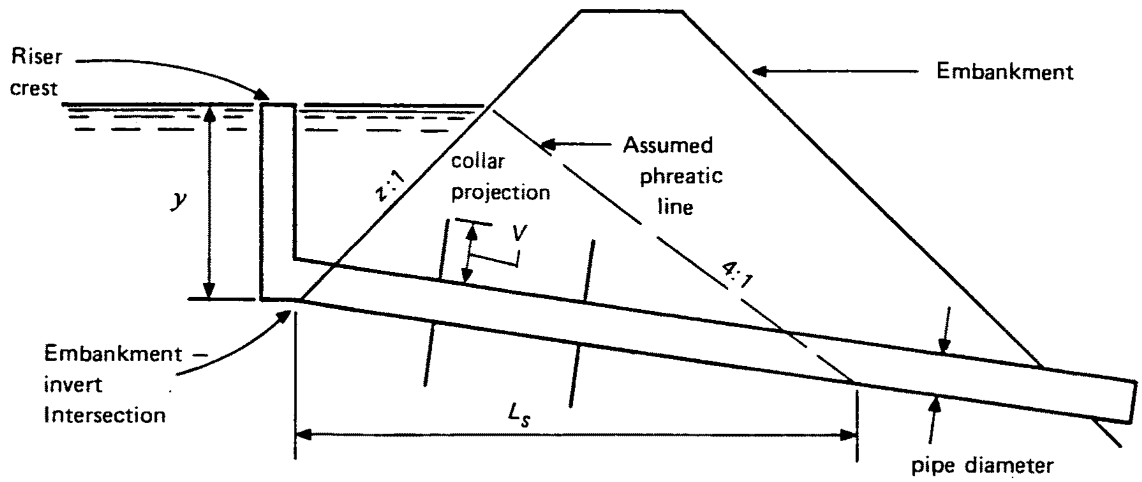
Roughness Coefficients – Unveg.	
Flow Depth	Manning's n
≤ 0.50 ft (0.15 m)	0.055
0.50 – 2.0 ft	0.055-0.021
≥ 2.0 ft (0.60 m)	0.021

Tensar
NORTH AMERICAN GREEN®

Tensar International Corporation
2500 Northwinds Parkway
Suite 500
Alpharetta, GA 30009
800-TENSAR-1
tensarcorp.com

Tensar International Corporation warrants that at the time of delivery the product furnished hereunder shall conform to the specification stated herein. Any other warranty including merchantability and fitness for a particular purpose, are hereby executed. If the product does not meet specifications on this page and Tensar is notified prior to installation, Tensar will replace the product at no cost to the customer. **This product specification supersedes all prior specifications for the product described above and is not applicable to any products shipped prior to January 1, 2012.**

STANDARD E&S WORKSHEET # 18
Anti-seep Collar Design



BASIN NO.	TEMP. OR PERM.	Y (FT)	Z	Ls (FT)	Lf (FT)	V (IN)	BARREL DIA. (IN)	COLLAR SIZE (IN)	NO. COLLARS	COLLAR SPACING (FT)	DISTANCE TO 1ST COLLAR (FT)
A	PERM.	4.5	3	34.2	39.3	33	24	90	1	-	15
B	PERM.	3	3	19.9	22.9	18	18	54	1	-	10
C	PERM.	3.26	3	23.8	27.4	24	18	66	1	-	10
D	PERM.	3.49	3	26.6	30.6	24	18	66	1	-	12
E	PERM.	3.56	5	33.9	38.9	33	18	84	1	-	30
G	PERM.	3.47	3	25.7	29.6	24	18	66	1	-	20

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1952 Waddle Road, Suite 201 State College, PA 16803
1-800-284-8590 hawbakerengineering.com

ANTI-SEEP COLLAR DESIGN - BASIN A

PROJECT NAME: ***Williamsport Ballpark Inc.***
LOCATION: ***City of Williamsport, Lycoming County***
PREPARED BY: ***REM*** DATE: ***2/12/2021***
CHECKED BY: ______ DATE: ______

Saturate Zone (Ls)

L_s = y (Z + 4) [1+(pipe slope (ft/ft)/(0.25 - pipe slope))]

L_s = Length of pipe in saturated zone (ft)

y = Distance from upstream invert of principal spillway riser to top of dewatering volume

$Riser_{Invert}$ = **528**

$Dewater_{Vol}$= **532.5**

y = **4.5**

Z = Horizontal component of upstream embankment slope (ft)

Z = **3**

Pipe Slope = pipe slope (ft/Ft)

Pipe Sope = **0.0194**

L_s = **34.2**

Determine the required increase in flow path

For temporary basin use a minimum of 10% increase, for a permanent basin use a minimum of a 15% increase.

Temporary or Permanent Basin = **Permanent**

L_F = **39.3**

The minimum collar projection (V) is equal to 1/2 the increase in flow length (for one collar). If more than one collar is used, it is the increase divided by twice the number of collars.

Number of Collars = **1**

$V_{min.}$= **2.56** ≈ **2.75**

Maximum spacing between collars = 14 * V

Max. spacing = **38.5**

Minimum spacing between collars = 5 * V

Min. spacing = **13.8**

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ANTI-SEEP COLLAR DESIGN - BASIN B

PROJECT NAME: ***Williamsport Ballpark Inc.***
LOCATION: ***City of Williamsport, Lycoming County***
PREPARED BY: ***REM*** DATE: ***2/12/2021***
CHECKED BY: ______ DATE: ______

Saturate Zone (Ls)

L_s = y (Z + 4) [1+(pipe slope (ft/ft)/(0.25 - pipe slope))]

L_s = Length of pipe in saturated zone (ft)

y = Distance from upstream invert of principal spillway riser to top of dewatering volume

$Riser_{Invert}$ = **530.45**

$Dewater_{Vol}$= **533.16**

y = **2.71**

Z = Horizontal component of upstream embankment slope (ft)

Z = **3**

Pipe Slope = pipe slope (ft/Ft)

Pipe Sope = **0.0115**

L_s = **19.9**

Determine the required increase in flow path

For temporary basin use a minimum of 10% increase, for a permanent basin use a minimum of a 15% increase.

Temporary or Permanent Basin = **Permanent**

L_F = **22.9**

The minimum collar projection (V) is equal to 1/2 the increase in flow length (for one collar). If more than one collar is used, it is the increase divided by twice the number of collars.

Number of Collars = **1**

$V_{min.}$= **1.49** ≈ **1.50**

Maximum spacing between collars = 14 * V

Max. spacing = **21.0**

Minimum spacing between collars = 5 * V

Min. spacing = **7.5**

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ANTI-SEEP COLLAR DESIGN - BASIN C

PROJECT NAME: ***Williamsport Ballpark Inc.***
LOCATION: ***City of Williamsport, Lycoming County***
PREPARED BY: ***REM*** DATE: ***2/12/2021***
CHECKED BY: DATE:

Saturate Zone (Ls)

L_s = y (Z + 4) [1+(pipe slope (ft/ft)/(0.25 - pipe slope))]

L_s = Length of pipe in saturated zone (ft)

y = Distance from upstream invert of principal spillway riser to top of dewatering volume

$Riser_{Invert}$ = **529.19**

$Dewater_{Vol}$= **532.45**

y = **3.26**

Z = Horizontal component of upstream embankment slope (ft)

Z = **3**

Pipe Slope = pipe slope (ft/Ft)

Pipe Sope = **0.0107**

12

L_s = **23.8**

Determine the required increase in flow path

For temporary basin use a minimum of 10% increase, for a permanent basin use a minimum of a 15% increase.

Temporary or Permanent Basin = **Permanent**

L_F = **27.4**

The minimum collar projection (V) is equal to 1/2 the increase in flow length (for one collar). If more than one collar is used, it is the increase divided by twice the number of collars.

Number of Collars = **1**

$V_{min.}$= **1.79** ≈ **2.00**

Maximum spacing between collars = 14 * V

Max. spacing = **28.0**

Minimum spacing between collars = 5 * V

Min. spacing = **10.0**

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ANTI-SEEP COLLAR DESIGN - BASIN D

PROJECT NAME: ***Williamsport Ballpark Inc.***
LOCATION: ***City of Williamsport, Lycoming County***
PREPARED BY: ***REM*** DATE: ***2/12/2021***
CHECKED BY: ______ DATE: ______

Saturate Zone (Ls)

L_s = y (Z + 4) [1+(pipe slope (ft/ft)/(0.25 - pipe slope))]

L_s = Length of pipe in saturated zone (ft)

y = Distance from upstream invert of principal spillway riser to top of dewatering volume

$Riser_{Invert}$ = **532**

$Dewater_{Vol}$= **535.49**

y = **3.49**

Z = Horizontal component of upstream embankment slope (ft)

Z = **3**

Pipe Slope = pipe slope (ft/Ft)

Pipe Sope = **0.0204**

L_s = **26.6**

Determine the required increase in flow path

For temporary basin use a minimum of 10% increase, for a permanent basin use a minimum of a 15% increase.

Temporary or Permanent Basin = **Permanent**

L_F = **30.6**

The minimum collar projection (V) is equal to 1/2 the increase in flow length (for one collar). If more than one collar is used, it is the increase divided by twice the number of collars.

Number of Collars = **1**

$V_{min.}$= **2.00** ≈ **2.00**

Maximum spacing between collars = 14 * V

Max. spacing = **28.0**

Minimum spacing between collars = 5 * V

Min. spacing = **10.0**

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ANTI-SEEP COLLAR DESIGN - BASIN E

PROJECT NAME: *Williamsport Ballpark Inc.*
LOCATION: *City of Williamsport, Lycoming County*
PREPARED BY: *REM* DATE: *2/12/2021*
CHECKED BY: ______ DATE: ______

Saturate Zone (Ls)

L_s = y (Z + 4) [1+(pipe slope (ft/ft)/(0.25 - pipe slope))]

L_s = Length of pipe in saturated zone (ft)

y = Distance from upstream invert of principal spillway riser to top of dewatering volume

$Riser_{Invert}$ = **530.5**

$Dewater_{Vol}$= **534.06**

y = **3.56**

Z = Horizontal component of upstream embankment slope (ft)

Z = **5**

Pipe Slope = pipe slope (ft/Ft)

Pipe Sope = **0.0135**

L_s = **33.9**

Determine the required increase in flow path

For temporary basin use a minimum of 10% increase, for a permanent basin use a minimum of a 15% increase.

Temporary or Permanent Basin = **Permanent**

L_F = **38.9**

The minimum collar projection (V) is equal to 1/2 the increase in flow length (for one collar). If more than one collar is used, it is the increase divided by twice the number of collars.

Number of Collars = **1**

$V_{min.}$= **2.54** ≈ **2.75**

Maximum spacing between collars = 14 * V

Max. spacing = **38.5**

Minimum spacing between collars = 5 * V

Min. spacing = **13.8**

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ANTI-SEEP COLLAR DESIGN - BASIN G

PROJECT NAME: ***Williamsport Ballpark Inc.***
LOCATION: ***City of Williamsport, Lycoming County***
PREPARED BY: ***REM*** DATE: ***2/12/2021***
CHECKED BY: ______ DATE: ______

Saturate Zone (Ls)

L_s = y (Z + 4) [1+(pipe slope (ft/ft)/(0.25 - pipe slope))]

L_s = Length of pipe in saturated zone (ft)

y = Distance from upstream invert of principal spillway riser to top of dewatering volume

$Riser_{Invert}$ = **530**

$Dewater_{Vol}$= **533.47**

y = **3.47**

Z = Horizontal component of upstream embankment slope (ft)

Z = **3**

Pipe Slope = pipe slope (ft/Ft)

Pipe Sope = **0.014**

L_s = **25.7**

Determine the required increase in flow path

For temporary basin use a minimum of 10% increase, for a permanent basin use a minimum of a 15% increase.

Temporary or Permanent Basin = **Permanent**

L_F = **29.6**

The minimum collar projection (V) is equal to 1/2 the increase in flow length (for one collar). If more than one collar is used, it is the increase divided by twice the number of collars.

Number of Collars = **1**

$V_{min.}$= **1.93** ≈ **2.00**

Maximum spacing between collars = 14 * V

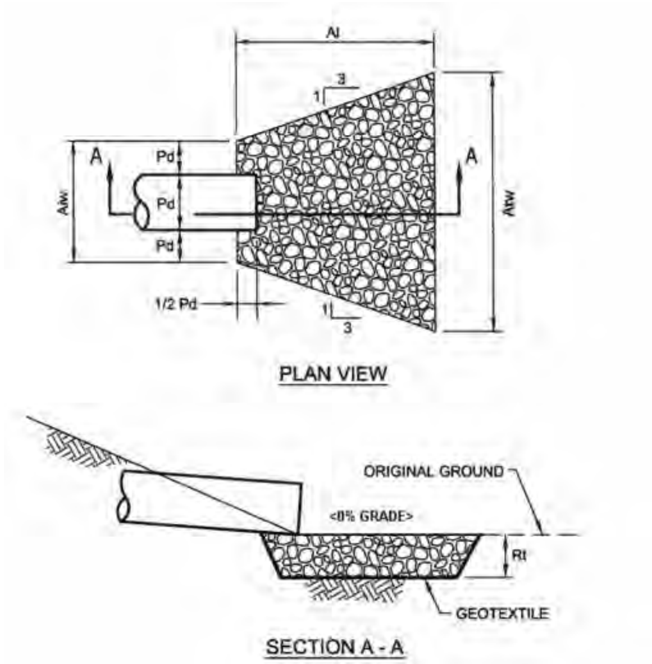
Max. spacing = **28.0**

Minimum spacing between collars = 5 * V

Min. spacing = **10.0**

STANDARD E&S WORKSHEET # 20
Riprap Apron Outlet Protection

PROJECT NAME: **Williamsport Ballpark, Inc.**
LOCATION: **2 Rose Street, Williamsport, PA 17701**
PREPARED BY: **REM** DATE: **March 9, 2021**
CHECKED BY: DATE:

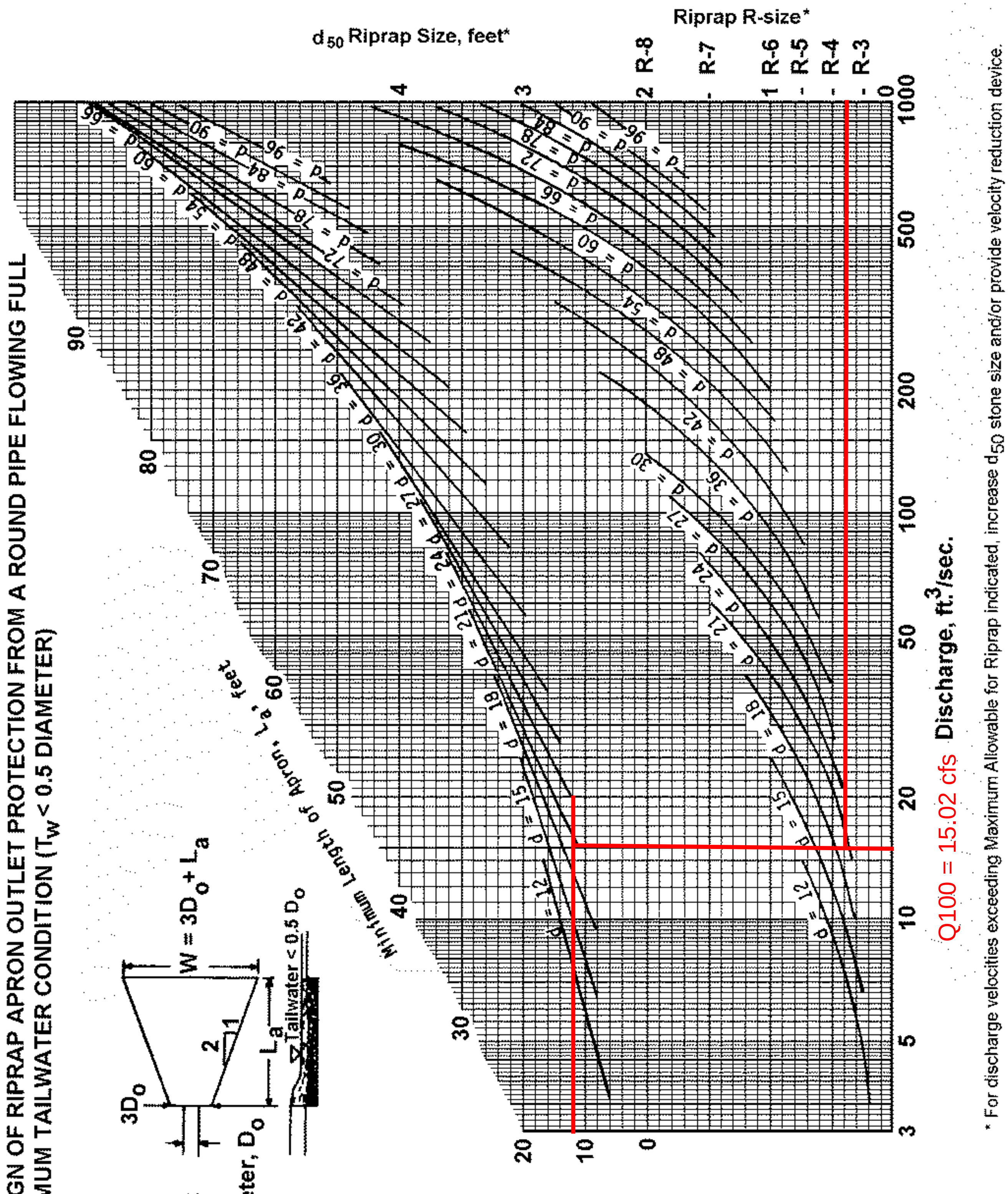


NO.	PIPE DIA. Do (in.)	TAIL WATER COND. (Max or Min)	MAN. "n" FOR PIPE	PIPE SLOPE (FT/FT)	Q (CFS)	V* (FPS)	RIPRAP SIZE	Rt (in)	Al (ft)	Aiw (ft)	Atw (ft)
A-2	24	MIN.	0.012	0.01	15.02	8.21	R-4	18	12	6	18
C1-1	18	MAX.	0.012	0.008	8.86	6.50	R-3	9	7	4.5	7.3
B-2	18	MIN.	0.012	0.0115	6.37	6.99	R-3	9	8	4.5	12.5
LL3-1	10	MAX.	0.012	0.020	1.5	5.99	R-3	9	4	2.5	4.1
LL3-2	12	MAX.	0.012	0.020	1.5	5.94	R-3	9	4	3	4.6
C-2	18	MIN.	0.012	0.0107	11.02	7.59	R-4	18	10	4.5	14.5
LL4-1	10	MAX.	0.012	0.0050	1.5	3.49	R-3	9	5	2.5	4.1
LL4-2	12	MAX.	0.012	0.0294	1.5	6.83	R-3	9	4	3	4.6
C2-3	15	MAX.	0.012	0.020	3.64	7.46	R-4	18	6	3.75	6.15
D-3	18	MIN.	0.012	0.011	11.58	7.72	R-4	18	10	4.5	14.5
C2-1	15	MAX.	0.012	0.0114	3.64	6.06	R-4	18	6	3.75	6.15
E-2	18	MIN.	0.012	0.0135	13.18	11.27	R-4	18	12	4.5	16.5
LL5-1	12	MAX.	0.012	0.020	2.99	7.12	R-4	18	4	3	4.6
LL6-2	12	MAX.	0.012	0.020	1.5	5.94	R-3	9	4	3	4.6
LL6-3	10	MAX.	0.012	0.020	1.5	5.99	R-3	9	4	2.5	4.1
F-2	10	MAX.	0.012	0.0062	1.86	3.92	R-3	9	4	2.5	4.1
G-2	18	MIN.	0.012	0.0140	9.67	8.31	R-4	18	8	4.5	12.5

***The anticipated velocity (V) should not exceed the maximum permissible shown in Table 6.6 for the proposed riprap protection. Adjust for less than full pipe flow. Use Manning's equation to calculate velocity for pipe slopes $\geq$ 0.05 ft/ft.**

FES A-2
Use R-4

FIGURE 9.3
Riprap Apron Design, Minimum Tailwater Condition



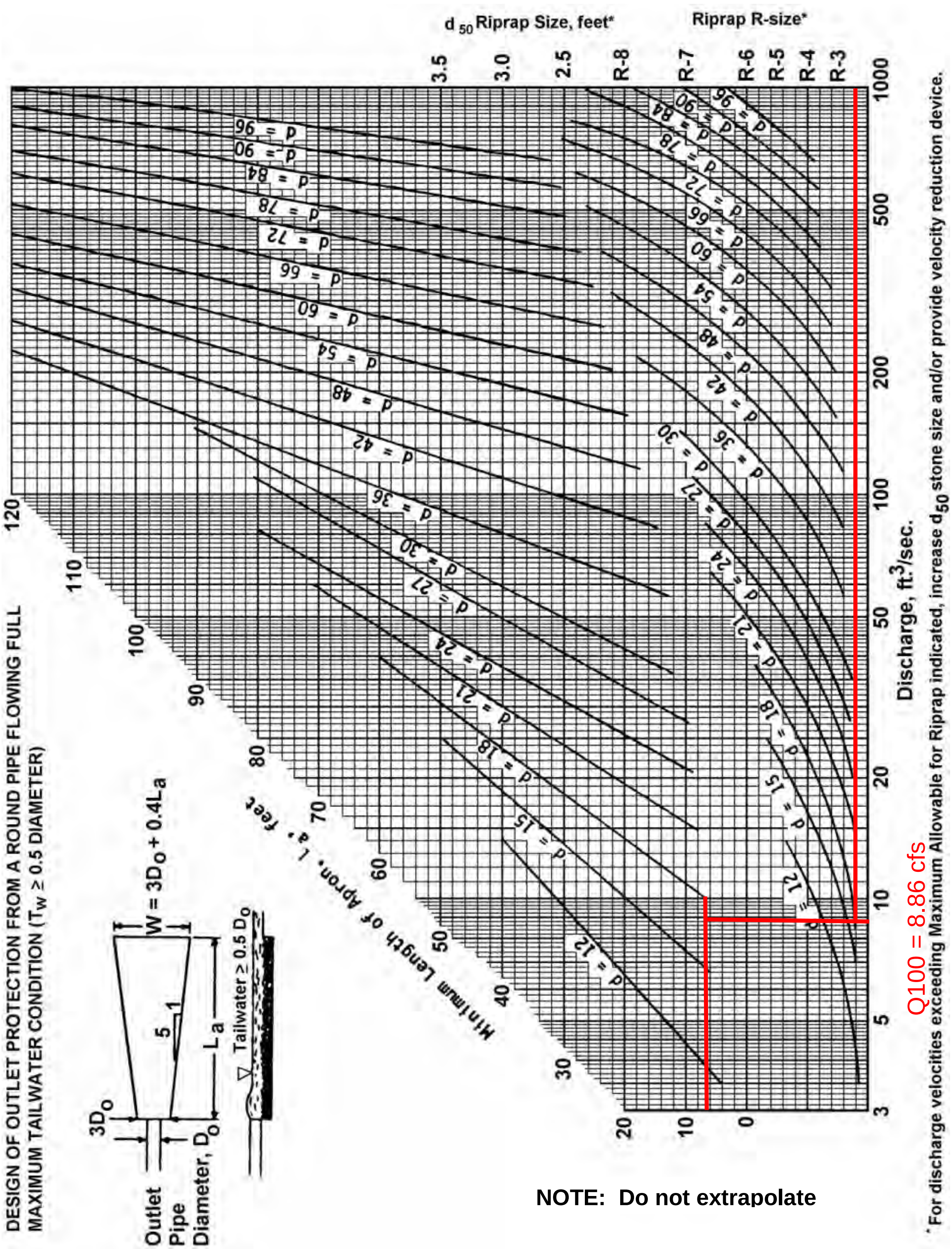
NOTE: Do not extrapolate

Adapted from USDA - NRCS

Not to be used for Box Culverts

FES C1-1
Use R-3

FIGURE 9.4
Riprap Apron Design, Maximum Tailwater Condition

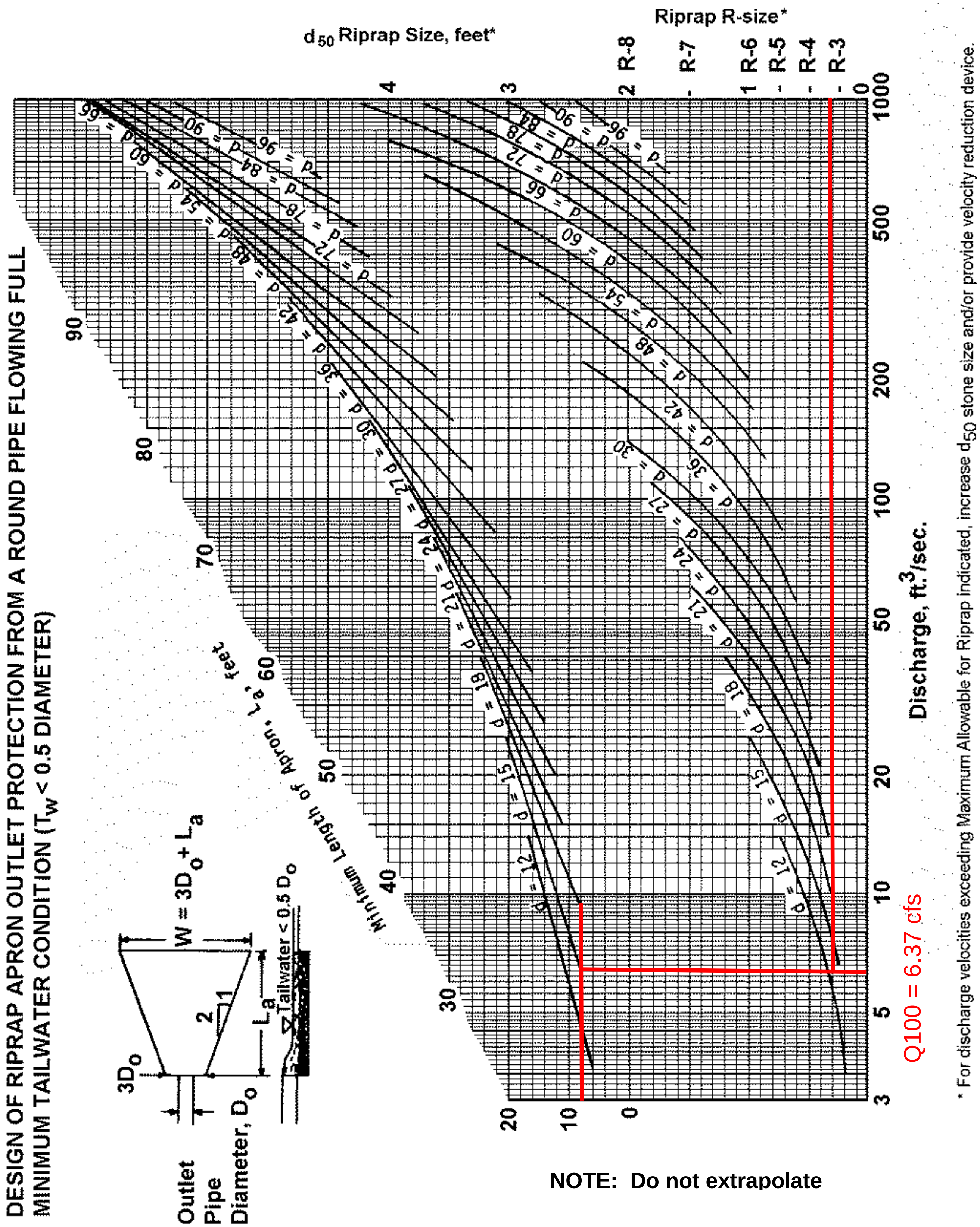


Adapted from USDA - NRCS

Not to be used for Box Culverts

FES B-2
Use R-4

FIGURE 9.3
Riprap Apron Design, Minimum Tailwater Condition



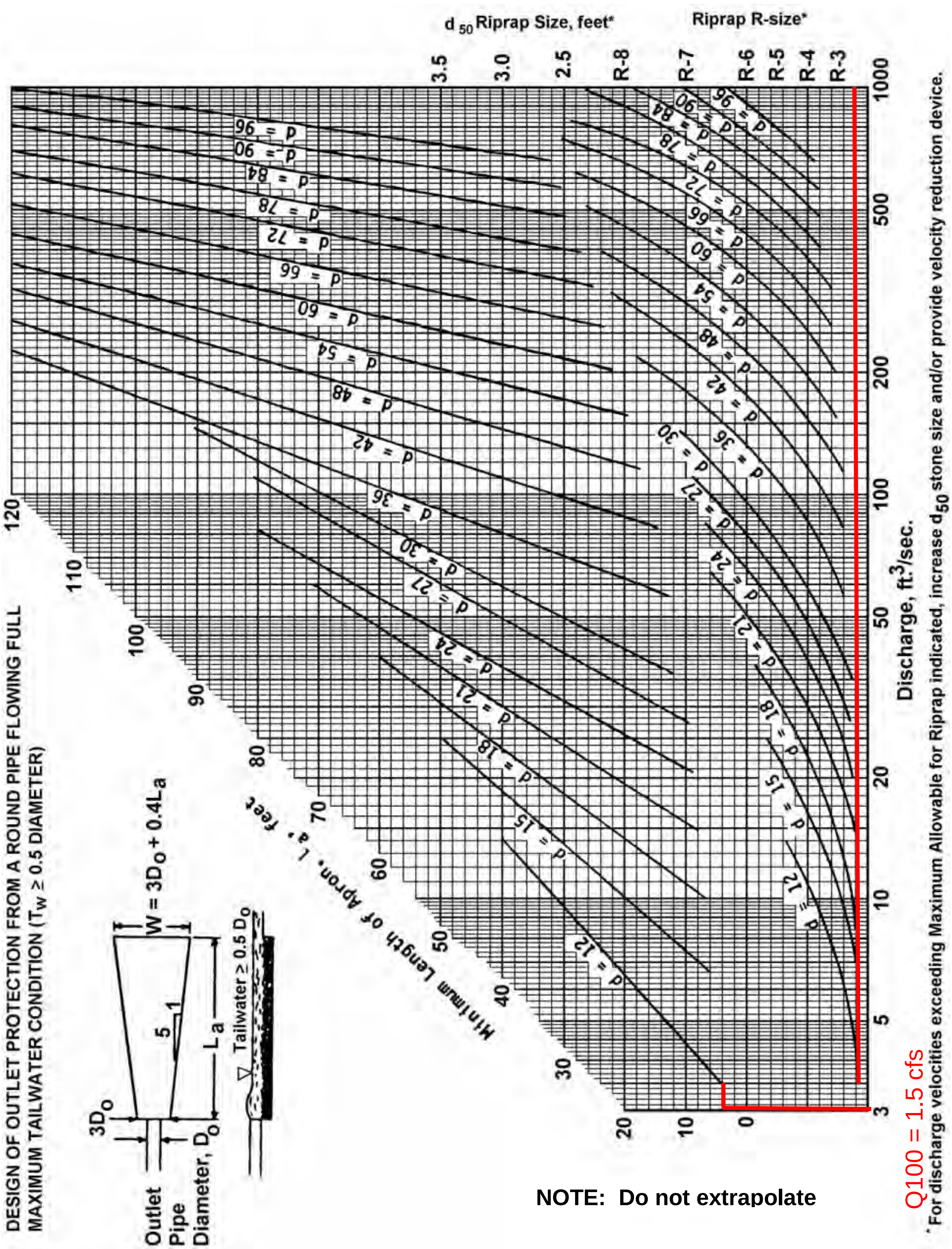
NOTE: Do not extrapolate

Adapted from USDA - NRCS

Not to be used for Box Culverts

LL3-1
Use R-3

FIGURE 9.4
Riprap Apron Design, Maximum Tailwater Condition

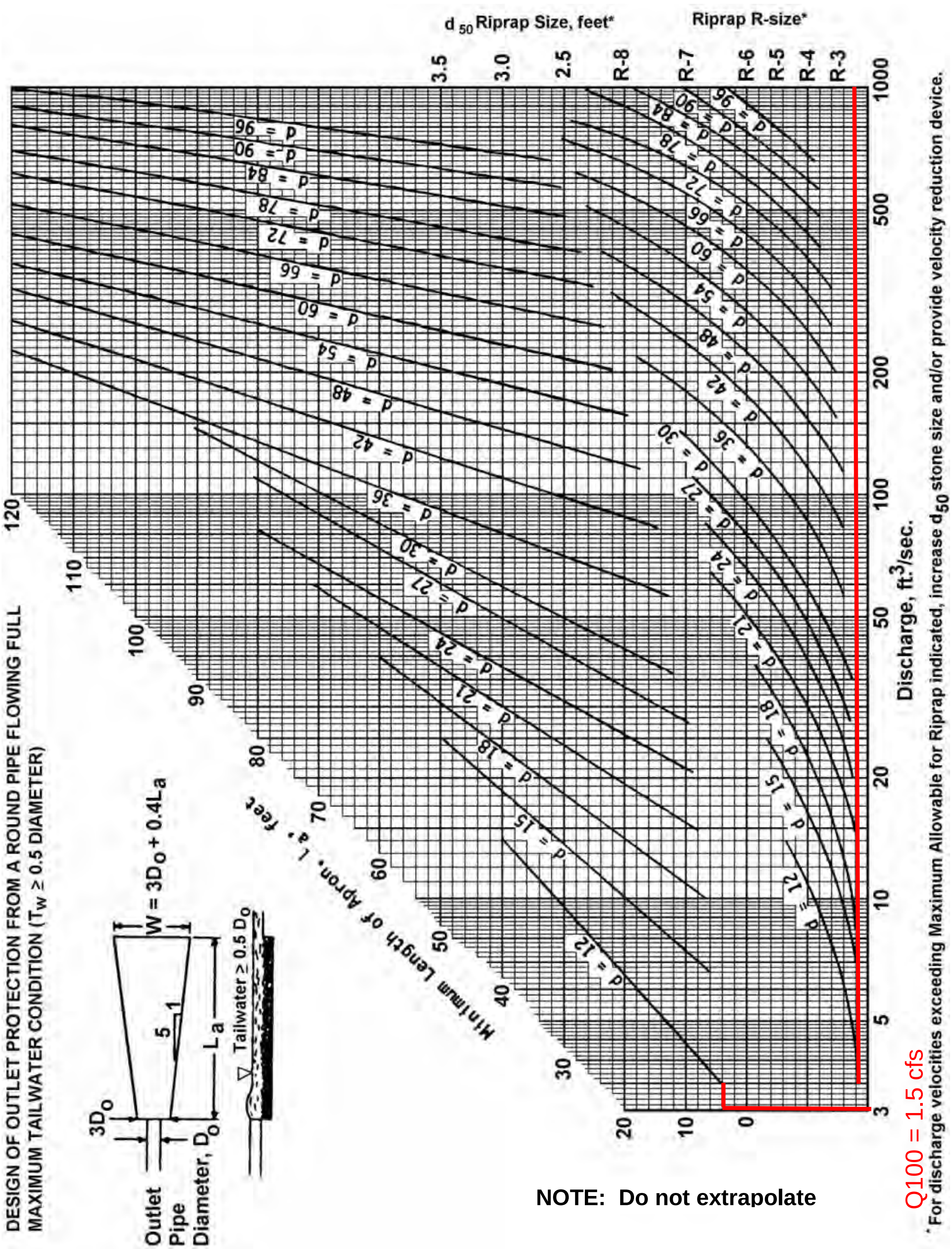


Adapted from USDA - NRCS

Not to be used for Box Culverts

LL3-2
Use R-3

FIGURE 9.4
Riprap Apron Design, Maximum Tailwater Condition

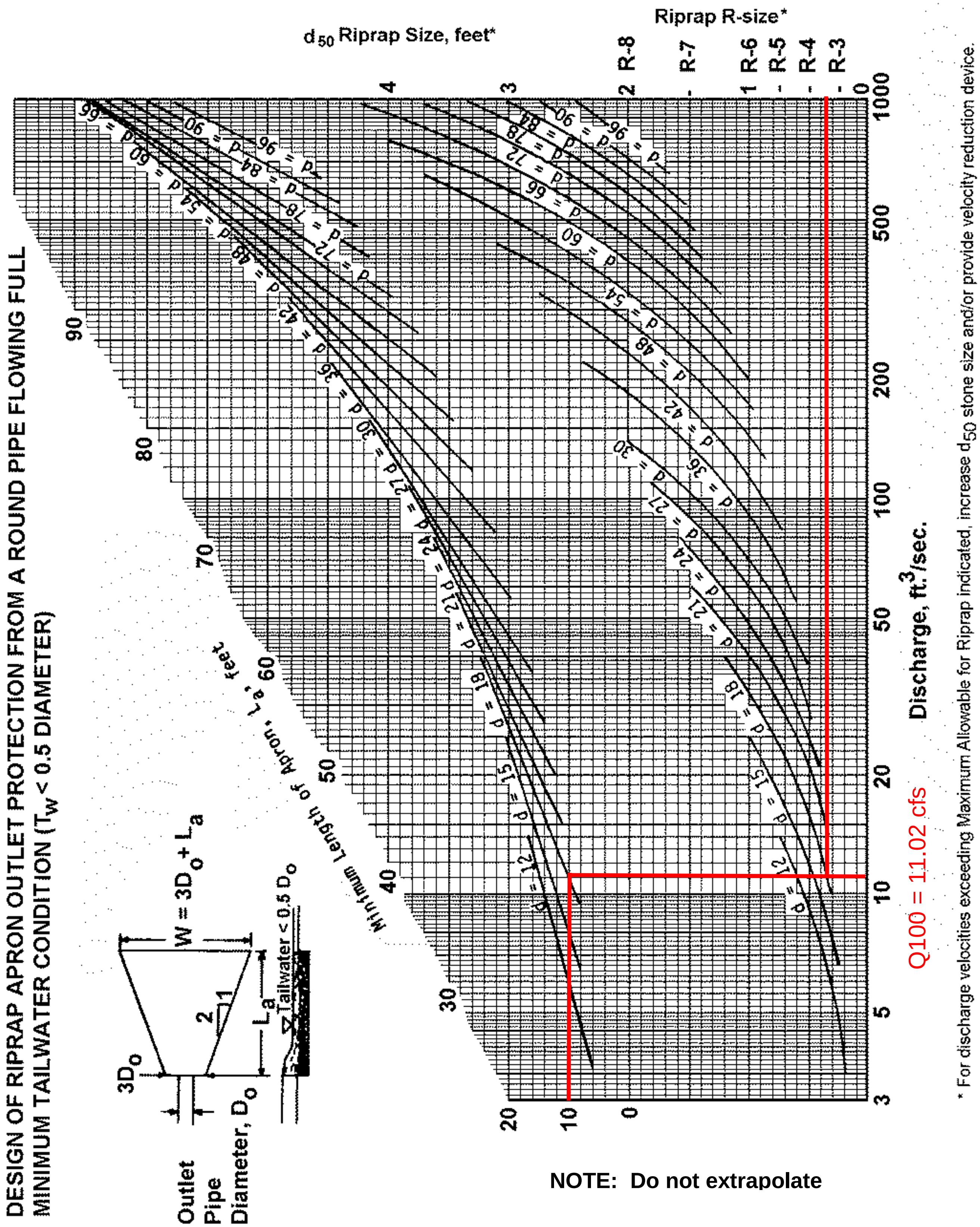


Adapted from USDA - NRCS

Not to be used for Box Culverts

FES C-2
Use R-4

FIGURE 9.3
Riprap Apron Design, Minimum Tailwater Condition

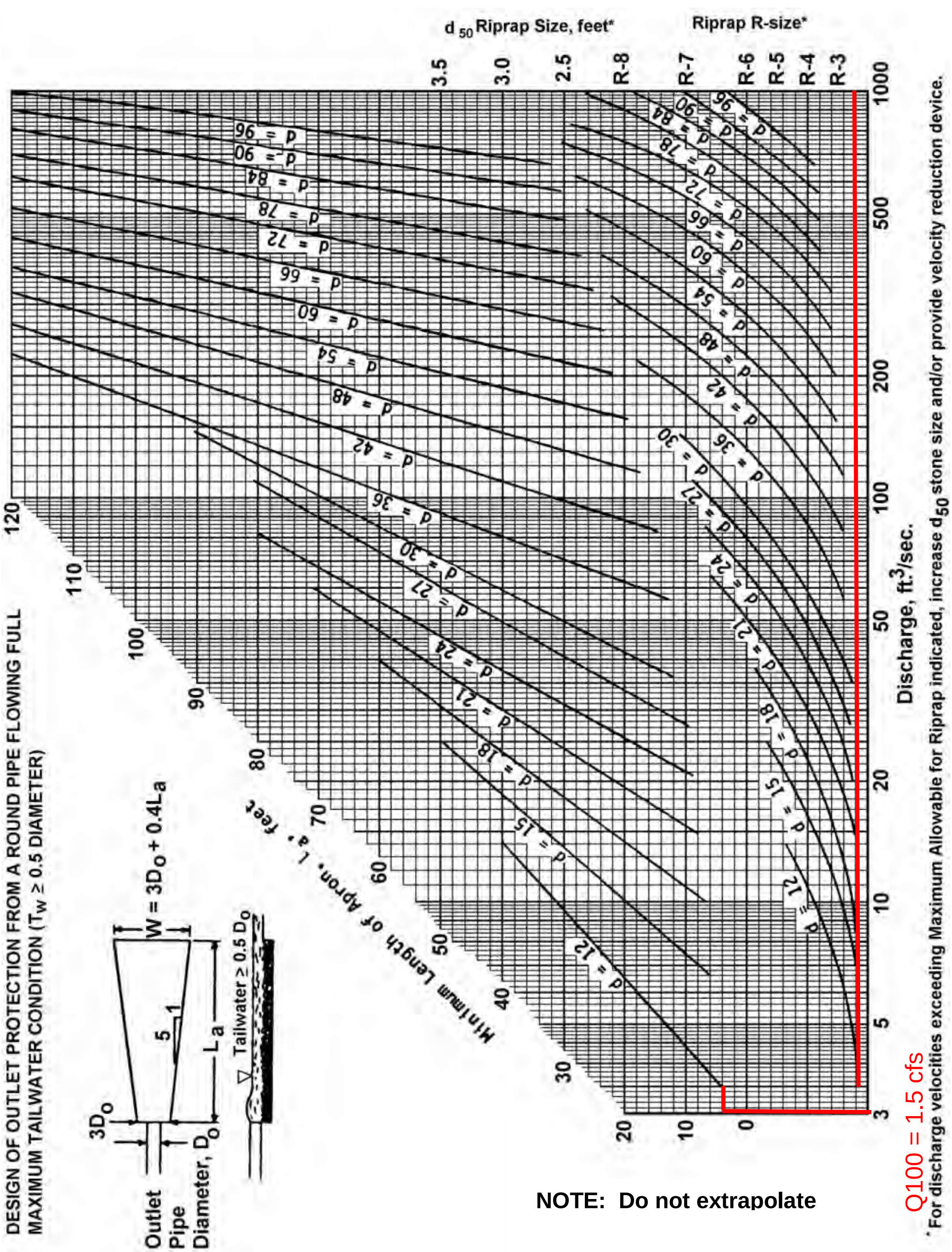


Adapted from USDA - NRCS

Not to be used for Box Culverts

LL4-1
Use R-3

FIGURE 9.4
Riprap Apron Design, Maximum Tailwater Condition

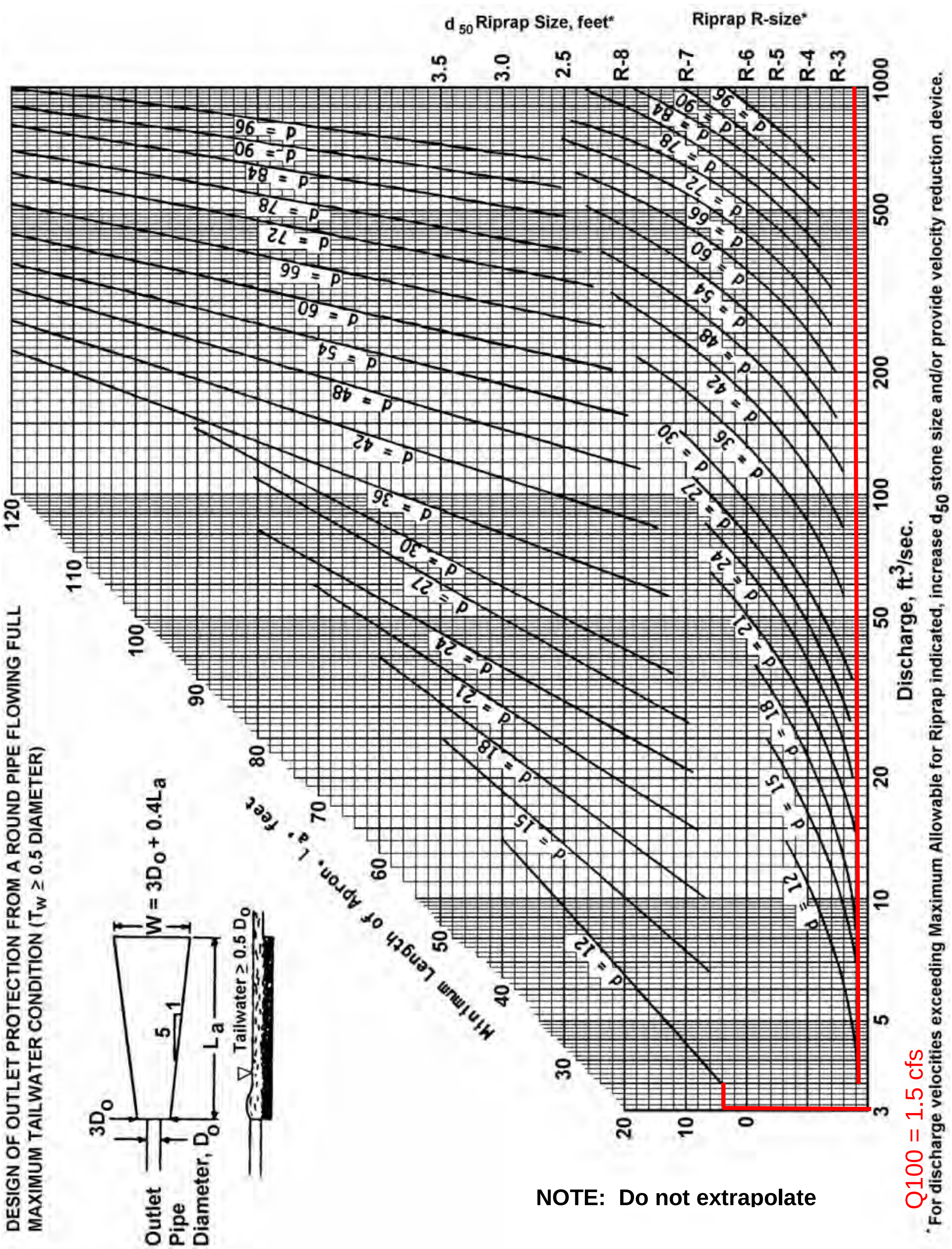


Adapted from USDA - NRCS

Not to be used for Box Culverts

LL4-2
Use R-3

FIGURE 9.4
Riprap Apron Design, Maximum Tailwater Condition

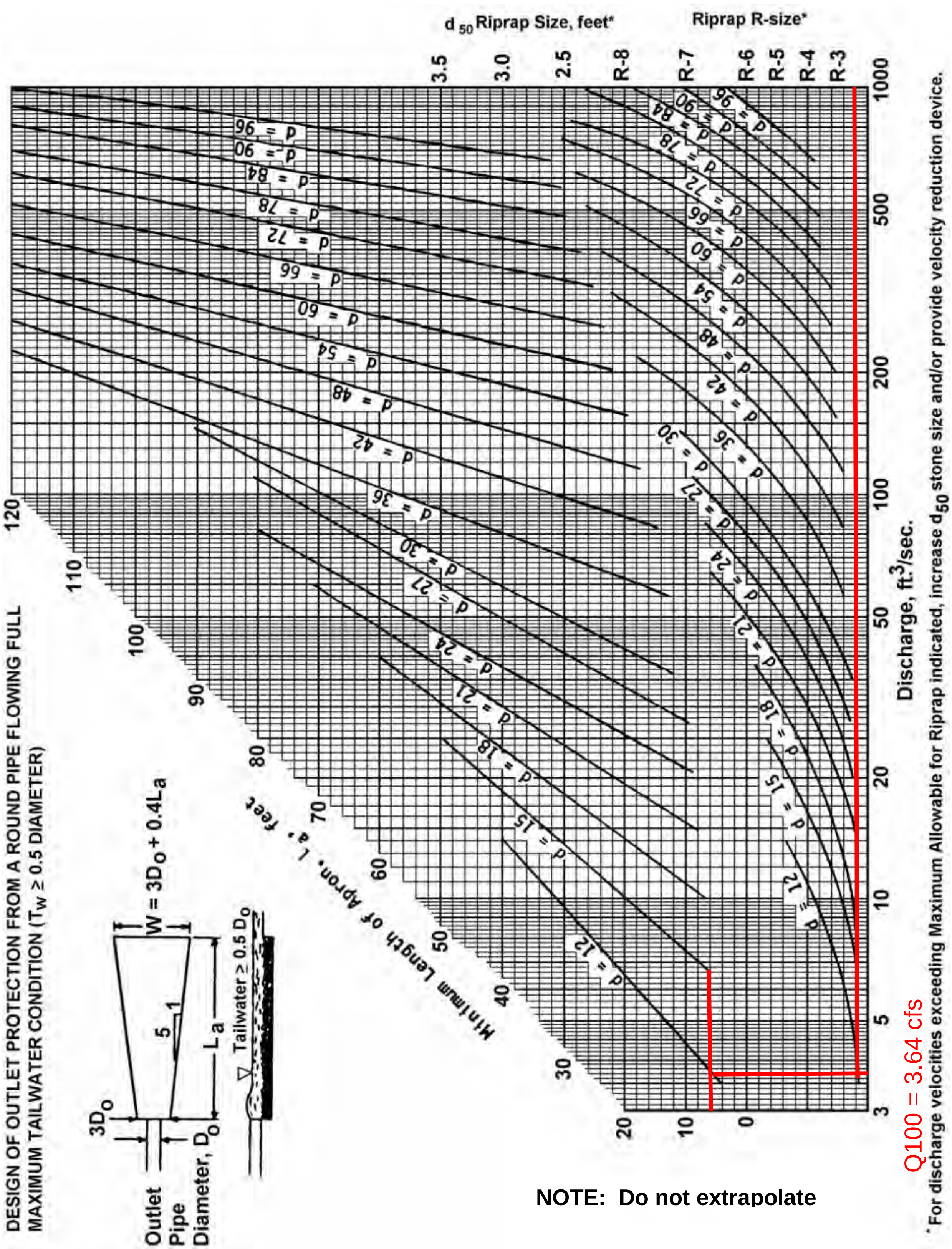


Adapted from USDA - NRCS

Not to be used for Box Culverts

C2-3
Use R-4

FIGURE 9.4
Riprap Apron Design, Maximum Tailwater Condition

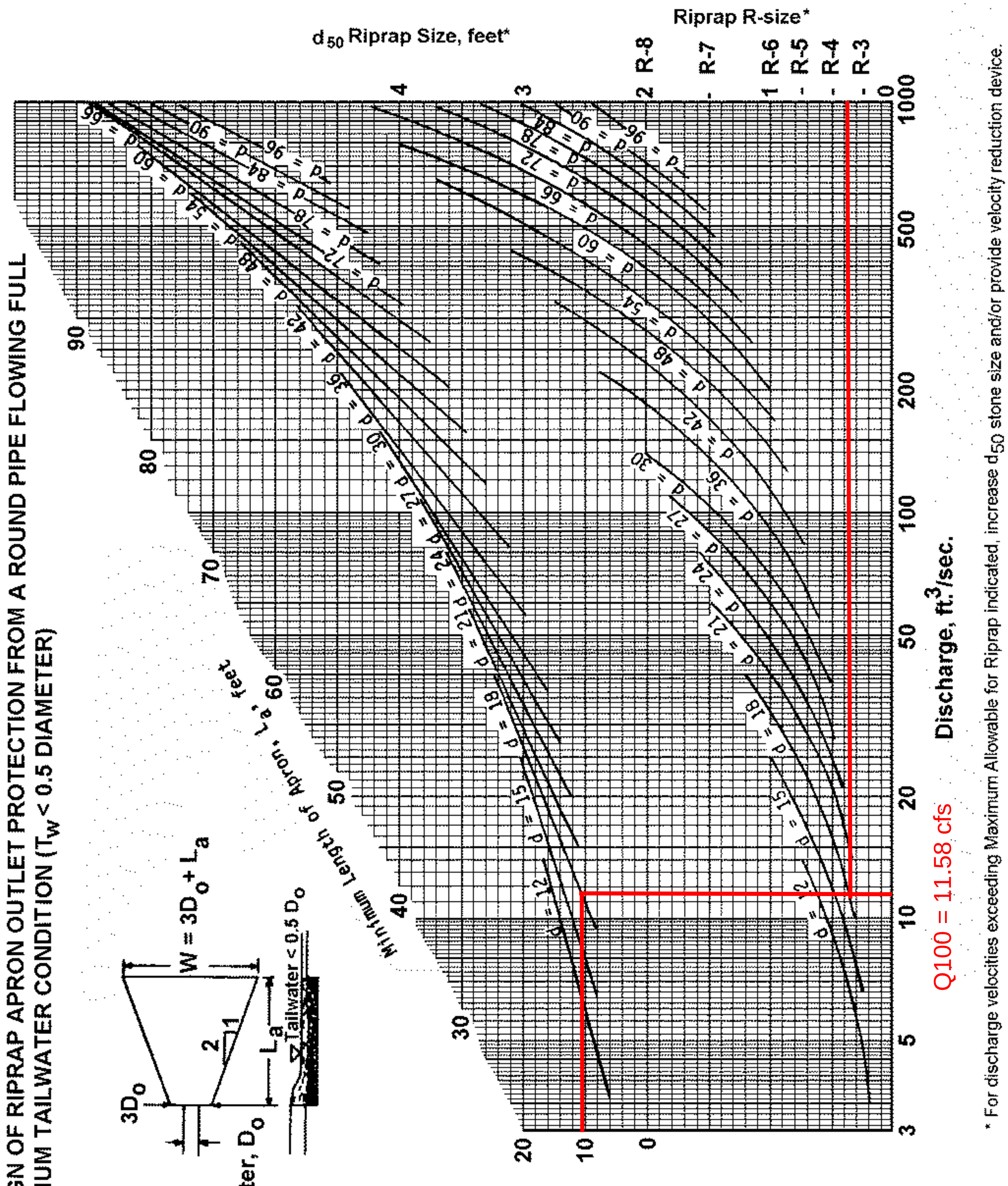


Adapted from USDA - NRCS

Not to be used for Box Culverts

FES D-3
Use R-4

FIGURE 9.3
Riprap Apron Design, Minimum Tailwater Condition



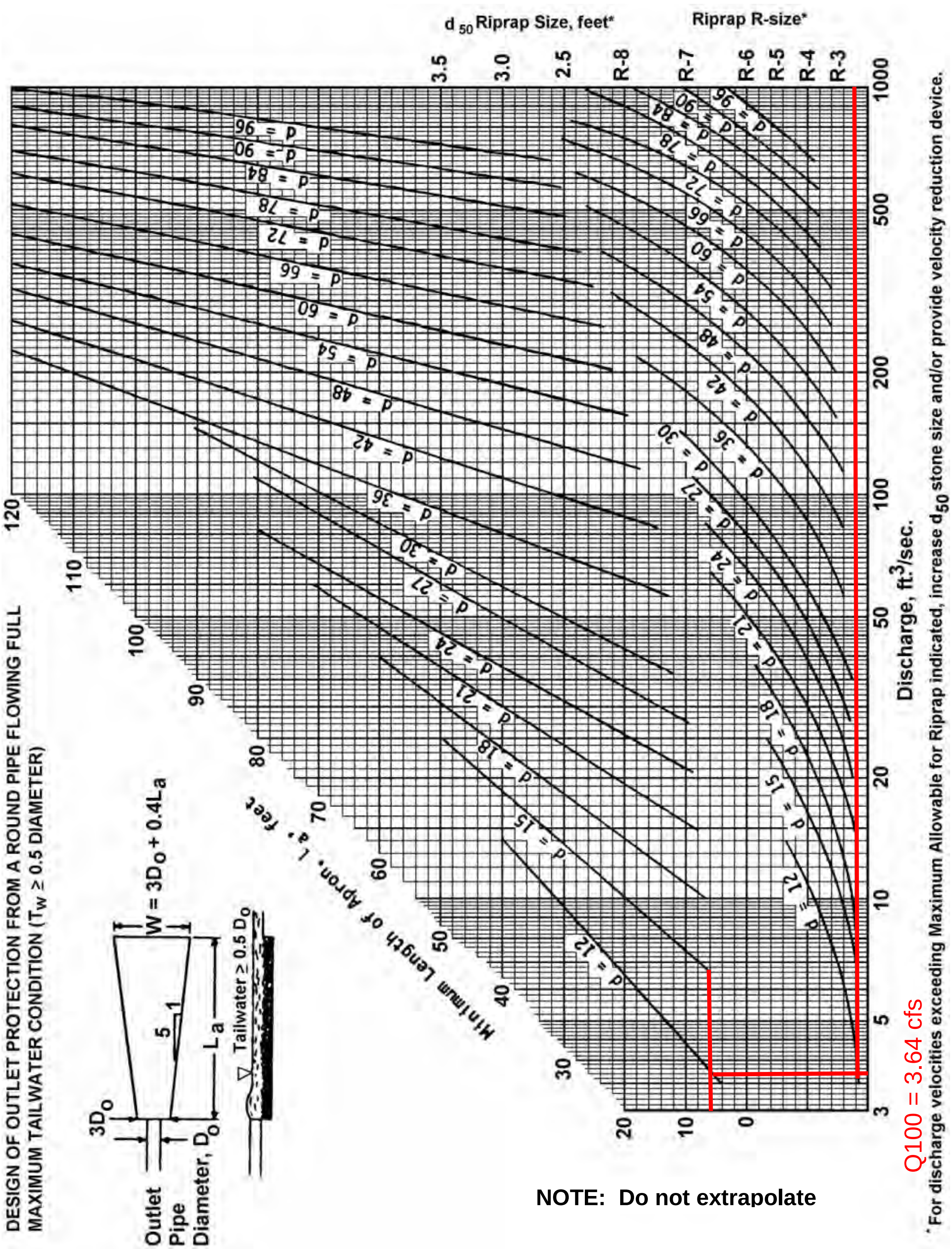
NOTE: Do not extrapolate

Adapted from USDA - NRCS

Not to be used for Box Culverts

C2-1
Use R-4

FIGURE 9.4
Riprap Apron Design, Maximum Tailwater Condition

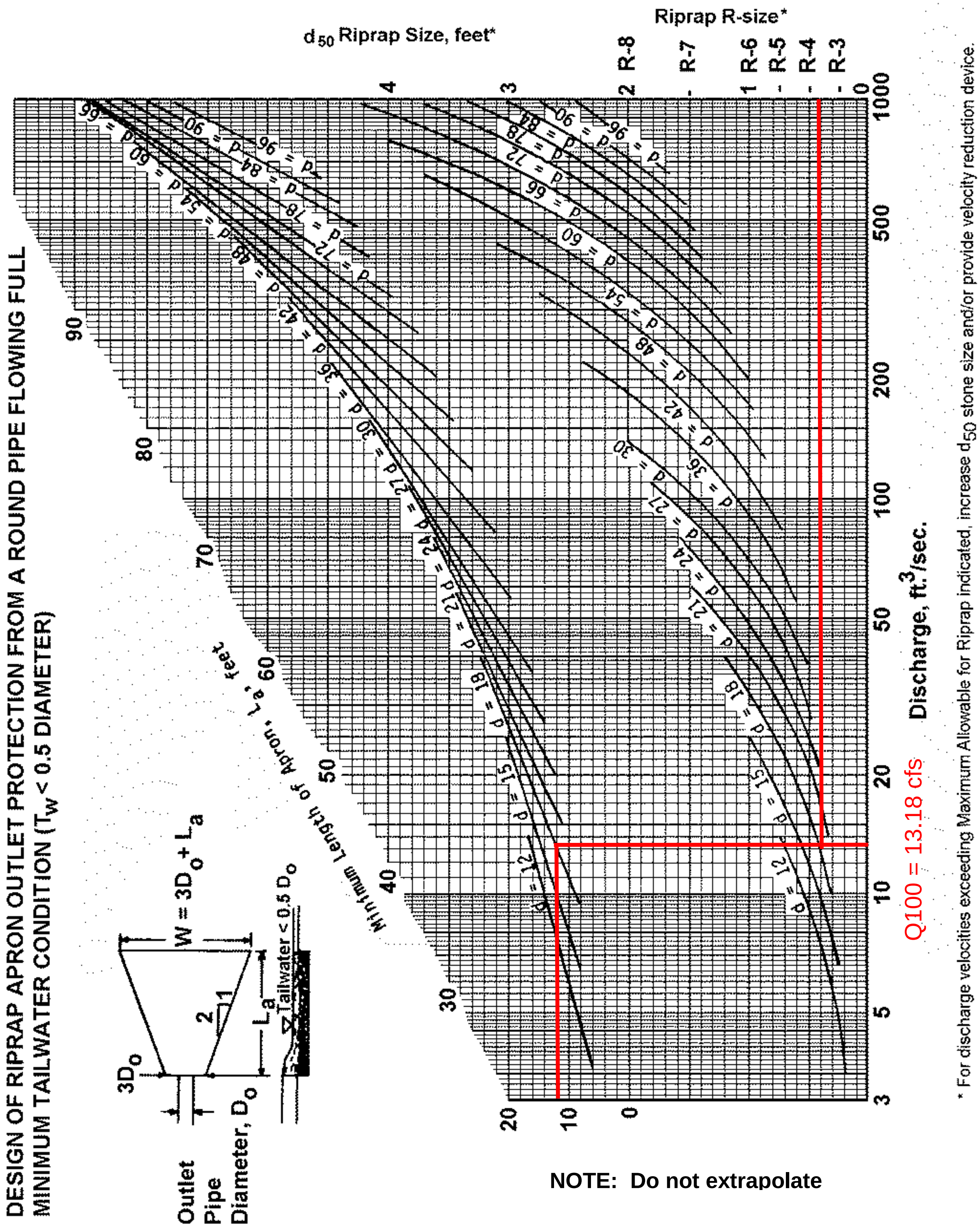


Adapted from USDA - NRCS

Not to be used for Box Culverts

FES E-2
Use R-4

FIGURE 9.3
Riprap Apron Design, Minimum Tailwater Condition

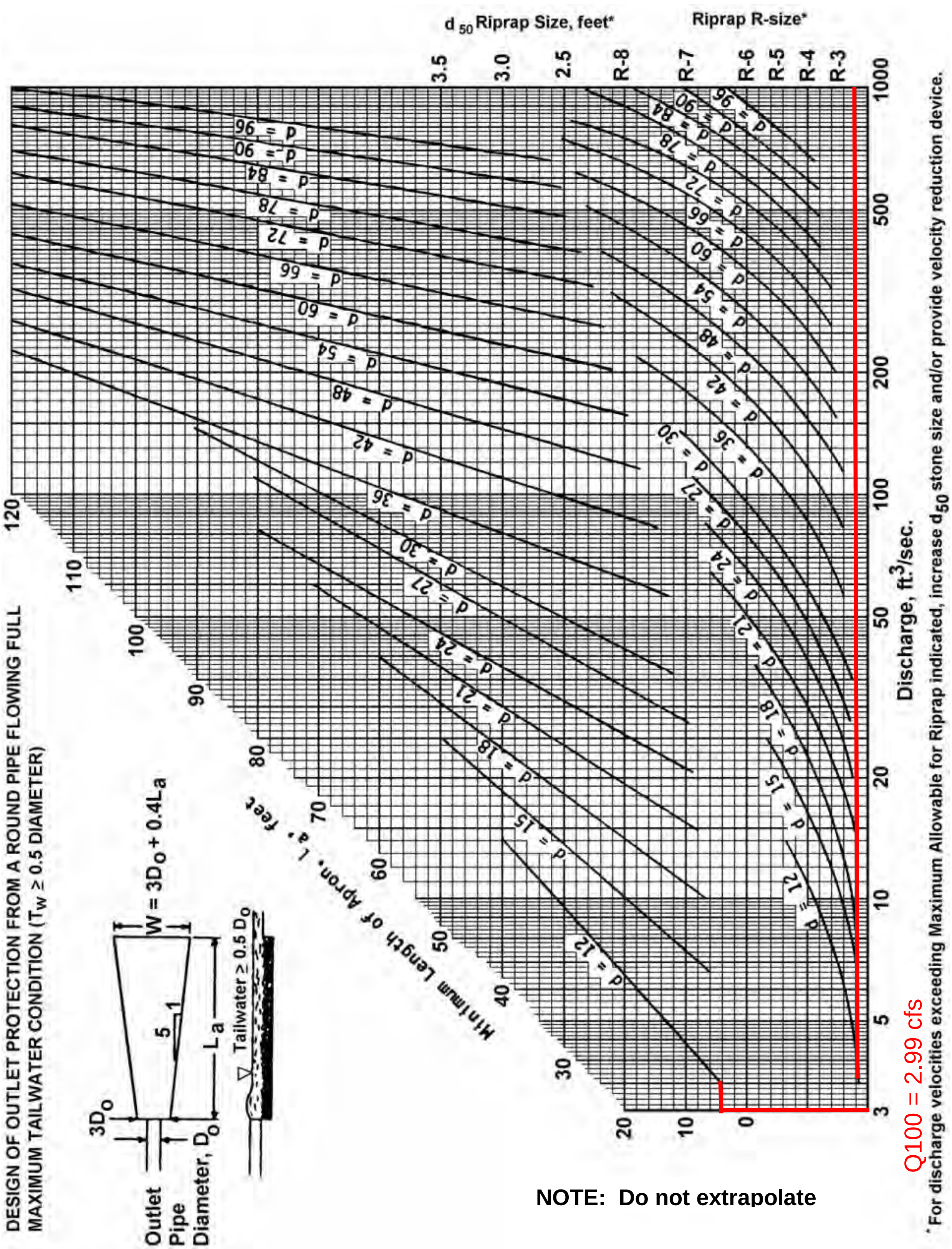


Adapted from USDA - NRCS

Not to be used for Box Culverts

LL5-1
Use R-4

FIGURE 9.4
Riprap Apron Design, Maximum Tailwater Condition

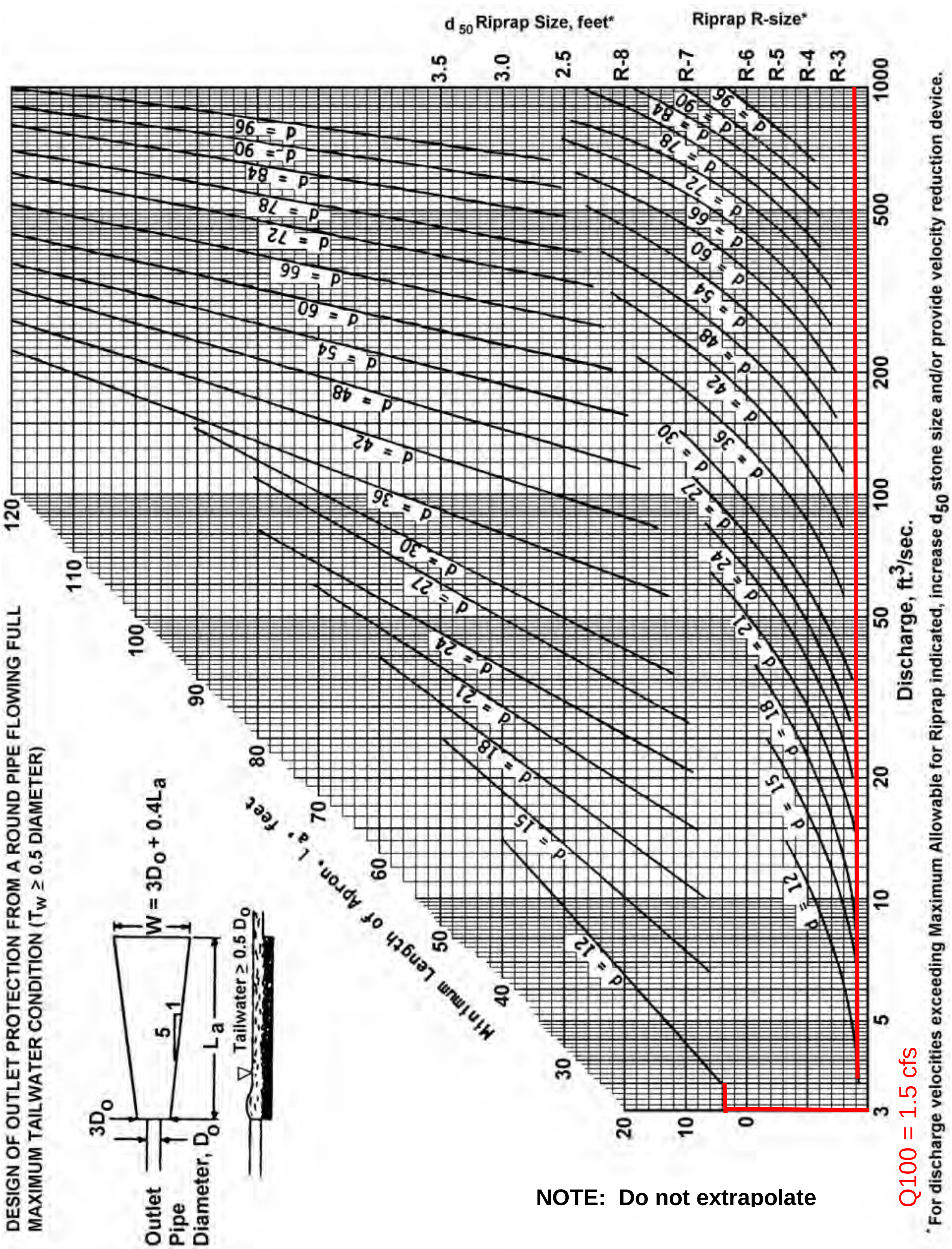


Adapted from USDA - NRCS

Not to be used for Box Culverts

LL6-2
Use R-3

FIGURE 9.4
Riprap Apron Design, Maximum Tailwater Condition

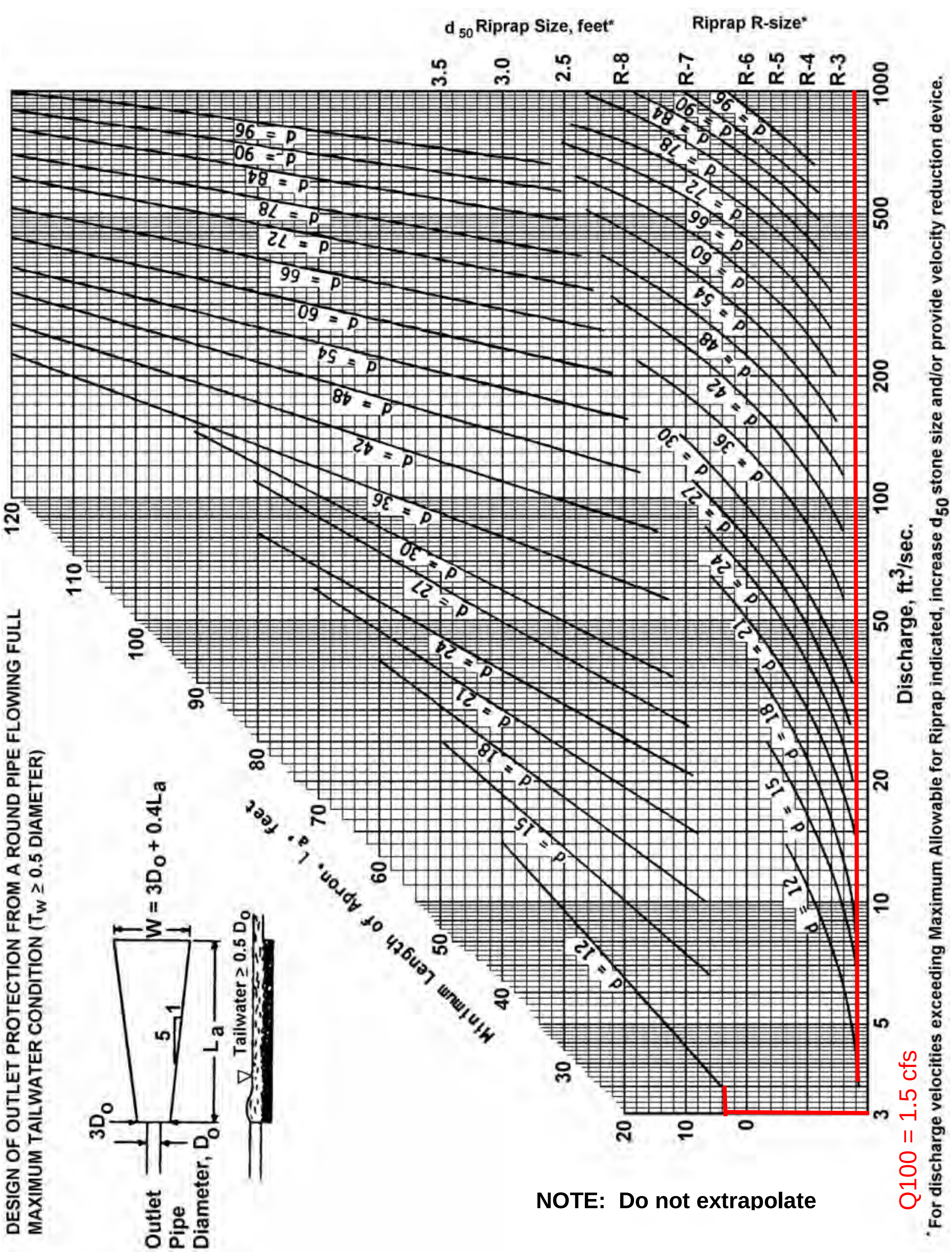


Adapted from USDA - NRCS

Not to be used for Box Culverts

LL6-3
Use R-3

FIGURE 9.4
Riprap Apron Design, Maximum Tailwater Condition

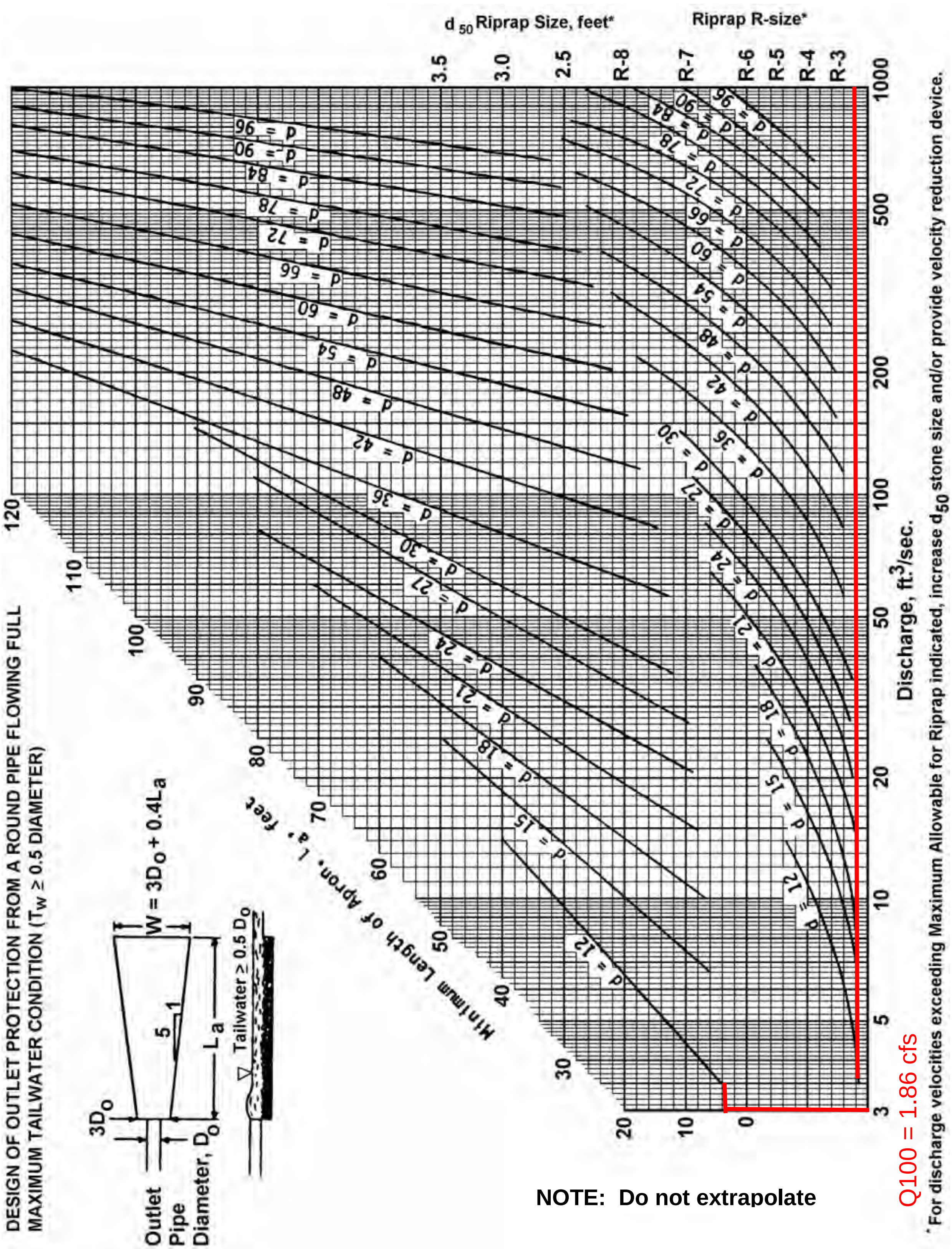


Adapted from USDA - NRCS

Not to be used for Box Culverts

F-2
Use R-3

FIGURE 9.4
Riprap Apron Design, Maximum Tailwater Condition

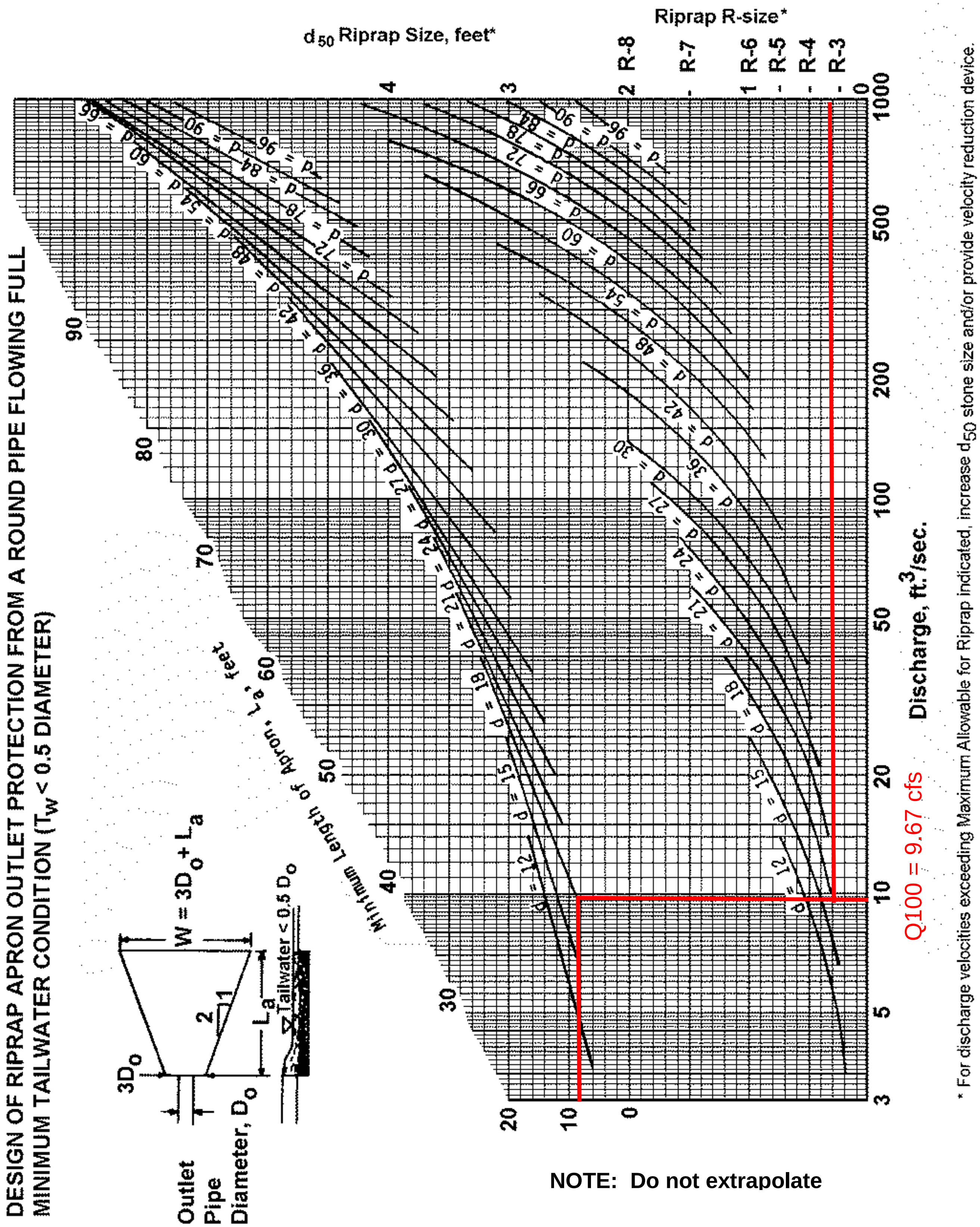


Adapted from USDA - NRCS

Not to be used for Box Culverts

FES G-2
Use R-4

FIGURE 9.3
Riprap Apron Design, Minimum Tailwater Condition



NOTE: Do not extrapolate

Adapted from USDA - NRCS

Not to be used for Box Culverts

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF CLEAN WATER

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) DISCHARGES OF STORMWATER ASSOCIATED WITH CONSTRUCTION ACTIVITIES POST-CONSTRUCTION STORMWATER MANAGEMENT (PCSM) MODULE 2

Applicant: **Williamsport Ballpark, Inc.** Project Site Name: **Former Susquehanna Supply Property**

Surface Water Name(s): **UNT Susquehanna River** Surface Water Use(s): **WWF**

PCSM PLAN INFORMATION

1. Identify all structural and non-structural PCSM BMPs that have been selected and provide the information requested.

Discharge Point(s)	BMP ID	BMP Name	BMP Manual	Latitude	Longitude	DA Treated (ac)
1	1	Basin A - MRC		41° 14' 00.79"	77° 01' 51.79"	4.28
2	2	Basin B - MRC		41° 13' 59.68"	77° 01' 45.40"	1.62
3	3	Basin C - MRC		41° 13' 58.38"	77° 01' 35.85"	4.21
4	4	Basin D - MRC		41° 13' 51.86"	77° 01' 32.82"	2.20
5	5	Basin E - MRC		41° 13' 52.50"	77° 01' 39.31"	3.30
6	6	Basin F - Detention		41° 13' 55.46"	77° 01' 42.58"	0.57
7	7	Basin G - MRC		41° 13' 54.96"	77° 01' 51.60"	1.67

Undetained Areas: 10.66 acre(s)

☐ The Project Qualifies as a Site Restoration Project (25 Pa. Code §102.8(n))

2. Describe the sequence of PCSM BMP implementation in relation to earth disturbance activities and a schedule of inspections for the critical stages of PCSM BMP installation.

   Install basins after final grades are reach for ballfield subgrades and geotextile and stone have been added to baseball field draining to the facility to ensure no sediment laden runoff enters stormwater facility. The licensed engineer who will be terminating the NPDES permit shall be onsite to inspect the construction of all seven (7) facilities listed above.

3.	☒ Plan drawings have been developed for the project and will be available on-site.
4.	☒ Plan drawings have been developed for the project and are attached to the NOI/application.
5.	☐ Recycling and proper disposal of materials associated with PCSM BMPs are addressed as part of long-term operation and maintenance of the PCSM BMPs.
6.	Identify naturally occurring geologic formations or soil conditions that may have the potential to cause pollution after earth disturbance activities are completed and PCSM BMPs are operational and the applicant's plan to avoid or minimize potential pollution and its impacts. **This site is on top of an existing landfill. In the event trash is encountered during the installation of these improvements, the removed trash must be disposed of at an approved landfill. A soil cover should be installed over an exposed trash.**
7.	Identify whether the potential exists for thermal impacts to surface waters from post-construction stormwater. If such potential exists, identify BMPs that will be implemented to avoid, minimize, or mitigate potential thermal impacts. **Most thermal impacts occur during the first flush of a rain from impervious areas during the hot summer months. The stormwater management for the site was design such that the impervious areas discharge to lawn or grass areas to help mitigate any temperature increase. Thermal impacts will be mitigated by sheet flowing runoff from impervious areas to vegetated areas adjacent to the impervious area. Rainfall on ballfields will drain through artifical turf and be collected and convey to the appropriate storm facilty via underdrain collector piping. The MRC basins are designed to capture the first flush which is typically the warmest runoff from the site. This vaolume will slowed drain into the soil and discharge via a subsurface orifice. This will help insure the first flush of runoff will be cooled before being discharged.**
8.	☒ The PCSM Plan has been planned, designed, and will be implemented to be consistent with the E&S Plan.
9.	☒ A pre-development site characterization has been performed.

STORMWATER ANALYSIS – RUNOFF VOLUME

Surface Water Name: **UNT to West Branch Susquehanna River** **Discharge Point(s):** **6**

1. ☐ The design standard is based on volume management requirements in an Act 167 Plan approved by DEP within the past five years.
2. ☒ The design standard is based on managing the net change for storms up to and including the 2-year/24-hour storm.
3. ☐ An alternative design standard is being used.
4. ☒ A printout of DEP's PCSM Spreadsheet – Volume Worksheet is attached.
5. 2-Year/24-Hour Storm Event: **2.84** inches Source of precipitation data: **NOAA Atlas 14**
6. Stormwater Runoff Volume, Pre-Construction Conditions: **145,255** CF ☒ Calculations attached
7. Stormwater Runoff Volume, Post-Construction Conditions: **163,369** CF ☒ Calculations attached
8. Net Change (Post-Construction – Pre-Construction Volumes): **18,114** CF
9. Identify all selected structural PCSM BMPs and provide the information requested. ☒ Calculations attached

DP No.	BMP ID	Series	Vol. Routed to BMP (CF)	Inf. Area (SF)	Inf. Rate (in/hr)	Inf. Period (hrs)	Veg?	Media Depth (ft)	Storage Vol. (CF)	Inf. Credit (CF)	ET Credit (CF)
1	1		27,799	12,449	0	0	☒	2	7,154	0	6,548
2	2		9,941	7,785	0	0	☒	2	2,491	0	4,095
3	3		24,568	19,842	0	0	☒	2	5,953	0	10,437
4	4		12,866	13,996	0	0	☒	2	4,199	0	7,362
5	5		20,084	9,885	0	0	☒	2	4,990	0	5,200
6	6		4,070	35	0	0	☒	2	0	0	6
7	7		10,890	6,428	0	0	☒	2	3,472	0	3,381
							☐				
							☐				

Total Infiltration & ET Credits (CF): **37,029**

Non-Structural BMP Volume Credits (CF) (Attach Calculations): **0**

Managed Release Credits (CF) (Attach MRC Design Summary): **69,125**

Volume Required to Reduce/Manage (CF): **18,114**

Total Credits (CF): **106,154**

INFILTRATION INFORMATION	
BMP ID: 1	☐ Soil/geologic test results are attached.
1. No. of infiltration tests completed:	
2. Method(s) used for infiltration testing: **N/A, infiltration not permitted**	
3. Test Pit Identifiers (from PCSM Plan Drawings):	
4. Avg Infiltration Rate: in/hr	5. FOS: : 1
6. Infiltration rate used for design: in/hr	
7. Separation distance between the BMP bottom and bedrock: feet	
8. Separation distance between the BMP bottom and seasonal high-water table: feet	
9. Comments: **Infiltration not permit, use MRC as directed by DEP**	
BMP ID: 2	☐ Soil/geologic test results are attached.
1. No. of infiltration tests completed:	
2. Method(s) used for infiltration testing: **N/A, infiltration not permitted**	
3. Test Pit Identifiers (from PCSM Plan Drawings):	
4. Avg Infiltration Rate: in/hr	5. FOS: : 1
6. Infiltration Rate Used for Design: in/hr	
7. Separation distance between the BMP bottom and bedrock: feet	
8. Separation distance between the BMP bottom and seasonal high-water table: feet	
9. Comments: **Infiltration not permit, use MRC as directed by DEP**	
BMP ID: 3	☐ Soil/geologic test results are attached.
1. No. of infiltration tests completed:	
2. Method(s) used for infiltration testing: **N/A, infiltration not permitted**	
3. Test Pit Identifiers (from PCSM Plan Drawings):	
4. Avg Infiltration Rate: in/hr	5. FOS: : 1
6. Infiltration Rate Used for Design: in/hr	
7. Separation distance between the BMP bottom and bedrock: feet	
8. Separation distance between the BMP bottom and seasonal high-water table: feet	
9. Comments: **Infiltration not permit, use MRC as directed by DEP**	

INFILTRATION INFORMATION	
BMP ID: 4	☐ Soil/geologic test results are attached.
10. No. of infiltration tests completed:	
11. Method(s) used for infiltration testing: **N/A, infiltration not permitted**	
12. Test Pit Identifiers (from PCSM Plan Drawings):	
13. Avg Infiltration Rate: in/hr	14. FOS: : 1
15. Infiltration rate used for design: in/hr	
16. Separation distance between the BMP bottom and bedrock: feet	
17. Separation distance between the BMP bottom and seasonal high-water table: feet	
18. Comments: **Infiltration not permit, use MRC as directed by DEP**	
BMP ID: 5	☐ Soil/geologic test results are attached.
10. No. of infiltration tests completed:	
11. Method(s) used for infiltration testing: **N/A, infiltration not permitted**	
12. Test Pit Identifiers (from PCSM Plan Drawings):	
13. Avg Infiltration Rate: in/hr	14. FOS: : 1
15. Infiltration Rate Used for Design: in/hr	
16. Separation distance between the BMP bottom and bedrock: feet	
17. Separation distance between the BMP bottom and seasonal high-water table: feet	
18. Comments: **Infiltration not permit, use MRC as directed by DEP**	
BMP ID: 6	☐ Soil/geologic test results are attached.
7. No. of infiltration tests completed:	
8. Method(s) used for infiltration testing: **N/A, infiltration not permitted**	
9. Test Pit Identifiers (from PCSM Plan Drawings):	
10. Avg Infiltration Rate: in/hr	11. FOS: : 1
12. Infiltration Rate Used for Design: in/hr	
9. Separation distance between the BMP bottom and bedrock: feet	
10. Separation distance between the BMP bottom and seasonal high-water table: feet	
10. Comments: **Infiltration not permit, use MRC as directed by DEP**	

INFILTRATION INFORMATION	
BMP ID: 7	☐ Soil/geologic test results are attached.
19. No. of infiltration tests completed:	
20. Method(s) used for infiltration testing: **N/A, infiltration not permitted**	
21. Test Pit Identifiers (from PCSM Plan Drawings):	
22. Avg Infiltration Rate: in/hr	23. FOS: : 1
24. Infiltration rate used for design: in/hr	
25. Separation distance between the BMP bottom and bedrock: feet	
26. Separation distance between the BMP bottom and seasonal high-water table: feet	
27. Comments: **Infiltration not permit, use MRC as directed by DEP**	
BMP ID:	☐ Soil/geologic test results are attached.
19. No. of infiltration tests completed:	
20. Method(s) used for infiltration testing:	
21. Test Pit Identifiers (from PCSM Plan Drawings):	
22. Avg Infiltration Rate: in/hr	23. FOS: : 1
24. Infiltration Rate Used for Design: in/hr	
25. Separation distance between the BMP bottom and bedrock: feet	
26. Separation distance between the BMP bottom and seasonal high-water table: feet	
27. Comments:	
BMP ID:	☐ Soil/geologic test results are attached.
13. No. of infiltration tests completed:	
14. Method(s) used for infiltration testing:	
15. Test Pit Identifiers (from PCSM Plan Drawings):	
16. Avg Infiltration Rate: in/hr	17. FOS: : 1
18. Infiltration Rate Used for Design: in/hr	
11. Separation distance between the BMP bottom and bedrock: feet	
12. Separation distance between the BMP bottom and seasonal high-water table: feet	
11. Comments:	

STORMWATER ANALYSIS – PEAK RATE

Surface Water Name: UNT to West Branch Susquehanna River **Discharge Point(s):** 6

1. ☐ The design standard is based on rate requirements in an Act 167 Plan approved by DEP within the past five years.
2. ☒ The design standard is based on managing the net change for 2-, 10-, 50-, and 100-year/24-hour storms.
3. ☐ An alternative design standard is being used.
4. ☒ A printout of DEP's PCSM Spreadsheet – Rate Worksheet is attached.
5. ☐ Alternative rate calculations are attached.
6. Identify precipitation amounts. Source of precipitation data: NOAA Altas 14

2-Year/24-Hour Storm: 2.84 10-Year/24-Hour Storm 4.09

50-Year/24-Hour Storm: 5.82 100-Year/24-Hour Storm 6.77

7. Report peak discharge rates, pre- and post-construction (without BMPs), based on a time of concentration analysis.

Design Storm	Pre-Construction Peak Rate (cfs)	Post-Construction Peak Rate (cfs)	Difference (cfs)
2-Year/24-Hour	61.51	51.25	-10.26
10-Year/24-Hour	111.89	91.46	-20.43
50-Year/24-Hour	185.27	149.03	-36.24
100-Year/24-Hour	226.19	181.04	-45.15

8. Identify all BMPs used to mitigate peak rate differences and provide the requested information.

BMP ID	Inflow to BMP (cfs)				Outflow from BMP (cfs)			
	2-Yr	10-Yr	50-Yr	100-Yr	2-Yr	10-Yr	50-Yr	100-Yr
1	11.81	19.19	29.39	34.95	1.30	2.37	7.67	15.02
2	4.37	7.24	11.24	13.42	0.39	1.13	3.36	6.37
3	6.81	11.68	18.56	22.34	0.38	0.77	6.28	11.02
4	5.40	9.15	14.40	17.28	0.41	3.18	8.72	11.58
5	5.42	9.13	14.35	17.21	0.50	3.29	10.71	13.18
6	1.55	2.50	3.80	4.51	1.03	1.64	1.78	1.85
7	4.45	7.46	10.85	12.71	0.28	1.51	7.32	10.23

9. Report peak rates for pre-construction and post-construction with BMPs and identify the differences.

Design Storm	Pre-Construction Peak Rate (cfs)	Post-Construction Peak Rate (with BMPs) (cfs)	Difference (cfs)
2-Year/24-Hour	61.51	25.14	-36.37
10-Year/24-Hour	111.89	51.48	-60.41
50-Year/24-Hour	185.27	93.49	-91.78
100-Year/24-Hour	226.19	132.69	-93.50

STORMWATER ANALYSIS – WATER QUALITY

☒ A printout of DEP's PCSM Spreadsheet – Quality Worksheet is attached for all surface waters receiving discharges.

LONG-TERM O&M

Describe the long-term operation and maintenance (O&M) requirements for each selected PCSM BMP.

BMP ID	O&M Requirements
1	**Inspect after each rainfall event greater than 1/4"**
2	**Inspect after each rainfall event greater than 1/4"**
3	**Inspect after each rainfall event greater than 1/4"**
4	**Inspect after each rainfall event greater than 1/4"**
5	**Inspect after each rainfall event greater than 1/4"**
6	**Inspect after each rainfall event greater than 1/4"**
7	**Inspect after each rainfall event greater than 1/4"**

PCSM PLAN DEVELOPER

☒ I am trained and experienced in PCSM methods. ☒ I am a licensed professional.

Name:	**Robert E. Myers**	Title:	**Project Manager**
Company:	**Hawbaker Engineering, LLC**	Phone No.:	**(814) 272-0786**
Address:	**1952 Waddle Road, Suite 201**	Email:	**rem2@hawbakerengineering.com**
City, State, ZIP:	**State College, PA 16803**	License No.:	**PE075926**
License Type:	**Professional Engineer**	Exp. Date	**09/30/2021**

Robt E Myers

PCSM Plan Developer Signature

March 5, 2021

Date

POST-CONSTRUCTION STORMWATER MANAGEMENT REPORT

SYNTHETIC SPORTS FIELDS COMPLEX

FOR

WILLIAMSPORT BALLPARK, INC.

CITY OF WILLIAMSPORT
LYCOMING COUNTY
PENNSYLVANIA

MARCH 17, 2021
REVISED AUGUST 4, 2021

HAWBAKER ENGINEERING

1952 WADDLE ROAD, SUITE 201
STATE COLLEGE, PA 16803

WWW.HAWBAKERENGINEERING.COM
1 (800) 284-8590

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NARRATIVE

POST-CONSTRUCTION STORMWATER MANAGEMENT PLAN

SYNTHETIC SPORTS FIELDS COMPLEX
WILLIAMSPORT BALLPARK INC.
WILLIAMSPORT, PA

Introduction

This plan and narrative addresses Post-Construction Stormwater Management associated with the construction of a new Synthetic Sports Field Complex that is being constructed by Williamsport Ballpark, Inc. with associated access, parking, utilities, and stormwater management facilities. The site is located at former Susquehanna Supply property along the northern side of SR 180 in the City of Williamsport, Lycoming County. The total area of disturbance is 28.51 acres and therefore will require an NPDES permit.

Receiving Waters

The receiving watercourses of this project are unnamed tributaries to the West Branch Susquehanna River which is classified as a Warm Water Fishery (WWF) in the Pennsylvania Code Title 25, Chapter 93 "Water Quality Standards". Since this project is being constructed on top of a former landfill, it has been determined that an Individual NPDES Permit will be required in lieu of a General NDPES Permit.

Soils

The soil types and extents shown on the plan are shown per the United State Department of Agriculture, Natural Resources Conservation Services' Web Soil Survey. A brief description is as follows:

Ur – Urban land

There is no hydrologic soil group listed for this soil. There is not Kw factor listed for this soil. Detailed descriptions of these soil complexes can be found in the soil survey.

The site is underlain by an existing landfill. The project intends to leave the garbage in place with a soil cap to remain over the trash to the greatest extent possible. In the event trash is disturbed, the trash will be loaded onto trucks and disposed of at an approved landfill. If these steps are followed, pollution during construction will be limited provided that erosion and sedimentation controls have been properly installed and maintained as indicated in this narrative and on the plans.

Soil limitations:

Soil Name	Cutbanks Cave	Corrosive to Concrete/Steel	Droughty	Easily Erodible	Flooding	Depth to saturated zone/seasonal high water table	Hydric/Hydric Inclusions	Low Strength / Landslide Prone	Slow Percolation	Piping	Poor Source of Topsoil	Frost Action	Shrink-Swell	Potential Sinkhole	Ponding	Wetness
Urban**																

** No soil limitations were indicated for this soil classification; however the following items are listed in case these conditions exist during construction.

Cutbanks Cave – Appropriate precautions shall be taken to safeguard workers during trenching and excavation operations. All applicable OSHA standards and regulations shall be implemented.

Corrosive to Concrete – All underground piping shall be HDPE or coated conduit.

Droughty – Mix compost with topsoil to improve moisture holding ability in lawn areas.

Easily Erodible – Limit the duration that exposed earth is not stabilized. Use silt sock and seeding to minimize erosion.

Depth to saturated zone/seasonal high water – It should be assumed that excavations will encounter water and appropriate means shall be provided to handle such water as determined necessary by the engineer. Provide trench plugs in utility trenches to prevent water migration along pipe lines. Provide underdrains around building foundations in these zones.

Hydric/Hydric Inclusions – Possible means of lowering the water table shall be sought if necessary by installing drains around and below building foundations of any newly constructed buildings.

Low Strength/Landslide Prone – Obtain Geotechnical testing results for areas of significant cut or steep slopes.

Slow Percolation – Spread stormwater out to minimize depth in infiltration facilities.

Piping – Anti-seep collars shall be installed on pipes which are subject to high volumes and high rates of flow as determined by the engineer.

Topsoil – Soil testing is strongly recommended to determine the proper application of soil amendments to promote the growth of the desired vegetation.

Frost Action – Precautions shall be set in place to prevent damage to soils from frost, especially soils which serve as the base to a roadway.

Sinkhole – Avoid concentrating stormwater storage above limestone soils with minimal soil coverage.

Wetness – Direct stormwater runoff away from areas of wetness to allow areas to dry if construction in the area is required and wetness is not the result of a wetland. Provide foundation drains to convey areas of wetness away from the foundation.

Existing Conditions

The existing topographic features are shown on the Grading & PCSM and/or Soil Erosion & Sedimentation Control Plan. Mapping and contours are based on existing information provided by a field survey conducted by Hawbaker Engineering, LLC.

The existing property consists of the former Susquehanna Supply site which contains the following:

- Buildings
- Concrete slabs from previously removed buildings
- Gravel, etc.
- Previous aerial images indicate that the entire Susquehanna Supply side was used for storage and compacted gravel. The gravel now has grass and weeds growing up through since the site has been sitting idle.

Prior to being used as a concrete plant, the site was used as a landfill. There are no know uses between the concrete plant and land fill.

Proposed Conditions

After the project has been completed there will be four (4) synthetic turf little league fields, one (1) synthetic turf collegiate baseball field and one (1) combined synthetic turf field that contain both a little league field and collegiate baseball field. The site will also contain access driveways, a building, parking lots, a common hospitality area and sidewalks. Several managed release concept basins and a detention basin will be constructed to manage the runoff from the redeveloped area.

This narrative, in conjunction with the Stormwater Management, Grading and Erosion Control Plans, describes the proposed facilities to be constructed to control stormwater and erosion and sedimentation during construction and once the development is permanently stabilized.

Stormwater Best Management Practices (BMP)

Stormwater Best Management Practices for this project consists of collecting runoff from impervious areas with sheet flows, swales, inlets and pipes to convey the runoff to managed release concept basins or a detention basin.

Design of the proposed BMPs is in accordance with the guidelines of the *Pennsylvania Stormwater Best Management Practices Manual and the DEP Managed Release Concept guidance documents.*

Since the site is located over an existing landfill, it was determined that promoting infiltration (i.e. in a facility) was not permitted by DEP. Since infiltration was not permitted/recommend the facilities were designed using the Managed Release Concept. The managed release guidance document was used to aid in the design of these facilities.

Stormwater Analysis

Stormwater analysis was computed using the TR55 Method as computed by using Hydraflow Hydrographs Extension for AutoCAD computer software program.

The time-of-concentration (Tc) for pre development and post development time-of-concentration was calculated based on the NRCS Segmental Equation.

The Stormwater Management Ordinance for the City of Williamsport requires calculations for the 2-yr, 5-yr, 10-yr, 25-yr, 50-yr, and 100-yr storms. The 1 year pre development was calculated for NDPES requirements.

The following assumptions were made prior to performing the stormwater calculations:

1. The site is underlain by C Soils.

2. The 1.2” rainfall volume was calculated for each MRC. A single orifice was designed to dewater the 1.2” rainfall event from all the MRC facilities to the bottom of the facility within 72 hours. No outlet besides this single orifice may be installs within the volume from the 1.2” storm. The first orifice in the outlet structure was added at the top of this required storage volume.

3. Some of the drainage areas to the MRC’s exceed the maximum recommended drainage area. We assumed that this would not be an issue due to the small amount of impervious area contributing to these facilities.

4. The subgrade under all the baseball fields will be compacted prior to placing geotextile, stone and underdrain piping.

5. All baseball fields will be model as fallow since the artificial surface of the fields will be placed on top of open graded stone on top of the earthen subgrade. We believe this will be quite conservation since the artificial turf and stone base has a significant amount of surface area that will need to become saturated before water discharges into the MRC basins.

6. The site drains in all four (4) directions (south, west, north & east). Post development flows are compared for each pre-development drainage area and compared to the post development areas that drain in that same location.

Stormwater analysis computation outputs for pre- and post-development conditions are contained in the appendices of this narrative.

Pre Development
Summary Table

Design Storm (Yr.)	Pre Development South Flow (Ft^3/s)	Pre Development West Flow (Ft^3/s)	Pre Development North Flow (Ft^3/s)	Pre Development East Flow (Ft^3/s)	Pre Development Combined Flow (Ft^3/s)
1	14.23	7.40	22.81	3.26	43.90
2	19.36	11.51	31.35	4.27	61.51
5	26.94	17.98	44.05	5.73	88.05
10	33.65	24.05	55.33	7.00	111.89
25	44.19	34.00	73.22	8.98	149.79
50	53.95	43.53	89.93	10.81	185.27
100	65.13	54.69	109.09	12.88	226.19

Post Development
Inflow Summary Table

Design Storm (Yr.)	MRC Basin A Inflow (Ft^3/s)	MRC Basin B Inflow (Ft^3/s)	MRC Basin C Inflow (Ft^3/s)	MRC Basin D Inflow (Ft^3/s)	MRC Basin E Inflow (Ft^3/s)	Retention Basin F Inflow (Ft^3/s)	MRC Basin G Inflow (Ft^3/s)
2	11.81	4.37	6.81	5.40	5.42	1.55	4.45
5	15.76	5.90	9.40	7.40	7.40	2.06	6.08
10	19.19	7.24	11.68	9.15	9.13	2.50	7.46
25	24.51	9.32	15.25	11.88	11.85	3.17	9.22
50	29.39	11.24	18.56	14.40	14.35	3.80	10.85
100	34.95	13.42	22.34	17.28	17.21	4.51	12.71

Post Development
Outfall Summary Table

Design Storm (Yr.)	MRC Basin A Outfall (Ft^3/s)	MRC Basin B Outfall (Ft^3/s)	MRC Basin C Outfall (Ft^3/s)	MRC Basin D Outfall (Ft^3/s)	MRC Basin E Outfall (Ft^3/s)	Retention Basin F Outfall (Ft^3/s)	MRC Basin G Outfall (Ft^3/s)
2	1.29	0.39	0.38	0.41	0.50	1.03	0.28
5	1.94	0.81	0.61	1.52	1.00	1.41	0.41
10	2.36	1.13	0.77	3.18	3.29	1.64	1.51
25	2.92	1.48	2.48	6.09	7.28	1.71	4.66
50	7.73	3.36	6.28	8.72	10.71	1.78	7.32
100	15.09	6.37	11.02	11.58	13.18	1.85	10.23

Post Development
Undetained Flow Summary Table

Design Storm (Yr.)	Post Development Undetained South Flow (Ft^3/s)	Post Development Undetained West Flow (Ft^3/s)	Post Development Undetained North Flow (Ft^3/s)	Post Development Undetained East Flow (Ft^3/s)
2	9.22	6.63	3.57	1.42
5	13.09	10.15	5.68	2.21
10	16.54	13.44	7.66	2.94
25	21.99	18.78	10.94	4.12
50	27.08	23.87	14.10	5.25
100	32.92	29.81	17.81	6.59

Pre-Post Development
Combined Overall Flow Comparison Summary Table

Design Storm (Yr.)	Pre Development Combined Flow (Ft^3/s))	Post Development Combined Flow (Ft^3/s)
2	61.51	20.18
5	88.05	31.88
10	111.89	43.29
25	149.79	61.62
50	185.27	90.97
100	226.19	128.72

In conclusion, the design reduced the post development runoff flows to less than or equal to pre development runoff flows across the developed site.

Thermal Impacts Analysis

Most thermal impacts occur during the first flush of a rain from impervious areas during the hot summer months. The stormwater management for the site was designed such that the impervious areas sheet flow to grassed areas or flow directly into a stormwater facility. Thermal impacts will be mitigated quickly by directing runoff from the impervious areas to vegetated areas. Since infiltration is not feasible due to the project being constructed on top of an old landfill, the MRC facilities will release water at a similar rate as if it where infiltrated into the ground. The basins are sized to capture the first flush from each of the drainage areas which is typically the warmest. The vegetated facilities and underground stormwater piping will aid in cooling the runoff until it is slowly discharged to the natural drainage way.

APPENDIX 1

STORMWATER FACILITIES MAINTENANCE PROGRAM

STORMWATER FACILITIES OWNERSHIP AND MAINTENANCE PROGRAM

Williamsport Ballpark, Inc. their heirs and assigns, will be responsible for the maintenance of the Stormwater control structures and facilities. Regular, periodic inspection and maintenance is essential for the proper functioning of the Stormwater control facilities. Inspection of the facilities should occur quarterly, at a minimum, or immediately following storm events.

Inspection and maintenance activities include, but are not limited to, the following:

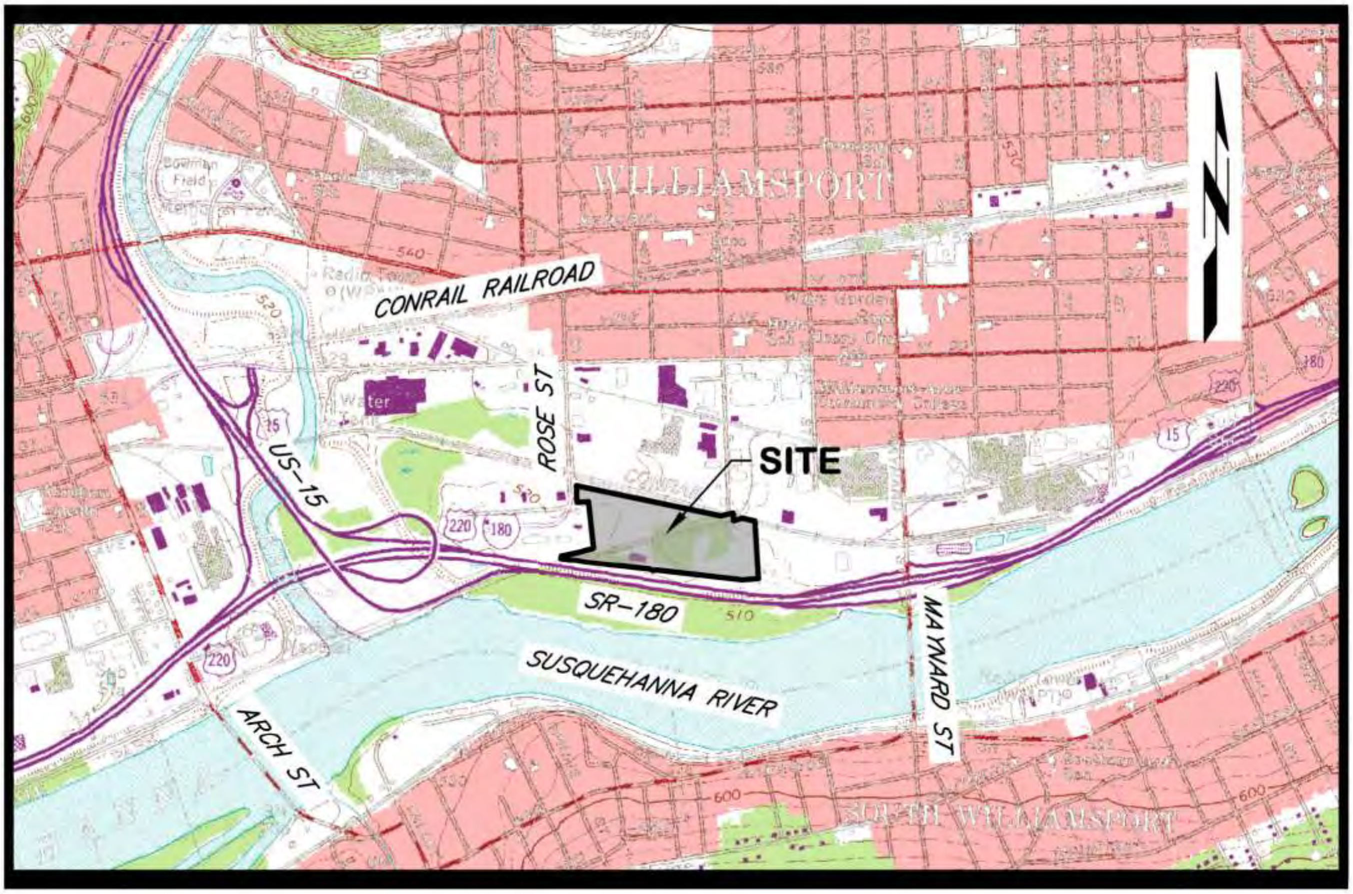
1. Inspect all swales for standing water and debris.
2. Inspect all facilities for signs of accelerated erosion
3. Inspect basin and rain garden for debris and gravel which may accumulate near the swale discharge into the basin or near the outlet structure.
4. Inspect the discharge structure for accumulation of silt, gravel or debris in the discharge chamber sump, or accumulation of debris on the discharge orifices.
5. Inspect discharge pipe and infiltration berm for accumulation of silt, sediment or debris.
6. Inspect the spillway of infiltration berm to assure uniform distribution of flows is occurring throughout the entire width of the spillway.
7. Inspect forebay for deposits of sediment or debris.
8. Inspect the trash screen on the outlet of the rain garden and remove any accumulated debris.
9. Inspect the grates for damage or vandalism. Damaged or missing grates must be replaced immediately upon discovery.
10. Inspect the integrity of all structural components of the facility. Any damaged or decaying components should be replaced or repaired upon discovery.
11. Inspect the outfall from all pipe discharges for scour or erosion. Erosion and/or scour should be repaired upon discovery. If recurrent erosion is evident, consult with personnel from the local County Conservation District for suggested techniques and procedures to address erosion.
12. Maintain the vegetation. Areas of vegetation that do not survive should be reestablished using seed mixes appropriate for the location.
13. Inspect the storm water detention embankments for settlement, sinkholes, seeps, structural cracking, animal burrows, excessive vegetation, foundation movement, erosion and depressions, repair accordingly.

If repairs are required to address a sinkhole which has occurred within the easement, Williamsport Ballpark, Inc. shall employ a licensed Geotechnical consultant and make immediate restoration of the sinkhole area as recommended by said Geotechnical consultant.

Williamsport Ballpark, Inc., their respective heirs, executors, administrators, successors and assigns shall notify the city of Williamsport, the Lycoming County Conservation District and the Department of Environmental Protection (DEP) prior to initiating any major repair activities.

APPENDIX 2

LOCATION MAP



PROJECT LOCATION MAP

SCALE: 1" = 2000'

WILLIAMSPORT BALLPARK, INC.

CITY OF WILLIAMSPORT, LYCOMING COUNTY

PENNSYLVANIA

USGS QUAD.: WILLIAMSPORT

APPENDIX 3

RECORD OF TRAINING AND EXPERIENCE

RECORD OF TRAINING AND EXPERIENCE
IN POST CONSTRUCTION STORMWATER MANAGEMENT METHODS AND TECHNIQUES

NAME OF PLAN PREPARER: Robert E. Myers, PE, PLS

FORMAL EDUCATION:

Name of college or technical institute: Pennsylvania College of Technology
Curriculum or program: Civil Engineering Technology
Dates of attendance: August 1999 to December 2003
Degree received: B.S. In Civil Engineering Technology, A.A.S. in Surveying Technology

OTHER TRAINING:

Name of Training: Computational Methods in Stormwater Management
Presented by: Penn State University Outreach Continuing Education
Date: May 10, 2006

Name of Training: Low Impact Development: Post Construction Water Quality Treatment
Presented by: Filtrexx
Date: September 16, 2014

Name of Training: Stormwater Management Issues in the Spring Creek Watershed Seminar
Presented by: Penn State Office of Physical Plant
Date: May 21, 2015

Name of Training: Chapter 102/NPDES Workshop
Presented by: Clinton & Centre County Conservation Districts
Date: March 21, 2016

Name of Training: Advanced Drainage Systems Baysaver Water Quality and ADS Pipe Seminar
Presented by: Baysavers Technologies & ADS
Date: March 23, 2017

Name of Training: Industrial Solids/Liquid Separation - Making Contaminants Sink or Float
Presented by: Evoqua Water Technologies
Date: October 24, 2017

Name of Training: Geosynthetic Solutions for Paved & Unpaved Applications
Presented by: Tensar
Date: February 28, 2018

Name of Training: Slope Stabilization and Landslide Prevention
Presented by: HalfMoon Education, Inc.
Date: October 12, 2018

Name of Training: Specifying Engineered Soils for Sustainable Vegetation
Presented by: Forester University
Date: February 12, 2019

Name of Training: A to Z: Low Impact Development and Permeable Pavers
Presented by: Forester University
Date: February 12, 2019

Name of Training: Compost BMPs for Targeted Pollutant Removal
Presented by: Filtrexx International
Date: February 13, 2019

Name of Training: Precast Concrete Box Culvert Design and Installation
Presented by: American Concrete Pipe Association
Date: March 14, 2019

Name of Training: Low Impact Development - Post-construction Water Quality Treatment
Presented by: Filtrexx International
Date: March 20, 2019

Name of Training: Proactive Data Collection for Flood Warning
Presented by: Forester University
Date: July 24, 2019

Name of Training: Compost BMPs for Pollutant Removal
Presented by: Filtrexx International
Date: October 16, 2019

Name of Training: E&S and Waterways Workshop
Presented by: Clinton County Conservation District & DEP
Date: February 18, 2020

Name of Training: Karst Topography & Sinkhole Remediation
Presented by: Centre Consulting
Date: February 21, 2020

Name of Training: Low Impact Development
Presented by: Filtrexx International
Date: March 25, 2020

Name of Training: ADS Design Tool 2.0
Presented by: StormTech - ADS
Date: April 3, 2020

Name of Training: StormTech Chambers
Presented by: Advanced Drainage Systems (ADS)
Date: July 8, 2020

Name of Training: BayFilter Water Quality MTD Design Tool
Presented by: Advanced Drainage Systems (ADS)
Date: July 28, 2020

Name of Training: DEP Greenport Registration & ePermitting EFA and Applicant Training
Presented by: PADEP
Date: January 21, 2021

Name of Training: DEP Clean Water – 102 ePermitting Applicant Traning
Presented by: PADEP
Date: January 21, 2021

EMPLOYMENT HISTORY:

Current Employer: Hawbaker Engineering (HE) (2014 to present)
Telephone: (814) 272-0786

Former Employer: Nittany Engineering & Associates, LLC (NEA) (2005 to 2014)
Telephone: (814) 364-2262

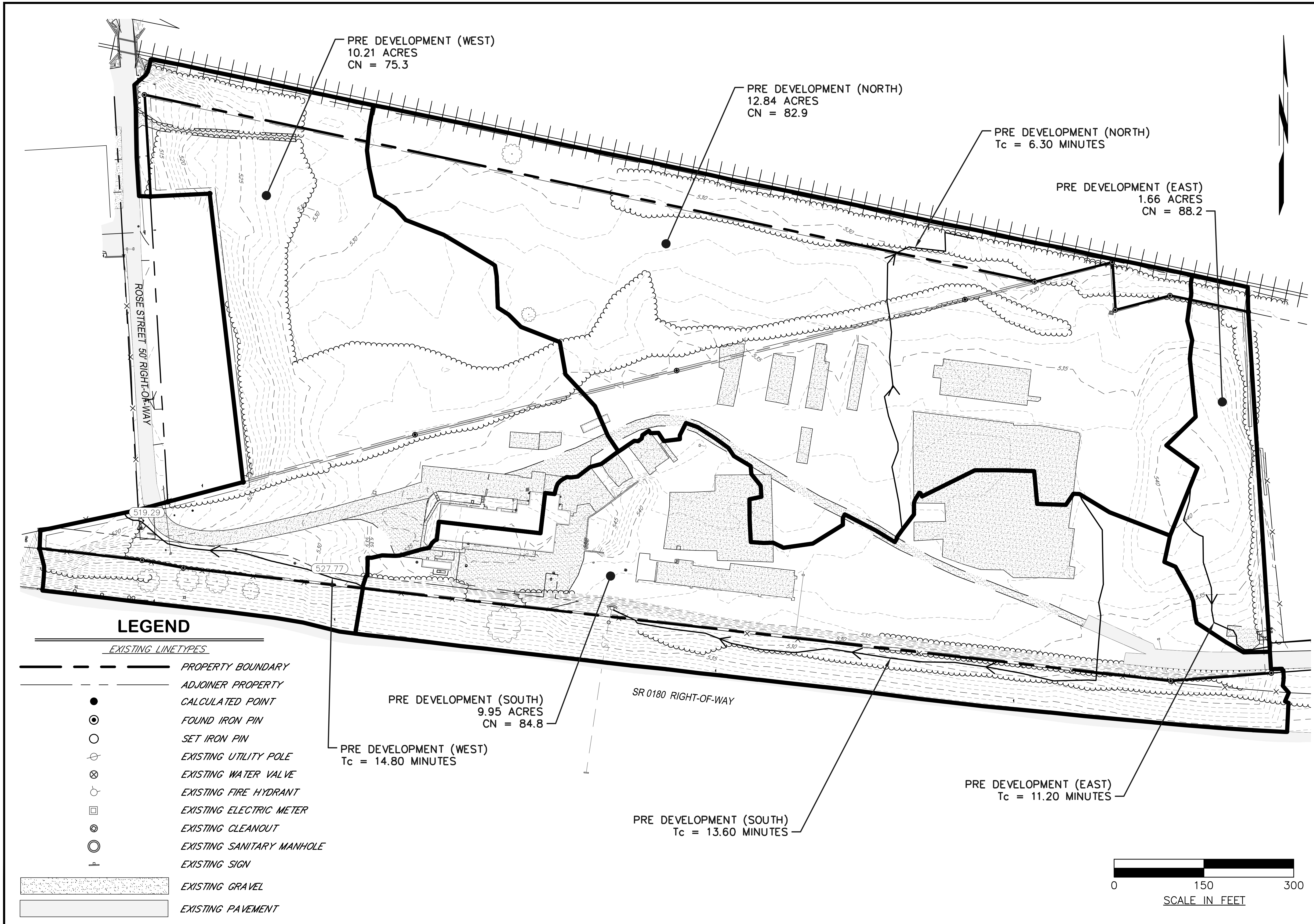
Former Employer: Dana R. Boob Surveying & Engineering (DRB) (2003 to 2005)
Telephone: (merged into Nittany Engineering & Associates, LLC)

RECENT POST CONSTRUCTION STORMWATER MANAGEMENT PLANS PREPARED

	#1	#2	#3
Name of Project: *(Type)*	**Bellefonte Laser Wash** Residential Subdivision	**Steppe Waste Site** Highway Construction Waste Area	**Century Estates Subdivision** Residential Subdivision
County:	Centre	Lycoming	Centre
Municipality:	Bellefonte Borough	Woodward Township	Gregg Township
NPDES#: *(if applicable)*	**PAC140107**	**PAC410049**	**PAC140086**
Approving Agency:	Centre County Conservation District	Lycoming County Conservation District	Centre County Conservation District

APPENDIX 4

DRAINAGE AREA MAPS



PLOTTED: March 16, 2021–11:33am (rem2) FILENAME: F:\Projects\20914 Ausley Construction – Williamsport Ballpark Inc. (Sports Fields Complex)\DWG\20914 WBI – LDP Base – PCSM (PRE).dwg LAYOUT: DA – PRE

DATE	REVISION	REV. BY

PRE DEVELOPMENT DRAINAGE AREA

OWNER: WILLIAMSPORT BALLPARK, INC.
LOCATION: CITY OF WILLIAMSPORT LYCOMING COUNTY, PA
DATE: MARCH 15, 2021
DESIGN: REM
DRAWN: REM
JOB NUMBER: .....
SHEET NUMBER: 1 OF 2

POST CONSTRUCTION STORMWATER MANAGEMENT PLAN FOR WILLIAMSPORT BALLPARK, INC.
CITY OF WILLIAMSPORT
LYCOMING COUNTY, PENNSYLVANIA

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1952 Waddle Road, Suite 201 State College, Pa 16803
1-800-284-8590 hawbakerengineering.com

POST DEVELOPMENT – BASIN A 4.28 ACRES CN = 88.8
POST DEVELOPMENT – BASIN A Tc = 9.10 MINUTES
POST DEVELOPMENT – BASIN B 1.62 ACRES CN = 87.3
POST DEVELOPMENT – NORTH (UNDETAINED) 3.42 ACRES CN = 74.2
POST DEVELOPMENT – BASIN B Tc = 7.90 MINUTES
POST DEVELOPMENT – BASIN C 4.21 ACRES CN = 86.0
POST DEVELOPMENT – NORTH (UNDETAINED) Tc = 6.30 MINUTES
POST DEVELOPMENT – BASIN C Tc = 23.0 MINUTES
POST DEVELOPMENT – WEST (UNDETAINED) 5.61 ACRES CN = 76.8
533.50
POST DEVELOPMENT – BASIN F 0.57 ACRES CN = 89.6 Tc = 5 MIN.
POST DEVELOPMENT – BASIN E Tc = 25.30 MINUTES
POST DEVELOPMENT – BASIN G Tc = 15.80 MINUTES
POST DEVELOPMENT – WEST (UNDETAINED) Tc = 14.80 MINUTES
POST DEVELOPMENT – BASIN D Tc = 9.60 MINUTES
POST DEVELOPMENT – BASIN E 3.30 ACRES CN = 87.1
POST DEVELOPMENT – EAST (UNDETAINED) 0.90 ACRES CN = 74.1 Tc = 5 MIN
POST DEVELOPMENT – BASIN G 1.67 ACRES CN = 87.2
POST DEVELOPMENT – SOUTH (UNDETAINED) 6.99 ACRES CN = 83.5
POST DEVELOPMENT – BASIN D 2.20 ACRES CN = 86.1
0 150 300
SCALE IN FEET
POST DEVELOPMENT DRAINAGE AREA
OWNER: WILLIAMSPORT BALLPARK, INC.
LOCATION: CITY OF WILLIAMSPORT LYCOMING COUNTY, PA
DATE: MARCH 15, 2021
DESIGN: REM
DRAWN: REM
SHEET NUMBER: 2 OF 2
POST CONSTRUCTION STORMWATER MANAGEMENT PLAN FOR WILLIAMSPORT BALLPARK, INC. CITY OF WILLIAMSPORT LYCOMING COUNTY, PENNSYLVANIA
HAWBAKER ENGINEERING
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DATE REVISION REV. BY

APPENDIX 5

SWM CALCULATIONS

PRE DEVELOPMENT FLOWS

POST DEVELOPMENT INFLOWS

POST DEVELOPMENT BASIN OUTFALL FLOWS

POST DEVELOPMENT COMBINED FLOWS

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SOIL CONSERVATION SERVICE
HYDROLOGIC DATA FOR WATERSHED
RUNOFF COMPUTATIONS

DATE: 1/25/2021
REV: 0
BY: REM

JOB NO.: 20914 **PROJECT:** Williamsport Baseball, Inc. **TOWNSHIP:** City of Williamsport, Lycoming County
DESCRIPTION: Pre Development - North

Total Area: 12.84 acres

Hydrological Soil Group	Land Use	Hydrologic Condition	Soil Runoff Curve Number	Area acres	Complex Number acres	Comment
C	Meadow	Good	71	4.96	352.08	Good Condition
C	Gravel	Good	89	6.65	591.70	Compacted gravel parking area
	Impervious	N/A	98	1.24	121.27	Pavement/buildings
			Total Area	12.84	1065.05	

Weighted Soil Complex Number $\frac{1065.05}{12.84}$ = **82.9**

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SOIL CONSERVATION SERVICE
HYDROLOGIC DATA FOR WATERSHED
RUNOFF COMPUTATIONS

DATE: 1/25/2021
REV: 0
BY: REM

JOB NO.: 20914 **PROJECT:** Williamsport Baseball, Inc. **TOWNSHIP:** City of Williamsport, Lycoming County
DESCRIPTION: Pre Development - West

Total Area: 10.21 acres

Hydrological Soil Group	Land Use	Hydrologic Condition	Soil Runoff Curve Number	Area acres	Complex Number acres	Comment
C	Meadow	Good	71	8.16	579.07	Good Condition
C	Gravel	Good	89	1.33	118.63	Compacted gravel parking area
	Impervious	N/A	98	0.72	70.72	Pavement/buildings
			Total Area	10.21	768.41	

Weighted Soil Complex Number $\frac{768.41}{10.21}$ = **75.3**

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SOIL CONSERVATION SERVICE
HYDROLOGIC DATA FOR WATERSHED
RUNOFF COMPUTATIONS

DATE: 1/25/2021
REV: 0
BY: REM

JOB NO.: 20914 **PROJECT:** Williamsport Baseball, Inc. **TOWNSHIP:** City of Williamsport, Lycoming County
DESCRIPTION: Pre Development - South

Total Area: 9.95 acres

Hydrological Soil Group	Land Use	Hydrologic Condition	Soil Runoff Curve Number	Area acres	Complex Number acres	Comment
C	Meadow	Good	71	3.38	240.22	Good Condition
C	Gravel	Good	89	4.44	395.51	Compacted gravel parking area
	Impervious	N/A	98	2.12	208.08	Pavement/buildings
			Total Area	9.95	843.80	

$$\text{Weighted Soil Complex Number} \quad \frac{843.80}{9.95} = \boxed{84.8}$$

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SOIL CONSERVATION SERVICE
HYDROLOGIC DATA FOR WATERSHED
RUNOFF COMPUTATIONS

DATE: 1/25/2021
REV: 0
BY: REM

JOB NO.: 20914 **PROJECT:** Williamsport Baseball, Inc. **TOWNSHIP:** City of Williamsport, Lycoming County
DESCRIPTION: Pre Development - East

Total Area: 1.66 acres

Hydrological Soil Group	Land Use	Hydrologic Condition	Soil Runoff Curve Number	Area acres	Complex Number acres	Comment
C	Meadow	Good	71	0.08	5.78	Good Condition
C	Gravel	Good	89	1.55	138.38	Compacted gravel parking area
	Impervious	N/A	98	0.02	2.35	Pavement/buildings
			Total Area	1.66	146.51	

$$\text{Weighted Soil Complex Number} \quad \frac{146.51}{1.66} = \boxed{88.2}$$

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SOIL CONSERVATION SERVICE
HYDROLOGIC DATA FOR WATERSHED
RUNOFF COMPUTATIONS

DATE: 1/25/2021
REV: 0
BY: REM

JOB NO.: 20914 **PROJECT:** Williamsport Baseball, Inc. **TOWNSHIP:** City of Williamsport, Lycoming County
DESCRIPTION: Basin A

Total Area: 4.28 acres

Hydrological Soil Group	Land Use	Hydrologic Condition	Soil Runoff Curve Number	Area acres	Complex Number acres	Comment
C	Fallow	Good	91	3.43	312.18	Bare soil
C	Lawn	Good	74	0.64	47.17	Good Condition
	Impervious	N/A	98	0.21	20.84	Pavement/buildings
			Total Area	4.28	380.19	

$$\text{Weighted Soil Complex Number} = \frac{380.19}{4.28} = \boxed{88.8}$$

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SOIL CONSERVATION SERVICE
HYDROLOGIC DATA FOR WATERSHED
RUNOFF COMPUTATIONS

DATE: 1/25/2021
REV: 0
BY: REM

JOB NO.: 20914 **PROJECT:** Williamsport Baseball, Inc. **TOWNSHIP:** City of Williamsport, Lycoming County
DESCRIPTION: Basin B

Total Area: 1.62 acres

Hydrological Soil Group	Land Use	Hydrologic Condition	Soil Runoff Curve Number	Area acres	Complex Number acres	Comment
C	Fallow	Good	91	1.15	104.38	Bare soil
C	Lawn	Good	74	0.39	28.65	Good Condition
	Impervious	N/A	98	0.09	8.36	Pavement/buildings
			Total Area	1.62	141.39	

Weighted Soil Complex Number $\frac{141.39}{1.62}$ = $\boxed{87.3}$

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SOIL CONSERVATION SERVICE
HYDROLOGIC DATA FOR WATERSHED
RUNOFF COMPUTATIONS

DATE: 1/25/2021
REV: 0
BY: REM

JOB NO.: 20914 **PROJECT:** Williamsport Baseball, Inc. **TOWNSHIP:** City of Williamsport, Lycoming County
DESCRIPTION: Basin C

Total Area: 4.21 acres

Hydrological Soil Group	Land Use	Hydrologic Condition	Soil Runoff Curve Number	Area acres	Complex Number acres	Comment
C	Fallow	Good	91	2.61	237.14	Bare soil
C	Lawn	Good	74	1.34	99.51	Good Condition
	Impervious	N/A	98	0.26	25.36	Pavement/buildings
			Total Area	4.21	362.01	

$$\text{Weighted Soil Complex Number} \quad \frac{362.01}{4.21} = \boxed{86.0}$$

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SOIL CONSERVATION SERVICE
HYDROLOGIC DATA FOR WATERSHED
RUNOFF COMPUTATIONS

DATE: 1/21/2021
REV: 0
BY: REM

JOB NO.: 20914 **PROJECT:** Williamsport Baseball, Inc. **TOWNSHIP:** City of Williamsport, Lycoming County
DESCRIPTION: Basin D

Total Area: 2.20 acres

Hydrological Soil Group	Land Use	Hydrologic Condition	Soil Runoff Curve Number	Area acres	Complex Number acres	Comment
C	Fallow	Good	91	1.46	132.66	Bare soil
C	Lawn	Good	74	0.67	49.45	Good Condition
	Impervious	N/A	98	0.08	7.66	Pavement/buildings
			Total Area	2.20	189.77	

Weighted Soil Complex Number $\dfrac{189.77}{2.20} = \boxed{86.1}$

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SOIL CONSERVATION SERVICE
HYDROLOGIC DATA FOR WATERSHED
RUNOFF COMPUTATIONS

DATE: 1/21/2021
REV: 0
BY: REM

JOB NO.: 20914 **PROJECT:** Williamsport Baseball, Inc. **TOWNSHIP:** City of Williamsport, Lycoming County
DESCRIPTION: Basin E

Total Area: 3.30 acres

Hydrological Soil Group	Land Use	Hydrologic Condition	Soil Runoff Curve Number	Area acres	Complex Number acres	Comment
C	Fallow	Good	91	2.29	208.75	Bare soil
C	Lawn	Good	74	0.83	61.74	Good Condition
	Impervious	N/A	98	0.17	16.99	Pavement/buildings
			Total Area	3.30	287.49	

Weighted Soil Complex Number $\dfrac{287.49}{3.30}$ = $\boxed{87.1}$

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HYDROLOGIC DATA FOR WATERSHED
RUNOFF COMPUTATIONS

DATE: 1/21/2021
REV: 0
BY: REM

JOB NO.: 20914 **PROJECT:** Williamsport Baseball, Inc. **TOWNSHIP:** City of Williamsport, Lycoming County
DESCRIPTION: Basin F

Total Area: 0.57 acres

Hydrological Soil Group	Land Use	Hydrologic Condition	Soil Runoff Curve Number	Area acres	Complex Number acres	Comment
C	Fallow	Good	91	0.00	0.00	Bare soil
C	Lawn	Good	74	0.20	14.68	Good Condition
	Impervious	N/A	98	0.37	36.06	Pavement/buildings
			Total Area	0.57	50.74	

Weighted Soil Complex Number $\frac{50.74}{0.57}$ = **89.6**

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HYDROLOGIC DATA FOR WATERSHED
RUNOFF COMPUTATIONS

DATE: 1/21/2021
REV: 0
BY: REM

JOB NO.: 20914 **PROJECT:** Williamsport Baseball, Inc. **TOWNSHIP:** City of Williamsport, Lycoming County
DESCRIPTION: Basin G

Total Area: 1.67 acres

Hydrological Soil Group	Land Use	Hydrologic Condition	Soil Runoff Curve Number	Area acres	Complex Number acres	Comment
C	Fallow	Good	91	0.00	0.00	Bare soil
C	Lawn	Good	74	0.75	55.70	Good Condition
	Impervious	N/A	98	0.92	89.75	Pavement/buildings

Total Area 1.67 145.45

$$\text{Weighted Soil Complex Number} \quad \frac{145.45}{1.67} = \boxed{87.2}$$

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SOIL CONSERVATION SERVICE
HYDROLOGIC DATA FOR WATERSHED
RUNOFF COMPUTATIONS

DATE: 1/21/2021
REV: 0
BY: REM

JOB NO.: 20914 **PROJECT:** Williamsport Baseball, Inc. **TOWNSHIP:** City of Williamsport, Lycoming County
DESCRIPTION: Undetained - West

Total Area: 5.49 acres

Hydrological Soil Group	Land Use	Hydrologic Condition	Soil Runoff Curve Number	Area acres	Complex Number acres	Comment
C	Lawn	Good	74	4.83	357.71	Good Condition
	Impervious	N/A	98	0.66	64.52	Pavement/buildings
			Total Area	5.49	422.23	

Weighted Soil Complex Number $\frac{422.23}{5.49}$ = $\boxed{76.9}$

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HYDROLOGIC DATA FOR WATERSHED
RUNOFF COMPUTATIONS

DATE: 1/21/2021
REV: 0
BY: REM

JOB NO.: 20914 **PROJECT:** Williamsport Baseball, Inc. **TOWNSHIP:** City of Williamsport, Lycoming County
DESCRIPTION: Undetained - North

Total Area: 3.42 acres

Hydrological Soil Group	Land Use	Hydrologic Condition	Soil Runoff Curve Number	Area acres	Complex Number acres	Comment
C	Lawn	Good	74	3.40	251.45	Good Condition
	Impervious	N/A	98	0.03	2.53	Pavement/buildings
			Total Area	3.42	253.97	

Weighted Soil Complex Number $\frac{253.97}{3.42}$ = $\boxed{\mathbf{74.2}}$

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HYDROLOGIC DATA FOR WATERSHED
RUNOFF COMPUTATIONS

DATE: 1/21/2021
REV: 0
BY: REM

JOB NO.: 20914 **PROJECT:** Williamsport Baseball, Inc. **TOWNSHIP:** City of Williamsport, Lycoming County
DESCRIPTION: Undetained - East

Total Area: 0.90 acres

Hydrological Soil Group	Land Use	Hydrologic Condition	Soil Runoff Curve Number	Area acres	Complex Number acres	Comment
C	Lawn	Good	74	0.90	66.77	Good Condition
	Impervious	N/A	98	0.00	0.20	Pavement/buildings
			Total Area	0.90	66.98	

Weighted Soil Complex Number $\frac{66.98}{0.90}$ = $\boxed{\textbf{74.1}}$

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SOIL CONSERVATION SERVICE
HYDROLOGIC DATA FOR WATERSHED
RUNOFF COMPUTATIONS

DATE: 1/21/2021
REV: 0
BY: REM

JOB NO.: 20914 **PROJECT:** Williamsport Baseball, Inc. **TOWNSHIP:** City of Williamsport, Lycoming County
DESCRIPTION: Undetained - South

Total Area: 6.99 acres

Hydrological Soil Group	Land Use	Hydrologic Condition	Soil Runoff Curve Number	Area acres	Complex Number acres	Comment
C	Lawn	Good	74	4.22	312.18	Good Condition
	Impervious	N/A	98	2.78	271.96	Pavement/buildings
			Total Area	6.99	584.14	

Weighted Soil Complex Number $\frac{584.14}{6.99}$ = $\boxed{83.5}$

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PROPOSED WILLIAMSPORT BALLPARK, INC.

BASIN A - VOLUME CALCULATION
~ RAIN GARDEN/DETENTION CAPACITY ~

PROJECT NAME: *Williamsports Ballpark, Inc.*
LOCATION: *City of Williamsport, Lycoming County*
PREPARED BY: *REM* DATE: *1/21/2021*
CHECKED BY: DATE:

WATER SURFACE ELEVATION (FT)	AREA (FT^2)	AVERAGE AREA (FT^2)	DIFFERENCE IN ELEVATION (FT)	VOID VOLUME	STORAGE VOLUME (FT^3)	
					INCREMENTAL	TOTAL
528.00	7,119					
		7,119	1.00	0.15	1,068	
529.00	7,119					1,068
		7,119	1.00	0.15	1,068	
530.00	7,119					2,136
		7,266	0.27	1.00	1,962	
530.27	7,413					4,098
		8,051	0.73	1.00	5,877	
531.00	8,688					9,974
		9,510	1.00	1.00	9,510	
532.00	10,332					19,484
		11,190	1.00	1.00	11,190	
533.00	12,047					30,674
		15,207	0.50	1.00	7,603	
533.50	18,366					38,277

VOLUME TO BE RETAINED BELOW LOWEST ORIFICE @ 530.26

4,098 ***FT^3***

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PROPOSED WILLIAMSPORT BALLPARK, INC.

BASIN B - VOLUME CALCULATION
~ RAIN GARDEN/DETENTION CAPACITY ~

PROJECT NAME: *Williamsports Ballpark, Inc.*
LOCATION: *City of Williamsport, Lycoming County*
PREPARED BY: *REM* DATE: *1/21/2021*
CHECKED BY: DATE:

WATER SURFACE ELEVATION (FT)	AREA (FT^2)	AVERAGE AREA (FT^2)	DIFFERENCE IN ELEVATION (FT)	VOID VOLUME	STORAGE VOLUME (FT^3)	
					INCREMENTAL	TOTAL
529.90	7,119					
		7,119	0.10	0.15	107	
530.00	7,119					107
		7,119	1.00	0.15	1,068	
531.00	7,119					1,175
		7,266	0.90	0.15	981	
531.90	7,413					2,156
		8,051	0.02	1.00	161	
531.92	8,688					2,317
		9,510	0.08	1.00	761	
532.00	10,332					3,077
		11,190	1.00	1.00	11,190	
533.00	12,047					14,267
		11,787	1.00	1.00	11,787	
534.00	11,526					26,053
		11,823	0.35	1.00	4,138	
534.35	12,120					30,191

VOLUME TO BE RETAINED BELOW LOWEST ORIFICE @ 531.92

2,317 *FT^3*

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PROPOSED WILLIAMSPORT BALLPARK, INC.

BASIN C - VOLUME CALCULATION
~ RAIN GARDEN/DETENTION CAPACITY ~

PROJECT NAME: ***Williamsports Ballpark, Inc.***
LOCATION: ***City of Williamsport, Lycoming County***
PREPARED BY: ***REM*** DATE: ***1/21/2021***
CHECKED BY: DATE:

WATER SURFACE ELEVATION (FT)	AREA (FT^2)	AVERAGE AREA (FT^2)	DIFFERENCE IN ELEVATION (FT)	VOID VOLUME	STORAGE VOLUME (FT^3)	
					INCREMENTAL	TOTAL
529.00	7,119					
		7,119	1.00	0.15	1,068	
530.00	7,119					1,068
		7,119	1.00	0.15	1,068	
531.00	7,119					2,136
		7,266	1.00	1.00	7,266	
532.00	7,413					9,402
		8,051	1.00	1.00	8,051	
533.00	8,688					17,452
		9,510	0.50	1.00	4,755	
533.50	10,332					22,207
	12,047					

VOLUME TO BE RETAINED BELOW LOWEST ORIFICE @ 531.00

2,136 ***FT^3***

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PROPOSED WILLIAMSPORT BALLPARK, INC.

BASIN D - VOLUME CALCULATION
~ RAIN GARDEN/DETENTION CAPACITY ~

PROJECT NAME: ***Williamsports Ballpark, Inc.***
LOCATION: ***City of Williamsport, Lycoming County***
PREPARED BY: ***REM*** DATE: ***1/21/2021***
CHECKED BY: DATE:

WATER SURFACE ELEVATION (FT)	AREA (FT^2)	AVERAGE AREA (FT^2)	DIFFERENCE IN ELEVATION (FT)	VOID VOLUME	STORAGE VOLUME (FT^3)	
					INCREMENTAL	TOTAL
532.00	7,119					
		7,119	1.00	0.15	1,068	
533.00	7,119					1,068
		7,119	1.00	0.15	1,068	
534.00	7,119					2,136
		7,266	1.00	0.15	1,090	
535.00	7,413					3,226
		8,051	1.00	1.00	8,051	
536.00	8,688					11,276
		9,510	1.00	1.00	9,510	
537.00	10,332					20,786
	12,047					

VOLUME TO BE RETAINED BELOW LOWEST ORIFICE @ 534.00

2,136 FT^3

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1-800-284-8590 hawbakerengineering.com

PROPOSED WILLIAMSPORT BALLPARK, INC.

BASIN E - VOLUME CALCULATION
~ RAIN GARDEN/DETENTION CAPACITY ~

PROJECT NAME: *Williamsports Ballpark, Inc.*
LOCATION: *City of Williamsport, Lycoming County*
PREPARED BY: *REM* DATE: *1/21/2021*
CHECKED BY: DATE:

WATER SURFACE ELEVATION (FT)	AREA (FT^2)	AVERAGE AREA (FT^2)	DIFFERENCE IN ELEVATION (FT)	VOID VOLUME	STORAGE VOLUME (FT^3)	
					INCREMENTAL	TOTAL
530.50	7,119					
		7,119	0.50	0.15	534	
531.00	7,119					534
		7,119	0.50	0.15	534	
531.50	7,119					1,068
		7,266	0.50	0.15	545	
532.00	7,413					1,613
		8,051	0.50	0.15	604	
532.50	8,688					2,217
		9,510	0.20	1.00	1,902	
532.70	10,332					4,119
		11,190	0.30	1.00	3,357	
533.00	12,047					7,475
		12,856	1.00	1.00	12,856	
534.00	13,665					20,331
		15,020	1.00	1.00	15,020	
535.00	16,375					35,351
		17,807	1.00	1.00	17,807	
536.00	19,238					53,158

VOLUME TO BE RETAINED BELOW LOWEST ORIFICE @ 532.70

4,119 ***FT^3***

HAWBAKER ENGINEERING
1952 Waddle Road, Suite 201 State College, PA 16803
1-800-284-8590 hawbakerengineering.com

PROPOSED WILLIAMSPORT BALLPARK, INC.

BASIN F - VOLUME CALCULATION
~ DETENTION CAPACITY ~

PROJECT NAME: ***Williamsports Ballpark, Inc.***
LOCATION: ***City of Williamsport, Lycoming County***
PREPARED BY: ***REM*** DATE: ***1/21/2021***
CHECKED BY: DATE:

WATER SURFACE ELEVATION (FT)	AREA (FT^2)	AVERAGE AREA (FT^2)	DIFFERENCE IN ELEVATION (FT)	VOID VOLUME	STORAGE VOLUME (FT^3)	
					INCREMENTAL	TOTAL
534.00	7,119					
		7,119	1.00	1.00	7,119	
535.00	7,119					7,119
		7,119	1.00	1.00	7,119	
536.00	7,119					14,238
	7,413					
	8,688					
	10,332					
	12,047					

HAWBAKER ENGINEERING
1952 Waddle Road, Suite 201 State College, PA 16803
1-800-284-8590 hawbakerengineering.com

PROPOSED WILLIAMSPORT BALLPARK, INC.

BASIN G - VOLUME CALCULATION
~ INFILTRATION/DETENTION CAPACITY ~

PROJECT NAME: ***Williamsports Ballpark, Inc.***
LOCATION: ***City of Williamsport, Lycoming County***
PREPARED BY: ***REM*** DATE: ***1/21/2021***
CHECKED BY: DATE:

WATER SURFACE ELEVATION (FT)	AREA (FT^2)	AVERAGE AREA (FT^2)	DIFFERENCE IN ELEVATION (FT)	VOID VOLUME	STORAGE VOLUME (FT^3)	
					INCREMENTAL	TOTAL
530.00	**7,119**					
		7,119	**1.00**	**0.15**	**1,068**	
531.00	**7,119**					**1,068**
		7,119	**1.00**	**0.15**	**1,068**	
532.00	**7,119**					**2,136**
		7,266	**0.19**	**1.00**	**1,381**	
532.19	**7,413**					**3,516**
		8,051	**0.81**	**1.00**	**6,521**	
533.00	**8,688**					**10,037**
		9,510	**1.00**	**1.00**	**9,510**	
534.00	**10,332**					**19,547**
		11,190	**1.00**	**1.00**	**11,190**	
535.00	**12,047**					**30,737**

VOLUME TO BE RETAINED BELOW LOWEST ORIFICE @ 532.19

3,516 ***FT^3***

2 - Year

5 - Year

25 - Year

50 - Year

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

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	------	13.84	18.90	-------	26.42	33.09	43.56	53.29	64.42	Pre Development - South
2	SCS Runoff	------	6.951	10.88	-------	17.09	22.89	32.44	41.61	52.35	Pre Development - West
3	SCS Runoff	------	22.81	31.35	-------	44.05	55.33	73.22	89.93	109.09	Pre Development - North
4	SCS Runoff	------	3.255	4.265	-------	5.729	7.004	8.984	10.81	12.88	Pre Development - East
5	Combine	1, 2, 3, 4	42.74	59.96	-------	85.94	109.29	146.43	181.22	221.35	Combined Pre Development
8	SCS Runoff	------	9.079	11.81	-------	15.76	19.19	24.51	29.39	34.95	POST - Basin A
9	Reservoir	8	0.623	1.291	-------	1.936	2.362	2.916	7.733	15.09	Post - Basin A - Route
11	SCS Runoff	------	3.311	4.366	-------	5.900	7.240	9.323	11.24	13.42	POST - Basin B
12	Reservoir	11	0.189	0.394	-------	0.811	1.128	1.484	3.359	6.371	Post - Basin B - Route
14	SCS Runoff	------	5.051	6.808	-------	9.395	11.68	15.25	18.56	22.34	POST - Basin C
15	Reservoir	14	0.202	0.378	-------	0.609	0.769	2.479	6.278	11.02	Post - Basin C - Route
17	SCS Runoff	------	4.041	5.402	-------	7.396	9.147	11.88	14.40	17.28	POST - Basin D
18	Reservoir	17	0.167	0.413	-------	1.520	3.183	6.094	8.722	11.58	Post - Basin D - Route
20	SCS Runoff	------	4.062	5.415	-------	7.395	9.133	11.85	14.35	17.21	POST - Basin E
21	Reservoir	20	0.286	0.504	-------	1.001	3.288	7.275	10.71	13.18	Post - Basin E - Route
23	SCS Runoff	------	1.201	1.552	-------	2.058	2.496	3.174	3.797	4.506	POST - Basin F
24	Reservoir	23	0.742	1.027	-------	1.412	1.640	1.708	1.775	1.854	Post - Basin F - Route
26	SCS Runoff	------	2.618	3.475	-------	4.726	5.821	7.529	9.103	10.90	POST - Basin G
27	Combine	24, 26	3.314	4.448	-------	6.082	7.460	9.217	10.85	12.71	F + G
28	Reservoir	27	0.181	0.275	-------	0.413	1.506	4.659	7.324	10.23	Post - Basin G - Route
30	SCS Runoff	------	6.656	9.224	-------	13.09	16.54	21.99	27.08	32.92	POST - Undetained - South
31	SCS Runoff	------	4.370	6.629	-------	10.15	13.44	18.78	23.87	29.81	POST - Undetained - West
32	SCS Runoff	------	2.240	3.570	-------	5.680	7.662	10.94	14.10	17.81	POST - Undetained - North
33	SCS Runoff	------	0.921	1.422	-------	2.208	2.935	4.120	5.251	6.585	POST - Undetained - East
35	Combine	18, 21, 30,	6.701	9.506	-------	14.95	20.24	30.49	42.52	55.03	Post - South - TOTAL
36	Combine	9, 28, 31,	4.597	7.517	-------	12.05	15.83	21.77	34.52	52.36	Post - West - TOTAL
37	Combine	12, 15, 32,	2.314	3.845	-------	6.405	8.861	12.72	17.31	24.62	Post - North - TOTAL
39	Combine	33, 35, 36, 37,	13.16	20.18	-------	31.88	43.29	61.62	90.97	128.72	POST - TOTAL

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

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	13.84	1	722	37,400	------	------	------	Pre Development - South
2	SCS Runoff	6.951	1	724	22,006	------	------	------	Pre Development - West
3	SCS Runoff	22.81	1	718	45,811	------	------	------	Pre Development - North
4	SCS Runoff	3.255	1	720	7,880	------	------	------	Pre Development - East
5	Combine	42.74	1	719	113,098	1, 2, 3, 4	------	------	Combined Pre Development
8	SCS Runoff	9.079	1	719	20,621	------	------	------	POST - Basin A
9	Reservoir	0.623	1	769	14,261	8	530.59	11,519	Post - Basin A - Route
11	SCS Runoff	3.311	1	718	7,013	------	------	------	POST - Basin B
12	Reservoir	0.189	1	780	5,122	11	532.09	3,897	Post - Basin B - Route
14	SCS Runoff	5.051	1	727	17,238	------	------	------	POST - Basin C
15	Reservoir	0.202	1	947	11,034	14	531.26	11,406	Post - Basin C - Route
17	SCS Runoff	4.041	1	719	9,140	------	------	------	POST - Basin D
18	Reservoir	0.167	1	830	5,598	17	534.55	5,451	Post - Basin D - Route
20	SCS Runoff	4.062	1	728	14,492	------	------	------	POST - Basin E
21	Reservoir	0.286	1	829	9,662	20	533.03	8,615	Post - Basin E - Route
23	SCS Runoff	1.201	1	720	2,918	------	------	------	POST - Basin F
24	Reservoir	0.742	1	727	2,914	23	534.47	787	Post - Basin F - Route
26	SCS Runoff	2.618	1	723	7,467	------	------	------	POST - Basin G
27	Combine	3.314	1	724	10,380	24, 26	------	------	F + G
28	Reservoir	0.181	1	845	7,145	27	532.52	6,226	Post - Basin G - Route
30	SCS Runoff	6.656	1	730	25,280	------	------	------	POST - Undetained - South
31	SCS Runoff	4.370	1	724	13,432	------	------	------	POST - Undetained - West
32	SCS Runoff	2.240	1	723	6,758	------	------	------	POST - Undetained - North
33	SCS Runoff	0.921	1	716	1,655	------	------	------	POST - Undetained - East
35	Combine	6.701	1	730	40,540	18, 21, 30,	------	------	Post - South - TOTAL
36	Combine	4.597	1	725	34,838	9, 28, 31,	------	------	Post - West - TOTAL
37	Combine	2.314	1	724	22,914	12, 15, 32,	------	------	Post - North - TOTAL
39	Combine	13.16	1	726	99,947	33, 35, 36, 37,	------	------	POST - TOTAL

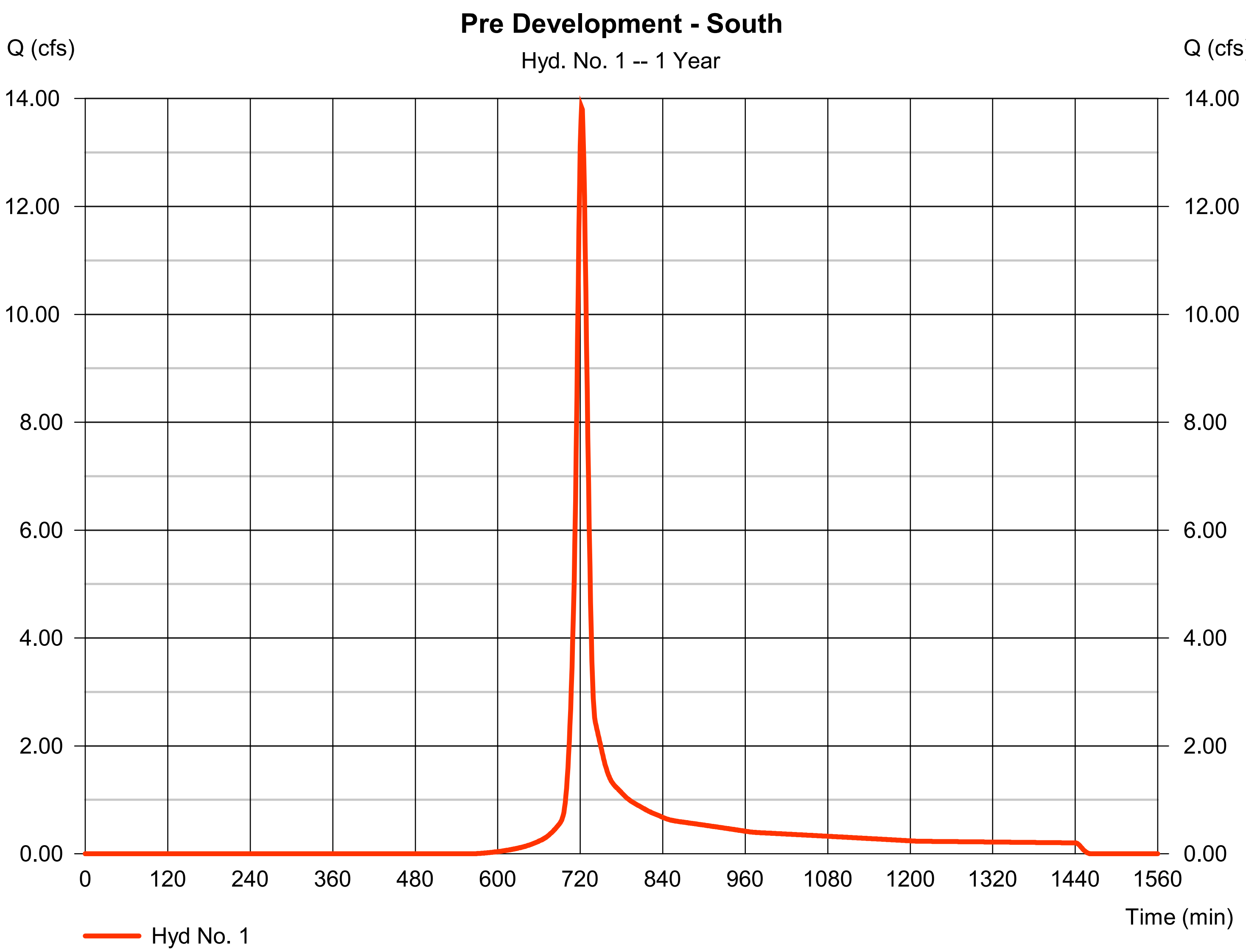
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 1

Pre Development - South

Hydrograph type	= SCS Runoff	Peak discharge	= 13.84 cfs
Storm frequency	= 1 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 37,400 cuft
Drainage area	= 9.910 ac	Curve number	= 84.4
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 13.60 min
Total precip.	= 2.37 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 1

Pre Development - South

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.011		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	2.84		0.00		0.00		
Land slope (%)	=	0.30		0.00		0.00		
Travel Time (min)	**=**	**2.75**	**+**	**0.00**	**+**	**0.00**	**=**	**2.75**
Shallow Concentrated Flow								
Flow length (ft)	=	189.00		36.00		0.00		
Watercourse slope (%)	=	1.50		25.00		0.00		
Surface description	=	Unpaved		Unpaved		Unpaved		
Average velocity (ft/s)	=1.98			8.07		0.00		
Travel Time (min)	**=**	**1.59**	**+**	**0.07**	**+**	**0.00**	**=**	**1.67**
Channel Flow								
X sectional flow area (sqft)	=	4.20		0.00		0.00		
Wetted perimeter (ft)	=	11.40		0.00		0.00		
Channel slope (%)	=	1.00		0.00		0.00		
Manning's n-value	=	0.050		0.015		0.015		
Velocity (ft/s)	=1.53							
				0.00				
						0.00		
Flow length (ft)	({0})837.0			0.0		0.0		
Travel Time (min)	**=**	**9.14**	**+**	**0.00**	**+**	**0.00**	**=**	**9.14**

Total Travel Time, Tc .... 13.60 min

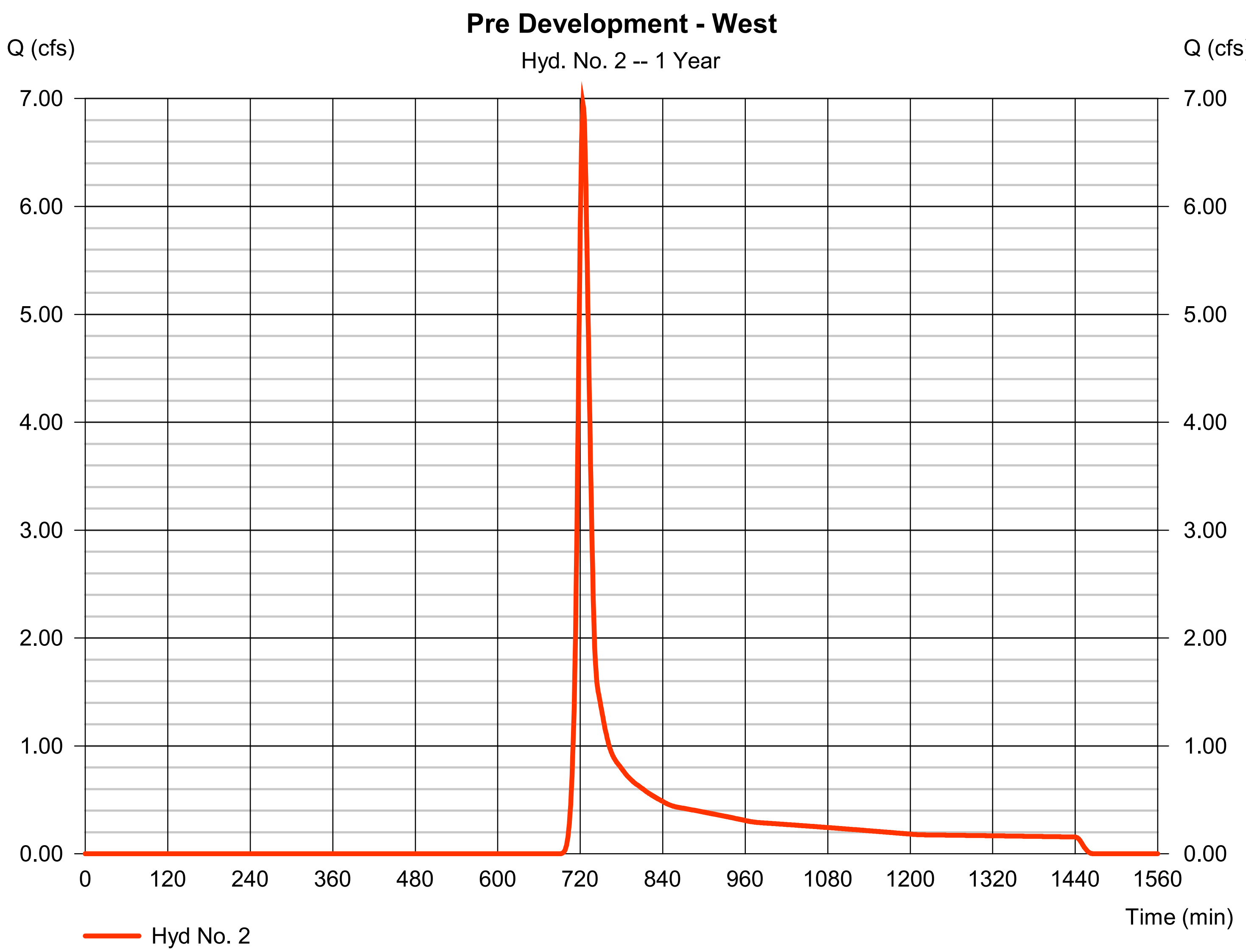
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 2

Pre Development - West

Hydrograph type	= SCS Runoff	Peak discharge	= 6.951 cfs
Storm frequency	= 1 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 22,006 cuft
Drainage area	= 10.250 ac	Curve number	= 75.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 16.30 min
Total precip.	= 2.37 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 2

Pre Development - West

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	2.84		0.00		0.00		
Land slope (%)	=	2.40		0.00		0.00		
Travel Time (min)	**=**	**14.08**	**+**	**0.00**	**+**	**0.00**	**=**	**14.08**
Shallow Concentrated Flow								
Flow length (ft)	=	356.00		0.00		0.00		
Watercourse slope (%)	=	2.70		0.00		0.00		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (ft/s)	=2.65			0.00		0.00		
Travel Time (min)	**=**	**2.24**	**+**	**0.00**	**+**	**0.00**	**=**	**2.24**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=0.00							
				0.00				
						0.00		
Flow length (ft)	({0})0.0			0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc .... 16.30 min

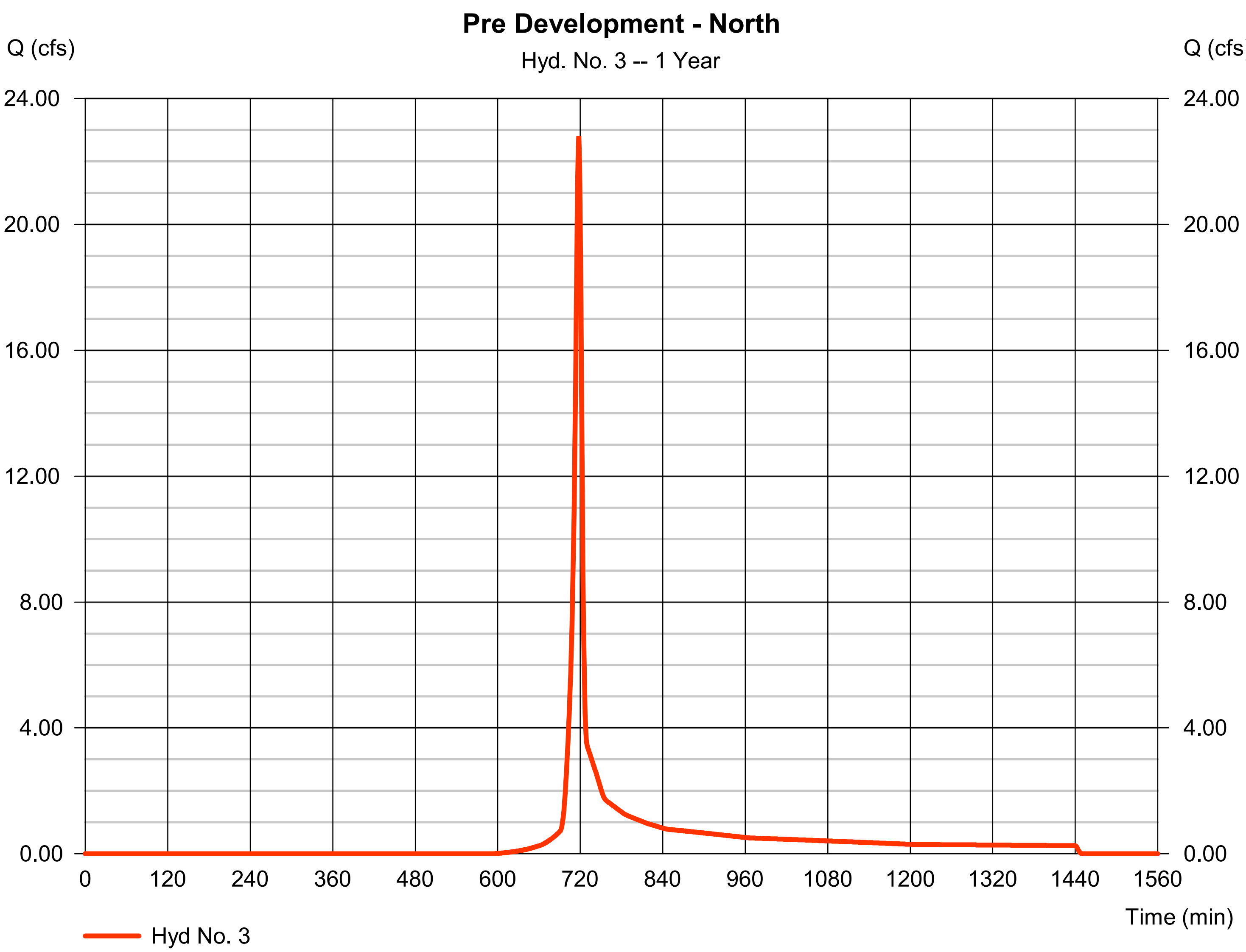
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 3

Pre Development - North

Hydrograph type	= SCS Runoff	Peak discharge	= 22.81 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 45,811 cuft
Drainage area	= 12.840 ac	Curve number	= 82.9
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.30 min
Total precip.	= 2.37 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 3

Pre Development - North

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.011		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	2.84		0.00		0.00		
Land slope (%)	=	1.00		0.00		0.00		
Travel Time (min)	**=**	**1.70**	**+**	**0.00**	**+**	**0.00**	**=**	**1.70**
Shallow Concentrated Flow								
Flow length (ft)	=	560.00		0.00		0.00		
Watercourse slope (%)	=	1.60		0.00		0.00		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (ft/s)	=2.04			0.00		0.00		
Travel Time (min)	**=**	**4.57**	**+**	**0.00**	**+**	**0.00**	**=**	**4.57**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=0.00							
				0.00				
						0.00		
Flow length (ft)	({0})0.0			0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc .... 6.30 min

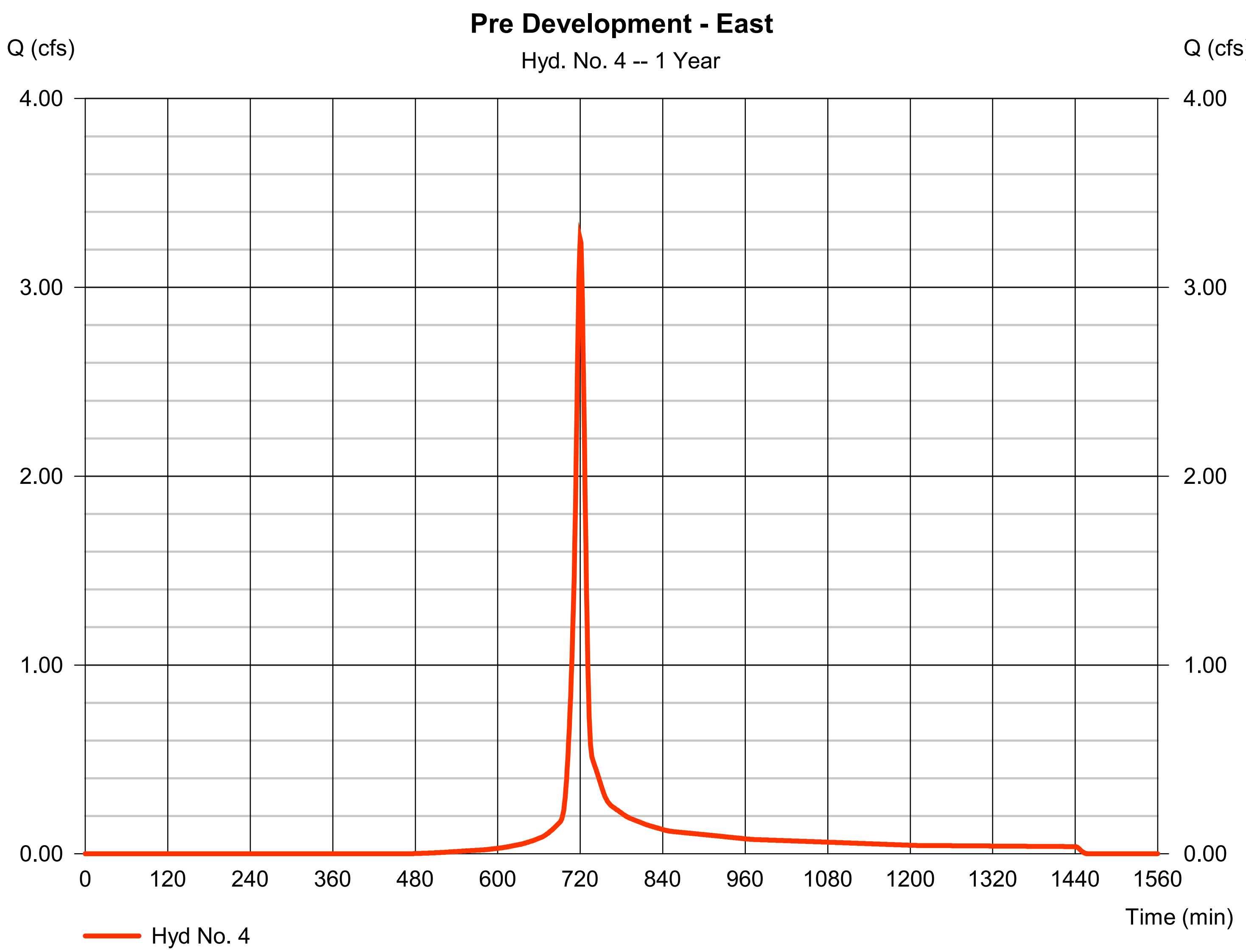
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 4

Pre Development - East

Hydrograph type	= SCS Runoff	Peak discharge	= 3.255 cfs
Storm frequency	= 1 yrs	Time to peak	= 720 min
Time interval	= 1 min	Hyd. volume	= 7,880 cuft
Drainage area	= 1.660 ac	Curve number	= 88.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 11.20 min
Total precip.	= 2.37 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 4

Pre Development - East

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.130		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	2.84		0.00		0.00		
Land slope (%)	=	1.82		0.00		0.00		
Travel Time (min)	**=**	**9.63**	**+**	**0.00**	**+**	**0.00**	**=**	**9.63**
Shallow Concentrated Flow								
Flow length (ft)	=	298.00		0.00		0.00		
Watercourse slope (%)	=	3.84		0.00		0.00		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (ft/s)	=	3.16		0.00		0.00		
Travel Time (min)	**=**	**1.57**	**+**	**0.00**	**+**	**0.00**	**=**	**1.57**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00						
				0.00				
						0.00		
Flow length (ft)		({0})0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc .... 11.20 min

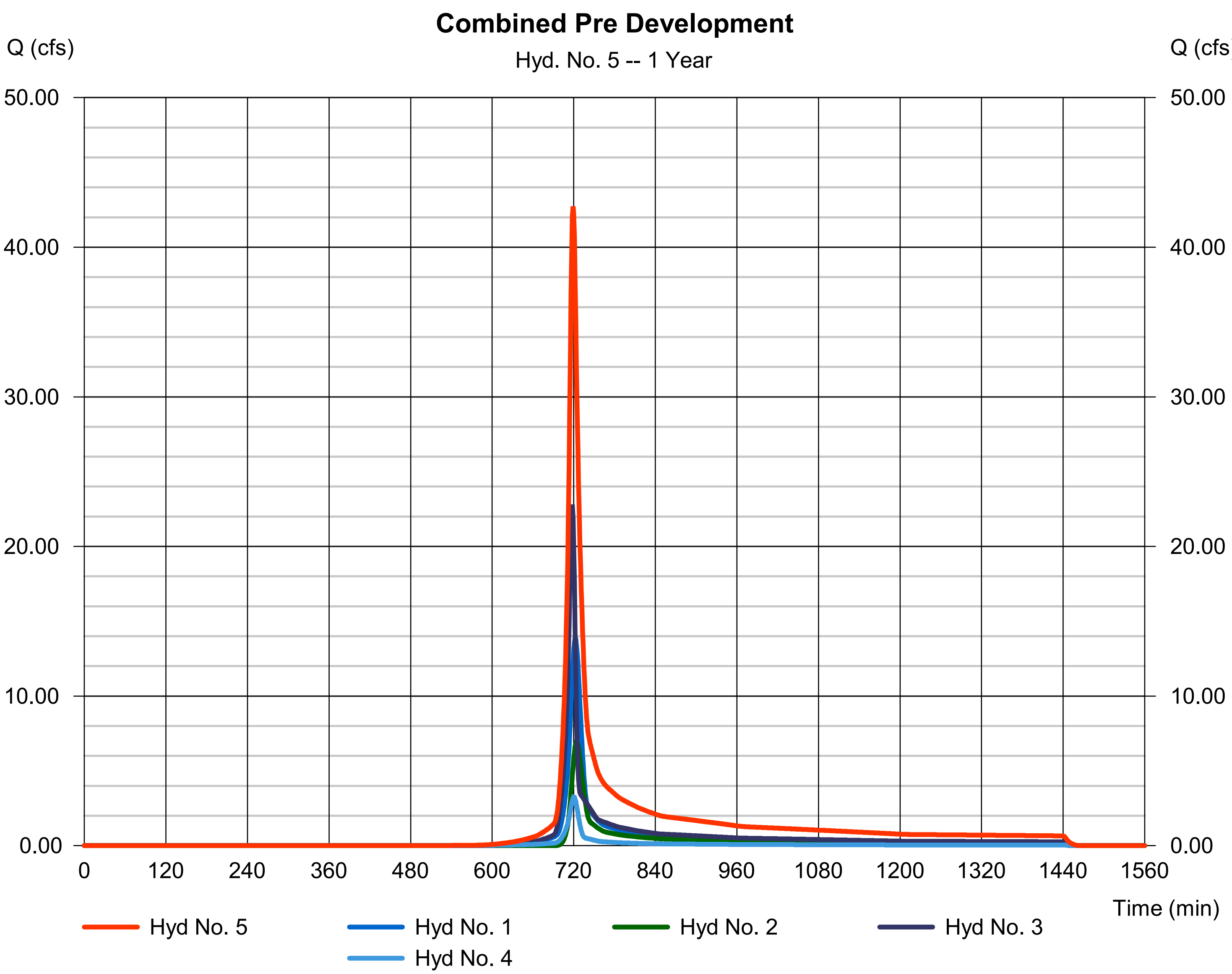
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Thursday, 08 / 5 / 2021

Hyd. No. 5

Combined Pre Development

Hydrograph type	= Combine	Peak discharge	= 42.74 cfs
Storm frequency	= 1 yrs	Time to peak	= 719 min
Time interval	= 1 min	Hyd. volume	= 113,098 cuft
Inflow hyds.	= 1, 2, 3, 4	Contrib. drain. area	= 34.660 ac

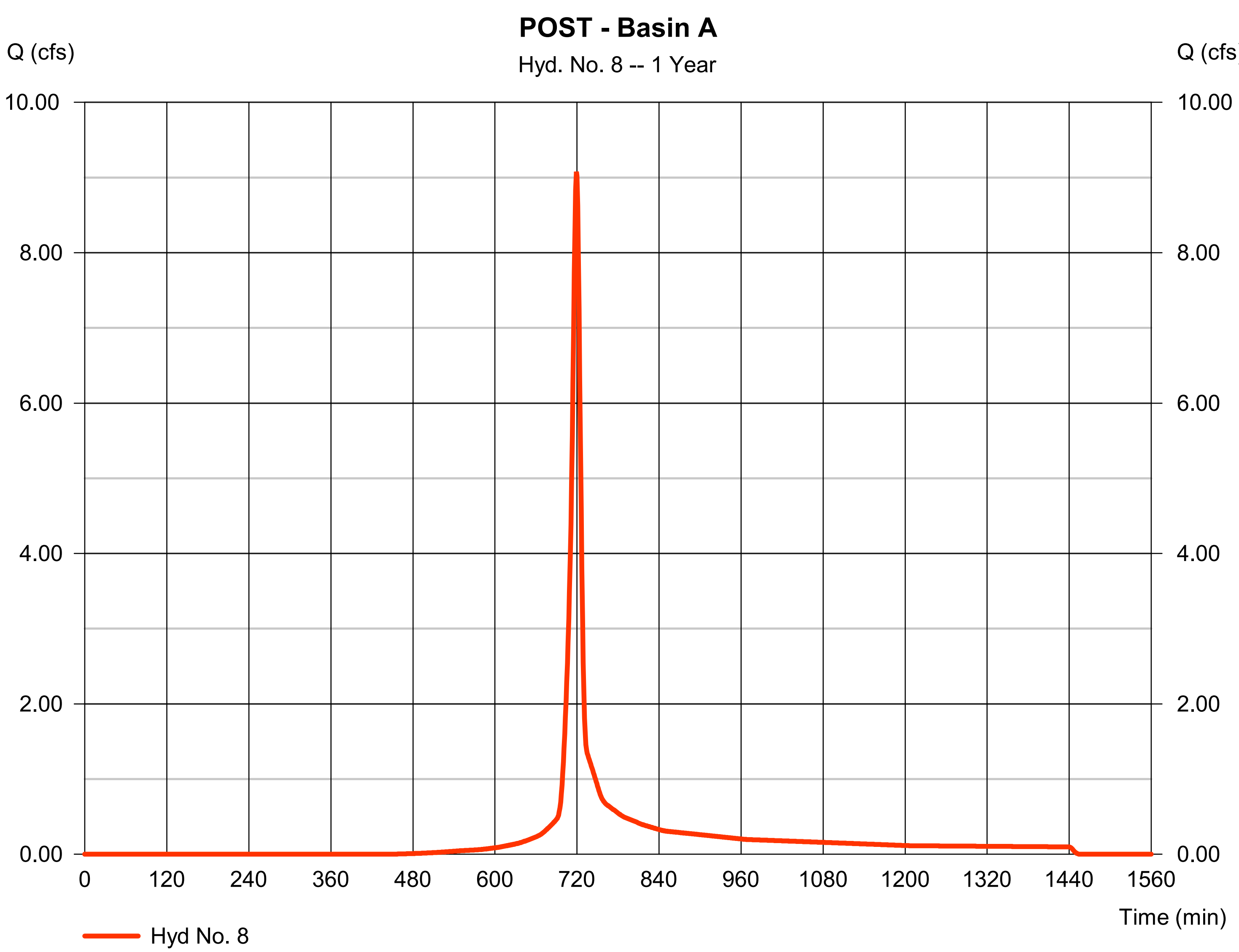


Hydrograph Report

Hyd. No. 8

POST - Basin A

Hydrograph type	= SCS Runoff	Peak discharge	= 9.079 cfs
Storm frequency	= 1 yrs	Time to peak	= 719 min
Time interval	= 1 min	Hyd. volume	= 20,621 cuft
Drainage area	= 4.280 ac	Curve number	= 88.8
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.10 min
Total precip.	= 2.37 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 8

POST - Basin A

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.050		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	2.84		0.00		0.00		
Land slope (%)	=	0.50		0.00		0.00		
Travel Time (min)	**=**	**7.52**	**+**	**0.00**	**+**	**0.00**	**=**	**7.52**
Shallow Concentrated Flow								
Flow length (ft)	=	105.00		0.00		0.00		
Watercourse slope (%)	=	0.50		0.00		0.00		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (ft/s)	=1.14			0.00		0.00		
Travel Time (min)	**=**	**1.53**	**+**	**0.00**	**+**	**0.00**	**=**	**1.53**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=0.00			0.00		0.00		
Flow length (ft)	({0})0.0			0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc .... 9.10 min

Hydrograph Report

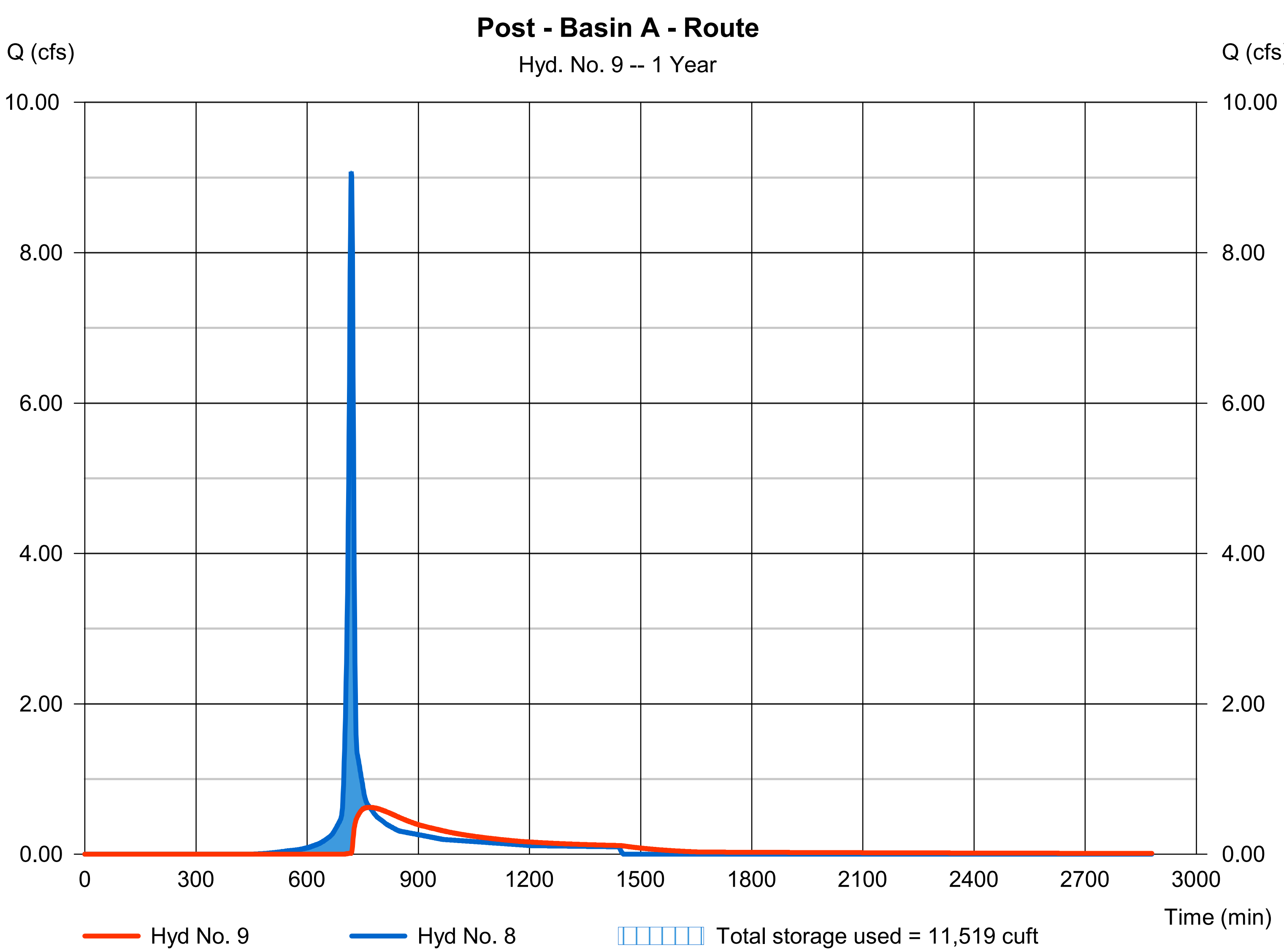
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 9

Post - Basin A - Route

Hydrograph type	= Reservoir	Peak discharge	= 0.623 cfs
Storm frequency	= 1 yrs	Time to peak	= 769 min
Time interval	= 1 min	Hyd. volume	= 14,261 cuft
Inflow hyd. No.	= 8 - POST - Basin A	Max. Elevation	= 530.59 ft
Reservoir name	= Basin A	Max. Storage	= 11,519 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Pond No. 1 - Basin A

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	528.00	n/a	0	0
1.00	529.00	n/a	1,867	1,867
2.00	530.00	n/a	1,868	3,735
3.00	531.00	n/a	13,257	16,992
4.00	532.00	n/a	14,907	31,899
5.00	533.00	n/a	16,611	48,510
5.50	533.50	n/a	8,961	57,471

Culvert / Orifice Structures

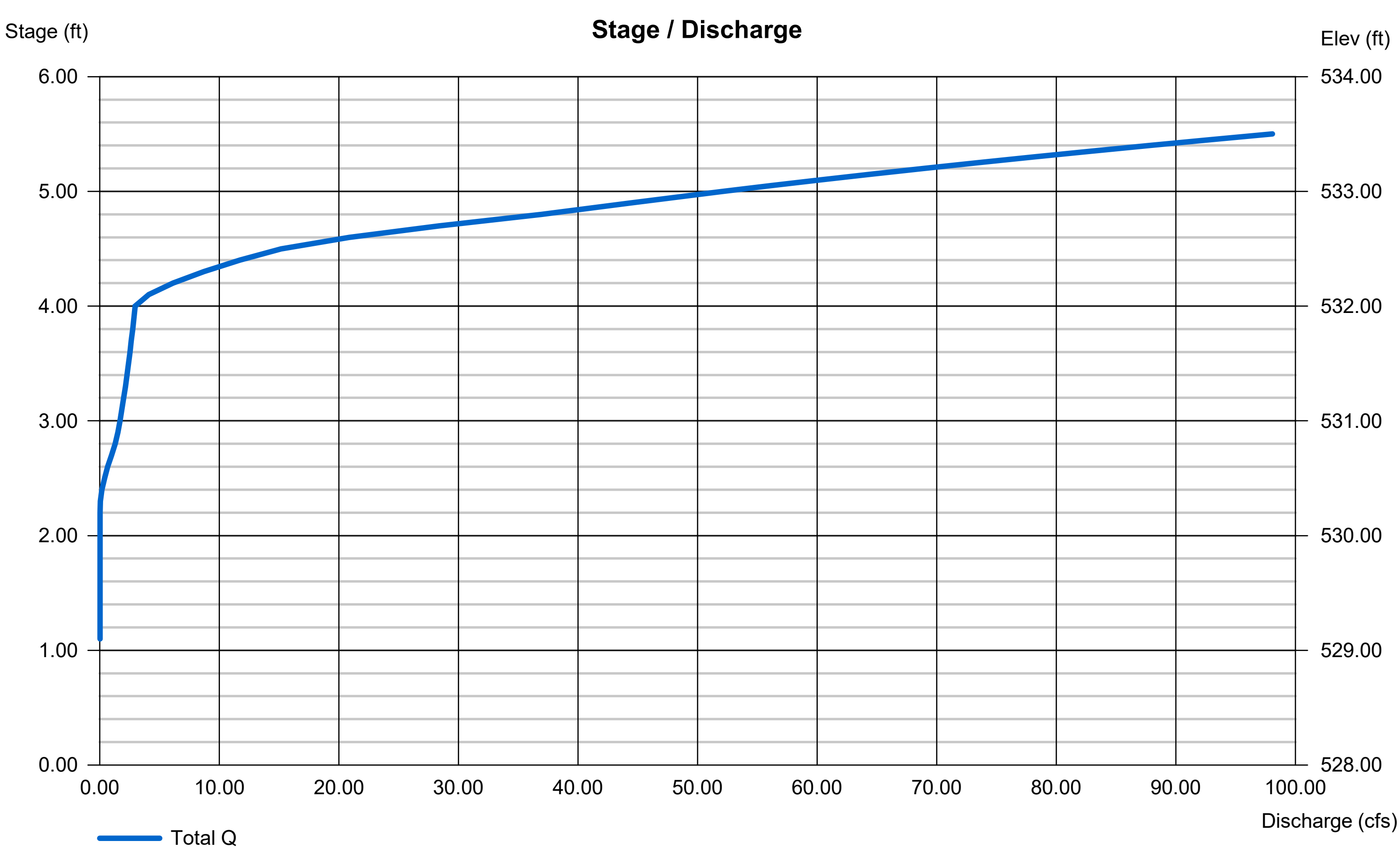
	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	0.63	6.00	0.00
Span (in)	= 24.00	0.63	12.00	0.00
No. Barrels	= 1	1	1	1
Invert El. (ft)	= 528.00	529.00	530.27	0.00
Length (ft)	= 36.28	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 9.98	20.00	0.00	0.00
Crest El. (ft)	= 532.00	532.50	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	Broad	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)
TW Elev. (ft) = 0.00

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

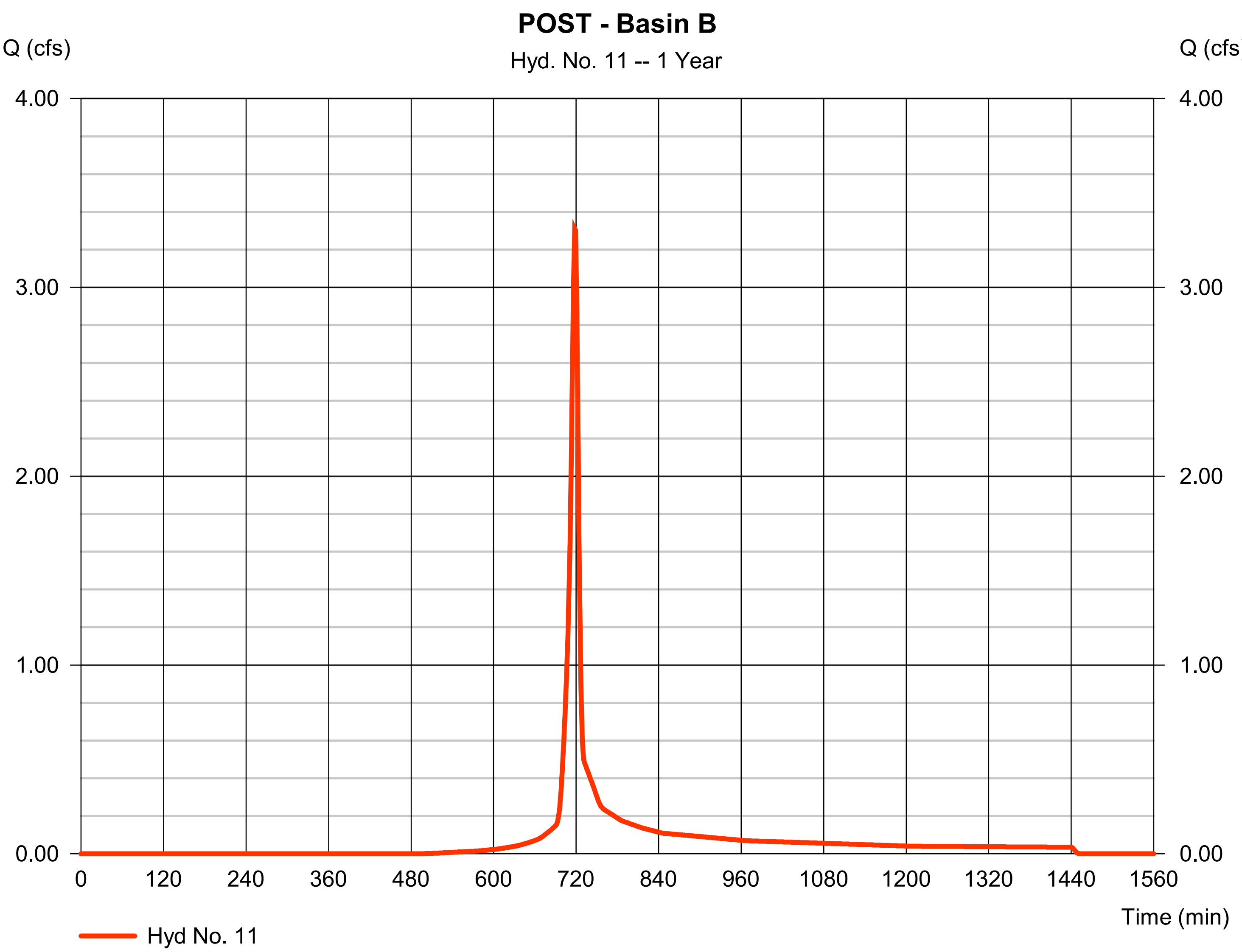


Hydrograph Report

Hyd. No. 11

POST - Basin B

Hydrograph type	= SCS Runoff	Peak discharge	= 3.311 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 7,013 cuft
Drainage area	= 1.620 ac	Curve number	= 87.3
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.90 min
Total precip.	= 2.37 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 11

POST - Basin B

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.050		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	2.84		0.00		0.00		
Land slope (%)	=	0.50		0.00		0.00		
Travel Time (min)	**=**	**7.52**	**+**	**0.00**	**+**	**0.00**	**=**	**7.52**
Shallow Concentrated Flow								
Flow length (ft)	=	29.00		0.00		0.00		
Watercourse slope (%)	=	0.50		0.00		0.00		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (ft/s)	=	1.14		0.00		0.00		
Travel Time (min)	**=**	**0.42**	**+**	**0.00**	**+**	**0.00**	**=**	**0.42**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)		({0})0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc .... **7.90 min**

Hydrograph Report

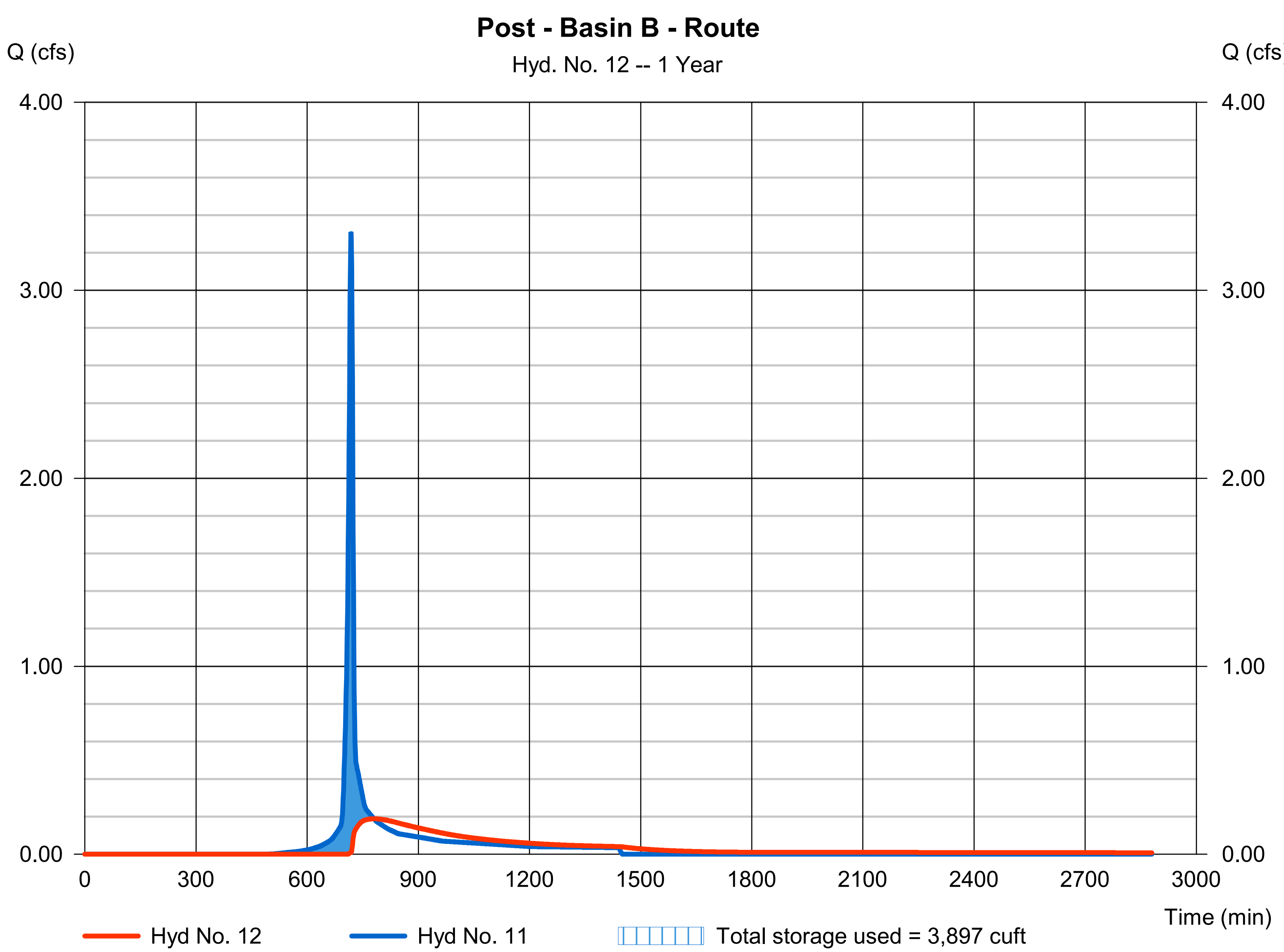
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 12

Post - Basin B - Route

Hydrograph type	= Reservoir	Peak discharge	= 0.189 cfs
Storm frequency	= 1 yrs	Time to peak	= 780 min
Time interval	= 1 min	Hyd. volume	= 5,122 cuft
Inflow hyd. No.	= 11 - POST - Basin B	Max. Elevation	= 532.09 ft
Reservoir name	= Basin B	Max. Storage	= 3,897 cuft

Storage Indication method used.



Pond Report

Pond No. 3 - Basin B

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	529.90	n/a	0	0
0.10	530.00	n/a	117	117
1.10	531.00	n/a	1,168	1,285
2.00	531.90	n/a	1,051	2,336
2.10	532.00	n/a	784	3,120
3.10	533.00	n/a	8,898	12,018
4.10	534.00	n/a	10,707	22,725
4.45	534.35	n/a	4,138	26,863

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	0.63	6.00	0.00
Span (in)	= 18.00	0.63	9.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 530.45	530.90	531.92	0.00
Length (ft)	= 26.94	0.00	0.00	0.00
Slope (%)	= 1.15	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

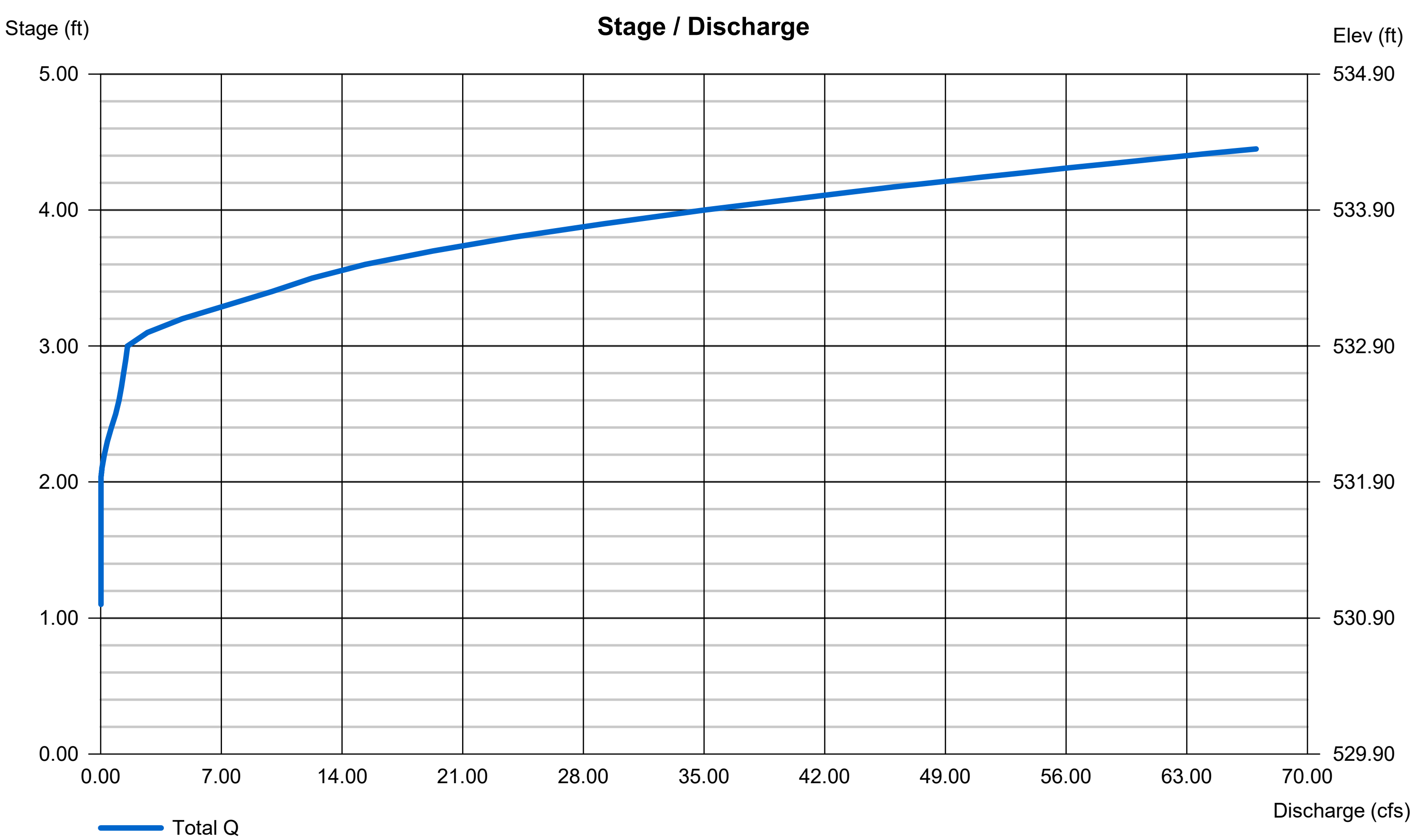
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 9.98	20.00	0.00	0.00
Crest El. (ft)	= 532.90	533.35	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) = 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).



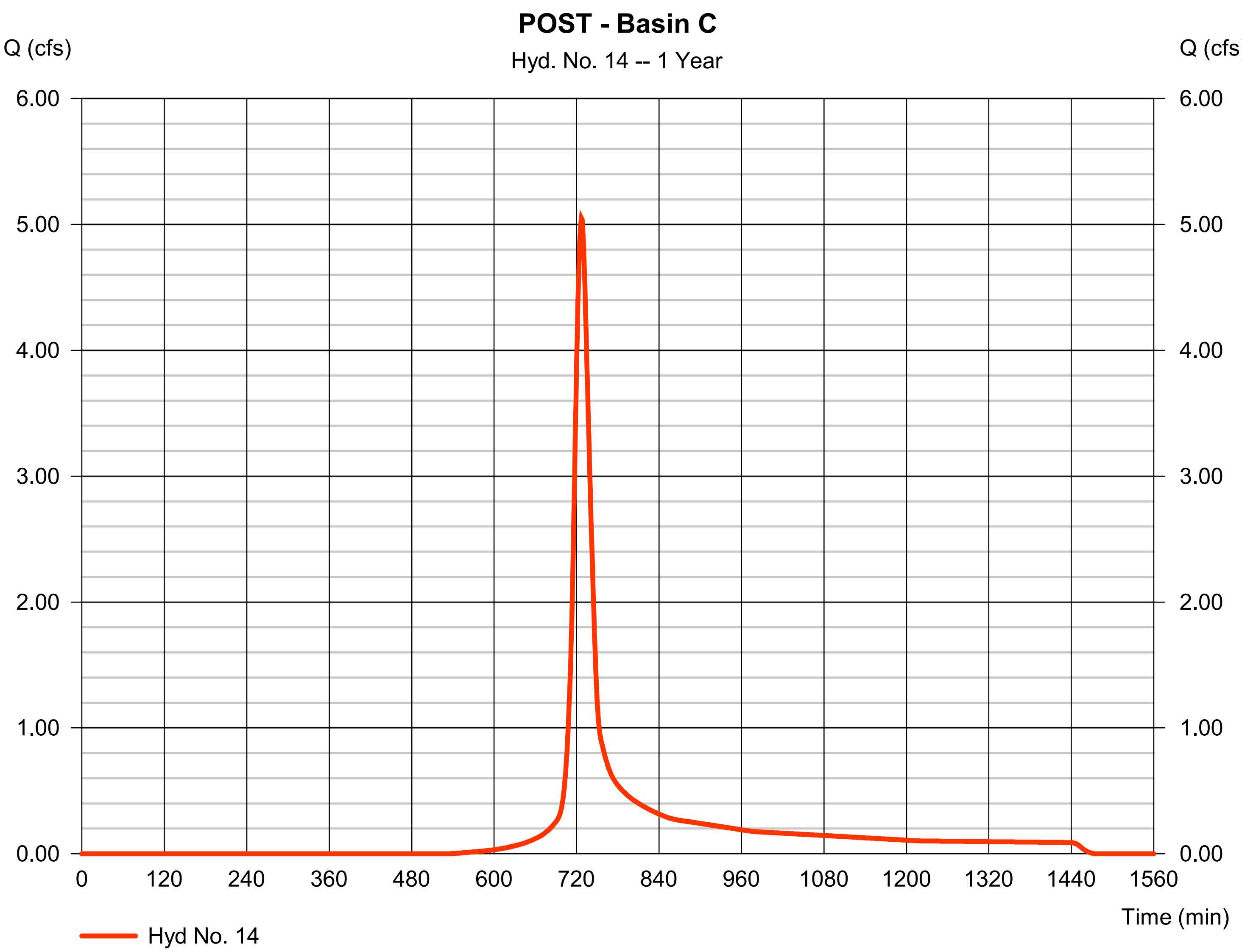
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 14

POST - Basin C

Hydrograph type	= SCS Runoff	Peak discharge	= 5.051 cfs
Storm frequency	= 1 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 17,238 cuft
Drainage area	= 4.210 ac	Curve number	= 86
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 23.00 min
Total precip.	= 2.37 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 14

POST - Basin C

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	2.84		0.00		0.00		
Land slope (%)	=	0.80		0.00		0.00		
Travel Time (min)	**=**	**21.85**	**+**	**0.00**	**+**	**0.00**	**=**	**21.85**
Shallow Concentrated Flow								
Flow length (ft)	=	174.00		0.00		0.00		
Watercourse slope (%)	=	2.62		0.00		0.00		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (ft/s)	=2.61			0.00		0.00		
Travel Time (min)	**=**	**1.11**	**+**	**0.00**	**+**	**0.00**	**=**	**1.11**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=0.00							
				0.00				
						0.00		
Flow length (ft)	({0})0.0			0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc .... **23.00 min**

Hydrograph Report

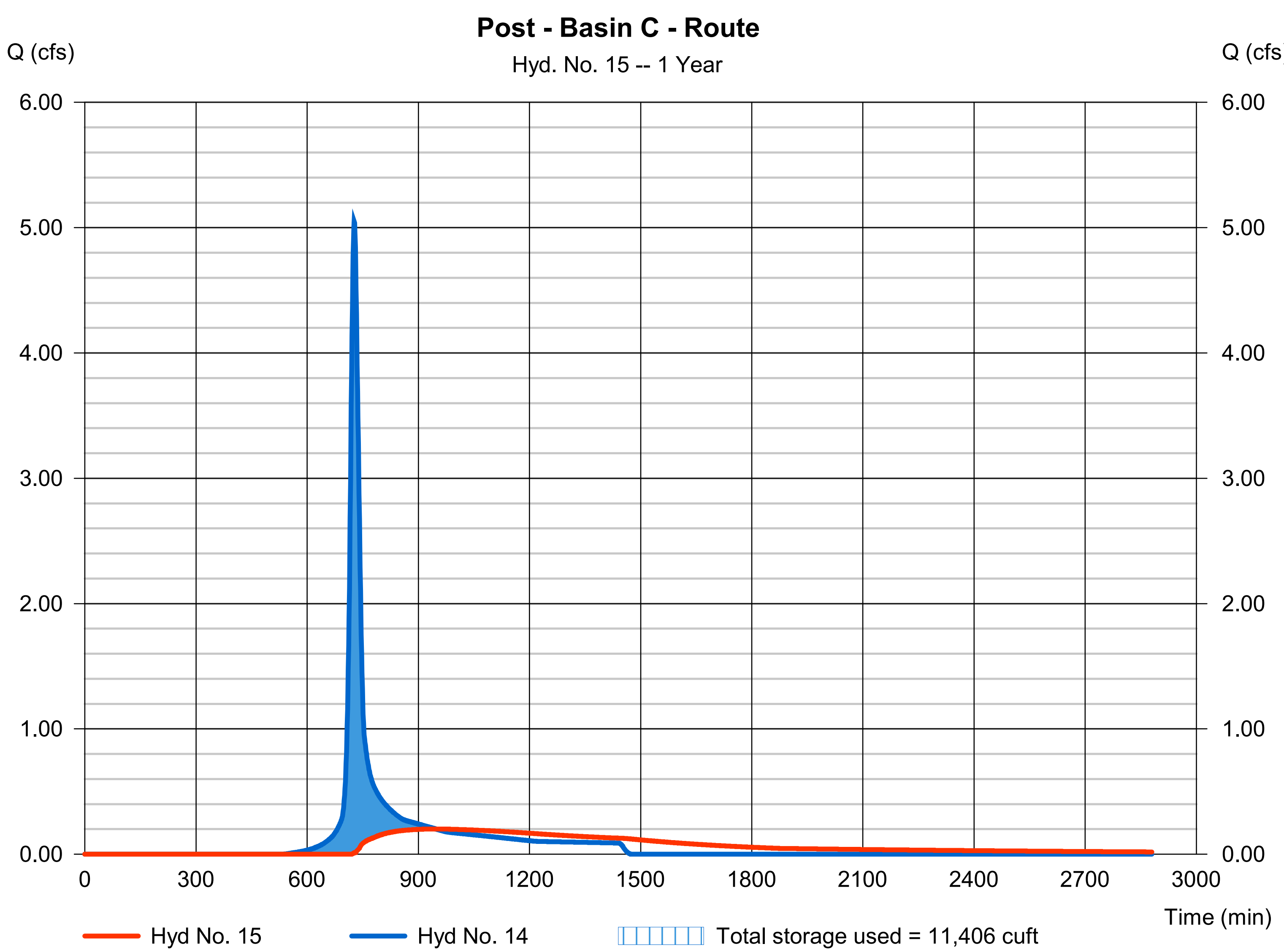
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 15

Post - Basin C - Route

Hydrograph type	= Reservoir	Peak discharge	= 0.202 cfs
Storm frequency	= 1 yrs	Time to peak	= 947 min
Time interval	= 1 min	Hyd. volume	= 11,034 cuft
Inflow hyd. No.	= 14 - POST - Basin C	Max. Elevation	= 531.26 ft
Reservoir name	= Basin C	Max. Storage	= 11,406 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Pond No. 5 - Basin C

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	529.00	n/a	0	0
1.00	530.00	n/a	2,976	2,976
2.00	531.00	n/a	2,977	5,953
3.00	532.00	n/a	20,861	26,814
4.00	533.00	n/a	22,931	49,745
4.50	533.50	n/a	12,258	62,003

Culvert / Orifice Structures

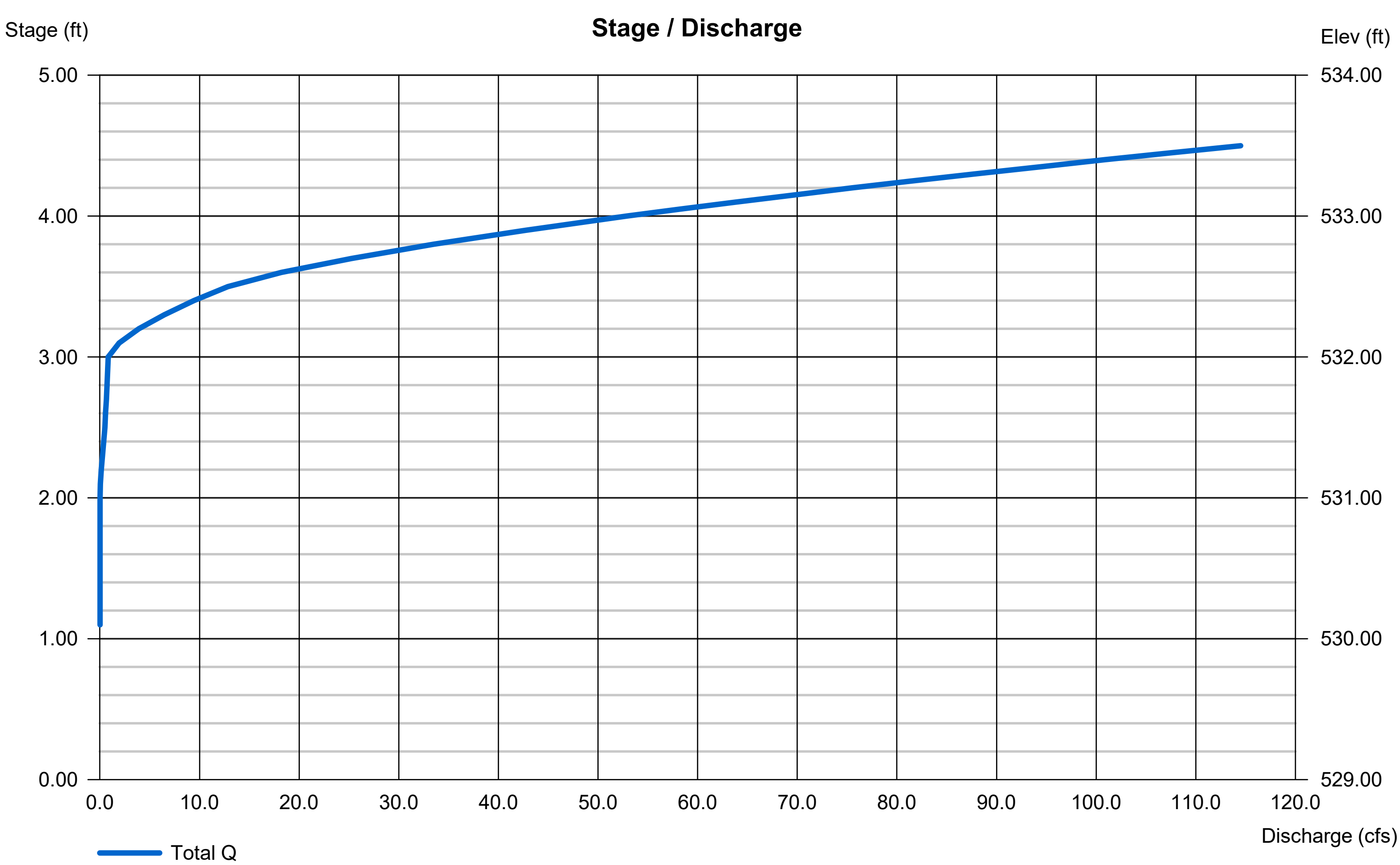
	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	0.75	6.00	0.00
Span (in)	= 18.00	0.75	6.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 529.19	530.00	531.00	0.00
Length (ft)	= 24.65	0.00	0.00	0.00
Slope (%)	= 1.07	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 9.98	20.00	0.00	0.00
Crest El. (ft)	= 532.00	532.50	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= Rect	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).



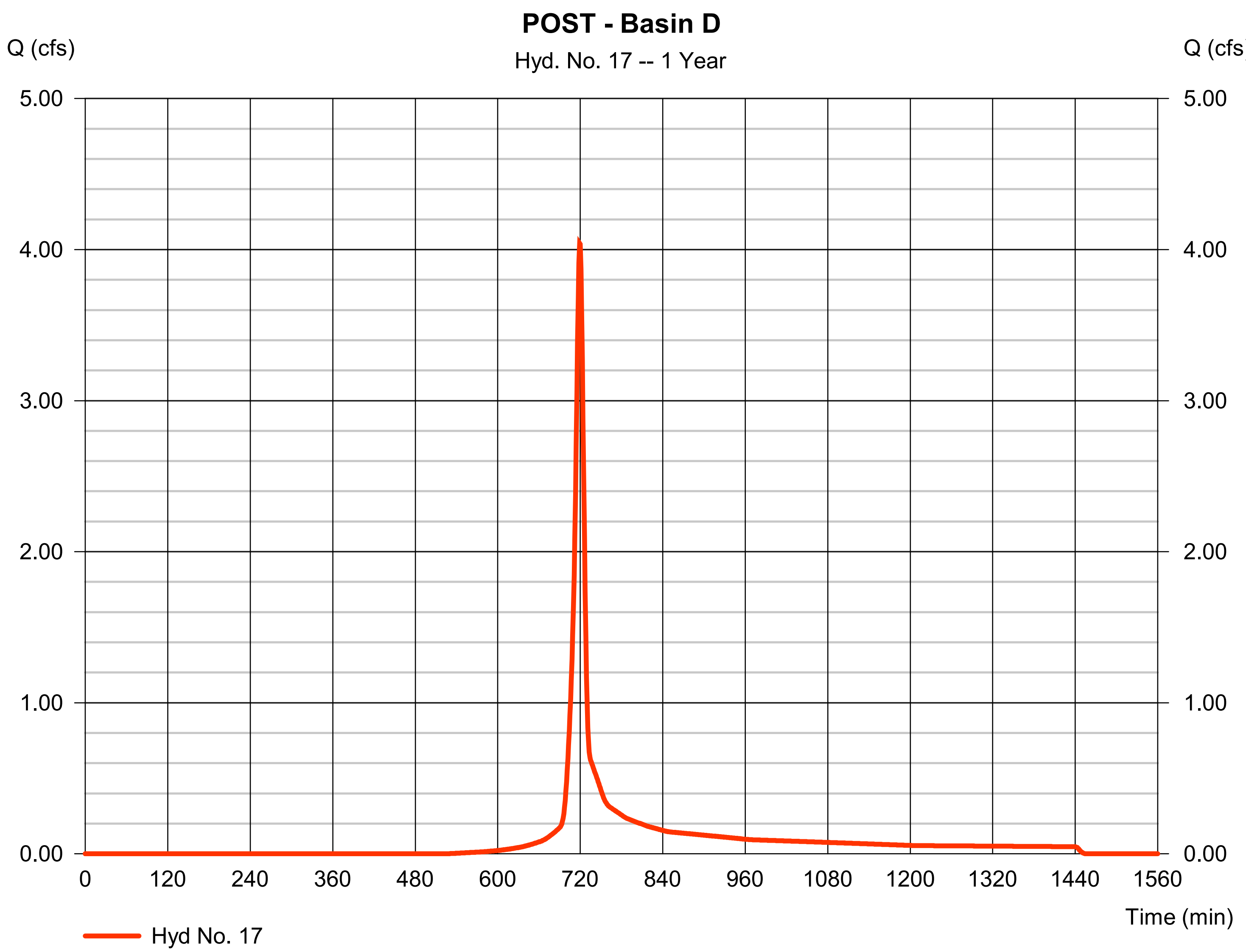
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 17

POST - Basin D

Hydrograph type	= SCS Runoff	Peak discharge	= 4.041 cfs
Storm frequency	= 1 yrs	Time to peak	= 719 min
Time interval	= 1 min	Hyd. volume	= 9,140 cuft
Drainage area	= 2.200 ac	Curve number	= 86.1
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.60 min
Total precip.	= 2.37 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 17

POST - Basin D

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.050		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	2.84		0.00		0.00		
Land slope (%)	=	0.50		0.00		0.00		
Travel Time (min)	**=**	**7.52**	**+**	**0.00**	**+**	**0.00**	**=**	**7.52**
Shallow Concentrated Flow								
Flow length (ft)	=	143.00		0.00		0.00		
Watercourse slope (%)	=	0.50		0.00		0.00		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (ft/s)	=	1.14		0.00		0.00		
Travel Time (min)	**=**	**2.09**	**+**	**0.00**	**+**	**0.00**	**=**	**2.09**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00						
				0.00				
						0.00		
Flow length (ft)	({0})	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc .... **9.60 min**

Hydrograph Report

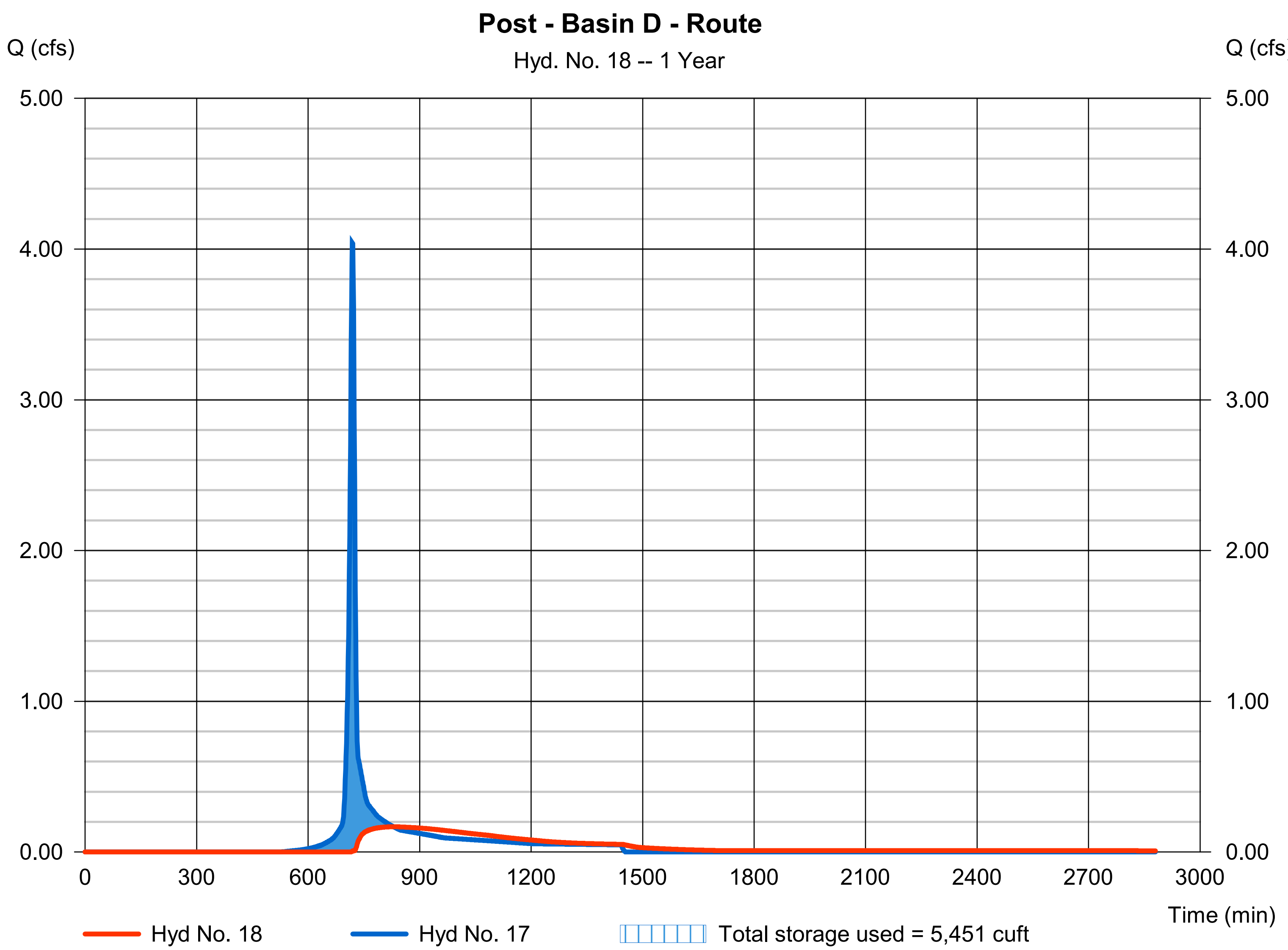
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 18

Post - Basin D - Route

Hydrograph type	= Reservoir	Peak discharge	= 0.167 cfs
Storm frequency	= 1 yrs	Time to peak	= 830 min
Time interval	= 1 min	Hyd. volume	= 5,598 cuft
Inflow hyd. No.	= 17 - POST - Basin D	Max. Elevation	= 534.55 ft
Reservoir name	= Basin D	Max. Storage	= 5,451 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Pond No. 7 - Basin D

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	532.00	n/a	0	0
1.00	533.00	n/a	2,099	2,099
2.00	534.00	n/a	2,100	4,199
3.00	535.00	n/a	2,259	6,458
4.00	536.00	n/a	17,232	23,690
5.00	537.00	n/a	19,464	43,154

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	0.63	3.00	0.00
Span (in)	= 18.00	0.63	3.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 532.00	533.00	534.00	0.00
Length (ft)	= 91.76	0.00	0.00	0.00
Slope (%)	= 2.04	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

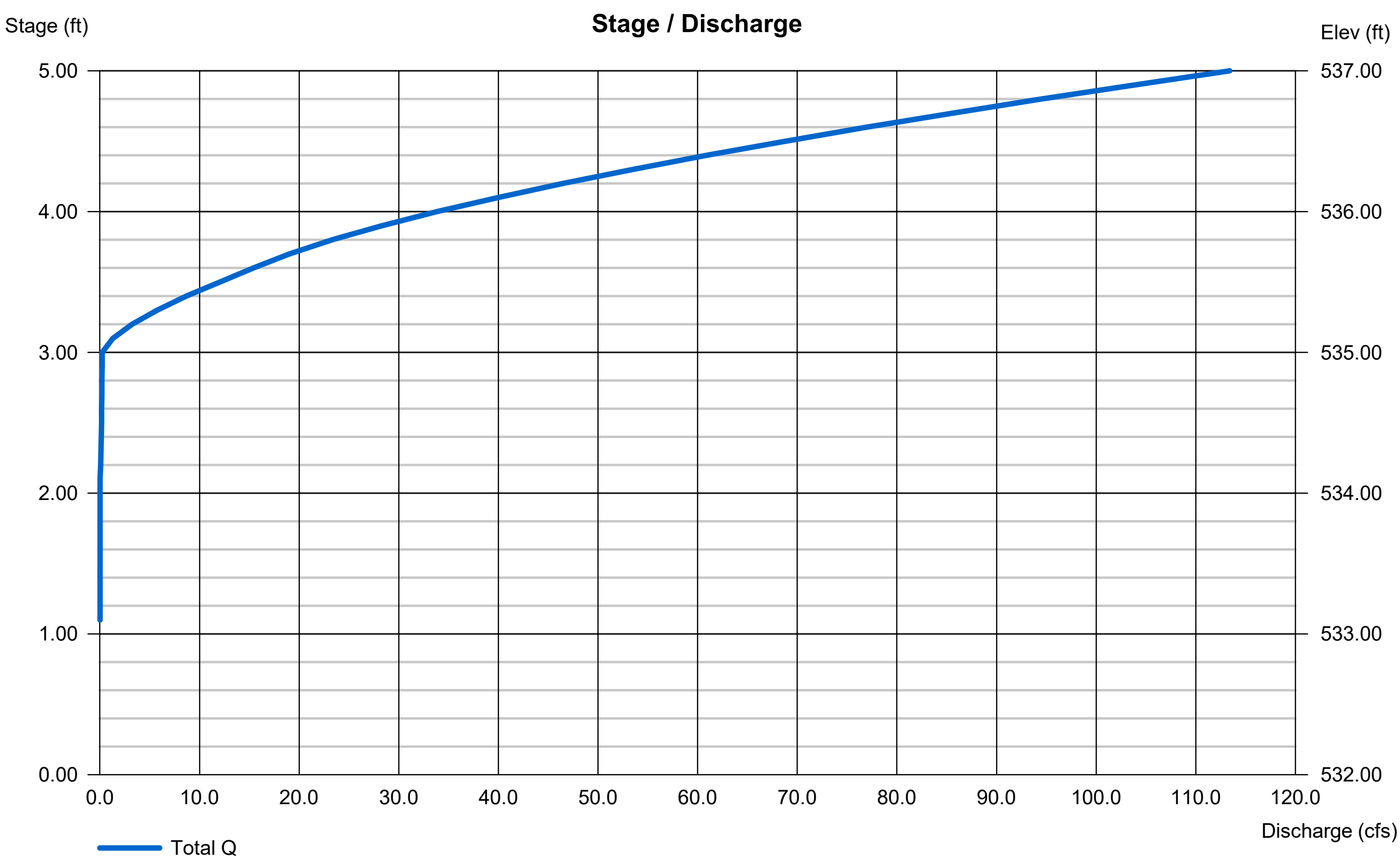
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 9.98	20.00	0.00	0.00
Crest El. (ft)	= 535.00	535.50	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) = 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).

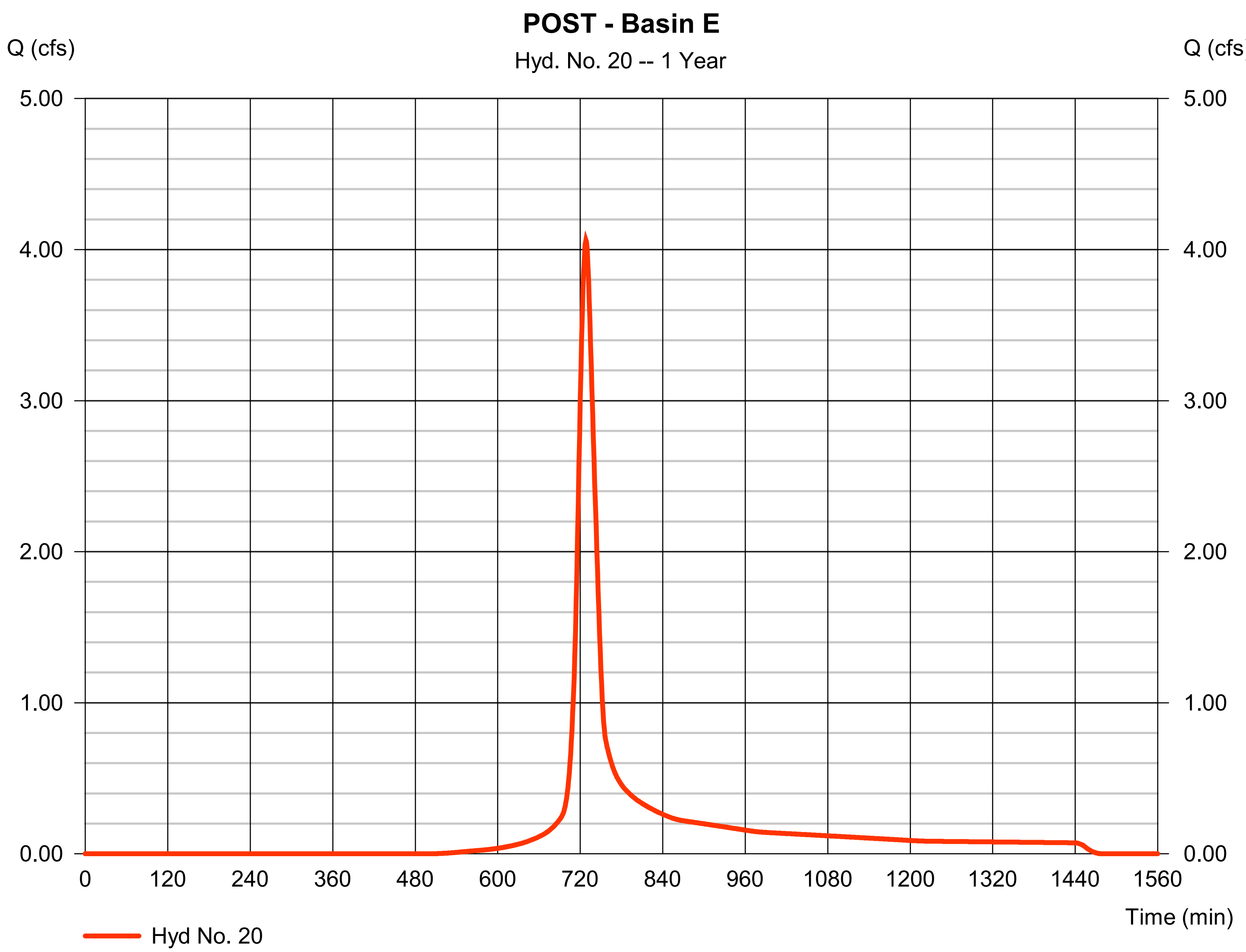


Hydrograph Report

Hyd. No. 20

POST - Basin E

Hydrograph type	= SCS Runoff	Peak discharge	= 4.062 cfs
Storm frequency	= 1 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 14,492 cuft
Drainage area	= 3.300 ac	Curve number	= 87.1
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 25.30 min
Total precip.	= 2.37 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 20

POST - Basin E

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	2.84		0.00		0.00		
Land slope (%)	=	0.60		0.00		0.00		
Travel Time (min)	**=**	**24.52**	**+**	**0.00**	**+**	**0.00**	**=**	**24.52**
Shallow Concentrated Flow								
Flow length (ft)	=	61.00		0.00		0.00		
Watercourse slope (%)	=	0.60		0.00		0.00		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (ft/s)	=	1.25		0.00		0.00		
Travel Time (min)	**=**	**0.81**	**+**	**0.00**	**+**	**0.00**	**=**	**0.81**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)		({0})0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc .... 25.30 min

Hydrograph Report

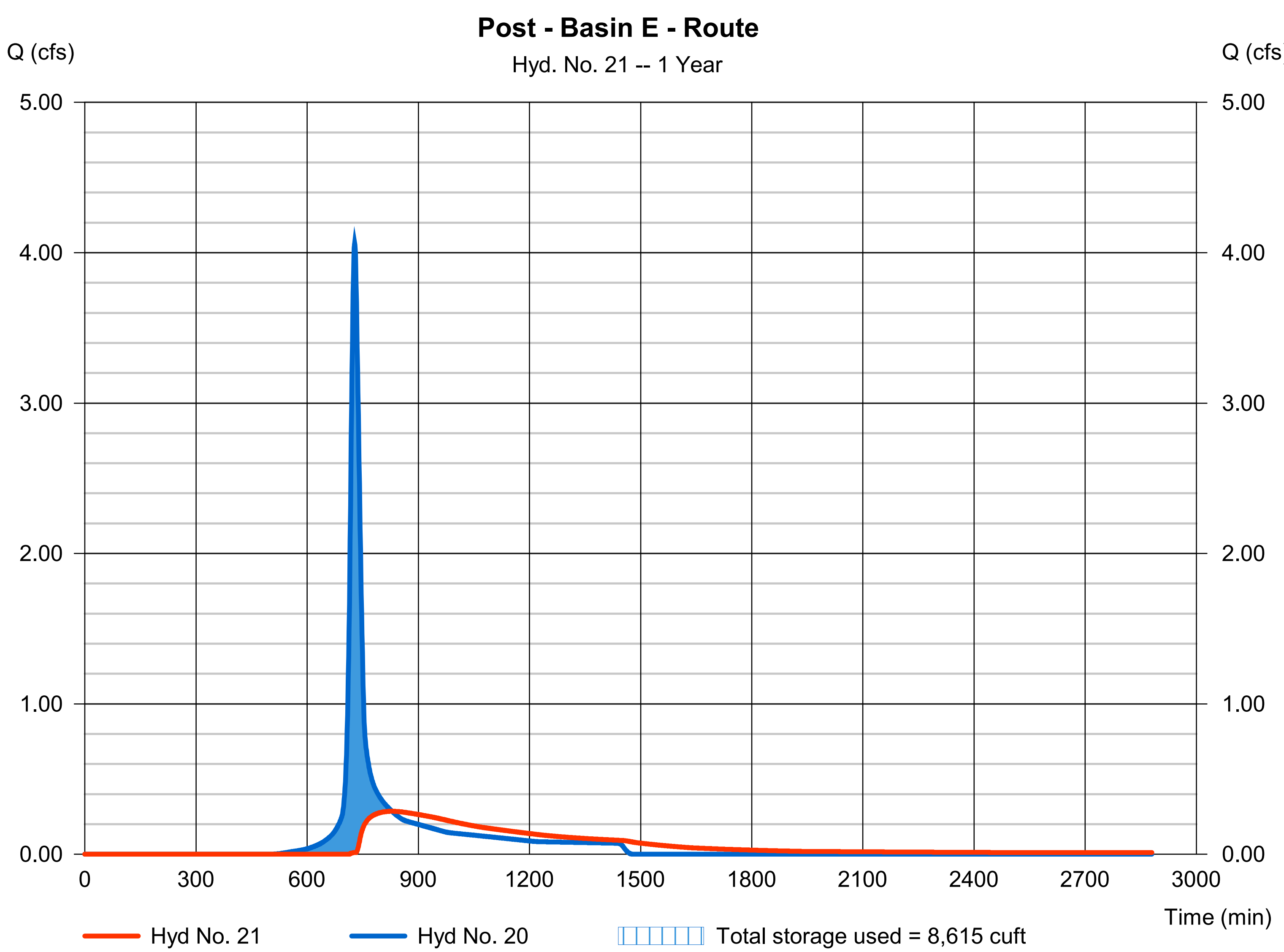
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 21

Post - Basin E - Route

Hydrograph type	= Reservoir	Peak discharge	= 0.286 cfs
Storm frequency	= 1 yrs	Time to peak	= 829 min
Time interval	= 1 min	Hyd. volume	= 9,662 cuft
Inflow hyd. No.	= 20 - POST - Basin E	Max. Elevation	= 533.03 ft
Reservoir name	= Basin E	Max. Storage	= 8,615 cuft

Storage Indication method used.



Pond Report

Pond No. 9 - Basin E

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	530.50	n/a	0	0
0.50	531.00	n/a	741	741
1.00	531.50	n/a	742	1,483
1.50	532.00	n/a	741	2,224
2.00	532.50	n/a	742	2,966
2.50	533.00	n/a	5,248	8,214
3.50	534.00	n/a	12,386	20,600
4.50	535.00	n/a	15,020	35,620
5.50	536.00	n/a	17,806	53,426

Culvert / Orifice Structures

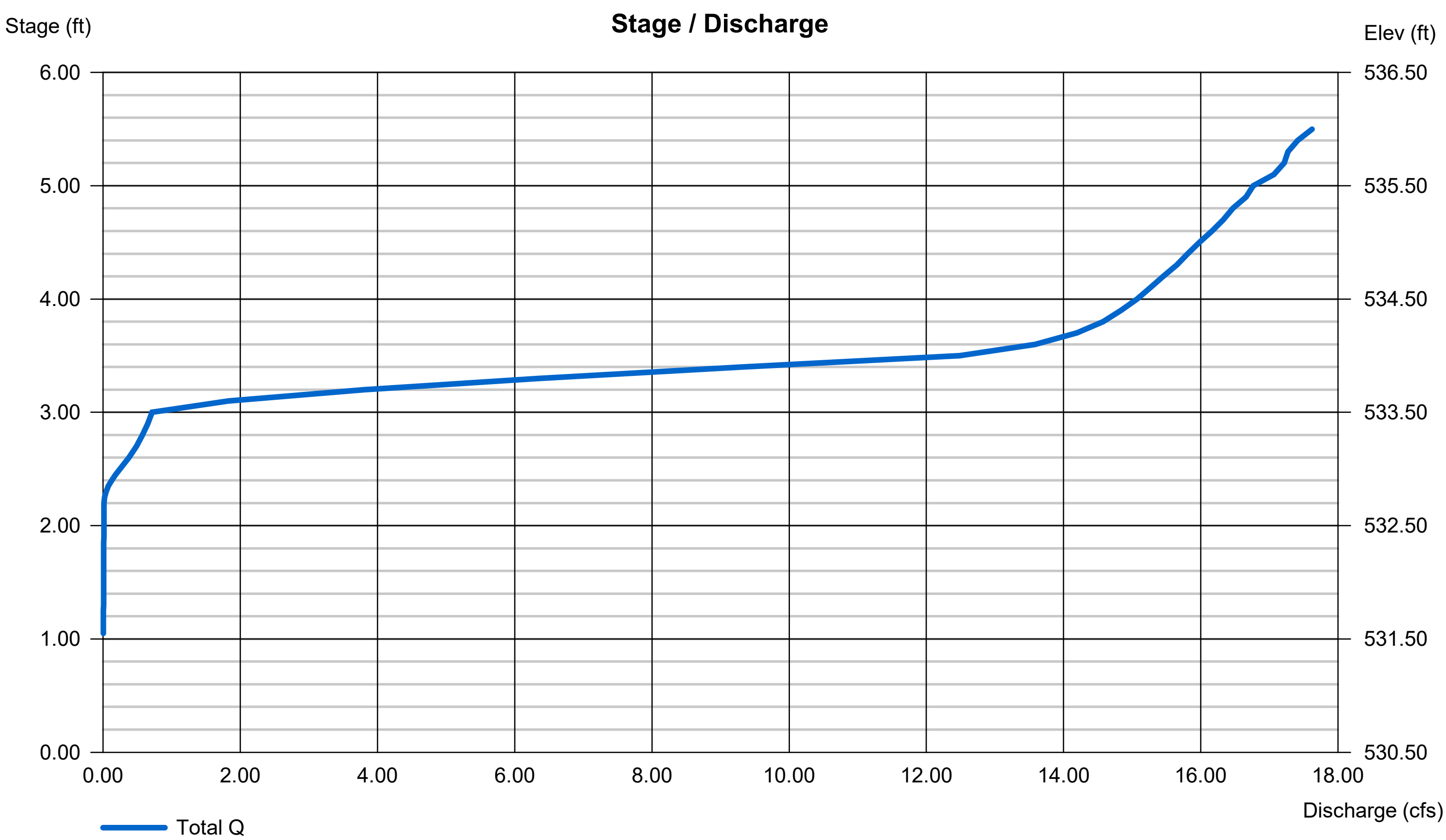
	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	0.63	6.00	0.00
Span (in)	= 18.00	0.63	6.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 530.50	531.50	532.70	0.00
Length (ft)	= 111.11	0.00	0.00	0.00
Slope (%)	= 1.35	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 9.98	9.98	0.00	0.00
Crest El. (ft)	= 533.50	534.10	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	Rect	---	---
Multi-Stage	= Yes	Yes	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).



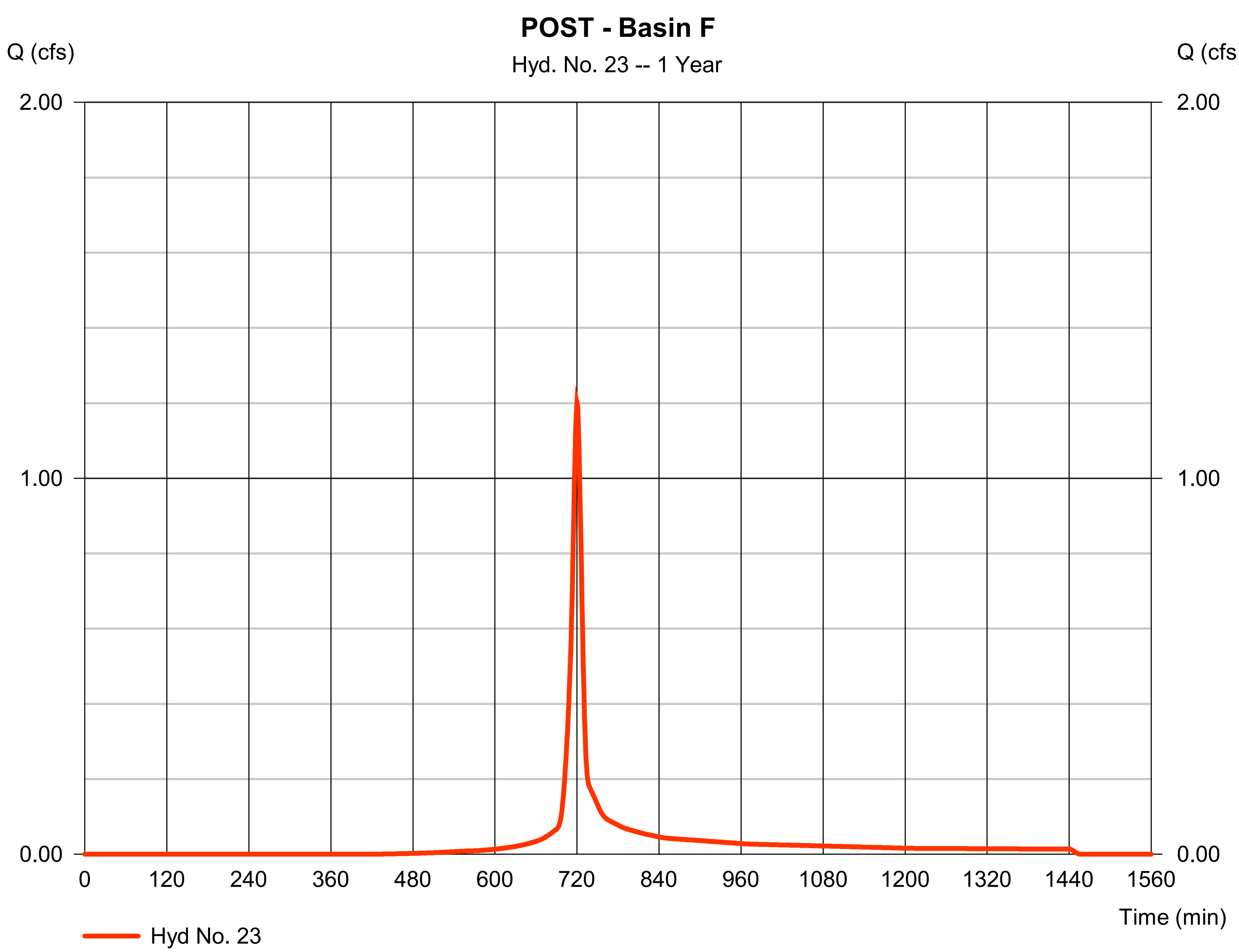
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 23

POST - Basin F

Hydrograph type	= SCS Runoff	Peak discharge	= 1.201 cfs
Storm frequency	= 1 yrs	Time to peak	= 720 min
Time interval	= 1 min	Hyd. volume	= 2,918 cuft
Drainage area	= 0.570 ac	Curve number	= 89.6
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 10.20 min
Total precip.	= 2.37 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 23

POST - Basin F

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	68.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	2.84		0.00		0.00		
Land slope (%)	=	2.50		0.00		0.00		
Travel Time (min)	**=**	**10.18**	**+**	**0.00**	**+**	**0.00**	**=**	**10.18**
Shallow Concentrated Flow								
Flow length (ft)	=	0.00		0.00		0.00		
Watercourse slope (%)	=	0.00		0.00		0.00		
Surface description	=	Paved		Paved		Paved		
Average velocity (ft/s)	=	0.00		0.00		0.00		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00						
				0.00				
						0.00		
Flow length (ft)	({0})	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc .... 10.20 min

Hydrograph Report

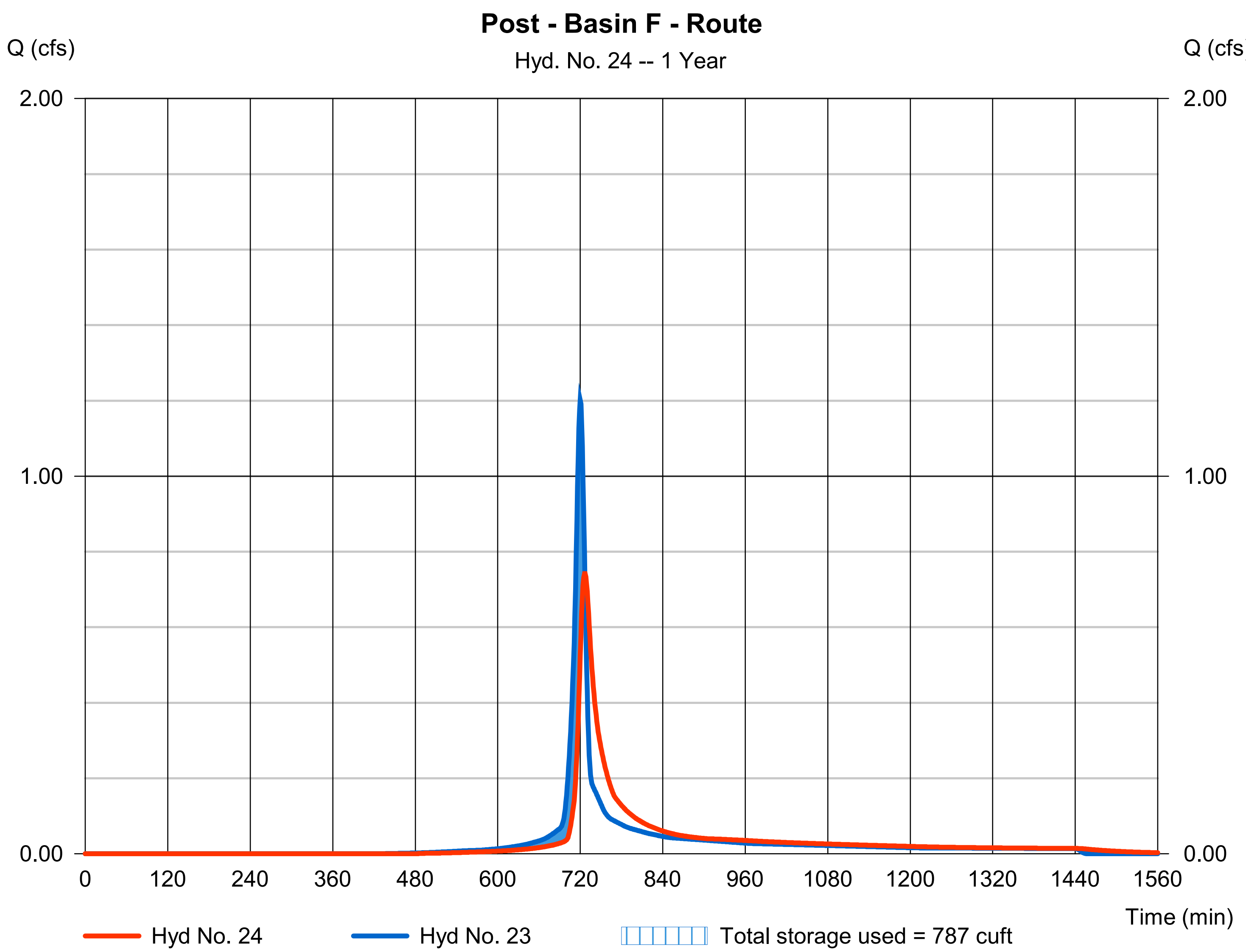
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 24

Post - Basin F - Route

Hydrograph type	= Reservoir	Peak discharge	= 0.742 cfs
Storm frequency	= 1 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 2,914 cuft
Inflow hyd. No.	= 23 - POST - Basin F	Max. Elevation	= 534.47 ft
Reservoir name	= Basin F	Max. Storage	= 787 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Pond No. 11 - Basin F

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	534.00	n/a	0	0
1.00	535.00	n/a	1,675	1,675
2.00	536.00	n/a	2,795	4,470

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 10.00	0.00	0.00	0.00
Span (in)	= 10.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 534.00	0.00	0.00	0.00
Length (ft)	= 330.00	0.00	0.00	0.00
Slope (%)	= 0.60	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

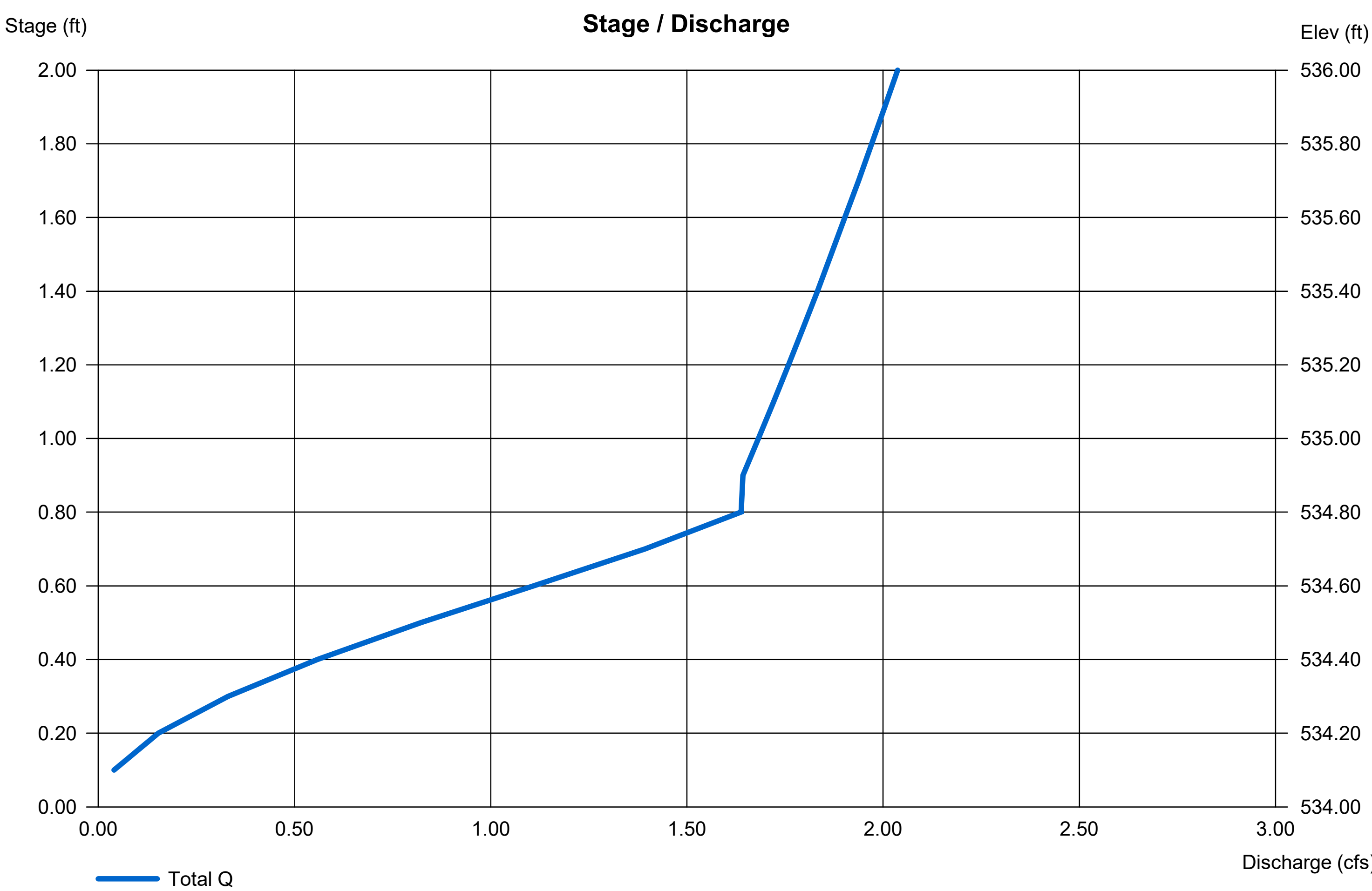
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	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).



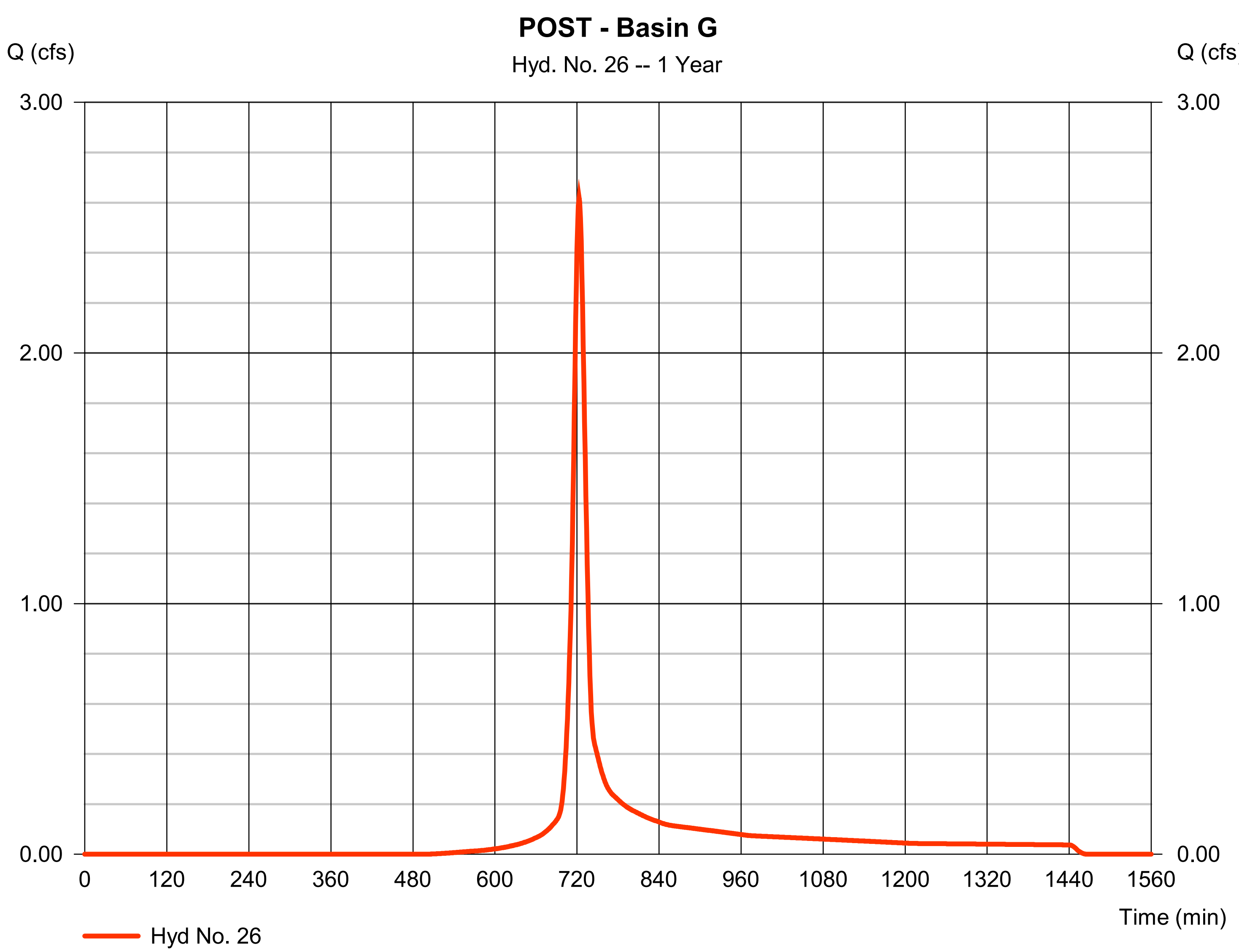
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 26

POST - Basin G

Hydrograph type	= SCS Runoff	Peak discharge	= 2.618 cfs
Storm frequency	= 1 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 7,467 cuft
Drainage area	= 1.670 ac	Curve number	= 87.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 15.80 min
Total precip.	= 2.37 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 26

POST - Basin G

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	2.84		0.00		0.00		
Land slope (%)	=	2.00		0.00		0.00		
Travel Time (min)	**=**	**15.15**	**+**	**0.00**	**+**	**0.00**	**=**	**15.15**
Shallow Concentrated Flow								
Flow length (ft)	=	69.00		0.00		0.00		
Watercourse slope (%)	=	1.40		0.00		0.00		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (ft/s)	=1.91			0.00		0.00		
Travel Time (min)	**=**	**0.60**	**+**	**0.00**	**+**	**0.00**	**=**	**0.60**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=0.00							
				0.00				
						0.00		
Flow length (ft)	({0})0.0			0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc .... 15.80 min

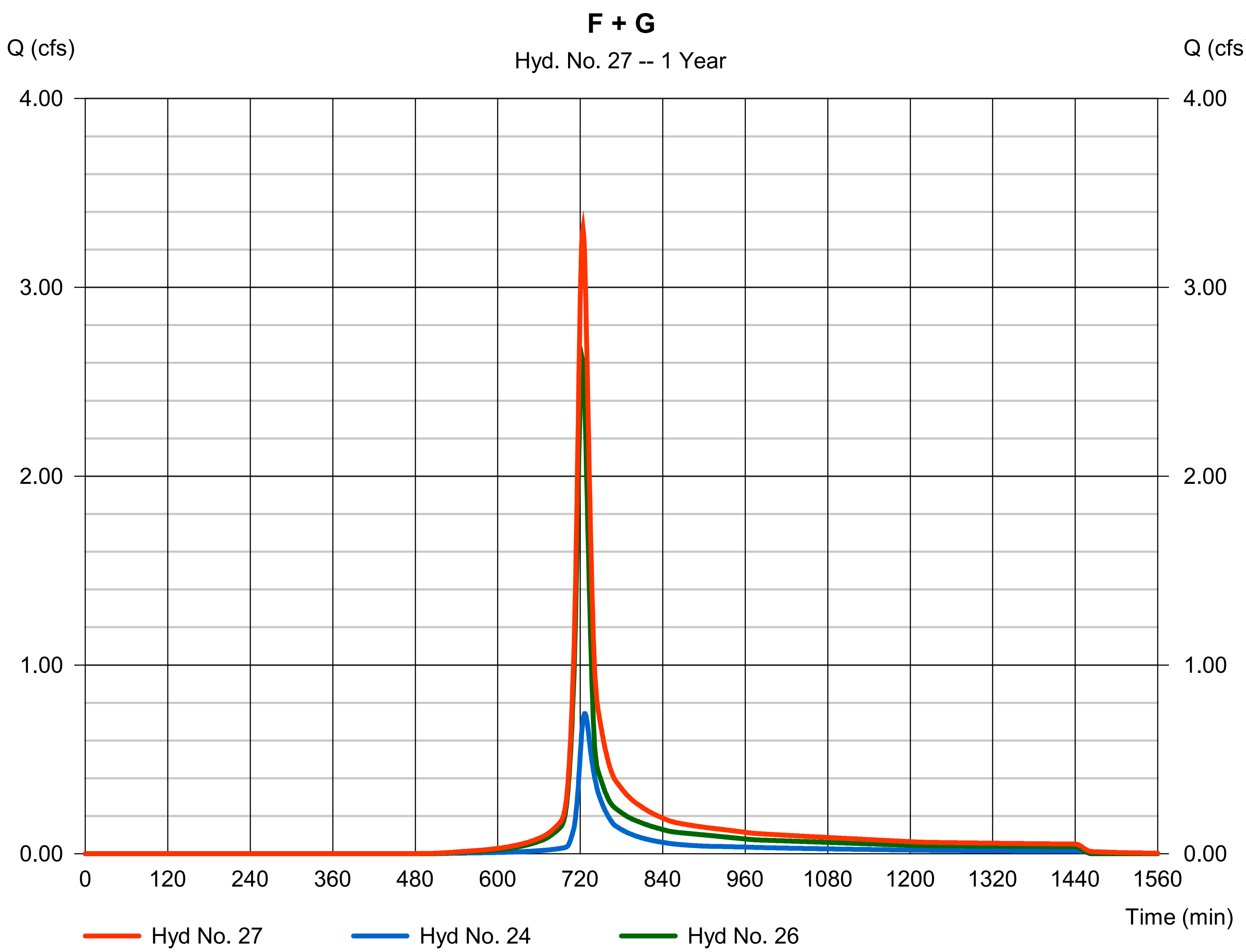
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 27

F + G

Hydrograph type	= Combine	Peak discharge	= 3.314 cfs
Storm frequency	= 1 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 10,380 cuft
Inflow hyds.	= 24, 26	Contrib. drain. area	= 1.670 ac



Hydrograph Report

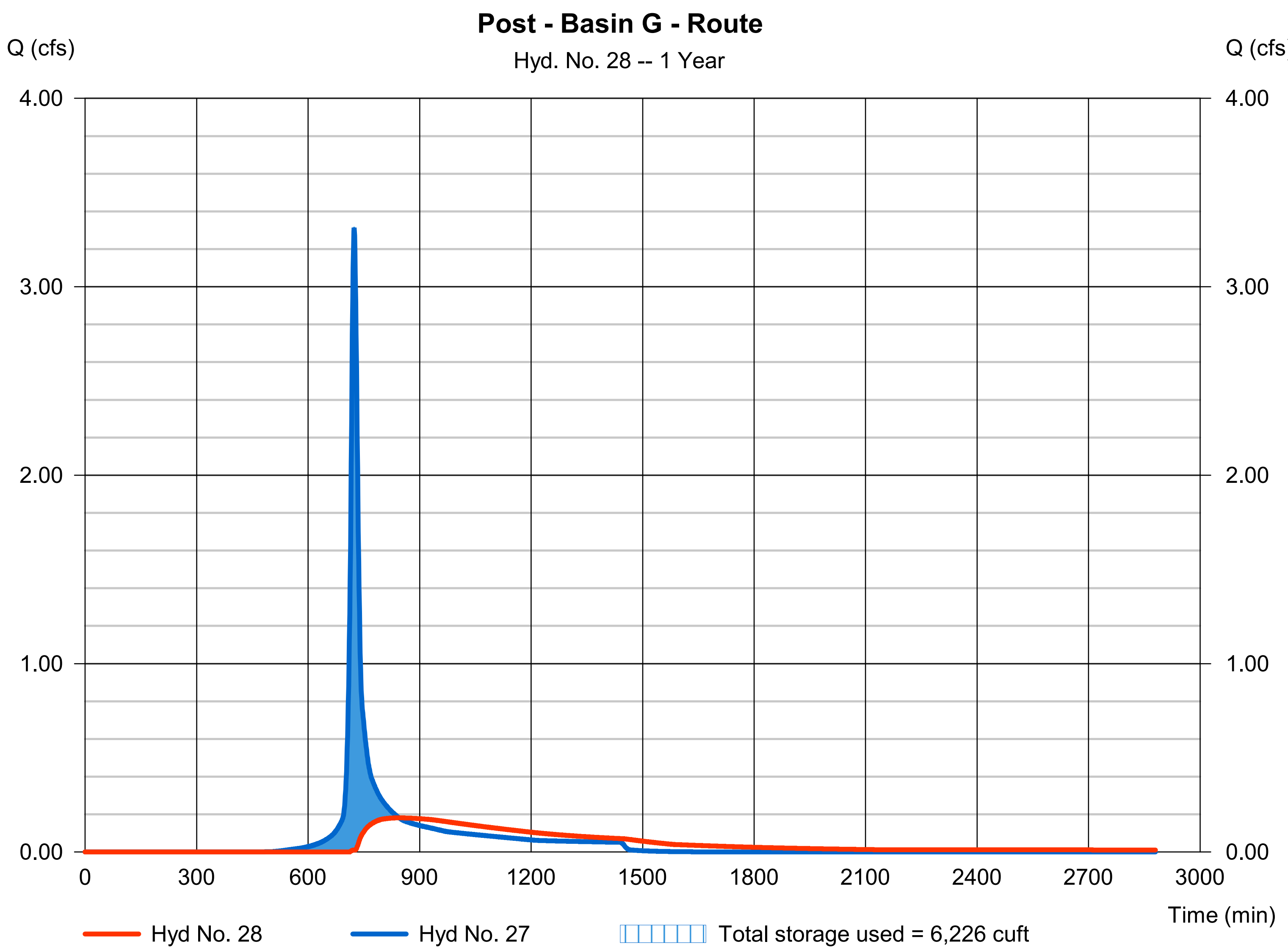
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 28

Post - Basin G - Route

Hydrograph type	= Reservoir	Peak discharge	= 0.181 cfs
Storm frequency	= 1 yrs	Time to peak	= 845 min
Time interval	= 1 min	Hyd. volume	= 7,145 cuft
Inflow hyd. No.	= 27 - F + G	Max. Elevation	= 532.52 ft
Reservoir name	= Basin G	Max. Storage	= 6,226 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Pond No. 13 - Basin G

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	530.00	n/a	0	0
1.00	531.00	n/a	1,068	1,068
2.00	532.00	n/a	1,068	2,136
3.00	533.00	n/a	7,901	10,037
4.00	534.00	n/a	9,510	19,547
5.00	535.00	n/a	11,190	30,737

Culvert / Orifice Structures

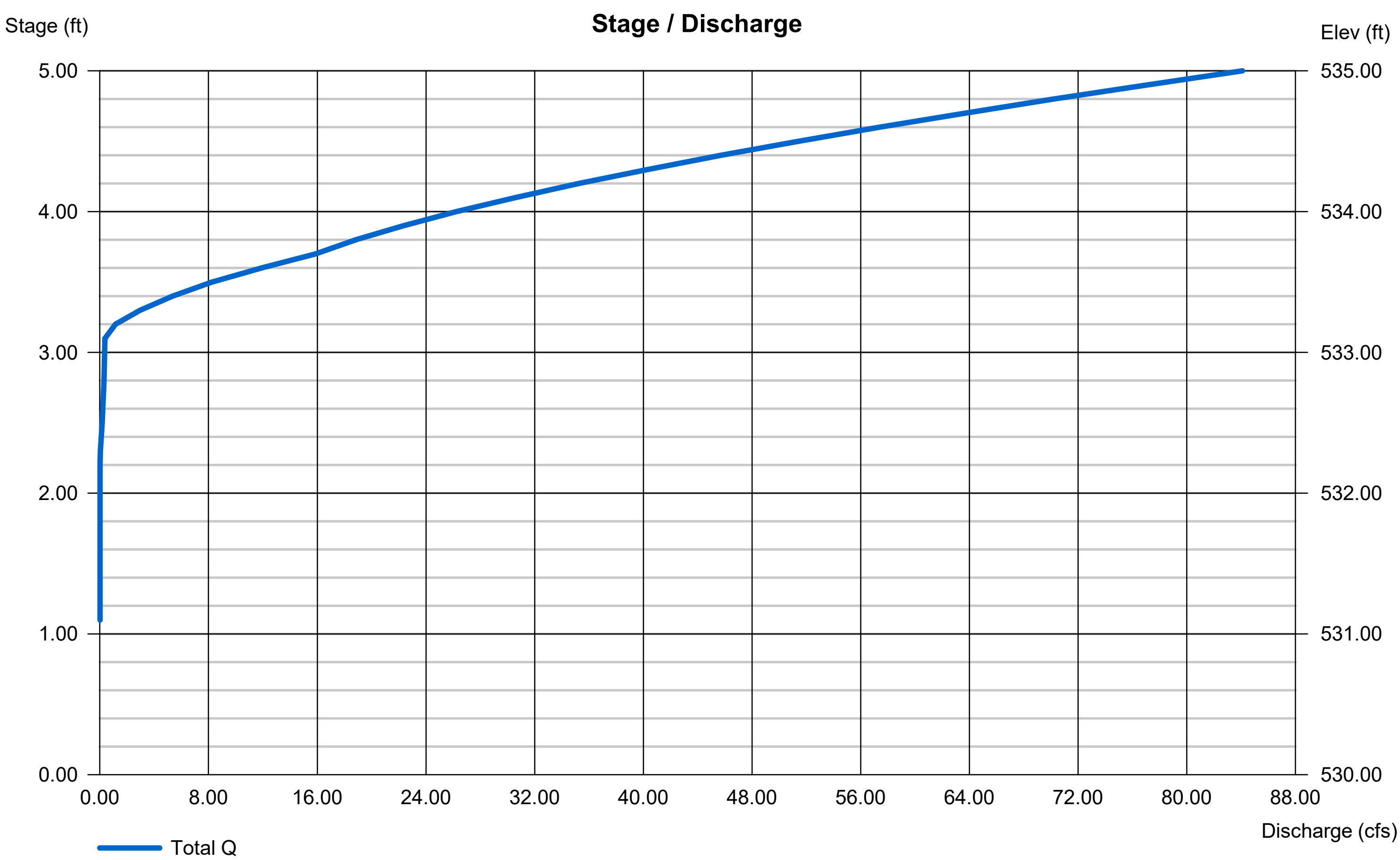
		[A]	[B]	[C]	[PrfRsr]
Rise (in)	=	18.00	0.63	4.00	0.00
Span (in)	=	18.00	0.63	4.00	0.00
No. Barrels	=	1	1	1	0
Invert El. (ft)	=	530.00	531.00	532.19	0.00
Length (ft)	=	172.92	0.00	0.00	0.00
Slope (%)	=	1.40	0.00	0.00	n/a
N-Value	=	.013	.013	.013	n/a
Orifice Coeff.	=	0.60	0.60	0.60	0.60
Multi-Stage	=	n/a	Yes	Yes	No

Weir Structures

		[A]	[B]	[C]	[D]
Crest Len (ft)	=	9.98	15.00	0.00	0.00
Crest El. (ft)	=	533.12	533.55	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) = 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).



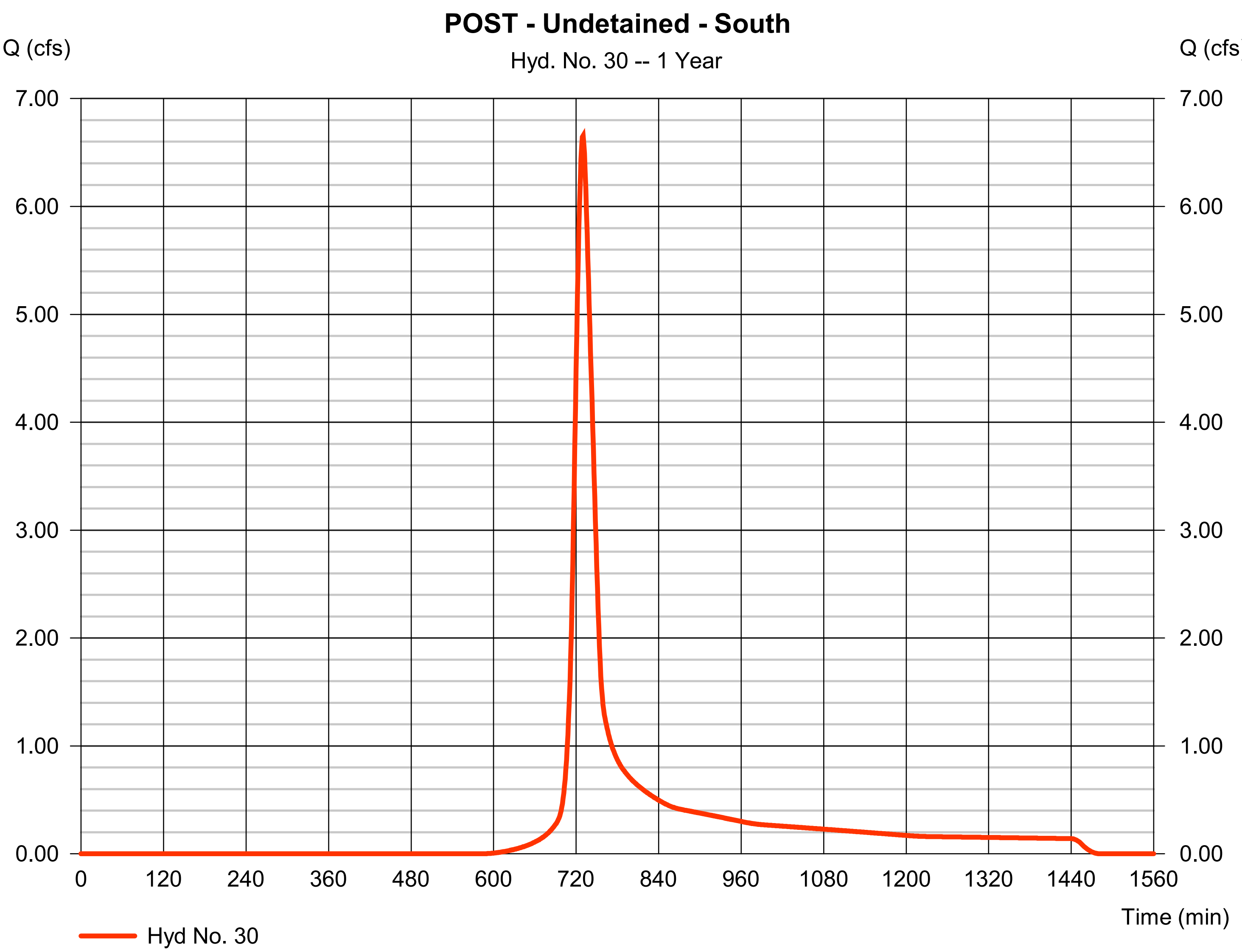
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 30

POST - Undetained - South

Hydrograph type	= SCS Runoff	Peak discharge	= 6.656 cfs
Storm frequency	= 1 yrs	Time to peak	= 730 min
Time interval	= 1 min	Hyd. volume	= 25,280 cuft
Drainage area	= 6.960 ac	Curve number	= 83.6
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 26.40 min
Total precip.	= 2.37 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 30

POST - Undetained - South

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	2.84		0.00		0.00		
Land slope (%)	=	0.50		0.00		0.00		
Travel Time (min)	**=**	**26.37**	**+**	**0.00**	**+**	**0.00**	**=**	**26.37**
Shallow Concentrated Flow								
Flow length (ft)	=	0.00		0.00		0.00		
Watercourse slope (%)	=	0.00		0.00		0.00		
Surface description	=	Paved		Paved		Paved		
Average velocity (ft/s)	=0.00			0.00		0.00		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=0.00							
				0.00				
						0.00		
Flow length (ft)	({0})0.0			0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

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

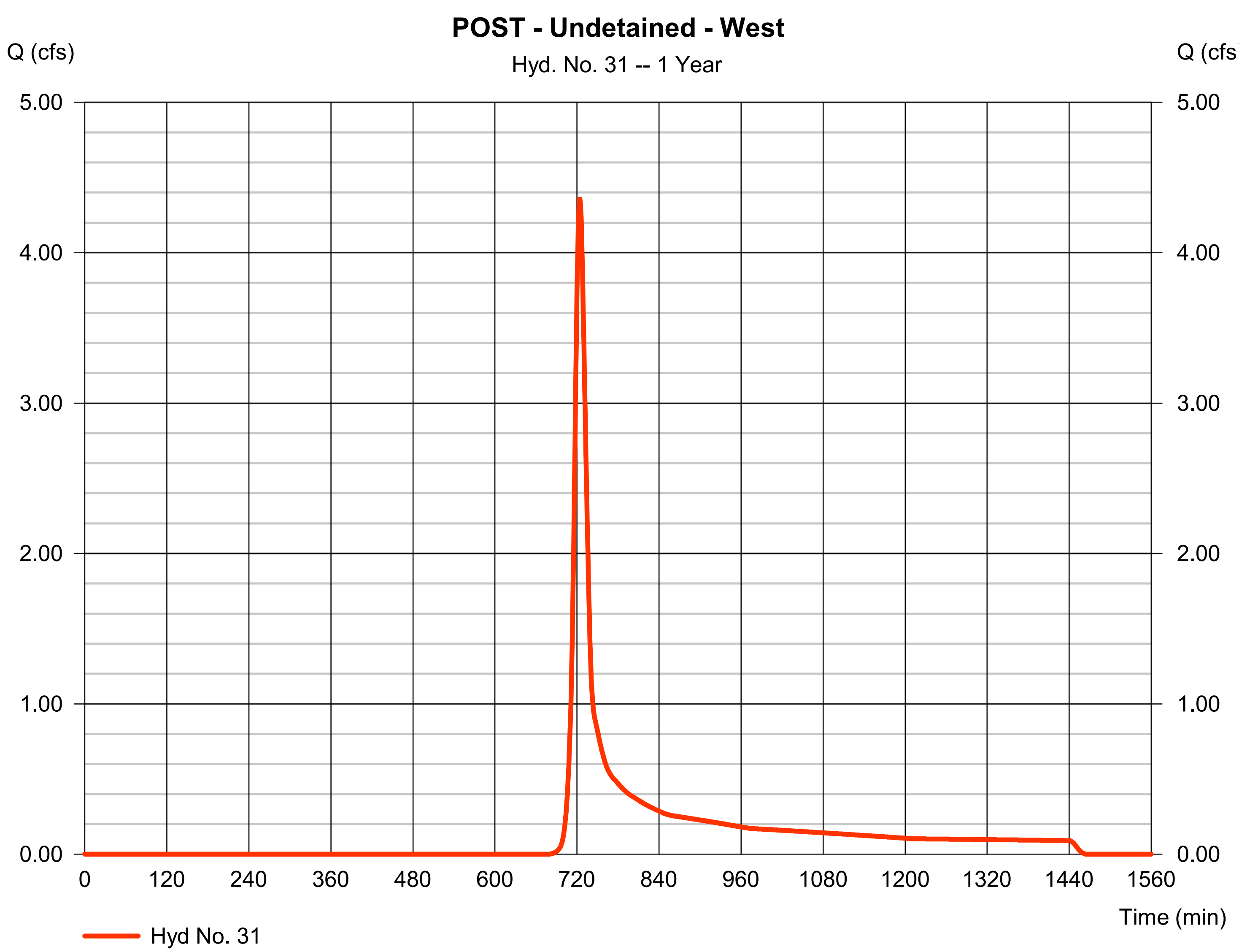
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 31

POST - Undetained - West

Hydrograph type	= SCS Runoff	Peak discharge	= 4.370 cfs
Storm frequency	= 1 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 13,432 cuft
Drainage area	= 5.610 ac	Curve number	= 76.8
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 16.30 min
Total precip.	= 2.37 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 31

POST - Undetained - West

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.240		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 2.84		0.00		0.00		
Land slope (%)	= 2.40		0.00		0.00		
Travel Time (min)	**= 14.08**	**+**	**0.00**	**+**	**0.00**	**=**	**14.08**
Shallow Concentrated Flow							
Flow length (ft)	= 356.00		0.00		0.00		
Watercourse slope (%)	= 2.70		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=2.65		0.00		0.00		
Travel Time (min)	**= 2.24**	**+**	**0.00**	**+**	**0.00**	**=**	**2.24**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00		0.00		0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

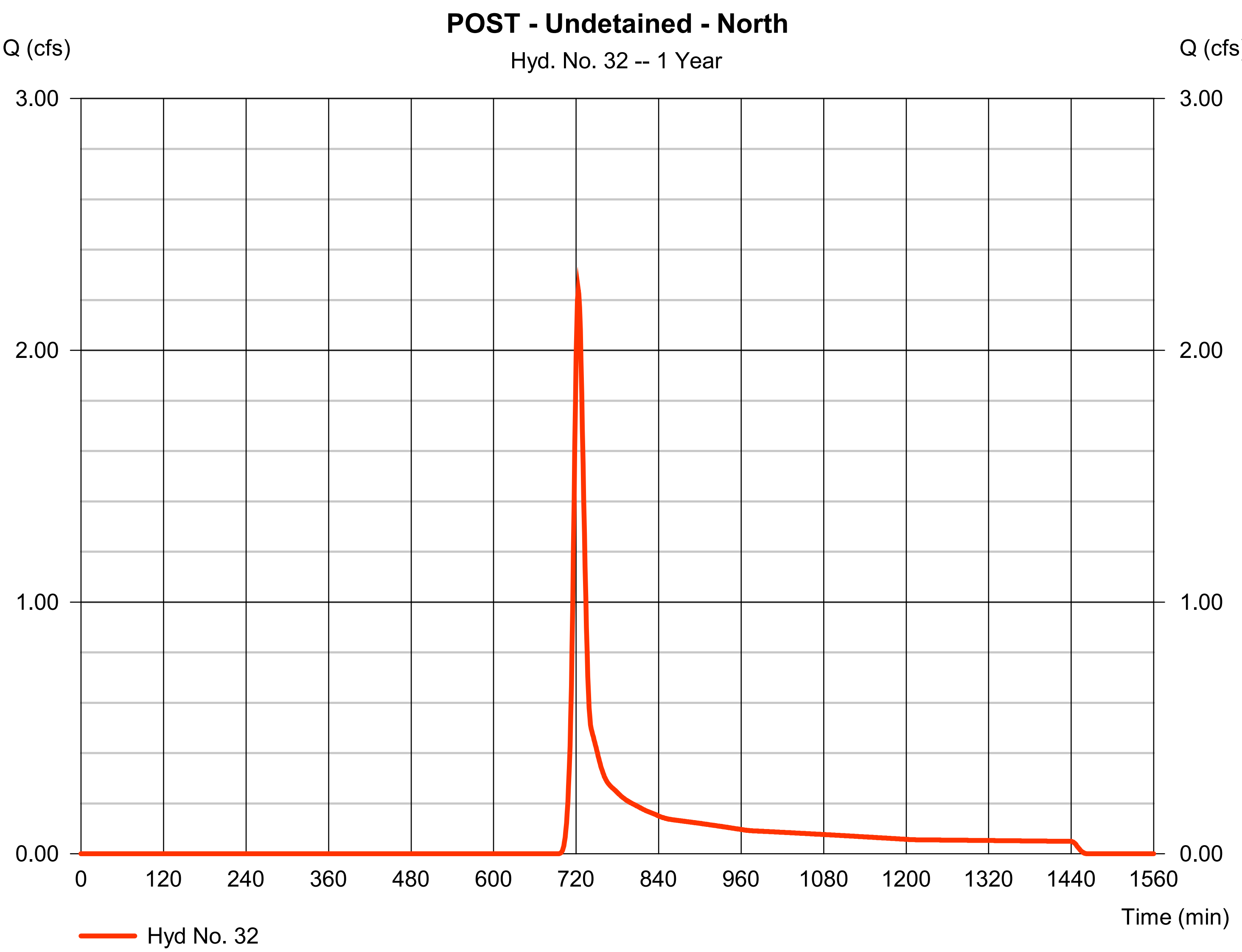
Total Travel Time, Tc .... 16.30 min

Hydrograph Report

Hyd. No. 32

POST - Undetained - North

Hydrograph type	= SCS Runoff	Peak discharge	= 2.240 cfs
Storm frequency	= 1 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 6,758 cuft
Drainage area	= 3.420 ac	Curve number	= 74.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 14.70 min
Total precip.	= 2.37 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 32

POST - Undetained - North

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	2.84		0.00		0.00		
Land slope (%)	=	3.00		0.00		0.00		
Travel Time (min)	**=**	**12.88**	**+**	**0.00**	**+**	**0.00**	**=**	**12.88**
Shallow Concentrated Flow								
Flow length (ft)	=	188.00		0.00		0.00		
Watercourse slope (%)	=	1.10		0.00		0.00		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (ft/s)	=	1.69		0.00		0.00		
Travel Time (min)	**=**	**1.85**	**+**	**0.00**	**+**	**0.00**	**=**	**1.85**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)		({0})0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc .... 14.70 min

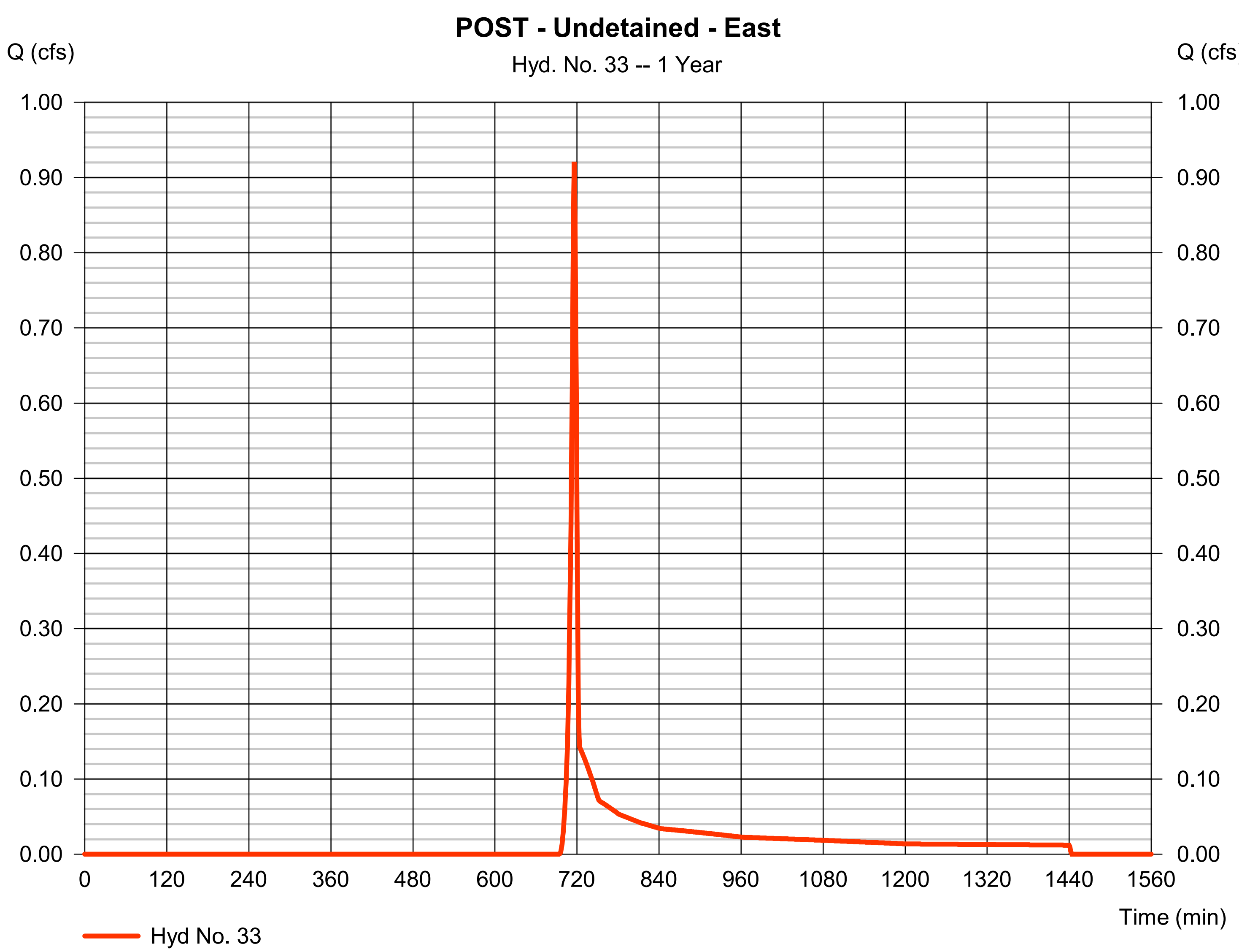
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 33

POST - Undetained - East

Hydrograph type	= SCS Runoff	Peak discharge	= 0.921 cfs
Storm frequency	= 1 yrs	Time to peak	= 716 min
Time interval	= 1 min	Hyd. volume	= 1,655 cuft
Drainage area	= 0.900 ac	Curve number	= 74.1
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 2.00 min
Total precip.	= 2.37 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



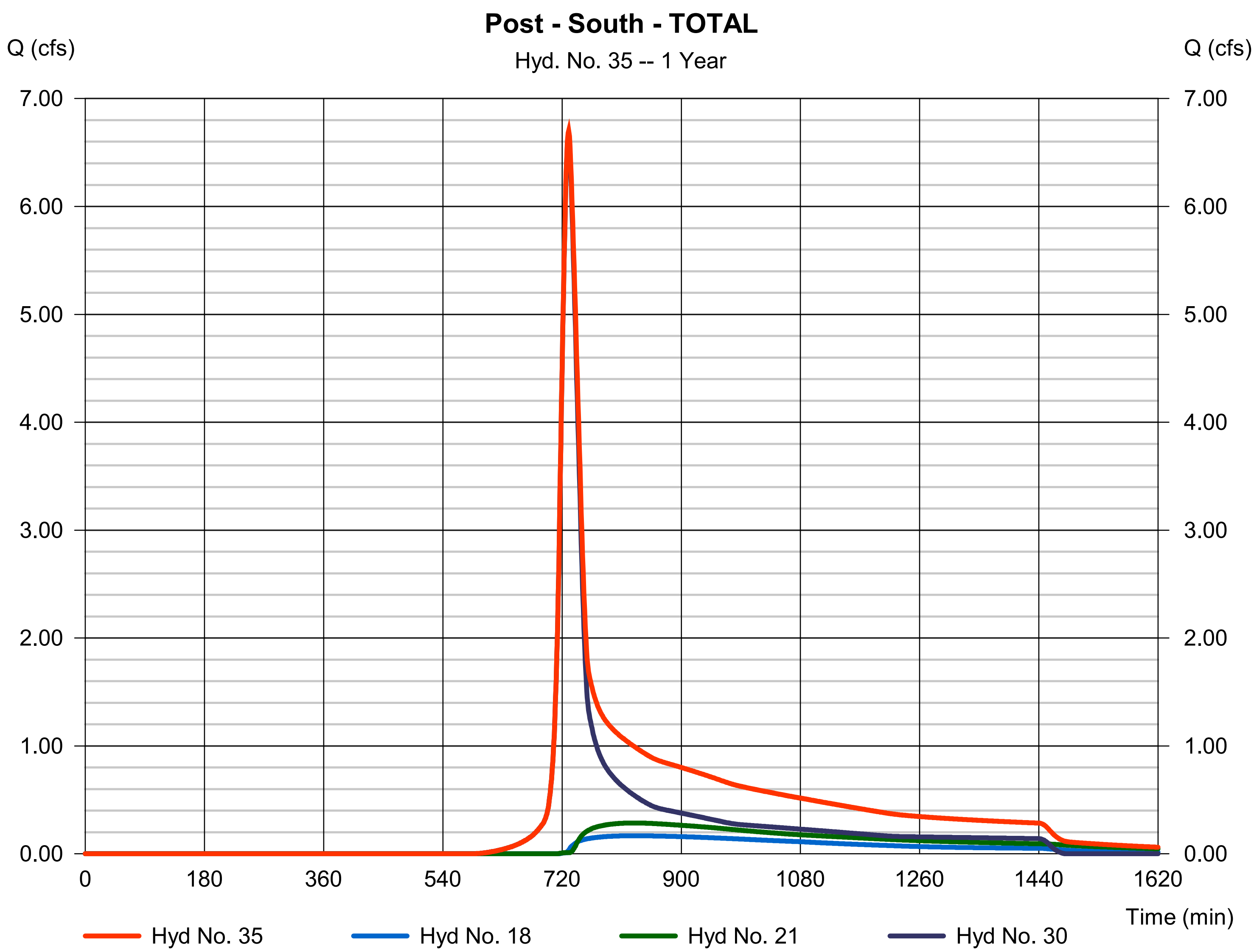
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 35

Post - South - TOTAL

Hydrograph type	= Combine	Peak discharge	= 6.701 cfs
Storm frequency	= 1 yrs	Time to peak	= 730 min
Time interval	= 1 min	Hyd. volume	= 40,540 cuft
Inflow hyds.	= 18, 21, 30	Contrib. drain. area	= 6.960 ac



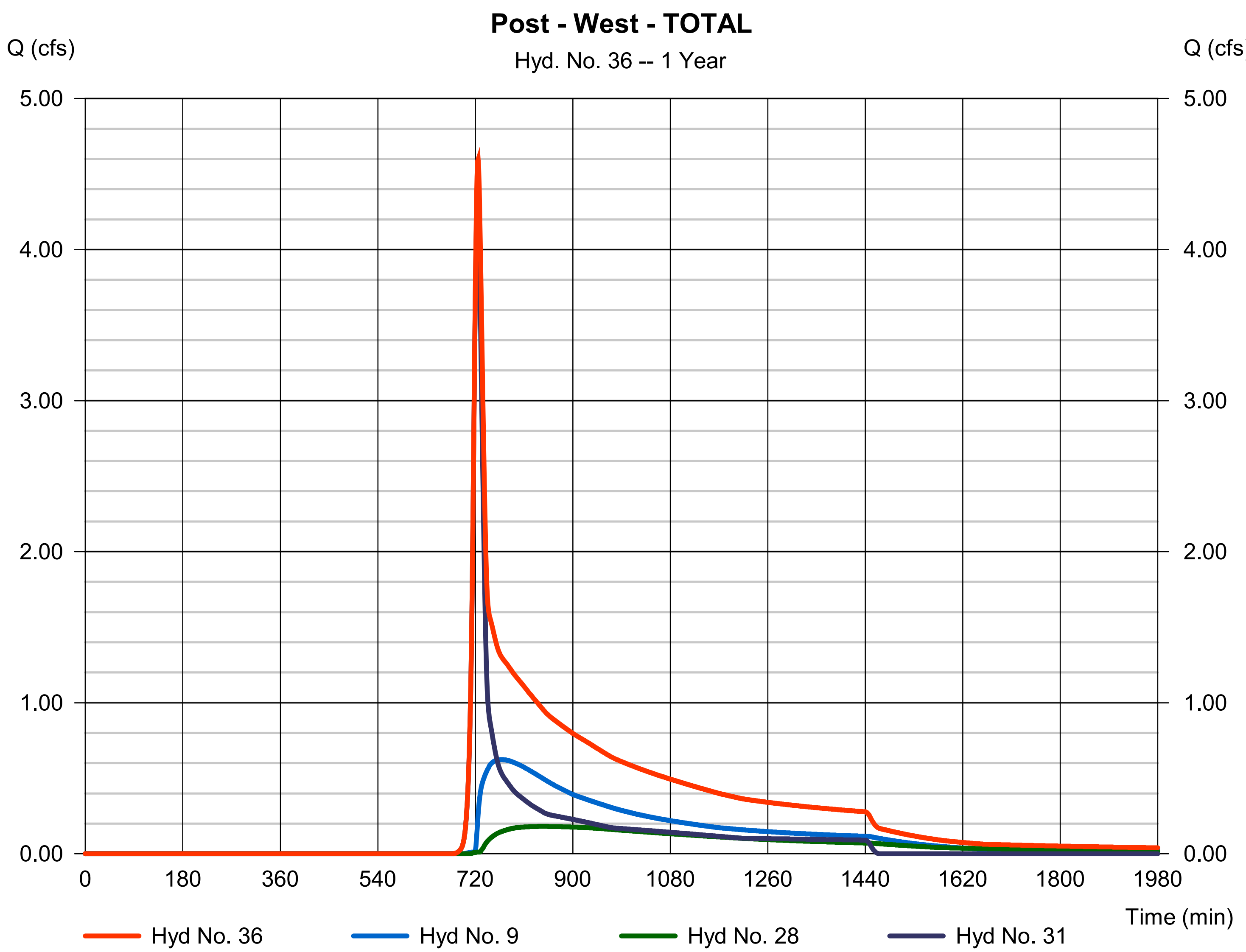
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 36

Post - West - TOTAL

Hydrograph type	= Combine	Peak discharge	= 4.597 cfs
Storm frequency	= 1 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 34,838 cuft
Inflow hyds.	= 9, 28, 31	Contrib. drain. area	= 5.610 ac



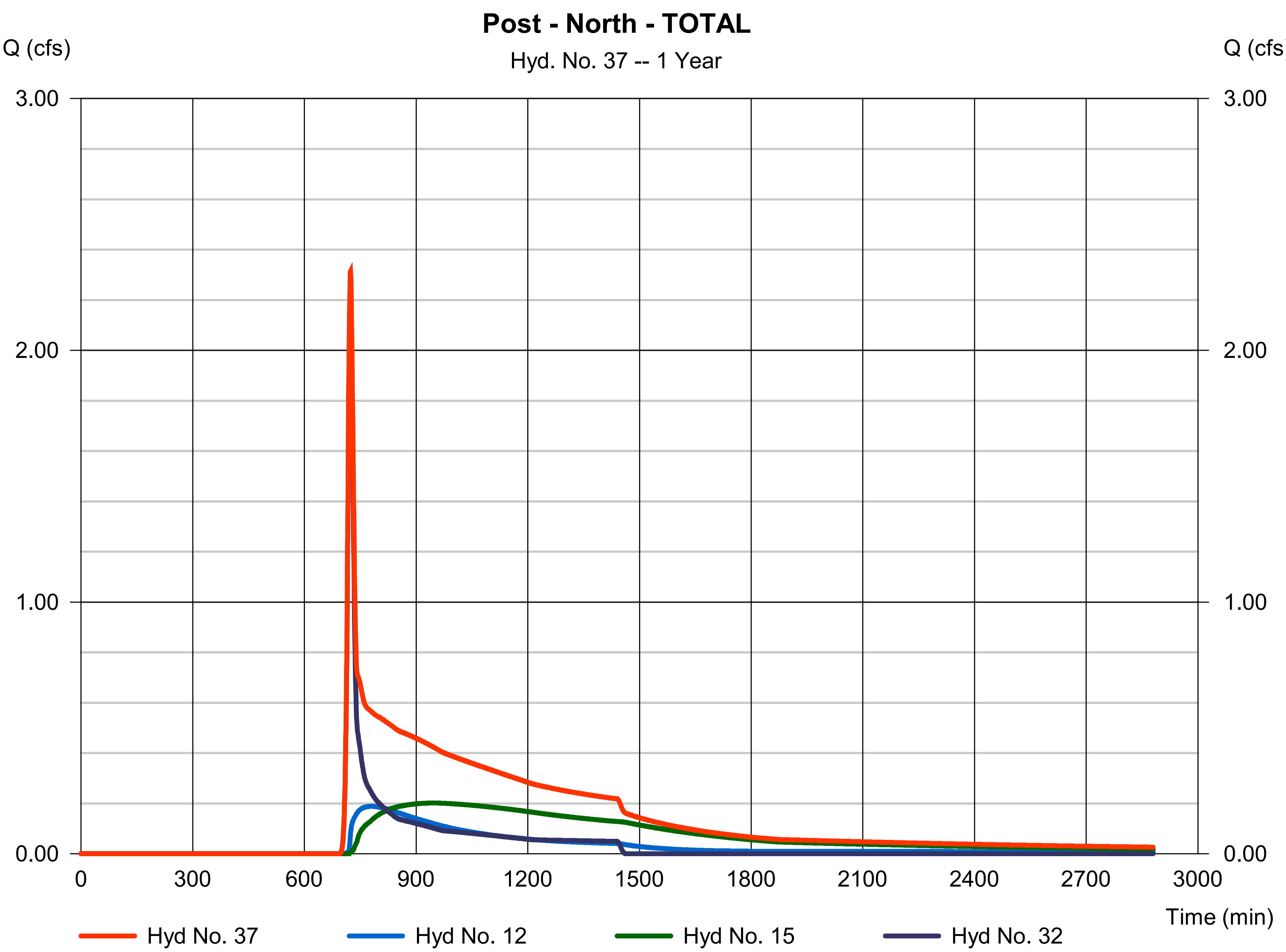
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 37

Post - North - TOTAL

Hydrograph type	= Combine	Peak discharge	= 2.314 cfs
Storm frequency	= 1 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 22,914 cuft
Inflow hyds.	= 12, 15, 32	Contrib. drain. area	= 3.420 ac



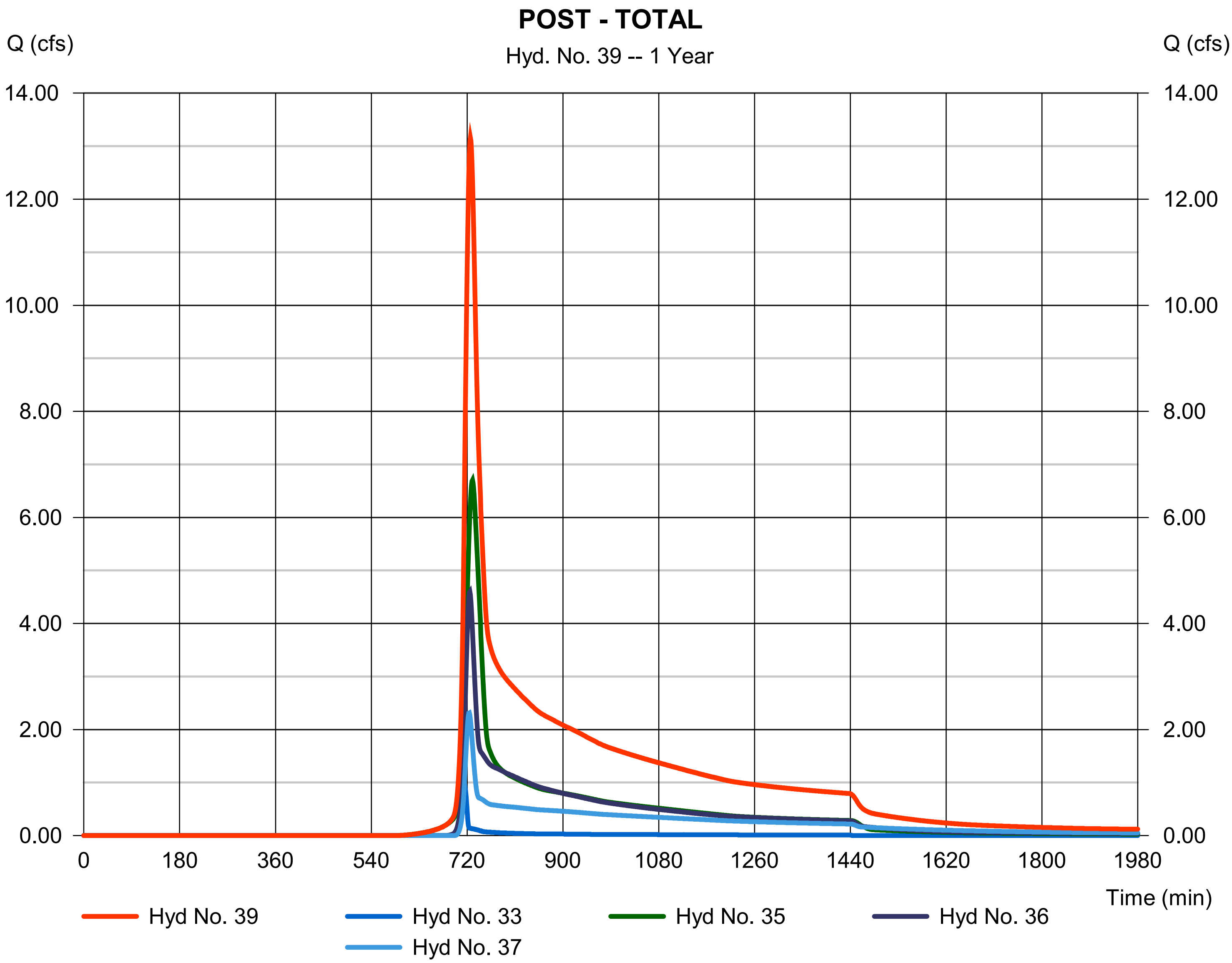
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 39

POST - TOTAL

Hydrograph type	= Combine	Peak discharge	= 13.16 cfs
Storm frequency	= 1 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 99,947 cuft
Inflow hyds.	= 33, 35, 36, 37	Contrib. drain. area	= 0.900 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

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	18.90	1	722	50,832	------	------	------	Pre Development - South
2	SCS Runoff	10.88	1	724	32,694	------	------	------	Pre Development - West
3	SCS Runoff	31.35	1	718	63,077	------	------	------	Pre Development - North
4	SCS Runoff	4.265	1	720	10,380	------	------	------	Pre Development - East
5	Combine	59.96	1	719	156,983	1, 2, 3, 4	------	------	Combined Pre Development
8	SCS Runoff	11.81	1	719	27,030	------	------	------	POST - Basin A
9	Reservoir	1.291	1	746	20,650	8	530.80	14,366	Post - Basin A - Route
11	SCS Runoff	4.366	1	718	9,305	------	------	------	POST - Basin B
12	Reservoir	0.394	1	750	7,400	11	532.20	4,915	Post - Basin B - Route
14	SCS Runoff	6.808	1	727	23,117	------	------	------	POST - Basin C
15	Reservoir	0.378	1	849	16,802	14	531.40	14,268	Post - Basin C - Route
17	SCS Runoff	5.402	1	719	12,247	------	------	------	POST - Basin D
18	Reservoir	0.413	1	760	8,693	17	535.02	6,746	Post - Basin D - Route
20	SCS Runoff	5.415	1	728	19,259	------	------	------	POST - Basin E
21	Reservoir	0.504	1	792	14,401	20	533.22	10,951	Post - Basin E - Route
23	SCS Runoff	1.552	1	720	3,801	------	------	------	POST - Basin F
24	Reservoir	1.027	1	726	3,796	23	534.57	957	Post - Basin F - Route
26	SCS Runoff	3.475	1	723	9,914	------	------	------	POST - Basin G
27	Combine	4.448	1	724	13,711	24, 26	------	------	F + G
28	Reservoir	0.275	1	822	10,434	27	532.75	8,032	Post - Basin G - Route
30	SCS Runoff	9.224	1	729	34,595	------	------	------	POST - Undetained - South
31	SCS Runoff	6.629	1	724	19,608	------	------	------	POST - Undetained - West
32	SCS Runoff	3.570	1	723	10,157	------	------	------	POST - Undetained - North
33	SCS Runoff	1.422	1	716	2,491	------	------	------	POST - Undetained - East
35	Combine	9.506	1	730	57,689	18, 21, 30,	------	------	Post - South - TOTAL
36	Combine	7.517	1	725	50,692	9, 28, 31,	------	------	Post - West - TOTAL
37	Combine	3.845	1	723	34,358	12, 15, 32,	------	------	Post - North - TOTAL
39	Combine	20.18	1	726	145,231	33, 35, 36, 37,	------	------	POST - TOTAL

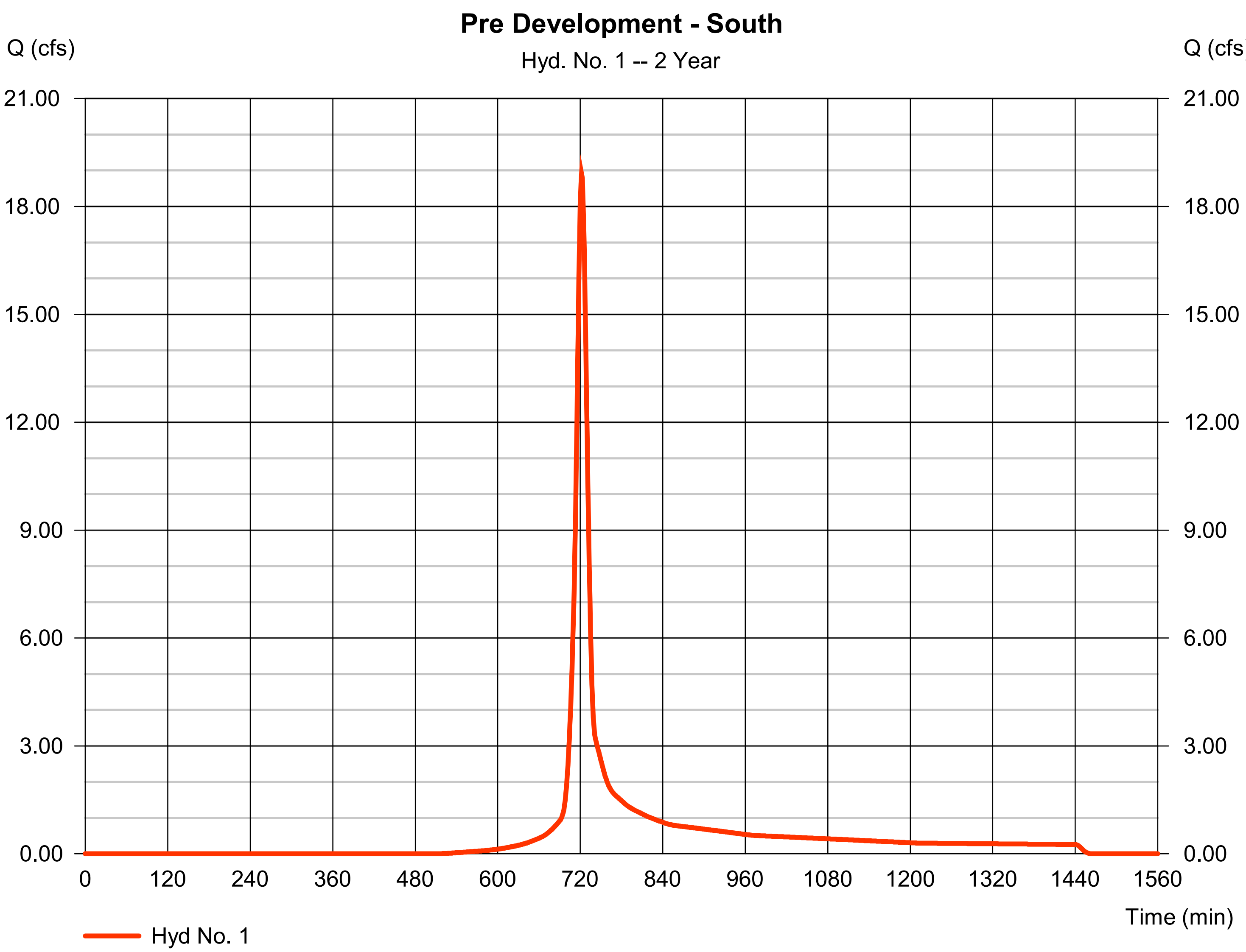
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 1

Pre Development - South

Hydrograph type	= SCS Runoff	Peak discharge	= 18.90 cfs
Storm frequency	= 2 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 50,832 cuft
Drainage area	= 9.910 ac	Curve number	= 84.4
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 13.60 min
Total precip.	= 2.84 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



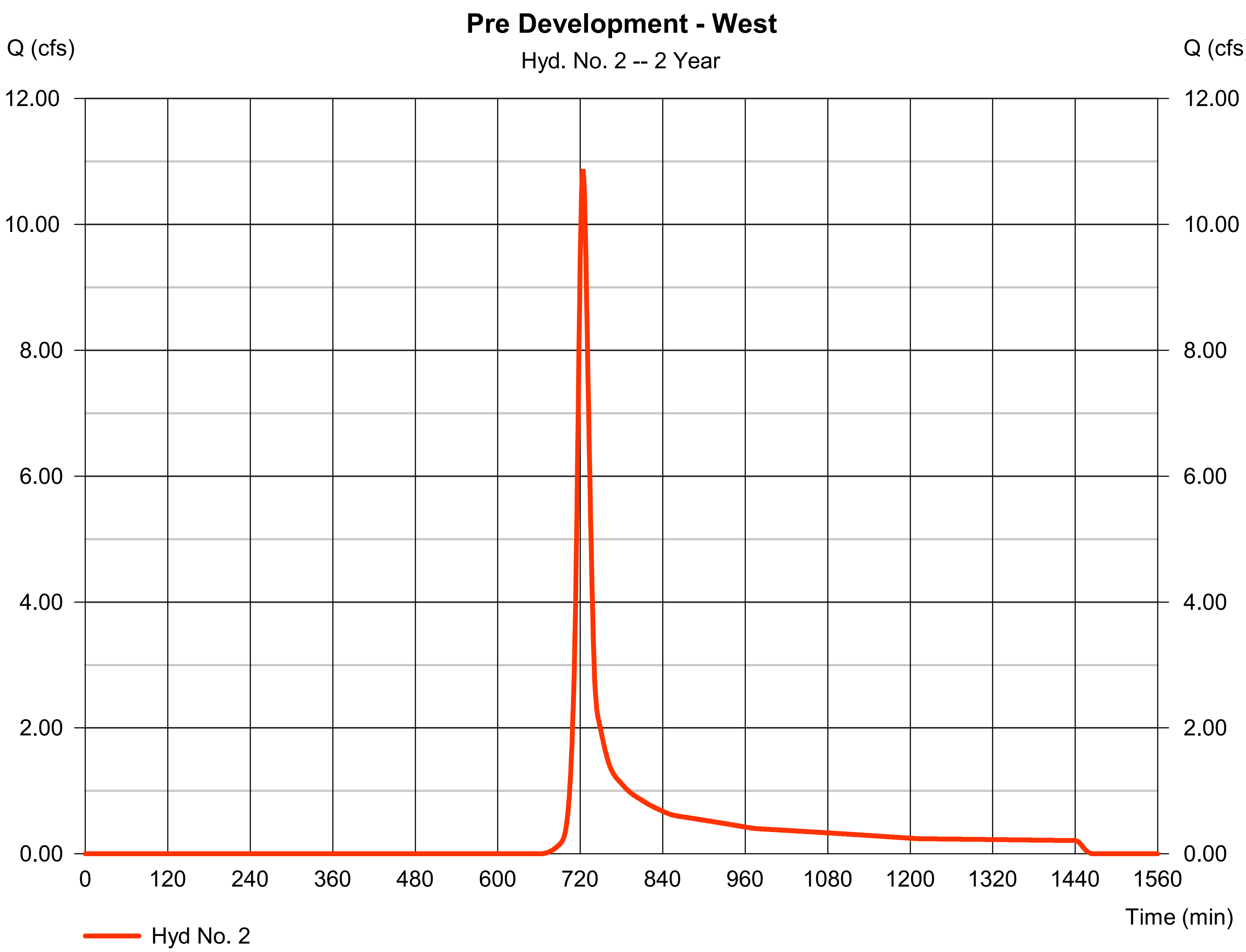
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 2

Pre Development - West

Hydrograph type	= SCS Runoff	Peak discharge	= 10.88 cfs
Storm frequency	= 2 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 32,694 cuft
Drainage area	= 10.250 ac	Curve number	= 75.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 16.30 min
Total precip.	= 2.84 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



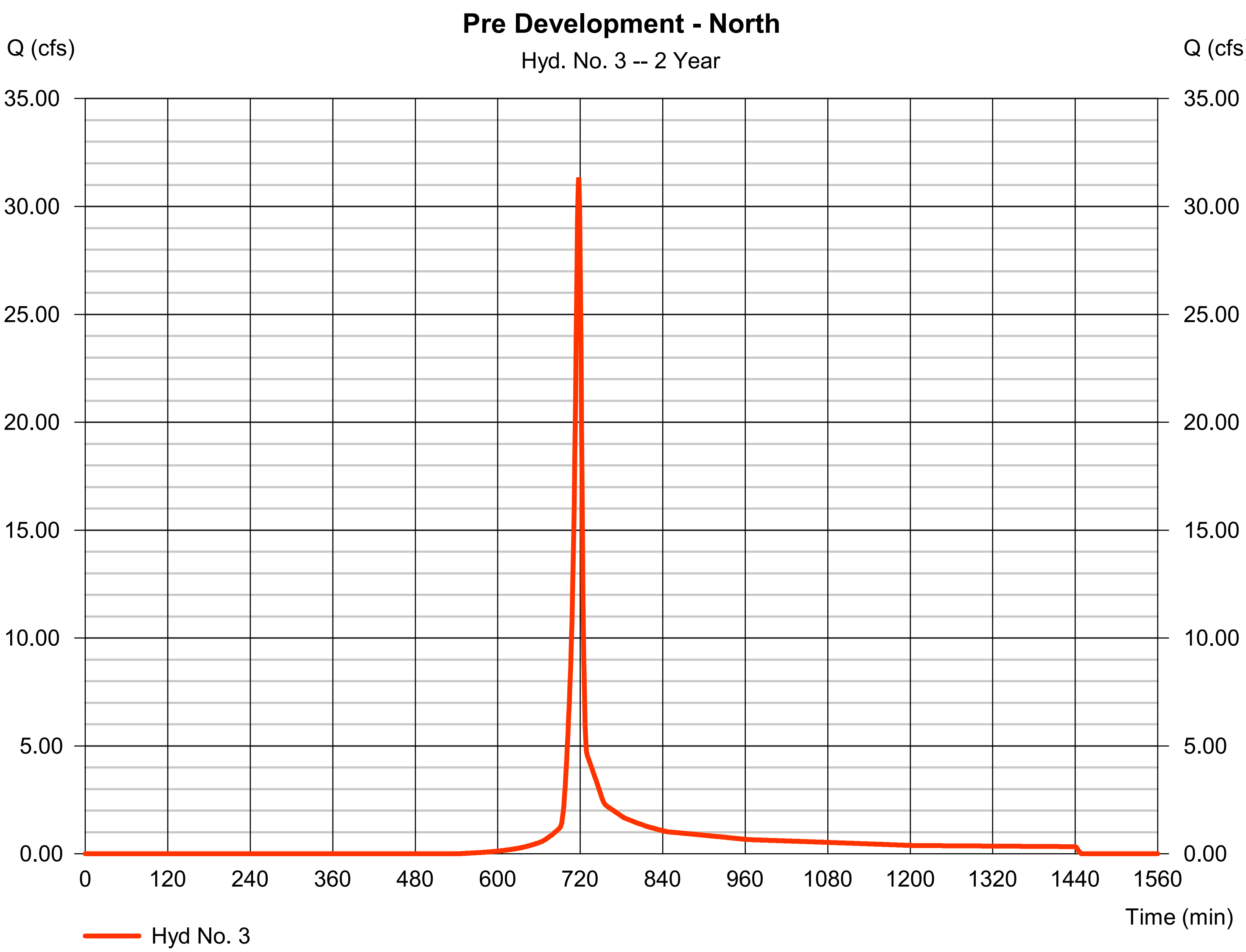
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 3

Pre Development - North

Hydrograph type	= SCS Runoff	Peak discharge	= 31.35 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 63,077 cuft
Drainage area	= 12.840 ac	Curve number	= 82.9
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.30 min
Total precip.	= 2.84 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



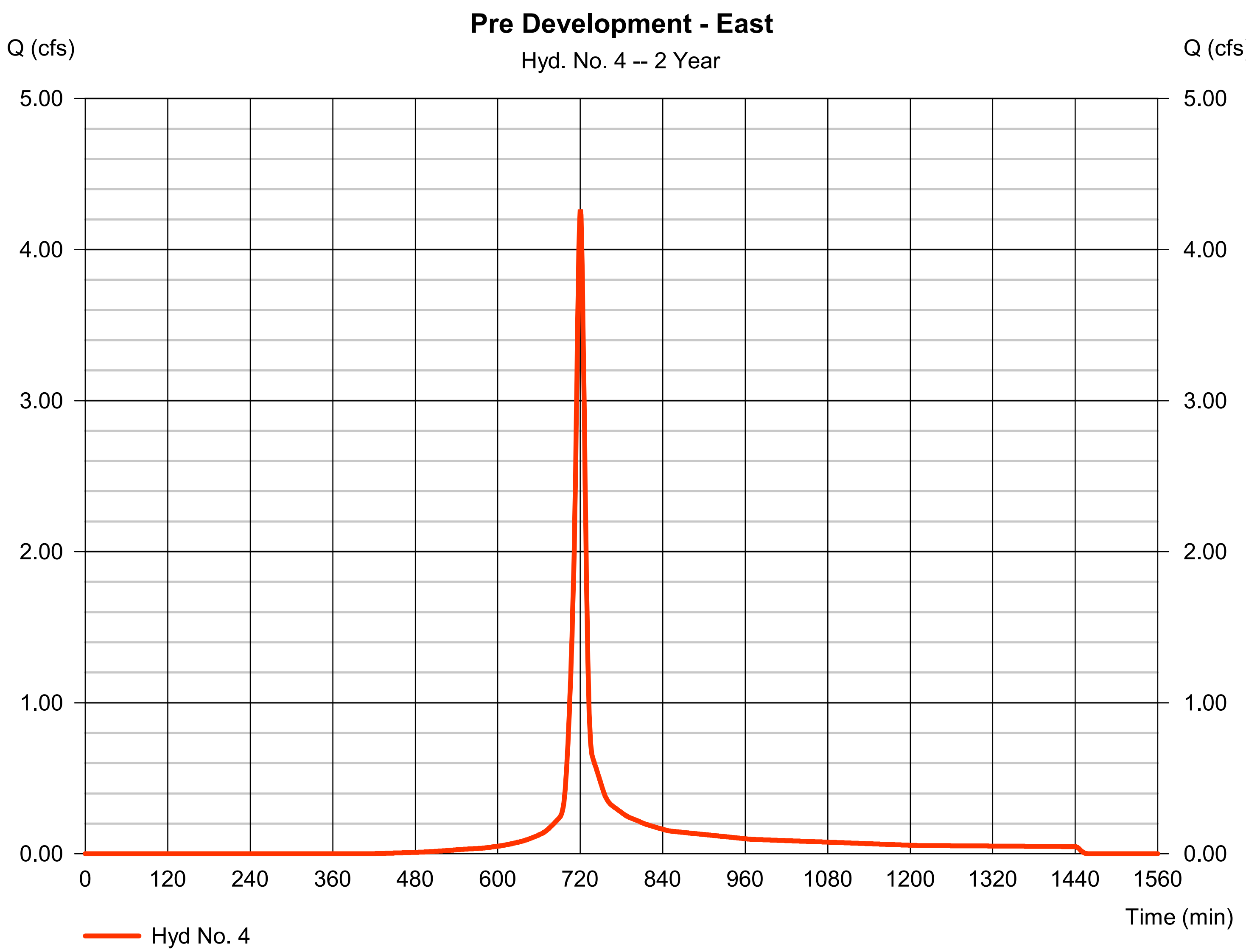
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 4

Pre Development - East

Hydrograph type	= SCS Runoff	Peak discharge	= 4.265 cfs
Storm frequency	= 2 yrs	Time to peak	= 720 min
Time interval	= 1 min	Hyd. volume	= 10,380 cuft
Drainage area	= 1.660 ac	Curve number	= 88.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 11.20 min
Total precip.	= 2.84 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



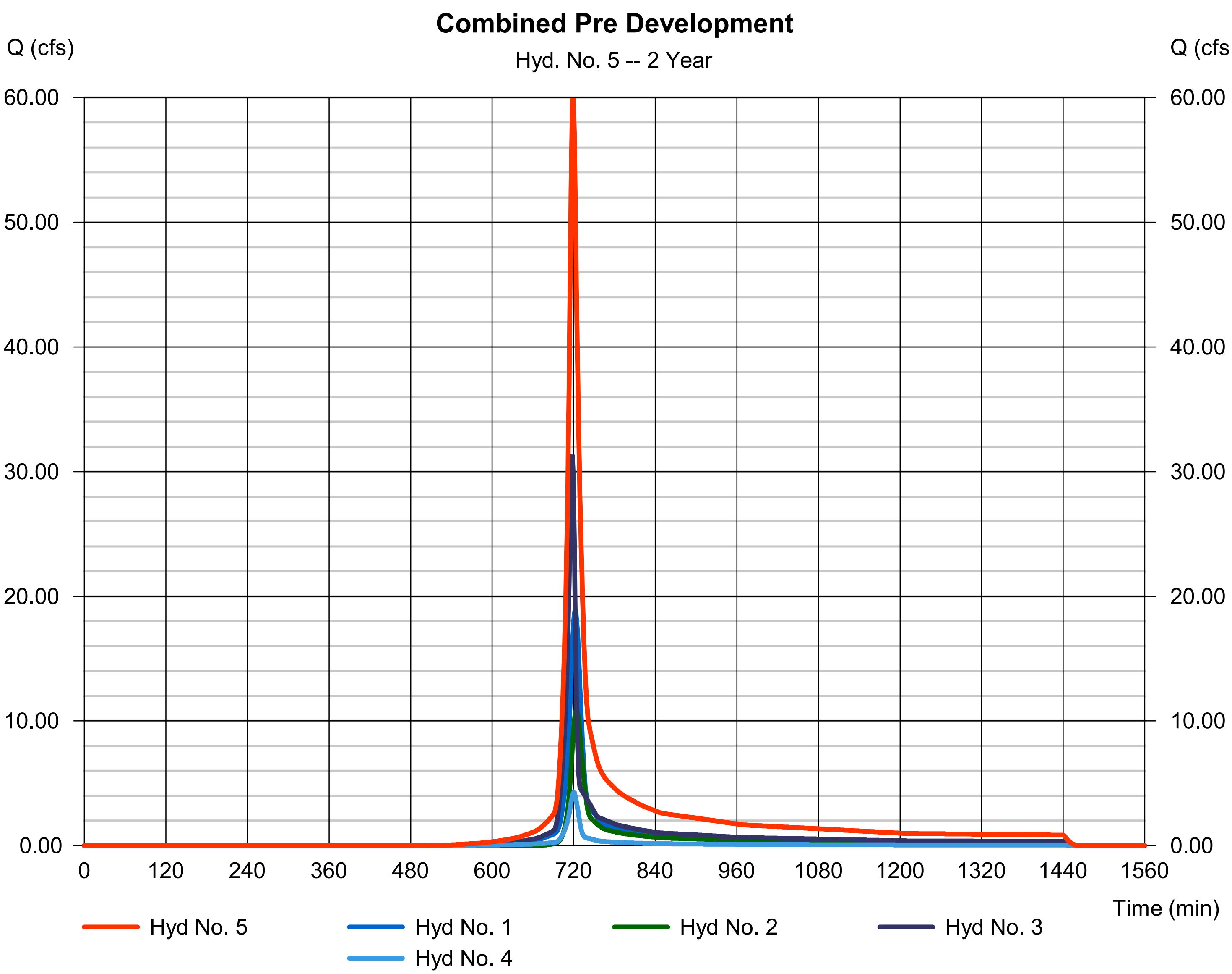
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 5

Combined Pre Development

Hydrograph type	= Combine	Peak discharge	= 59.96 cfs
Storm frequency	= 2 yrs	Time to peak	= 719 min
Time interval	= 1 min	Hyd. volume	= 156,983 cuft
Inflow hyds.	= 1, 2, 3, 4	Contrib. drain. area	= 34.660 ac



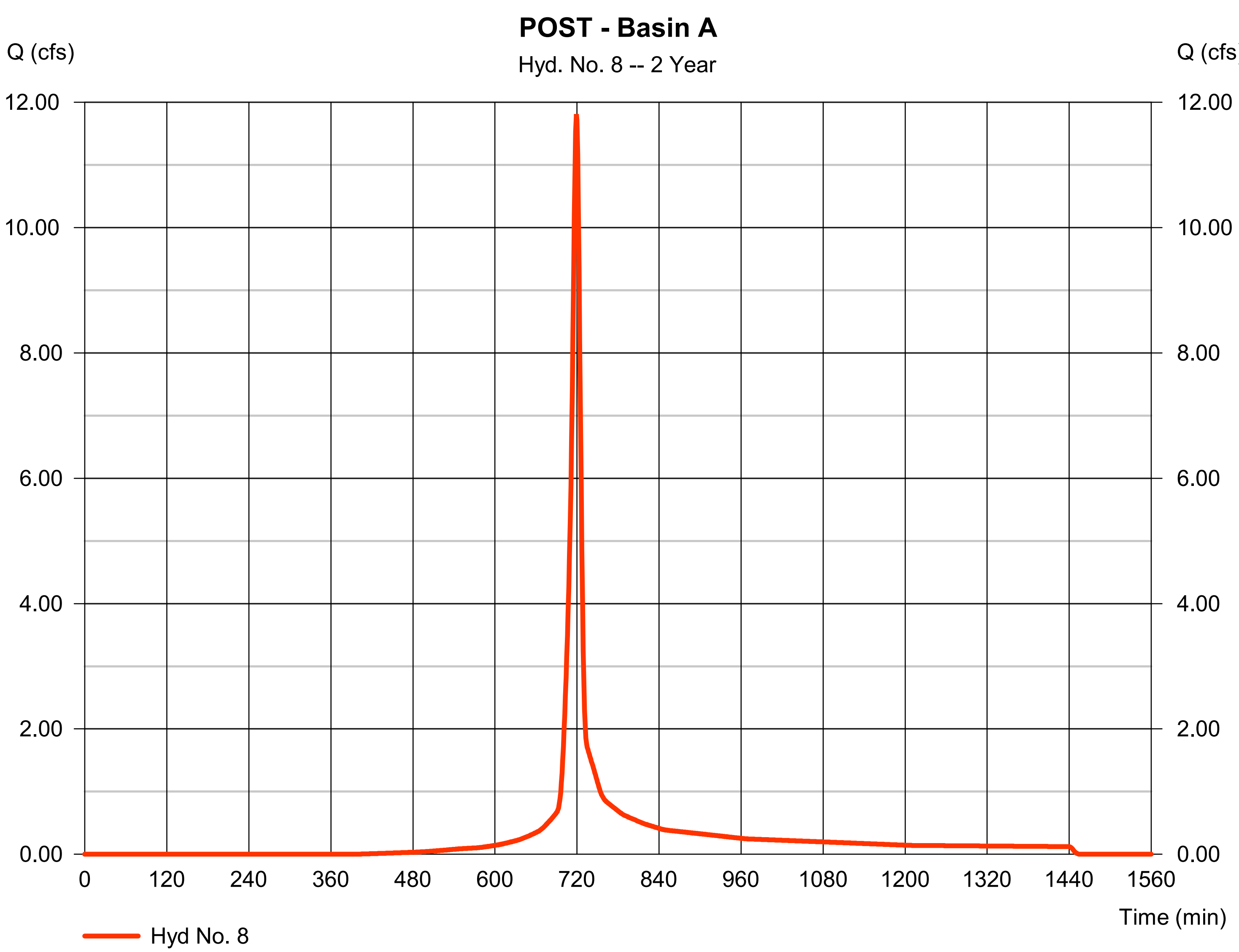
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 8

POST - Basin A

Hydrograph type	= SCS Runoff	Peak discharge	= 11.81 cfs
Storm frequency	= 2 yrs	Time to peak	= 719 min
Time interval	= 1 min	Hyd. volume	= 27,030 cuft
Drainage area	= 4.280 ac	Curve number	= 88.8
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.10 min
Total precip.	= 2.84 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

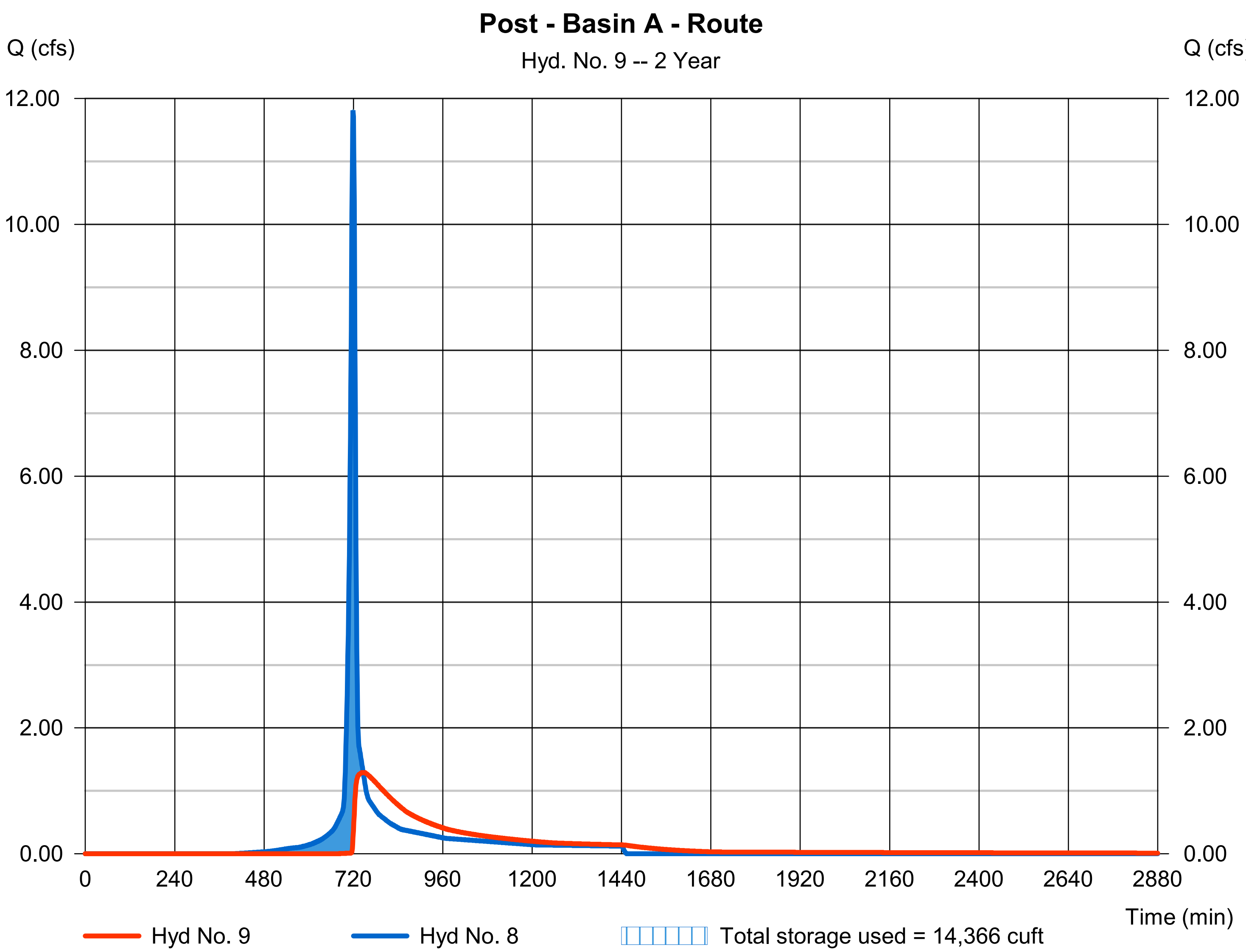
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 9

Post - Basin A - Route

Hydrograph type	= Reservoir	Peak discharge	= 1.291 cfs
Storm frequency	= 2 yrs	Time to peak	= 746 min
Time interval	= 1 min	Hyd. volume	= 20,650 cuft
Inflow hyd. No.	= 8 - POST - Basin A	Max. Elevation	= 530.80 ft
Reservoir name	= Basin A	Max. Storage	= 14,366 cuft

Storage Indication method used.



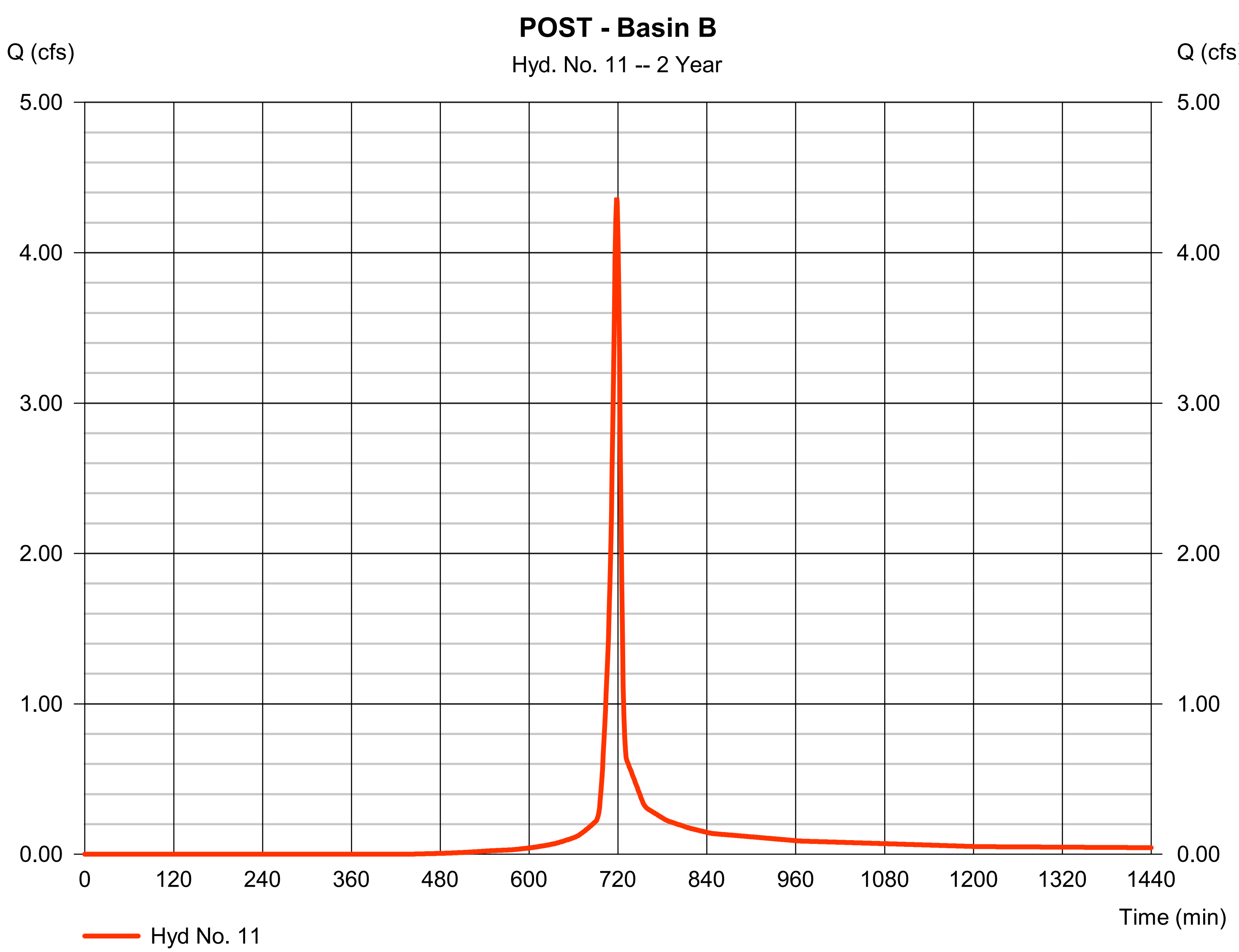
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 11

POST - Basin B

Hydrograph type	= SCS Runoff	Peak discharge	= 4.366 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 9,305 cuft
Drainage area	= 1.620 ac	Curve number	= 87.3
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.90 min
Total precip.	= 2.84 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

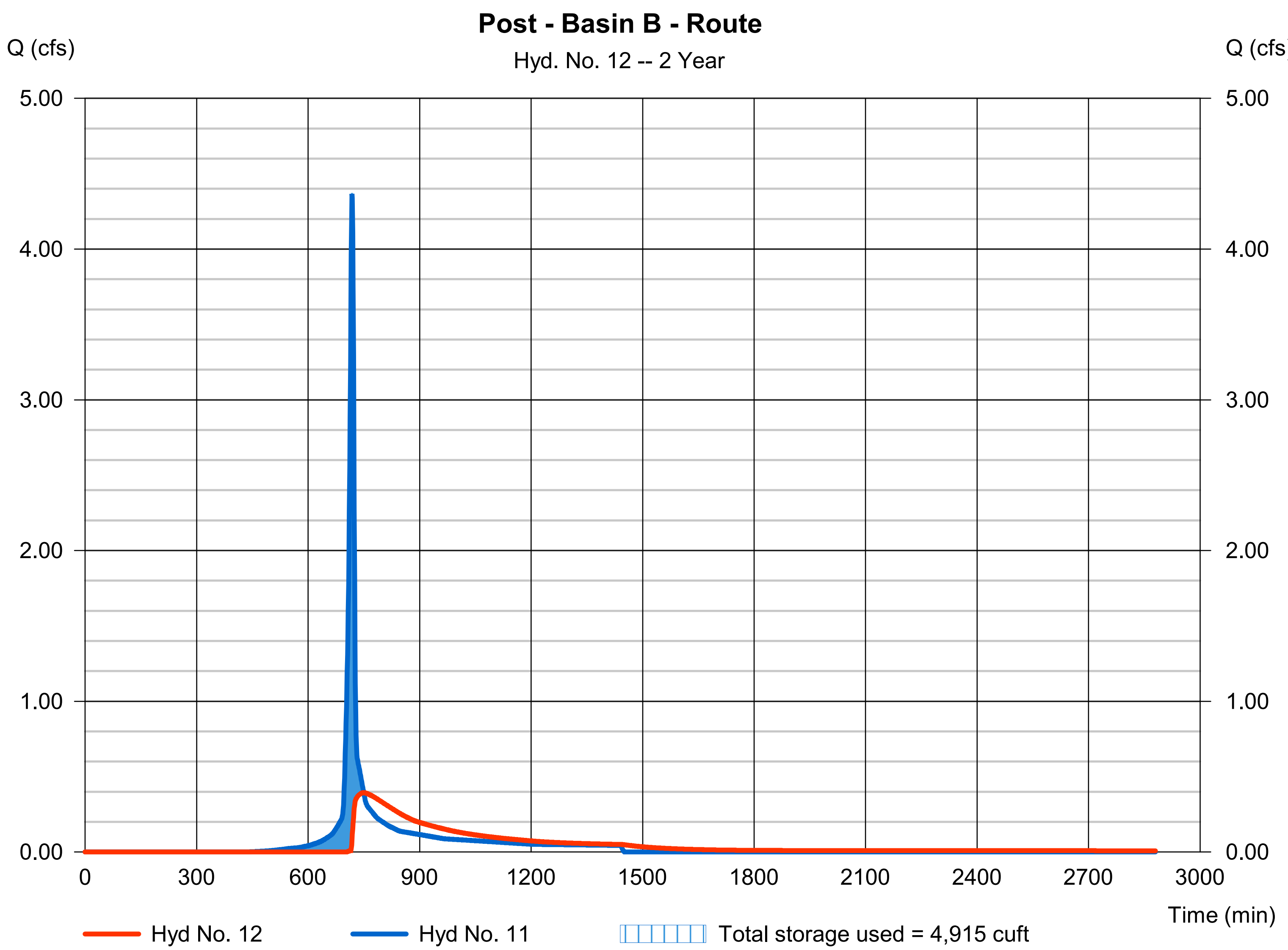
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Thursday, 08 / 5 / 2021

Hyd. No. 12

Post - Basin B - Route

Hydrograph type	= Reservoir	Peak discharge	= 0.394 cfs
Storm frequency	= 2 yrs	Time to peak	= 750 min
Time interval	= 1 min	Hyd. volume	= 7,400 cuft
Inflow hyd. No.	= 11 - POST - Basin B	Max. Elevation	= 532.20 ft
Reservoir name	= Basin B	Max. Storage	= 4,915 cuft

Storage Indication method used.



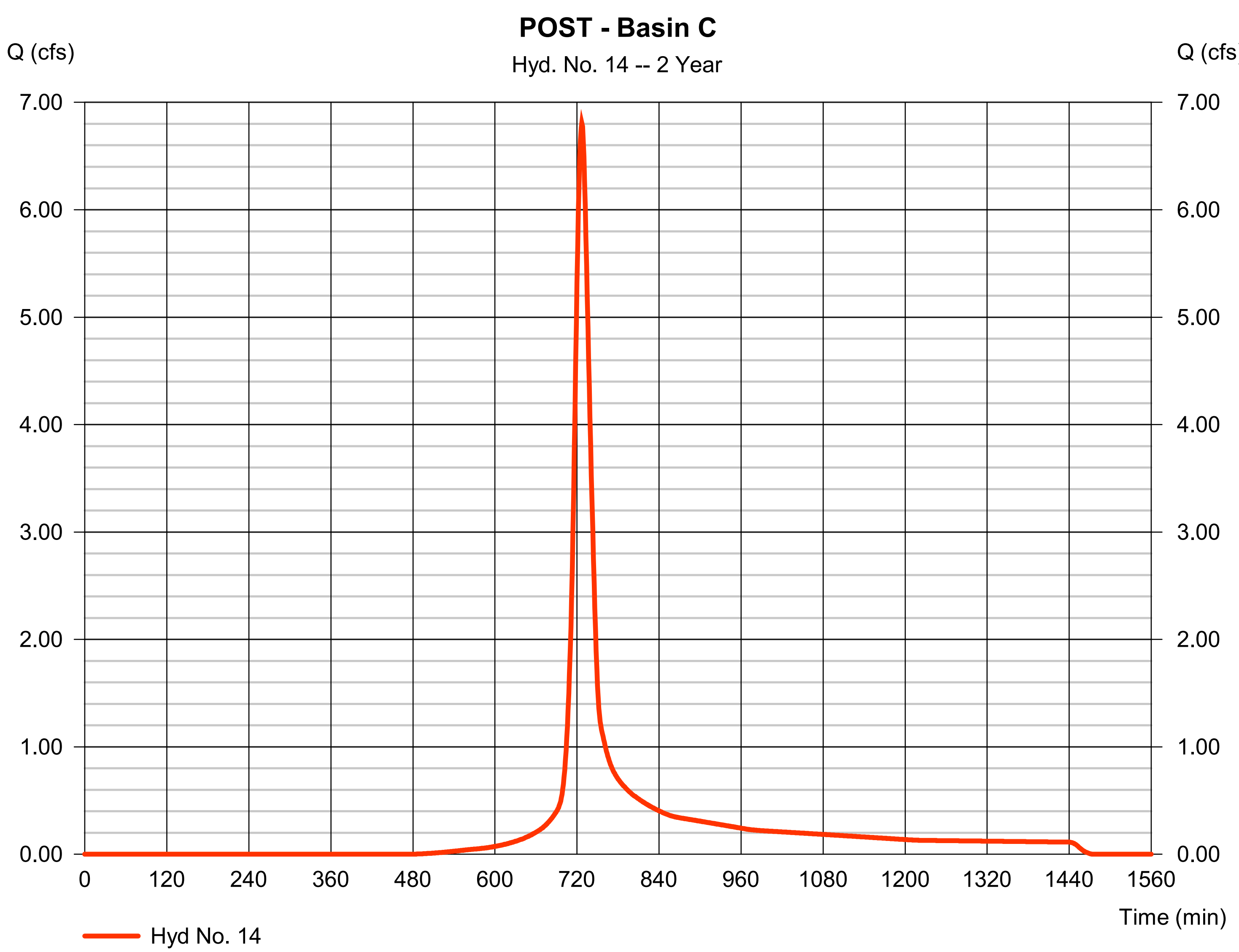
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 | Thursday, 08 / 5 / 2021

Hyd. No. 14

POST - Basin C

Hydrograph type	= SCS Runoff	Peak discharge	= 6.808 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 23,117 cuft
Drainage area	= 4.210 ac	Curve number	= 86
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 23.00 min
Total precip.	= 2.84 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

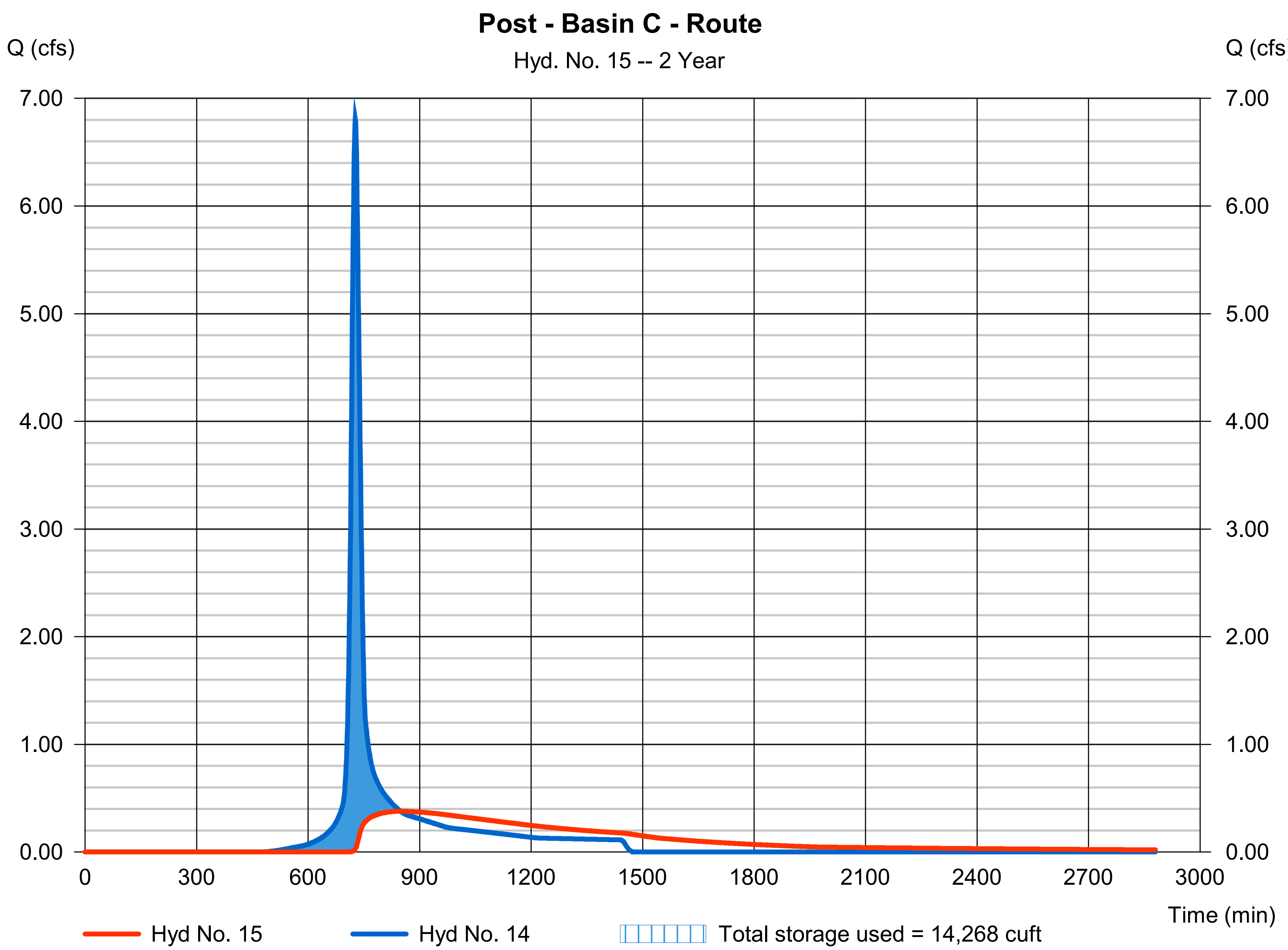
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 15

Post - Basin C - Route

Hydrograph type	= Reservoir	Peak discharge	= 0.378 cfs
Storm frequency	= 2 yrs	Time to peak	= 849 min
Time interval	= 1 min	Hyd. volume	= 16,802 cuft
Inflow hyd. No.	= 14 - POST - Basin C	Max. Elevation	= 531.40 ft
Reservoir name	= Basin C	Max. Storage	= 14,268 cuft

Storage Indication method used.



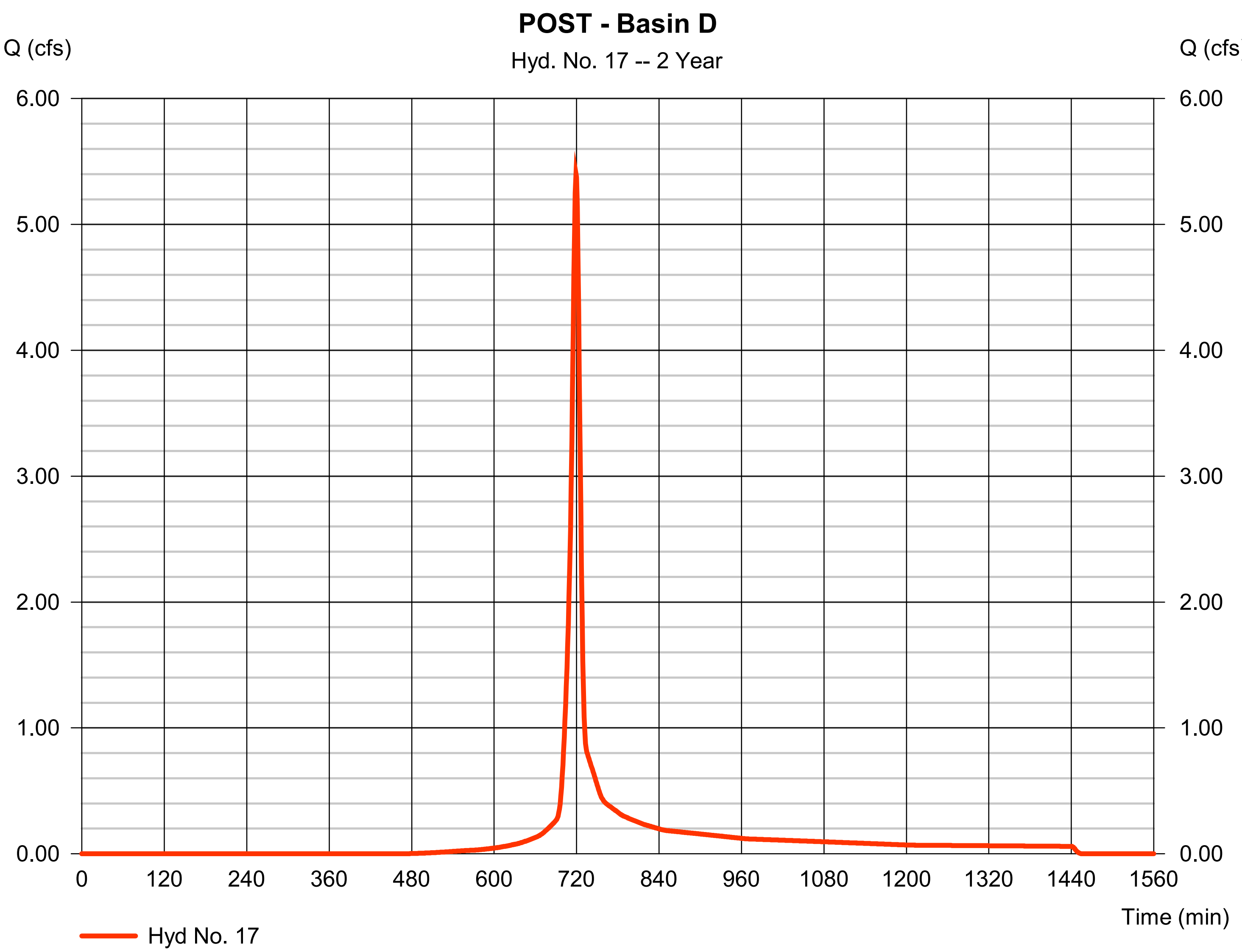
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 17

POST - Basin D

Hydrograph type	= SCS Runoff	Peak discharge	= 5.402 cfs
Storm frequency	= 2 yrs	Time to peak	= 719 min
Time interval	= 1 min	Hyd. volume	= 12,247 cuft
Drainage area	= 2.200 ac	Curve number	= 86.1
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.60 min
Total precip.	= 2.84 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

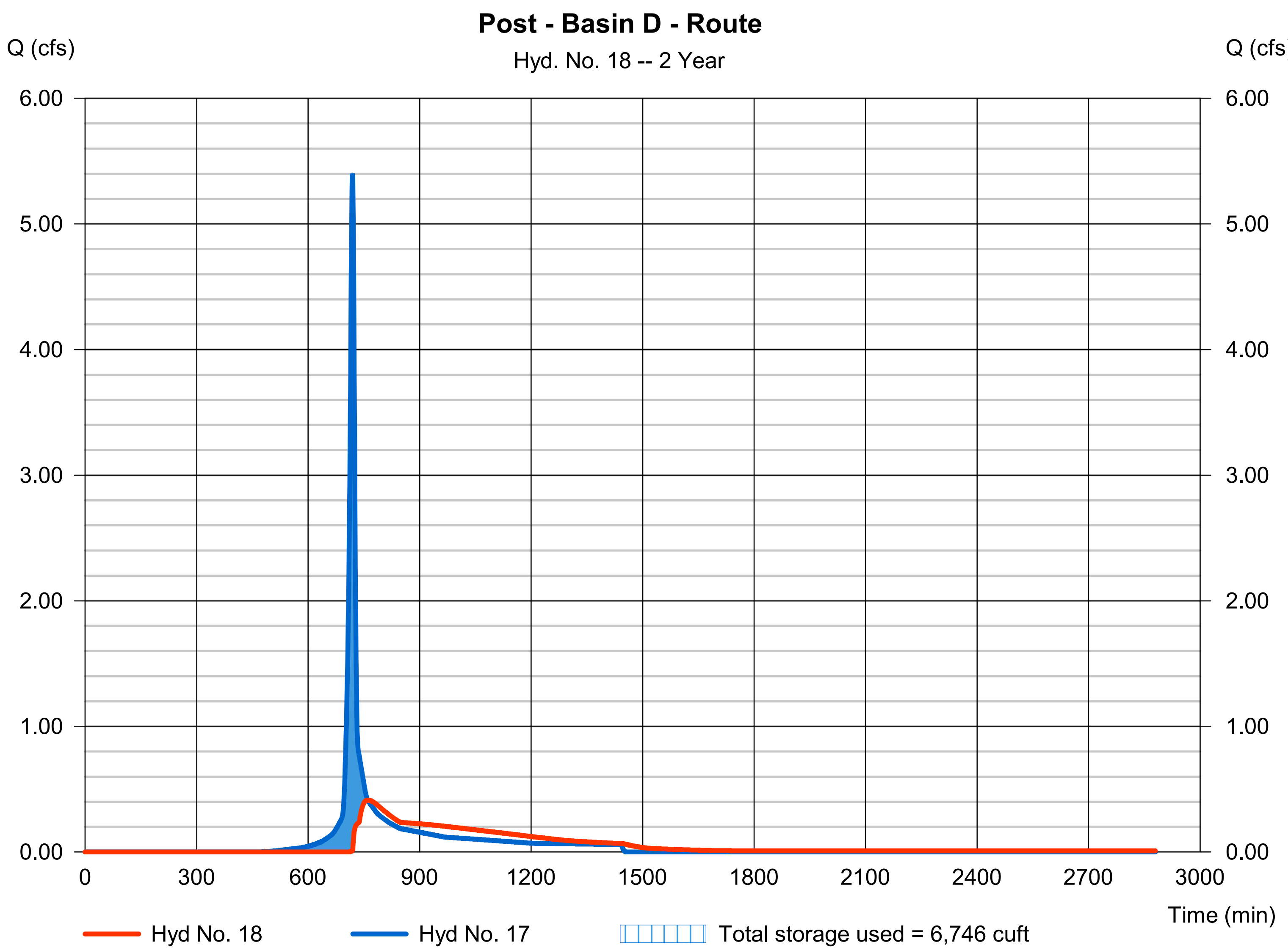
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 18

Post - Basin D - Route

Hydrograph type	= Reservoir	Peak discharge	= 0.413 cfs
Storm frequency	= 2 yrs	Time to peak	= 760 min
Time interval	= 1 min	Hyd. volume	= 8,693 cuft
Inflow hyd. No.	= 17 - POST - Basin D	Max. Elevation	= 535.02 ft
Reservoir name	= Basin D	Max. Storage	= 6,746 cuft

Storage Indication method used.



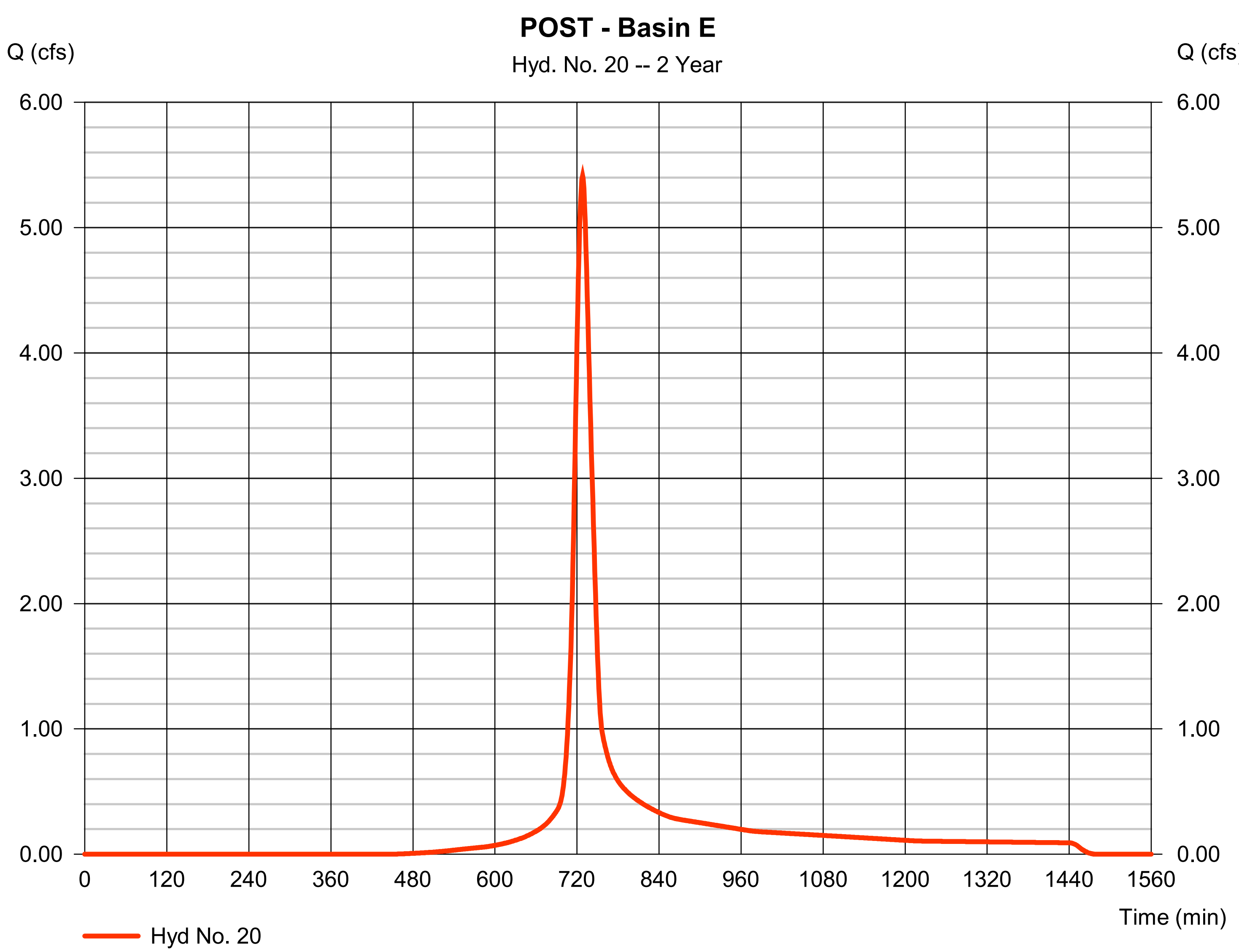
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 20

POST - Basin E

Hydrograph type	= SCS Runoff	Peak discharge	= 5.415 cfs
Storm frequency	= 2 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 19,259 cuft
Drainage area	= 3.300 ac	Curve number	= 87.1
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 25.30 min
Total precip.	= 2.84 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

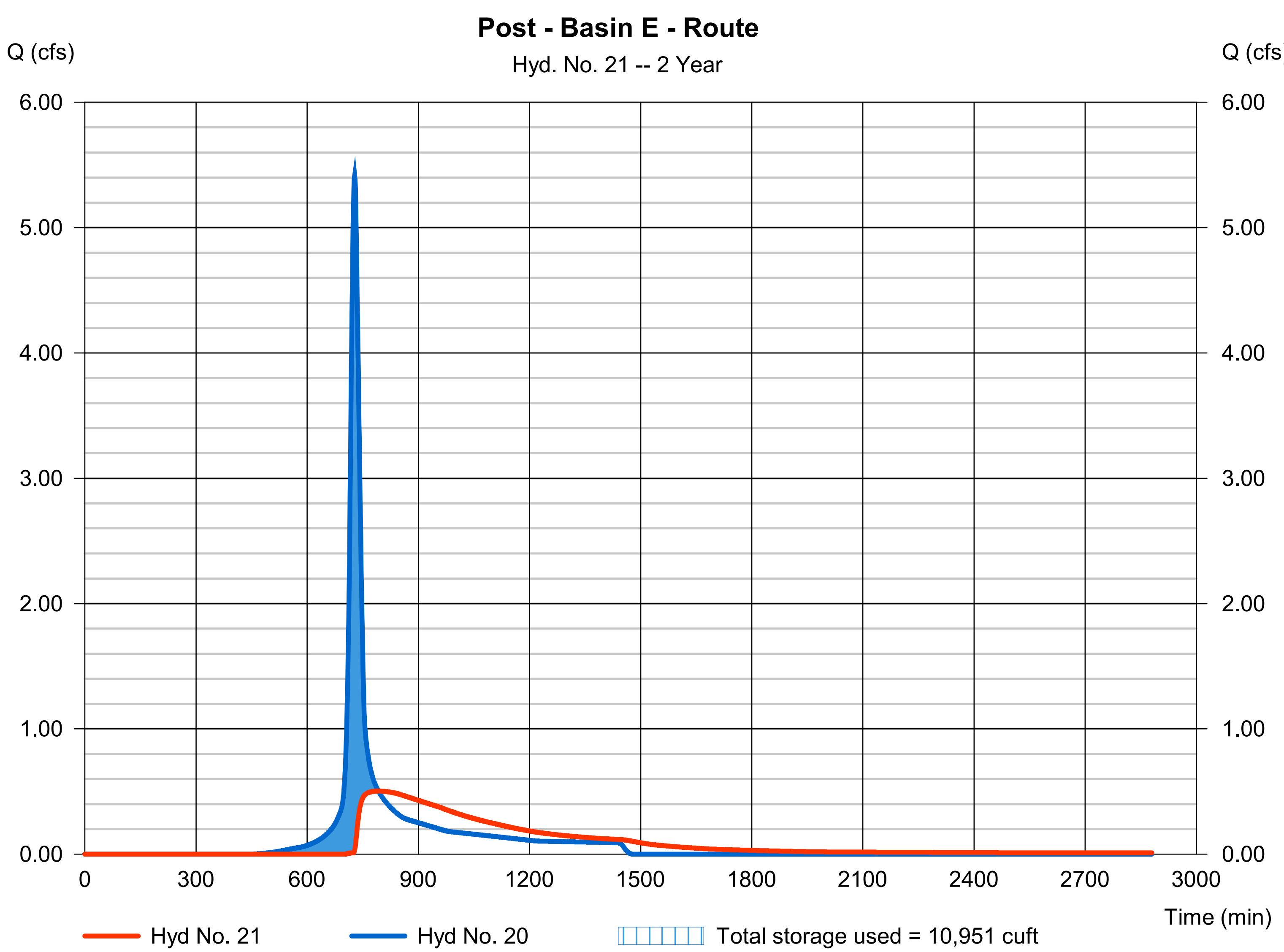
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 21

Post - Basin E - Route

Hydrograph type	= Reservoir	Peak discharge	= 0.504 cfs
Storm frequency	= 2 yrs	Time to peak	= 792 min
Time interval	= 1 min	Hyd. volume	= 14,401 cuft
Inflow hyd. No.	= 20 - POST - Basin E	Max. Elevation	= 533.22 ft
Reservoir name	= Basin E	Max. Storage	= 10,951 cuft

Storage Indication method used.



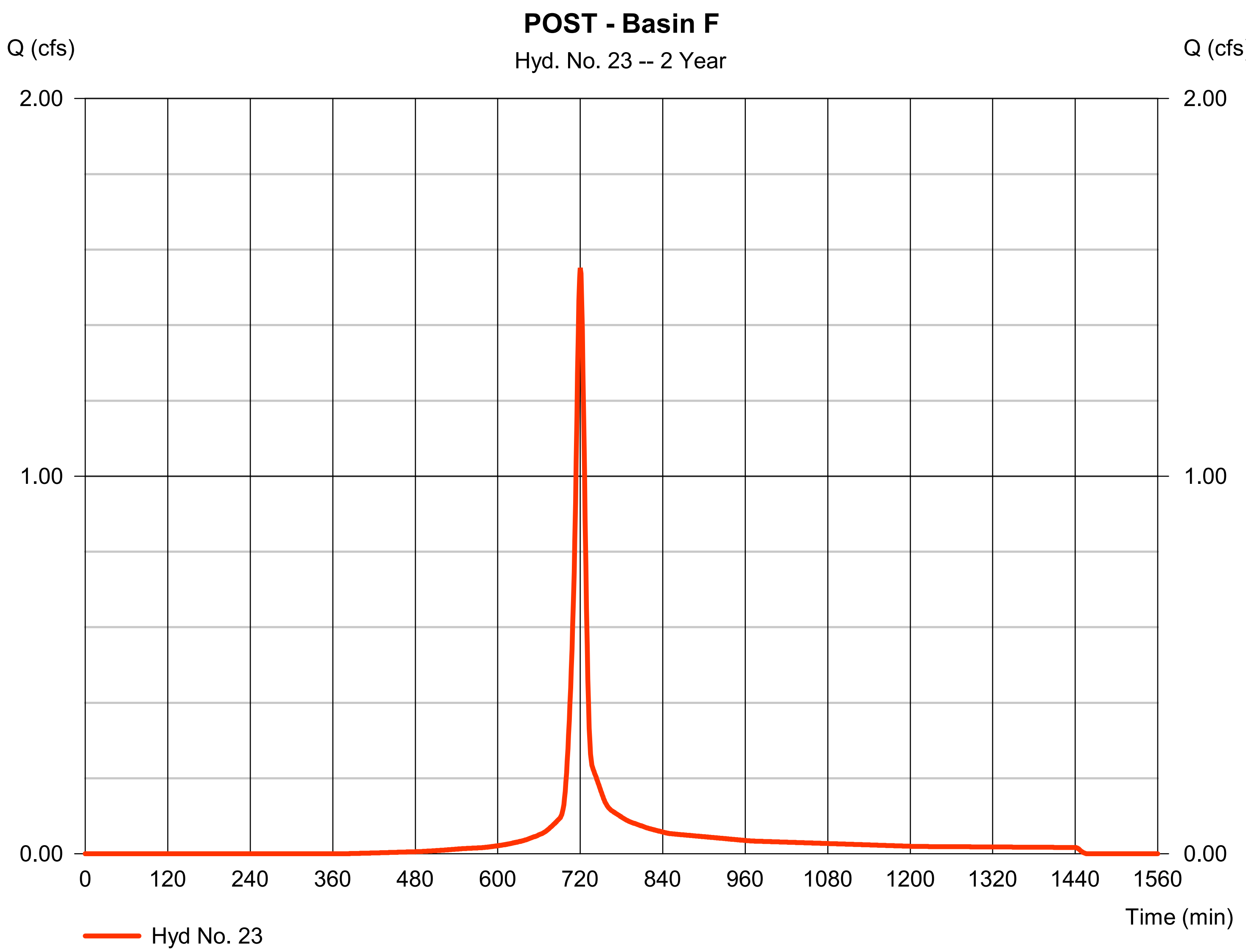
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 23

POST - Basin F

Hydrograph type	= SCS Runoff	Peak discharge	= 1.552 cfs
Storm frequency	= 2 yrs	Time to peak	= 720 min
Time interval	= 1 min	Hyd. volume	= 3,801 cuft
Drainage area	= 0.570 ac	Curve number	= 89.6
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 10.20 min
Total precip.	= 2.84 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

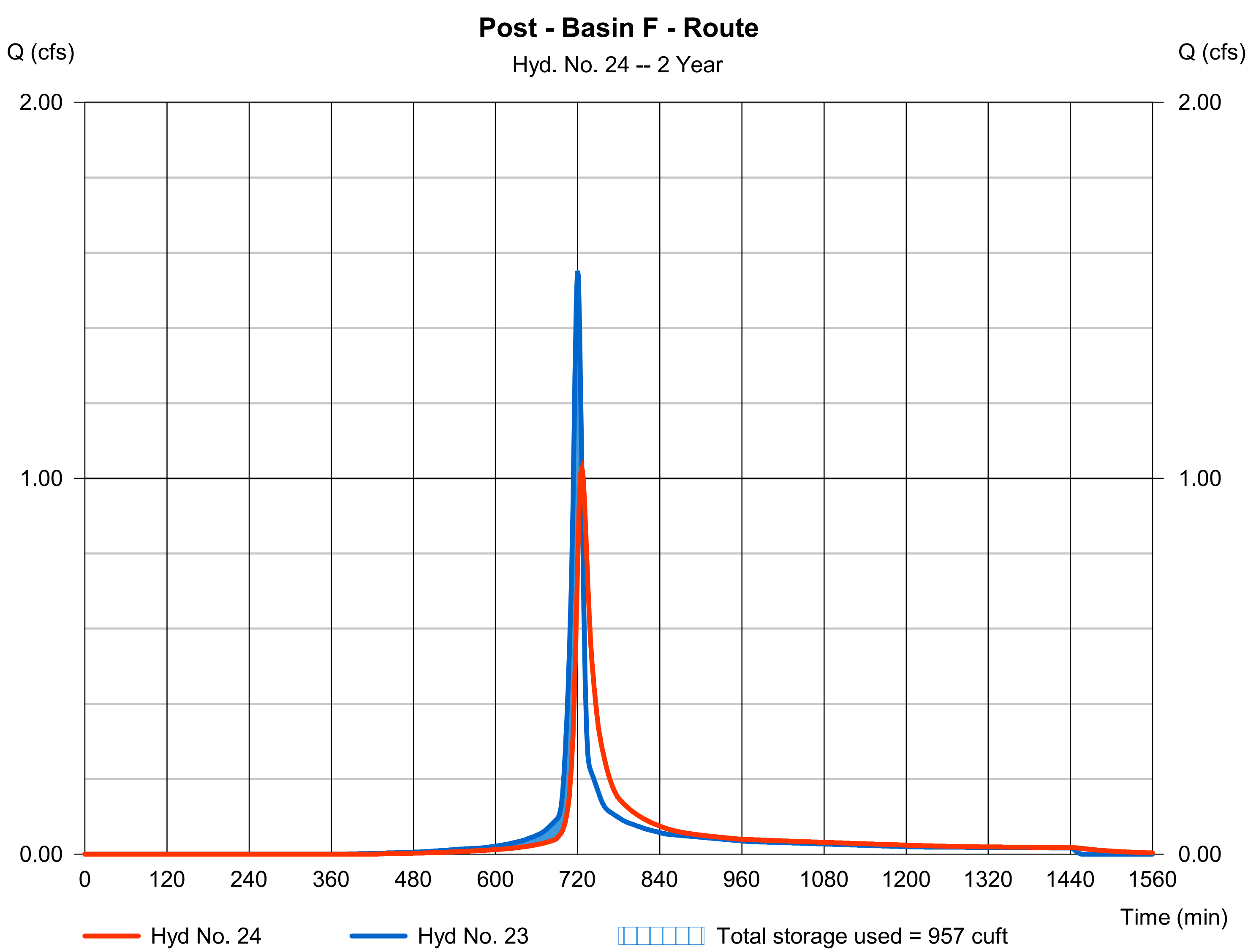
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 | Thursday, 08 / 5 / 2021

Hyd. No. 24

Post - Basin F - Route

Hydrograph type	= Reservoir	Peak discharge	= 1.027 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 3,796 cuft
Inflow hyd. No.	= 23 - POST - Basin F	Max. Elevation	= 534.57 ft
Reservoir name	= Basin F	Max. Storage	= 957 cuft

Storage Indication method used.



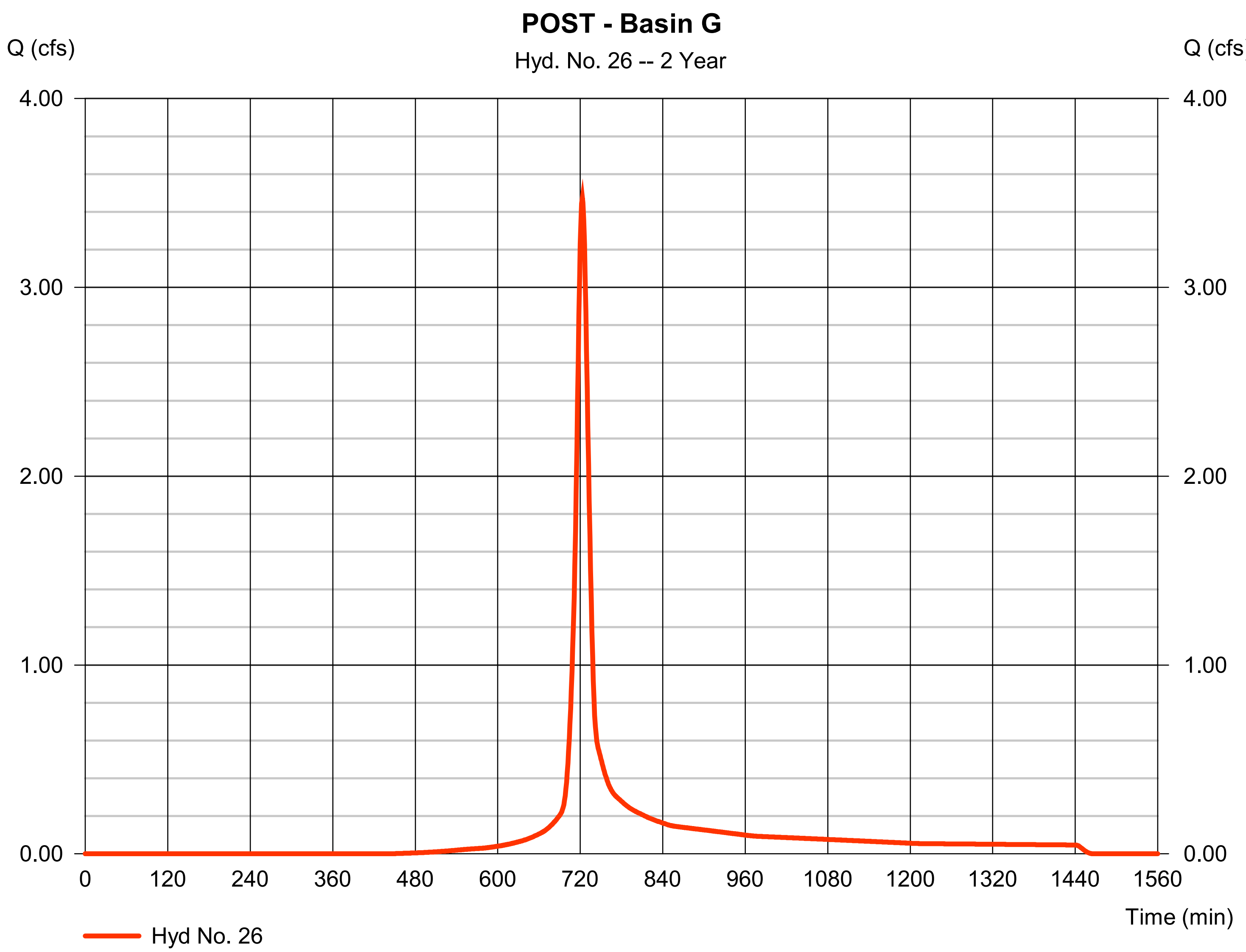
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 26

POST - Basin G

Hydrograph type	= SCS Runoff	Peak discharge	= 3.475 cfs
Storm frequency	= 2 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 9,914 cuft
Drainage area	= 1.670 ac	Curve number	= 87.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 15.80 min
Total precip.	= 2.84 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



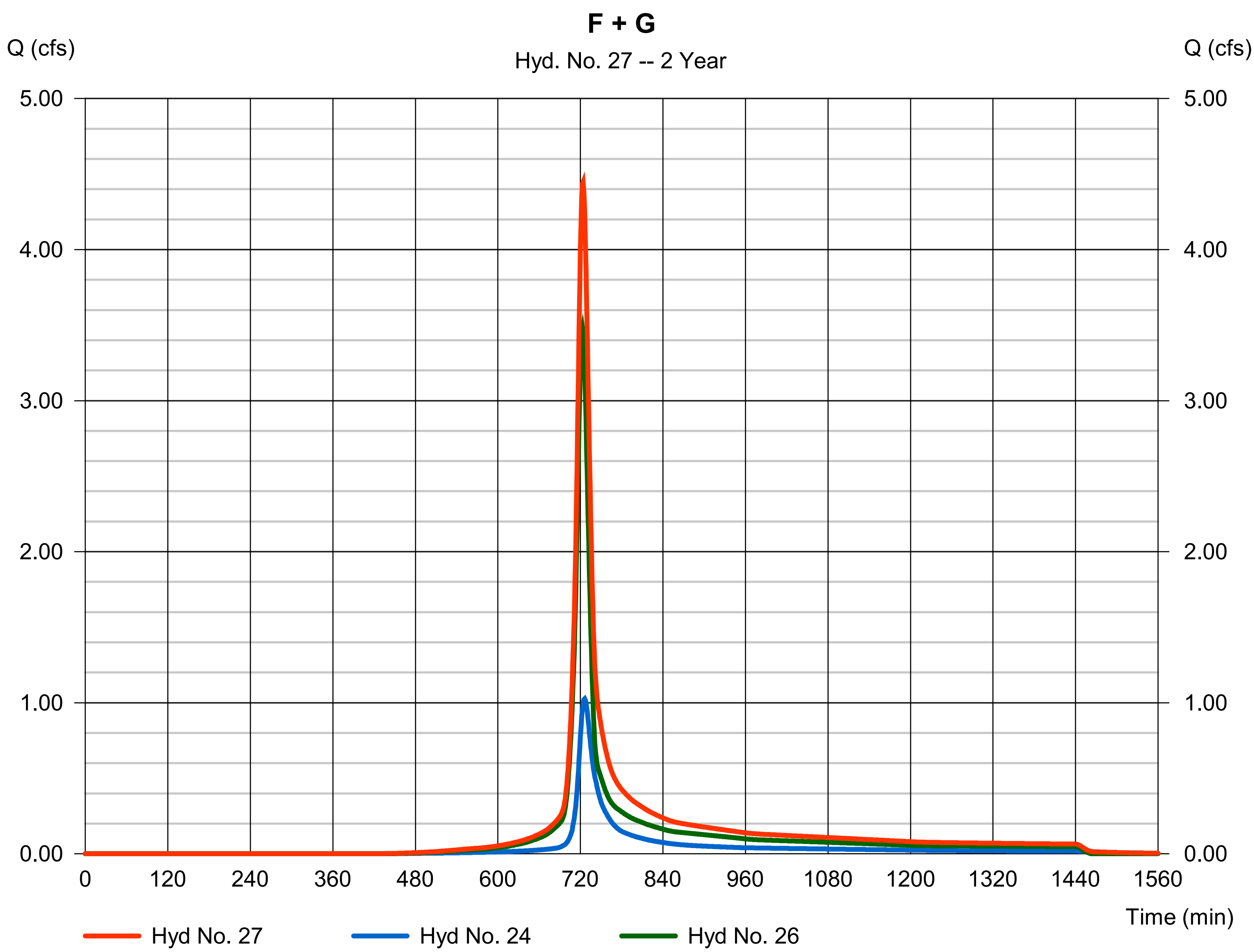
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 27

F + G

Hydrograph type	= Combine	Peak discharge	= 4.448 cfs
Storm frequency	= 2 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 13,711 cuft
Inflow hyds.	= 24, 26	Contrib. drain. area	= 1.670 ac



Hydrograph Report

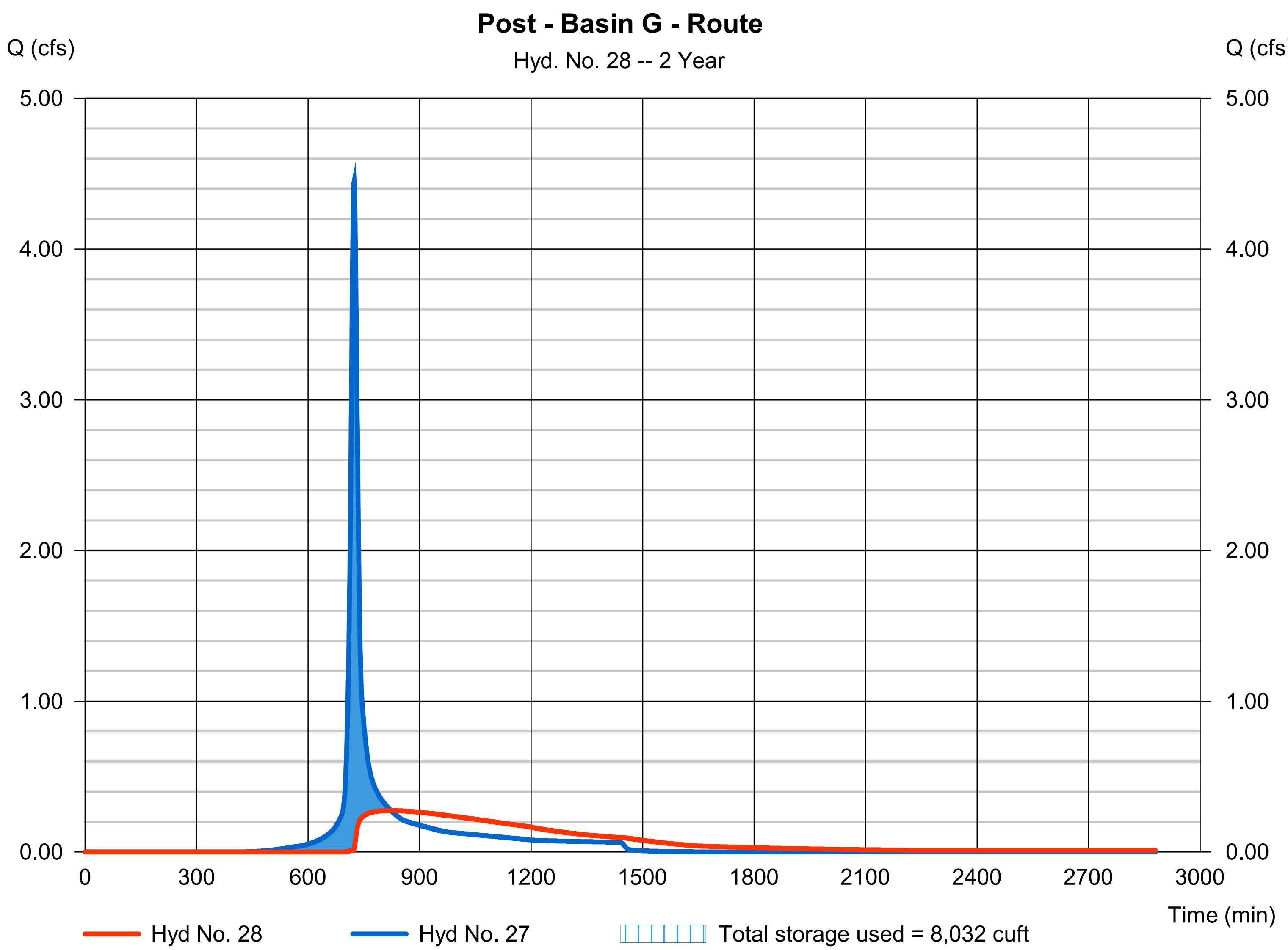
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 28

Post - Basin G - Route

Hydrograph type	= Reservoir	Peak discharge	= 0.275 cfs
Storm frequency	= 2 yrs	Time to peak	= 822 min
Time interval	= 1 min	Hyd. volume	= 10,434 cuft
Inflow hyd. No.	= 27 - F + G	Max. Elevation	= 532.75 ft
Reservoir name	= Basin G	Max. Storage	= 8,032 cuft

Storage Indication method used.

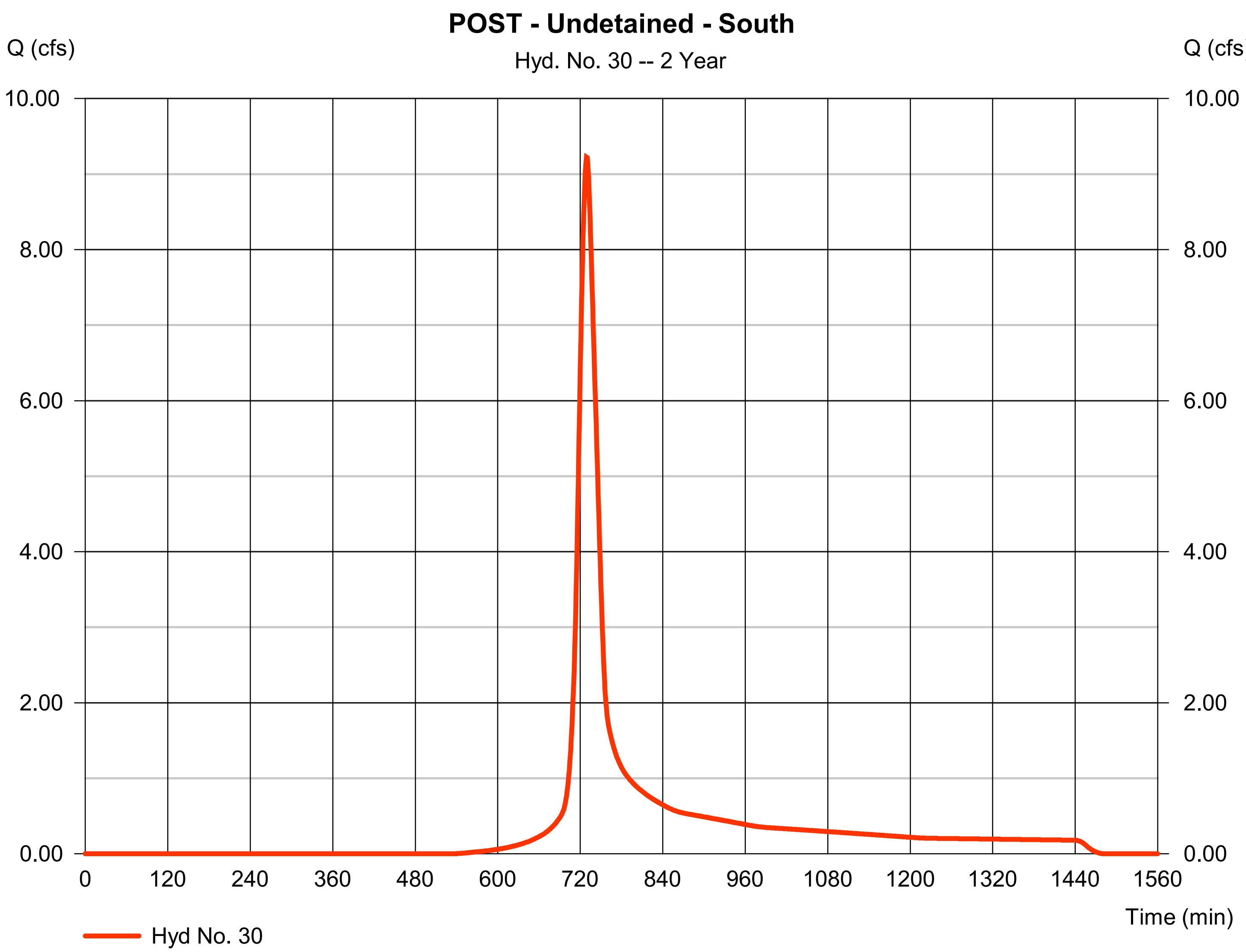


Hydrograph Report

Hyd. No. 30

POST - Undetained - South

Hydrograph type	= SCS Runoff	Peak discharge	= 9.224 cfs
Storm frequency	= 2 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 34,595 cuft
Drainage area	= 6.960 ac	Curve number	= 83.6
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 26.40 min
Total precip.	= 2.84 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



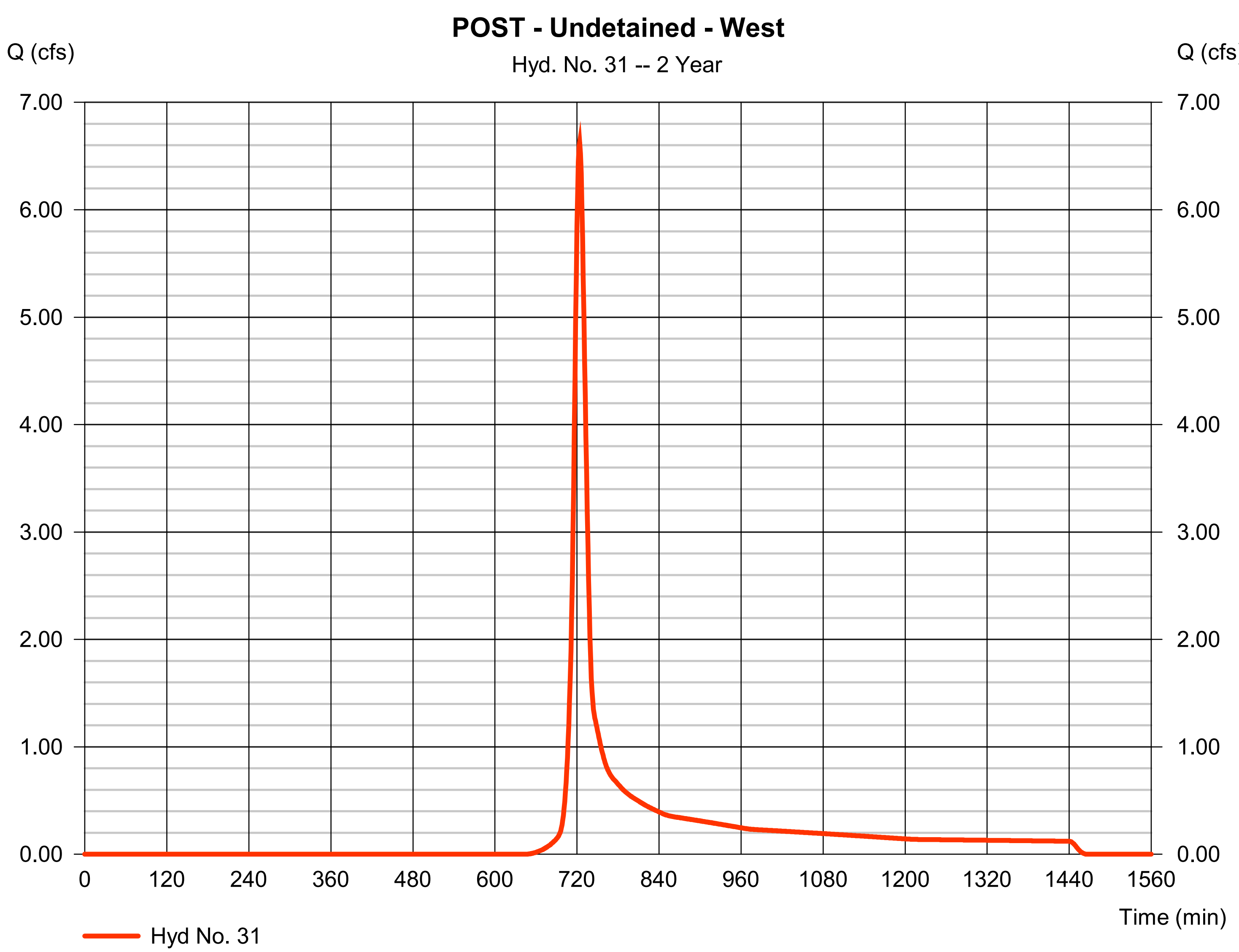
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 31

POST - Undetained - West

Hydrograph type	= SCS Runoff	Peak discharge	= 6.629 cfs
Storm frequency	= 2 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 19,608 cuft
Drainage area	= 5.610 ac	Curve number	= 76.8
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 16.30 min
Total precip.	= 2.84 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



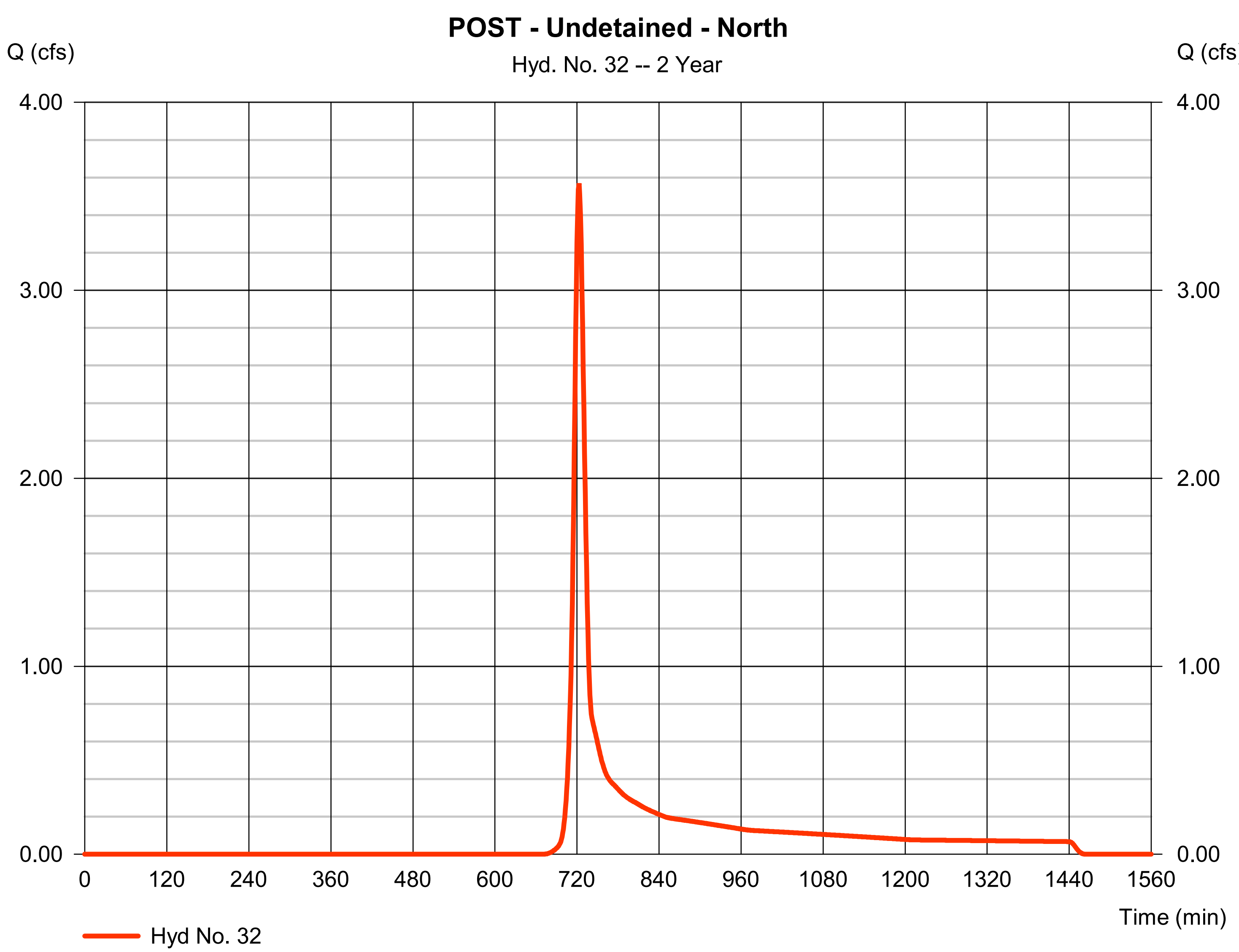
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 32

POST - Undetained - North

Hydrograph type	= SCS Runoff	Peak discharge	= 3.570 cfs
Storm frequency	= 2 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 10,157 cuft
Drainage area	= 3.420 ac	Curve number	= 74.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 14.70 min
Total precip.	= 2.84 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



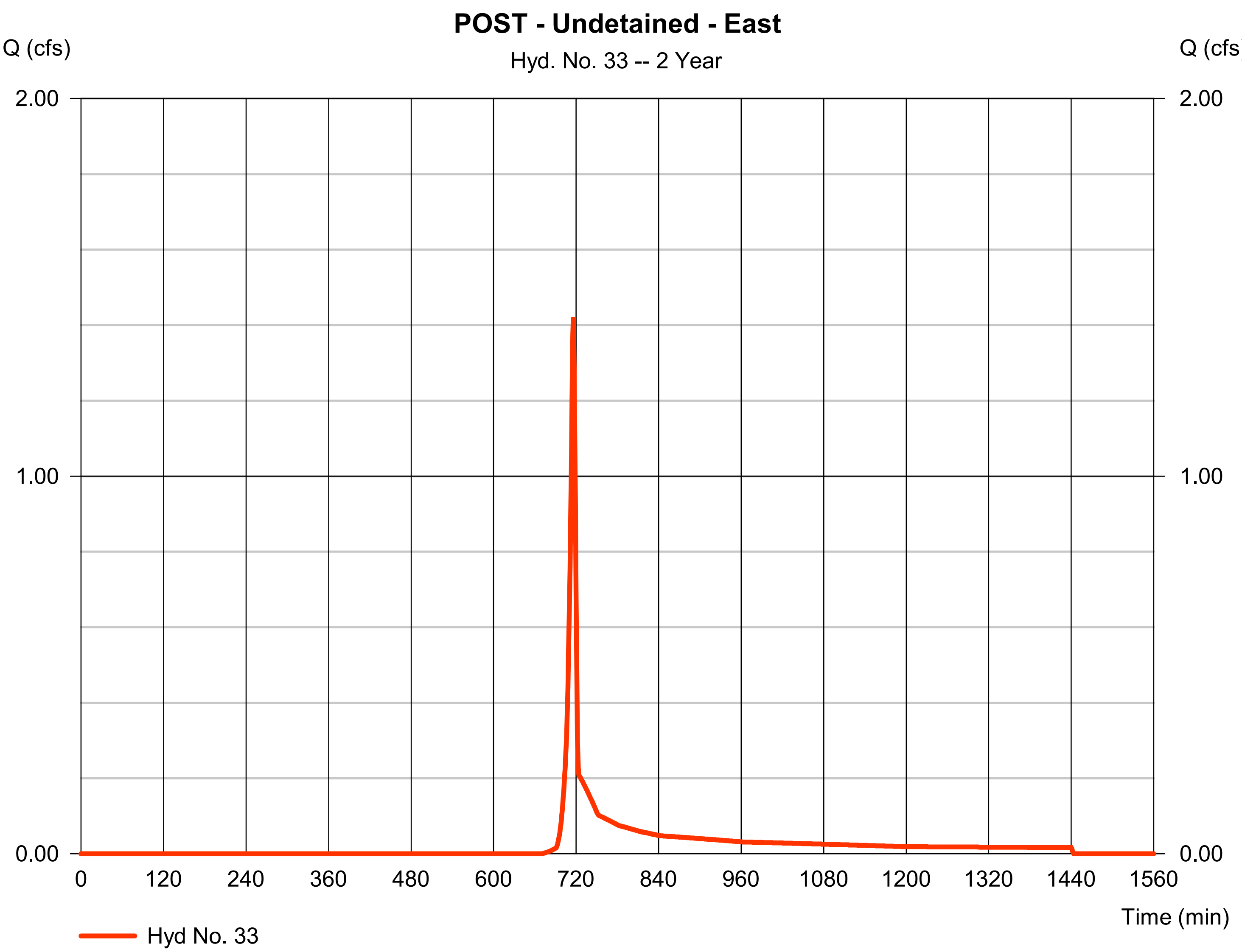
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Thursday, 08 / 5 / 2021

Hyd. No. 33

POST - Undetained - East

Hydrograph type	= SCS Runoff	Peak discharge	= 1.422 cfs
Storm frequency	= 2 yrs	Time to peak	= 716 min
Time interval	= 1 min	Hyd. volume	= 2,491 cuft
Drainage area	= 0.900 ac	Curve number	= 74.1
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 2.00 min
Total precip.	= 2.84 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



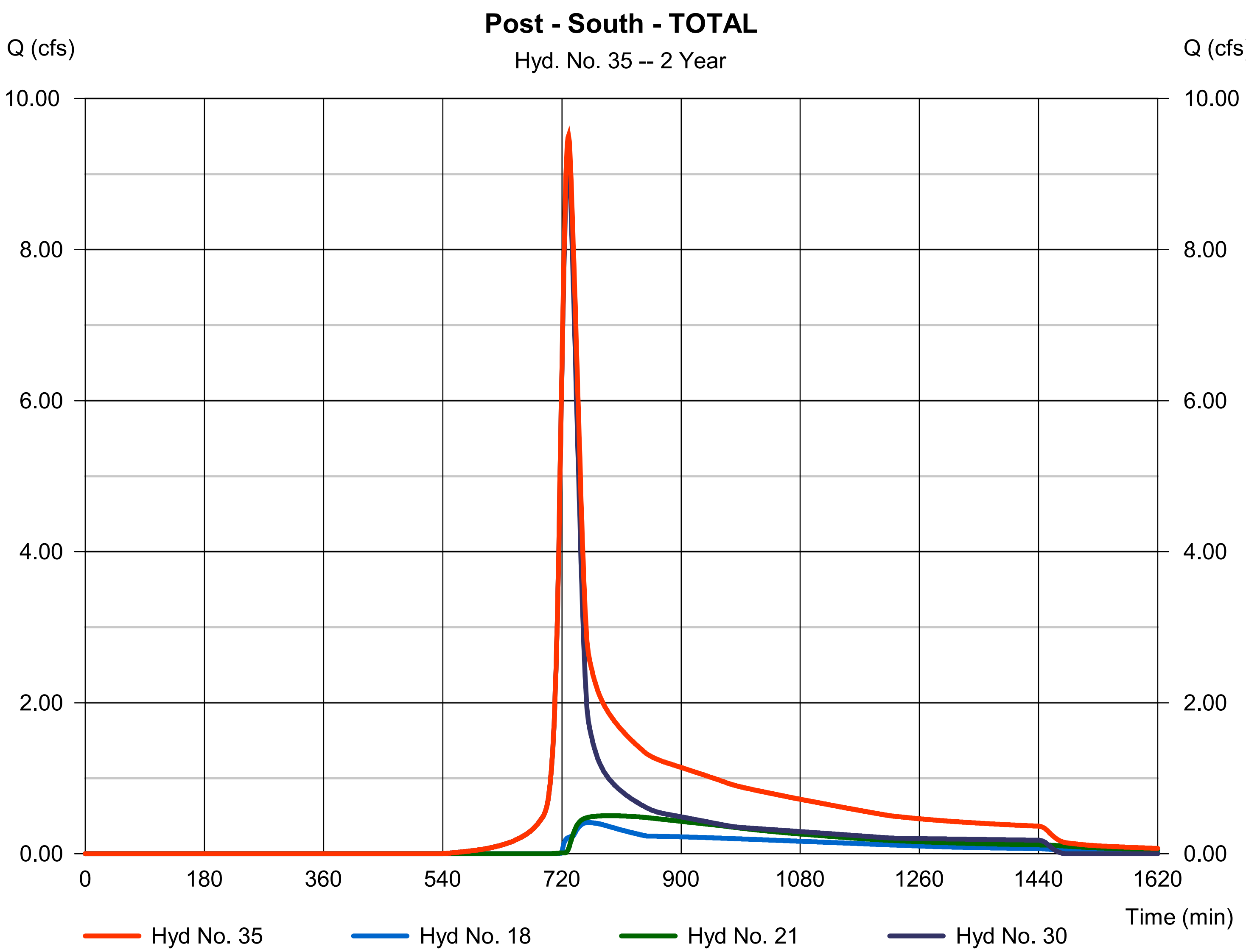
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 35

Post - South - TOTAL

Hydrograph type	= Combine	Peak discharge	= 9.506 cfs
Storm frequency	= 2 yrs	Time to peak	= 730 min
Time interval	= 1 min	Hyd. volume	= 57,689 cuft
Inflow hyds.	= 18, 21, 30	Contrib. drain. area	= 6.960 ac



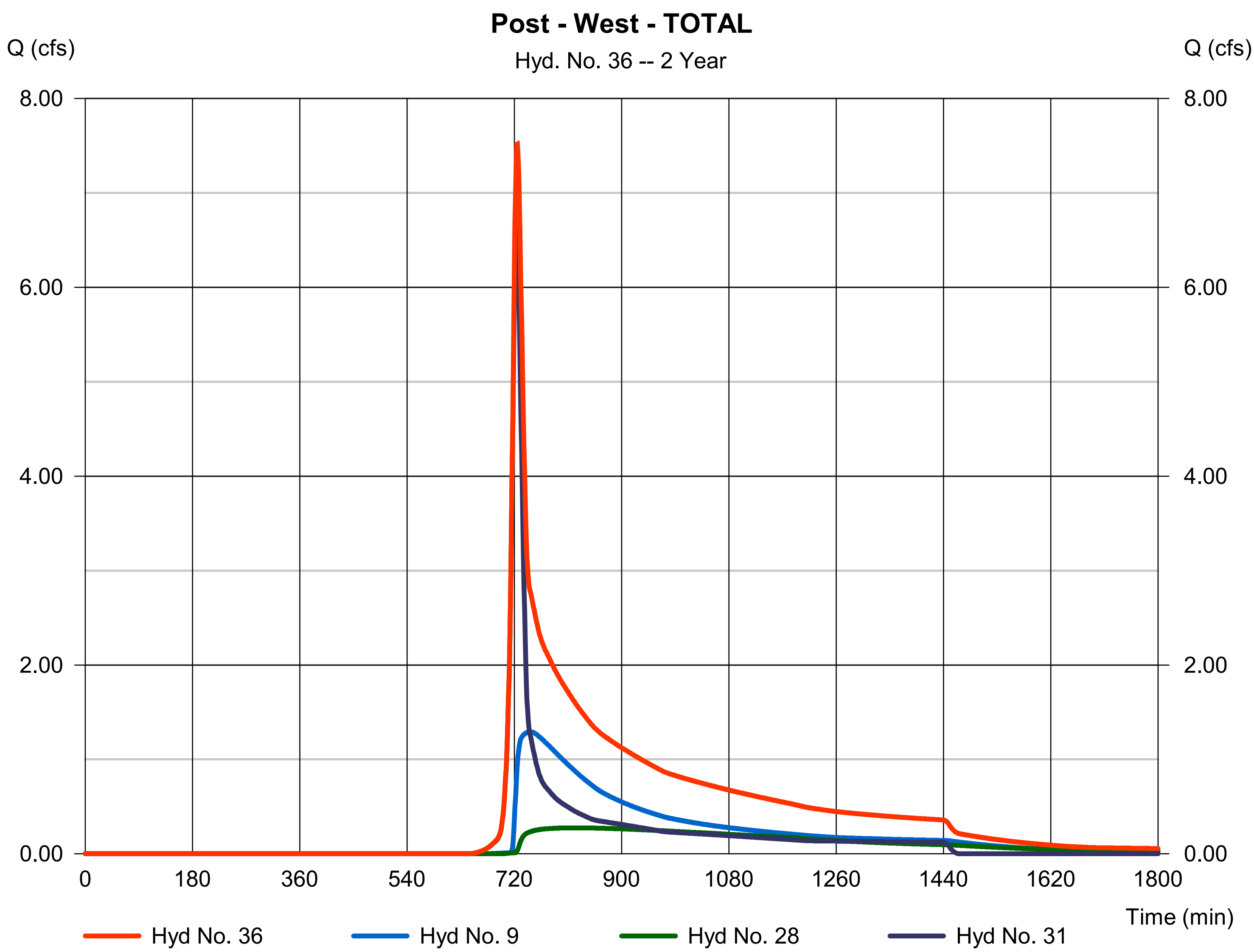
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 36

Post - West - TOTAL

Hydrograph type	= Combine	Peak discharge	= 7.517 cfs
Storm frequency	= 2 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 50,692 cuft
Inflow hyds.	= 9, 28, 31	Contrib. drain. area	= 5.610 ac



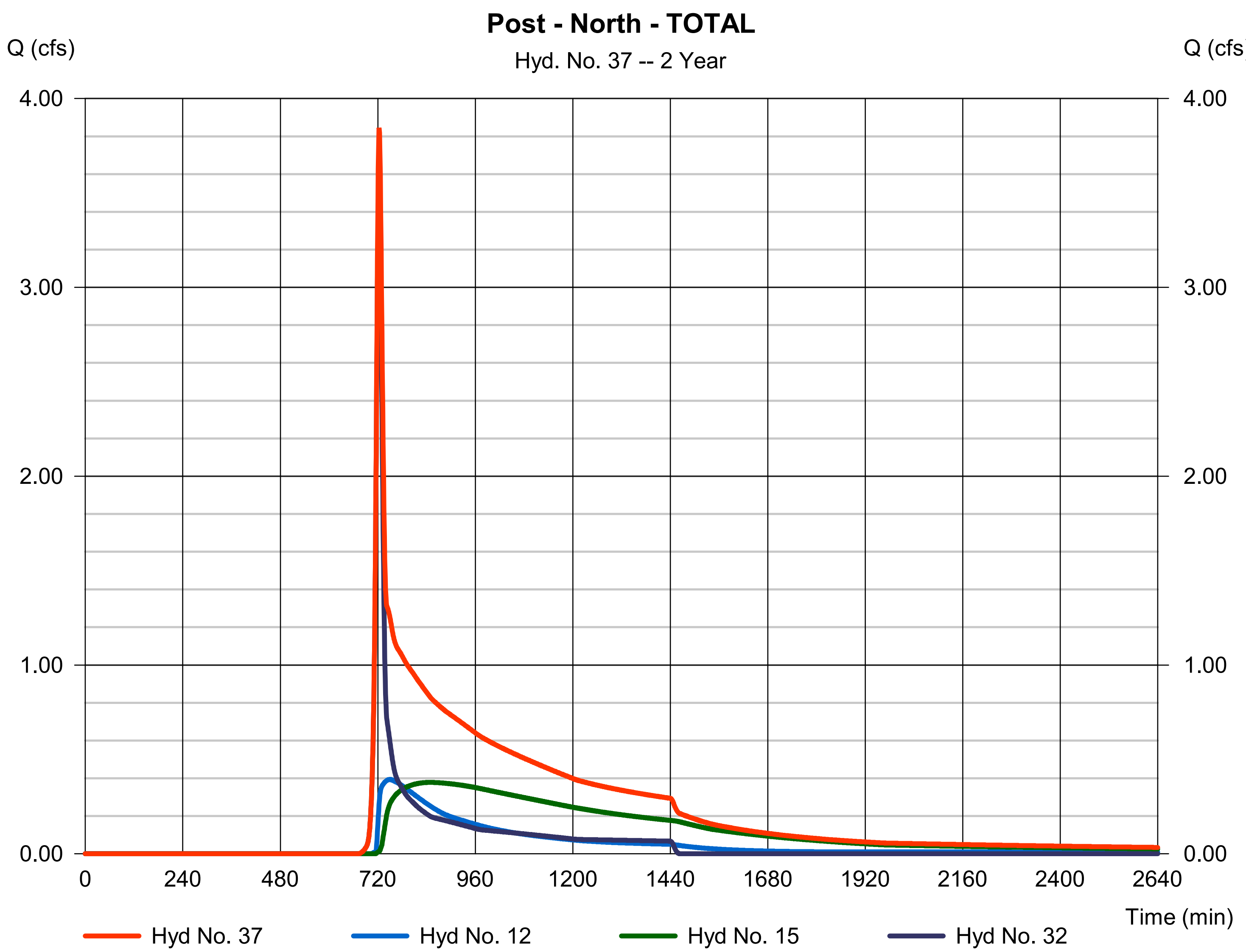
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 37

Post - North - TOTAL

Hydrograph type	= Combine	Peak discharge	= 3.845 cfs
Storm frequency	= 2 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 34,358 cuft
Inflow hyds.	= 12, 15, 32	Contrib. drain. area	= 3.420 ac



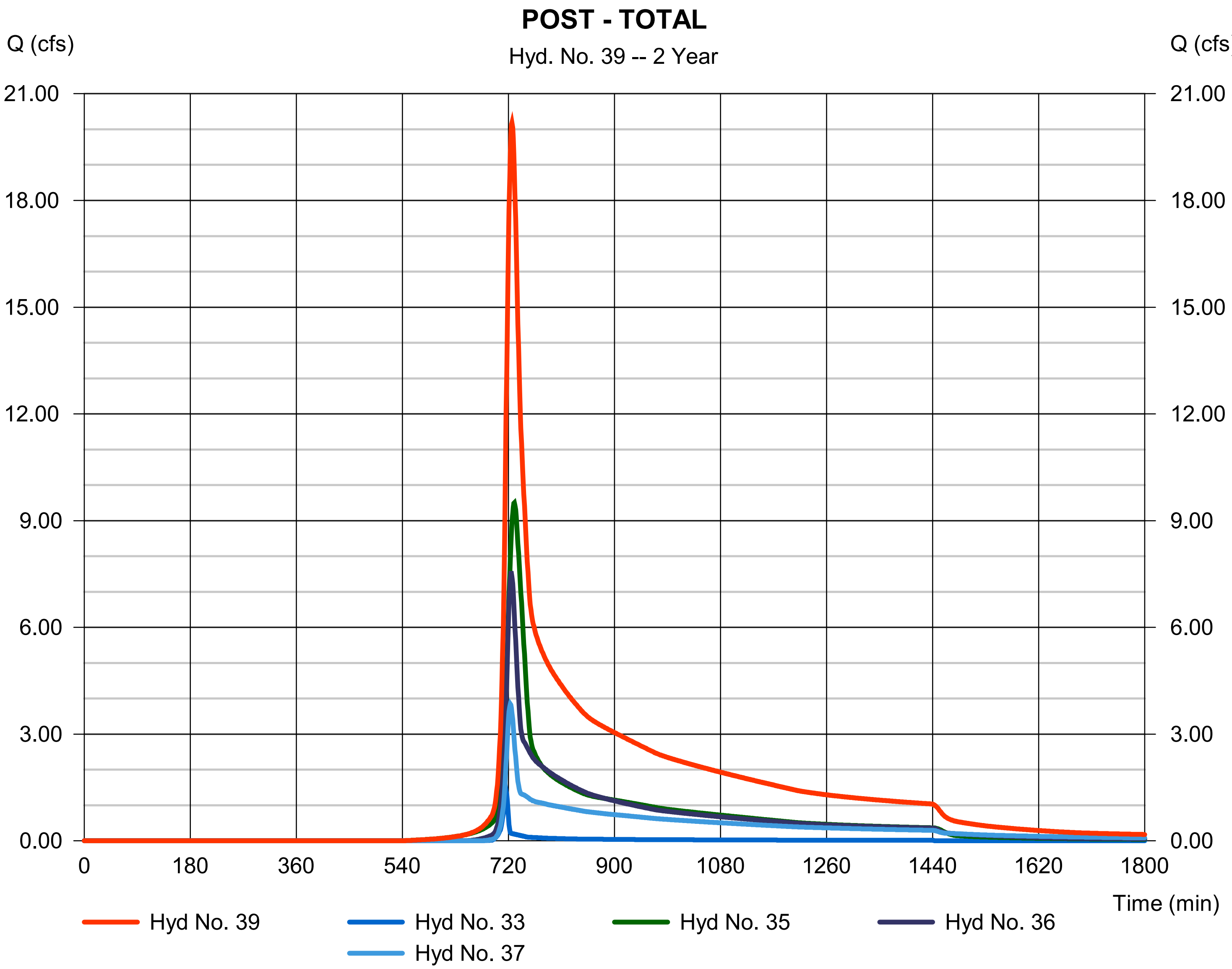
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 39

POST - TOTAL

Hydrograph type	= Combine	Peak discharge	= 20.18 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 145,231 cuft
Inflow hyds.	= 33, 35, 36, 37	Contrib. drain. area	= 0.900 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

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	26.42	1	722	71,113	------	------	------	Pre Development - South
2	SCS Runoff	17.09	1	724	49,784	------	------	------	Pre Development - West
3	SCS Runoff	44.05	1	718	89,368	------	------	------	Pre Development - North
4	SCS Runoff	5.729	1	720	14,078	------	------	------	Pre Development - East
5	Combine	85.94	1	719	224,343	1, 2, 3, 4	------	------	Combined Pre Development
8	SCS Runoff	15.76	1	719	36,487	------	------	------	POST - Basin A
9	Reservoir	1.936	1	741	30,087	8	531.16	19,340	Post - Basin A - Route
11	SCS Runoff	5.900	1	718	12,712	------	------	------	POST - Basin B
12	Reservoir	0.811	1	733	10,792	11	532.38	6,502	Post - Basin B - Route
14	SCS Runoff	9.395	1	727	31,915	------	------	------	POST - Basin C
15	Reservoir	0.609	1	823	25,469	14	531.64	19,330	Post - Basin C - Route
17	SCS Runoff	7.396	1	719	16,895	------	------	------	POST - Basin D
18	Reservoir	1.520	1	731	13,325	17	535.11	8,379	Post - Basin D - Route
20	SCS Runoff	7.395	1	728	26,353	------	------	------	POST - Basin E
21	Reservoir	1.001	1	766	21,464	20	533.53	14,726	Post - Basin E - Route
23	SCS Runoff	2.058	1	720	5,098	------	------	------	POST - Basin F
24	Reservoir	1.412	1	726	5,094	23	534.71	1,186	Post - Basin F - Route
26	SCS Runoff	4.726	1	723	13,556	------	------	------	POST - Basin G
27	Combine	6.082	1	723	18,649	24, 26	------	------	F + G
28	Reservoir	0.413	1	805	15,313	27	533.10	11,032	Post - Basin G - Route
30	SCS Runoff	13.09	1	729	48,724	------	------	------	POST - Undetained - South
31	SCS Runoff	10.15	1	723	29,376	------	------	------	POST - Undetained - West
32	SCS Runoff	5.680	1	723	15,631	------	------	------	POST - Undetained - North
33	SCS Runoff	2.208	1	716	3,838	------	------	------	POST - Undetained - East
35	Combine	14.95	1	730	83,513	18, 21, 30,	------	------	Post - South - TOTAL
36	Combine	12.05	1	724	74,776	9, 28, 31,	------	------	Post - West - TOTAL
37	Combine	6.405	1	723	51,893	12, 15, 32,	------	------	Post - North - TOTAL
39	Combine	31.88	1	726	214,018	33, 35, 36, 37,	------	------	POST - TOTAL

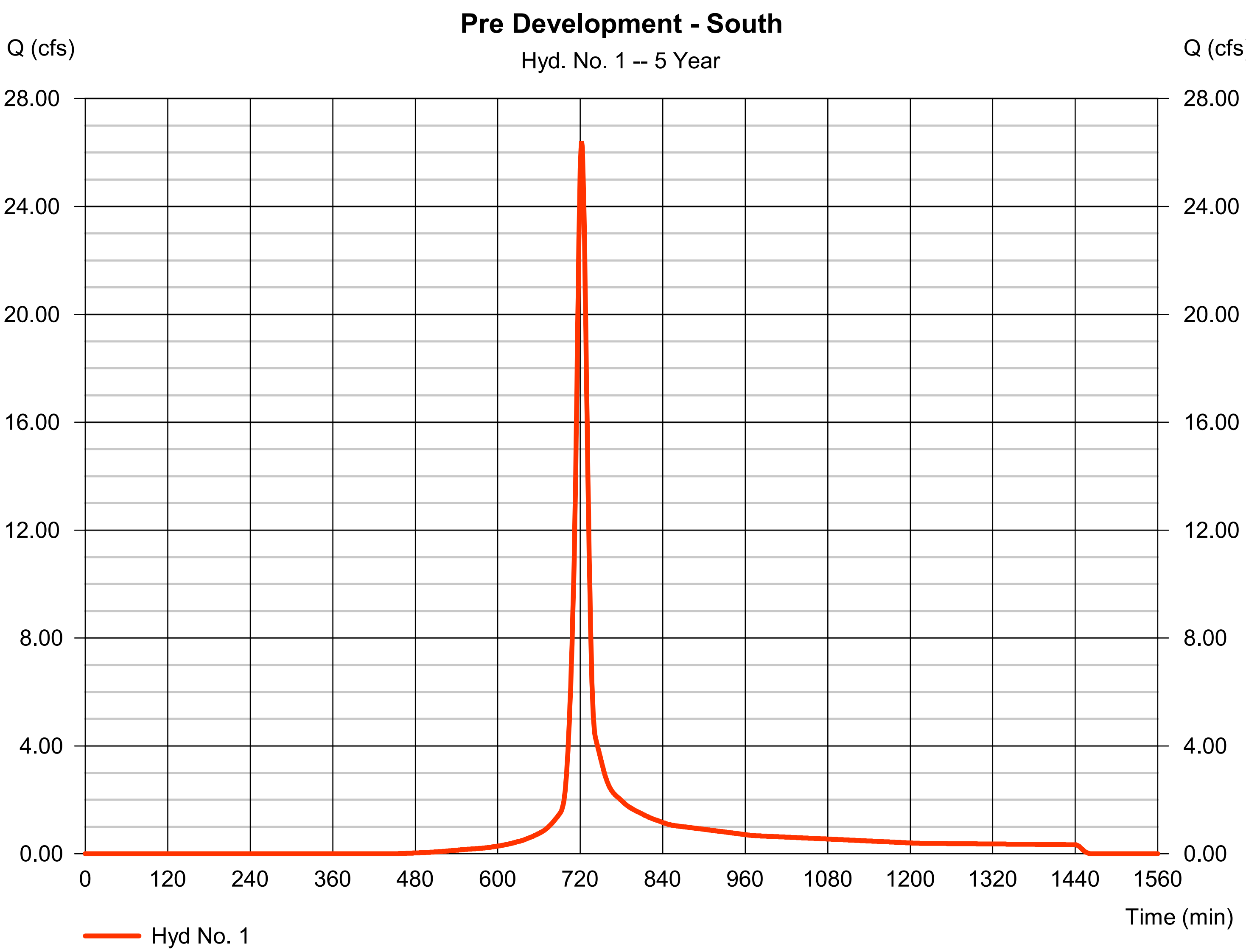
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Thursday, 08 / 5 / 2021

Hyd. No. 1

Pre Development - South

Hydrograph type	= SCS Runoff	Peak discharge	= 26.42 cfs
Storm frequency	= 5 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 71,113 cuft
Drainage area	= 9.910 ac	Curve number	= 84.4
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 13.60 min
Total precip.	= 3.51 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



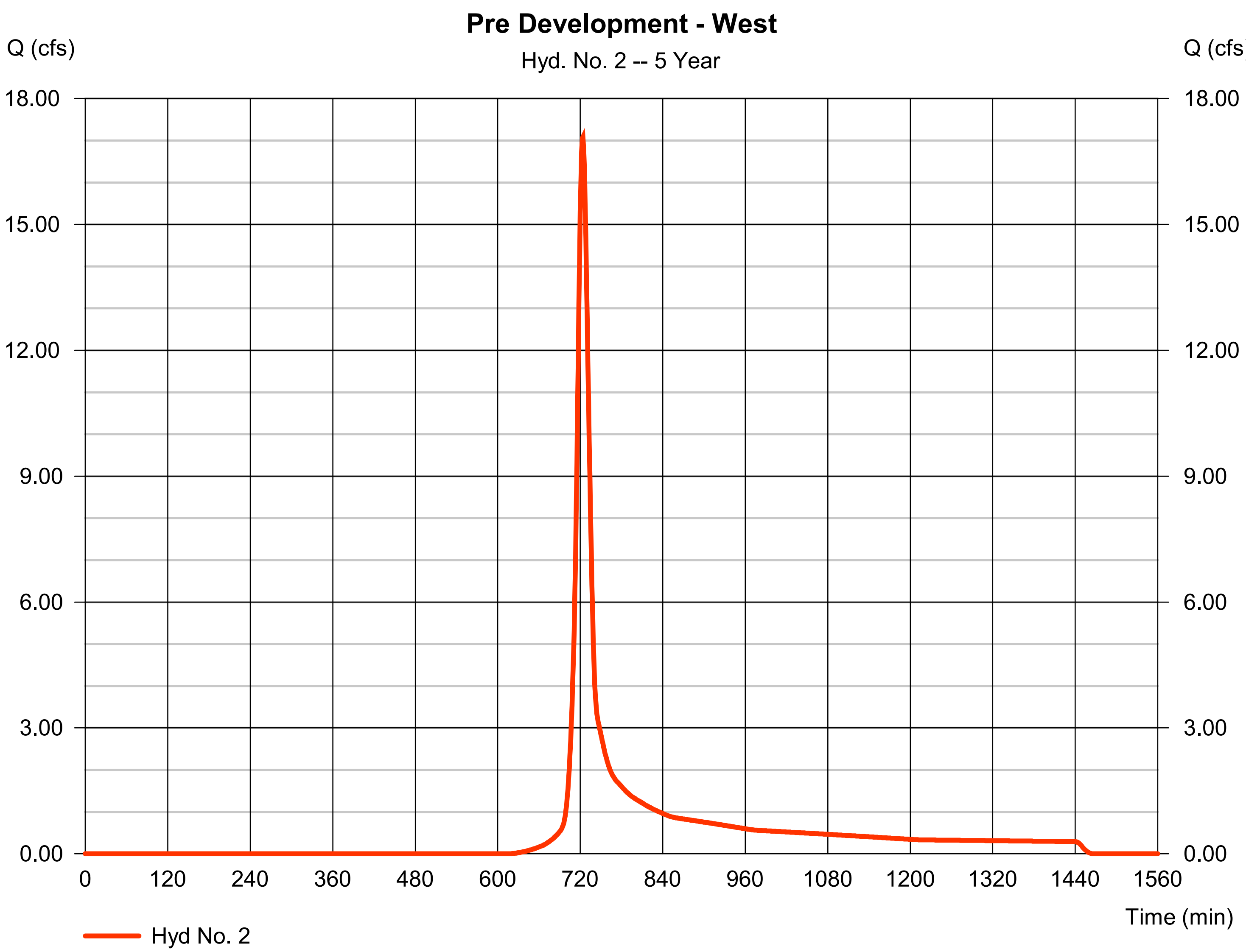
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 | Thursday, 08 / 5 / 2021

Hyd. No. 2

Pre Development - West

Hydrograph type	= SCS Runoff	Peak discharge	= 17.09 cfs
Storm frequency	= 5 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 49,784 cuft
Drainage area	= 10.250 ac	Curve number	= 75.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 16.30 min
Total precip.	= 3.51 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



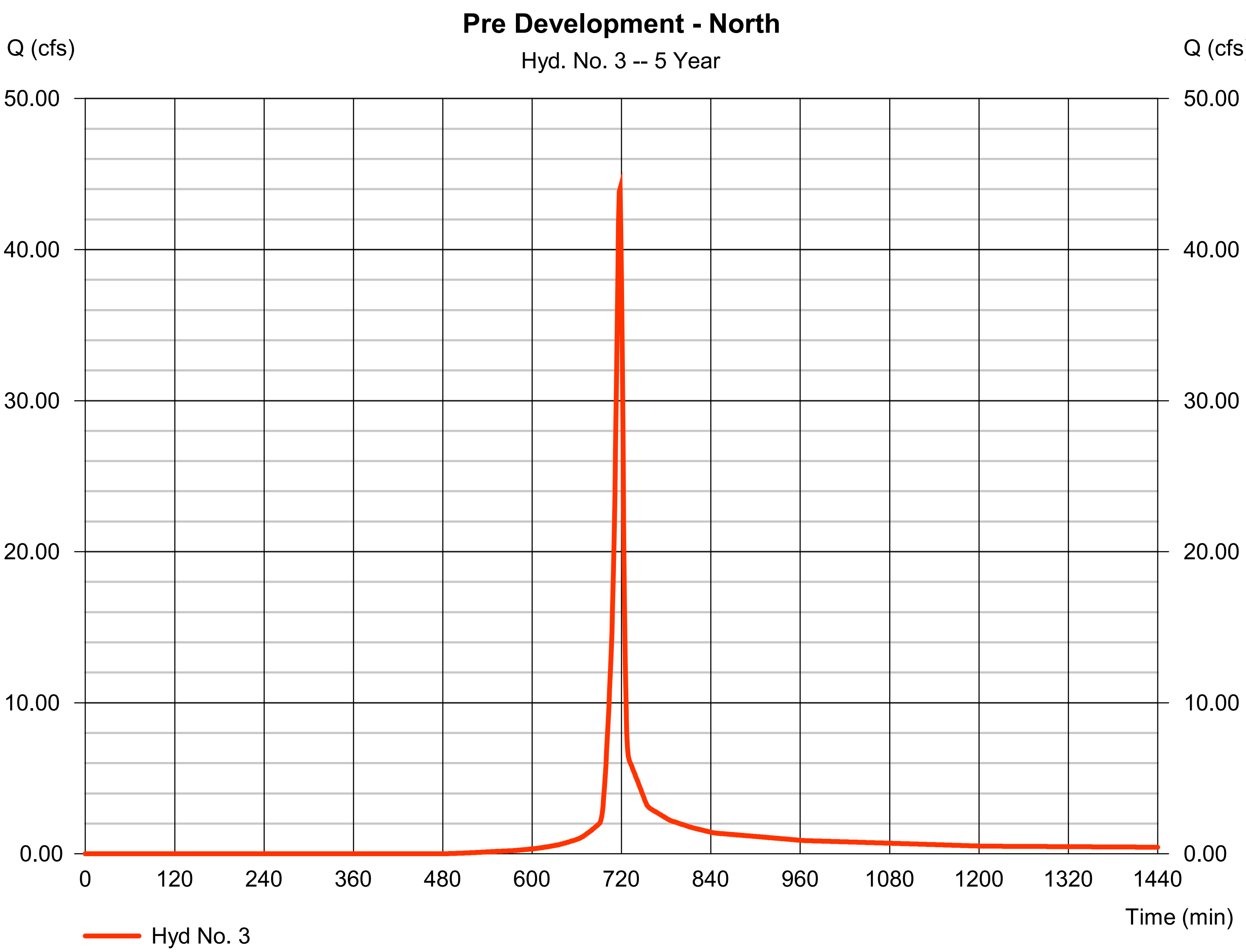
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 3

Pre Development - North

Hydrograph type	= SCS Runoff	Peak discharge	= 44.05 cfs
Storm frequency	= 5 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 89,368 cuft
Drainage area	= 12.840 ac	Curve number	= 82.9
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.30 min
Total precip.	= 3.51 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

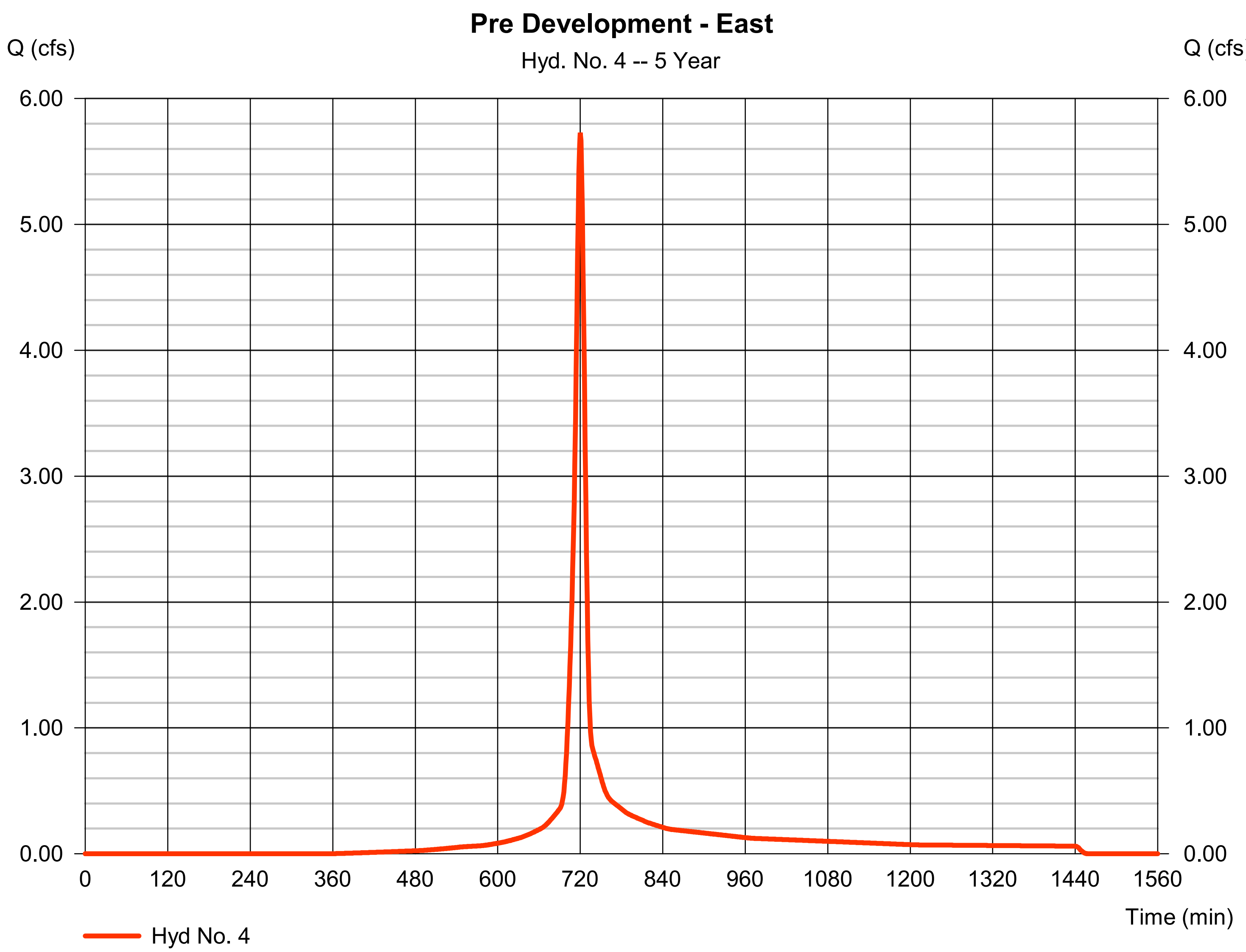


Hydrograph Report

Hyd. No. 4

Pre Development - East

Hydrograph type	= SCS Runoff	Peak discharge	= 5.729 cfs
Storm frequency	= 5 yrs	Time to peak	= 720 min
Time interval	= 1 min	Hyd. volume	= 14,078 cuft
Drainage area	= 1.660 ac	Curve number	= 88.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 11.20 min
Total precip.	= 3.51 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



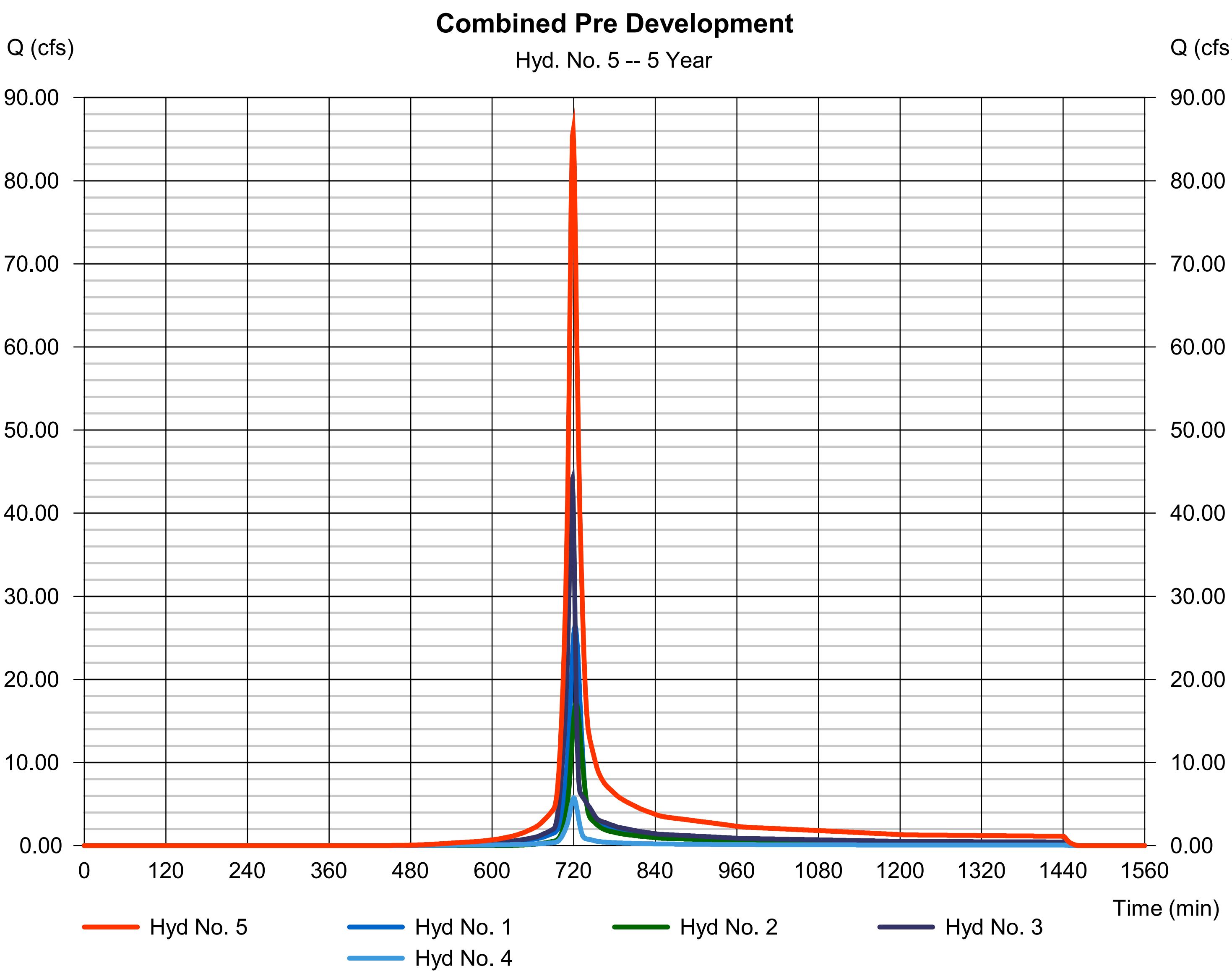
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Thursday, 08 / 5 / 2021

Hyd. No. 5

Combined Pre Development

Hydrograph type	= Combine	Peak discharge	= 85.94 cfs
Storm frequency	= 5 yrs	Time to peak	= 719 min
Time interval	= 1 min	Hyd. volume	= 224,343 cuft
Inflow hyds.	= 1, 2, 3, 4	Contrib. drain. area	= 34.660 ac



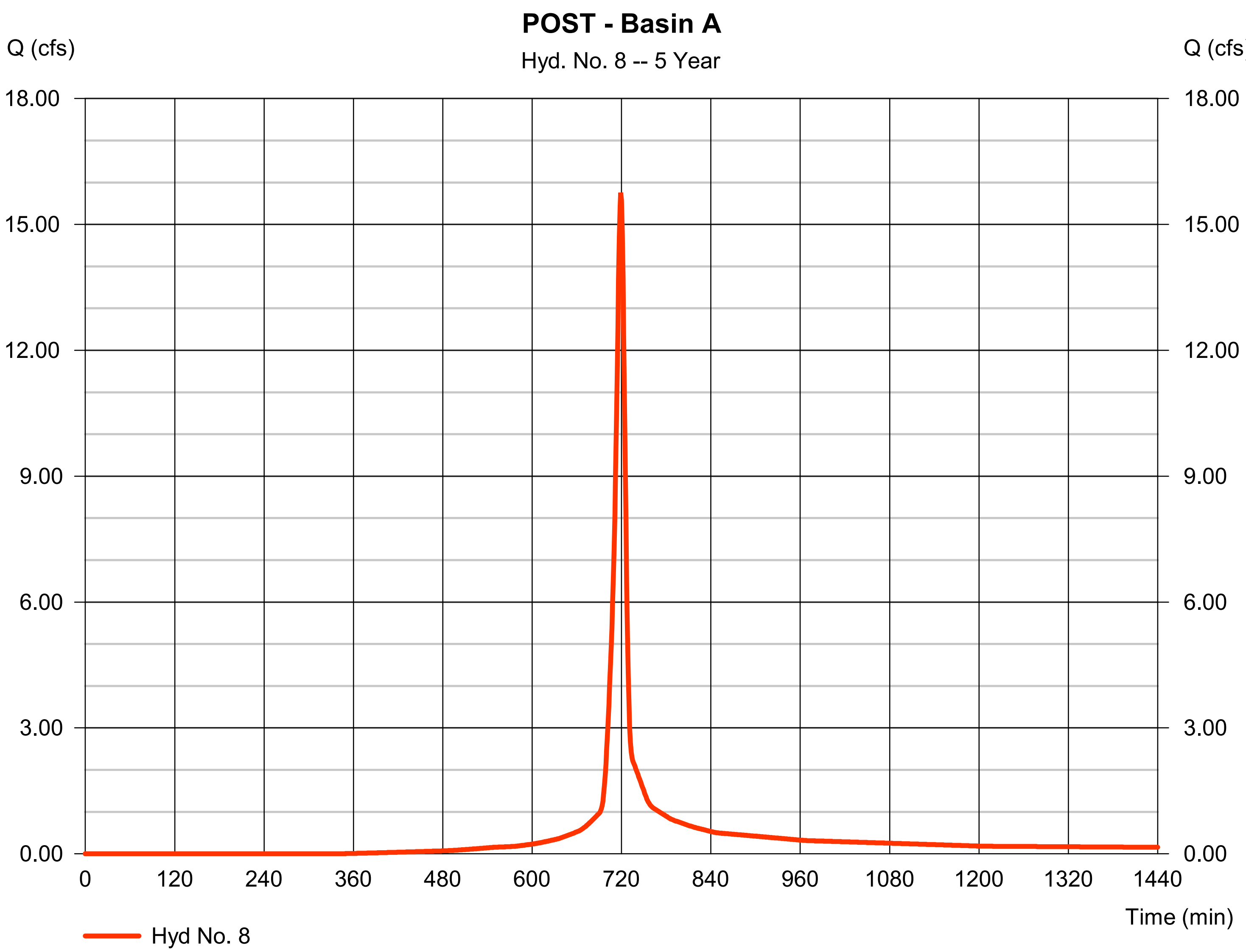
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 8

POST - Basin A

Hydrograph type	= SCS Runoff	Peak discharge	= 15.76 cfs
Storm frequency	= 5 yrs	Time to peak	= 719 min
Time interval	= 1 min	Hyd. volume	= 36,487 cuft
Drainage area	= 4.280 ac	Curve number	= 88.8
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.10 min
Total precip.	= 3.51 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

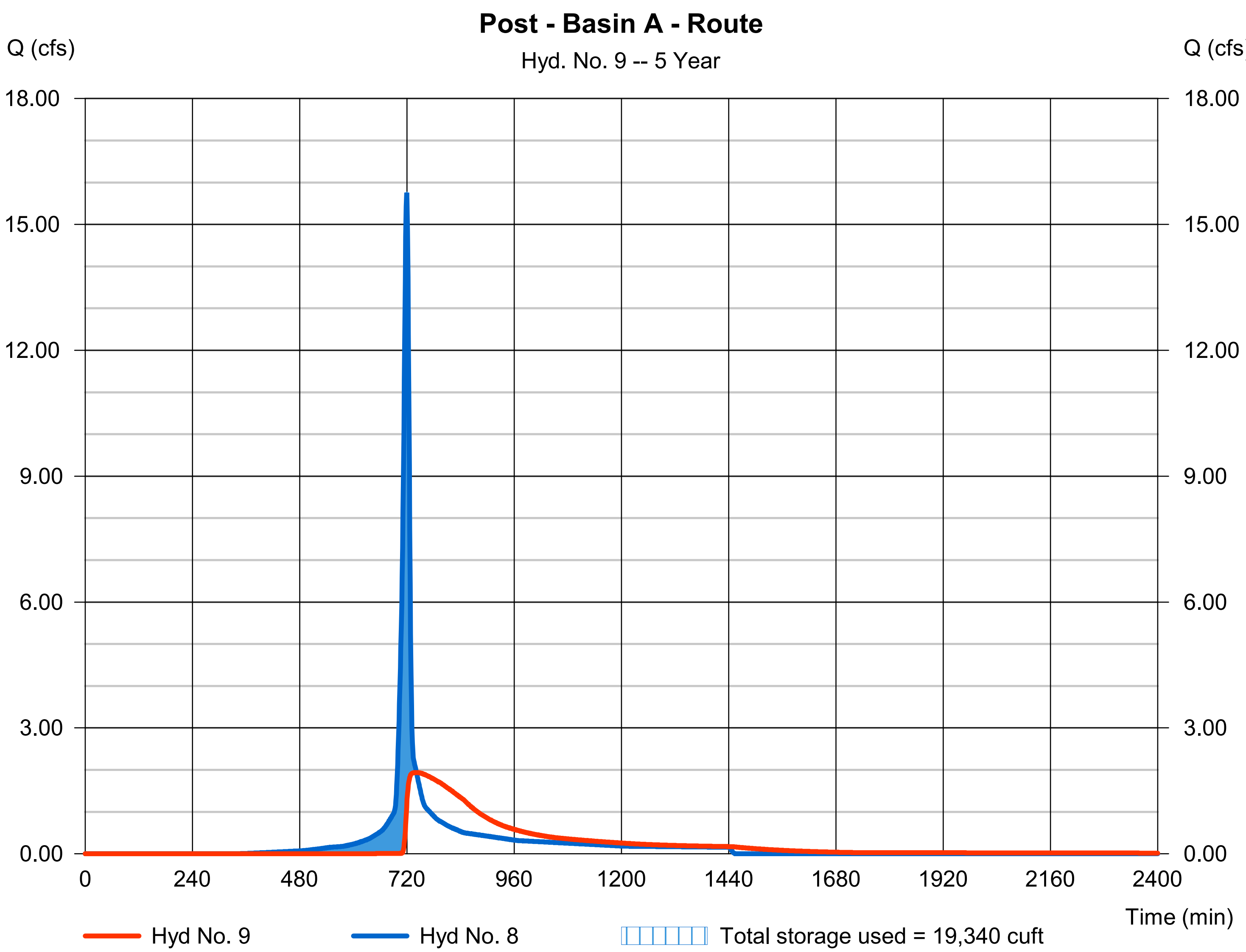
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 9

Post - Basin A - Route

Hydrograph type	= Reservoir	Peak discharge	= 1.936 cfs
Storm frequency	= 5 yrs	Time to peak	= 741 min
Time interval	= 1 min	Hyd. volume	= 30,087 cuft
Inflow hyd. No.	= 8 - POST - Basin A	Max. Elevation	= 531.16 ft
Reservoir name	= Basin A	Max. Storage	= 19,340 cuft

Storage Indication method used.



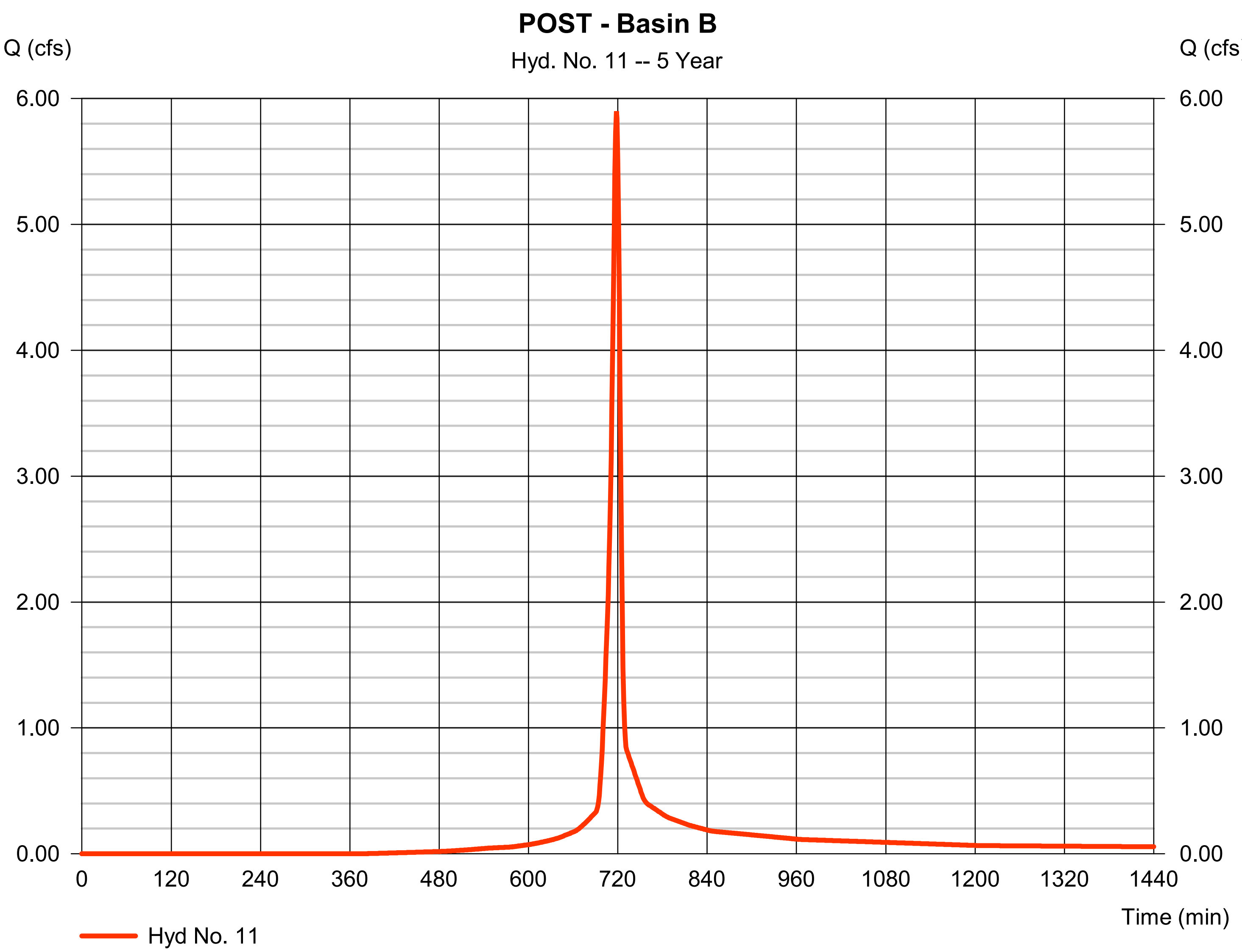
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 11

POST - Basin B

Hydrograph type	= SCS Runoff	Peak discharge	= 5.900 cfs
Storm frequency	= 5 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 12,712 cuft
Drainage area	= 1.620 ac	Curve number	= 87.3
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.90 min
Total precip.	= 3.51 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

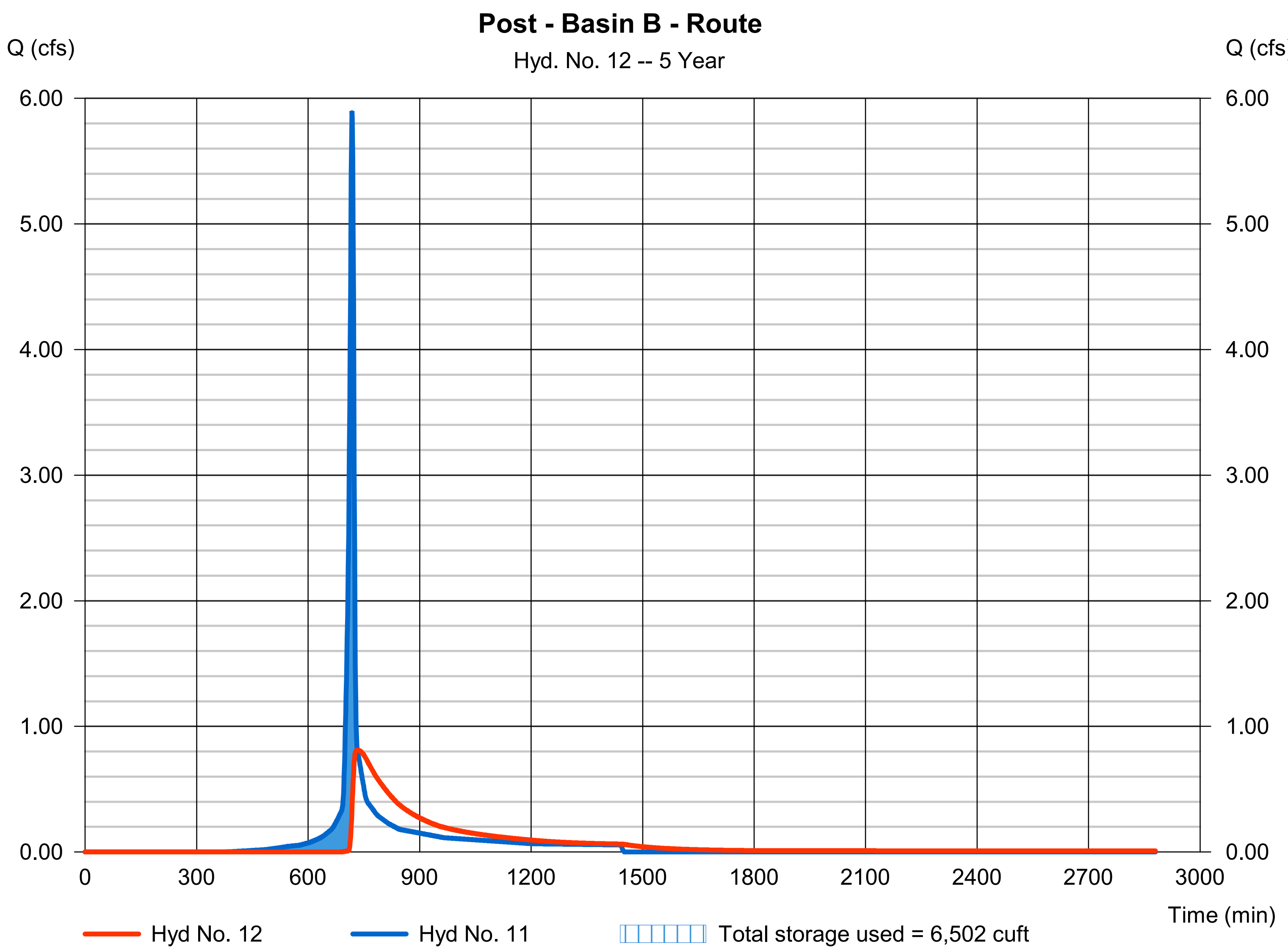
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 12

Post - Basin B - Route

Hydrograph type	= Reservoir	Peak discharge	= 0.811 cfs
Storm frequency	= 5 yrs	Time to peak	= 733 min
Time interval	= 1 min	Hyd. volume	= 10,792 cuft
Inflow hyd. No.	= 11 - POST - Basin B	Max. Elevation	= 532.38 ft
Reservoir name	= Basin B	Max. Storage	= 6,502 cuft

Storage Indication method used.

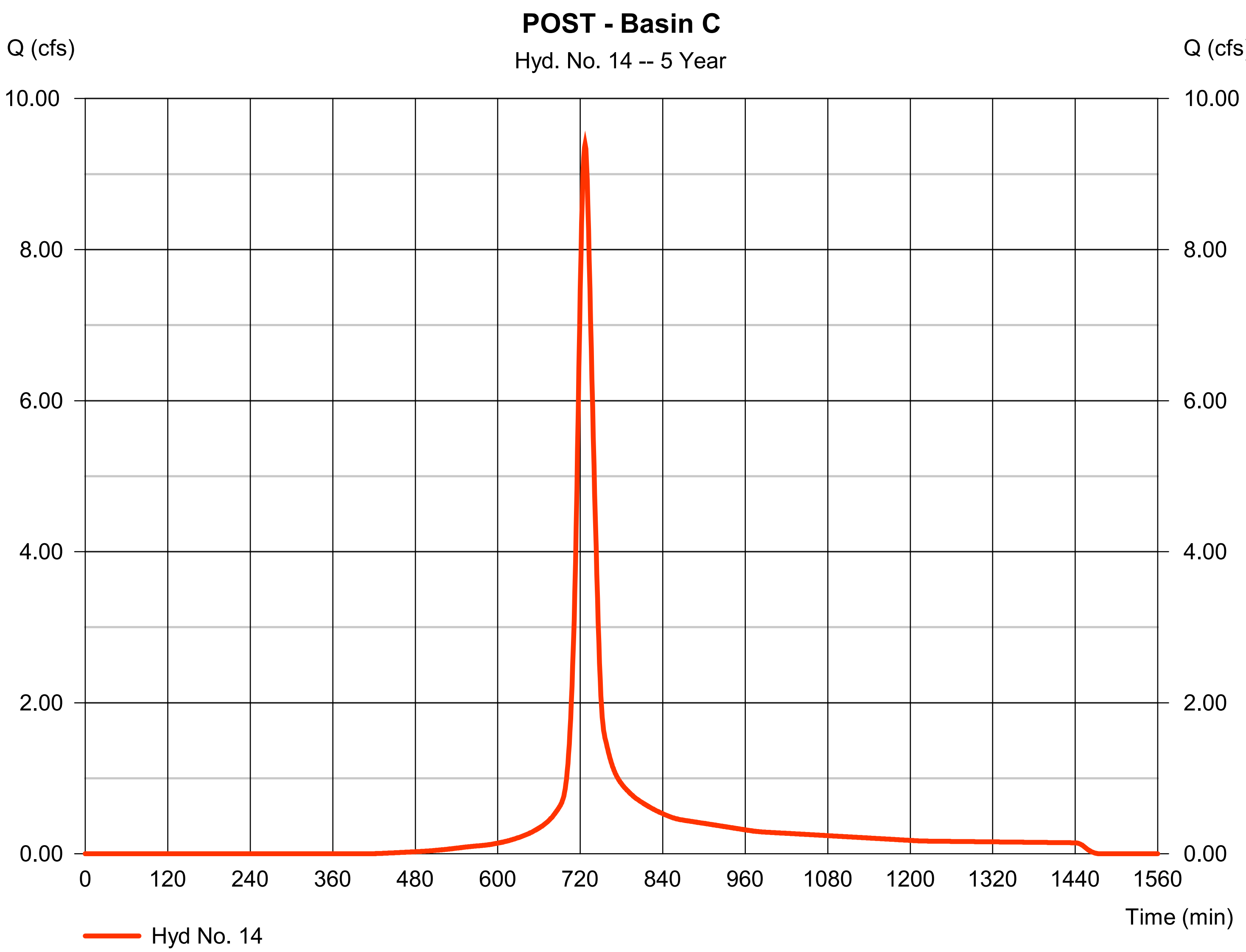


Hydrograph Report

Hyd. No. 14

POST - Basin C

Hydrograph type	= SCS Runoff	Peak discharge	= 9.395 cfs
Storm frequency	= 5 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 31,915 cuft
Drainage area	= 4.210 ac	Curve number	= 86
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 23.00 min
Total precip.	= 3.51 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

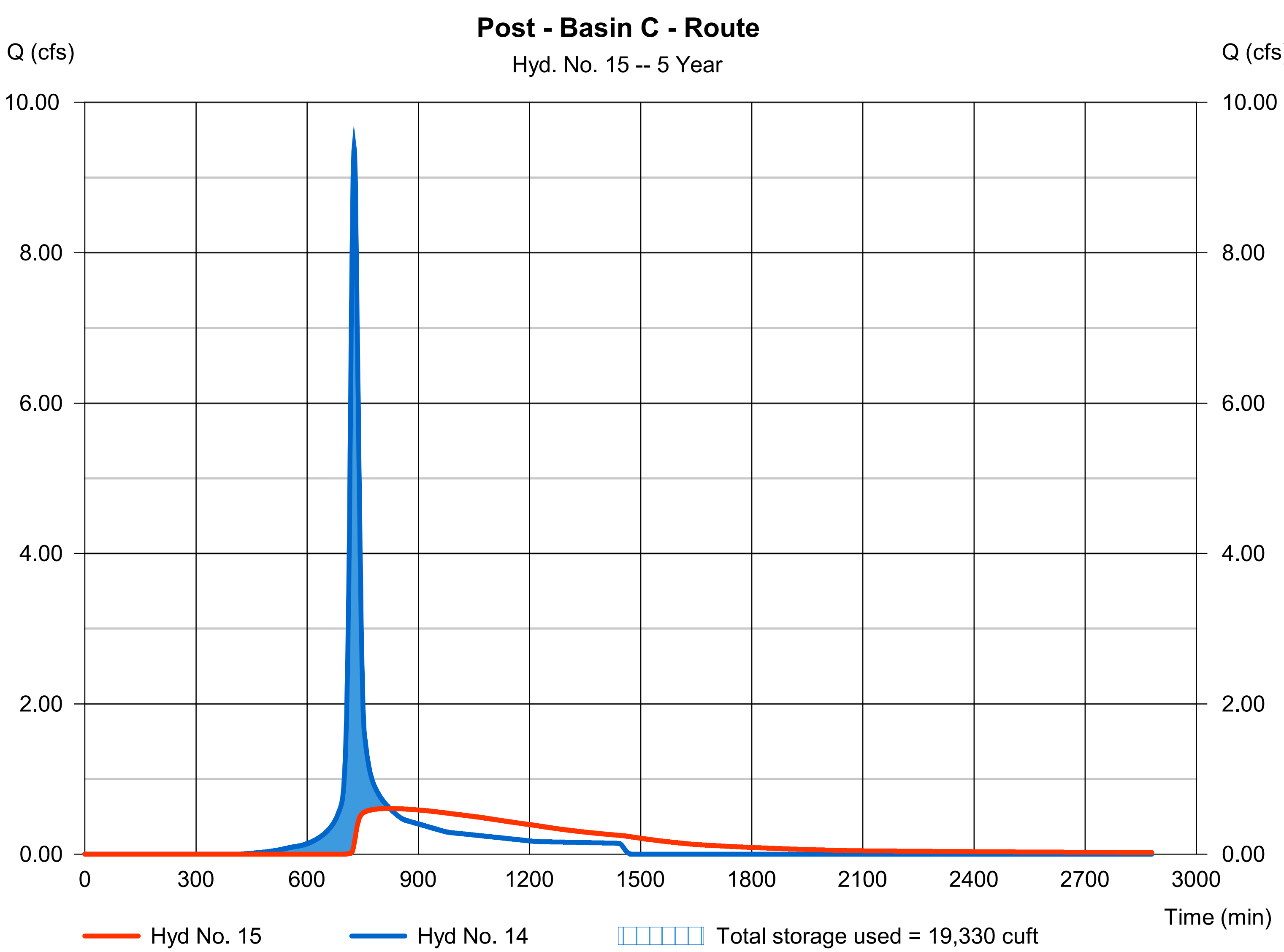
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 15

Post - Basin C - Route

Hydrograph type	= Reservoir	Peak discharge	= 0.609 cfs
Storm frequency	= 5 yrs	Time to peak	= 823 min
Time interval	= 1 min	Hyd. volume	= 25,469 cuft
Inflow hyd. No.	= 14 - POST - Basin C	Max. Elevation	= 531.64 ft
Reservoir name	= Basin C	Max. Storage	= 19,330 cuft

Storage Indication method used.

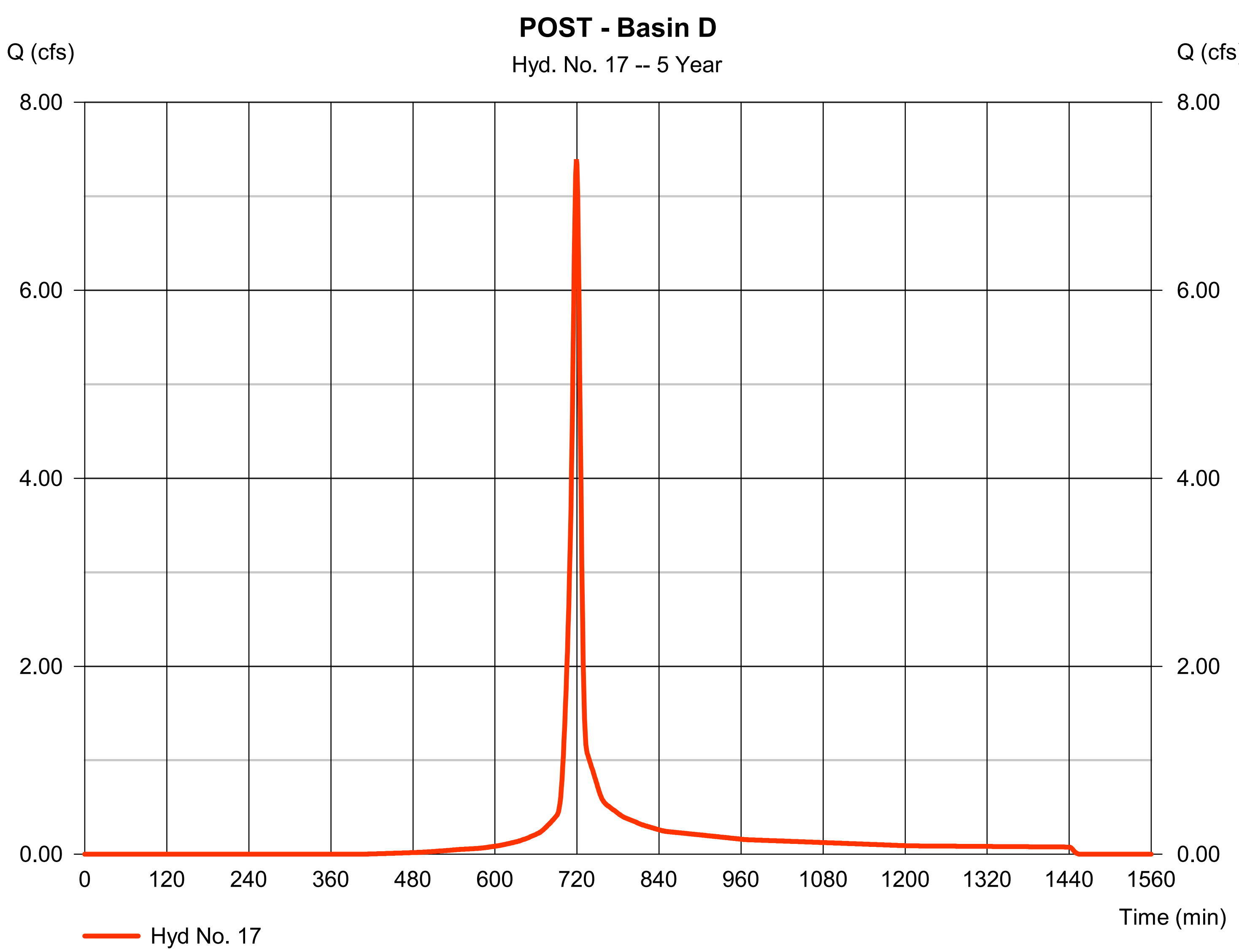


Hydrograph Report

Hyd. No. 17

POST - Basin D

Hydrograph type	= SCS Runoff	Peak discharge	= 7.396 cfs
Storm frequency	= 5 yrs	Time to peak	= 719 min
Time interval	= 1 min	Hyd. volume	= 16,895 cuft
Drainage area	= 2.200 ac	Curve number	= 86.1
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.60 min
Total precip.	= 3.51 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

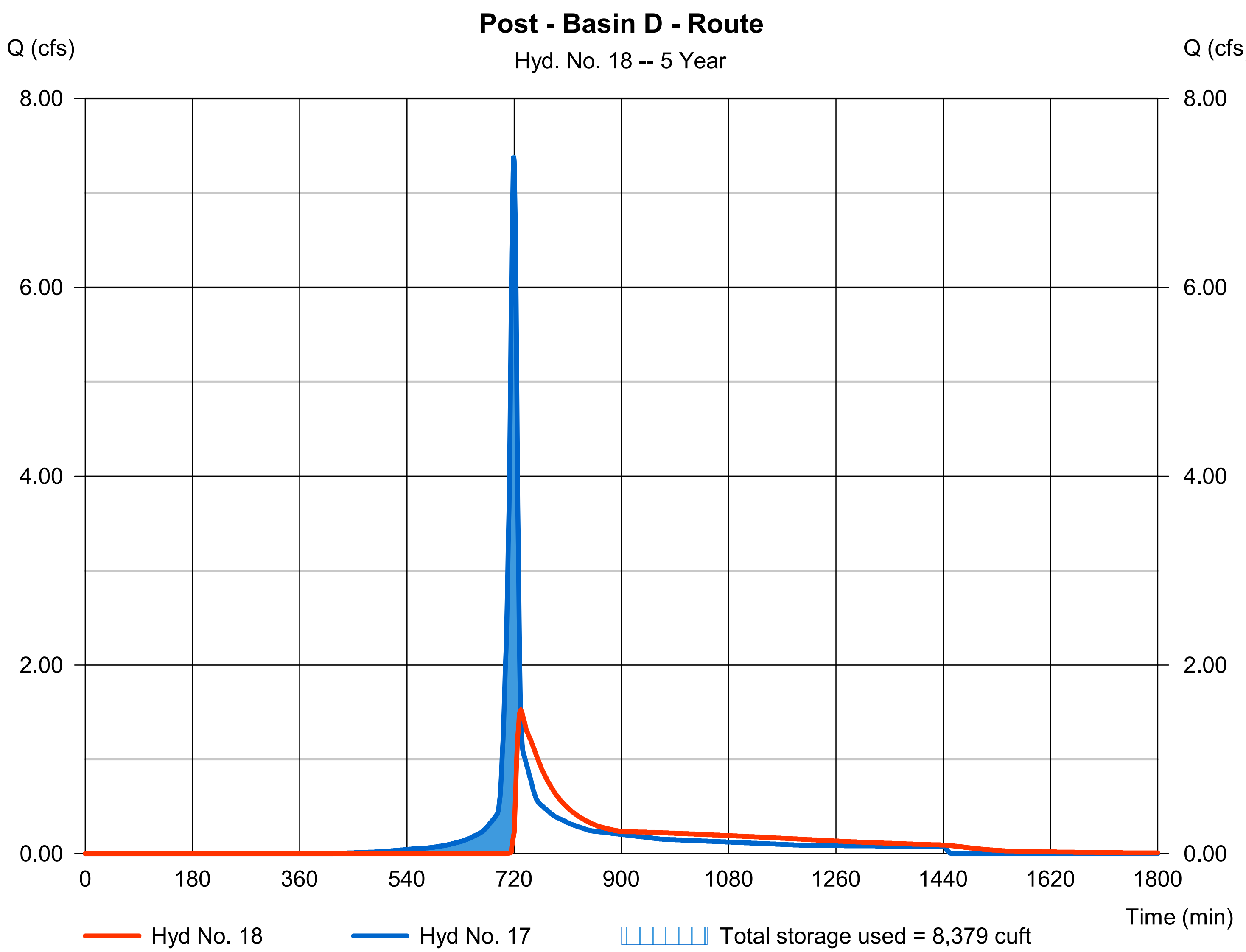
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Thursday, 08 / 5 / 2021

Hyd. No. 18

Post - Basin D - Route

Hydrograph type	= Reservoir	Peak discharge	= 1.520 cfs
Storm frequency	= 5 yrs	Time to peak	= 731 min
Time interval	= 1 min	Hyd. volume	= 13,325 cuft
Inflow hyd. No.	= 17 - POST - Basin D	Max. Elevation	= 535.11 ft
Reservoir name	= Basin D	Max. Storage	= 8,379 cuft

Storage Indication method used.



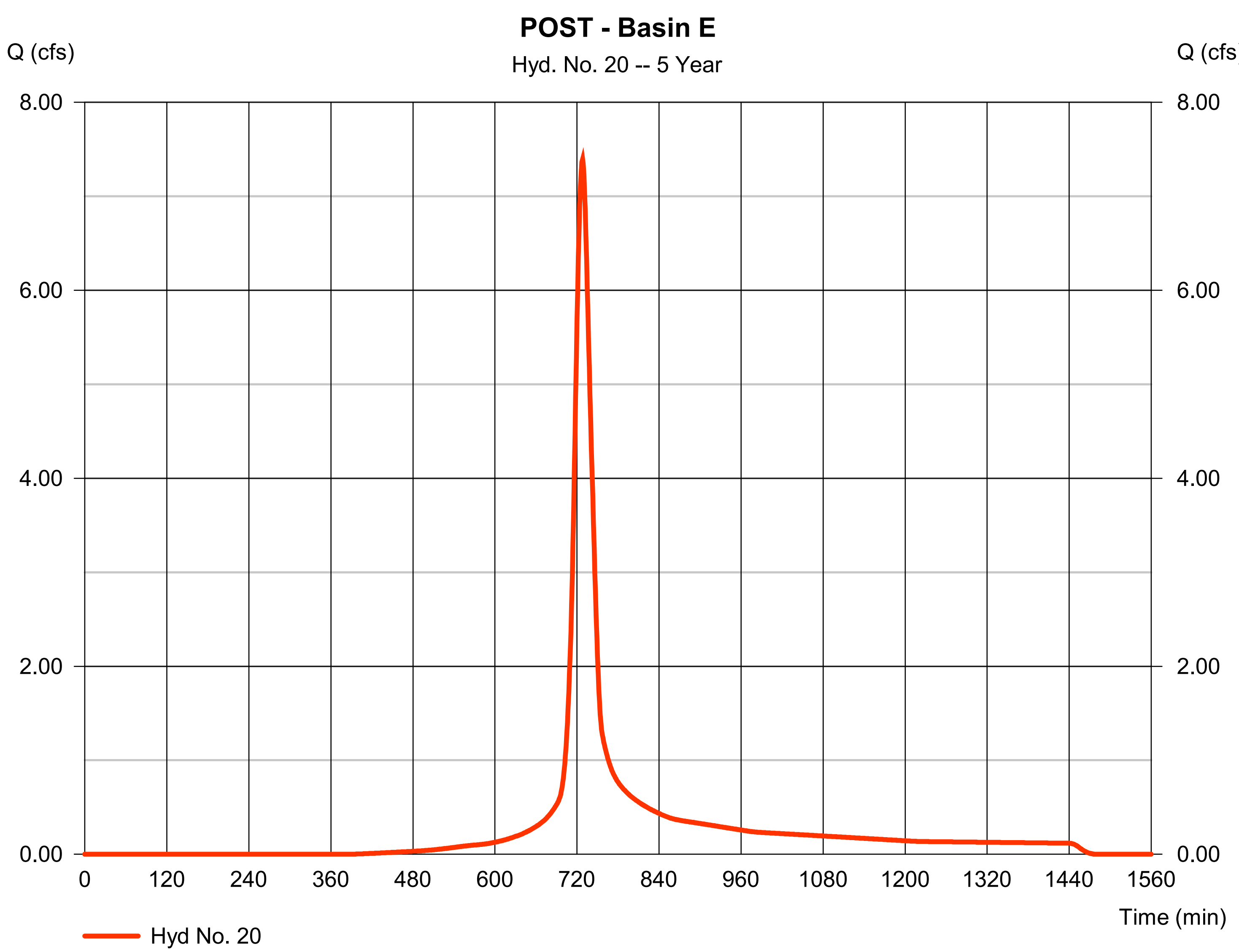
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 20

POST - Basin E

Hydrograph type	= SCS Runoff	Peak discharge	= 7.395 cfs
Storm frequency	= 5 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 26,353 cuft
Drainage area	= 3.300 ac	Curve number	= 87.1
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 25.30 min
Total precip.	= 3.51 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

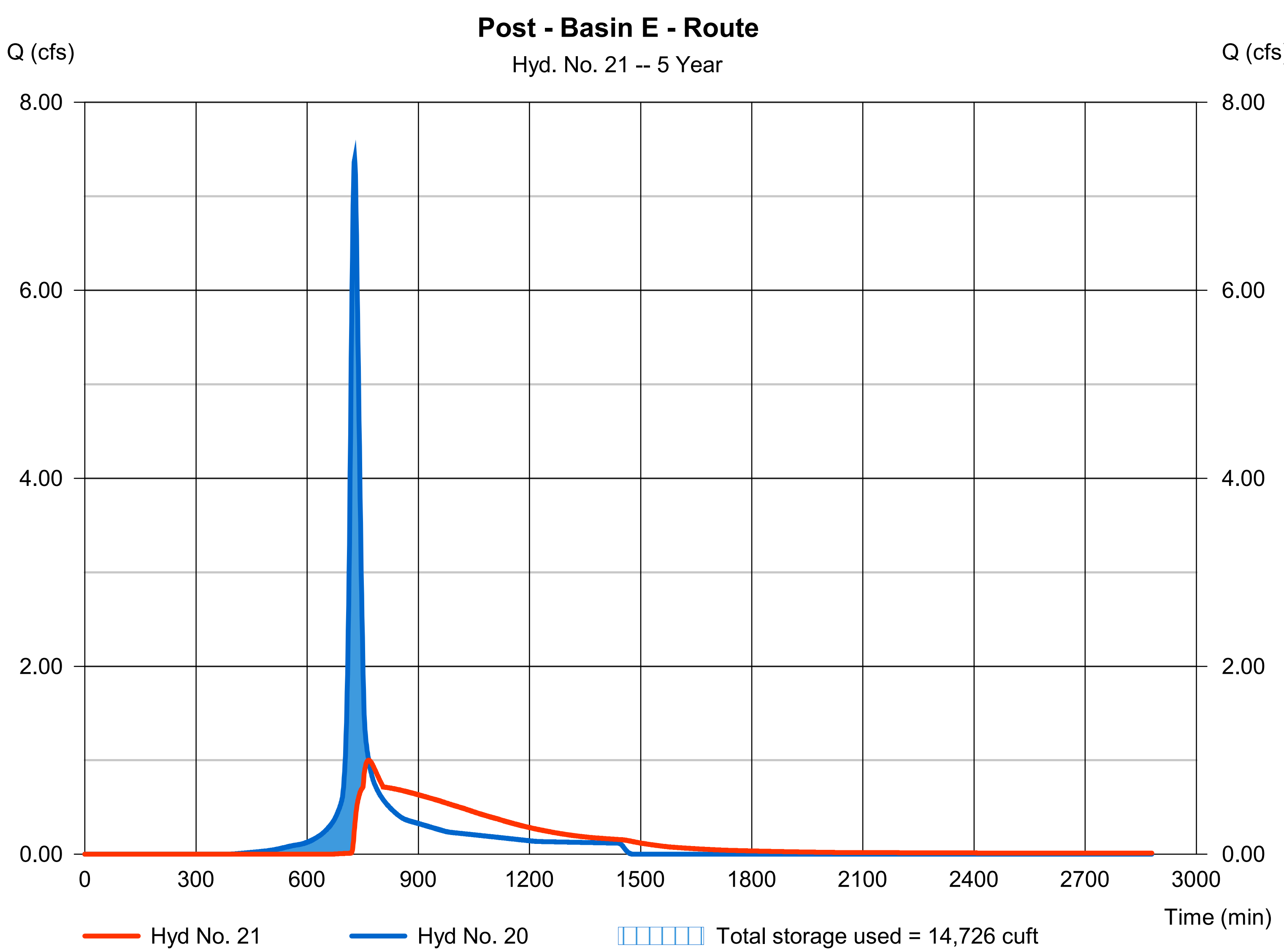
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 | Thursday, 08 / 5 / 2021

Hyd. No. 21

Post - Basin E - Route

Hydrograph type	= Reservoir	Peak discharge	= 1.001 cfs
Storm frequency	= 5 yrs	Time to peak	= 766 min
Time interval	= 1 min	Hyd. volume	= 21,464 cuft
Inflow hyd. No.	= 20 - POST - Basin E	Max. Elevation	= 533.53 ft
Reservoir name	= Basin E	Max. Storage	= 14,726 cuft

Storage Indication method used.



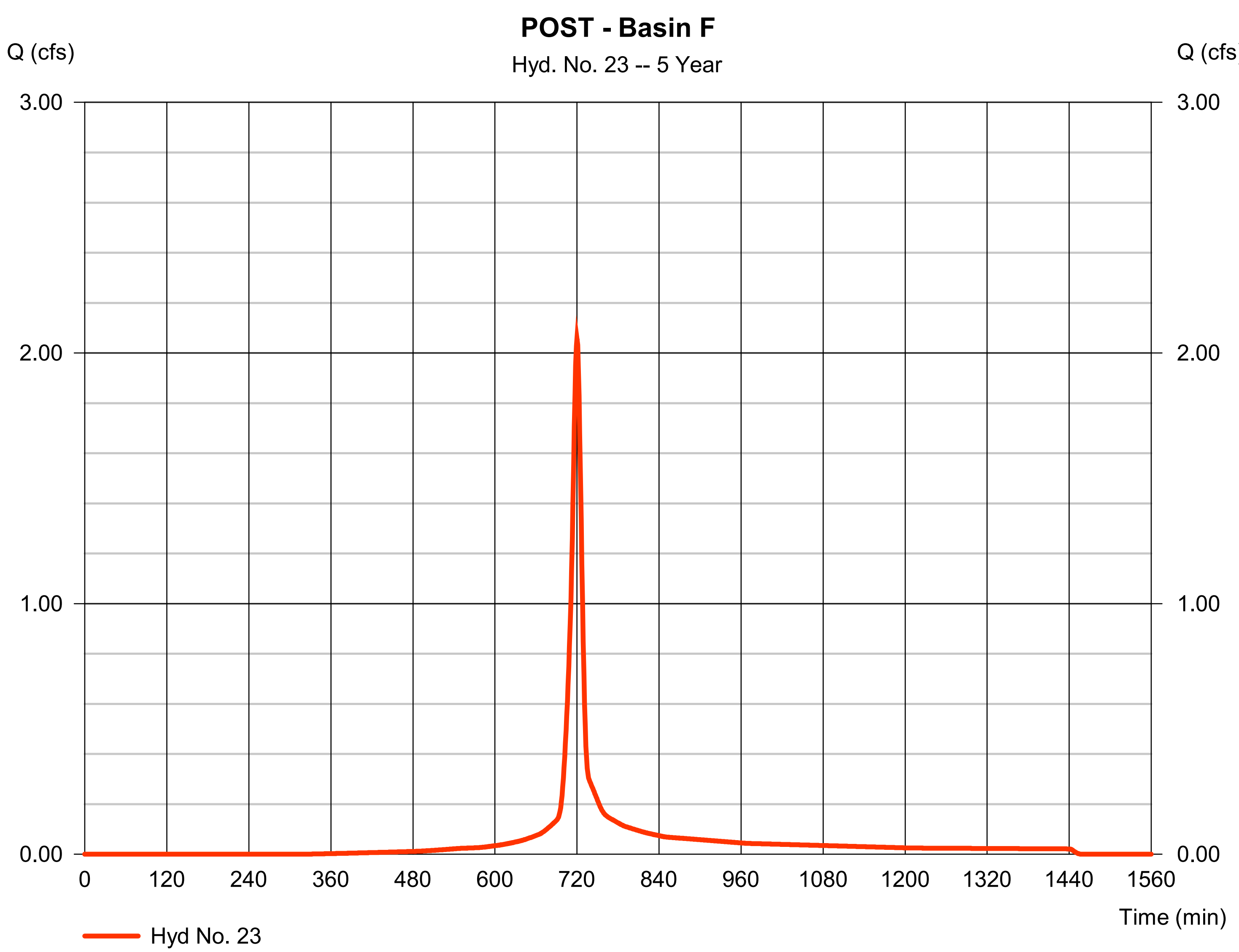
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 23

POST - Basin F

Hydrograph type	= SCS Runoff	Peak discharge	= 2.058 cfs
Storm frequency	= 5 yrs	Time to peak	= 720 min
Time interval	= 1 min	Hyd. volume	= 5,098 cuft
Drainage area	= 0.570 ac	Curve number	= 89.6
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 10.20 min
Total precip.	= 3.51 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

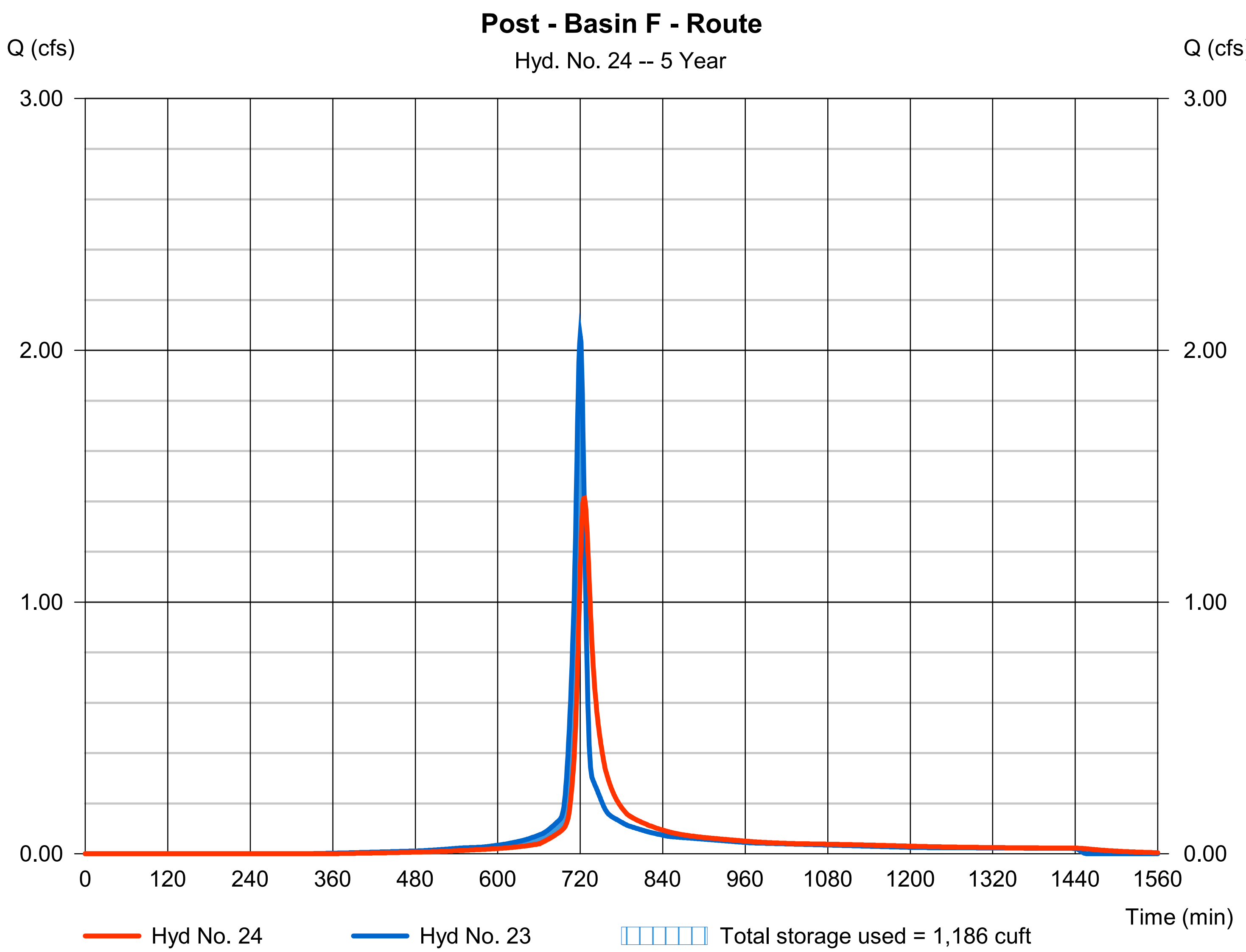
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 24

Post - Basin F - Route

Hydrograph type	= Reservoir	Peak discharge	= 1.412 cfs
Storm frequency	= 5 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 5,094 cuft
Inflow hyd. No.	= 23 - POST - Basin F	Max. Elevation	= 534.71 ft
Reservoir name	= Basin F	Max. Storage	= 1,186 cuft

Storage Indication method used.



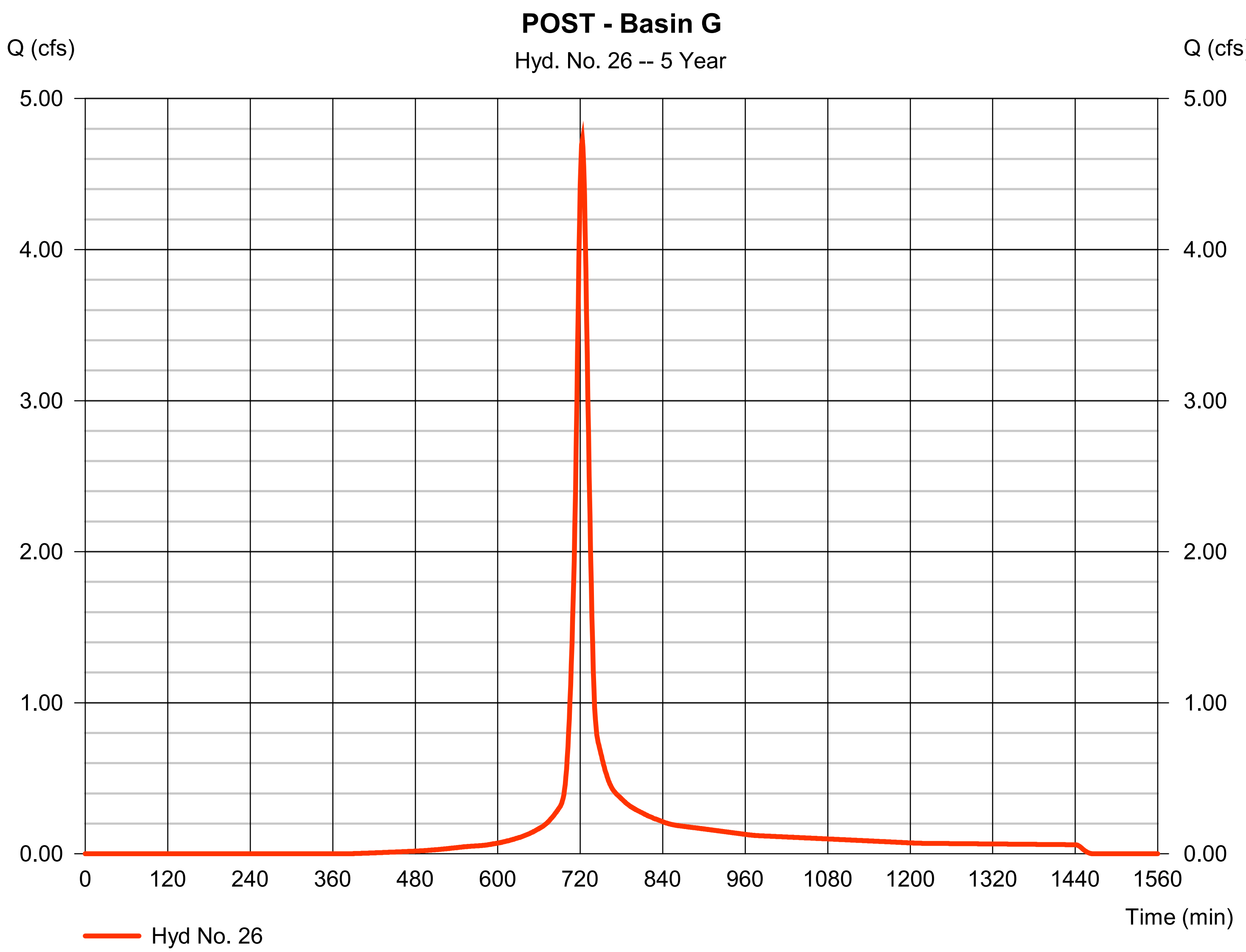
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 26

POST - Basin G

Hydrograph type	= SCS Runoff	Peak discharge	= 4.726 cfs
Storm frequency	= 5 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 13,556 cuft
Drainage area	= 1.670 ac	Curve number	= 87.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 15.80 min
Total precip.	= 3.51 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



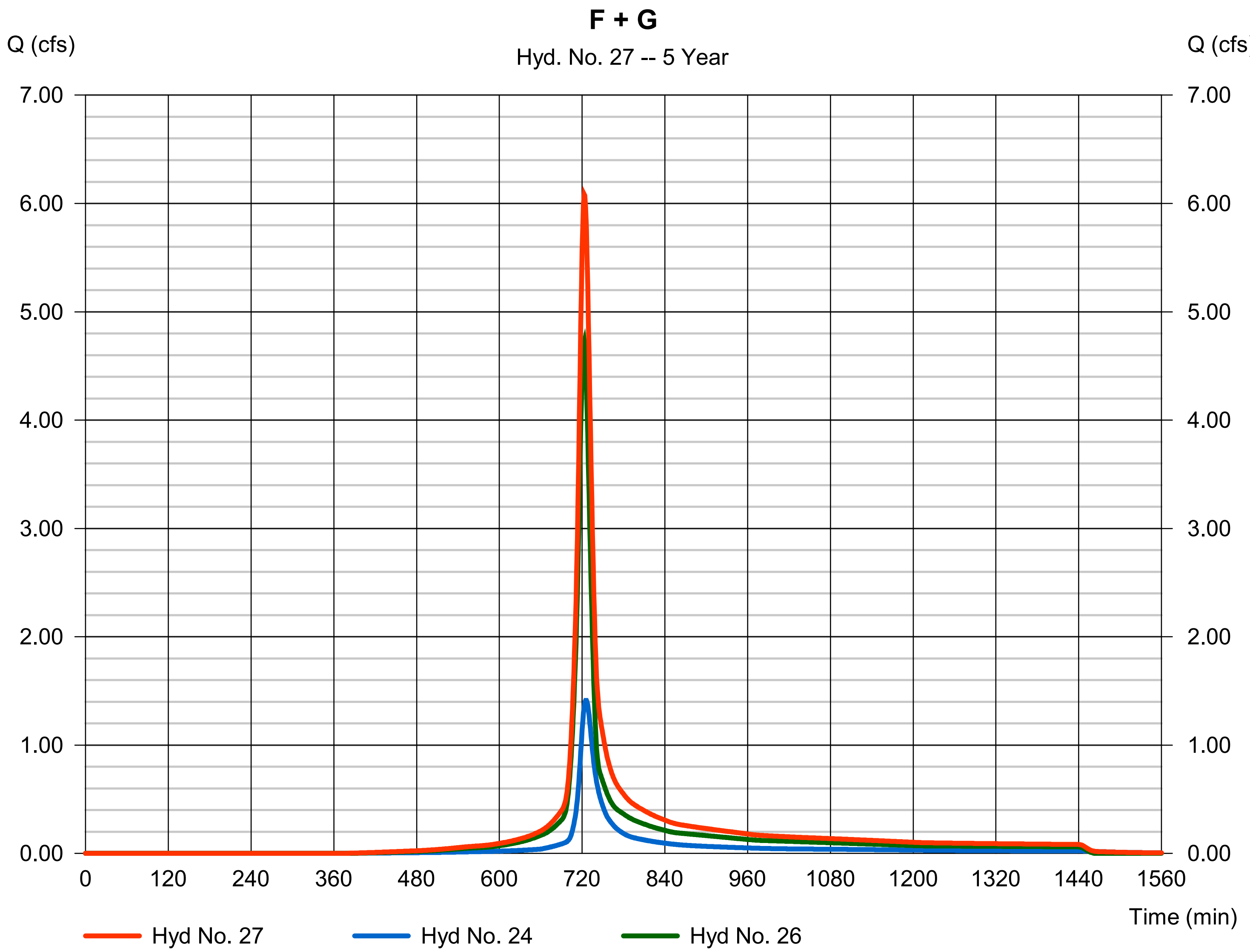
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 27

F + G

Hydrograph type	= Combine	Peak discharge	= 6.082 cfs
Storm frequency	= 5 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 18,649 cuft
Inflow hyds.	= 24, 26	Contrib. drain. area	= 1.670 ac



Hydrograph Report

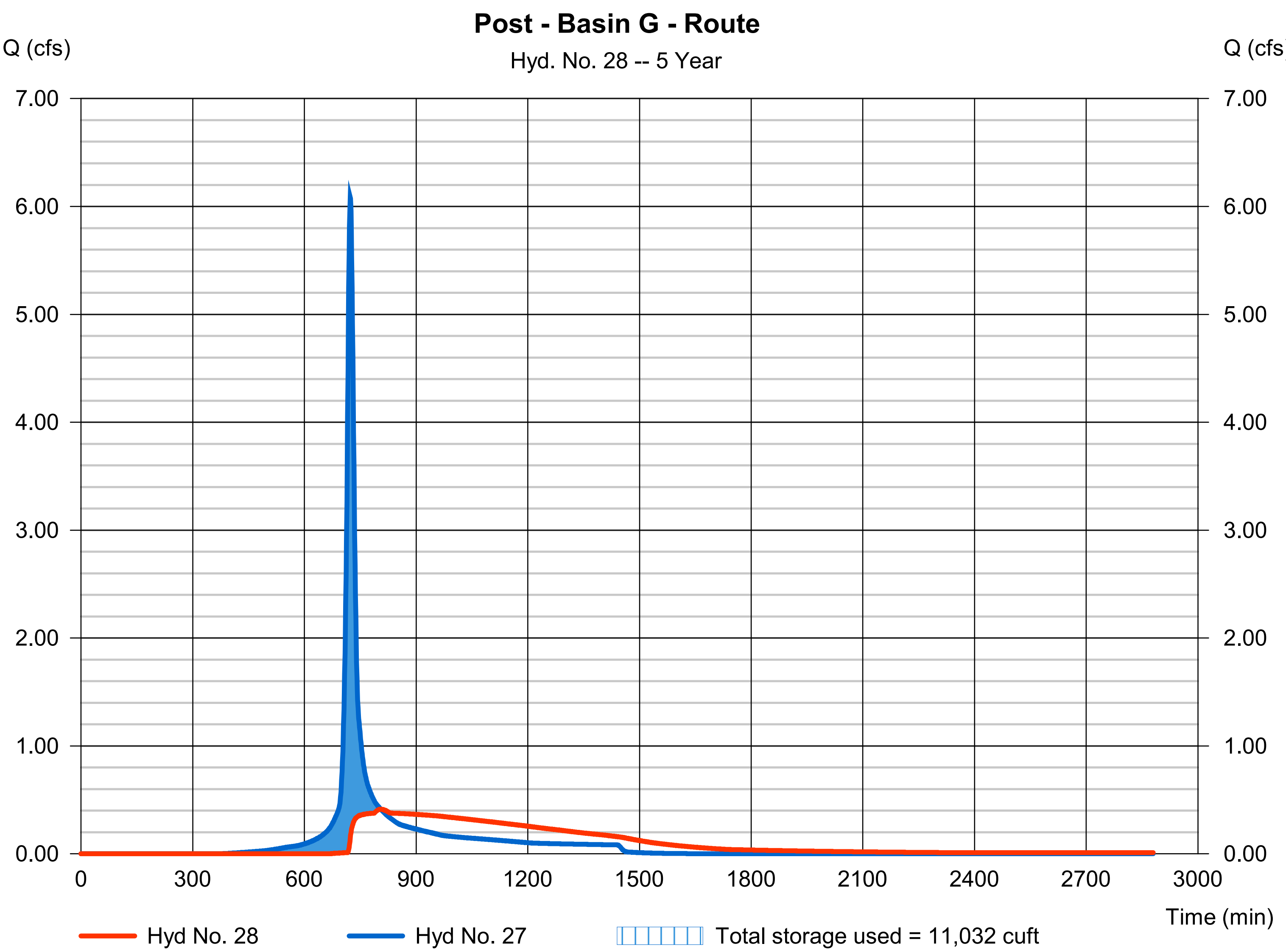
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 28

Post - Basin G - Route

Hydrograph type	= Reservoir	Peak discharge	= 0.413 cfs
Storm frequency	= 5 yrs	Time to peak	= 805 min
Time interval	= 1 min	Hyd. volume	= 15,313 cuft
Inflow hyd. No.	= 27 - F + G	Max. Elevation	= 533.10 ft
Reservoir name	= Basin G	Max. Storage	= 11,032 cuft

Storage Indication method used.



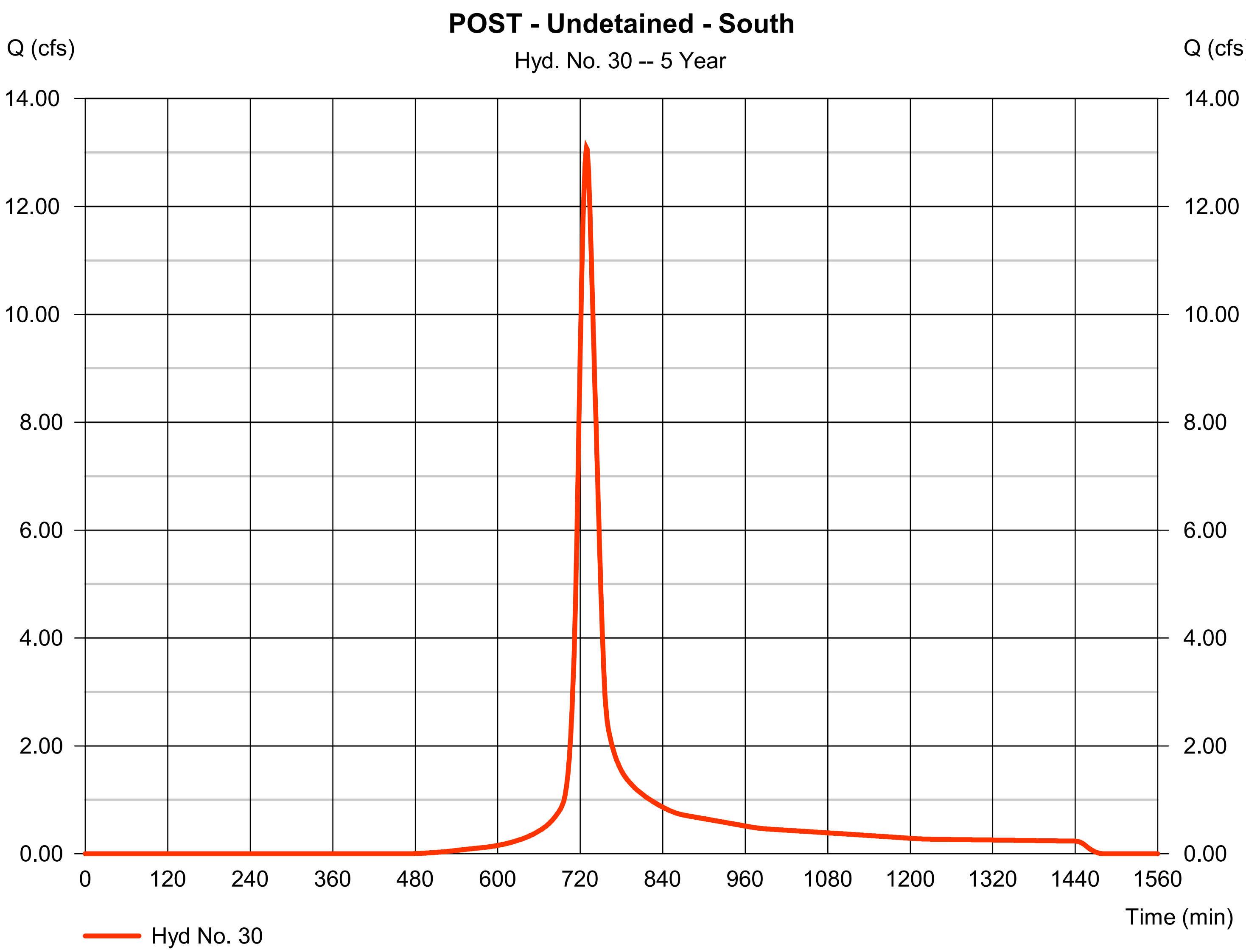
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 30

POST - Undetained - South

Hydrograph type	= SCS Runoff	Peak discharge	= 13.09 cfs
Storm frequency	= 5 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 48,724 cuft
Drainage area	= 6.960 ac	Curve number	= 83.6
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 26.40 min
Total precip.	= 3.51 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



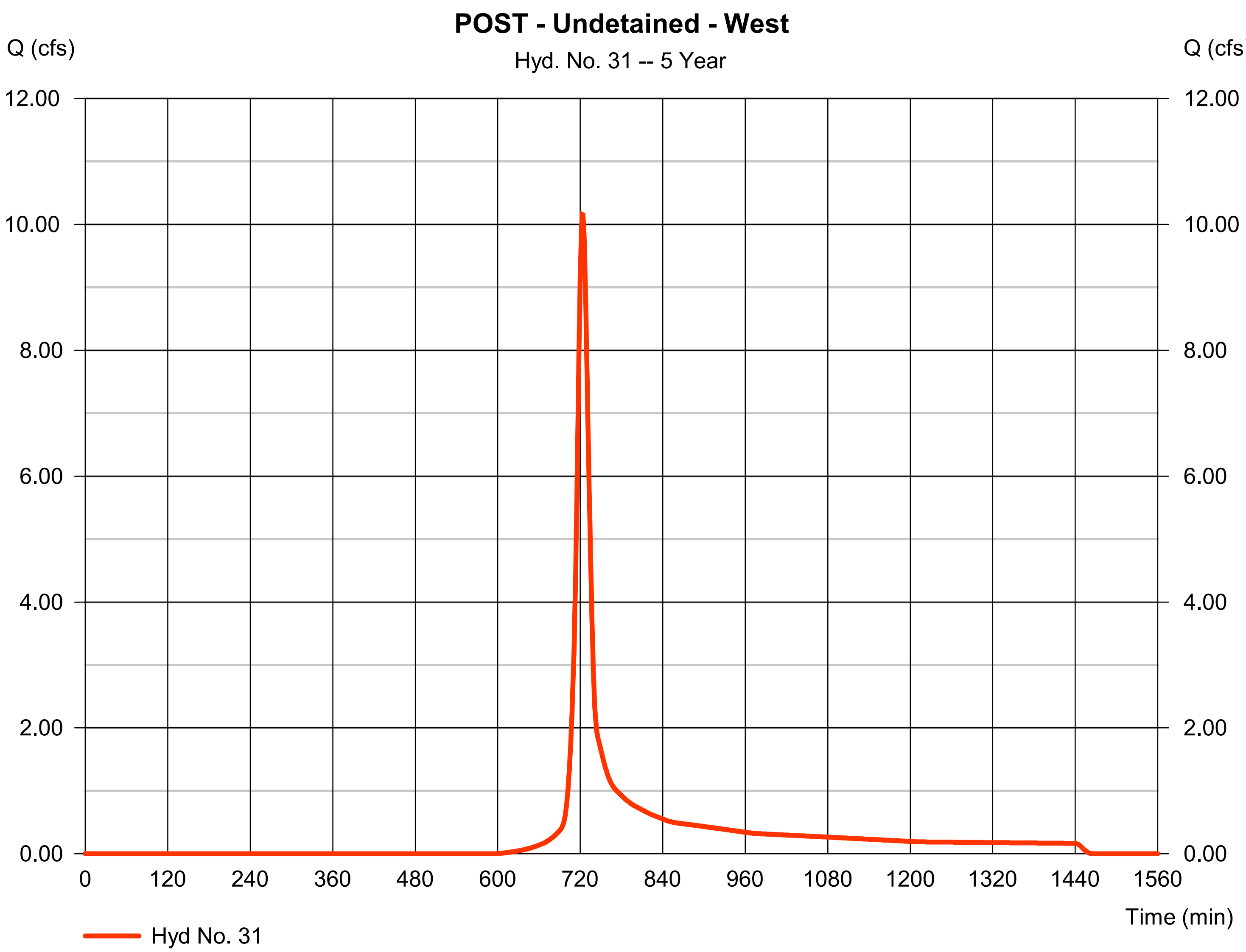
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Thursday, 08 / 5 / 2021

Hyd. No. 31

POST - Undetained - West

Hydrograph type	= SCS Runoff	Peak discharge	= 10.15 cfs
Storm frequency	= 5 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 29,376 cuft
Drainage area	= 5.610 ac	Curve number	= 76.8
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 16.30 min
Total precip.	= 3.51 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



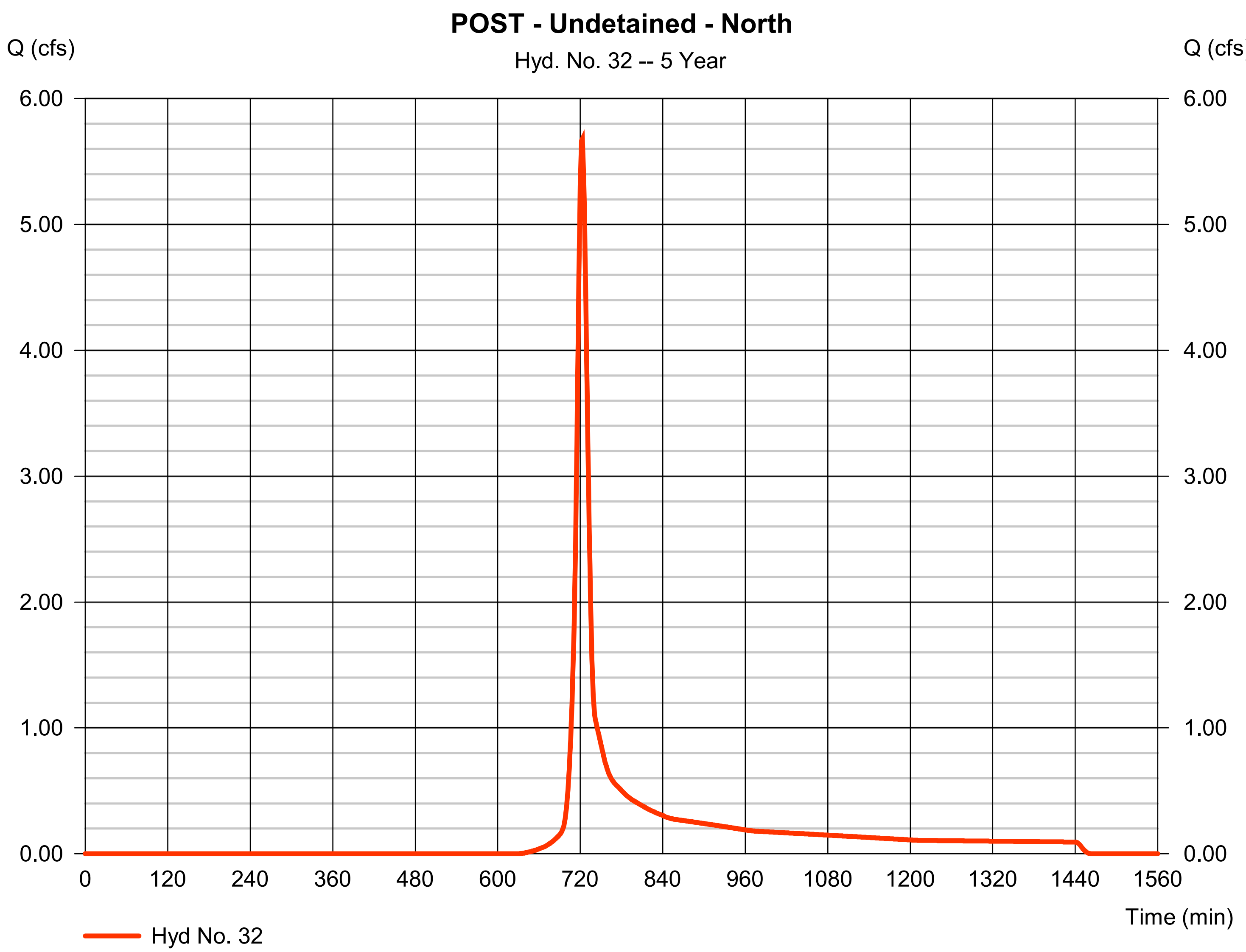
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 32

POST - Undetained - North

Hydrograph type	= SCS Runoff	Peak discharge	= 5.680 cfs
Storm frequency	= 5 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 15,631 cuft
Drainage area	= 3.420 ac	Curve number	= 74.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 14.70 min
Total precip.	= 3.51 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



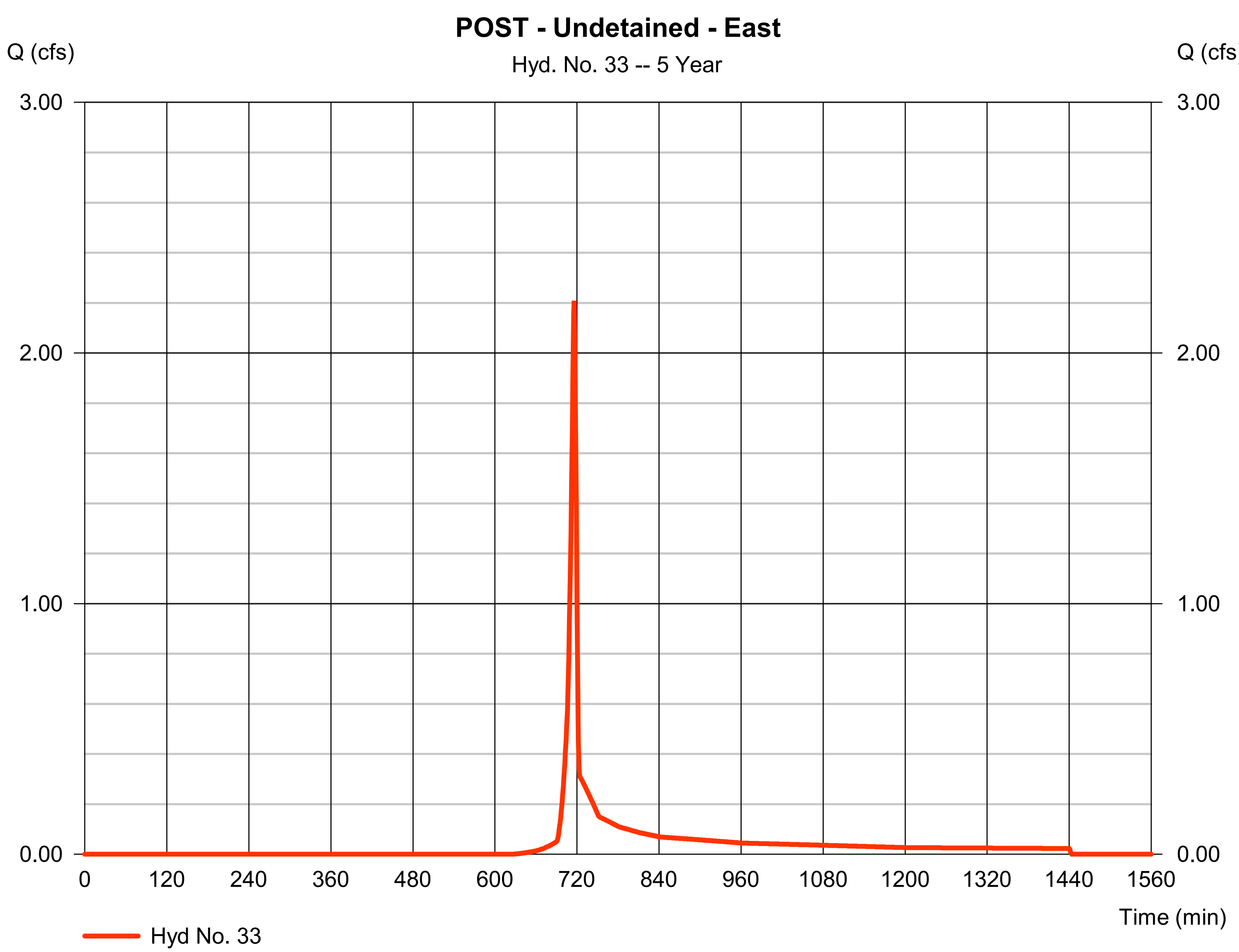
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 33

POST - Undetained - East

Hydrograph type	= SCS Runoff	Peak discharge	= 2.208 cfs
Storm frequency	= 5 yrs	Time to peak	= 716 min
Time interval	= 1 min	Hyd. volume	= 3,838 cuft
Drainage area	= 0.900 ac	Curve number	= 74.1
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 2.00 min
Total precip.	= 3.51 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



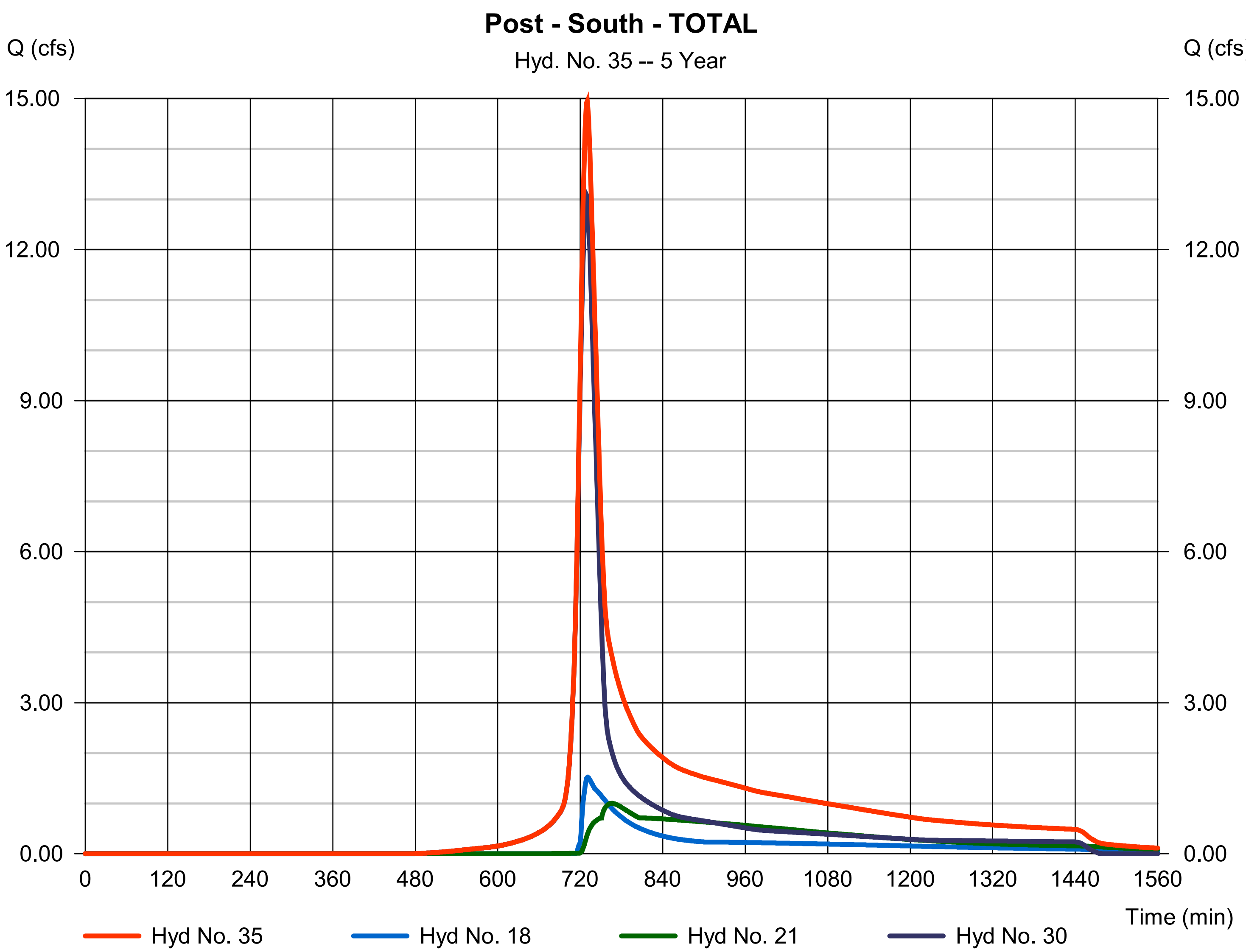
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 35

Post - South - TOTAL

Hydrograph type	= Combine	Peak discharge	= 14.95 cfs
Storm frequency	= 5 yrs	Time to peak	= 730 min
Time interval	= 1 min	Hyd. volume	= 83,513 cuft
Inflow hyds.	= 18, 21, 30	Contrib. drain. area	= 6.960 ac



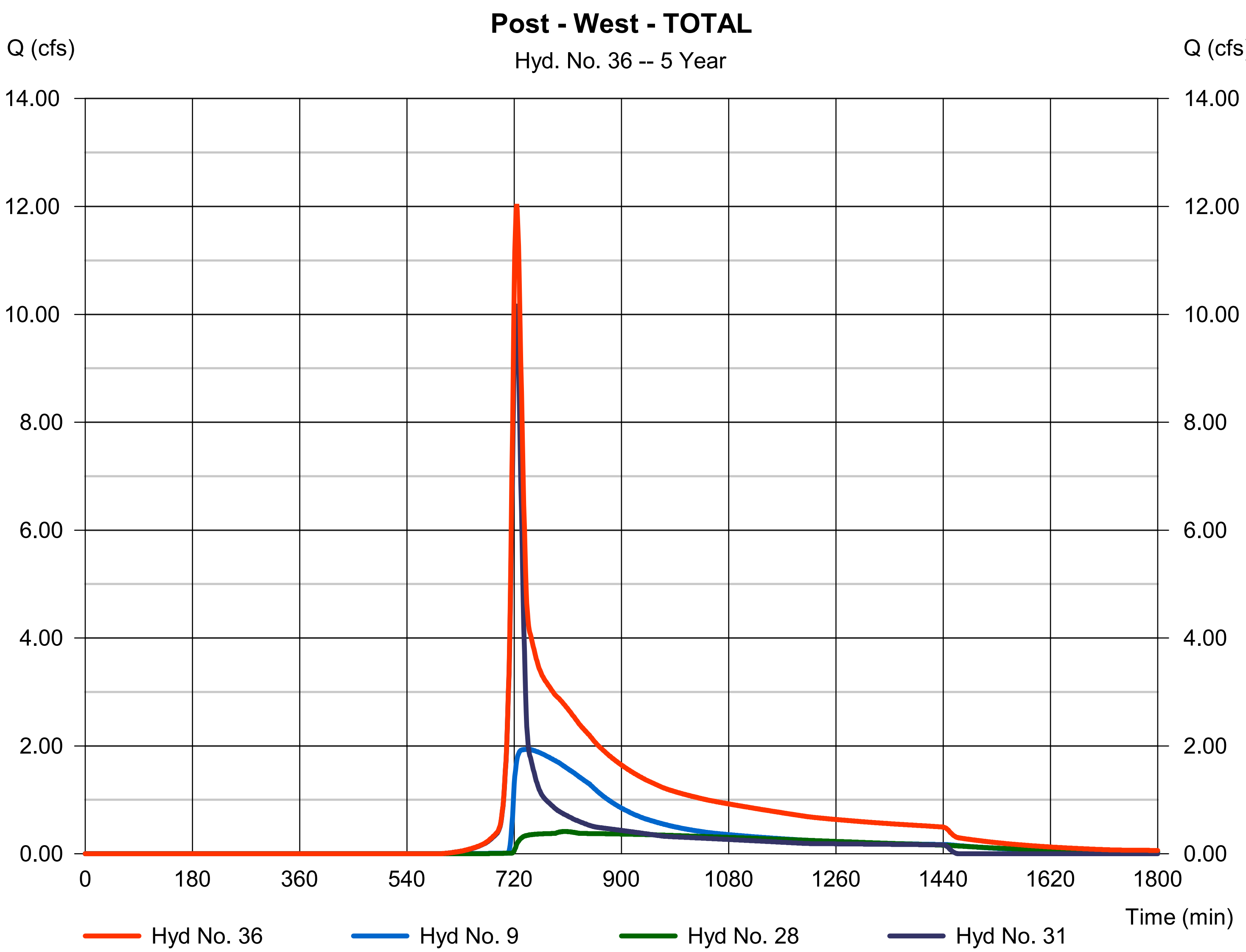
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 36

Post - West - TOTAL

Hydrograph type	= Combine	Peak discharge	= 12.05 cfs
Storm frequency	= 5 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 74,776 cuft
Inflow hyds.	= 9, 28, 31	Contrib. drain. area	= 5.610 ac



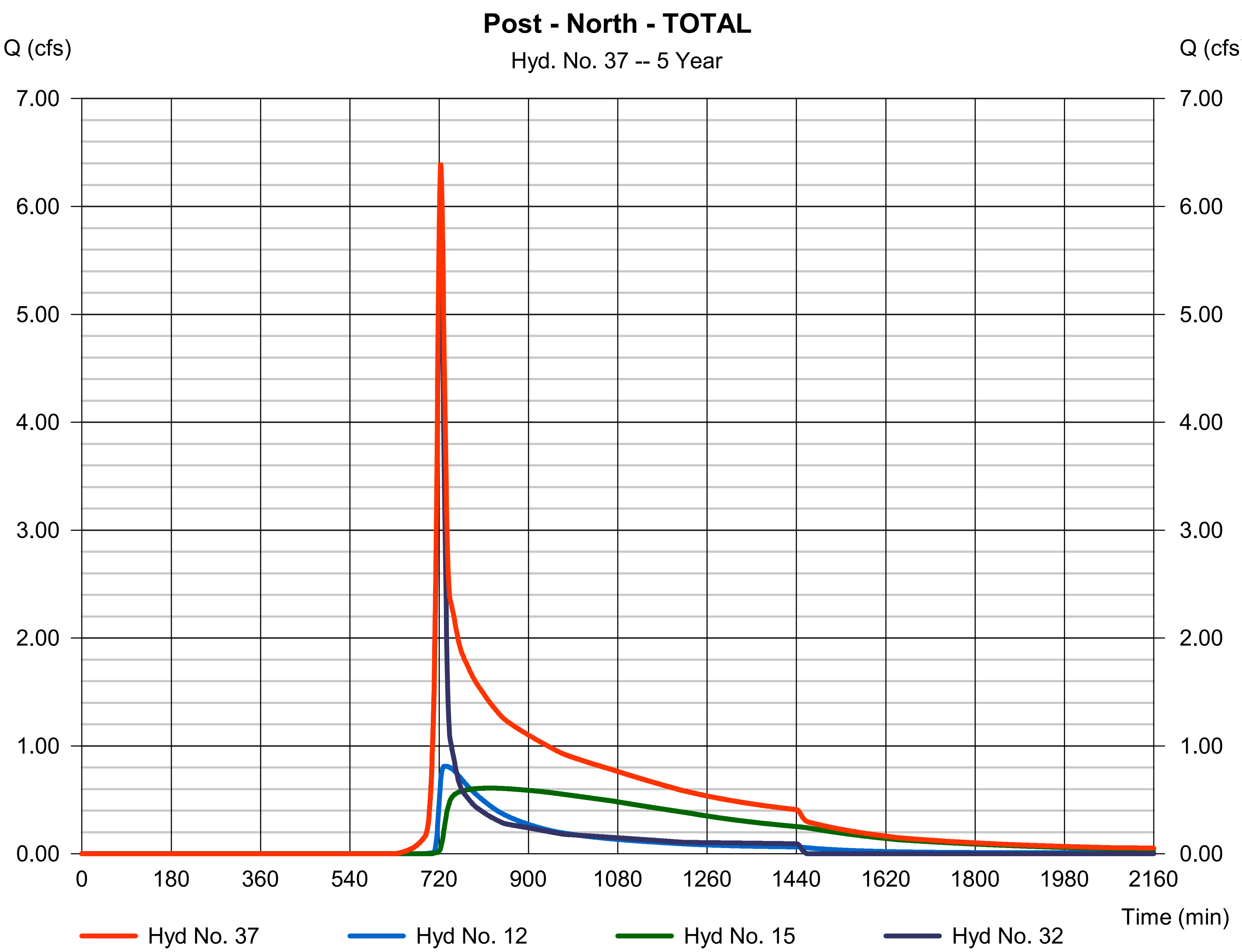
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 37

Post - North - TOTAL

Hydrograph type	= Combine	Peak discharge	= 6.405 cfs
Storm frequency	= 5 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 51,893 cuft
Inflow hyds.	= 12, 15, 32	Contrib. drain. area	= 3.420 ac



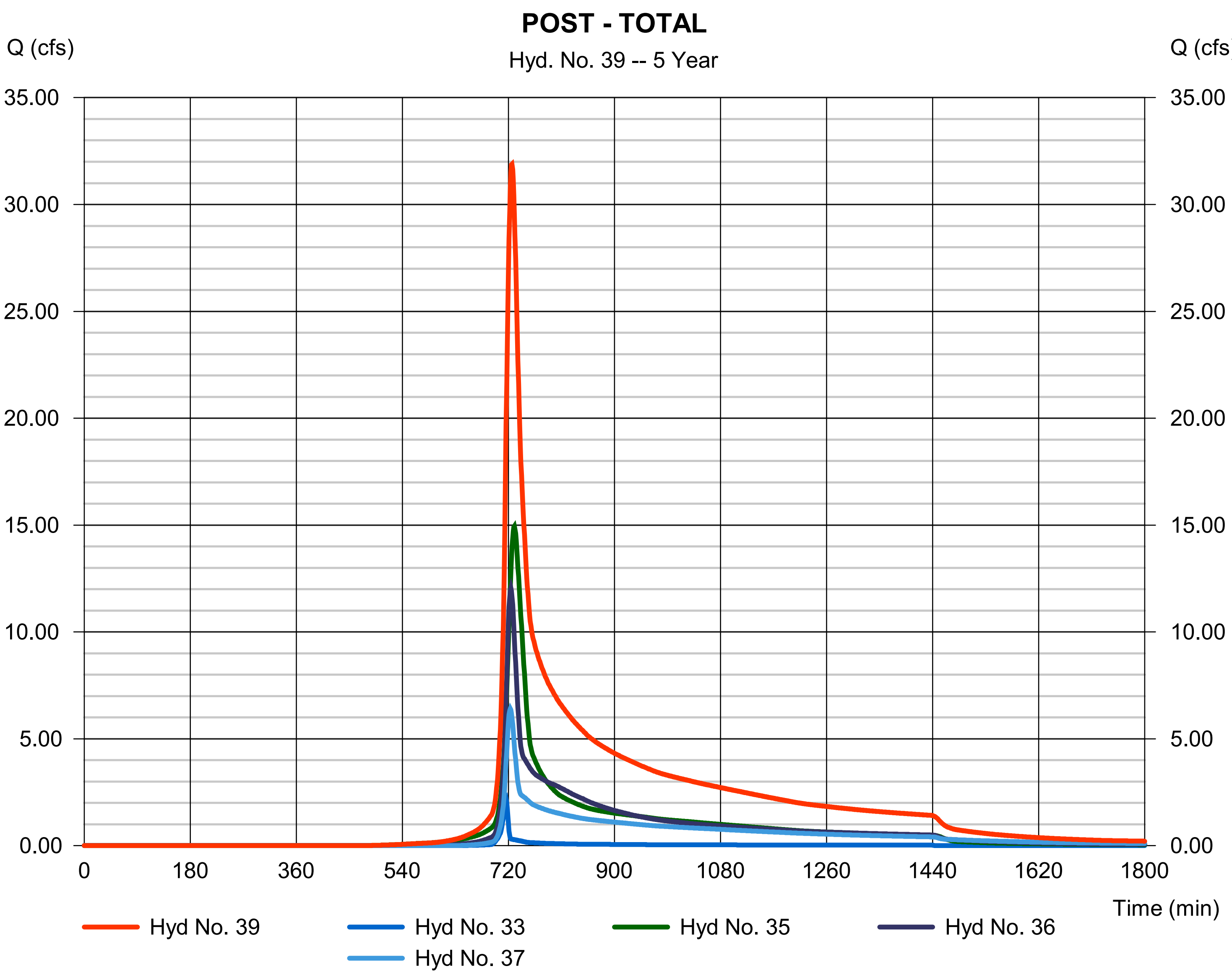
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 39

POST - TOTAL

Hydrograph type	= Combine	Peak discharge	= 31.88 cfs
Storm frequency	= 5 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 214,018 cuft
Inflow hyds.	= 33, 35, 36, 37	Contrib. drain. area	= 0.900 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

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	33.09	1	722	89,411	------	------	------	Pre Development - South
2	SCS Runoff	22.89	1	723	65,890	------	------	------	Pre Development - West
3	SCS Runoff	55.33	1	718	113,241	------	------	------	Pre Development - North
4	SCS Runoff	7.004	1	720	17,366	------	------	------	Pre Development - East
5	Combine	109.29	1	719	285,908	1, 2, 3, 4	------	------	Combined Pre Development
8	SCS Runoff	19.19	1	719	44,876	------	------	------	POST - Basin A
9	Reservoir	2.362	1	740	38,463	8	531.47	23,999	Post - Basin A - Route
11	SCS Runoff	7.240	1	718	15,751	------	------	------	POST - Basin B
12	Reservoir	1.128	1	730	13,822	11	532.55	8,039	Post - Basin B - Route
14	SCS Runoff	11.68	1	727	39,803	------	------	------	POST - Basin C
15	Reservoir	0.769	1	817	33,238	14	531.88	24,292	Post - Basin C - Route
17	SCS Runoff	9.147	1	719	21,059	------	------	------	POST - Basin D
18	Reservoir	3.183	1	728	17,477	17	535.20	9,860	Post - Basin D - Route
20	SCS Runoff	9.133	1	728	32,686	------	------	------	POST - Basin E
21	Reservoir	3.288	1	747	27,779	20	533.67	16,562	Post - Basin E - Route
23	SCS Runoff	2.496	1	720	6,246	------	------	------	POST - Basin F
24	Reservoir	1.640	1	726	6,242	23	534.83	1,399	Post - Basin F - Route
26	SCS Runoff	5.821	1	723	16,804	------	------	------	POST - Basin G
27	Combine	7.460	1	723	23,046	24, 26	------	------	F + G
28	Reservoir	1.506	1	746	19,685	27	533.22	12,125	Post - Basin G - Route
30	SCS Runoff	16.54	1	729	61,515	------	------	------	POST - Undetained - South
31	SCS Runoff	13.44	1	723	38,505	------	------	------	POST - Undetained - West
32	SCS Runoff	7.662	1	722	20,818	------	------	------	POST - Undetained - North
33	SCS Runoff	2.935	1	716	5,114	------	------	------	POST - Undetained - East
35	Combine	20.24	1	729	106,771	18, 21, 30,	------	------	Post - South - TOTAL
36	Combine	15.83	1	724	96,654	9, 28, 31,	------	------	Post - West - TOTAL
37	Combine	8.861	1	723	67,878	12, 15, 32,	------	------	Post - North - TOTAL
39	Combine	43.29	1	725	276,418	33, 35, 36, 37,	------	------	POST - TOTAL

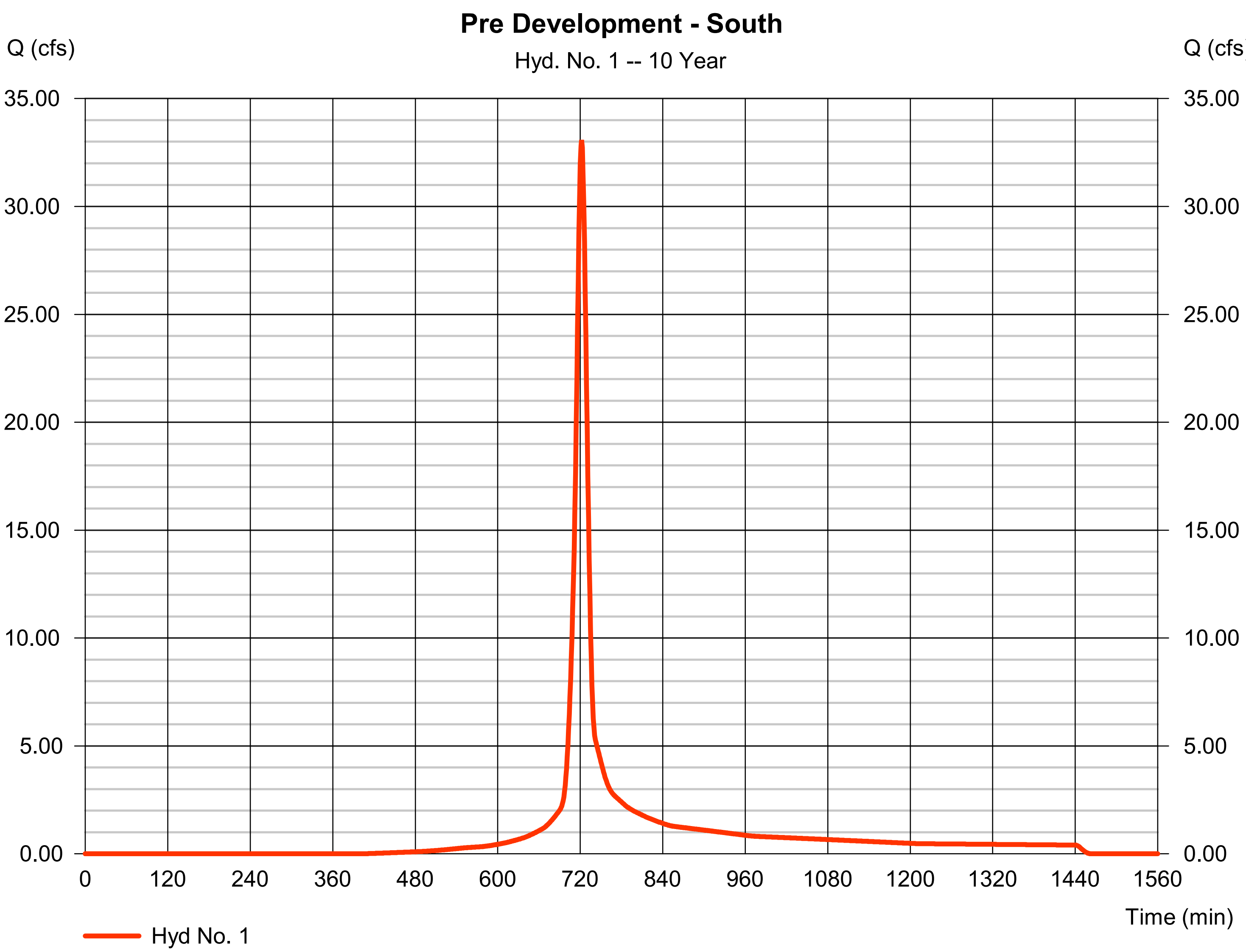
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 1

Pre Development - South

Hydrograph type	= SCS Runoff	Peak discharge	= 33.09 cfs
Storm frequency	= 10 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 89,411 cuft
Drainage area	= 9.910 ac	Curve number	= 84.4
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 13.60 min
Total precip.	= 4.09 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



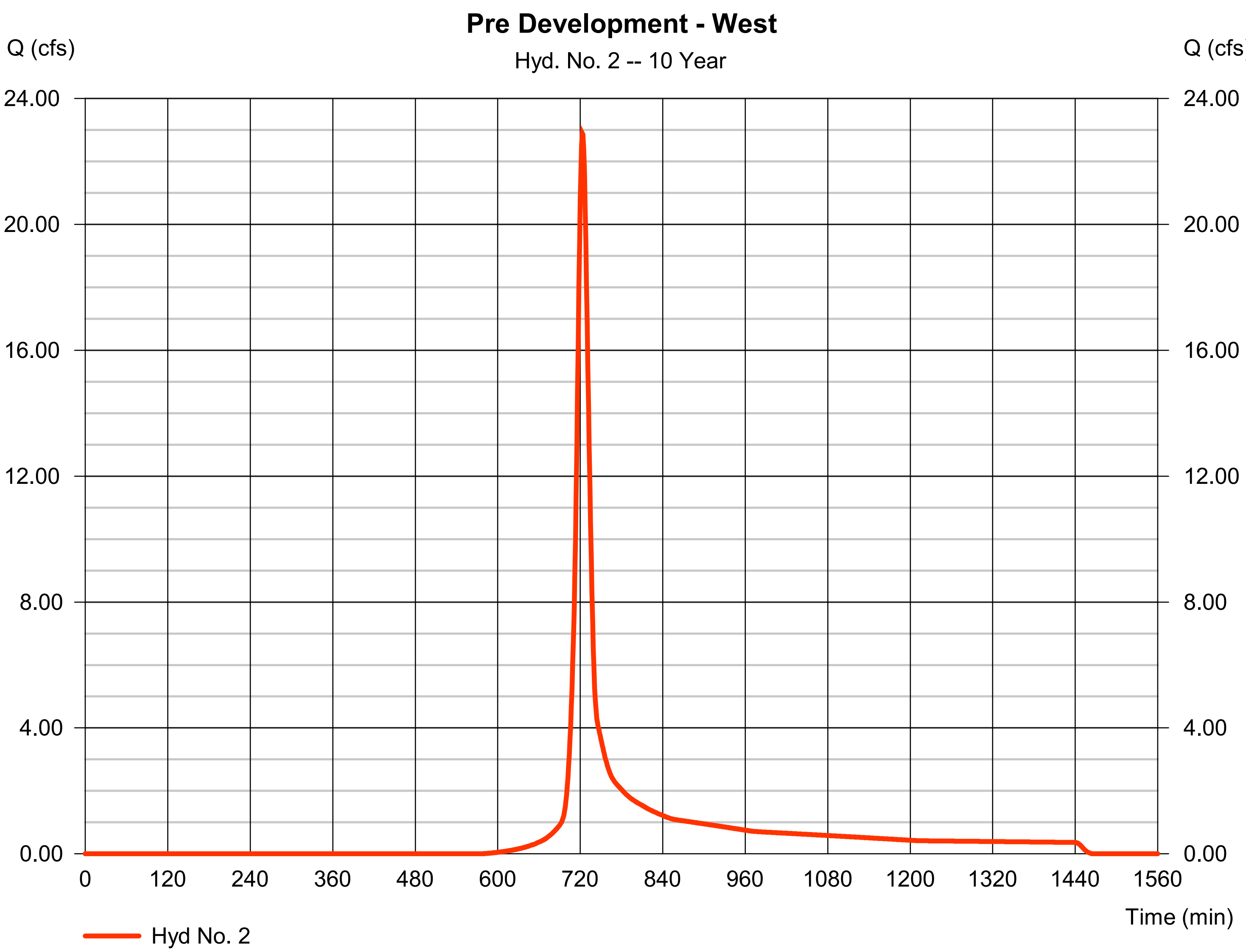
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Thursday, 08 / 5 / 2021

Hyd. No. 2

Pre Development - West

Hydrograph type	= SCS Runoff	Peak discharge	= 22.89 cfs
Storm frequency	= 10 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 65,890 cuft
Drainage area	= 10.250 ac	Curve number	= 75.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 16.30 min
Total precip.	= 4.09 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



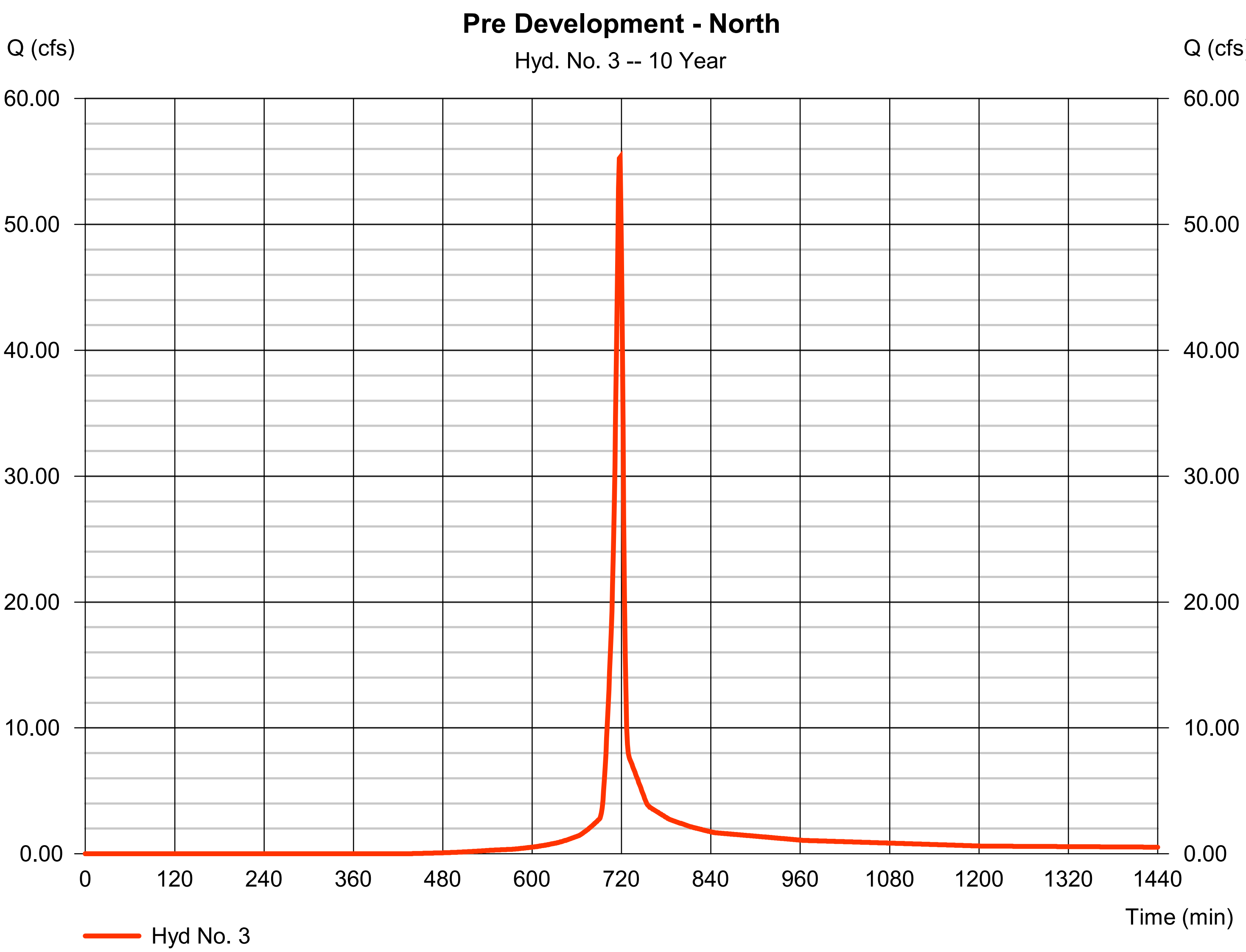
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 3

Pre Development - North

Hydrograph type	= SCS Runoff	Peak discharge	= 55.33 cfs
Storm frequency	= 10 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 113,241 cuft
Drainage area	= 12.840 ac	Curve number	= 82.9
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.30 min
Total precip.	= 4.09 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



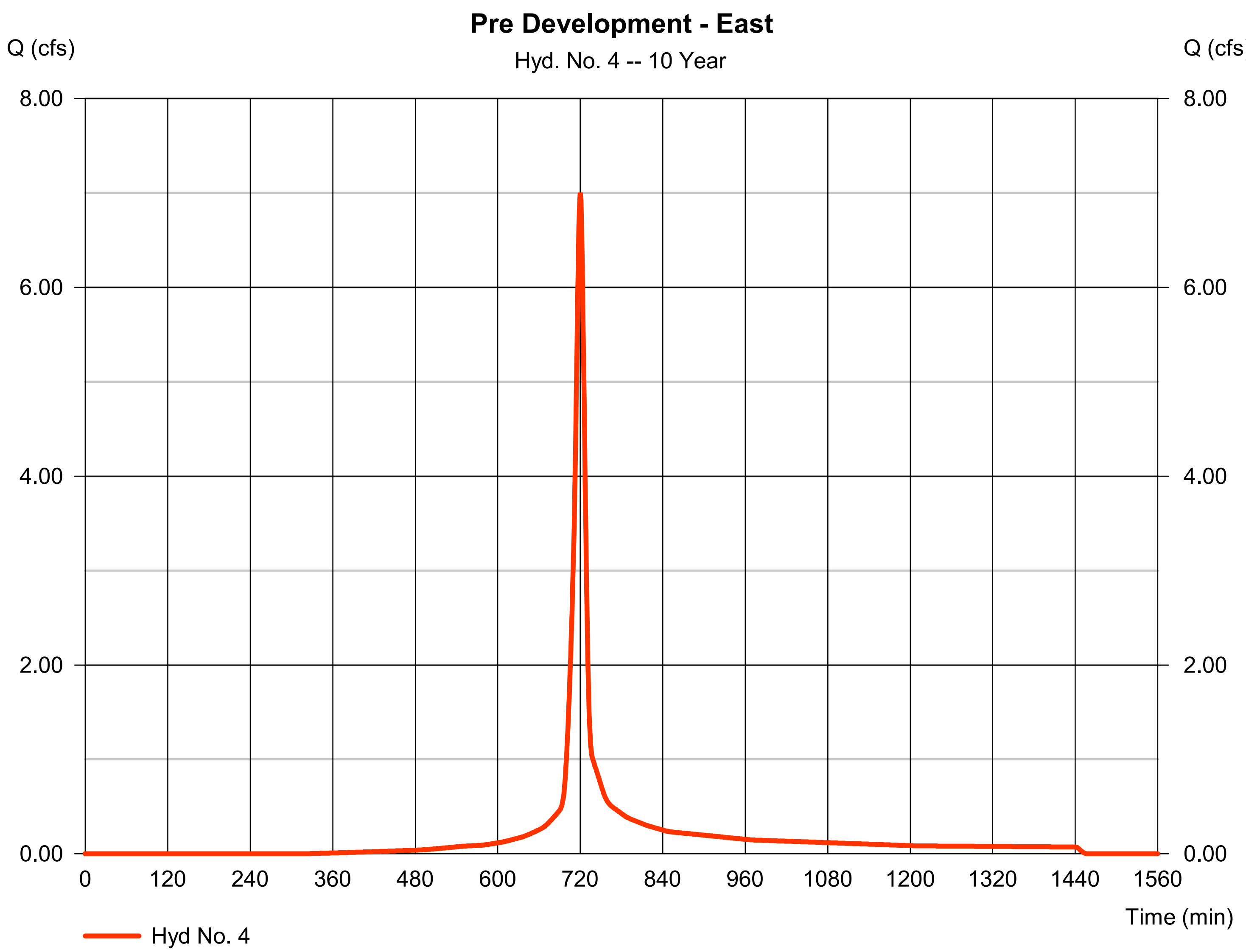
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 4

Pre Development - East

Hydrograph type	= SCS Runoff	Peak discharge	= 7.004 cfs
Storm frequency	= 10 yrs	Time to peak	= 720 min
Time interval	= 1 min	Hyd. volume	= 17,366 cuft
Drainage area	= 1.660 ac	Curve number	= 88.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 11.20 min
Total precip.	= 4.09 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



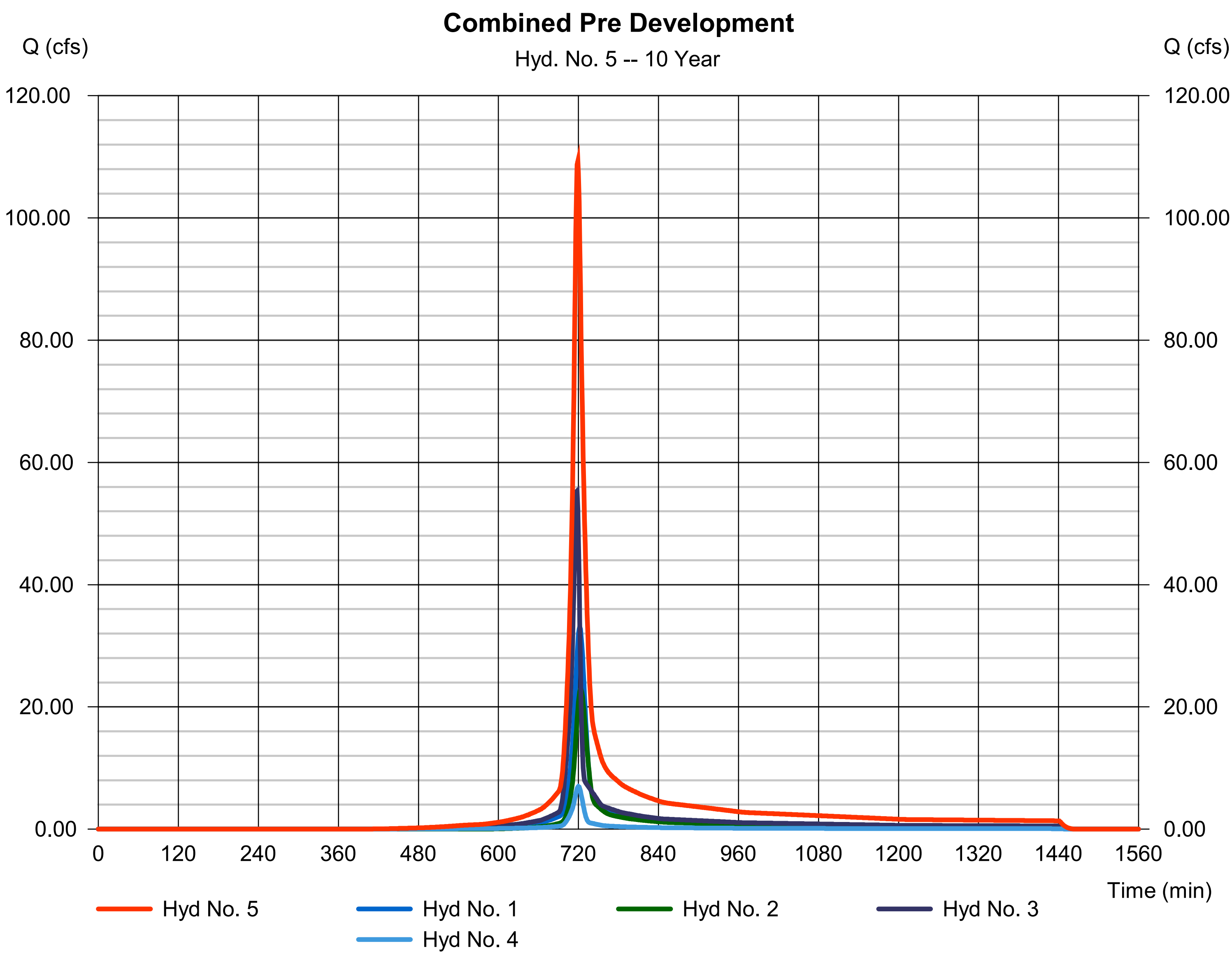
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 5

Combined Pre Development

Hydrograph type	= Combine	Peak discharge	= 109.29 cfs
Storm frequency	= 10 yrs	Time to peak	= 719 min
Time interval	= 1 min	Hyd. volume	= 285,908 cuft
Inflow hyds.	= 1, 2, 3, 4	Contrib. drain. area	= 34.660 ac



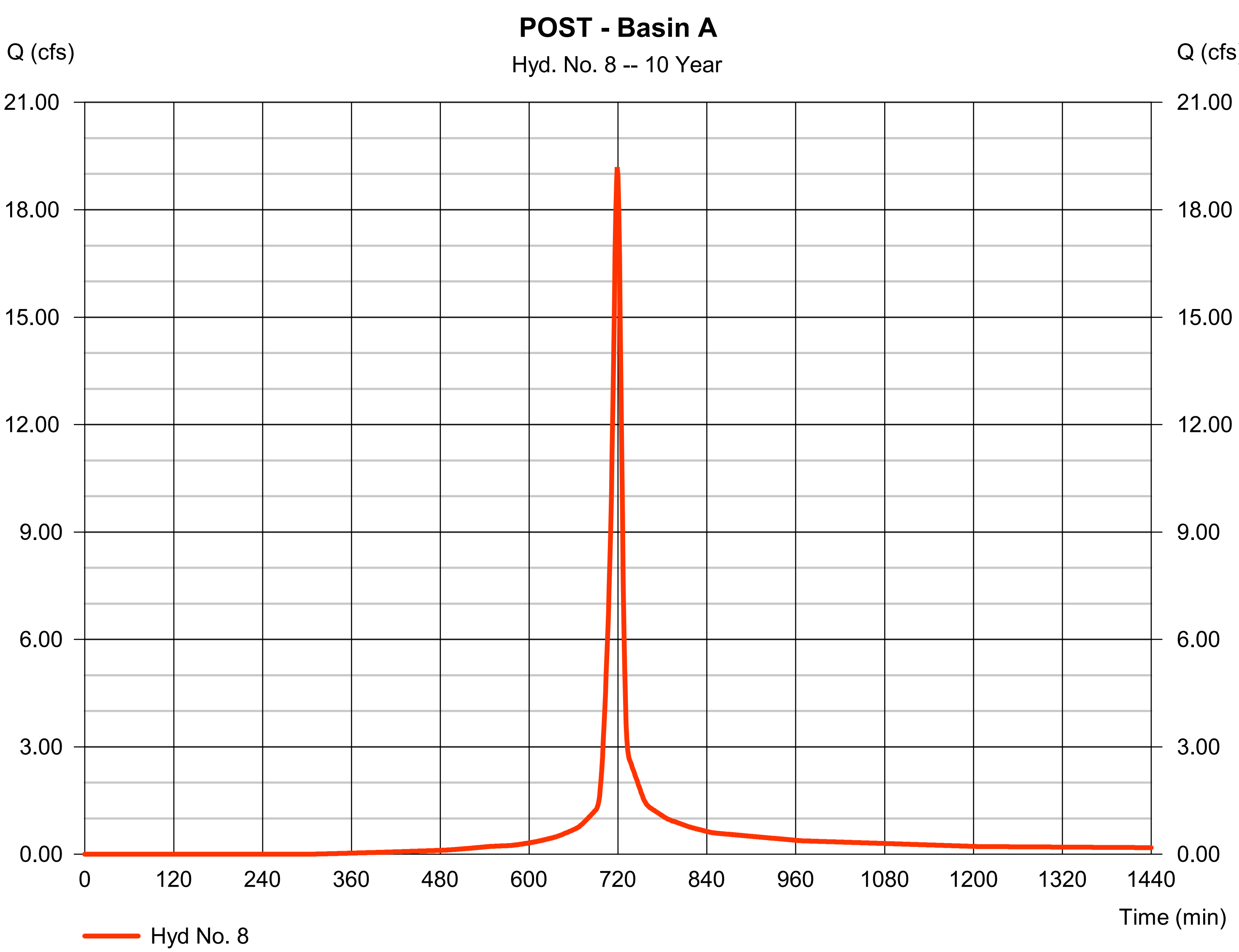
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 8

POST - Basin A

Hydrograph type	= SCS Runoff	Peak discharge	= 19.19 cfs
Storm frequency	= 10 yrs	Time to peak	= 719 min
Time interval	= 1 min	Hyd. volume	= 44,876 cuft
Drainage area	= 4.280 ac	Curve number	= 88.8
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.10 min
Total precip.	= 4.09 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

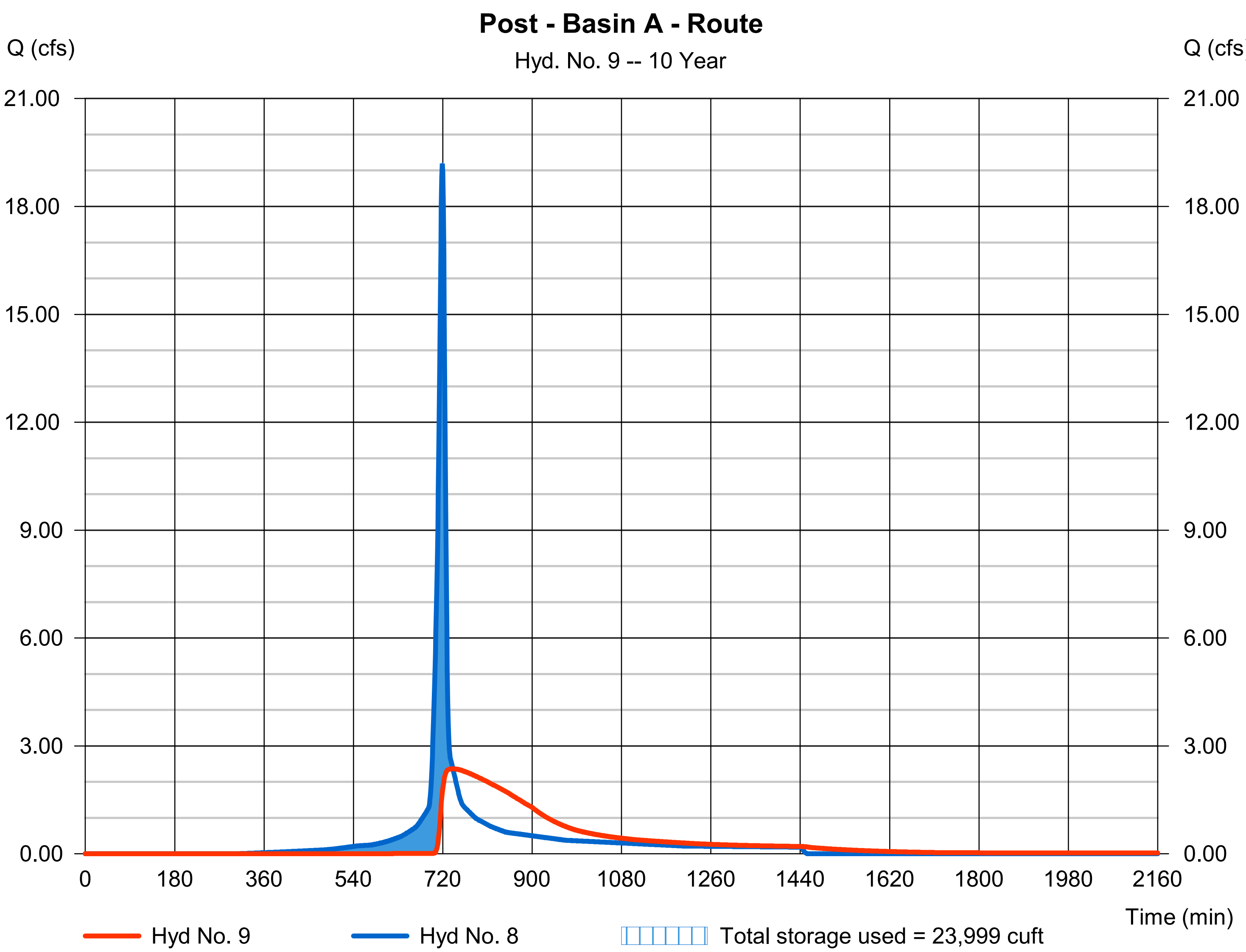
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 9

Post - Basin A - Route

Hydrograph type	= Reservoir	Peak discharge	= 2.362 cfs
Storm frequency	= 10 yrs	Time to peak	= 740 min
Time interval	= 1 min	Hyd. volume	= 38,463 cuft
Inflow hyd. No.	= 8 - POST - Basin A	Max. Elevation	= 531.47 ft
Reservoir name	= Basin A	Max. Storage	= 23,999 cuft

Storage Indication method used.



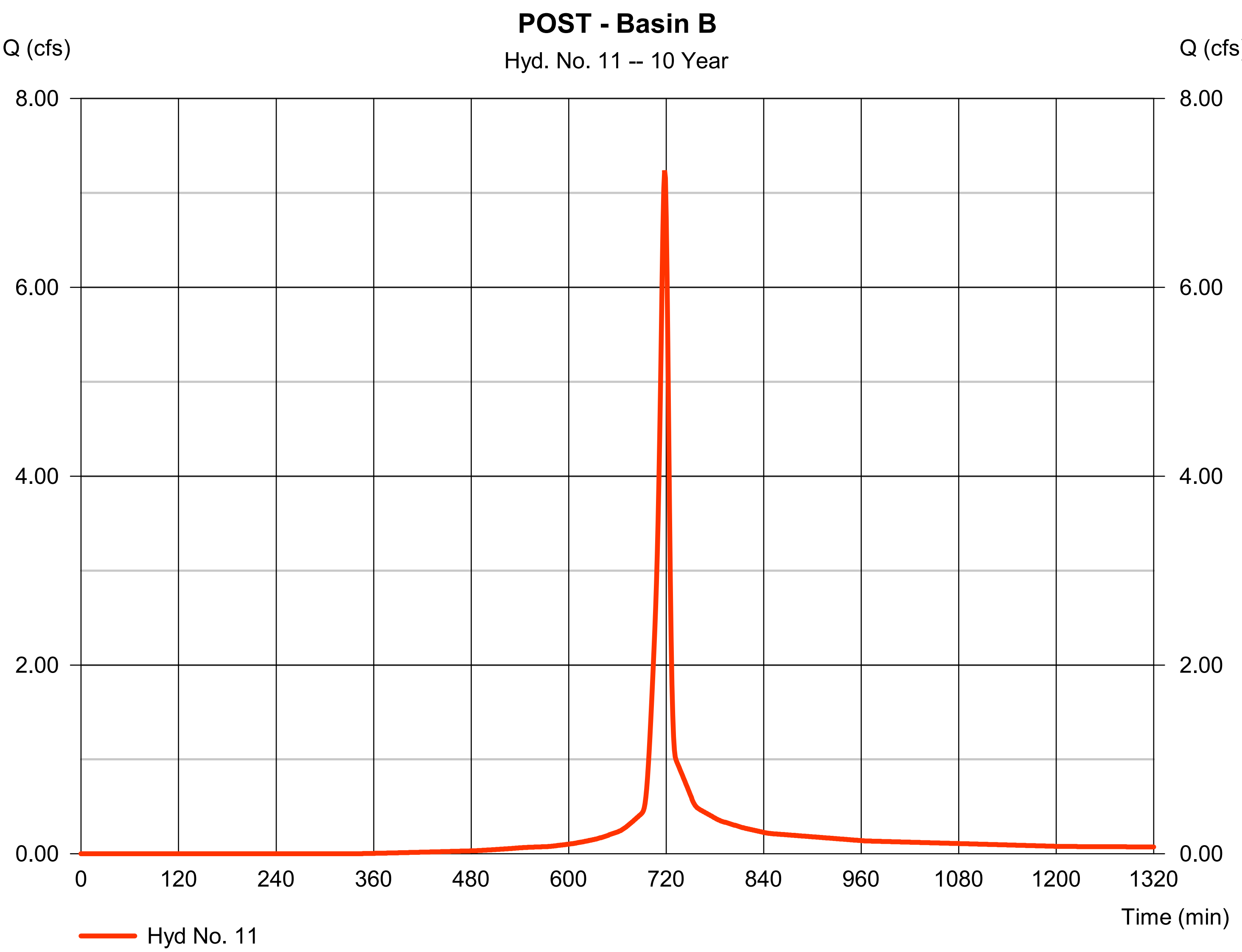
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 11

POST - Basin B

Hydrograph type	= SCS Runoff	Peak discharge	= 7.240 cfs
Storm frequency	= 10 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 15,751 cuft
Drainage area	= 1.620 ac	Curve number	= 87.3
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.90 min
Total precip.	= 4.09 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

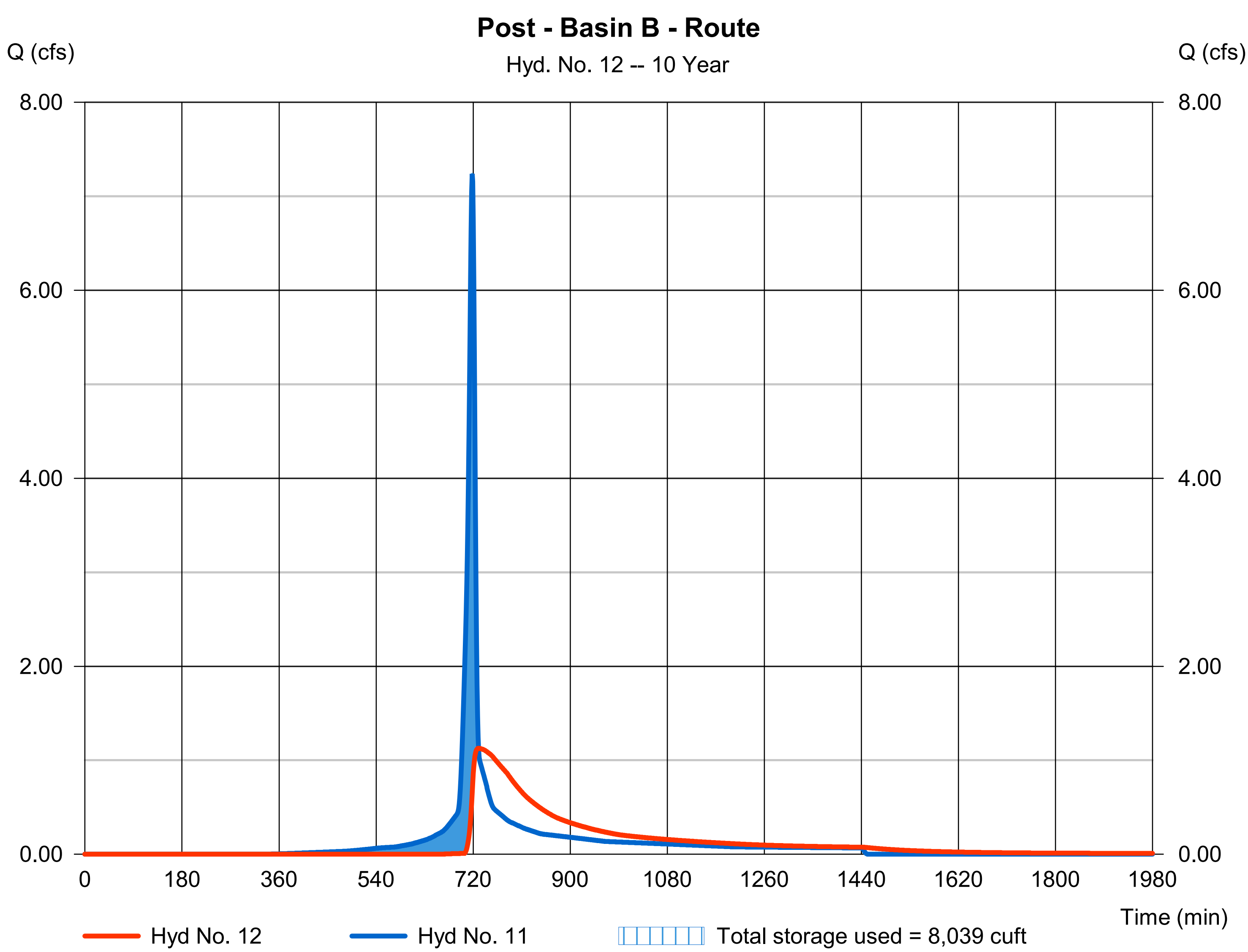
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 | Thursday, 08 / 5 / 2021

Hyd. No. 12

Post - Basin B - Route

Hydrograph type	= Reservoir	Peak discharge	= 1.128 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 1 min	Hyd. volume	= 13,822 cuft
Inflow hyd. No.	= 11 - POST - Basin B	Max. Elevation	= 532.55 ft
Reservoir name	= Basin B	Max. Storage	= 8,039 cuft

Storage Indication method used.

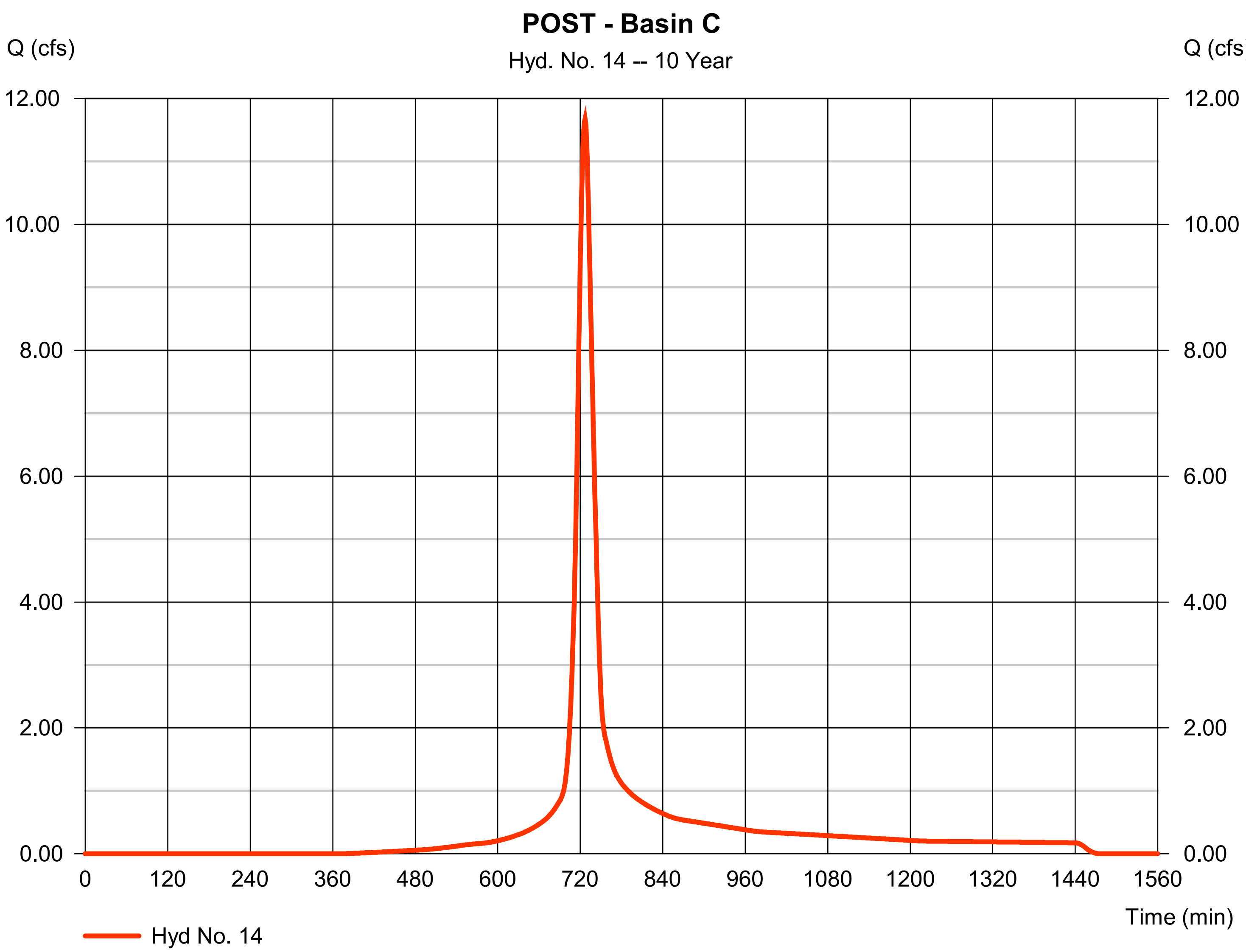


Hydrograph Report

Hyd. No. 14

POST - Basin C

Hydrograph type	= SCS Runoff	Peak discharge	= 11.68 cfs
Storm frequency	= 10 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 39,803 cuft
Drainage area	= 4.210 ac	Curve number	= 86
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 23.00 min
Total precip.	= 4.09 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

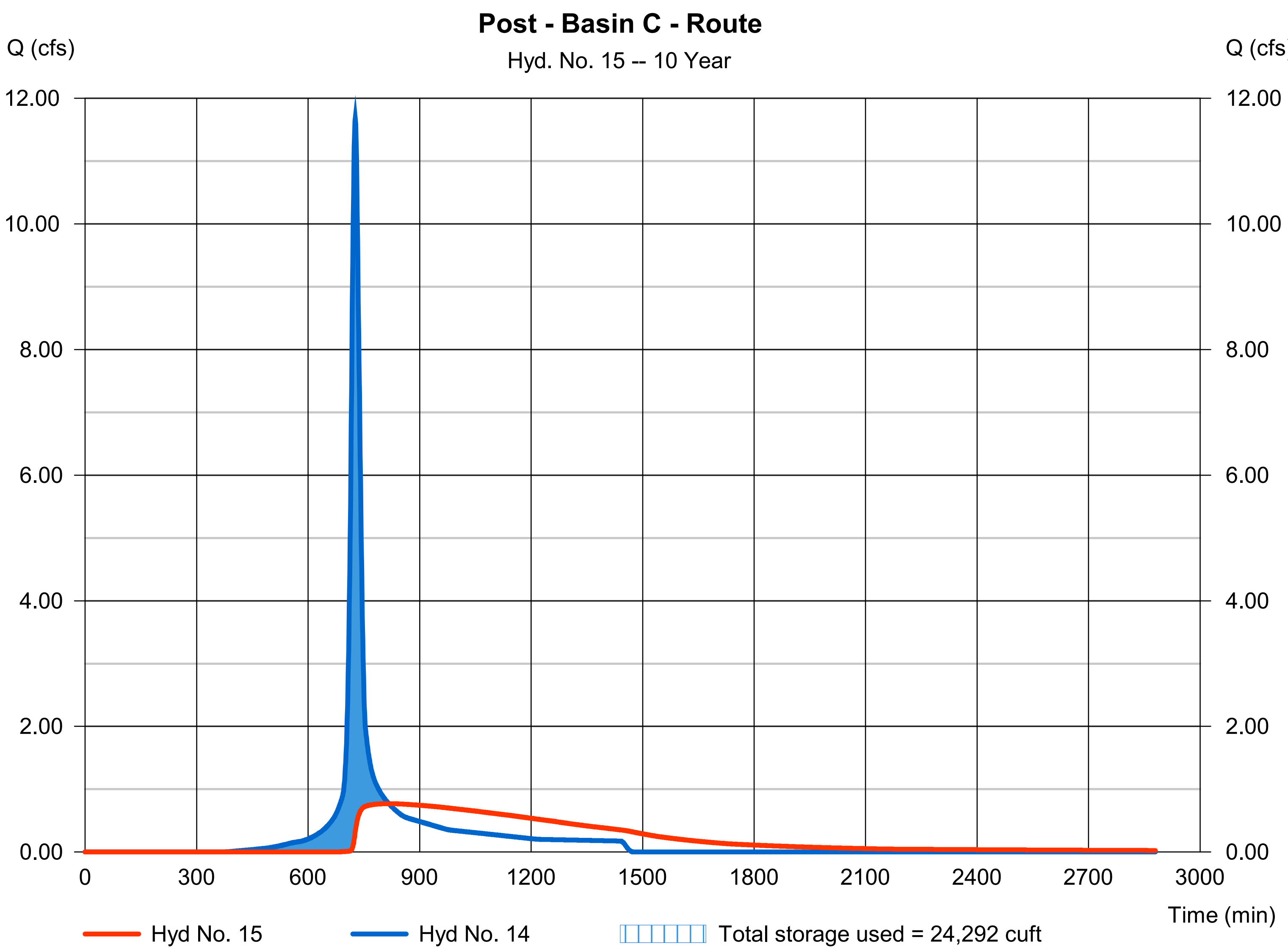
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 15

Post - Basin C - Route

Hydrograph type	= Reservoir	Peak discharge	= 0.769 cfs
Storm frequency	= 10 yrs	Time to peak	= 817 min
Time interval	= 1 min	Hyd. volume	= 33,238 cuft
Inflow hyd. No.	= 14 - POST - Basin C	Max. Elevation	= 531.88 ft
Reservoir name	= Basin C	Max. Storage	= 24,292 cuft

Storage Indication method used.



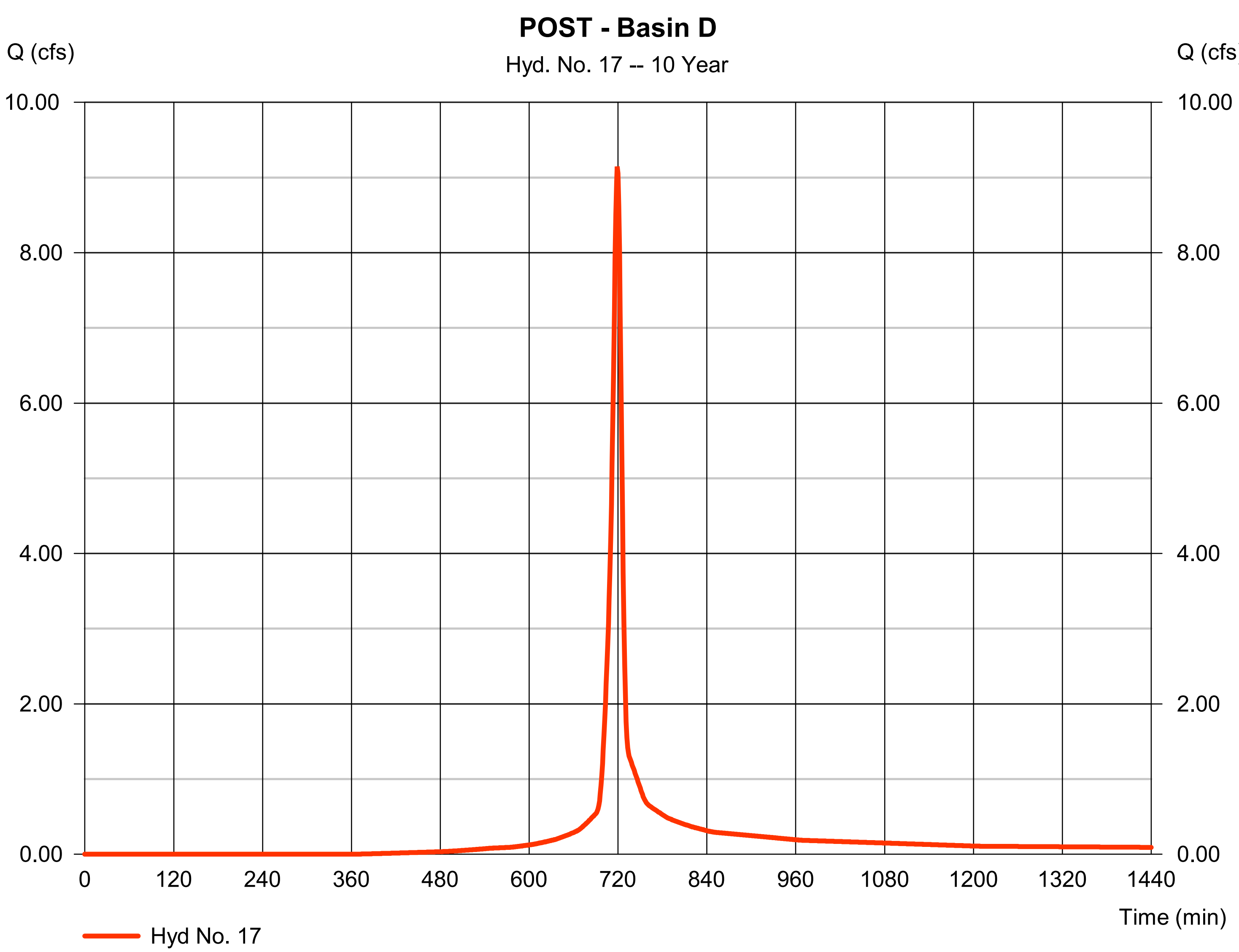
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 17

POST - Basin D

Hydrograph type	= SCS Runoff	Peak discharge	= 9.147 cfs
Storm frequency	= 10 yrs	Time to peak	= 719 min
Time interval	= 1 min	Hyd. volume	= 21,059 cuft
Drainage area	= 2.200 ac	Curve number	= 86.1
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.60 min
Total precip.	= 4.09 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

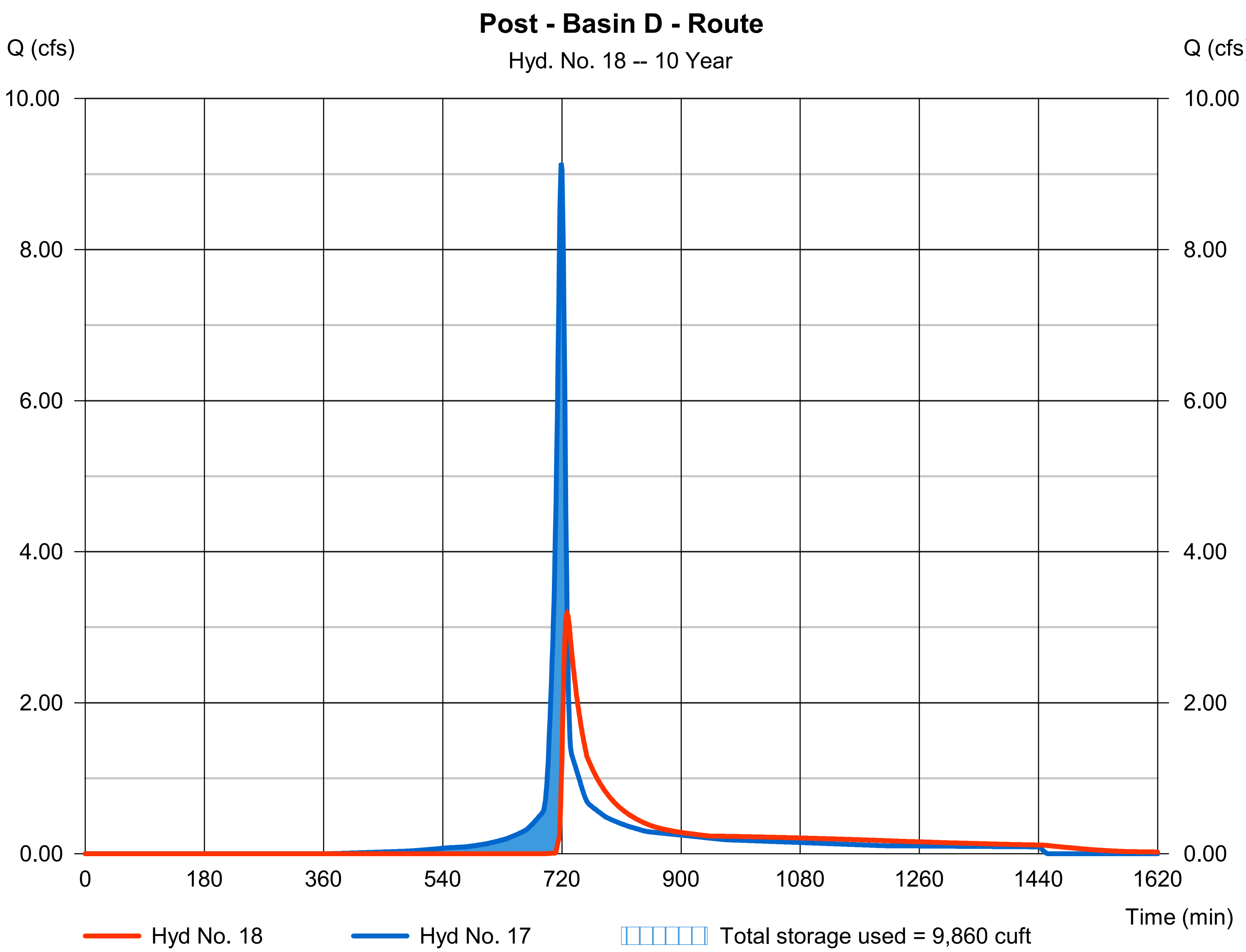
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Thursday, 08 / 5 / 2021

Hyd. No. 18

Post - Basin D - Route

Hydrograph type	= Reservoir	Peak discharge	= 3.183 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 17,477 cuft
Inflow hyd. No.	= 17 - POST - Basin D	Max. Elevation	= 535.20 ft
Reservoir name	= Basin D	Max. Storage	= 9,860 cuft

Storage Indication method used.



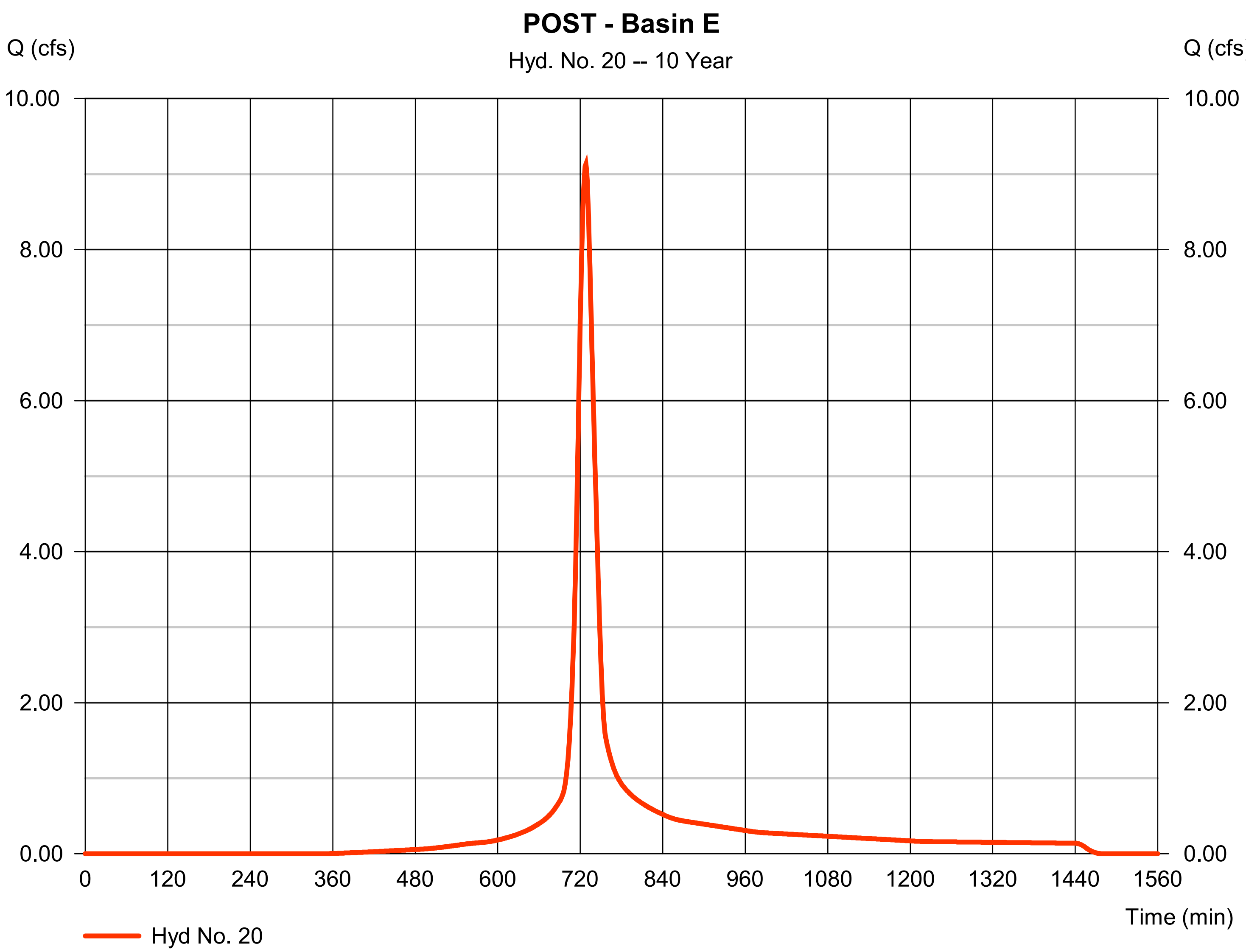
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 20

POST - Basin E

Hydrograph type	= SCS Runoff	Peak discharge	= 9.133 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 32,686 cuft
Drainage area	= 3.300 ac	Curve number	= 87.1
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 25.30 min
Total precip.	= 4.09 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

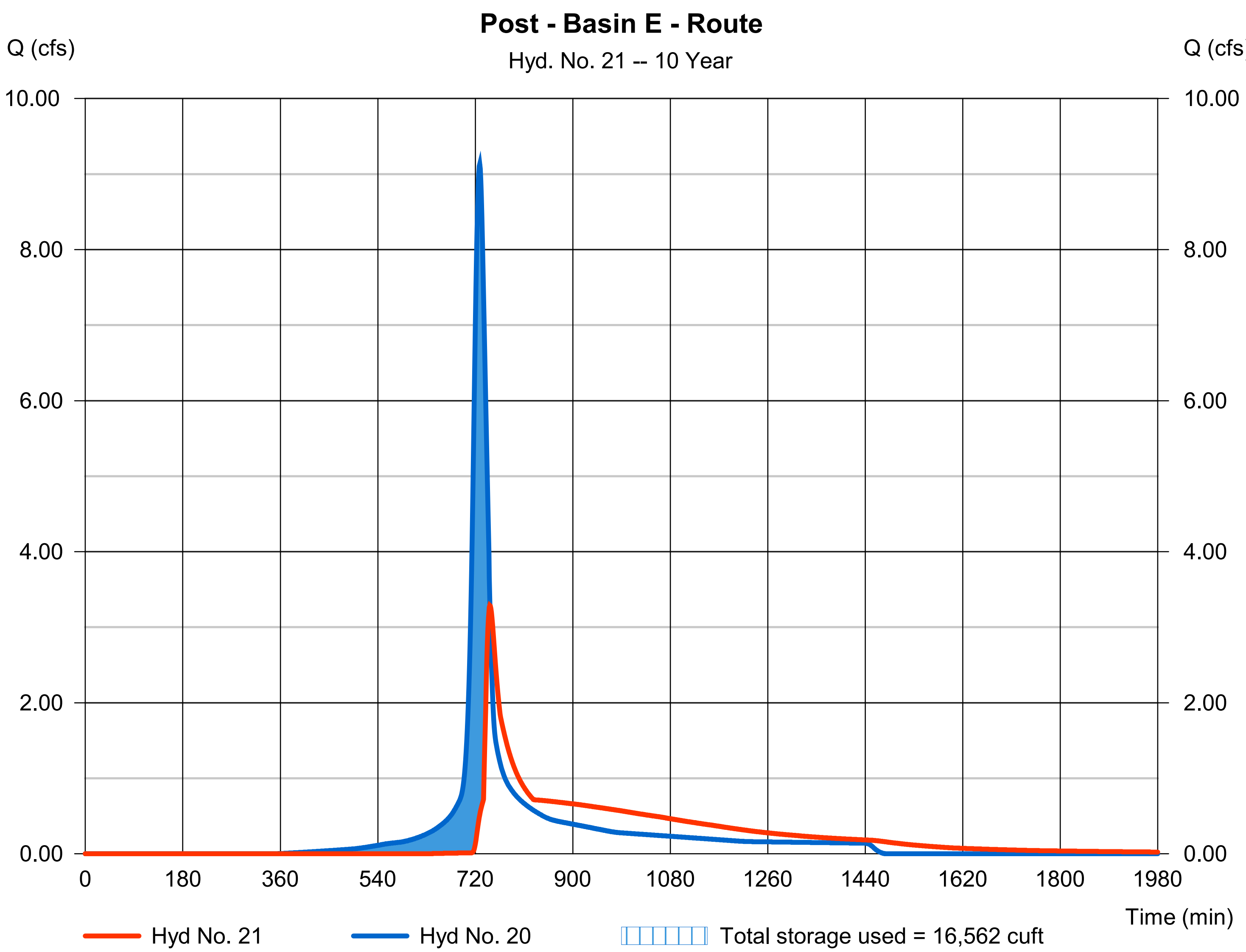
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 21

Post - Basin E - Route

Hydrograph type	= Reservoir	Peak discharge	= 3.288 cfs
Storm frequency	= 10 yrs	Time to peak	= 747 min
Time interval	= 1 min	Hyd. volume	= 27,779 cuft
Inflow hyd. No.	= 20 - POST - Basin E	Max. Elevation	= 533.67 ft
Reservoir name	= Basin E	Max. Storage	= 16,562 cuft

Storage Indication method used.



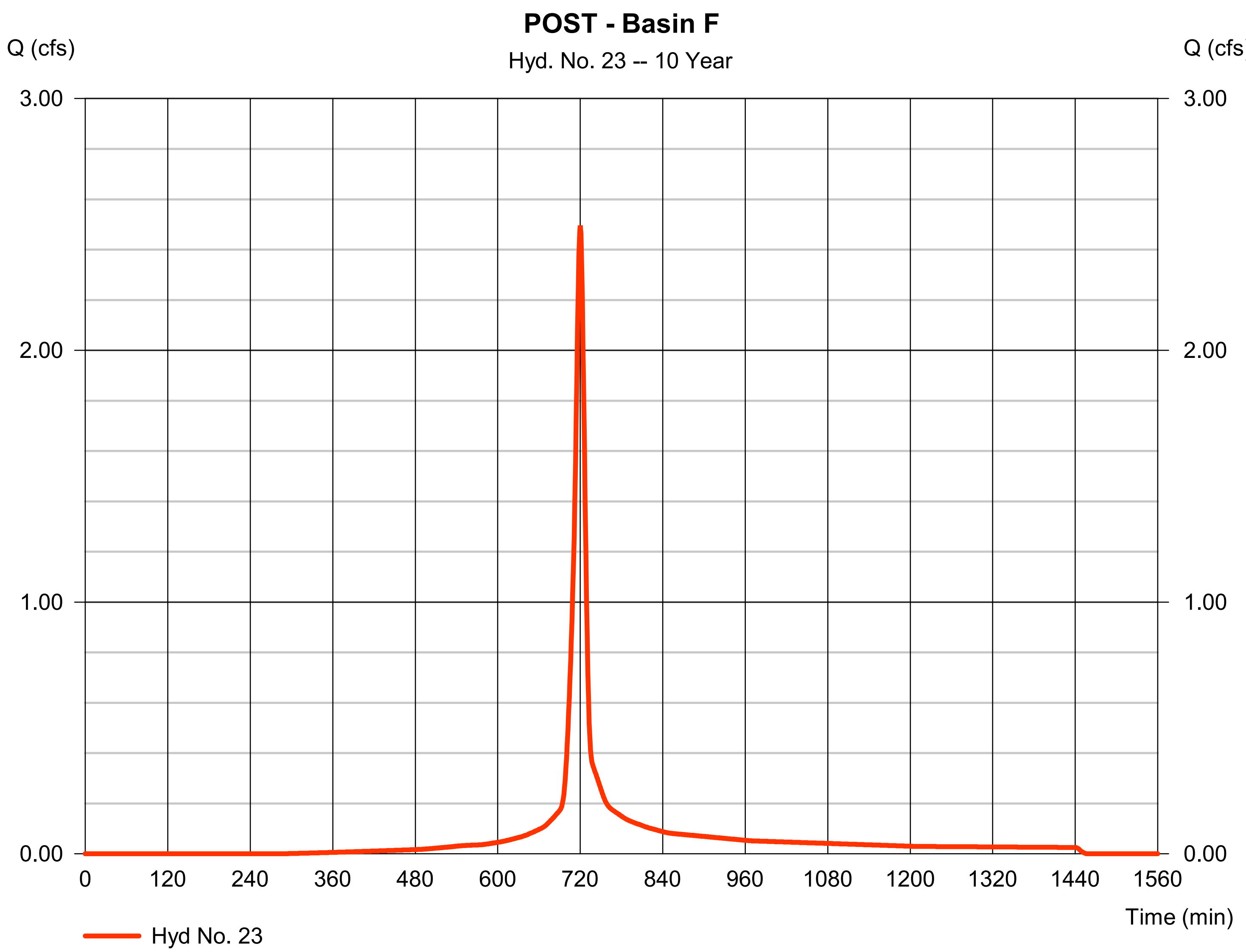
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 | Thursday, 08 / 5 / 2021

Hyd. No. 23

POST - Basin F

Hydrograph type	= SCS Runoff	Peak discharge	= 2.496 cfs
Storm frequency	= 10 yrs	Time to peak	= 720 min
Time interval	= 1 min	Hyd. volume	= 6,246 cuft
Drainage area	= 0.570 ac	Curve number	= 89.6
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 10.20 min
Total precip.	= 4.09 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

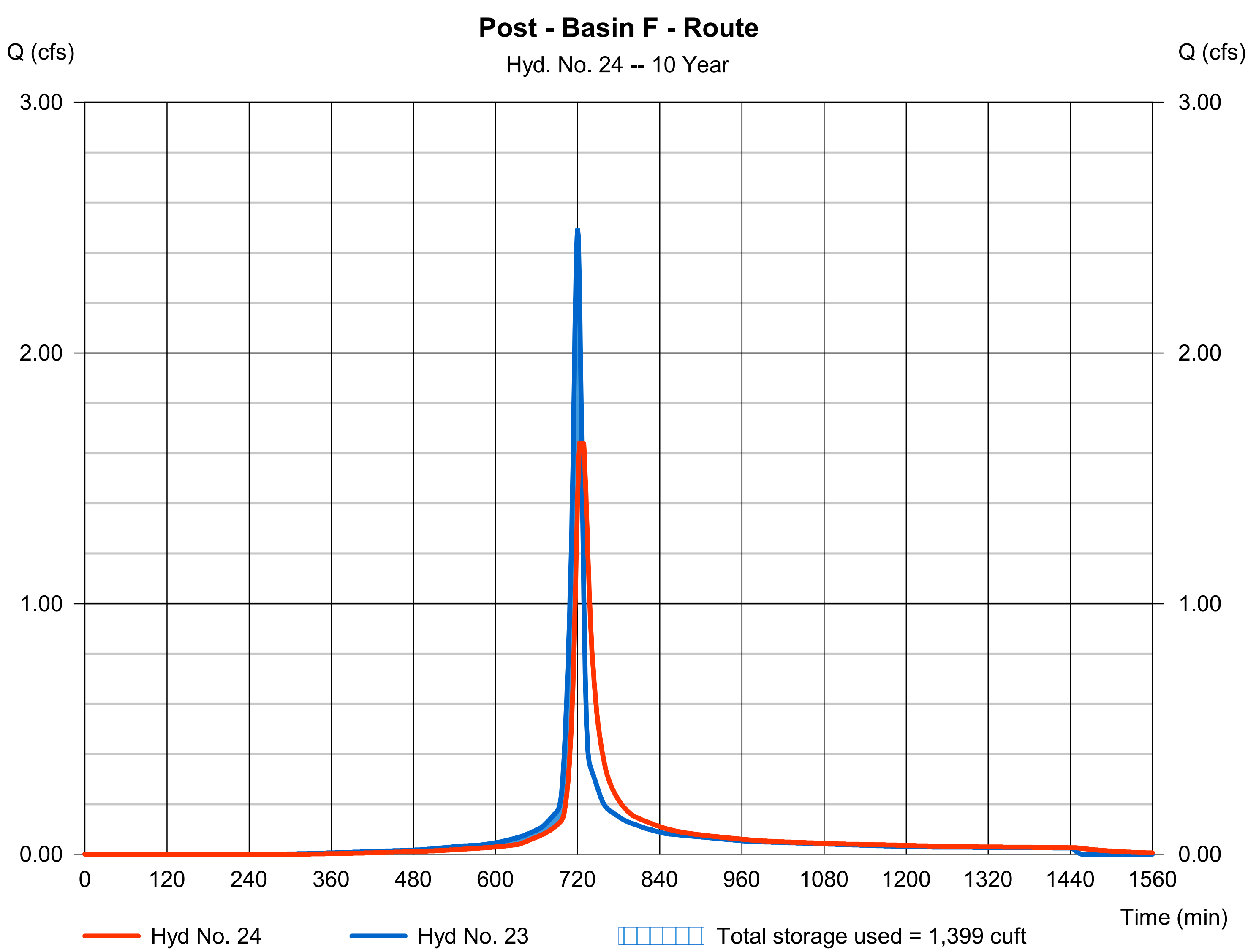
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 24

Post - Basin F - Route

Hydrograph type	= Reservoir	Peak discharge	= 1.640 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 6,242 cuft
Inflow hyd. No.	= 23 - POST - Basin F	Max. Elevation	= 534.83 ft
Reservoir name	= Basin F	Max. Storage	= 1,399 cuft

Storage Indication method used.



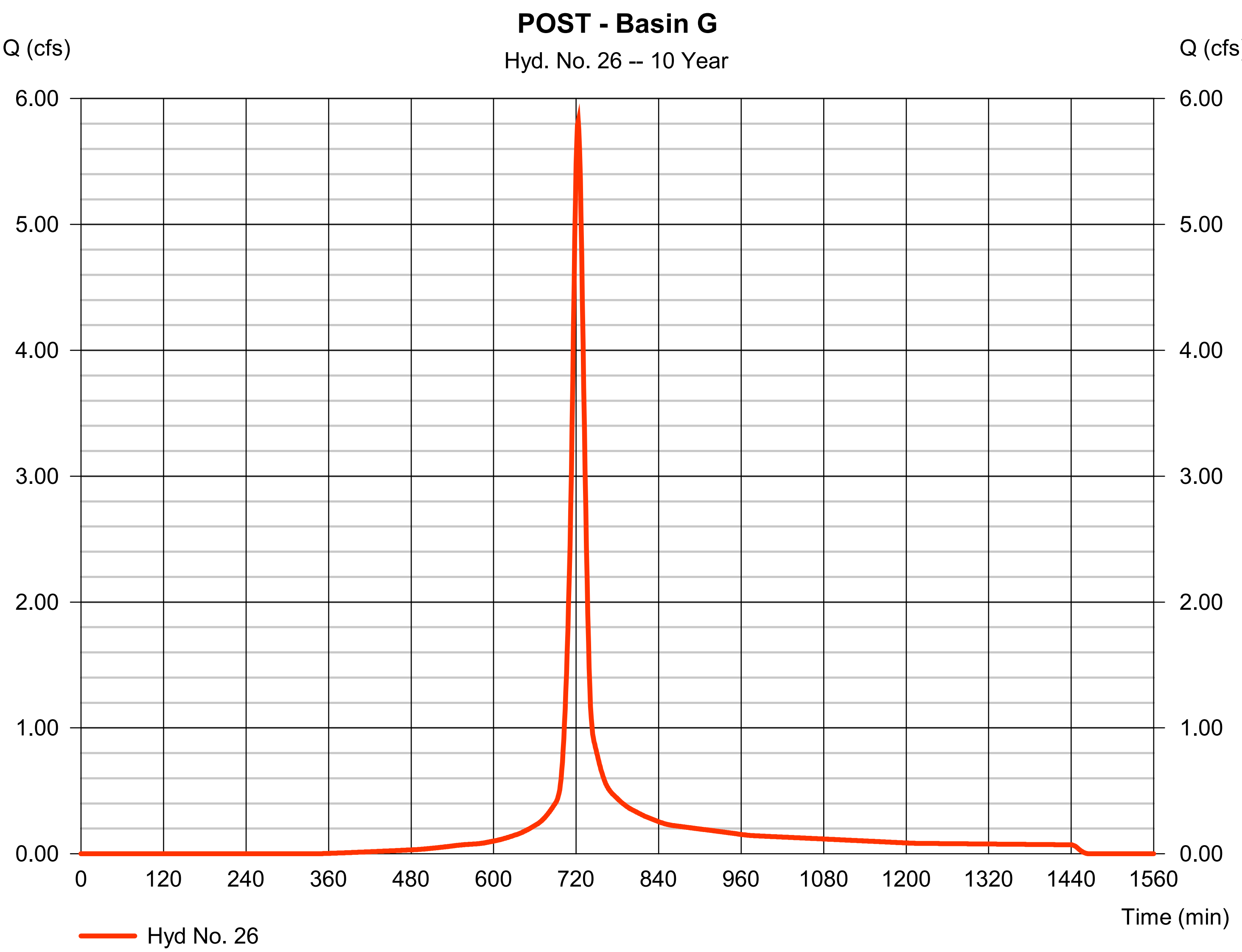
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 26

POST - Basin G

Hydrograph type	= SCS Runoff	Peak discharge	= 5.821 cfs
Storm frequency	= 10 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 16,804 cuft
Drainage area	= 1.670 ac	Curve number	= 87.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 15.80 min
Total precip.	= 4.09 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



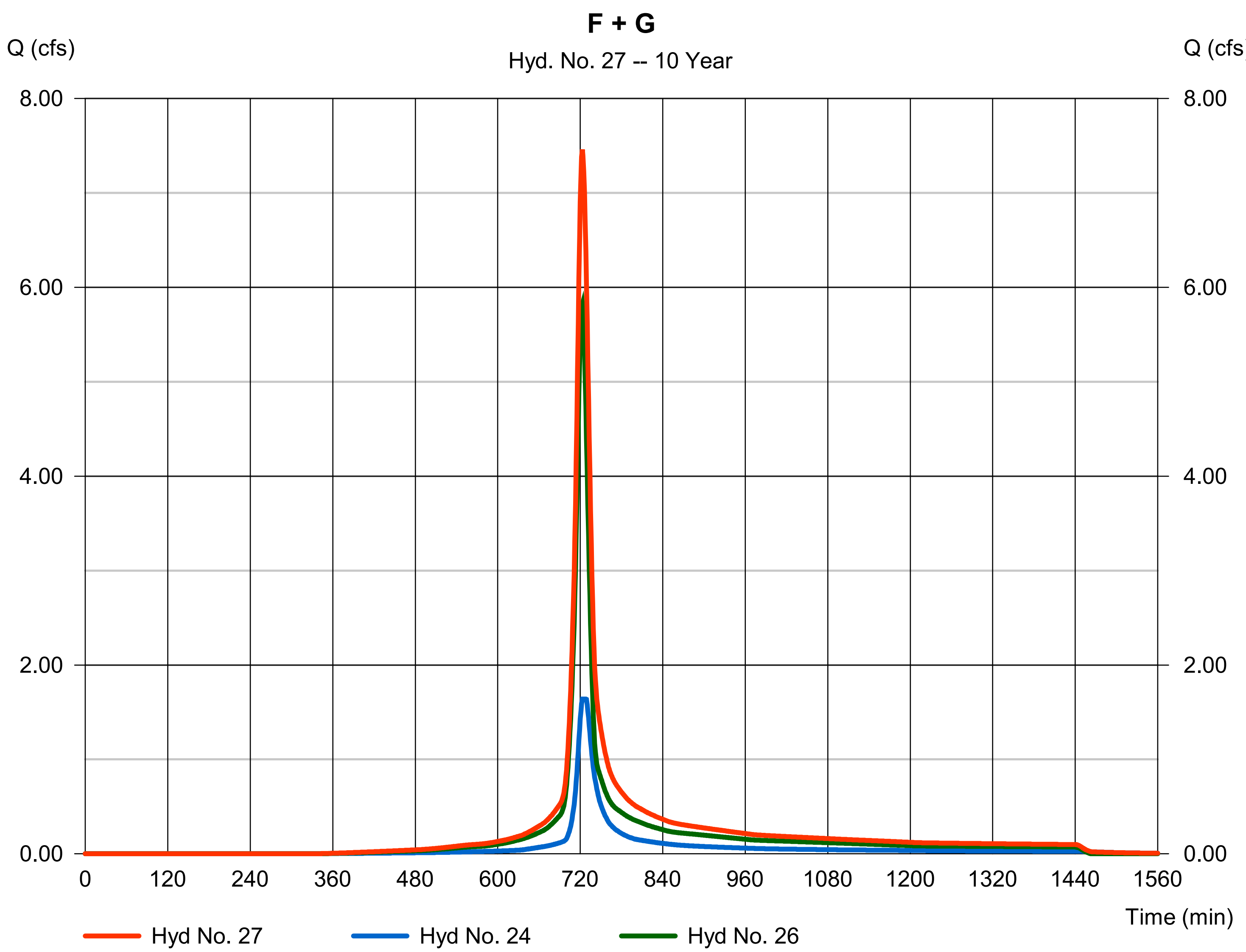
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 27

F + G

Hydrograph type	= Combine	Peak discharge	= 7.460 cfs
Storm frequency	= 10 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 23,046 cuft
Inflow hyds.	= 24, 26	Contrib. drain. area	= 1.670 ac



Hydrograph Report

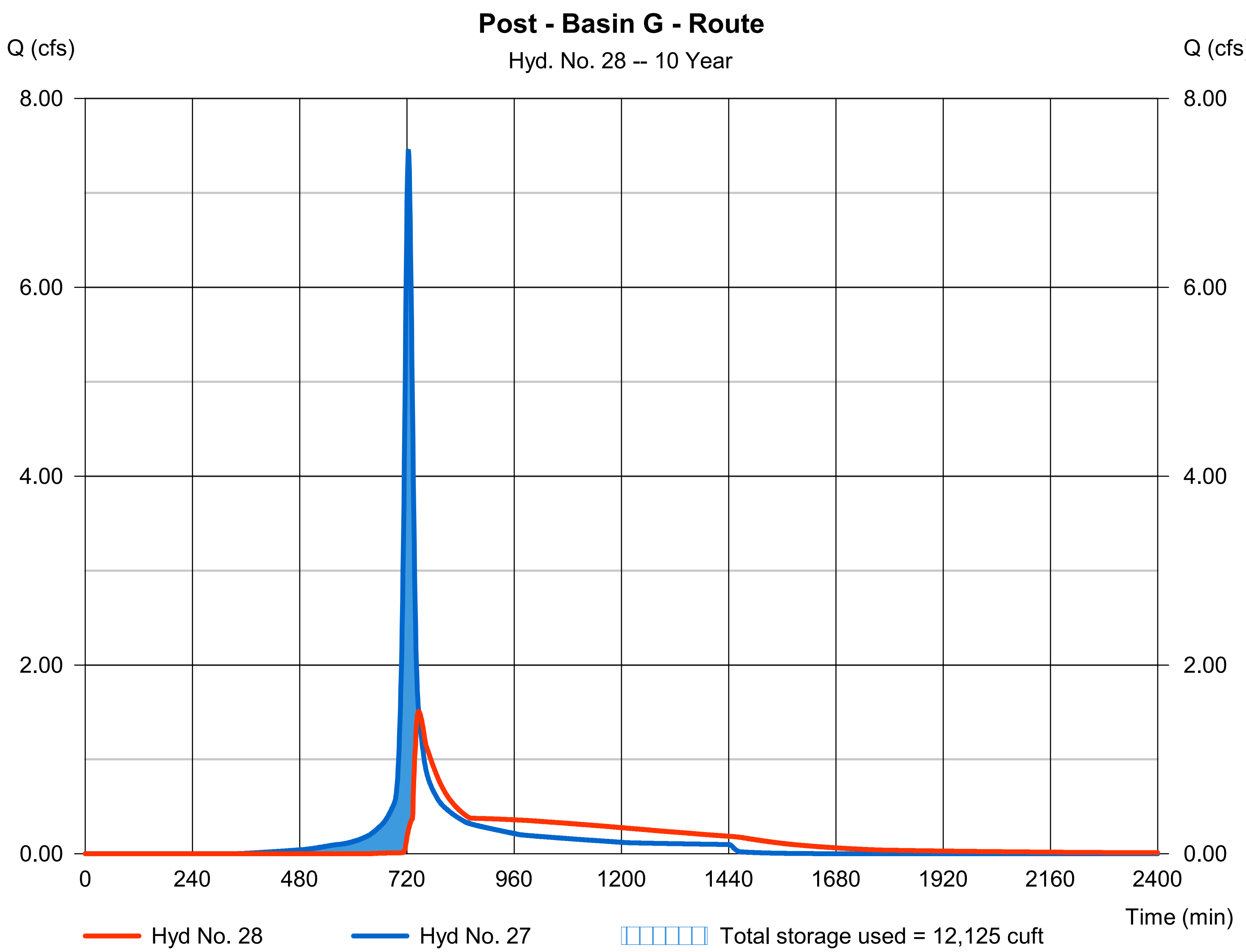
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 28

Post - Basin G - Route

Hydrograph type	= Reservoir	Peak discharge	= 1.506 cfs
Storm frequency	= 10 yrs	Time to peak	= 746 min
Time interval	= 1 min	Hyd. volume	= 19,685 cuft
Inflow hyd. No.	= 27 - F + G	Max. Elevation	= 533.22 ft
Reservoir name	= Basin G	Max. Storage	= 12,125 cuft

Storage Indication method used.



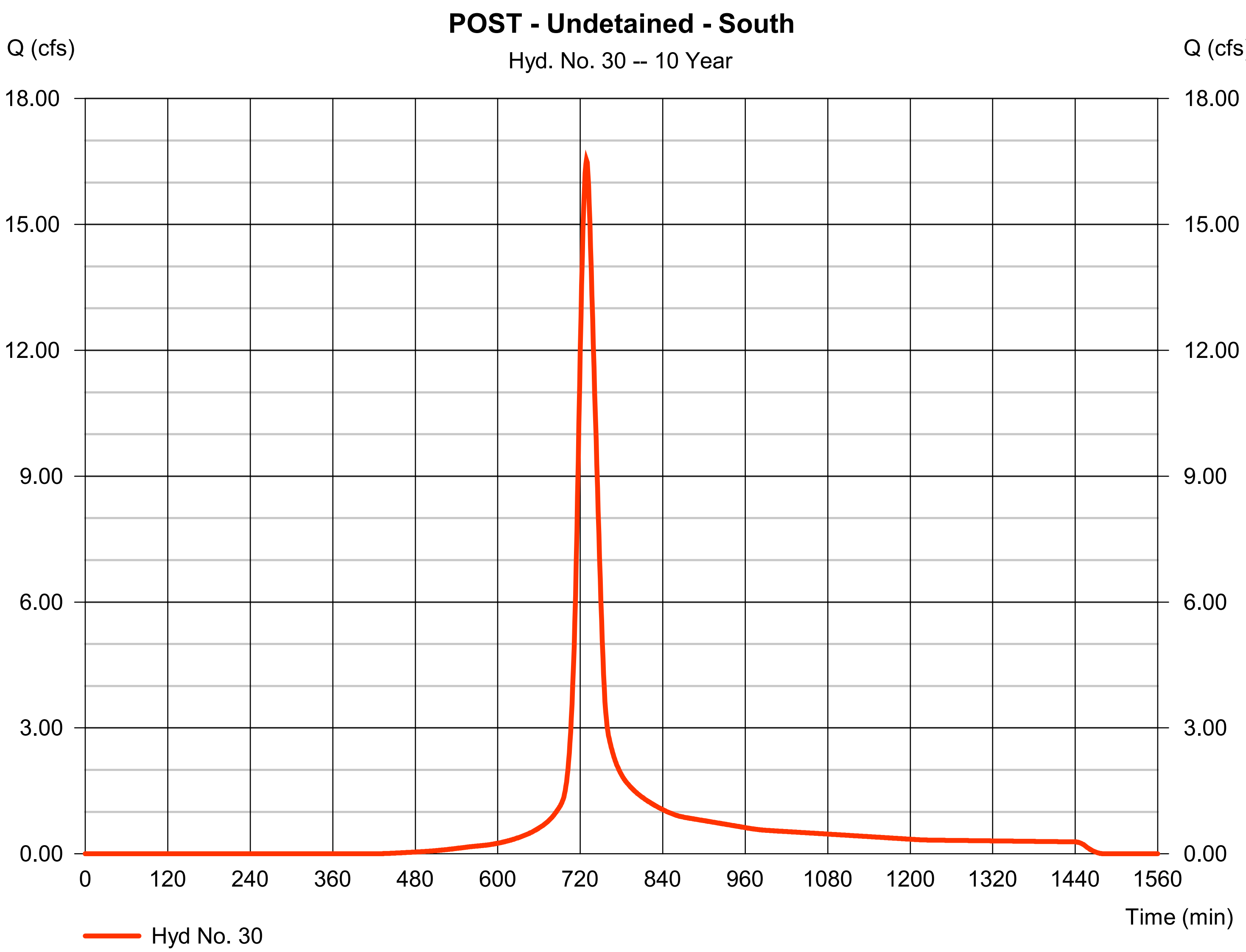
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Thursday, 08 / 5 / 2021

Hyd. No. 30

POST - Undetained - South

Hydrograph type	= SCS Runoff	Peak discharge	= 16.54 cfs
Storm frequency	= 10 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 61,515 cuft
Drainage area	= 6.960 ac	Curve number	= 83.6
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 26.40 min
Total precip.	= 4.09 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

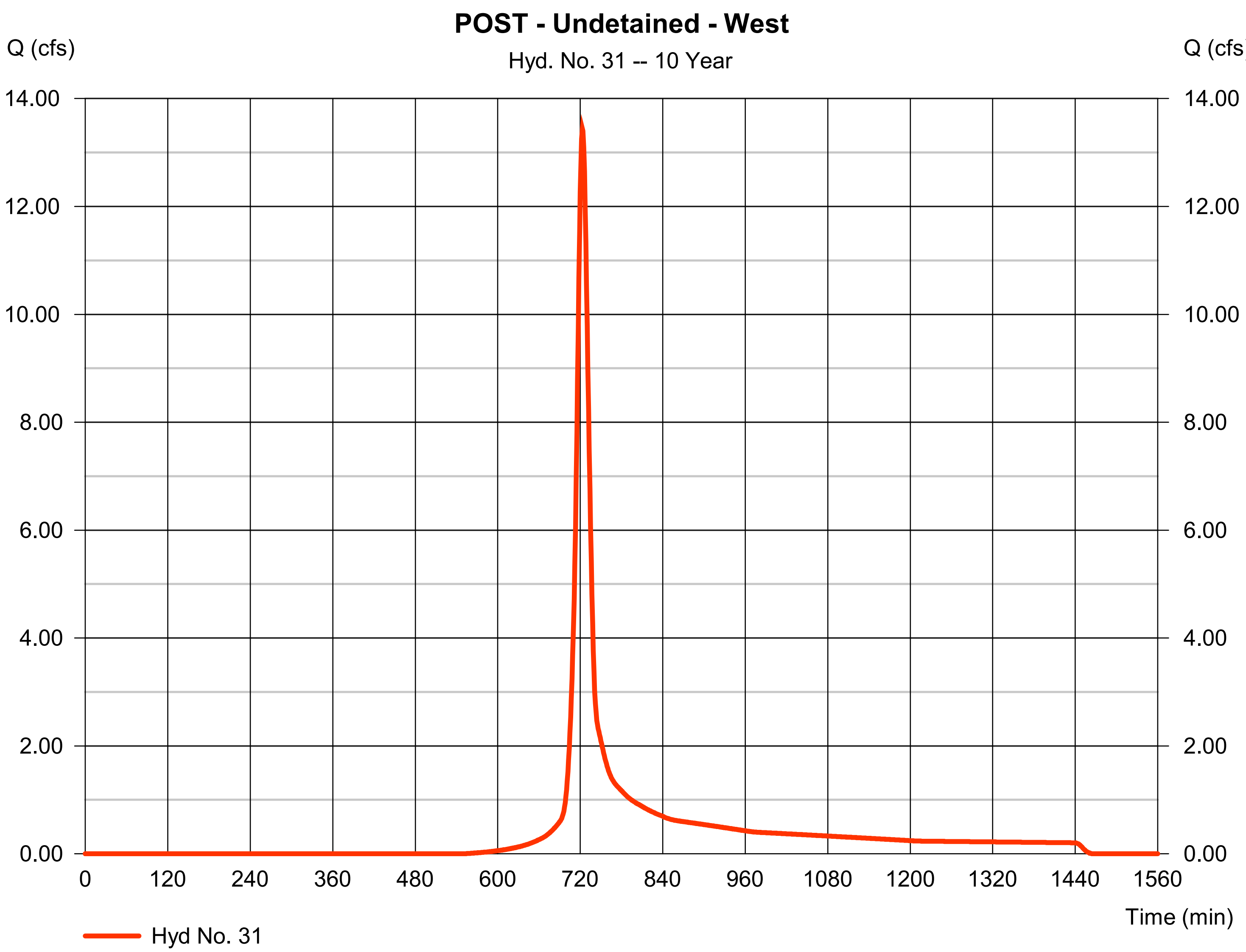


Hydrograph Report

Hyd. No. 31

POST - Undetained - West

Hydrograph type	= SCS Runoff	Peak discharge	= 13.44 cfs
Storm frequency	= 10 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 38,505 cuft
Drainage area	= 5.610 ac	Curve number	= 76.8
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 16.30 min
Total precip.	= 4.09 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



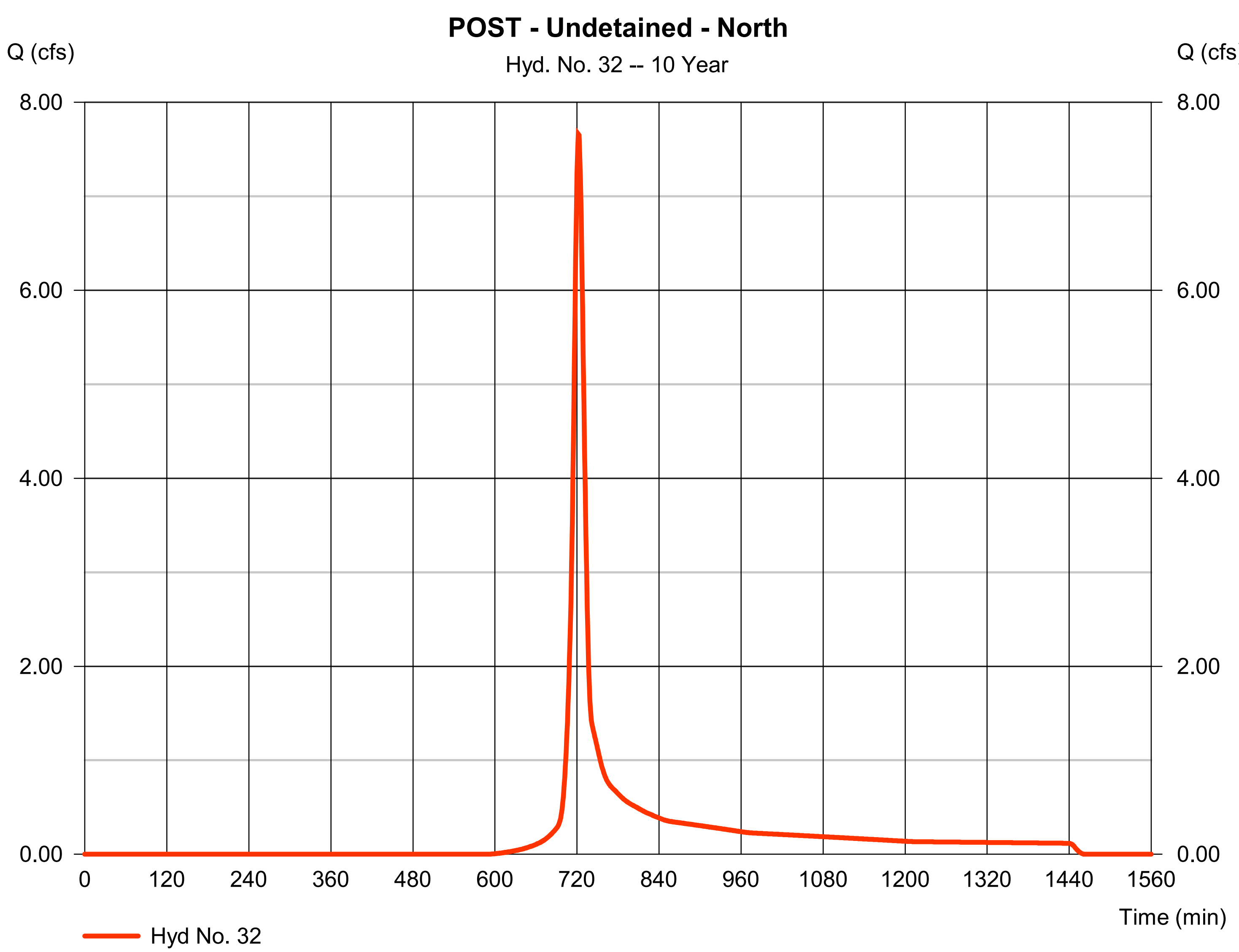
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Thursday, 08 / 5 / 2021

Hyd. No. 32

POST - Undetained - North

Hydrograph type	= SCS Runoff	Peak discharge	= 7.662 cfs
Storm frequency	= 10 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 20,818 cuft
Drainage area	= 3.420 ac	Curve number	= 74.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 14.70 min
Total precip.	= 4.09 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



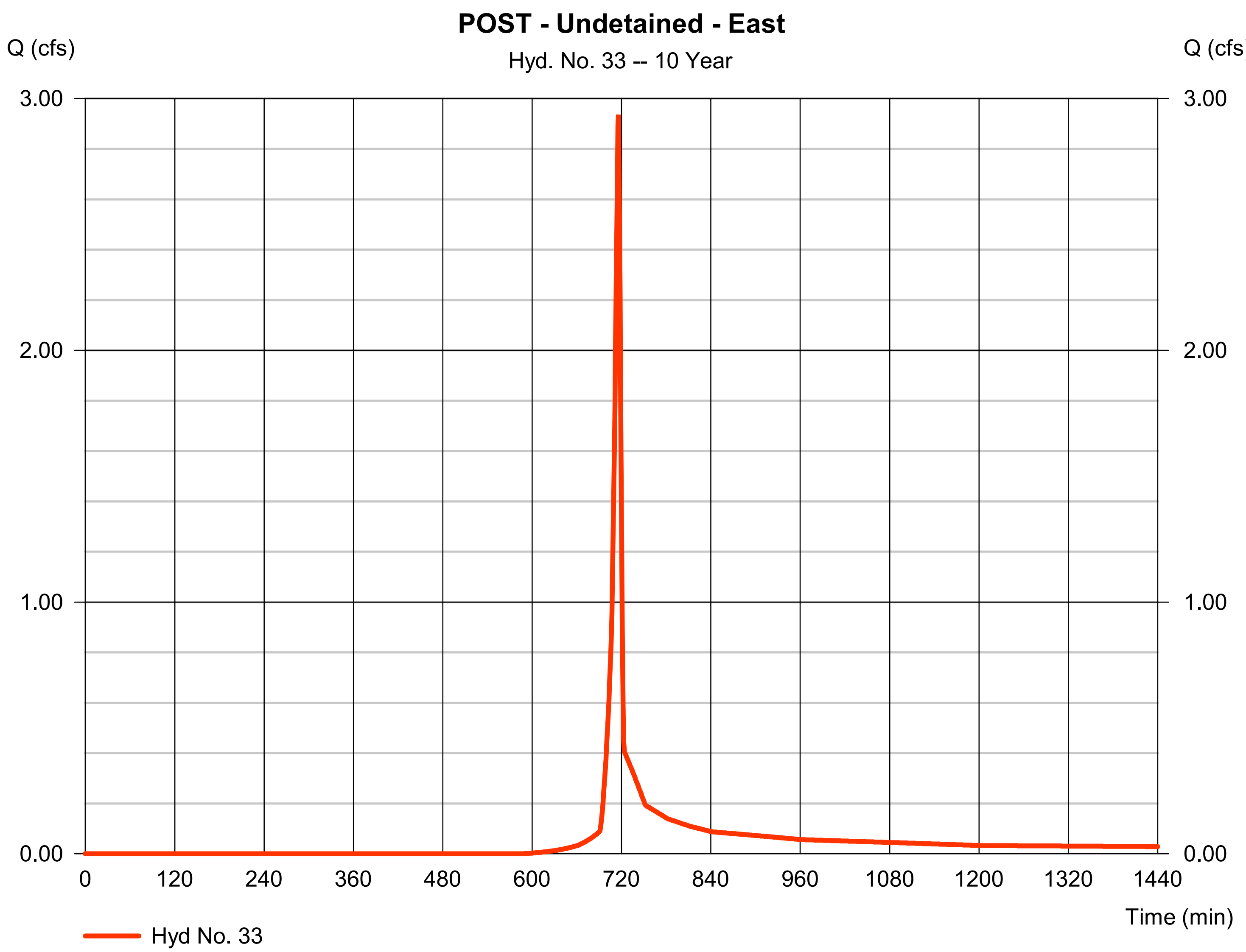
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 33

POST - Undetained - East

Hydrograph type	= SCS Runoff	Peak discharge	= 2.935 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 1 min	Hyd. volume	= 5,114 cuft
Drainage area	= 0.900 ac	Curve number	= 74.1
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 2.00 min
Total precip.	= 4.09 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



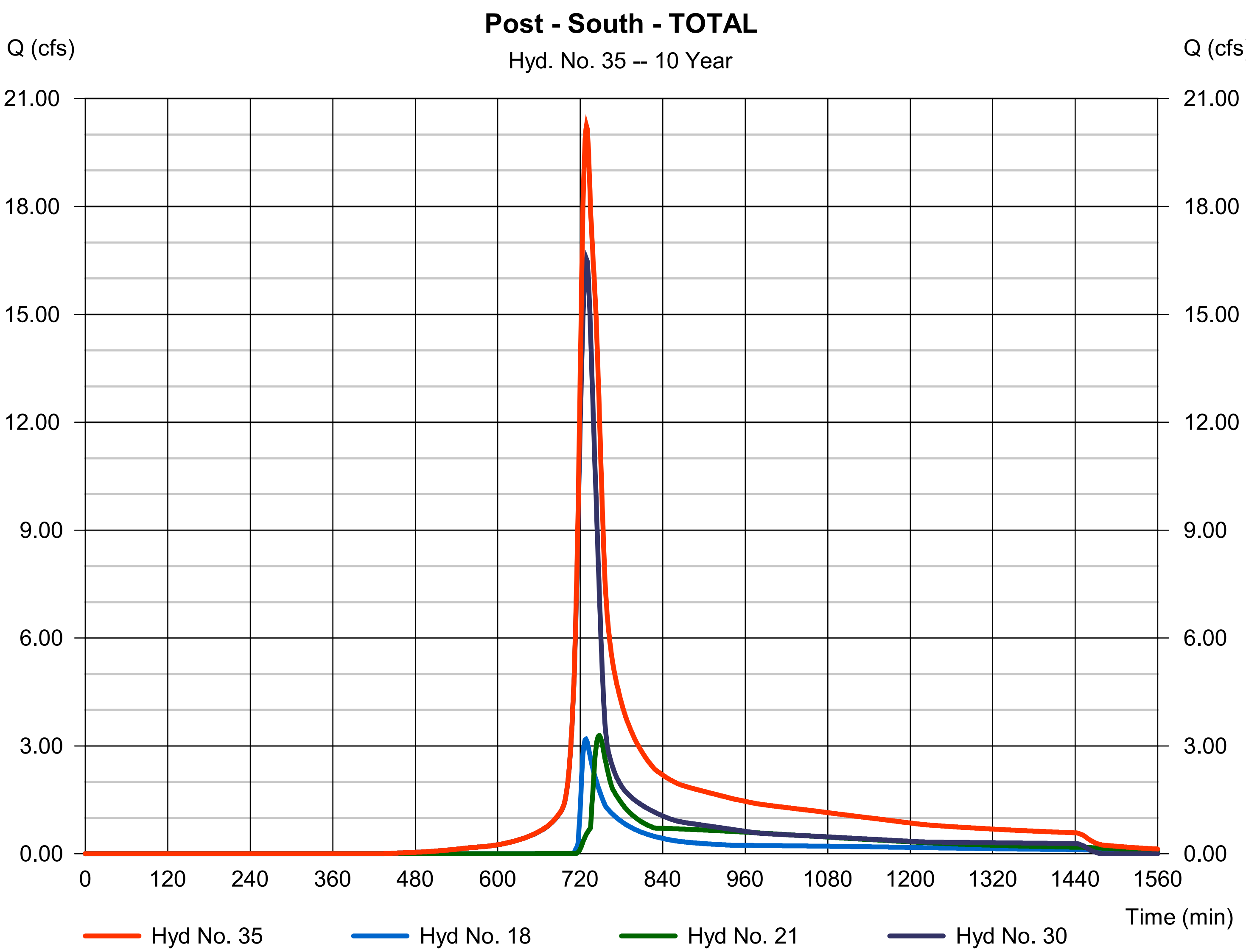
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 35

Post - South - TOTAL

Hydrograph type	= Combine	Peak discharge	= 20.24 cfs
Storm frequency	= 10 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 106,771 cuft
Inflow hyds.	= 18, 21, 30	Contrib. drain. area	= 6.960 ac



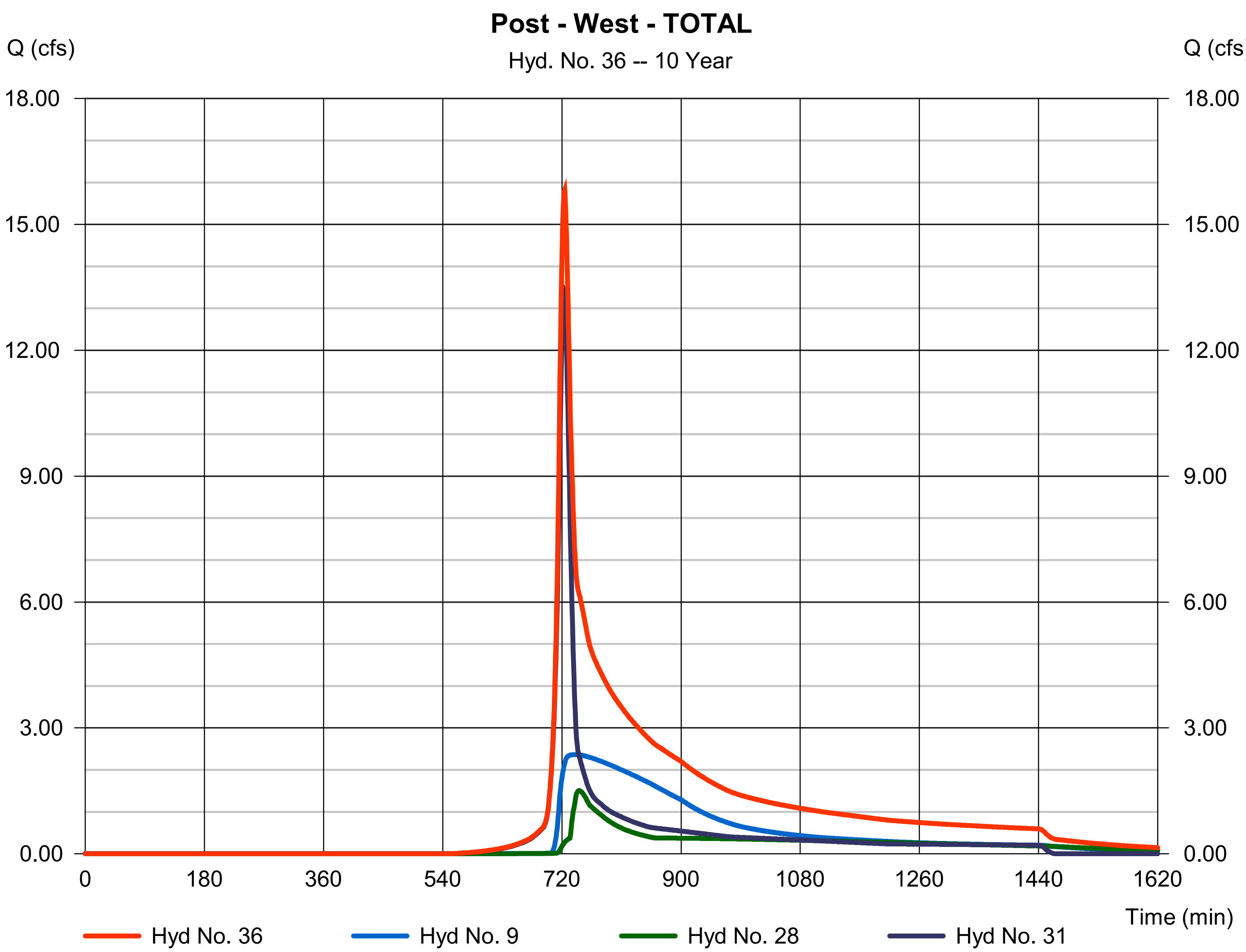
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 36

Post - West - TOTAL

Hydrograph type	= Combine	Peak discharge	= 15.83 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 96,654 cuft
Inflow hyds.	= 9, 28, 31	Contrib. drain. area	= 5.610 ac



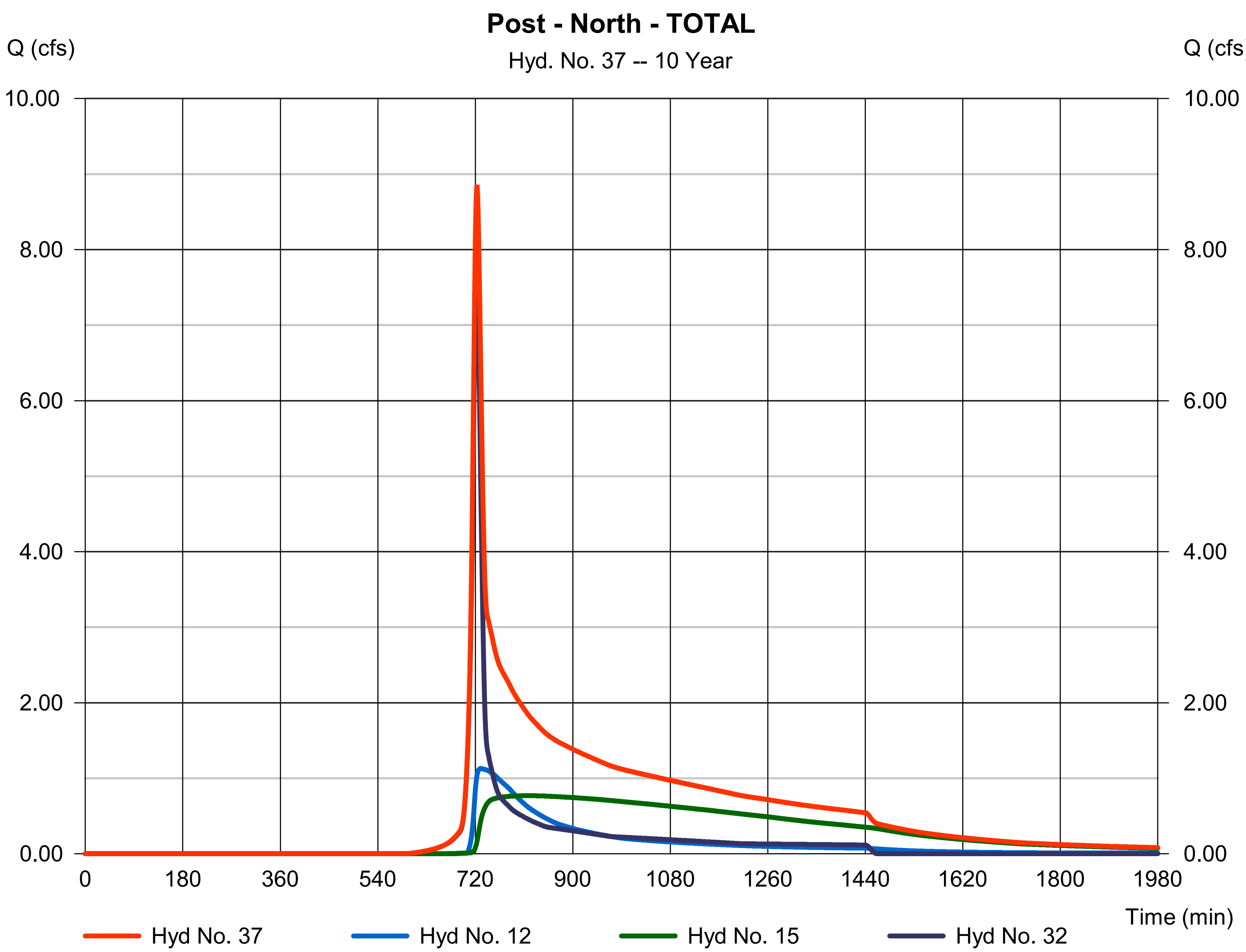
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Thursday, 08 / 5 / 2021

Hyd. No. 37

Post - North - TOTAL

Hydrograph type	= Combine	Peak discharge	= 8.861 cfs
Storm frequency	= 10 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 67,878 cuft
Inflow hyds.	= 12, 15, 32	Contrib. drain. area	= 3.420 ac



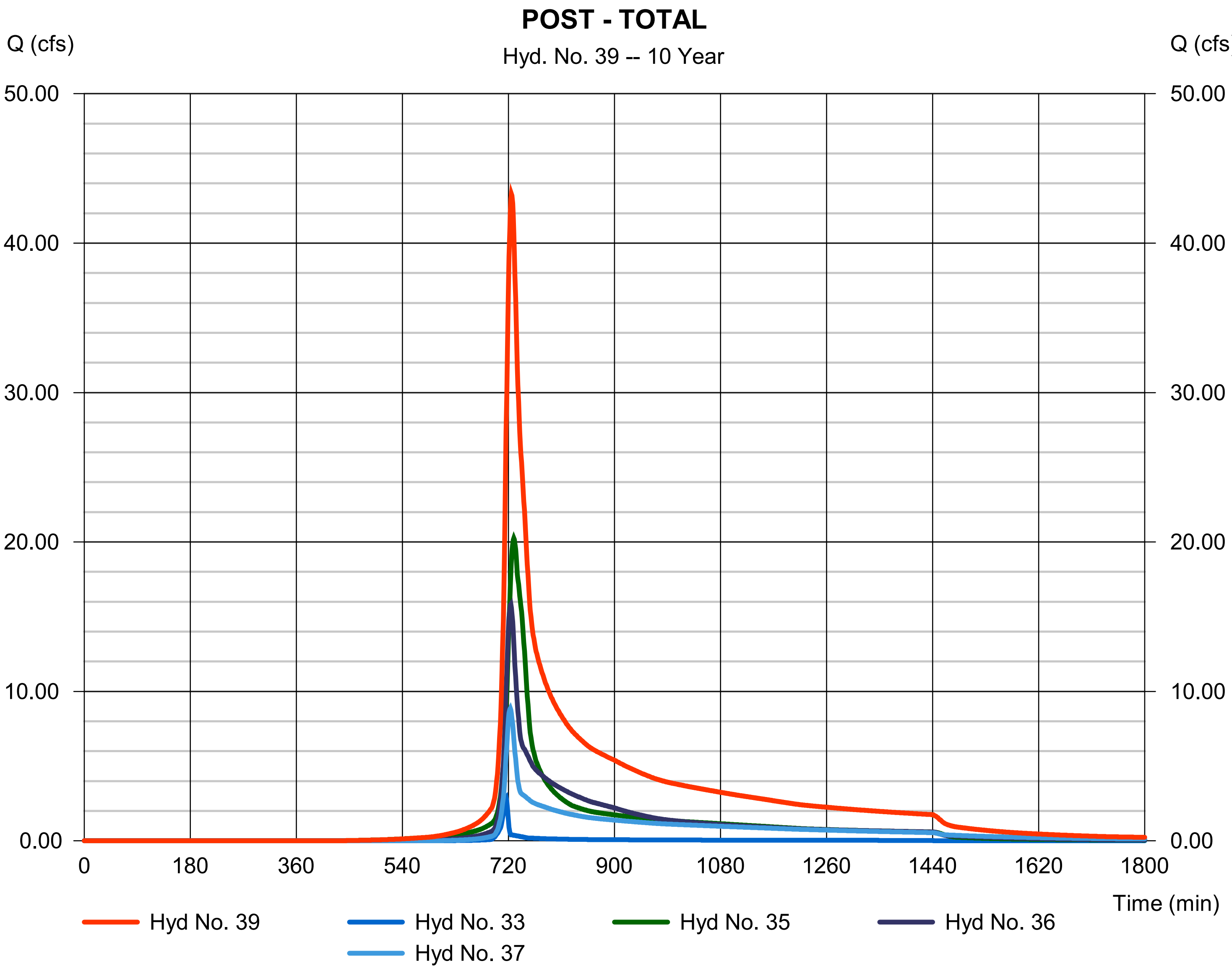
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 | Thursday, 08 / 5 / 2021

Hyd. No. 39

POST - TOTAL

Hydrograph type	= Combine	Peak discharge	= 43.29 cfs
Storm frequency	= 10 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 276,418 cuft
Inflow hyds.	= 33, 35, 36, 37	Contrib. drain. area	= 0.900 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

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	43.56	1	722	118,717	------	------	------	Pre Development - South
2	SCS Runoff	32.44	1	723	92,610	------	------	------	Pre Development - West
3	SCS Runoff	73.22	1	717	151,671	------	------	------	Pre Development - North
4	SCS Runoff	8.984	1	720	22,570	------	------	------	Pre Development - East
5	Combine	146.43	1	719	385,568	1, 2, 3, 4	------	------	Combined Pre Development
8	SCS Runoff	24.51	1	719	58,132	------	------	------	POST - Basin A
9	Reservoir	2.916	1	741	51,704	8	531.97	31,446	Post - Basin A - Route
11	SCS Runoff	9.323	1	718	20,573	------	------	------	POST - Basin B
12	Reservoir	1.484	1	730	18,633	11	532.83	10,539	Post - Basin B - Route
14	SCS Runoff	15.25	1	727	52,369	------	------	------	POST - Basin C
15	Reservoir	2.479	1	755	45,686	14	532.13	29,730	Post - Basin C - Route
17	SCS Runoff	11.88	1	719	27,693	------	------	------	POST - Basin D
18	Reservoir	6.094	1	726	24,091	17	535.31	11,840	Post - Basin D - Route
20	SCS Runoff	11.85	1	728	42,741	------	------	------	POST - Basin E
21	Reservoir	7.275	1	740	37,813	20	533.83	18,509	Post - Basin E - Route
23	SCS Runoff	3.174	1	720	8,055	------	------	------	POST - Basin F
24	Reservoir	1.708	1	727	8,051	23	535.07	1,864	Post - Basin F - Route
26	SCS Runoff	7.529	1	723	21,962	------	------	------	POST - Basin G
27	Combine	9.217	1	723	30,013	24, 26	------	------	F + G
28	Reservoir	4.659	1	735	26,620	27	533.37	13,561	Post - Basin G - Route
30	SCS Runoff	21.99	1	729	82,055	------	------	------	POST - Undetained - South
31	SCS Runoff	18.78	1	723	53,548	------	------	------	POST - Undetained - West
32	SCS Runoff	10.94	1	722	29,462	------	------	------	POST - Undetained - North
33	SCS Runoff	4.120	1	716	7,243	------	------	------	POST - Undetained - East
35	Combine	30.49	1	732	143,959	18, 21, 30,	------	------	Post - South - TOTAL
36	Combine	21.77	1	723	131,872	9, 28, 31,	------	------	Post - West - TOTAL
37	Combine	12.72	1	723	93,781	12, 15, 32,	------	------	Post - North - TOTAL
39	Combine	61.62	1	725	376,854	33, 35, 36, 37,	------	------	POST - TOTAL

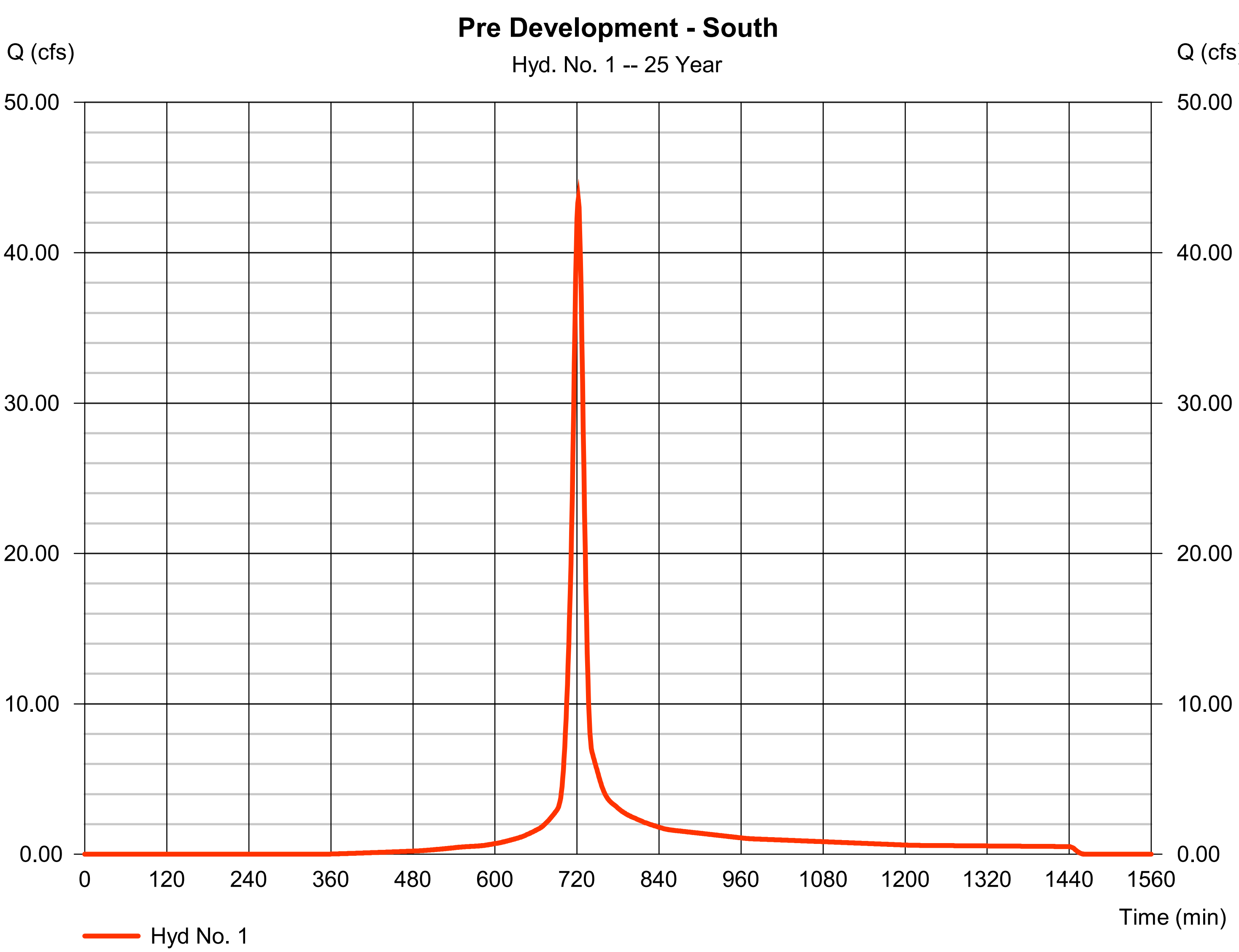
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Thursday, 08 / 5 / 2021

Hyd. No. 1

Pre Development - South

Hydrograph type	= SCS Runoff	Peak discharge	= 43.56 cfs
Storm frequency	= 25 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 118,717 cuft
Drainage area	= 9.910 ac	Curve number	= 84.4
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 13.60 min
Total precip.	= 4.99 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



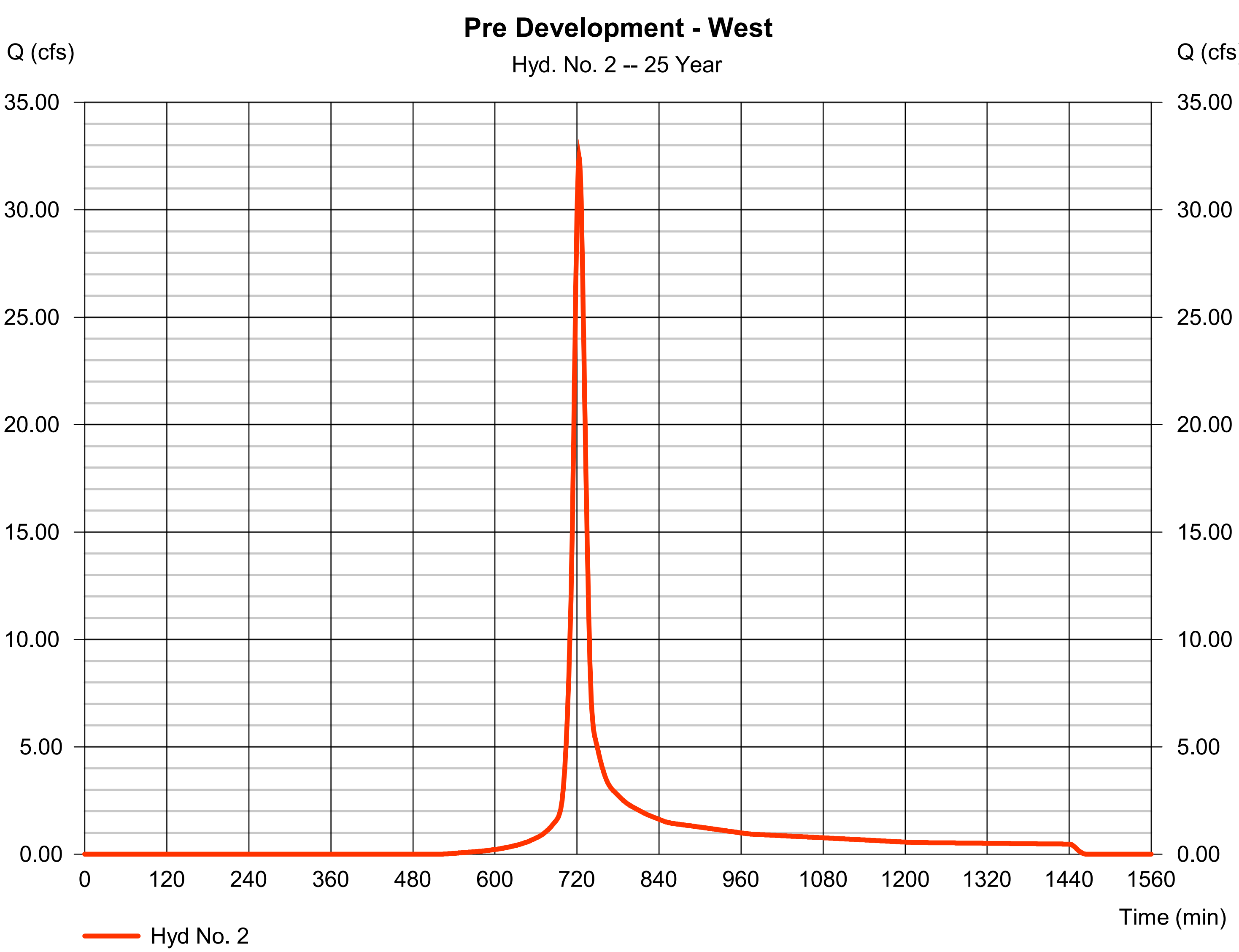
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 2

Pre Development - West

Hydrograph type	= SCS Runoff	Peak discharge	= 32.44 cfs
Storm frequency	= 25 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 92,610 cuft
Drainage area	= 10.250 ac	Curve number	= 75.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 16.30 min
Total precip.	= 4.99 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



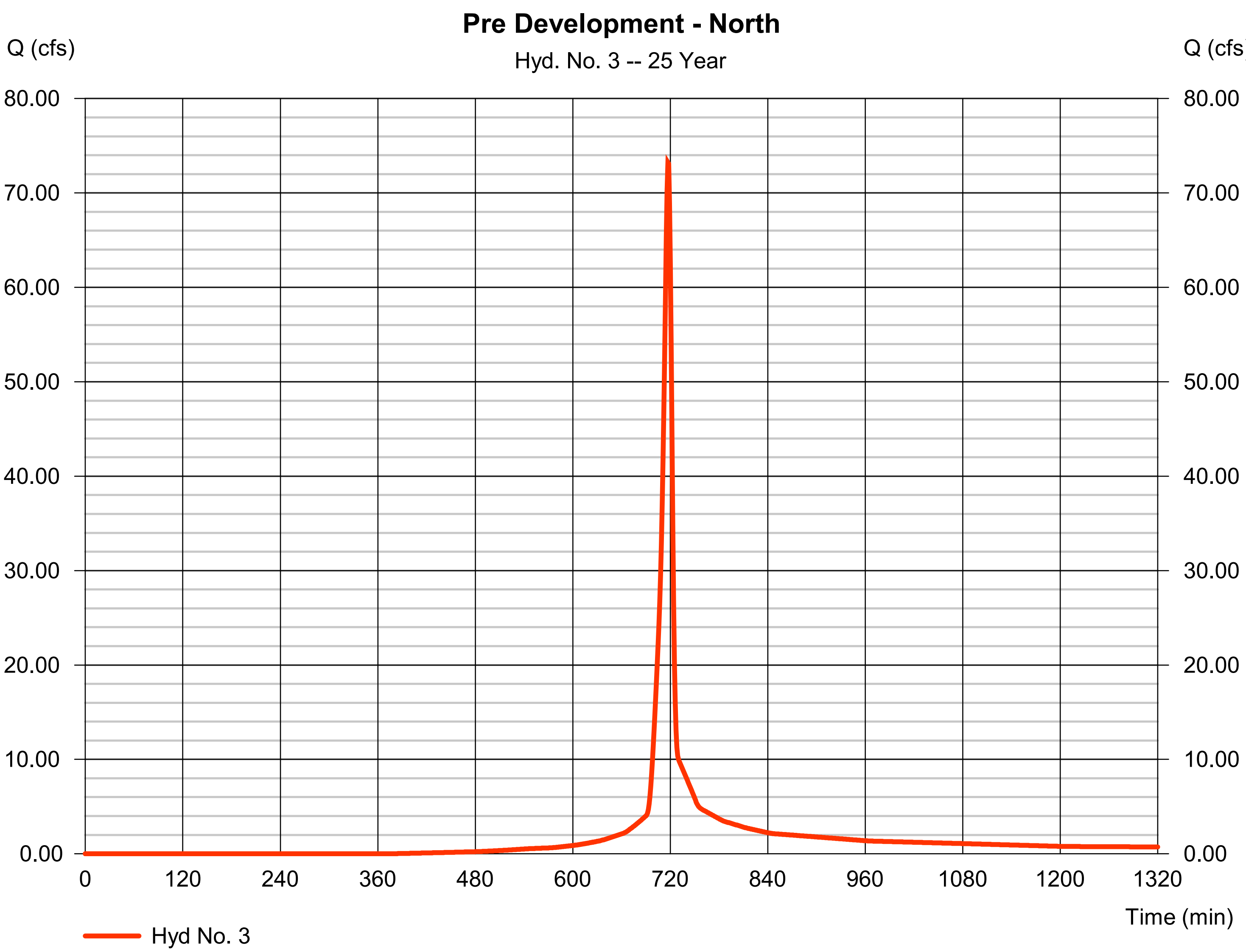
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 3

Pre Development - North

Hydrograph type	= SCS Runoff	Peak discharge	= 73.22 cfs
Storm frequency	= 25 yrs	Time to peak	= 717 min
Time interval	= 1 min	Hyd. volume	= 151,671 cuft
Drainage area	= 12.840 ac	Curve number	= 82.9
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.30 min
Total precip.	= 4.99 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



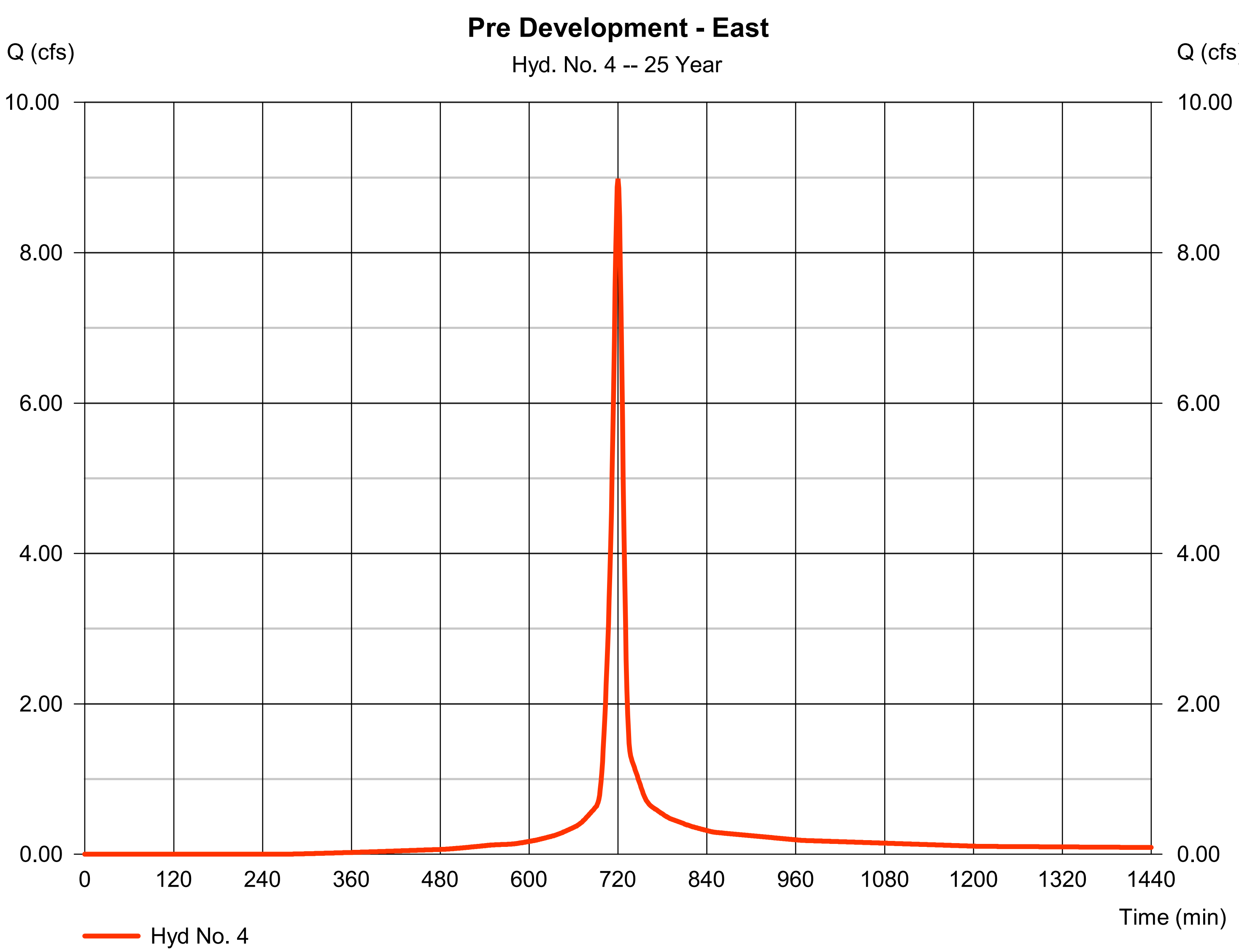
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 4

Pre Development - East

Hydrograph type	= SCS Runoff	Peak discharge	= 8.984 cfs
Storm frequency	= 25 yrs	Time to peak	= 720 min
Time interval	= 1 min	Hyd. volume	= 22,570 cuft
Drainage area	= 1.660 ac	Curve number	= 88.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 11.20 min
Total precip.	= 4.99 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



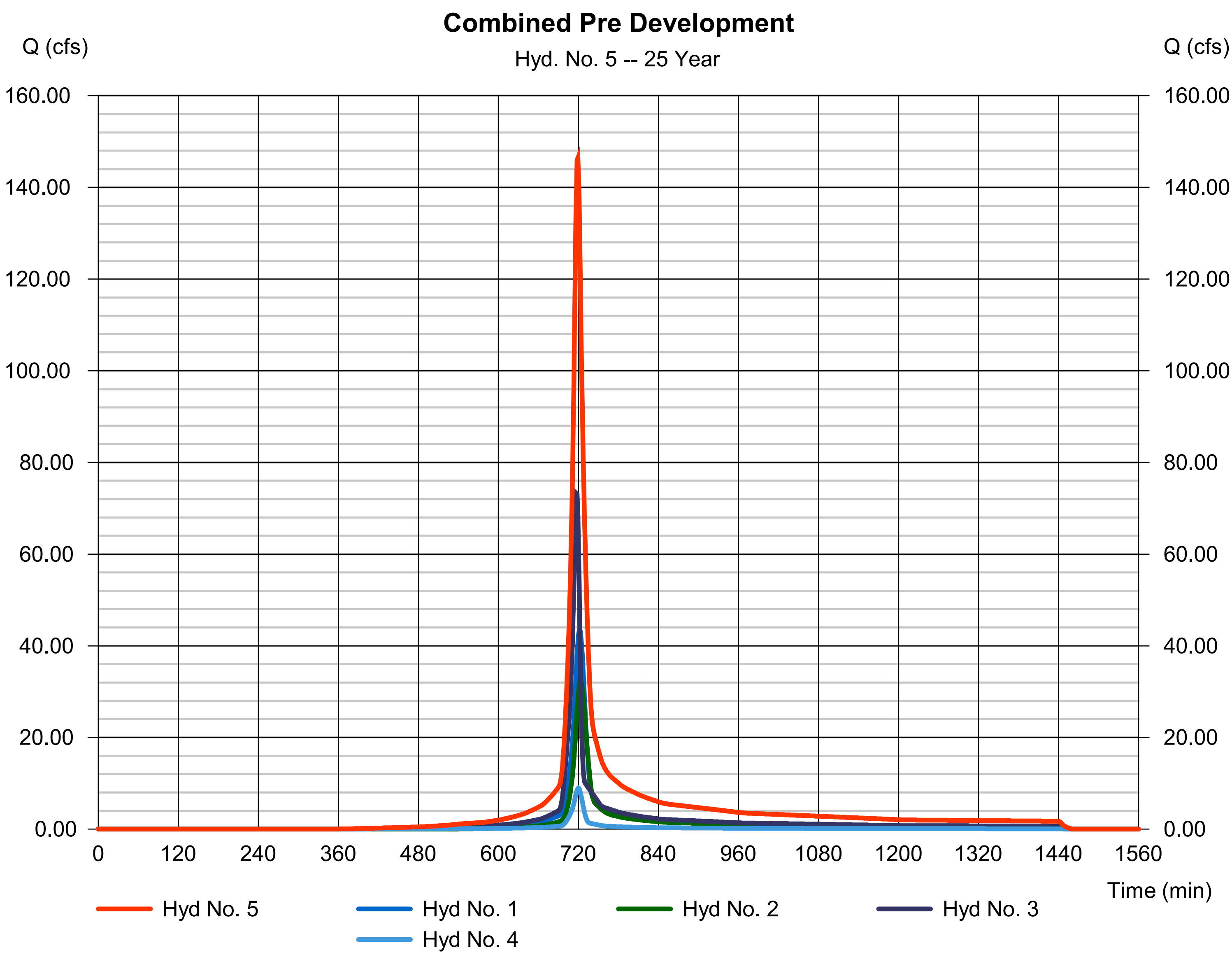
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 5

Combined Pre Development

Hydrograph type	= Combine	Peak discharge	= 146.43 cfs
Storm frequency	= 25 yrs	Time to peak	= 719 min
Time interval	= 1 min	Hyd. volume	= 385,568 cuft
Inflow hyds.	= 1, 2, 3, 4	Contrib. drain. area	= 34.660 ac



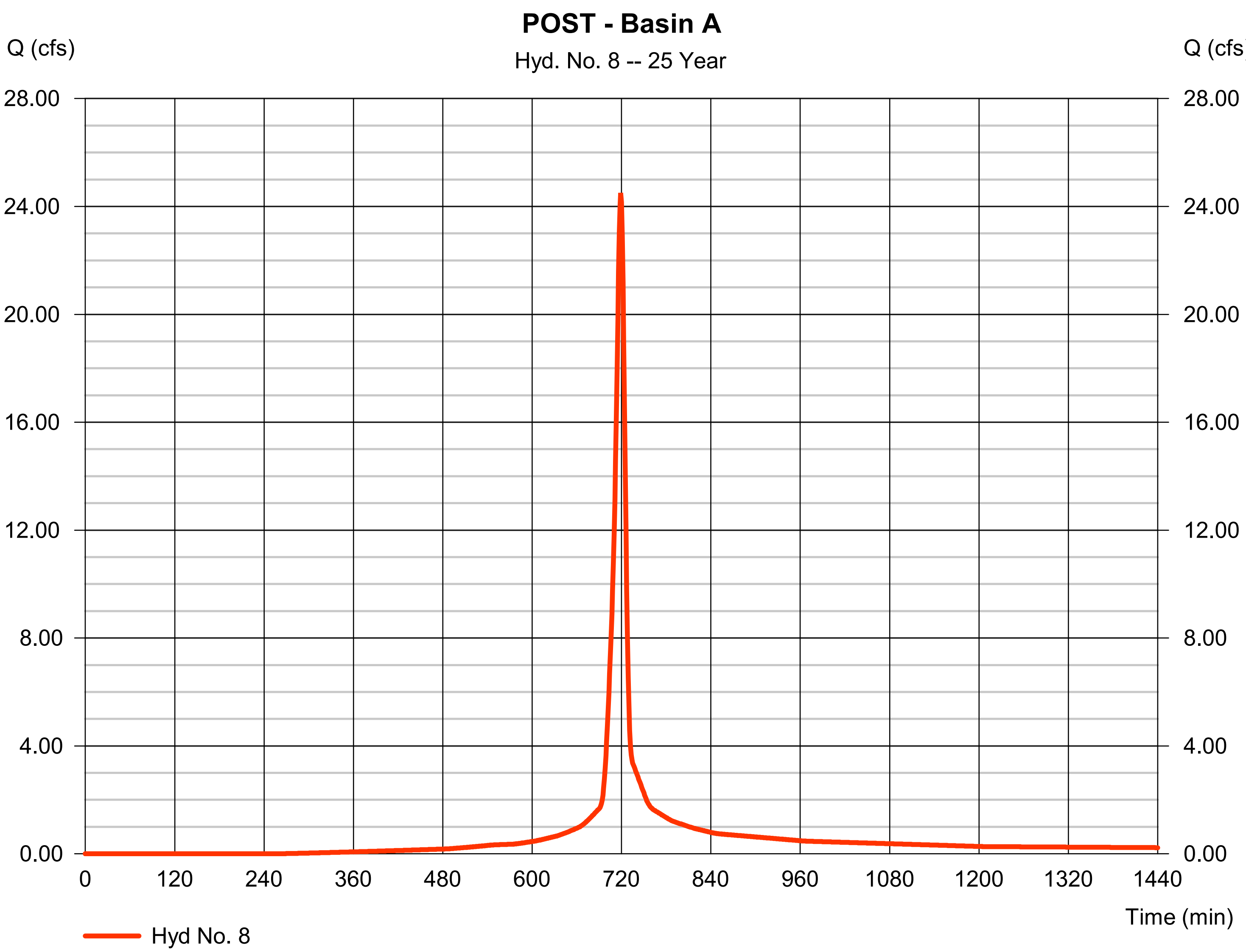
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 8

POST - Basin A

Hydrograph type	= SCS Runoff	Peak discharge	= 24.51 cfs
Storm frequency	= 25 yrs	Time to peak	= 719 min
Time interval	= 1 min	Hyd. volume	= 58,132 cuft
Drainage area	= 4.280 ac	Curve number	= 88.8
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.10 min
Total precip.	= 4.99 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

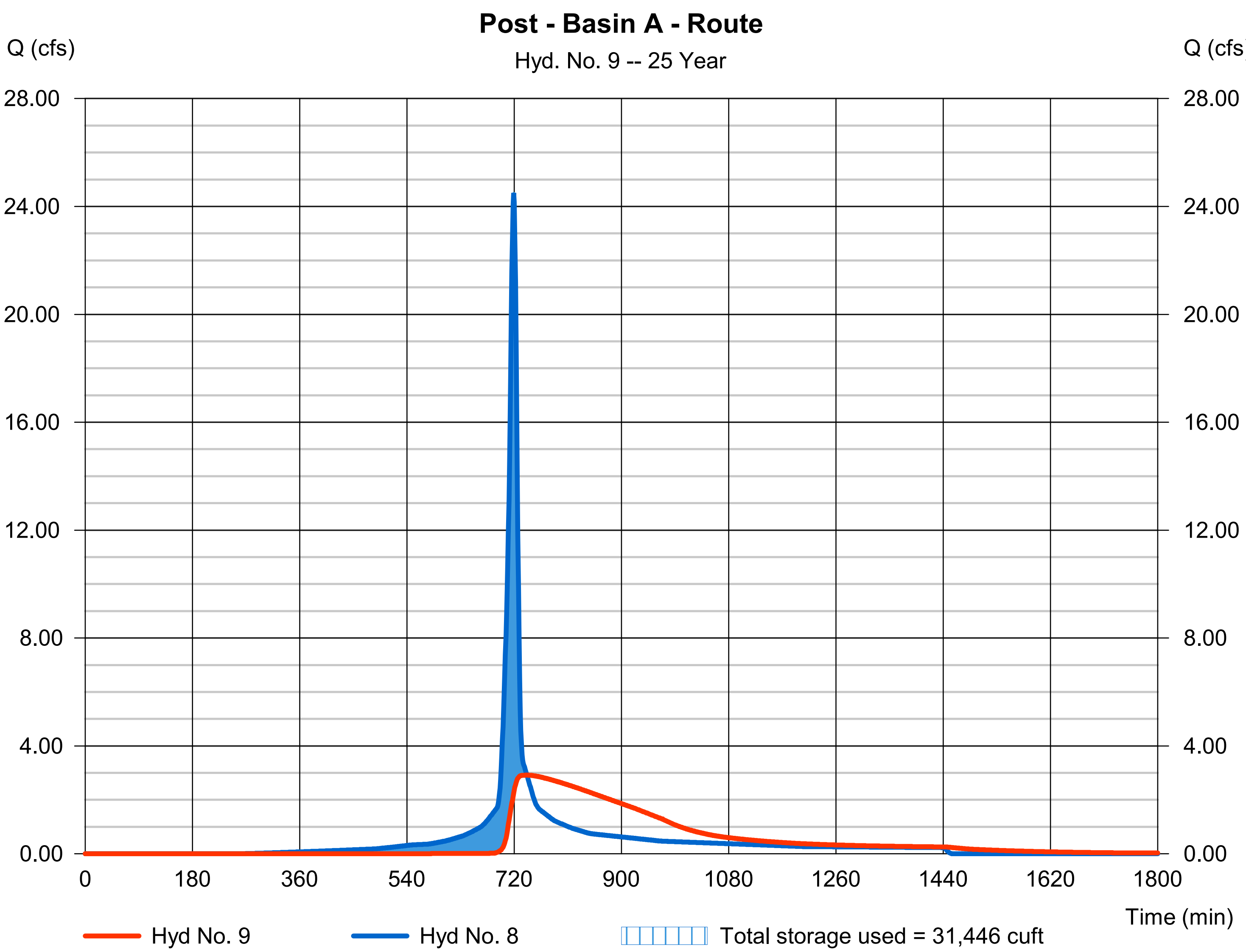
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 9

Post - Basin A - Route

Hydrograph type	= Reservoir	Peak discharge	= 2.916 cfs
Storm frequency	= 25 yrs	Time to peak	= 741 min
Time interval	= 1 min	Hyd. volume	= 51,704 cuft
Inflow hyd. No.	= 8 - POST - Basin A	Max. Elevation	= 531.97 ft
Reservoir name	= Basin A	Max. Storage	= 31,446 cuft

Storage Indication method used.



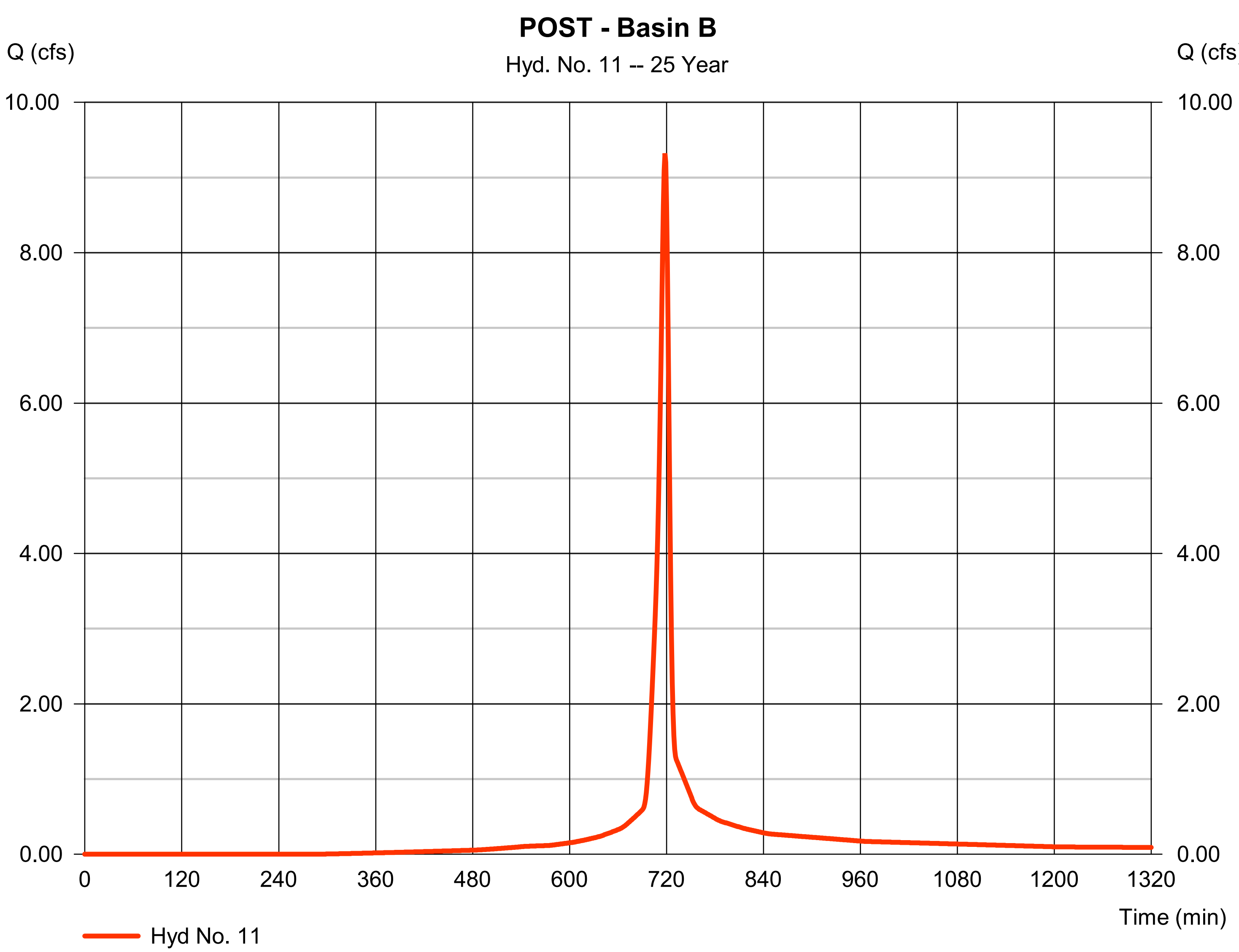
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Thursday, 08 / 5 / 2021

Hyd. No. 11

POST - Basin B

Hydrograph type	= SCS Runoff	Peak discharge	= 9.323 cfs
Storm frequency	= 25 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 20,573 cuft
Drainage area	= 1.620 ac	Curve number	= 87.3
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.90 min
Total precip.	= 4.99 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

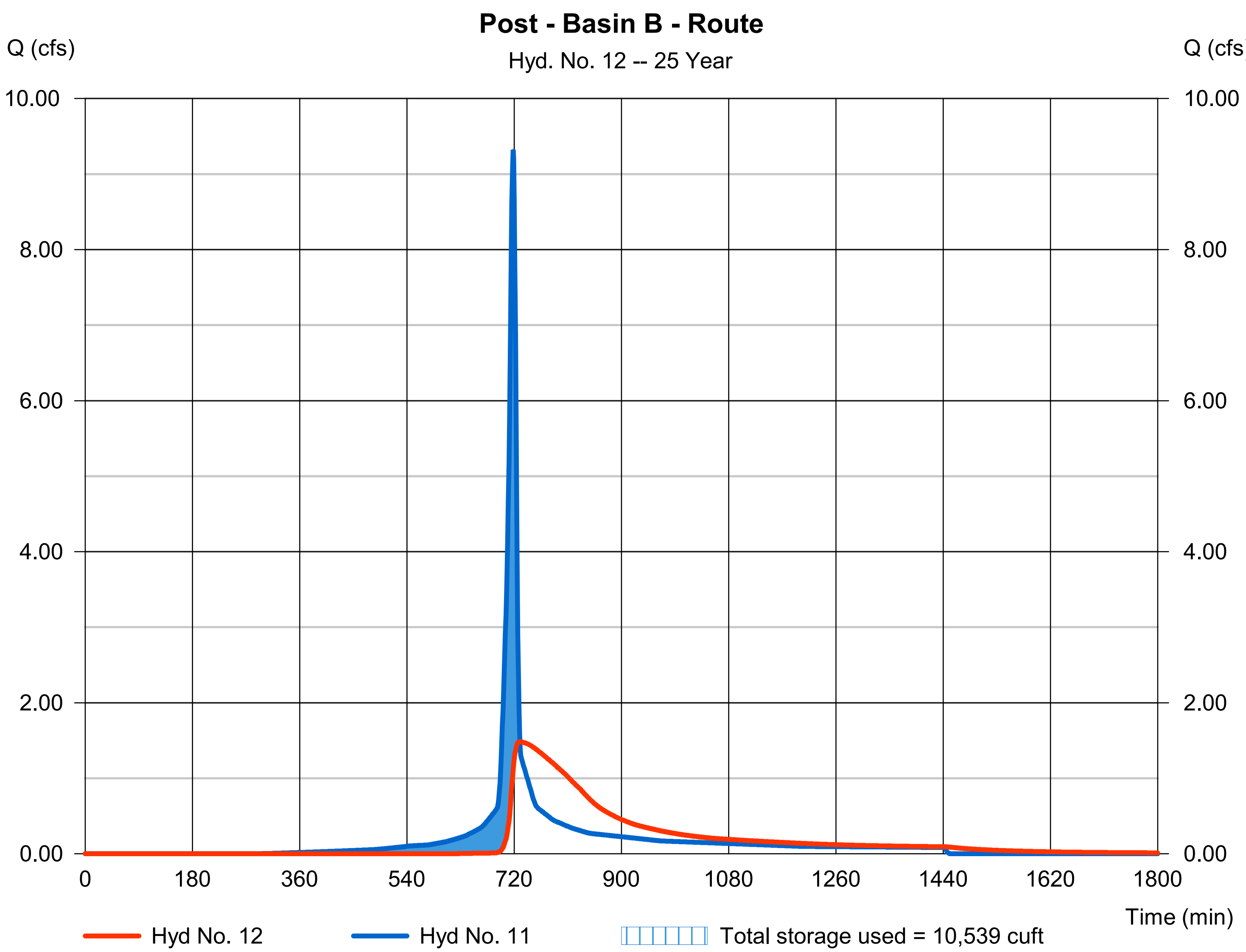
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 12

Post - Basin B - Route

Hydrograph type	= Reservoir	Peak discharge	= 1.484 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 1 min	Hyd. volume	= 18,633 cuft
Inflow hyd. No.	= 11 - POST - Basin B	Max. Elevation	= 532.83 ft
Reservoir name	= Basin B	Max. Storage	= 10,539 cuft

Storage Indication method used.



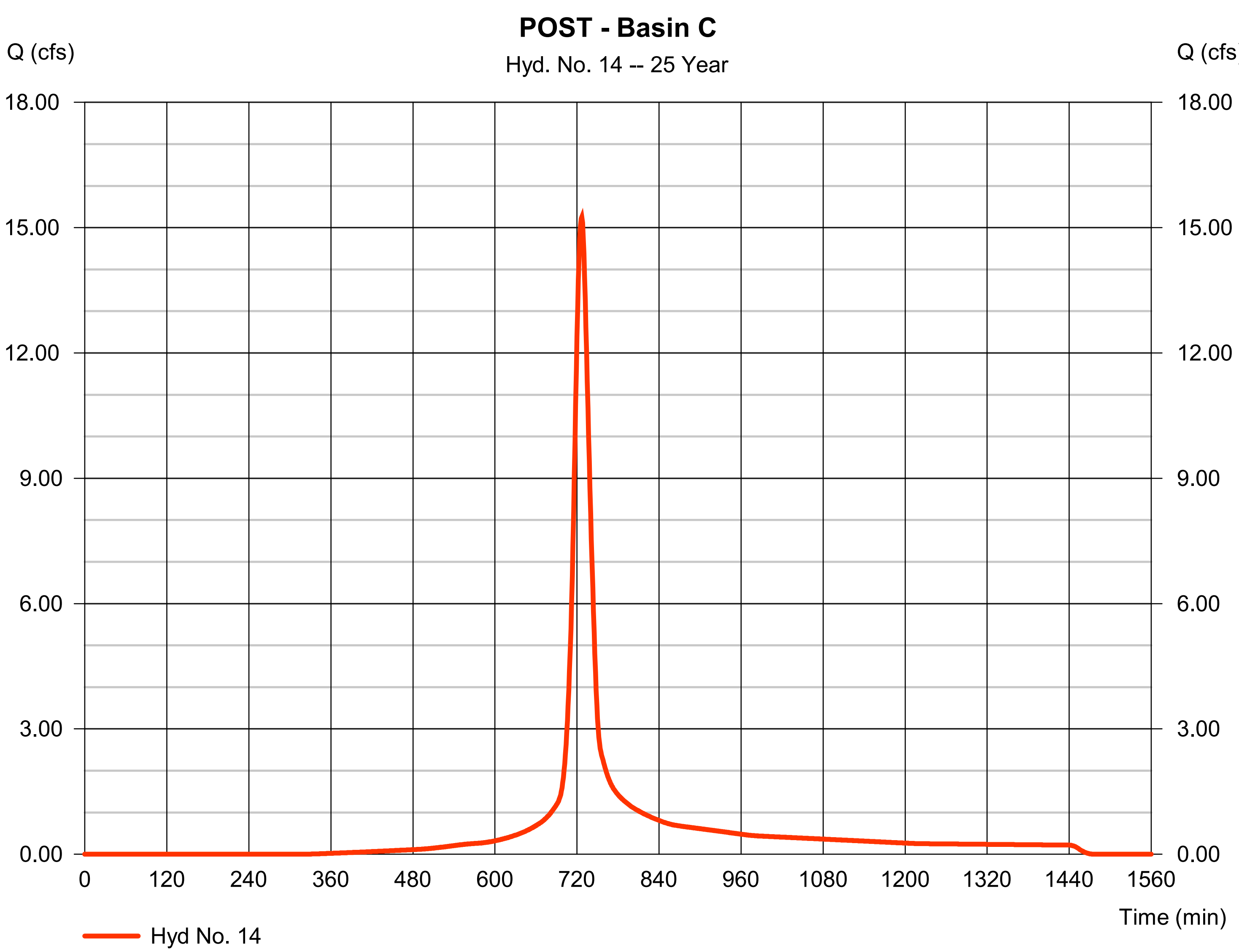
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 14

POST - Basin C

Hydrograph type	= SCS Runoff	Peak discharge	= 15.25 cfs
Storm frequency	= 25 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 52,369 cuft
Drainage area	= 4.210 ac	Curve number	= 86
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 23.00 min
Total precip.	= 4.99 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

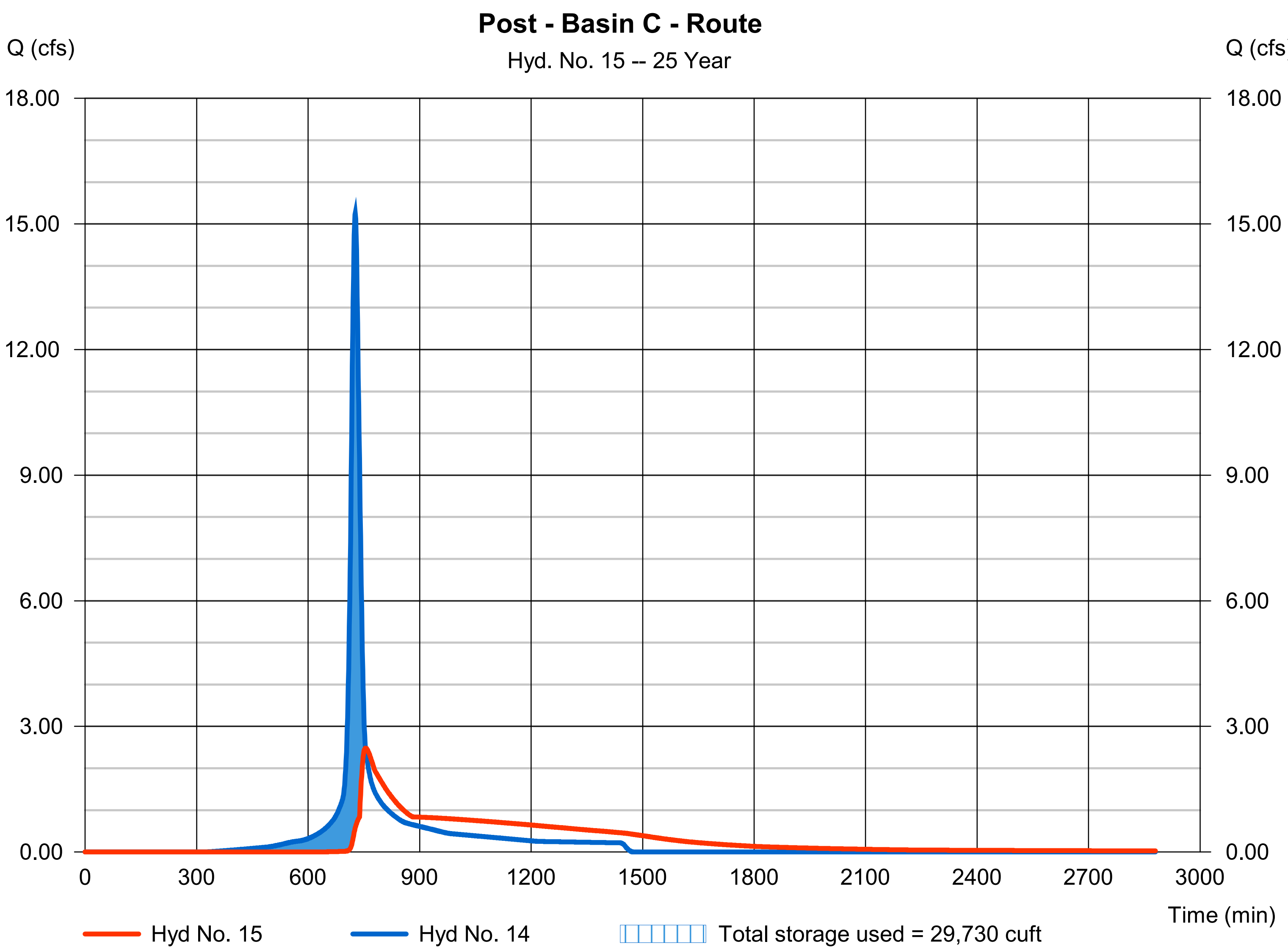
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 15

Post - Basin C - Route

Hydrograph type	= Reservoir	Peak discharge	= 2.479 cfs
Storm frequency	= 25 yrs	Time to peak	= 755 min
Time interval	= 1 min	Hyd. volume	= 45,686 cuft
Inflow hyd. No.	= 14 - POST - Basin C	Max. Elevation	= 532.13 ft
Reservoir name	= Basin C	Max. Storage	= 29,730 cuft

Storage Indication method used.



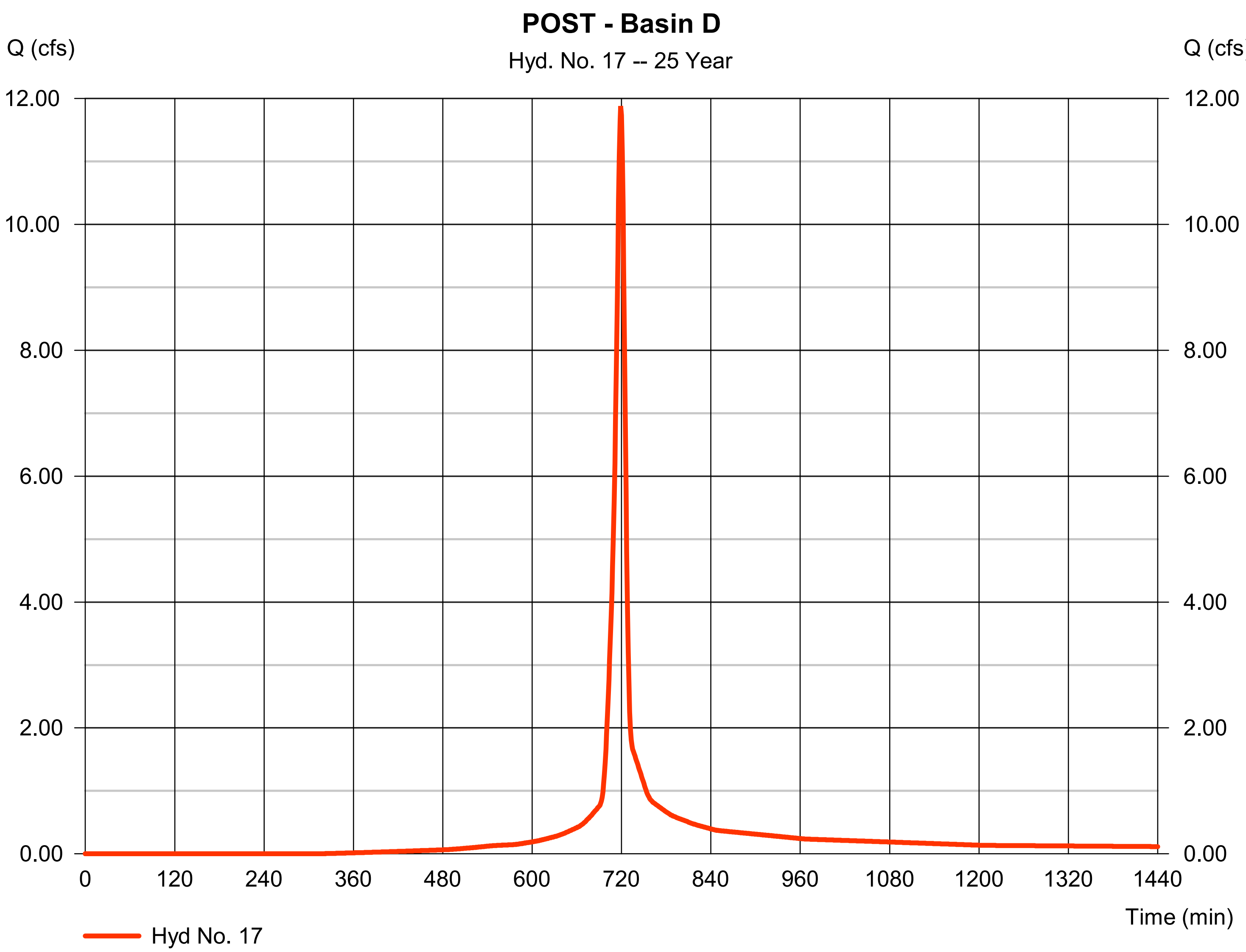
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 17

POST - Basin D

Hydrograph type	= SCS Runoff	Peak discharge	= 11.88 cfs
Storm frequency	= 25 yrs	Time to peak	= 719 min
Time interval	= 1 min	Hyd. volume	= 27,693 cuft
Drainage area	= 2.200 ac	Curve number	= 86.1
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.60 min
Total precip.	= 4.99 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

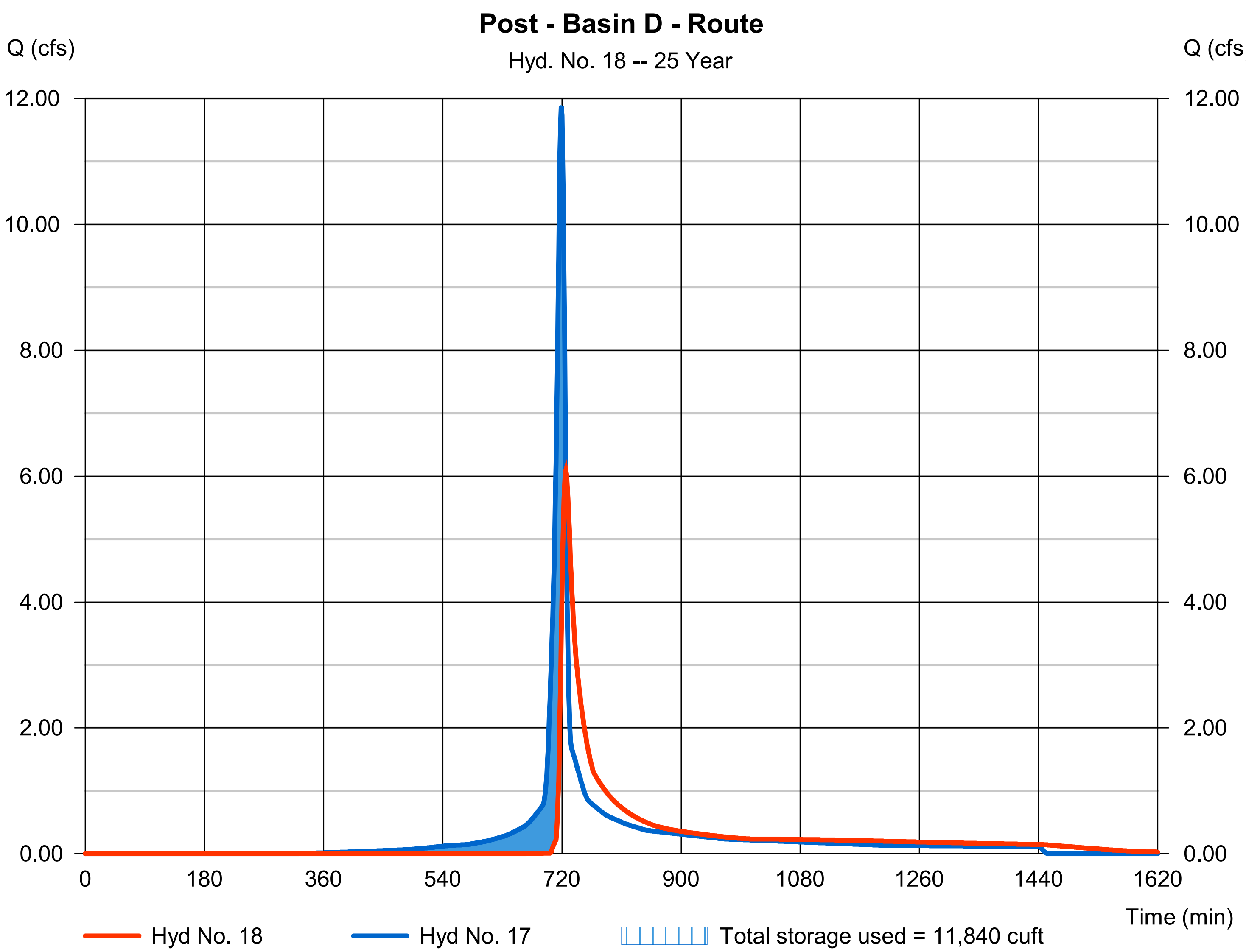
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Thursday, 08 / 5 / 2021

Hyd. No. 18

Post - Basin D - Route

Hydrograph type	= Reservoir	Peak discharge	= 6.094 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 24,091 cuft
Inflow hyd. No.	= 17 - POST - Basin D	Max. Elevation	= 535.31 ft
Reservoir name	= Basin D	Max. Storage	= 11,840 cuft

Storage Indication method used.



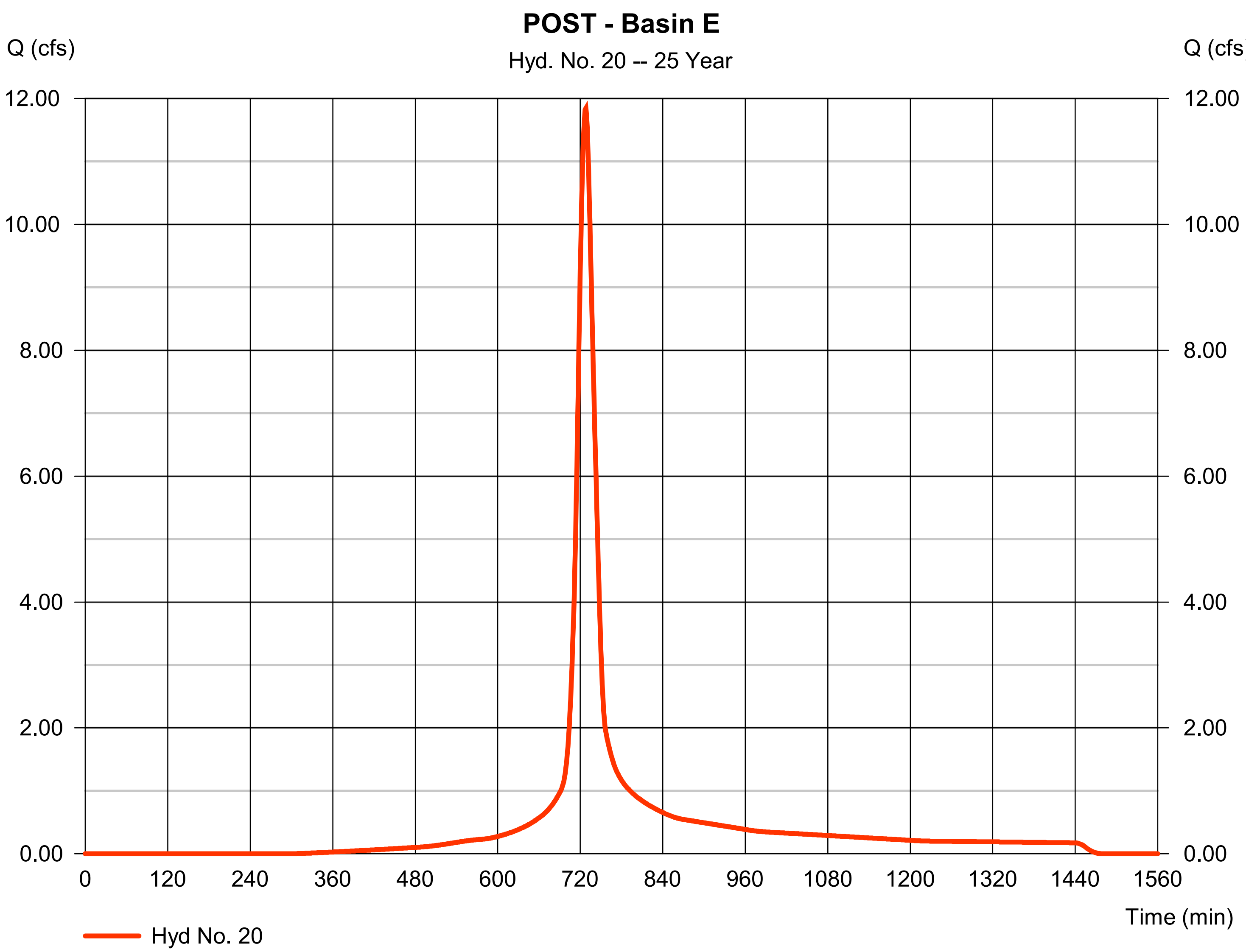
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 20

POST - Basin E

Hydrograph type	= SCS Runoff	Peak discharge	= 11.85 cfs
Storm frequency	= 25 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 42,741 cuft
Drainage area	= 3.300 ac	Curve number	= 87.1
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 25.30 min
Total precip.	= 4.99 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

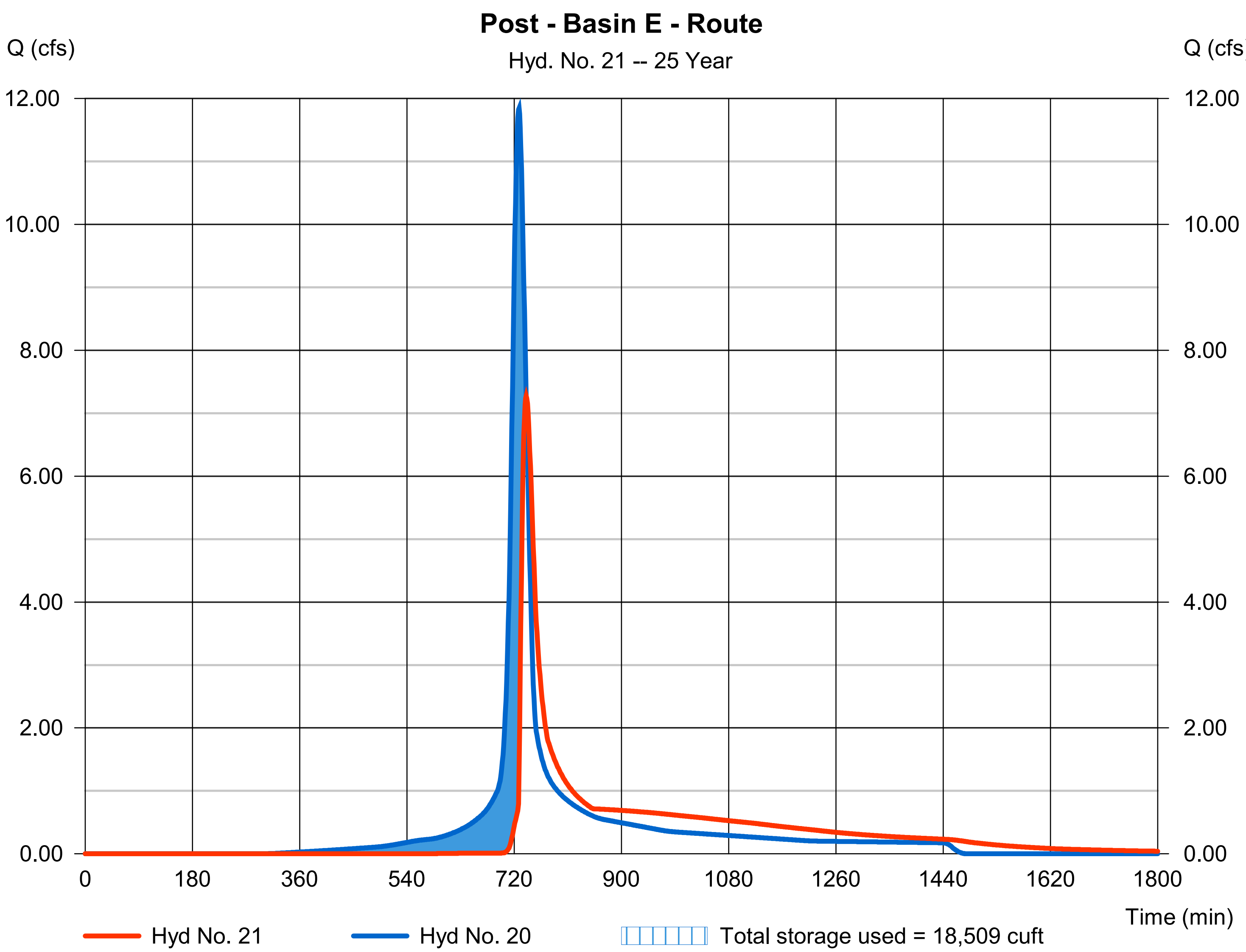
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 21

Post - Basin E - Route

Hydrograph type	= Reservoir	Peak discharge	= 7.275 cfs
Storm frequency	= 25 yrs	Time to peak	= 740 min
Time interval	= 1 min	Hyd. volume	= 37,813 cuft
Inflow hyd. No.	= 20 - POST - Basin E	Max. Elevation	= 533.83 ft
Reservoir name	= Basin E	Max. Storage	= 18,509 cuft

Storage Indication method used.



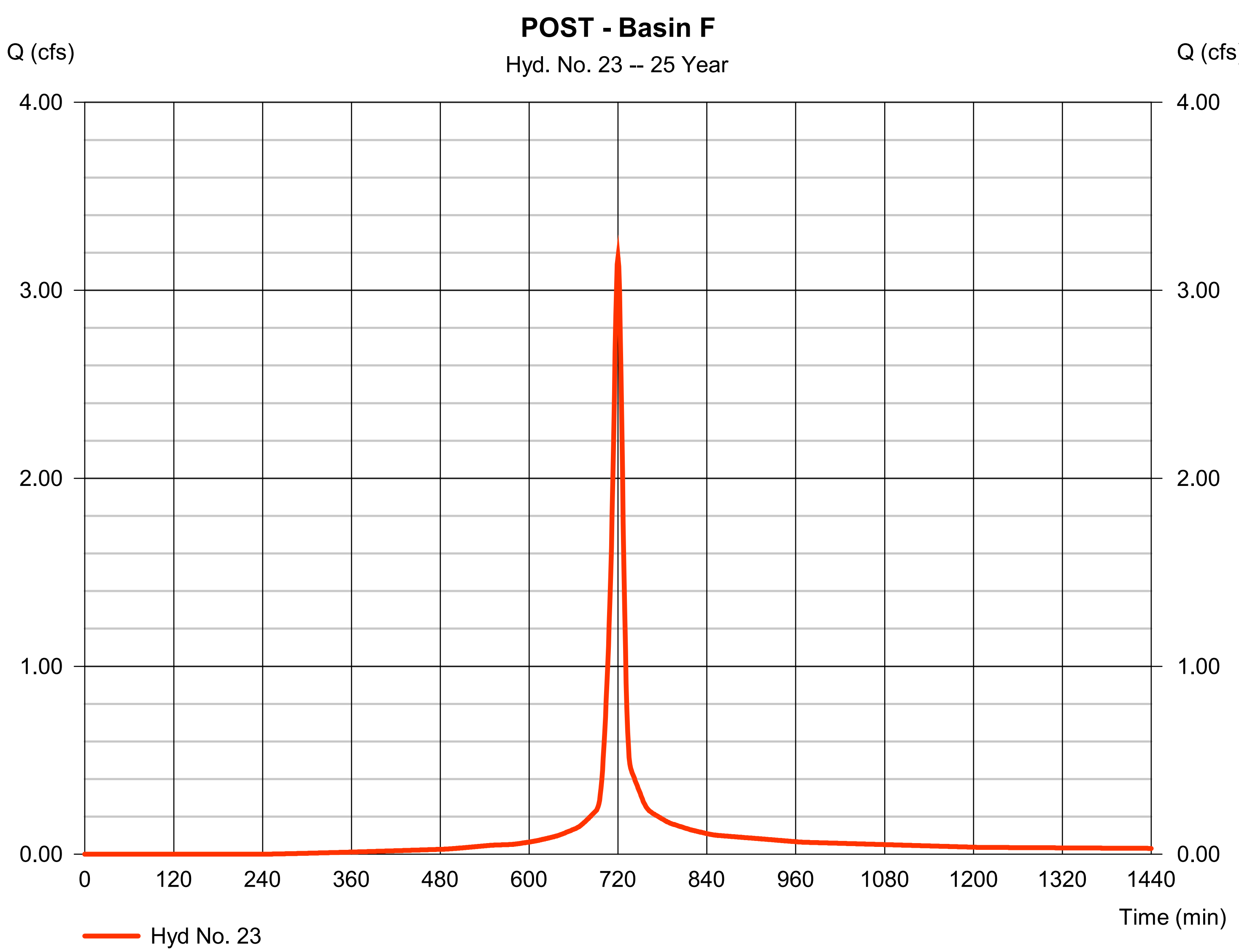
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 23

POST - Basin F

Hydrograph type	= SCS Runoff	Peak discharge	= 3.174 cfs
Storm frequency	= 25 yrs	Time to peak	= 720 min
Time interval	= 1 min	Hyd. volume	= 8,055 cuft
Drainage area	= 0.570 ac	Curve number	= 89.6
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 10.20 min
Total precip.	= 4.99 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

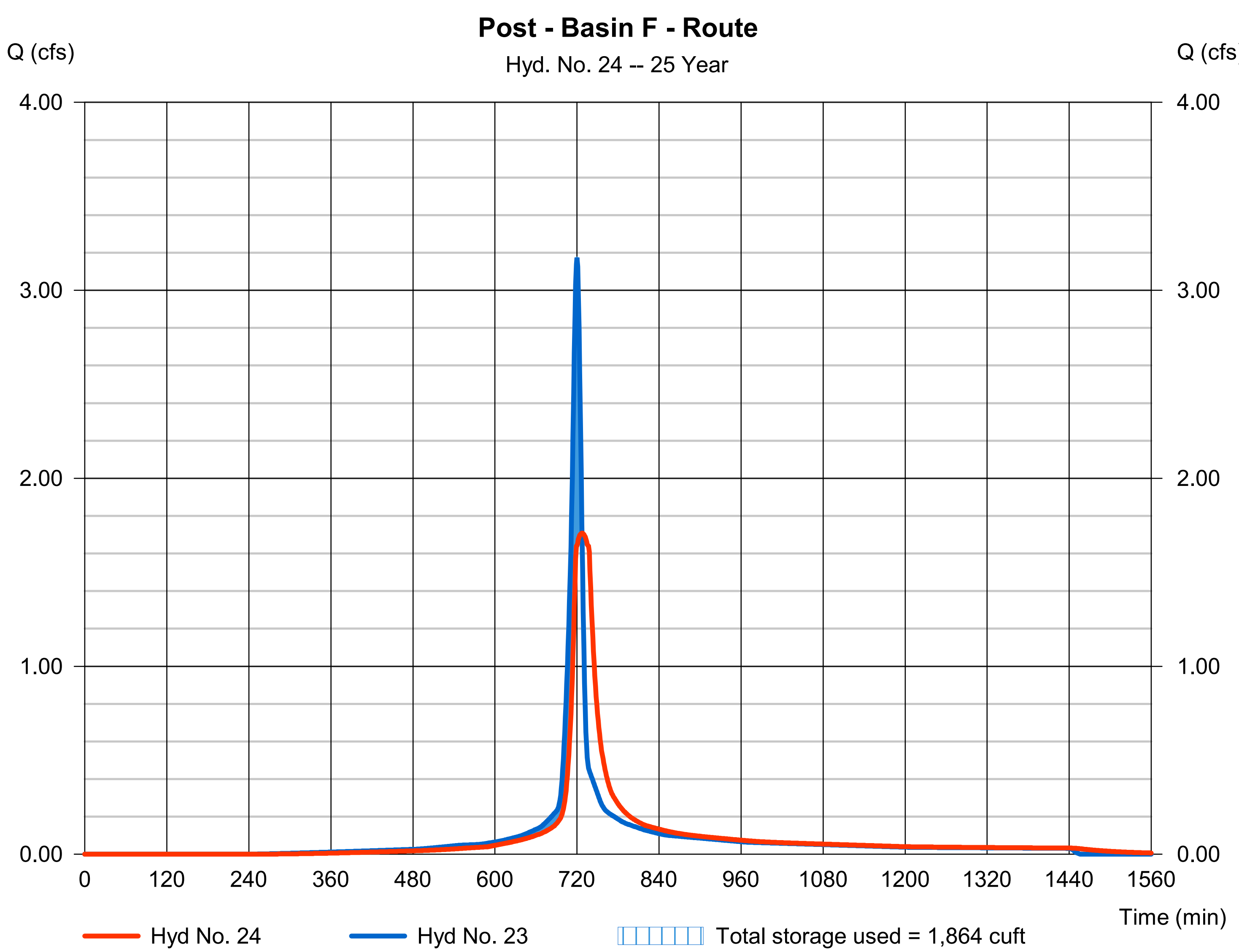
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 24

Post - Basin F - Route

Hydrograph type	= Reservoir	Peak discharge	= 1.708 cfs
Storm frequency	= 25 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 8,051 cuft
Inflow hyd. No.	= 23 - POST - Basin F	Max. Elevation	= 535.07 ft
Reservoir name	= Basin F	Max. Storage	= 1,864 cuft

Storage Indication method used.



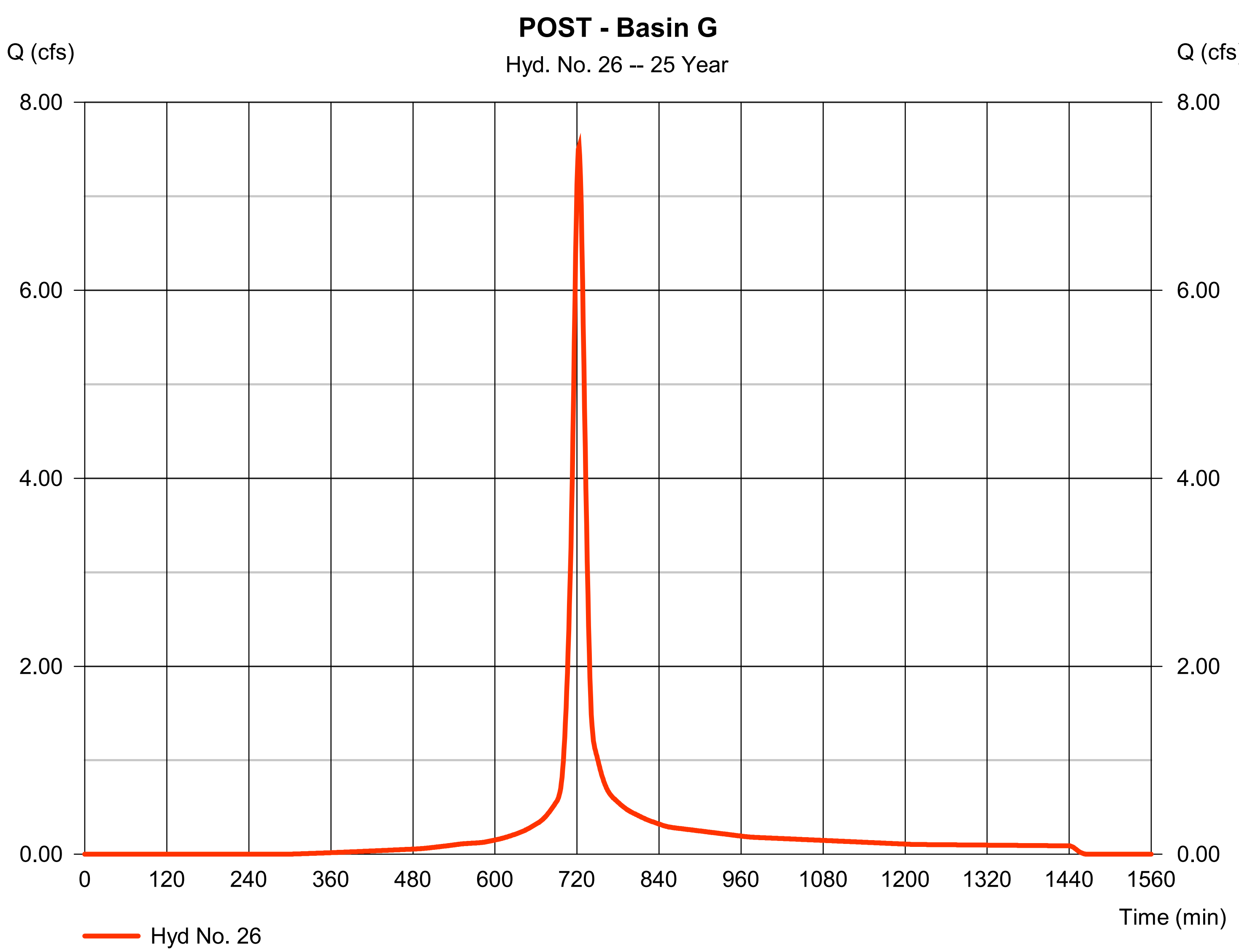
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 26

POST - Basin G

Hydrograph type	= SCS Runoff	Peak discharge	= 7.529 cfs
Storm frequency	= 25 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 21,962 cuft
Drainage area	= 1.670 ac	Curve number	= 87.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 15.80 min
Total precip.	= 4.99 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



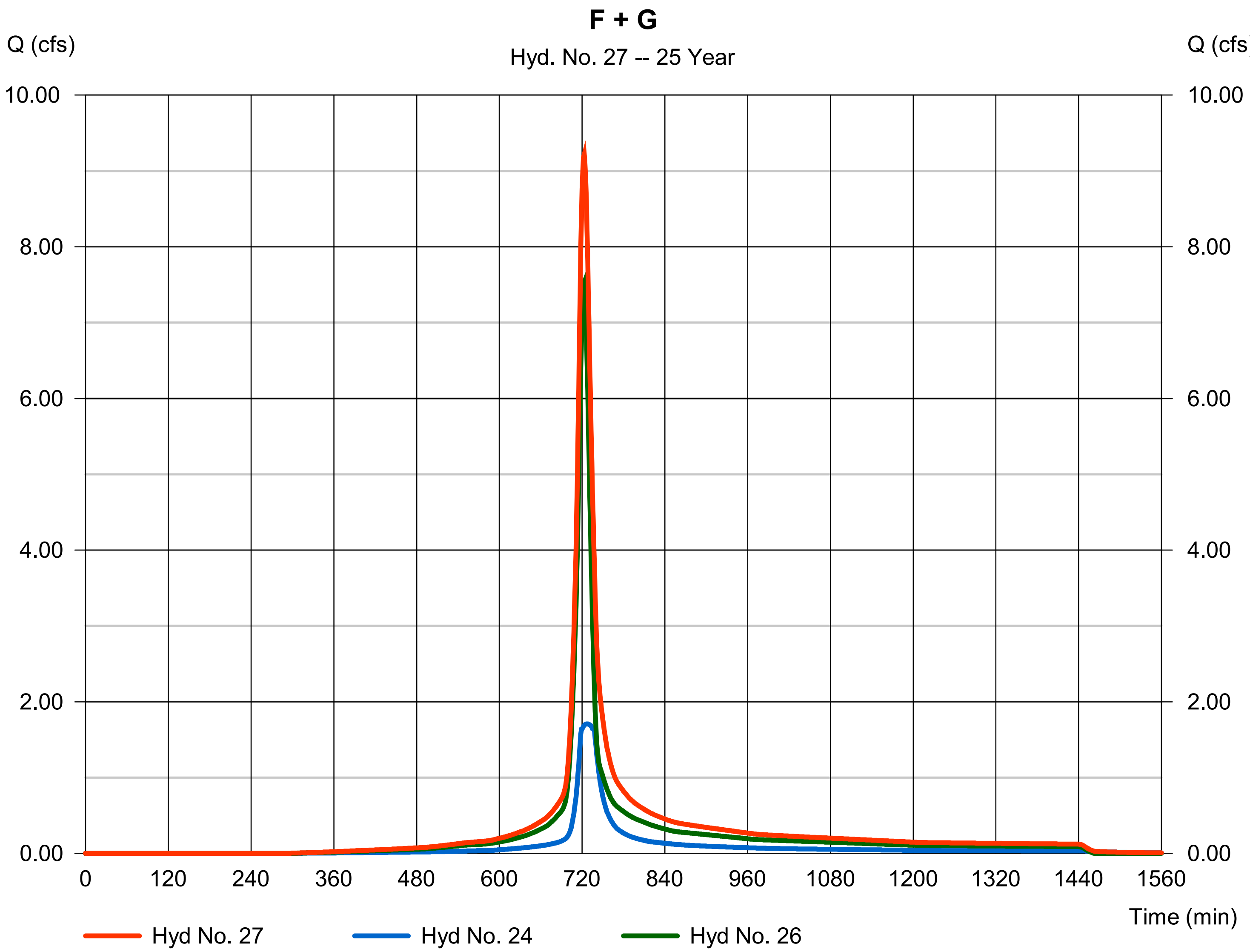
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 27

F + G

Hydrograph type	= Combine	Peak discharge	= 9.217 cfs
Storm frequency	= 25 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 30,013 cuft
Inflow hyds.	= 24, 26	Contrib. drain. area	= 1.670 ac



Hydrograph Report

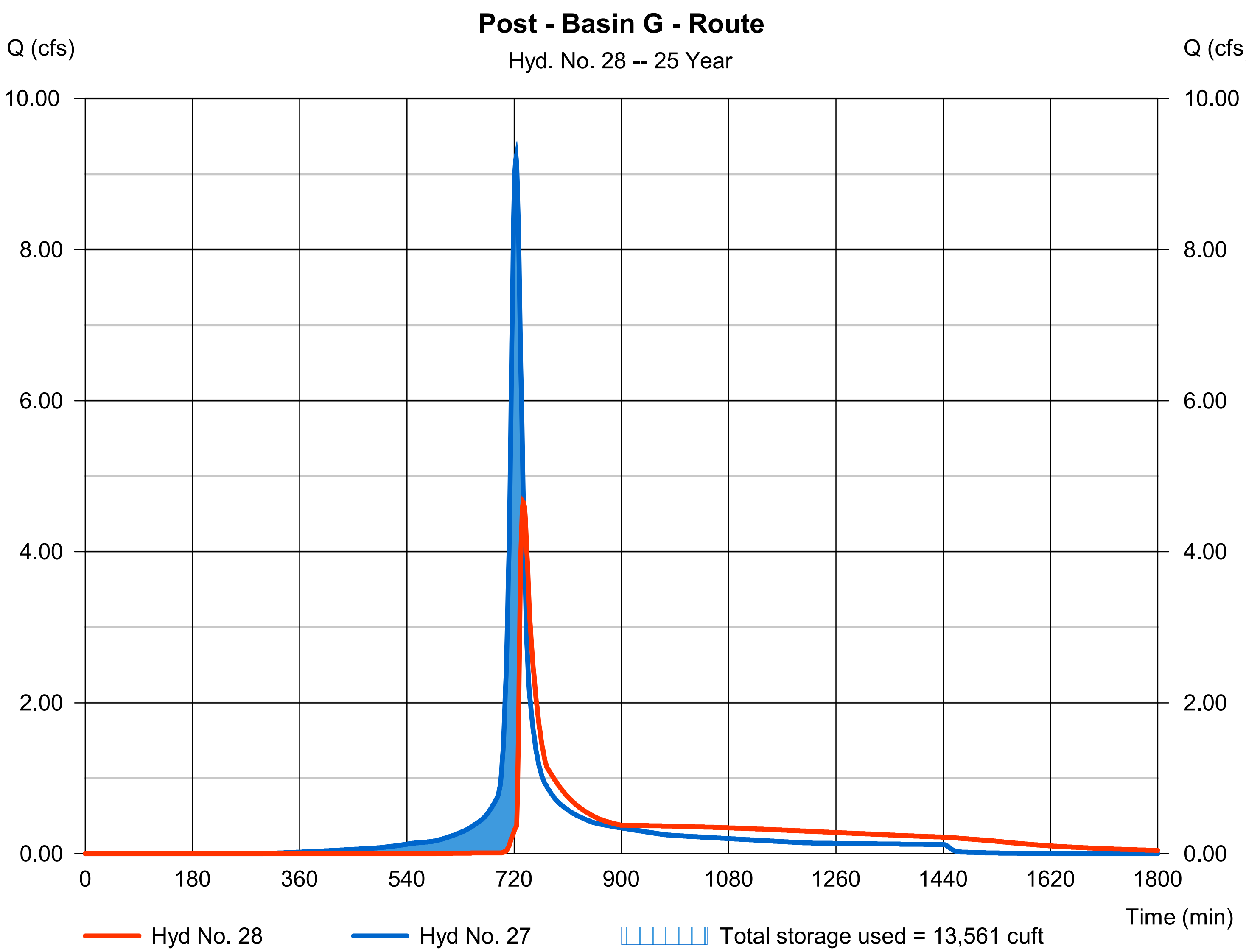
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 28

Post - Basin G - Route

Hydrograph type	= Reservoir	Peak discharge	= 4.659 cfs
Storm frequency	= 25 yrs	Time to peak	= 735 min
Time interval	= 1 min	Hyd. volume	= 26,620 cuft
Inflow hyd. No.	= 27 - F + G	Max. Elevation	= 533.37 ft
Reservoir name	= Basin G	Max. Storage	= 13,561 cuft

Storage Indication method used.



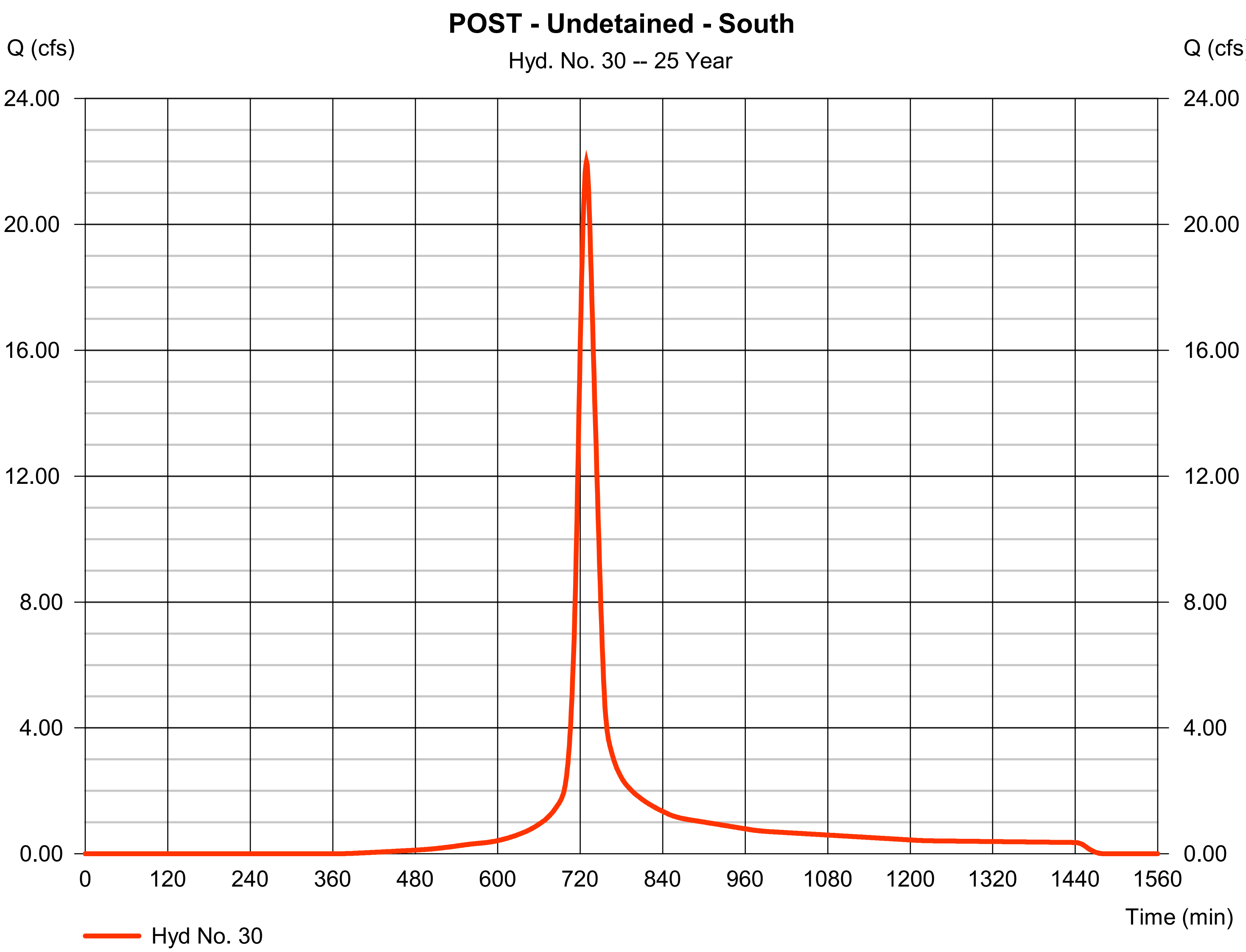
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 30

POST - Undetained - South

Hydrograph type	= SCS Runoff	Peak discharge	= 21.99 cfs
Storm frequency	= 25 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 82,055 cuft
Drainage area	= 6.960 ac	Curve number	= 83.6
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 26.40 min
Total precip.	= 4.99 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



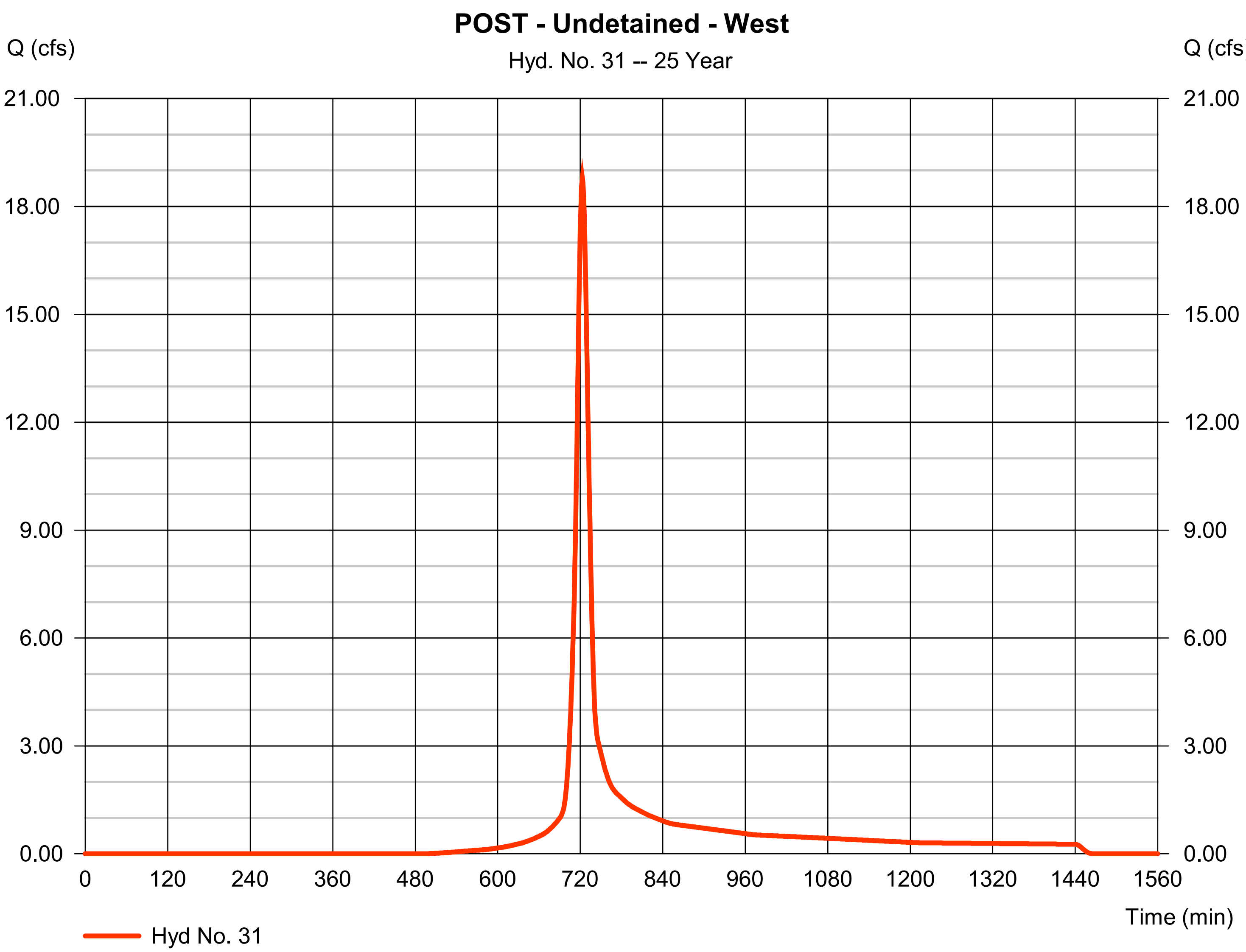
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 31

POST - Undetained - West

Hydrograph type	= SCS Runoff	Peak discharge	= 18.78 cfs
Storm frequency	= 25 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 53,548 cuft
Drainage area	= 5.610 ac	Curve number	= 76.8
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 16.30 min
Total precip.	= 4.99 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



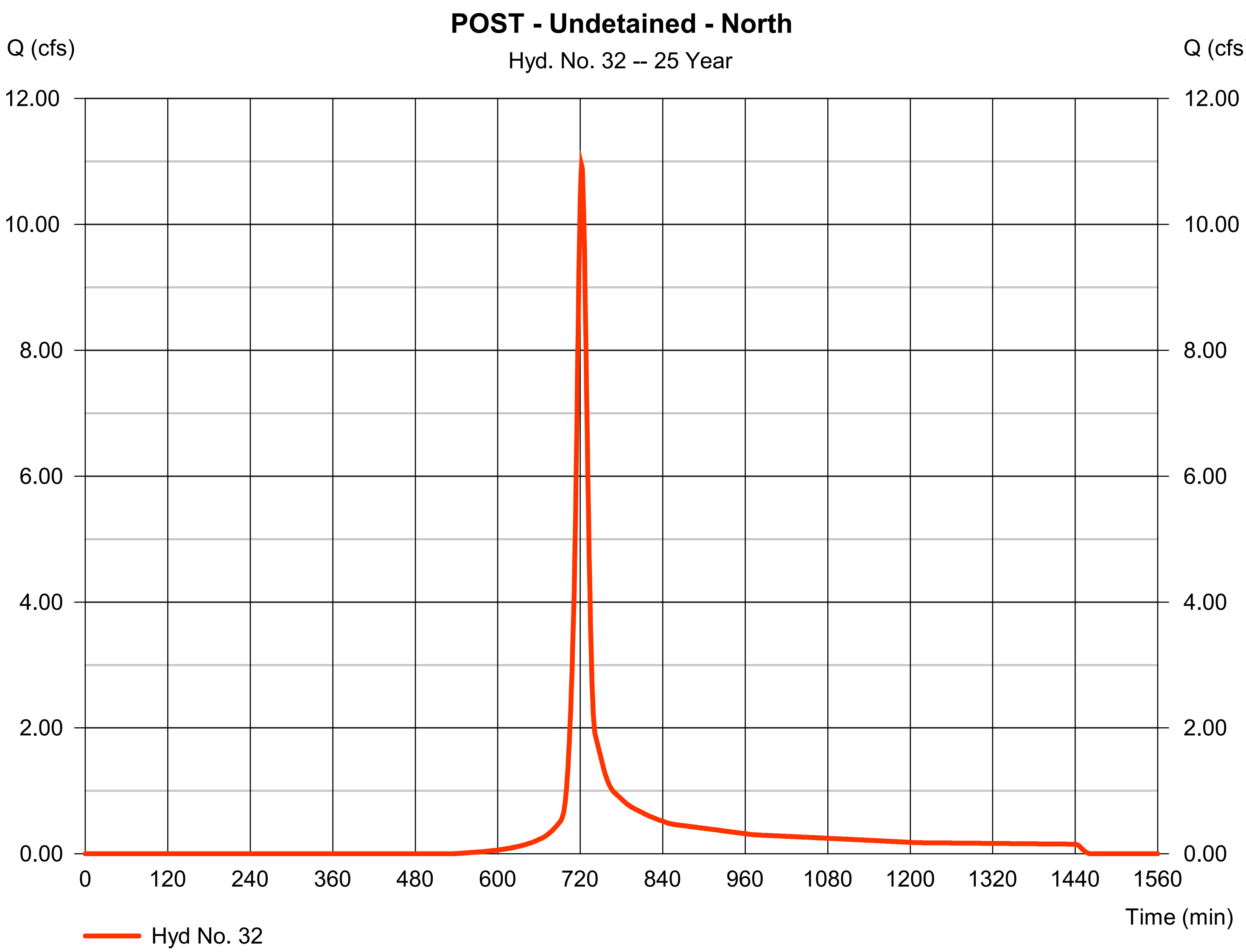
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 32

POST - Undetained - North

Hydrograph type	= SCS Runoff	Peak discharge	= 10.94 cfs
Storm frequency	= 25 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 29,462 cuft
Drainage area	= 3.420 ac	Curve number	= 74.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 14.70 min
Total precip.	= 4.99 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



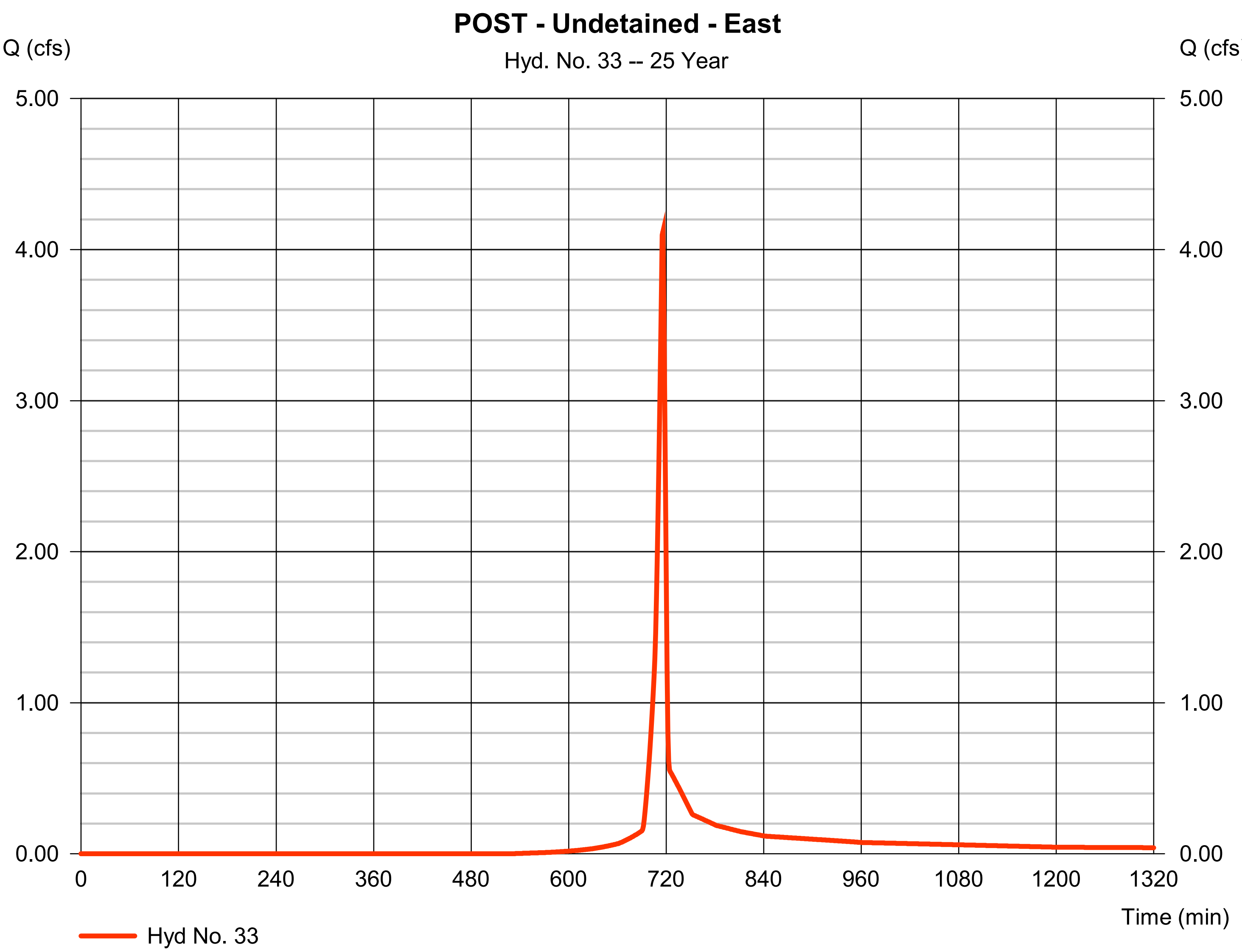
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 33

POST - Undetained - East

Hydrograph type	= SCS Runoff	Peak discharge	= 4.120 cfs
Storm frequency	= 25 yrs	Time to peak	= 716 min
Time interval	= 1 min	Hyd. volume	= 7,243 cuft
Drainage area	= 0.900 ac	Curve number	= 74.1
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 2.00 min
Total precip.	= 4.99 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



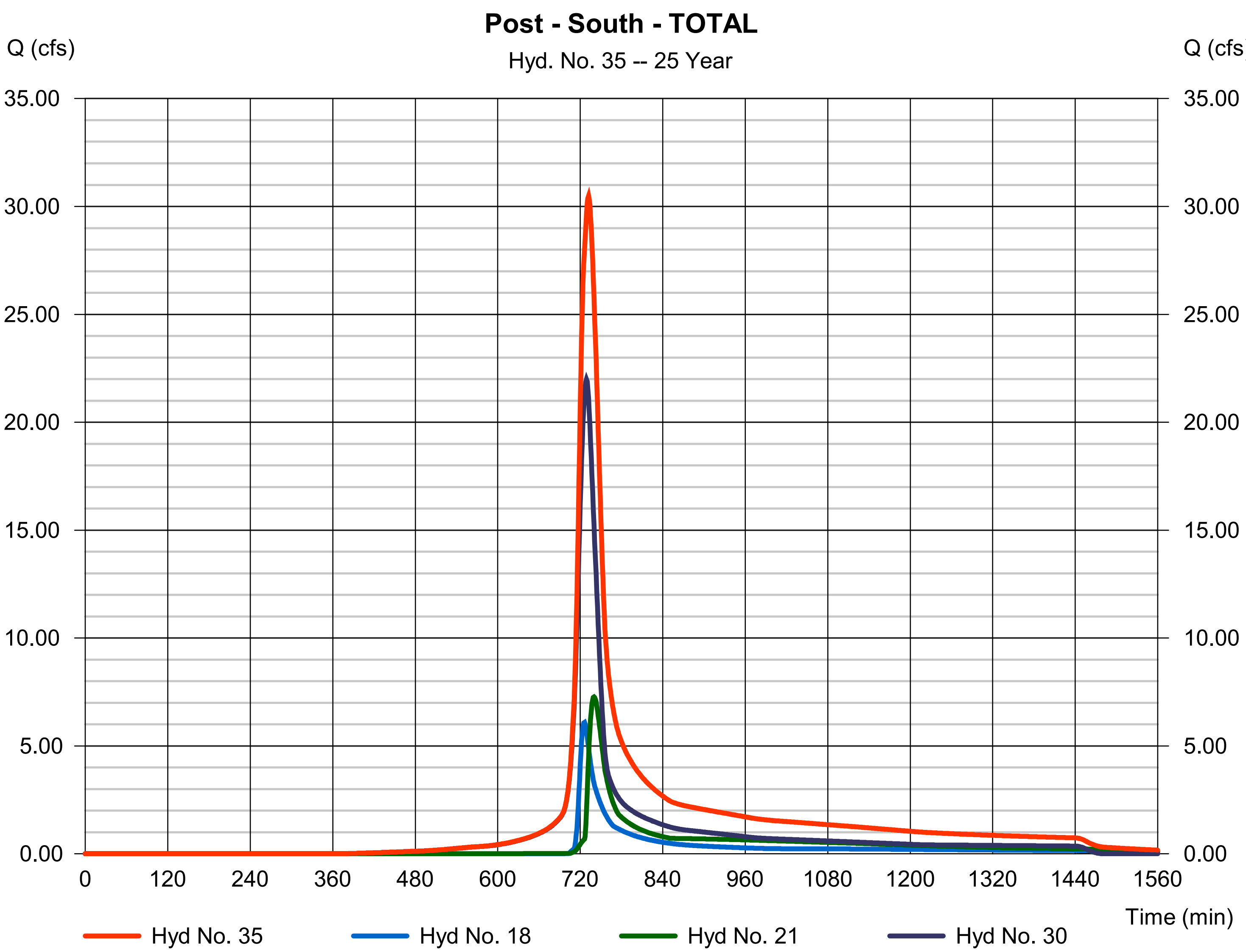
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 35

Post - South - TOTAL

Hydrograph type	= Combine	Peak discharge	= 30.49 cfs
Storm frequency	= 25 yrs	Time to peak	= 732 min
Time interval	= 1 min	Hyd. volume	= 143,959 cuft
Inflow hyds.	= 18, 21, 30	Contrib. drain. area	= 6.960 ac



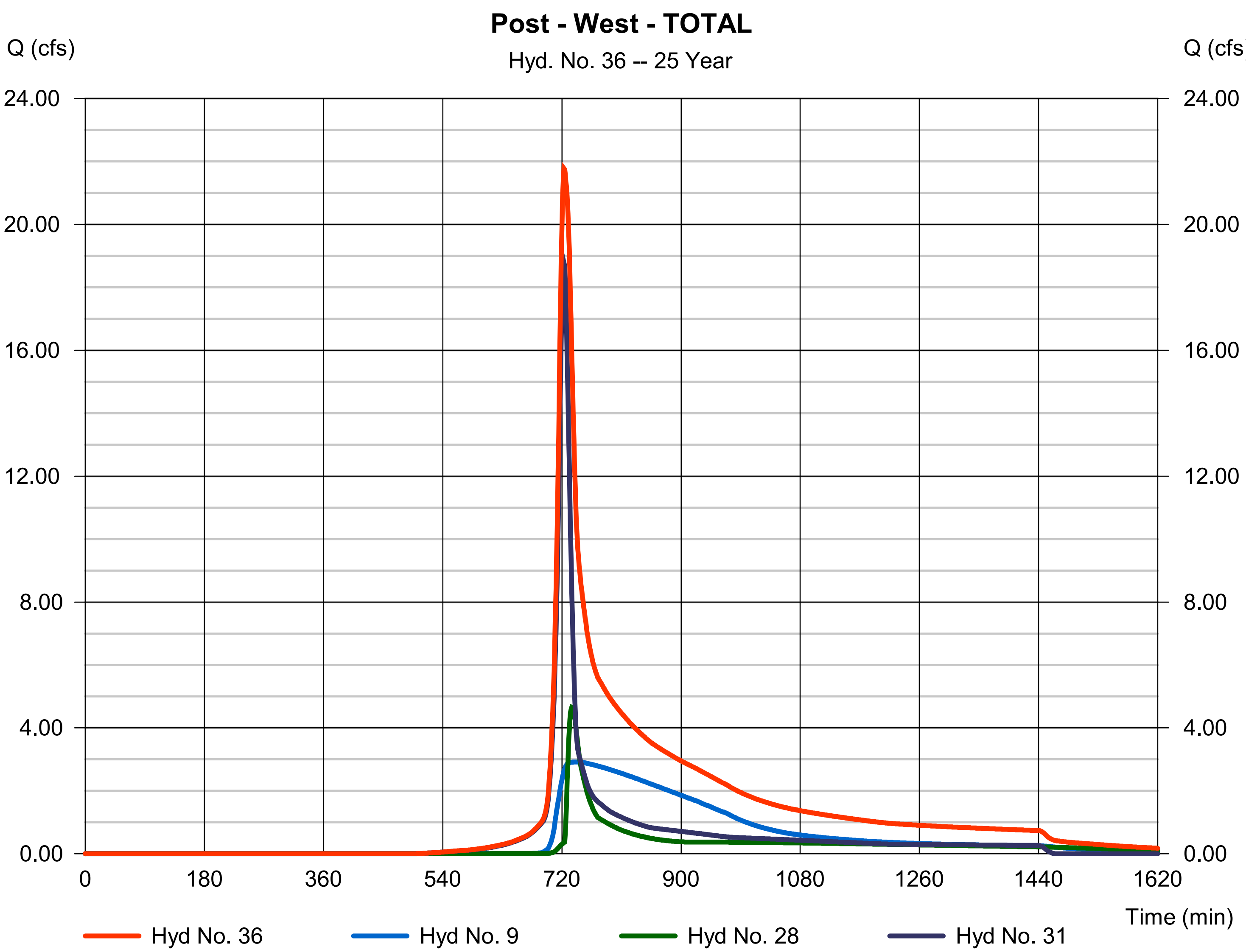
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 36

Post - West - TOTAL

Hydrograph type	= Combine	Peak discharge	= 21.77 cfs
Storm frequency	= 25 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 131,872 cuft
Inflow hyds.	= 9, 28, 31	Contrib. drain. area	= 5.610 ac



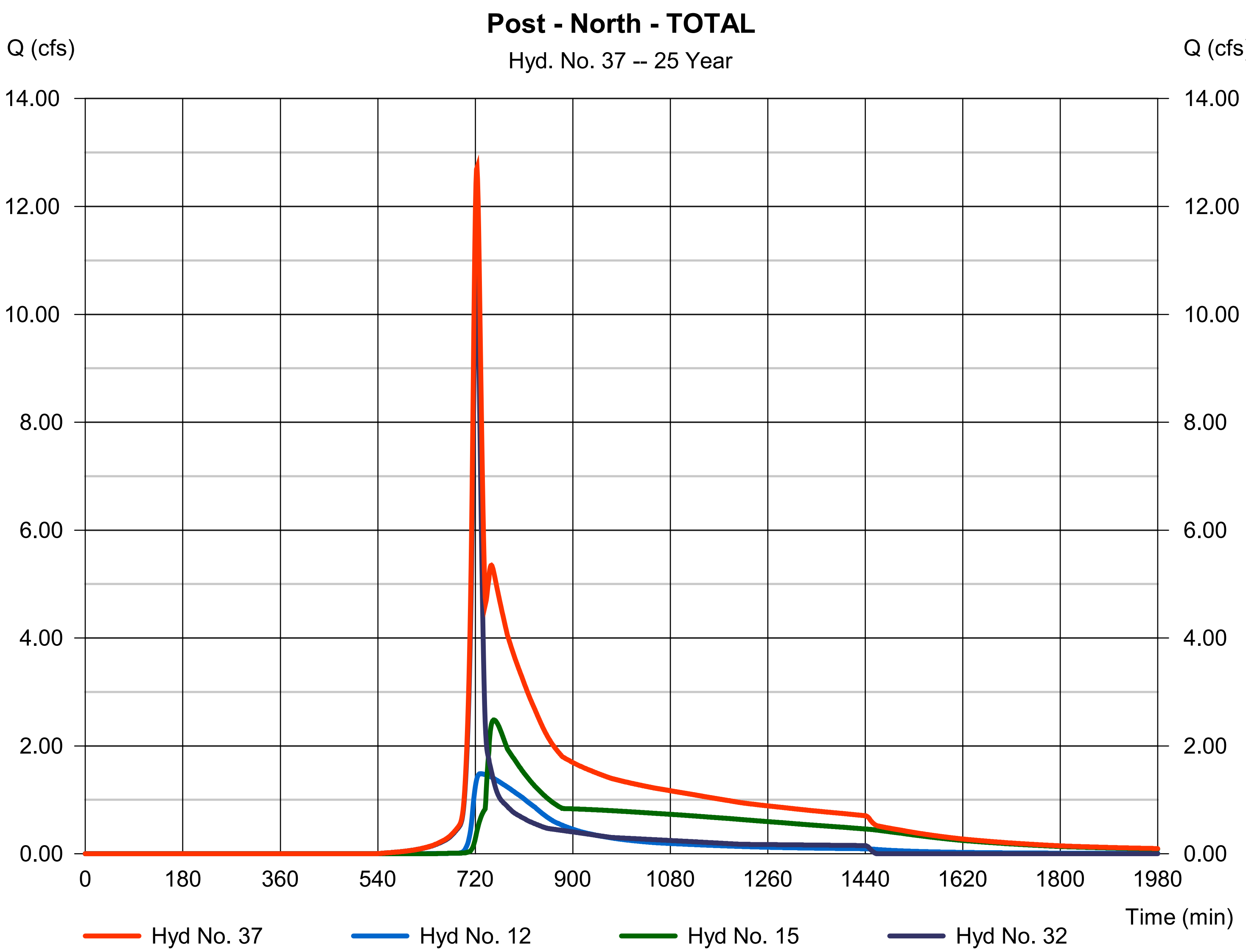
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 37

Post - North - TOTAL

Hydrograph type	= Combine	Peak discharge	= 12.72 cfs
Storm frequency	= 25 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 93,781 cuft
Inflow hyds.	= 12, 15, 32	Contrib. drain. area	= 3.420 ac



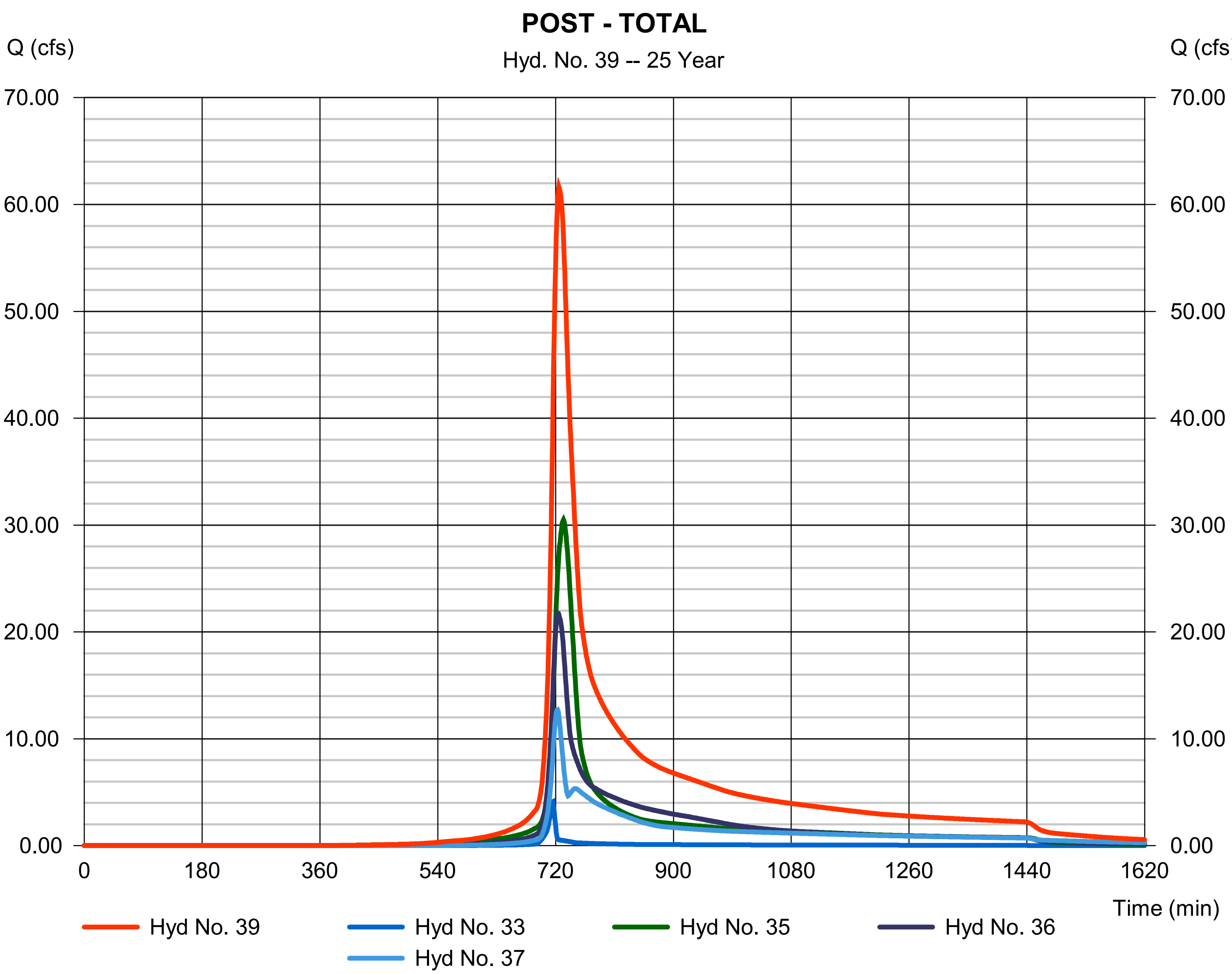
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 39

POST - TOTAL

Hydrograph type	= Combine	Peak discharge	= 61.62 cfs
Storm frequency	= 25 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 376,854 cuft
Inflow hyds.	= 33, 35, 36, 37	Contrib. drain. area	= 0.900 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

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	53.29	1	722	146,414	------	------	------	Pre Development - South
2	SCS Runoff	41.61	1	723	118,608	------	------	------	Pre Development - West
3	SCS Runoff	89.93	1	717	188,144	------	------	------	Pre Development - North
4	SCS Runoff	10.81	1	720	27,443	------	------	------	Pre Development - East
5	Combine	181.22	1	719	480,609	1, 2, 3, 4	------	------	Combined Pre Development
8	SCS Runoff	29.39	1	719	70,526	------	------	------	POST - Basin A
9	Reservoir	7.733	1	729	64,087	8	532.26	36,267	Post - Basin A - Route
11	SCS Runoff	11.24	1	718	25,098	------	------	------	POST - Basin B
12	Reservoir	3.359	1	726	23,149	11	533.03	12,363	Post - Basin B - Route
14	SCS Runoff	18.56	1	727	64,197	------	------	------	POST - Basin C
15	Reservoir	6.278	1	745	57,451	14	532.29	33,538	Post - Basin C - Route
17	SCS Runoff	14.40	1	719	33,934	------	------	------	POST - Basin D
18	Reservoir	8.722	1	725	30,317	17	535.40	13,370	Post - Basin D - Route
20	SCS Runoff	14.35	1	728	52,179	------	------	------	POST - Basin E
21	Reservoir	10.71	1	736	47,234	20	533.94	19,902	Post - Basin E - Route
23	SCS Runoff	3.797	1	720	9,744	------	------	------	POST - Basin F
24	Reservoir	1.775	1	728	9,740	23	535.24	2,357	Post - Basin F - Route
26	SCS Runoff	9.103	1	723	26,802	------	------	------	POST - Basin G
27	Combine	10.85	1	723	36,542	24, 26	------	------	F + G
28	Reservoir	7.324	1	731	33,124	27	533.47	14,488	Post - Basin G - Route
30	SCS Runoff	27.08	1	729	101,511	------	------	------	POST - Undetained - South
31	SCS Runoff	23.87	1	723	68,102	------	------	------	POST - Undetained - West
32	SCS Runoff	14.10	1	722	37,902	------	------	------	POST - Undetained - North
33	SCS Runoff	5.251	1	716	9,322	------	------	------	POST - Undetained - East
35	Combine	42.52	1	730	179,062	18, 21, 30,	------	------	Post - South - TOTAL
36	Combine	34.52	1	727	165,313	9, 28, 31,	------	------	Post - West - TOTAL
37	Combine	17.31	1	724	118,502	12, 15, 32,	------	------	Post - North - TOTAL
39	Combine	90.97	1	727	472,199	33, 35, 36, 37,	------	------	POST - TOTAL

20914 WBI_Hydroflow(DEP Comments).gpw	Return Period: 50 Year	Thursday, 08 / 5 / 2021

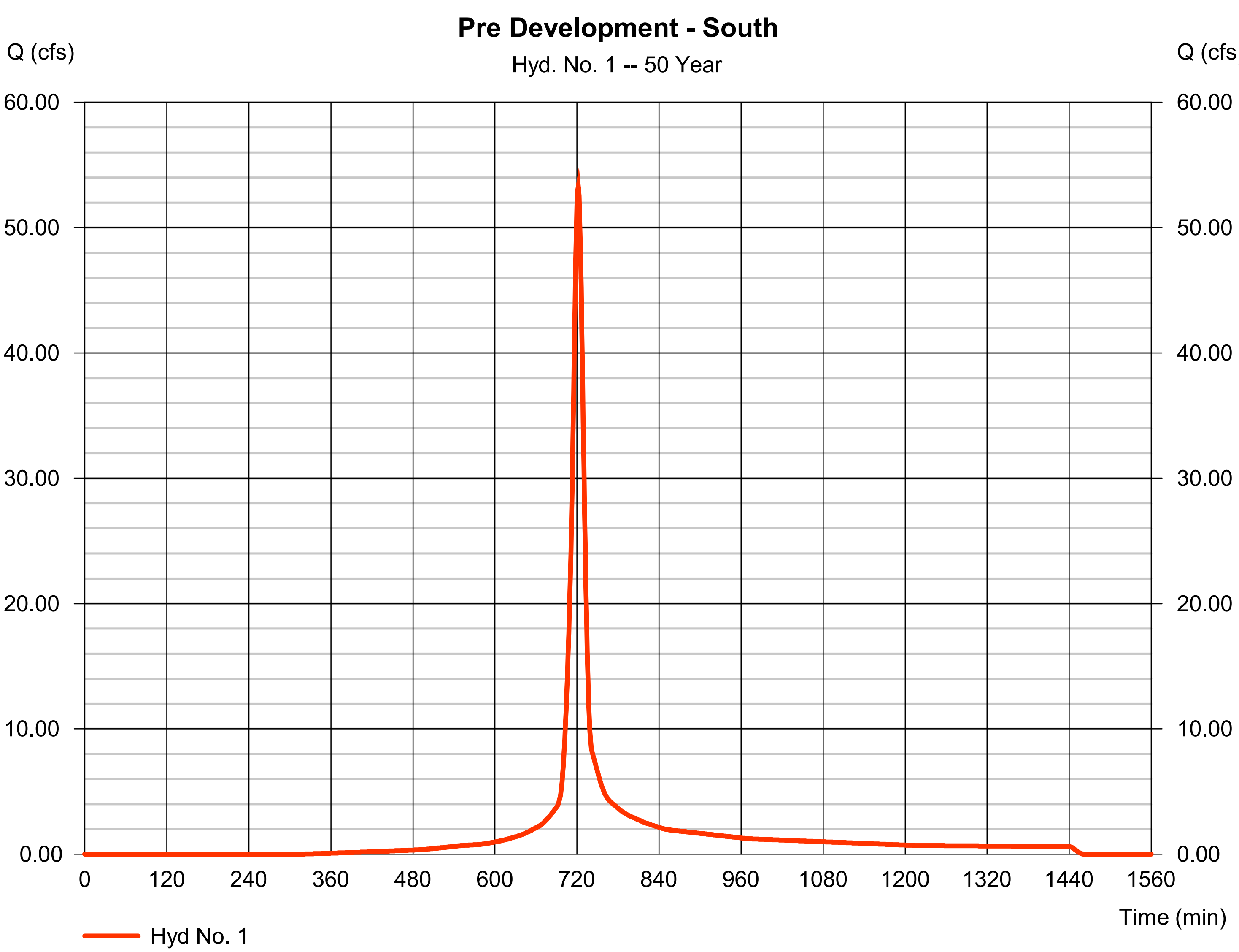
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 1

Pre Development - South

Hydrograph type	= SCS Runoff	Peak discharge	= 53.29 cfs
Storm frequency	= 50 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 146,414 cuft
Drainage area	= 9.910 ac	Curve number	= 84.4
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 13.60 min
Total precip.	= 5.82 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



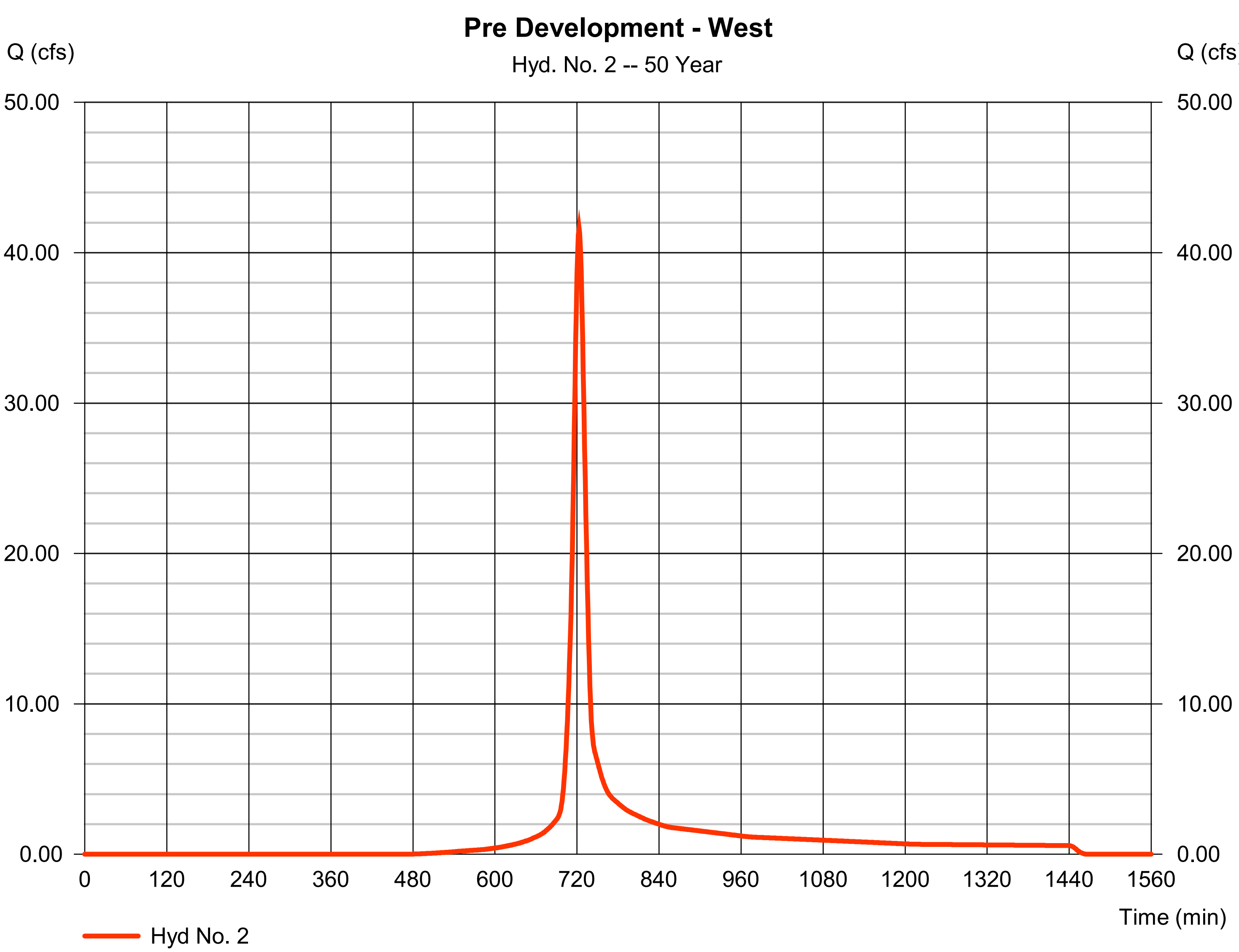
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 2

Pre Development - West

Hydrograph type	= SCS Runoff	Peak discharge	= 41.61 cfs
Storm frequency	= 50 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 118,608 cuft
Drainage area	= 10.250 ac	Curve number	= 75.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 16.30 min
Total precip.	= 5.82 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



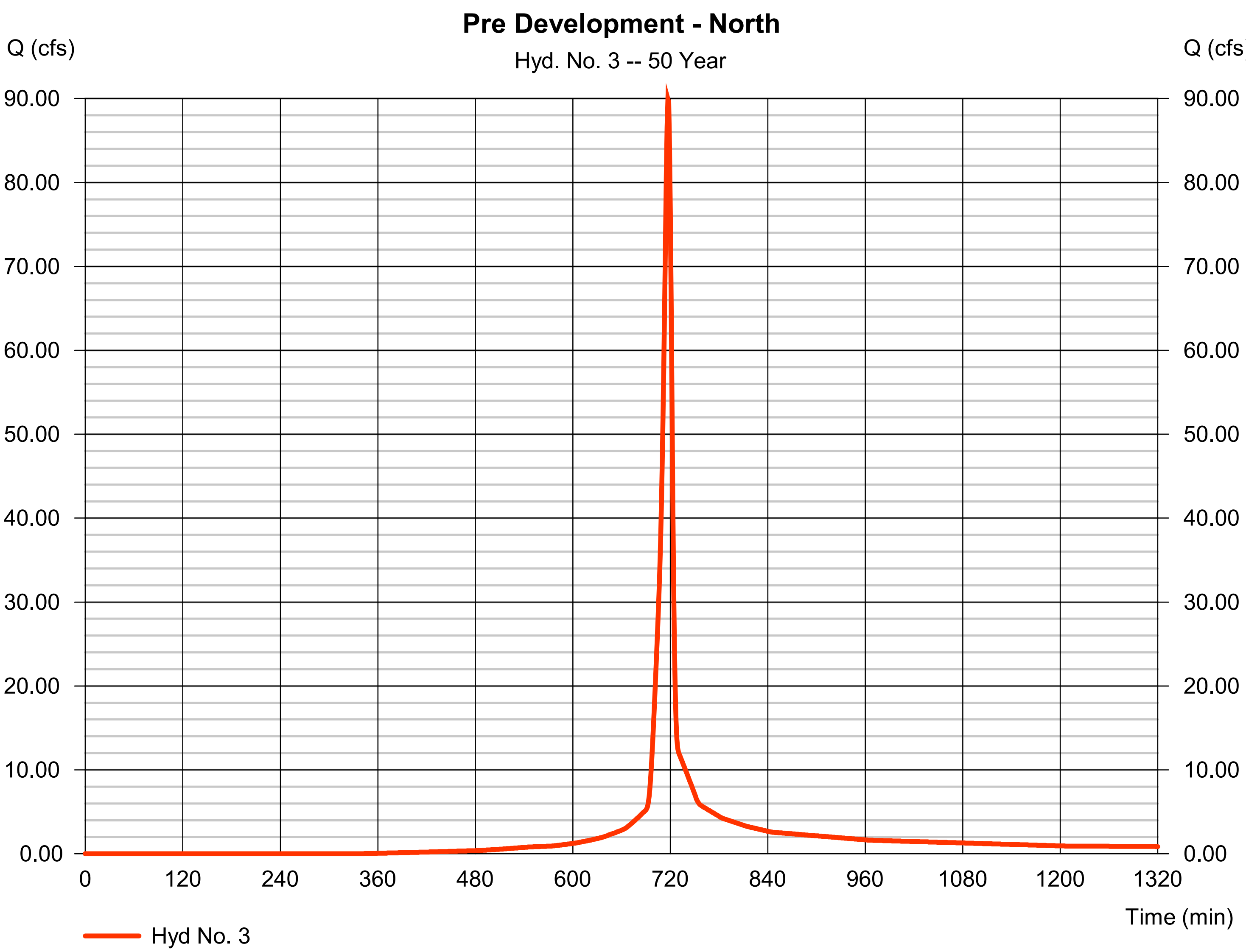
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 | Thursday, 08 / 5 / 2021

Hyd. No. 3

Pre Development - North

Hydrograph type	= SCS Runoff	Peak discharge	= 89.93 cfs
Storm frequency	= 50 yrs	Time to peak	= 717 min
Time interval	= 1 min	Hyd. volume	= 188,144 cuft
Drainage area	= 12.840 ac	Curve number	= 82.9
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.30 min
Total precip.	= 5.82 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



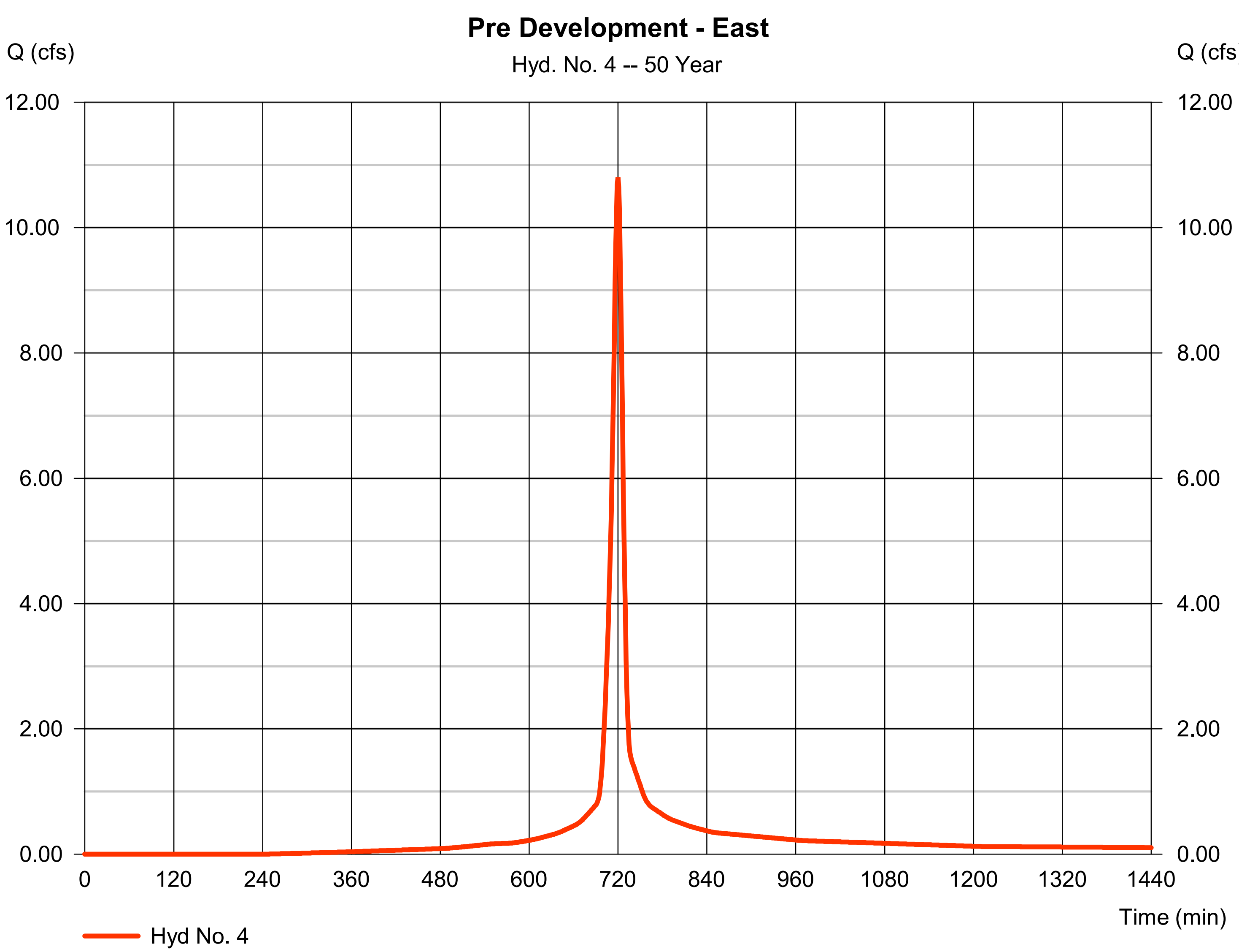
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 | Thursday, 08 / 5 / 2021

Hyd. No. 4

Pre Development - East

Hydrograph type	= SCS Runoff	Peak discharge	= 10.81 cfs
Storm frequency	= 50 yrs	Time to peak	= 720 min
Time interval	= 1 min	Hyd. volume	= 27,443 cuft
Drainage area	= 1.660 ac	Curve number	= 88.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 11.20 min
Total precip.	= 5.82 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



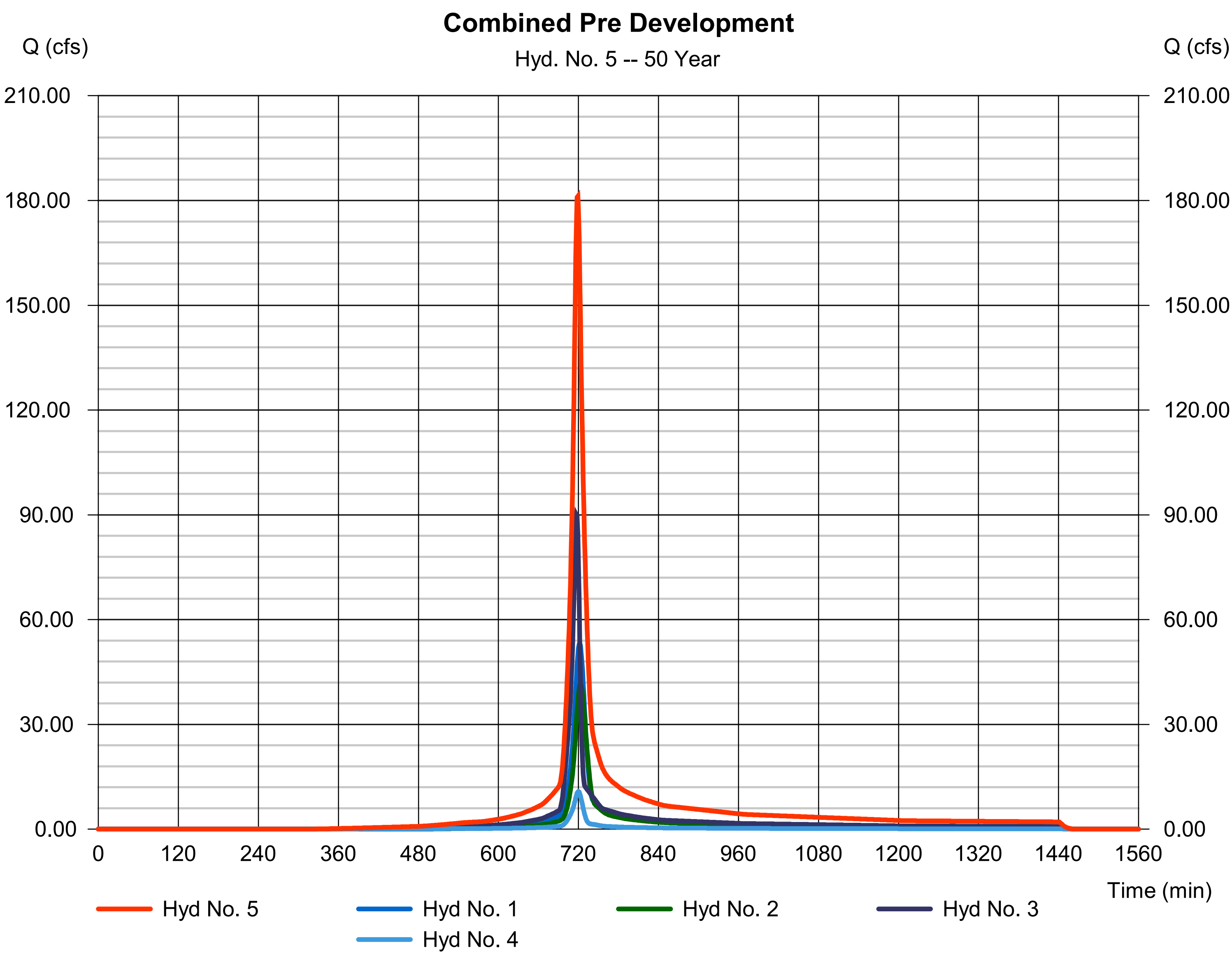
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 5

Combined Pre Development

Hydrograph type	= Combine	Peak discharge	= 181.22 cfs
Storm frequency	= 50 yrs	Time to peak	= 719 min
Time interval	= 1 min	Hyd. volume	= 480,609 cuft
Inflow hyds.	= 1, 2, 3, 4	Contrib. drain. area	= 34.660 ac



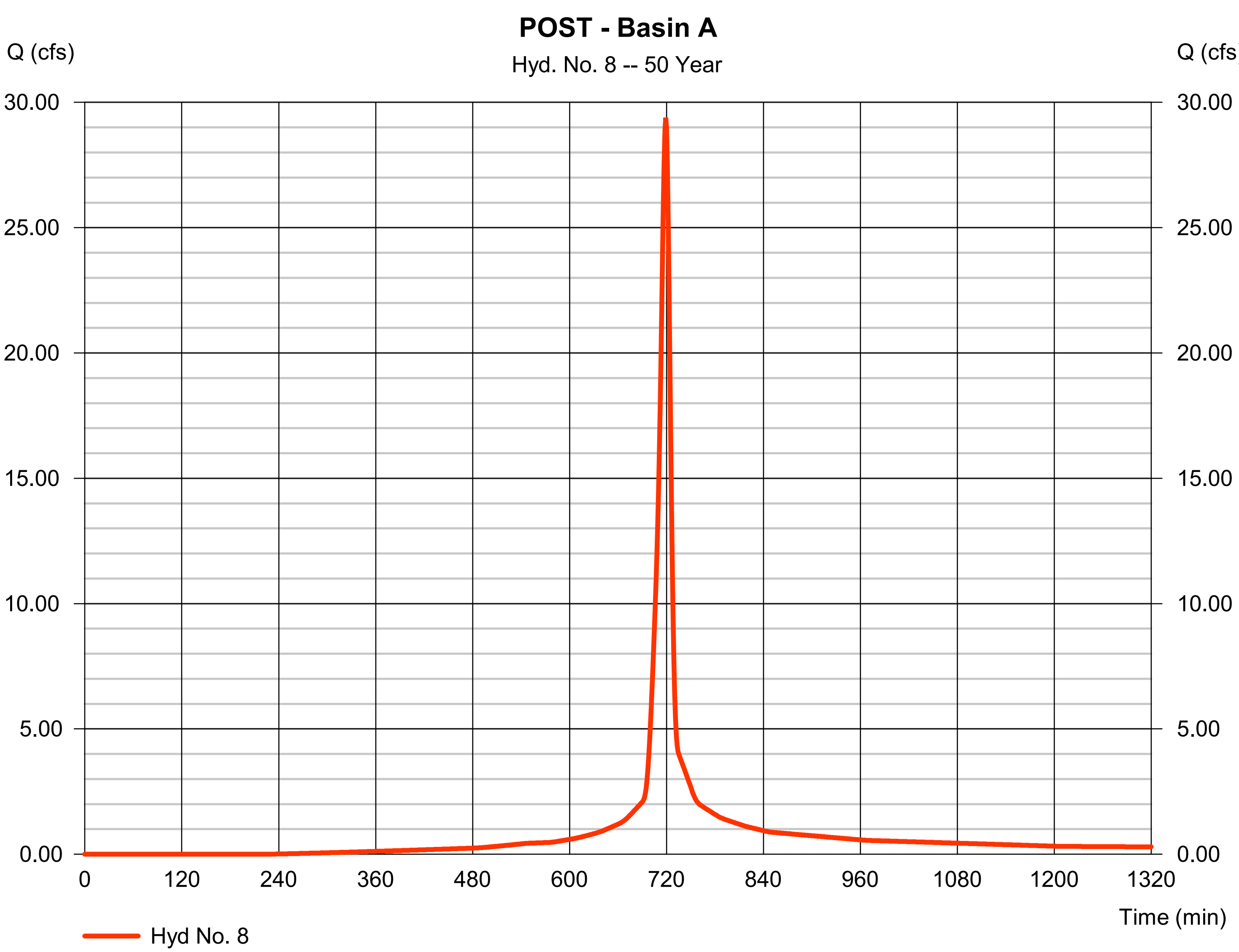
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 8

POST - Basin A

Hydrograph type	= SCS Runoff	Peak discharge	= 29.39 cfs
Storm frequency	= 50 yrs	Time to peak	= 719 min
Time interval	= 1 min	Hyd. volume	= 70,526 cuft
Drainage area	= 4.280 ac	Curve number	= 88.8
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.10 min
Total precip.	= 5.82 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

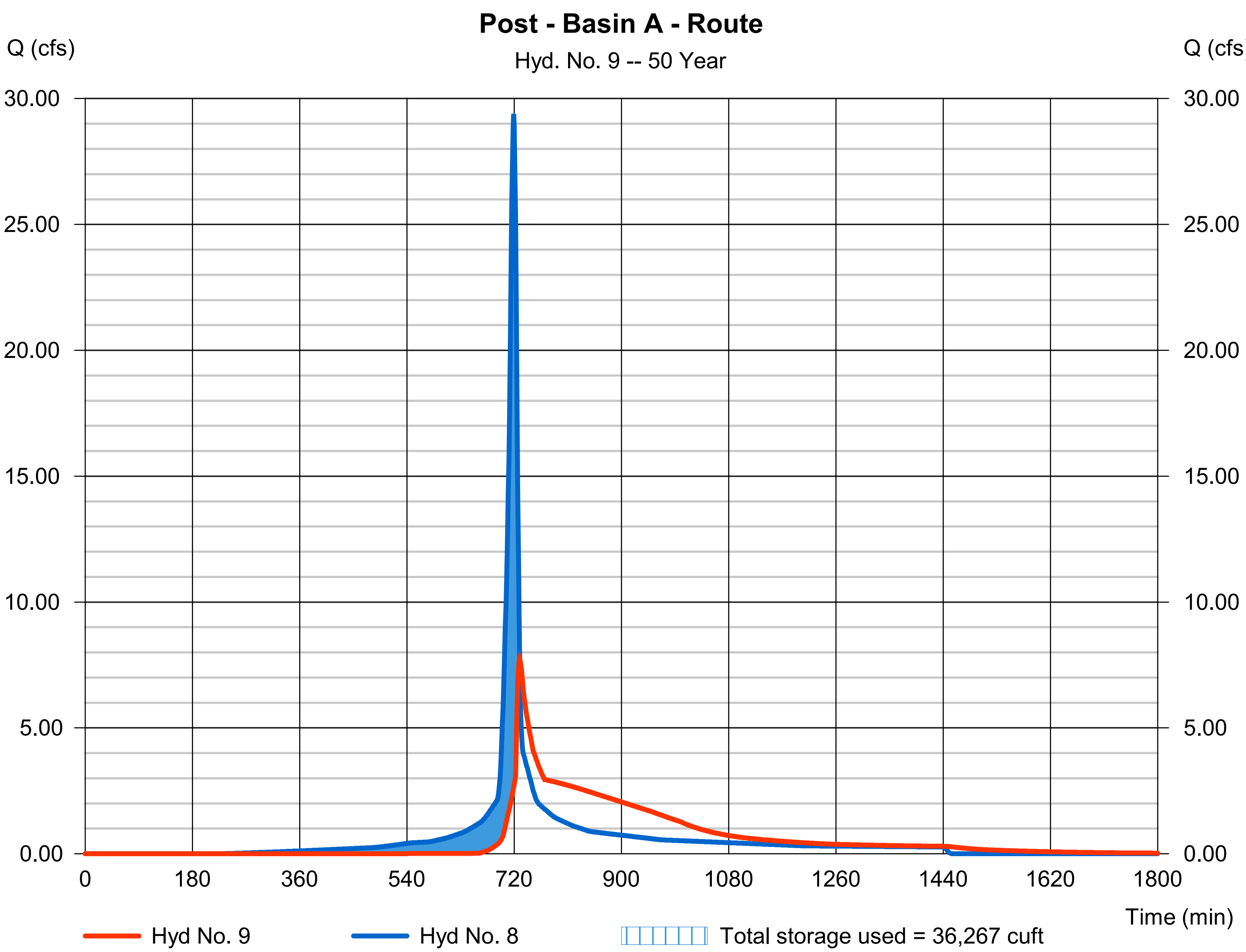
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 9

Post - Basin A - Route

Hydrograph type	= Reservoir	Peak discharge	= 7.733 cfs
Storm frequency	= 50 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 64,087 cuft
Inflow hyd. No.	= 8 - POST - Basin A	Max. Elevation	= 532.26 ft
Reservoir name	= Basin A	Max. Storage	= 36,267 cuft

Storage Indication method used.



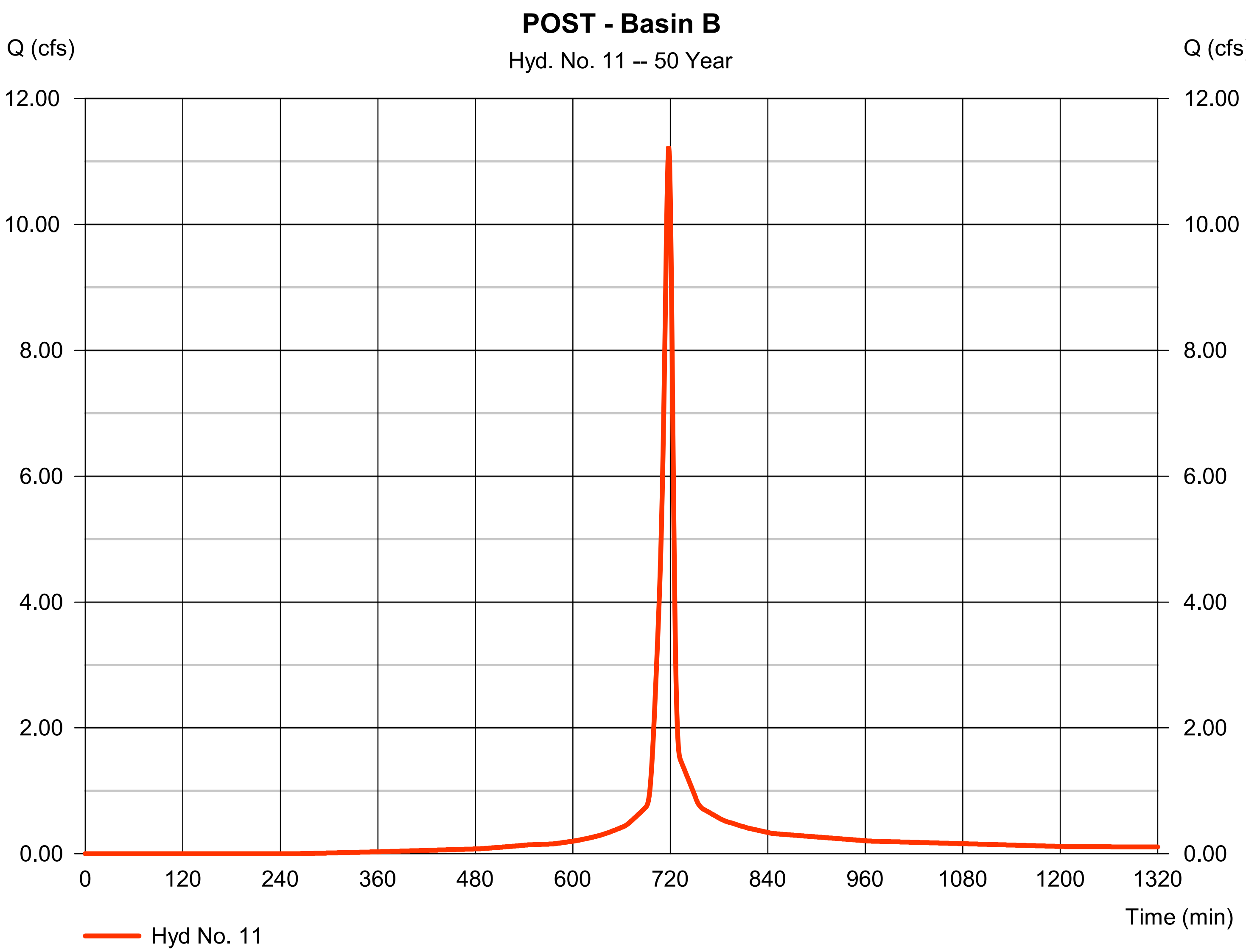
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 11

POST - Basin B

Hydrograph type	= SCS Runoff	Peak discharge	= 11.24 cfs
Storm frequency	= 50 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 25,098 cuft
Drainage area	= 1.620 ac	Curve number	= 87.3
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.90 min
Total precip.	= 5.82 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

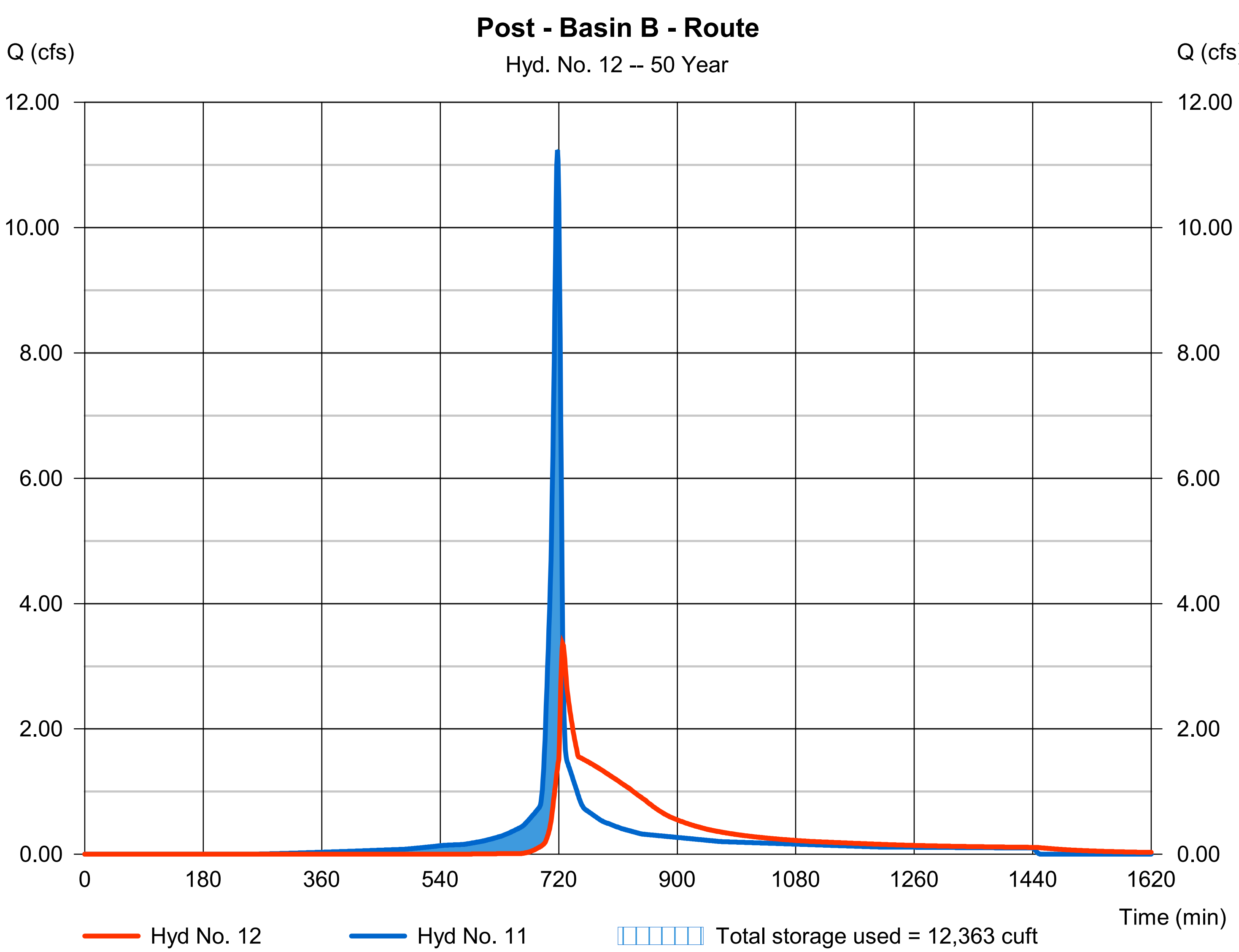
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 12

Post - Basin B - Route

Hydrograph type	= Reservoir	Peak discharge	= 3.359 cfs
Storm frequency	= 50 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 23,149 cuft
Inflow hyd. No.	= 11 - POST - Basin B	Max. Elevation	= 533.03 ft
Reservoir name	= Basin B	Max. Storage	= 12,363 cuft

Storage Indication method used.



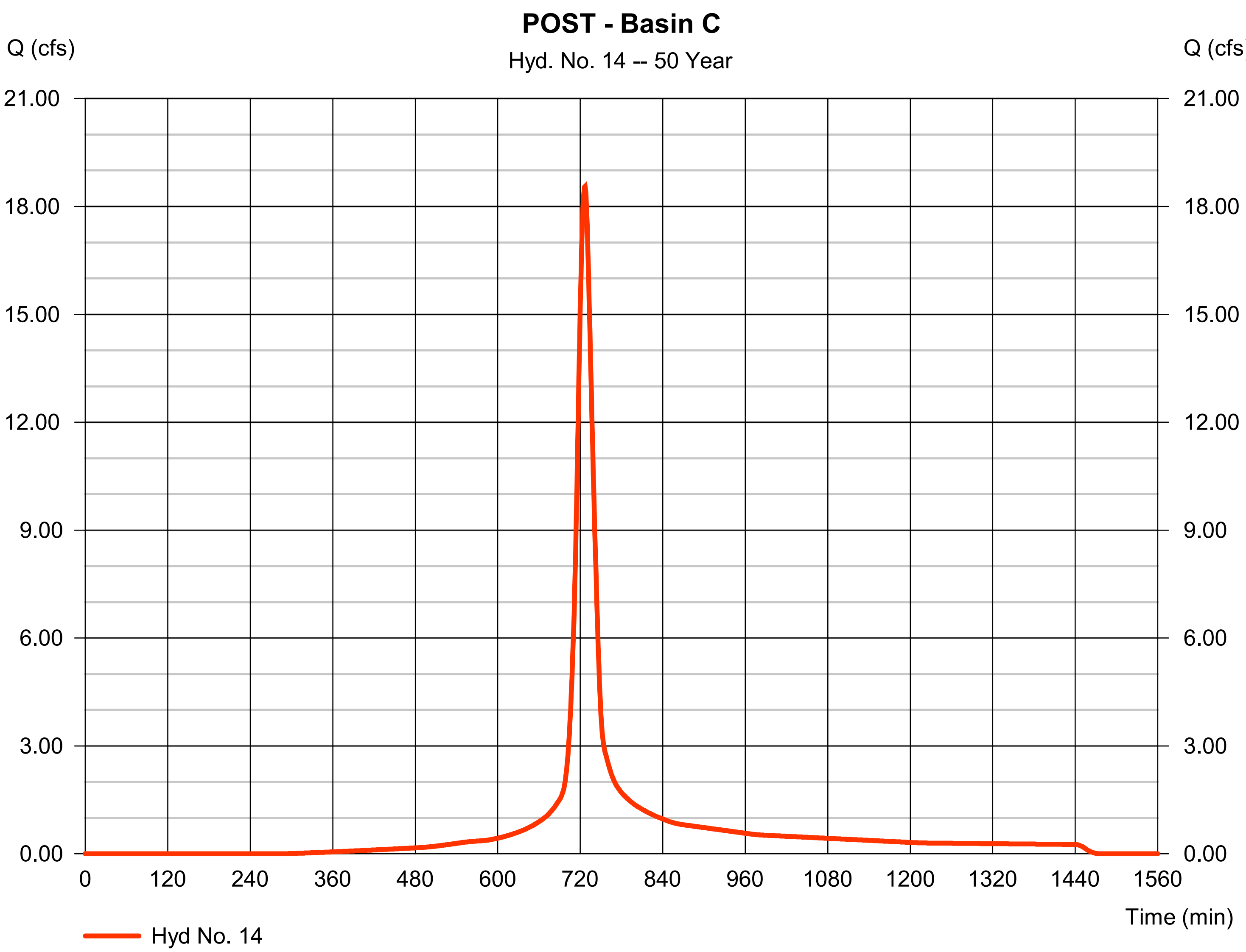
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 14

POST - Basin C

Hydrograph type	= SCS Runoff	Peak discharge	= 18.56 cfs
Storm frequency	= 50 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 64,197 cuft
Drainage area	= 4.210 ac	Curve number	= 86
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 23.00 min
Total precip.	= 5.82 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

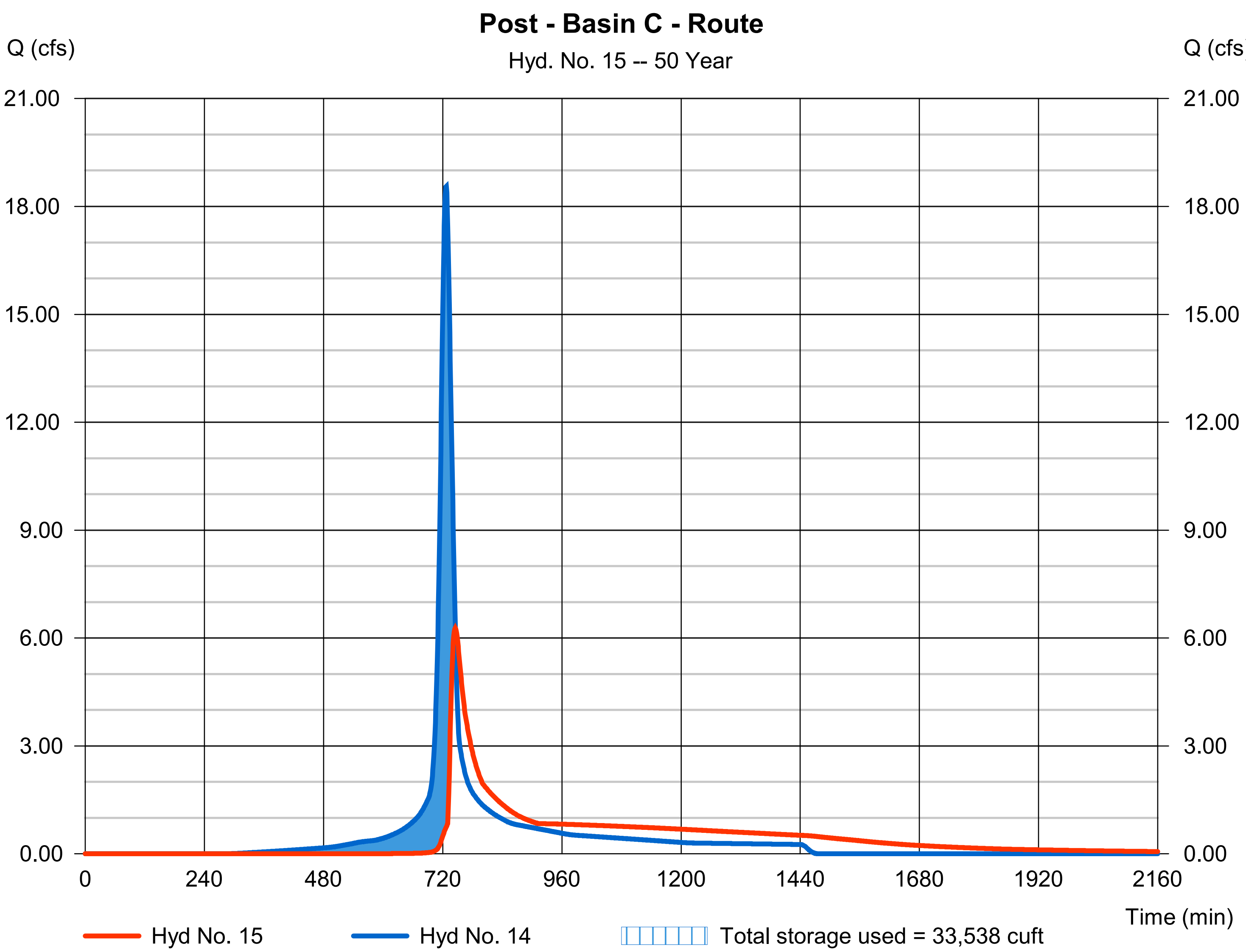
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 15

Post - Basin C - Route

Hydrograph type	= Reservoir	Peak discharge	= 6.278 cfs
Storm frequency	= 50 yrs	Time to peak	= 745 min
Time interval	= 1 min	Hyd. volume	= 57,451 cuft
Inflow hyd. No.	= 14 - POST - Basin C	Max. Elevation	= 532.29 ft
Reservoir name	= Basin C	Max. Storage	= 33,538 cuft

Storage Indication method used.



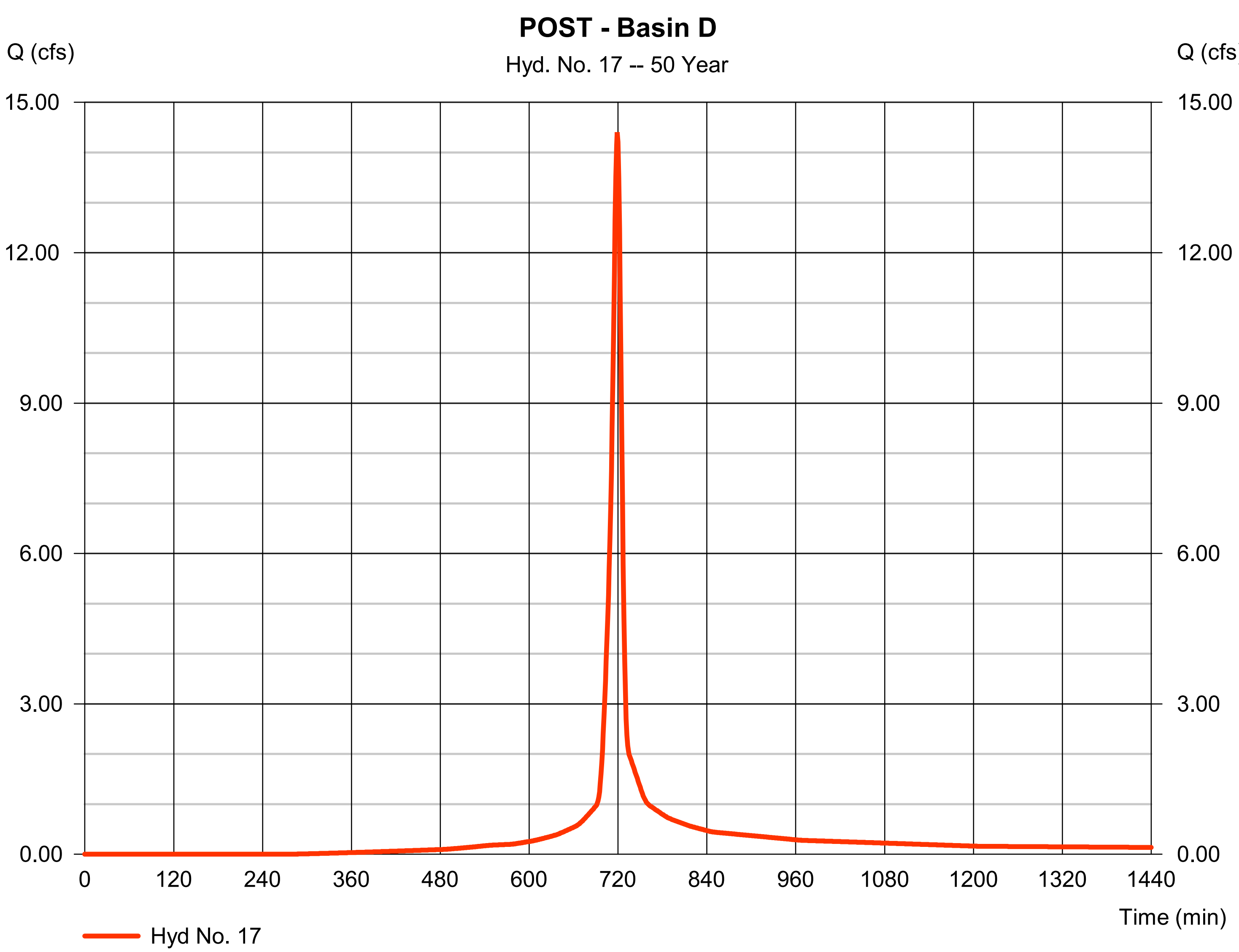
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 17

POST - Basin D

Hydrograph type	= SCS Runoff	Peak discharge	= 14.40 cfs
Storm frequency	= 50 yrs	Time to peak	= 719 min
Time interval	= 1 min	Hyd. volume	= 33,934 cuft
Drainage area	= 2.200 ac	Curve number	= 86.1
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.60 min
Total precip.	= 5.82 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

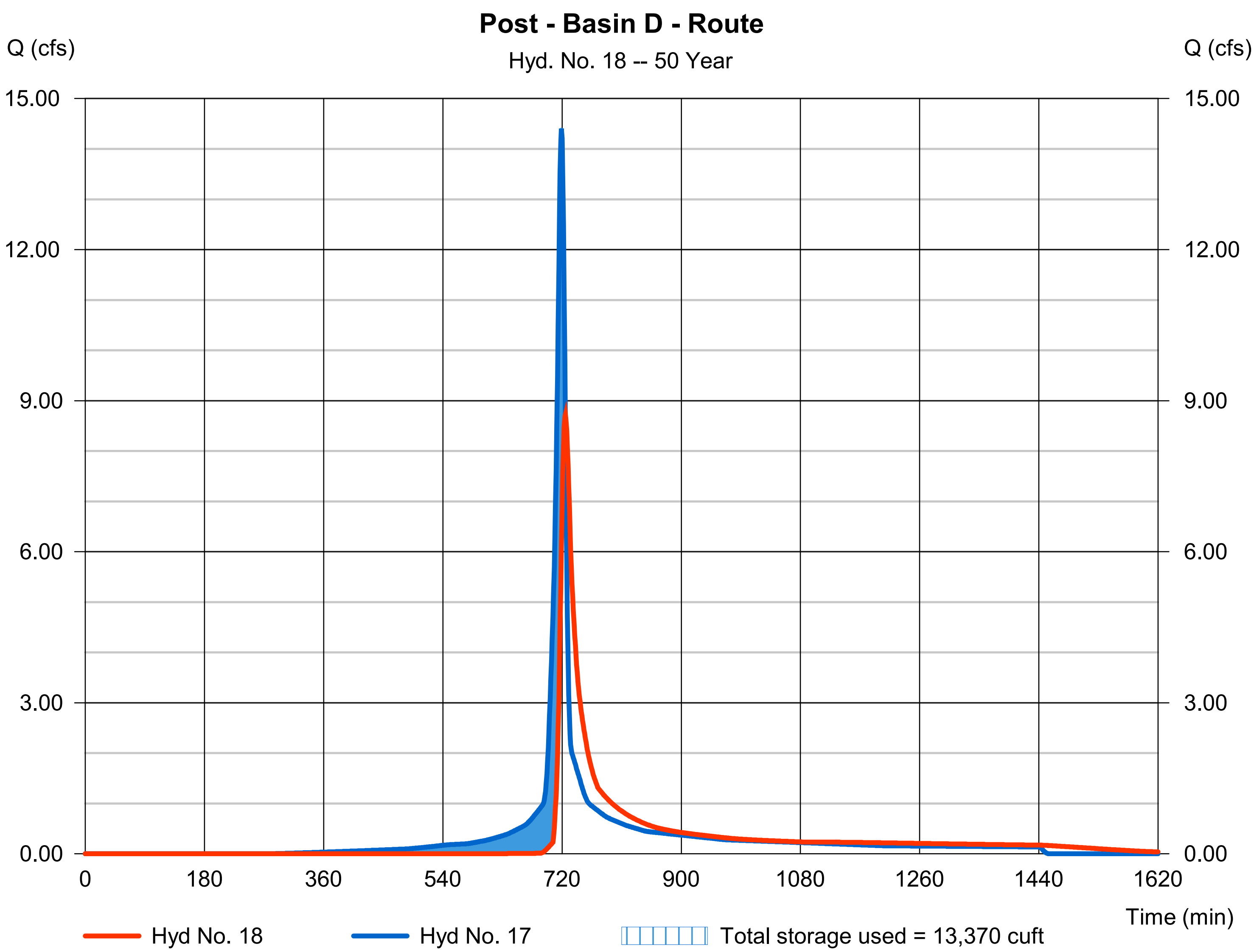
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 18

Post - Basin D - Route

Hydrograph type	= Reservoir	Peak discharge	= 8.722 cfs
Storm frequency	= 50 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 30,317 cuft
Inflow hyd. No.	= 17 - POST - Basin D	Max. Elevation	= 535.40 ft
Reservoir name	= Basin D	Max. Storage	= 13,370 cuft

Storage Indication method used.



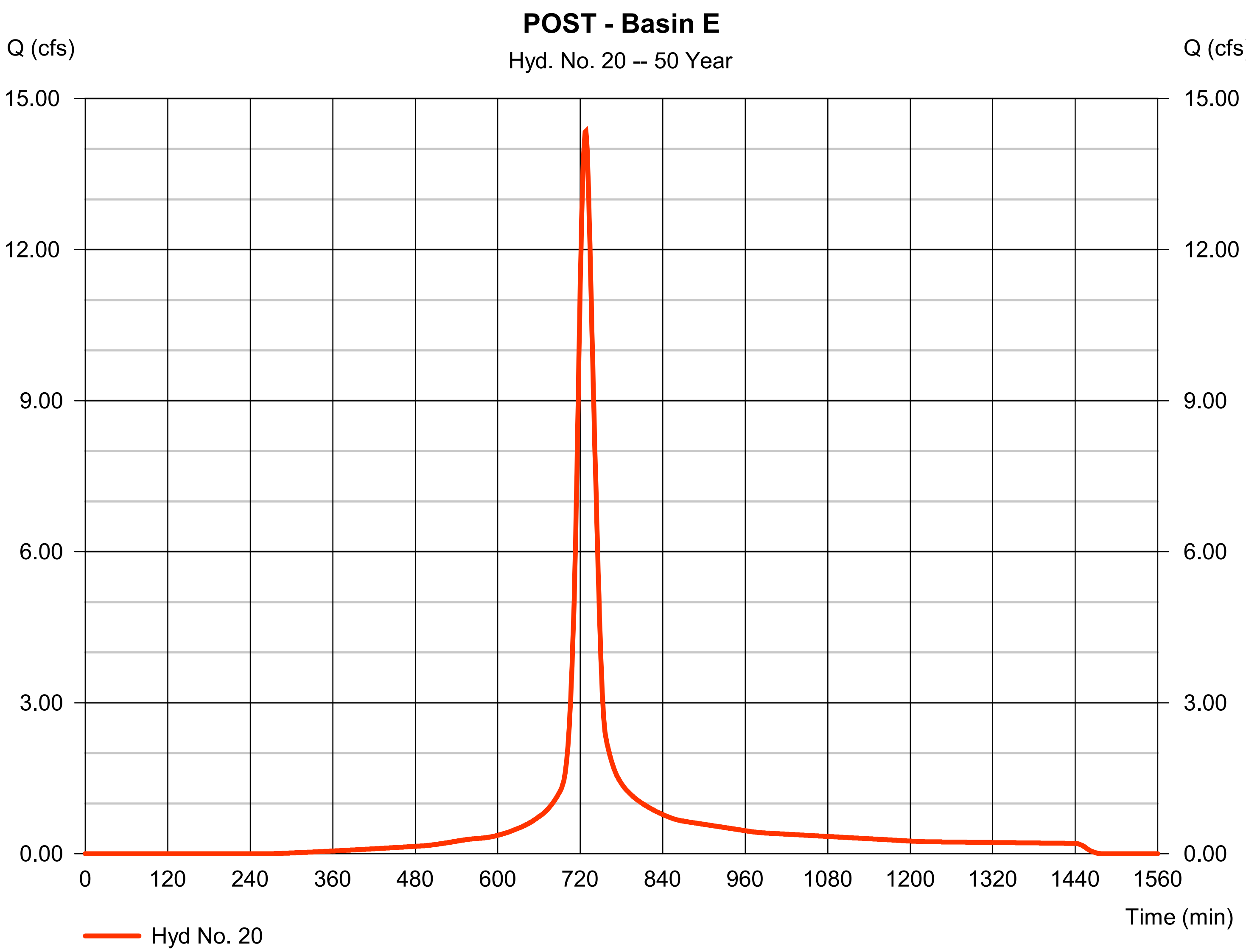
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 20

POST - Basin E

Hydrograph type	= SCS Runoff	Peak discharge	= 14.35 cfs
Storm frequency	= 50 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 52,179 cuft
Drainage area	= 3.300 ac	Curve number	= 87.1
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 25.30 min
Total precip.	= 5.82 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

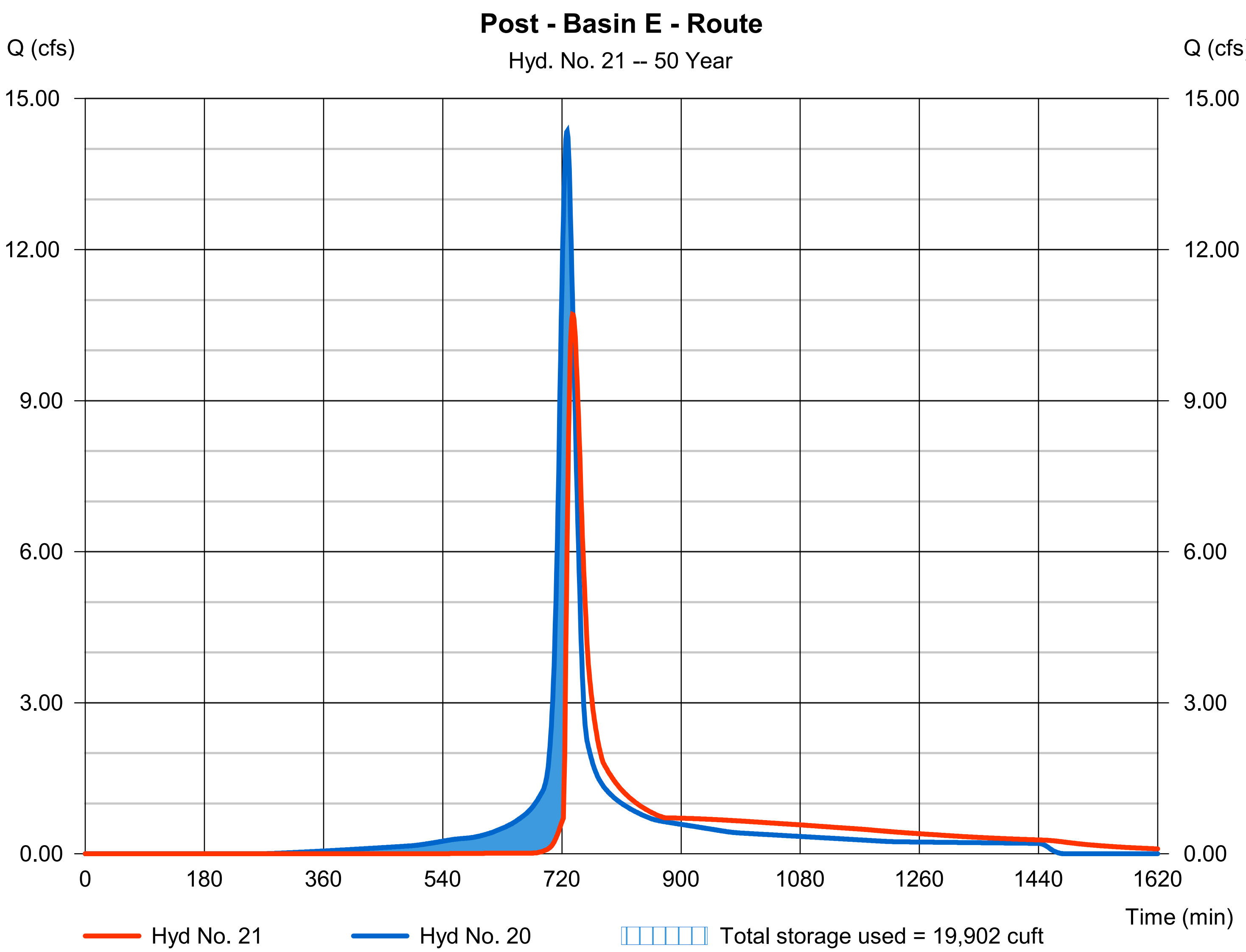
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 21

Post - Basin E - Route

Hydrograph type	= Reservoir	Peak discharge	= 10.71 cfs
Storm frequency	= 50 yrs	Time to peak	= 736 min
Time interval	= 1 min	Hyd. volume	= 47,234 cuft
Inflow hyd. No.	= 20 - POST - Basin E	Max. Elevation	= 533.94 ft
Reservoir name	= Basin E	Max. Storage	= 19,902 cuft

Storage Indication method used.



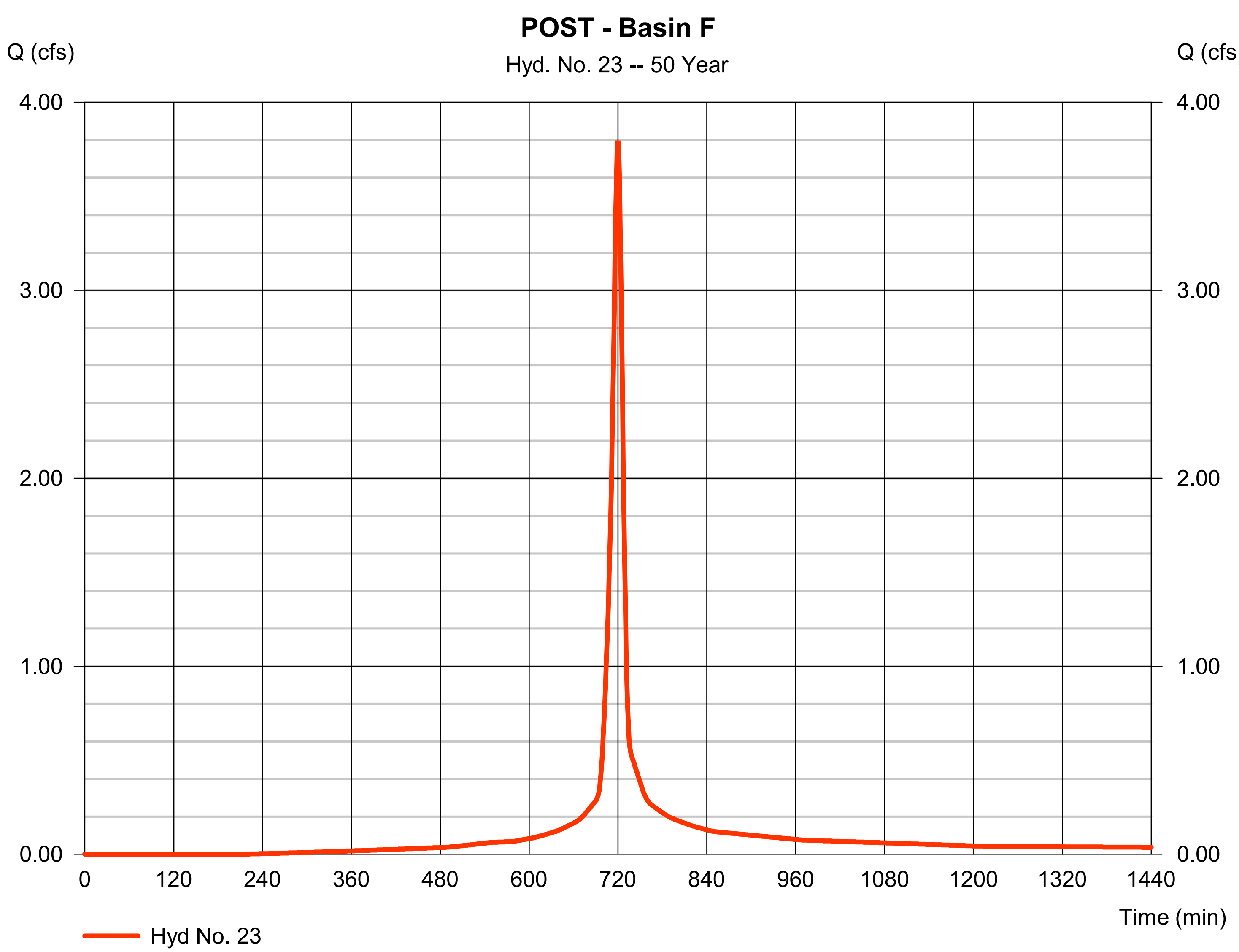
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 23

POST - Basin F

Hydrograph type	= SCS Runoff	Peak discharge	= 3.797 cfs
Storm frequency	= 50 yrs	Time to peak	= 720 min
Time interval	= 1 min	Hyd. volume	= 9,744 cuft
Drainage area	= 0.570 ac	Curve number	= 89.6
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 10.20 min
Total precip.	= 5.82 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

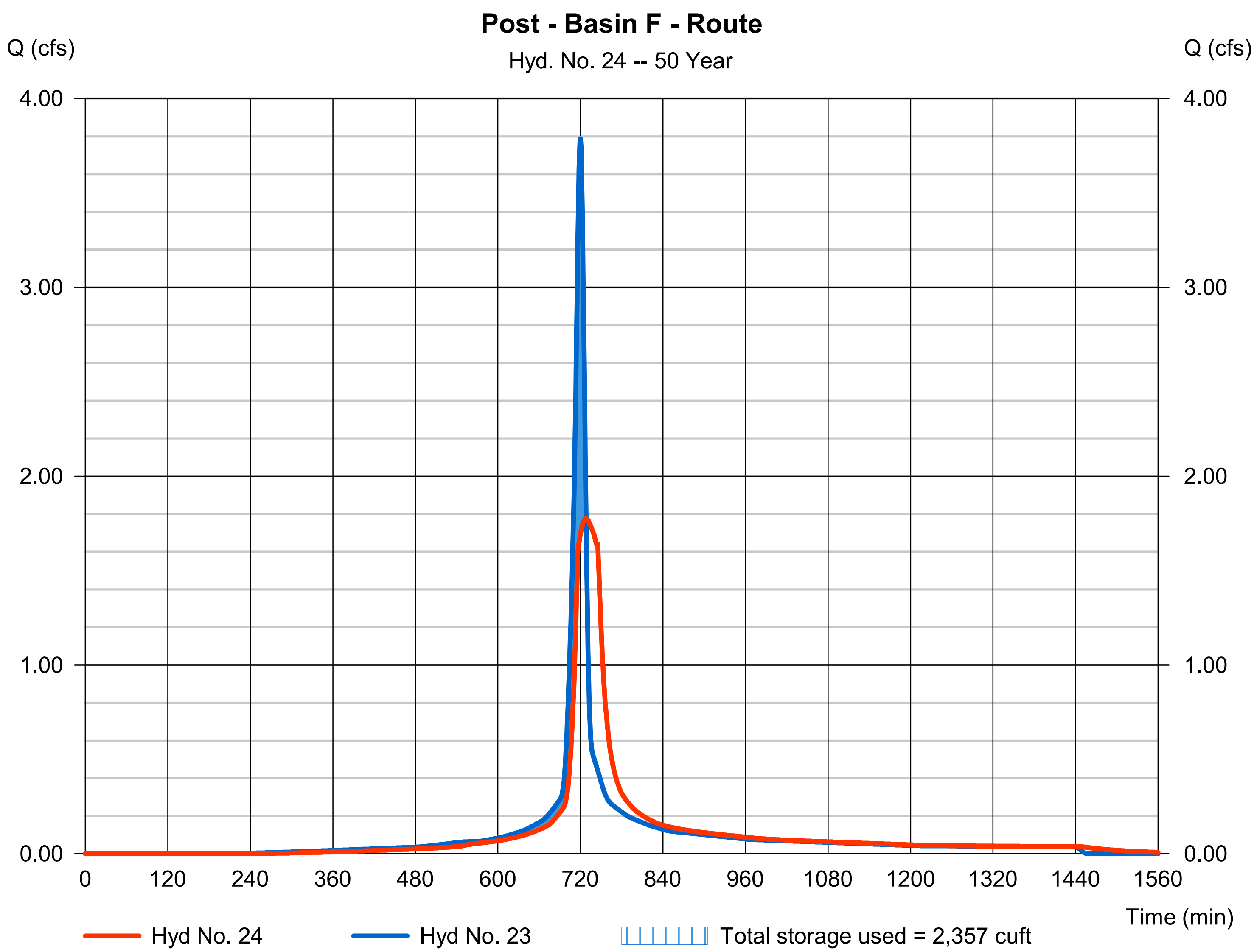
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 24

Post - Basin F - Route

Hydrograph type	= Reservoir	Peak discharge	= 1.775 cfs
Storm frequency	= 50 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 9,740 cuft
Inflow hyd. No.	= 23 - POST - Basin F	Max. Elevation	= 535.24 ft
Reservoir name	= Basin F	Max. Storage	= 2,357 cuft

Storage Indication method used.



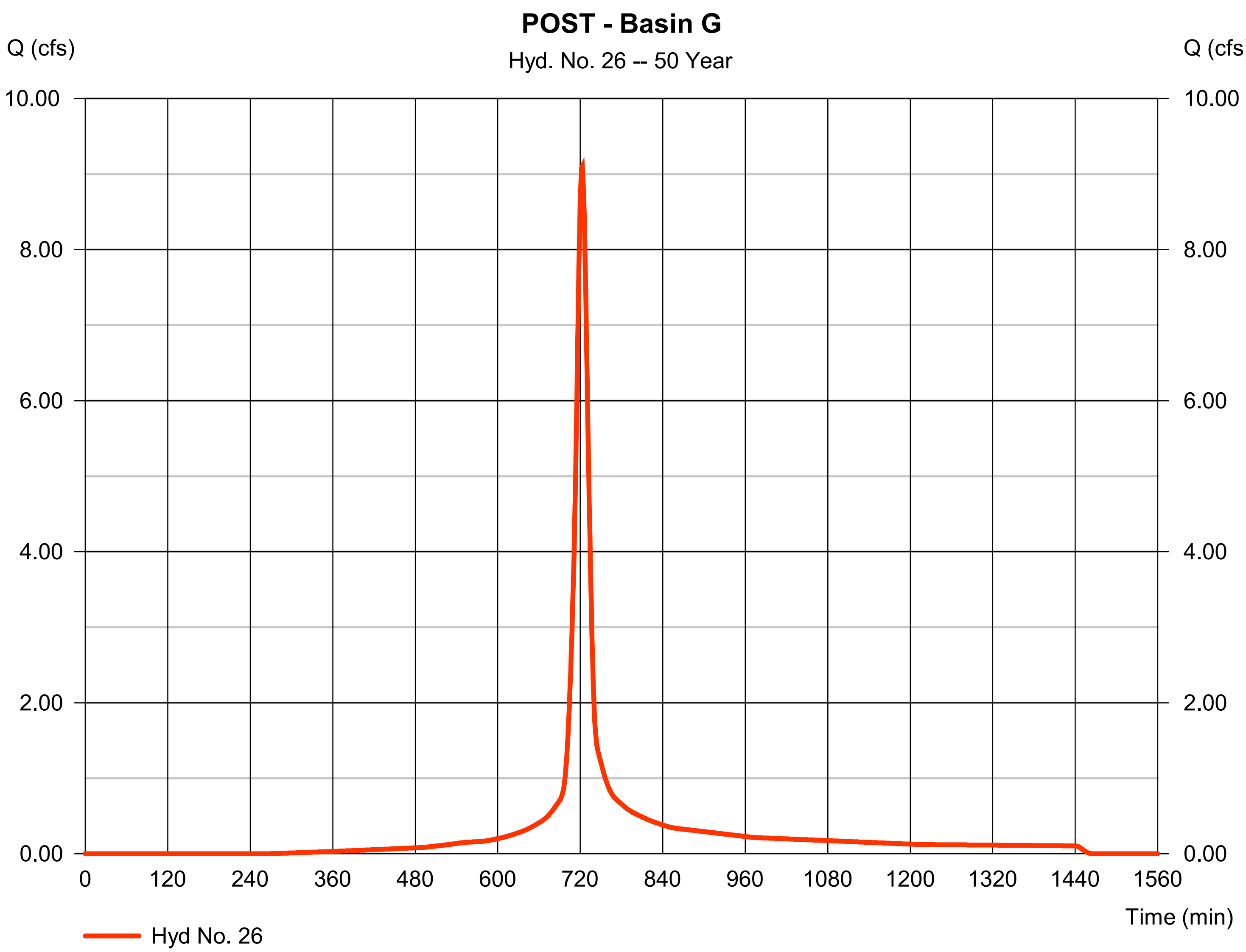
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 26

POST - Basin G

Hydrograph type	= SCS Runoff	Peak discharge	= 9.103 cfs
Storm frequency	= 50 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 26,802 cuft
Drainage area	= 1.670 ac	Curve number	= 87.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 15.80 min
Total precip.	= 5.82 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



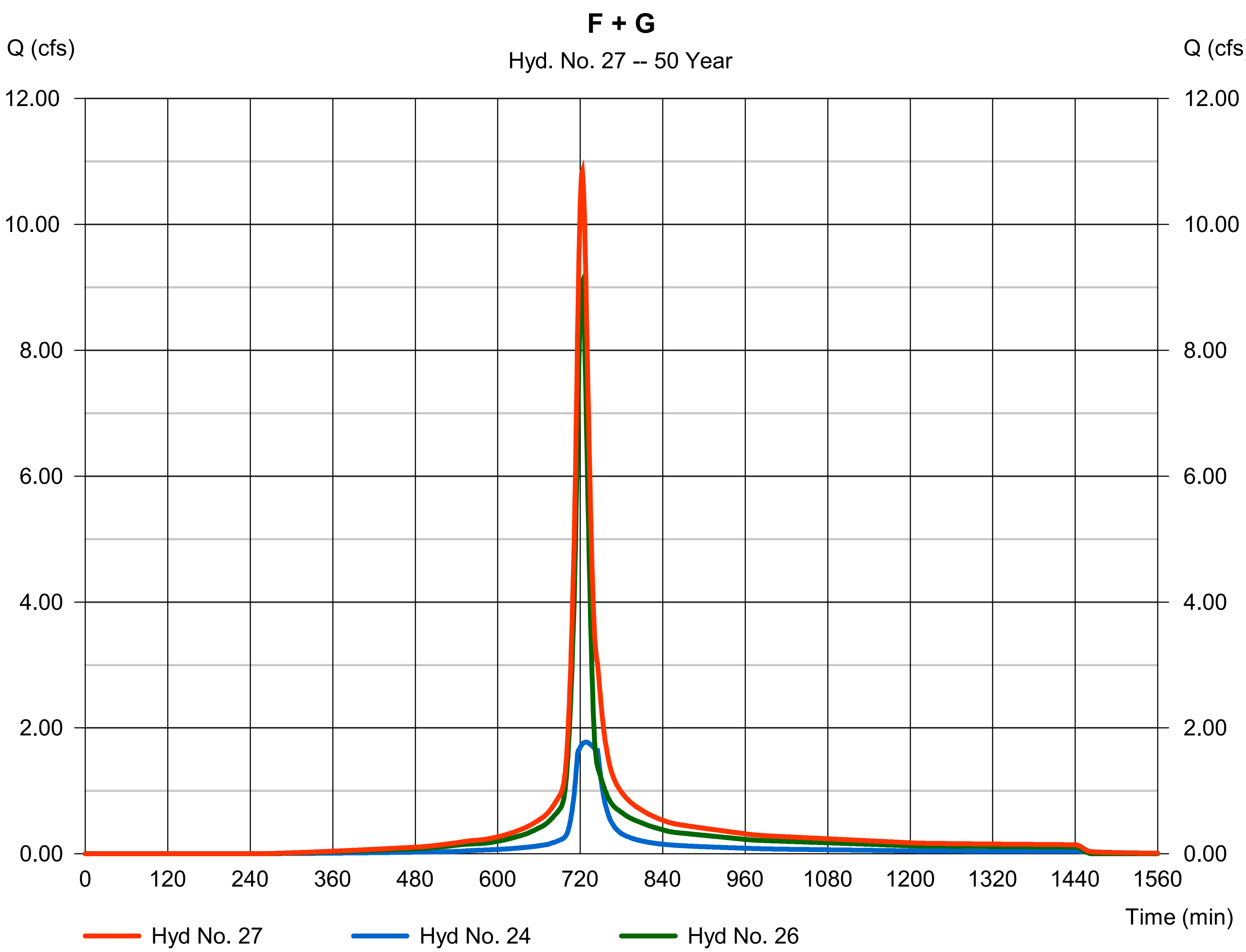
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 27

F + G

Hydrograph type	= Combine	Peak discharge	= 10.85 cfs
Storm frequency	= 50 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 36,542 cuft
Inflow hyds.	= 24, 26	Contrib. drain. area	= 1.670 ac



Hydrograph Report

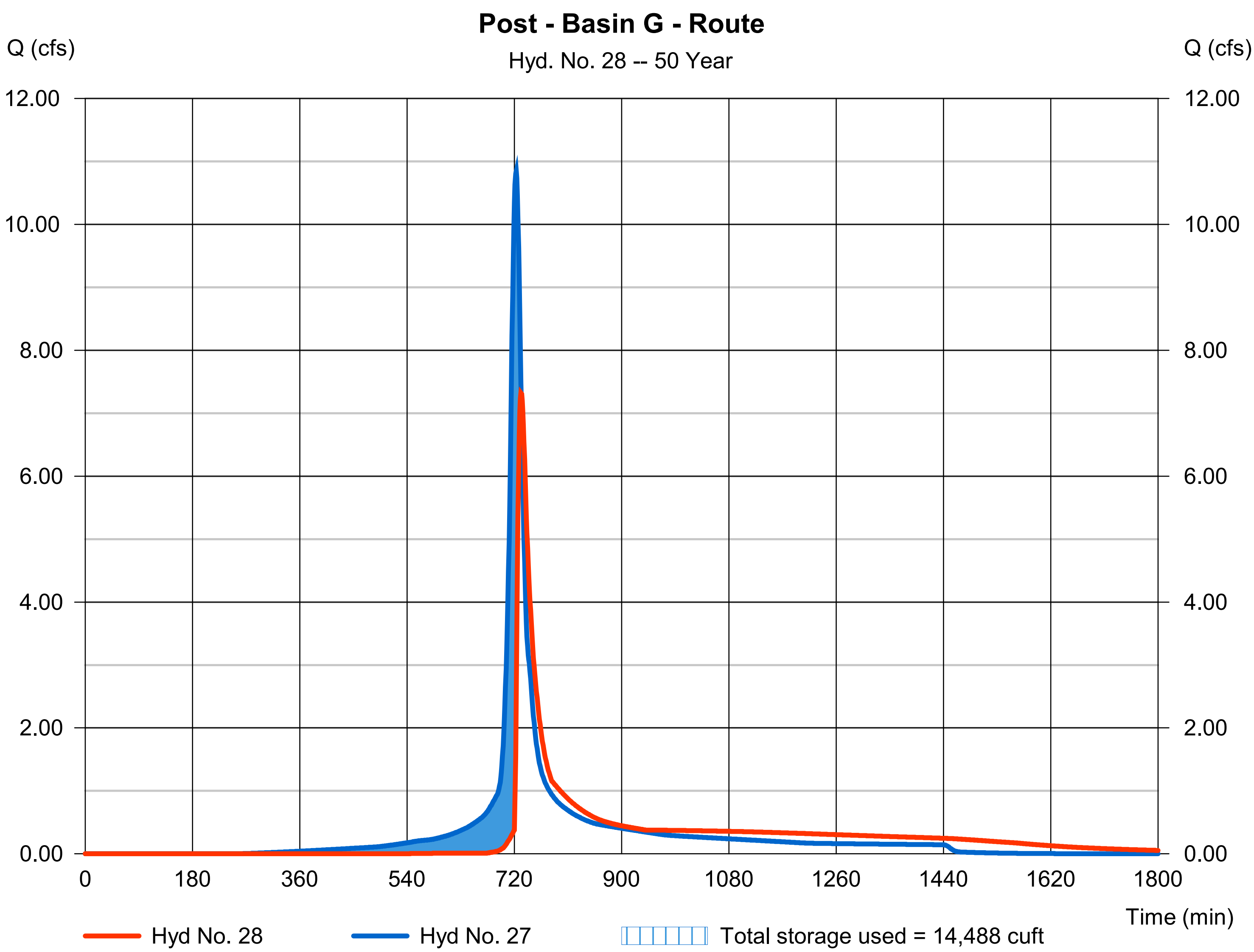
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 | Thursday, 08 / 5 / 2021

Hyd. No. 28

Post - Basin G - Route

Hydrograph type	= Reservoir	Peak discharge	= 7.324 cfs
Storm frequency	= 50 yrs	Time to peak	= 731 min
Time interval	= 1 min	Hyd. volume	= 33,124 cuft
Inflow hyd. No.	= 27 - F + G	Max. Elevation	= 533.47 ft
Reservoir name	= Basin G	Max. Storage	= 14,488 cuft

Storage Indication method used.



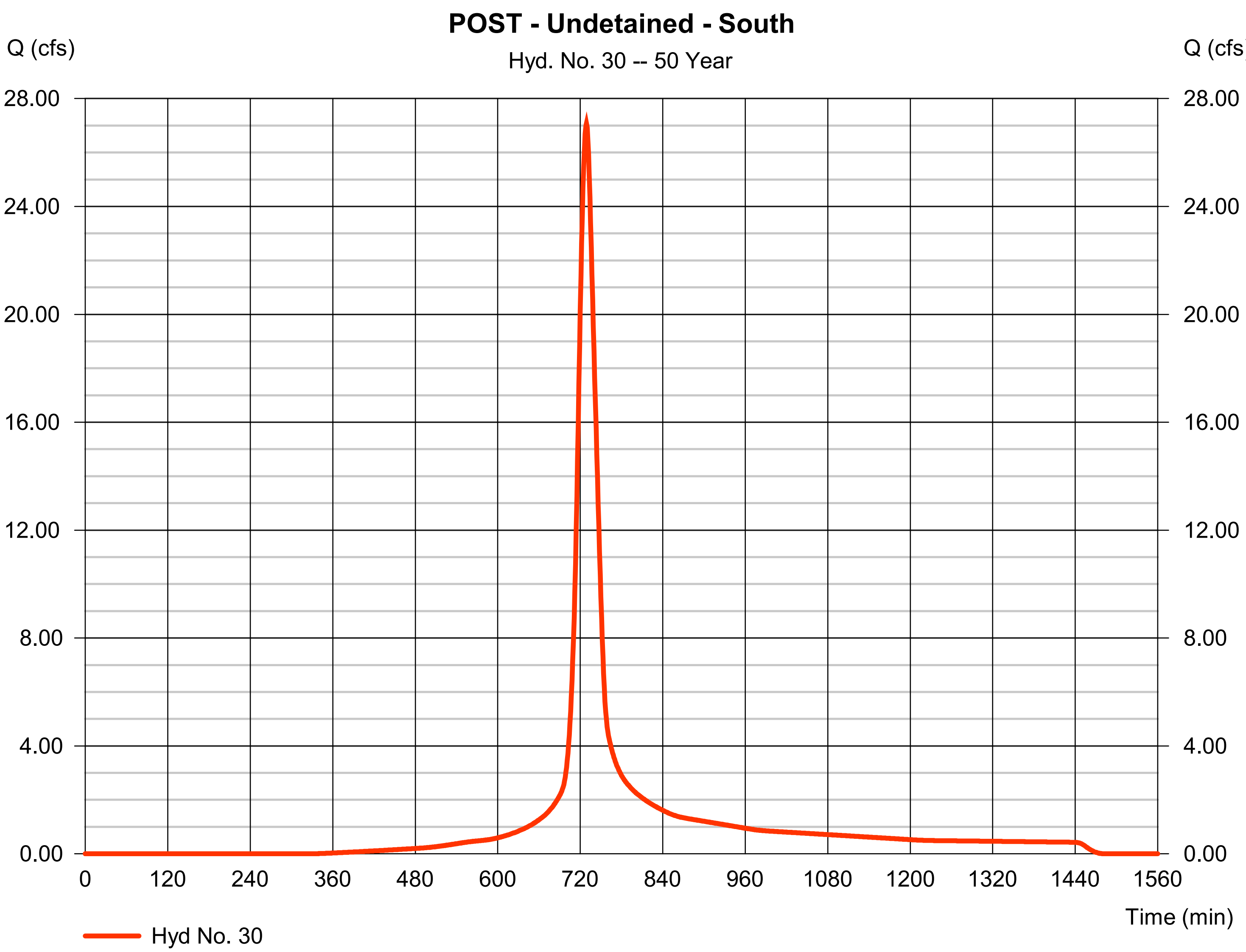
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 30

POST - Undetained - South

Hydrograph type	= SCS Runoff	Peak discharge	= 27.08 cfs
Storm frequency	= 50 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 101,511 cuft
Drainage area	= 6.960 ac	Curve number	= 83.6
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 26.40 min
Total precip.	= 5.82 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



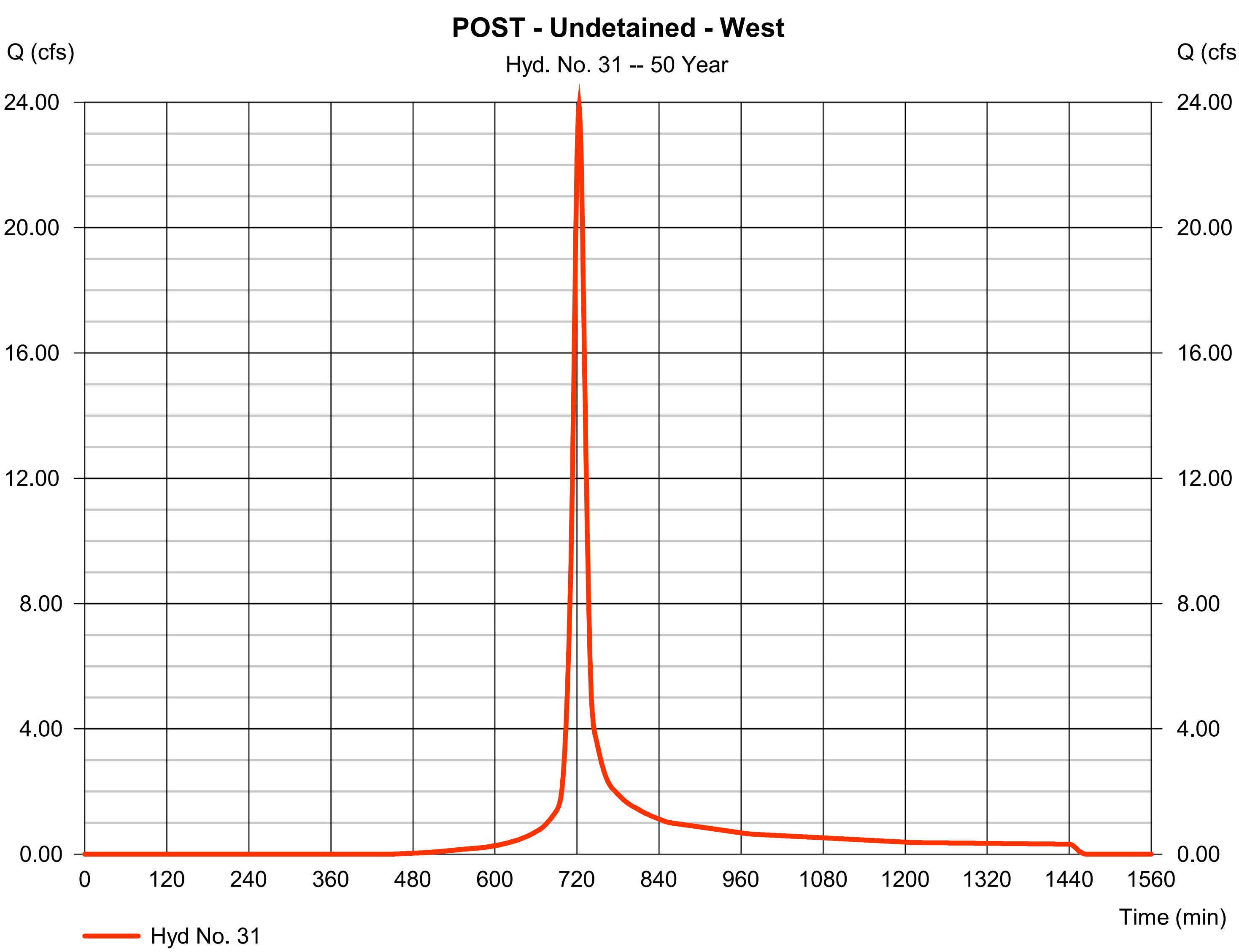
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 31

POST - Undetained - West

Hydrograph type	= SCS Runoff	Peak discharge	= 23.87 cfs
Storm frequency	= 50 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 68,102 cuft
Drainage area	= 5.610 ac	Curve number	= 76.8
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 16.30 min
Total precip.	= 5.82 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



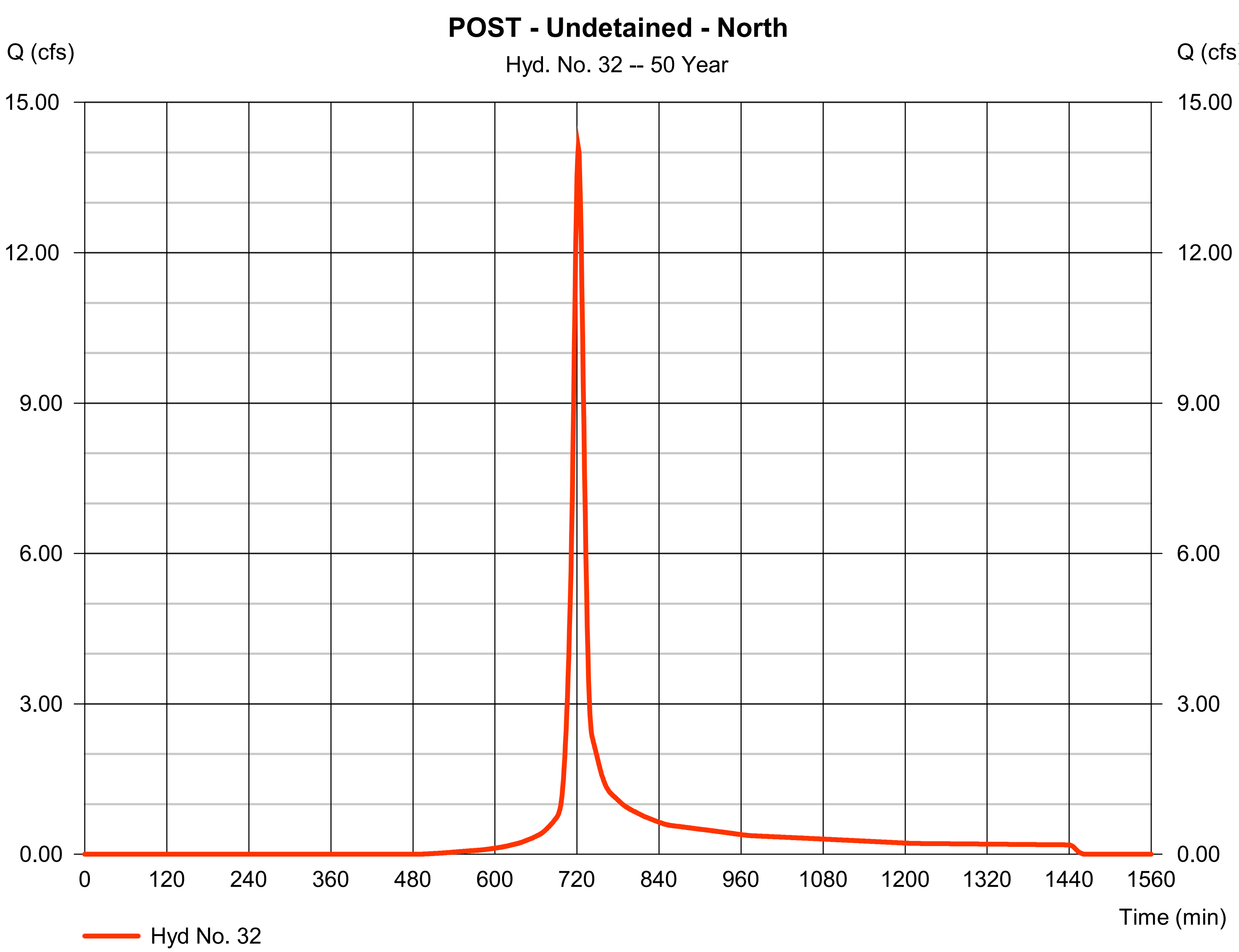
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 32

POST - Undetained - North

Hydrograph type	= SCS Runoff	Peak discharge	= 14.10 cfs
Storm frequency	= 50 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 37,902 cuft
Drainage area	= 3.420 ac	Curve number	= 74.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 14.70 min
Total precip.	= 5.82 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



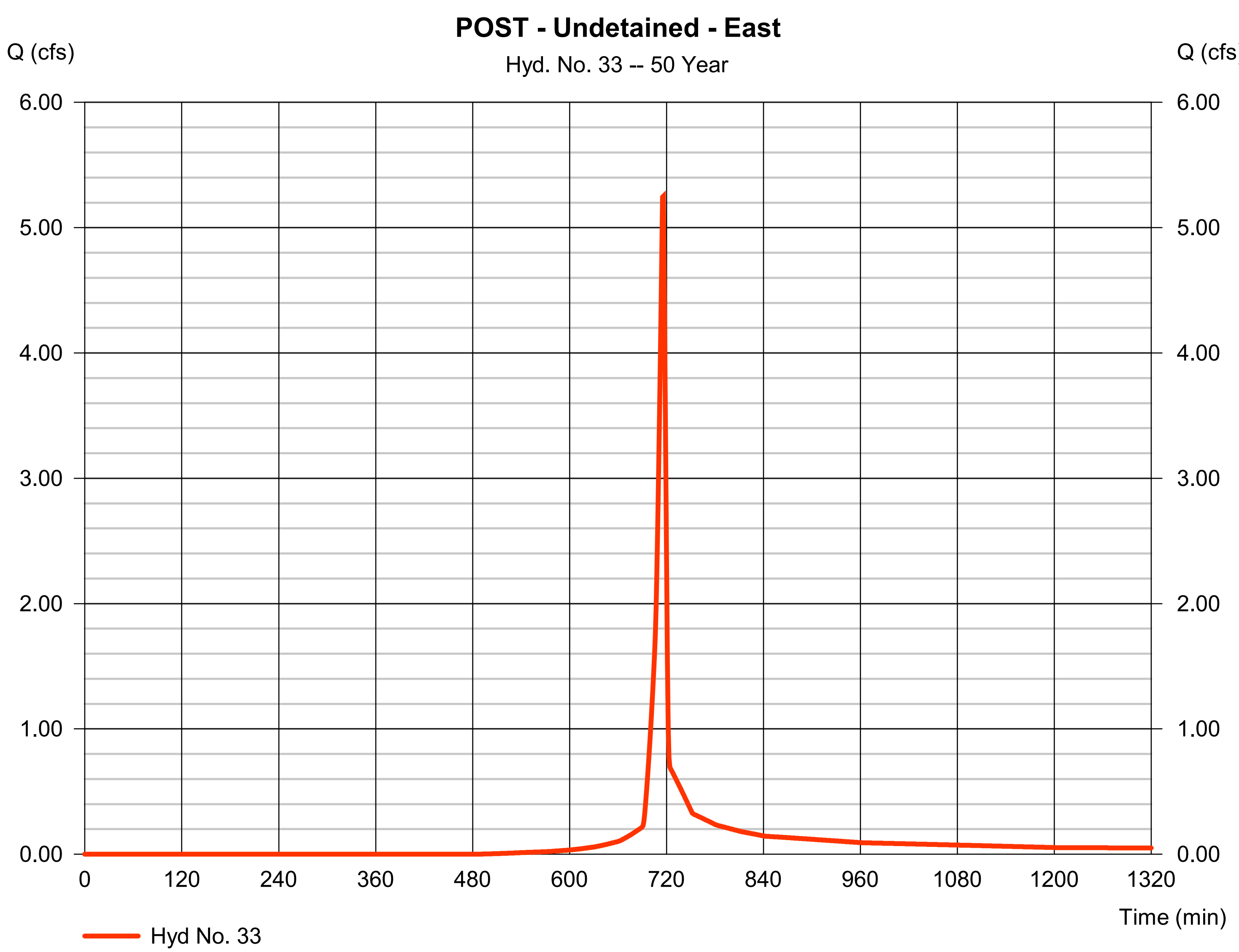
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 33

POST - Undetained - East

Hydrograph type	= SCS Runoff	Peak discharge	= 5.251 cfs
Storm frequency	= 50 yrs	Time to peak	= 716 min
Time interval	= 1 min	Hyd. volume	= 9,322 cuft
Drainage area	= 0.900 ac	Curve number	= 74.1
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 2.00 min
Total precip.	= 5.82 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



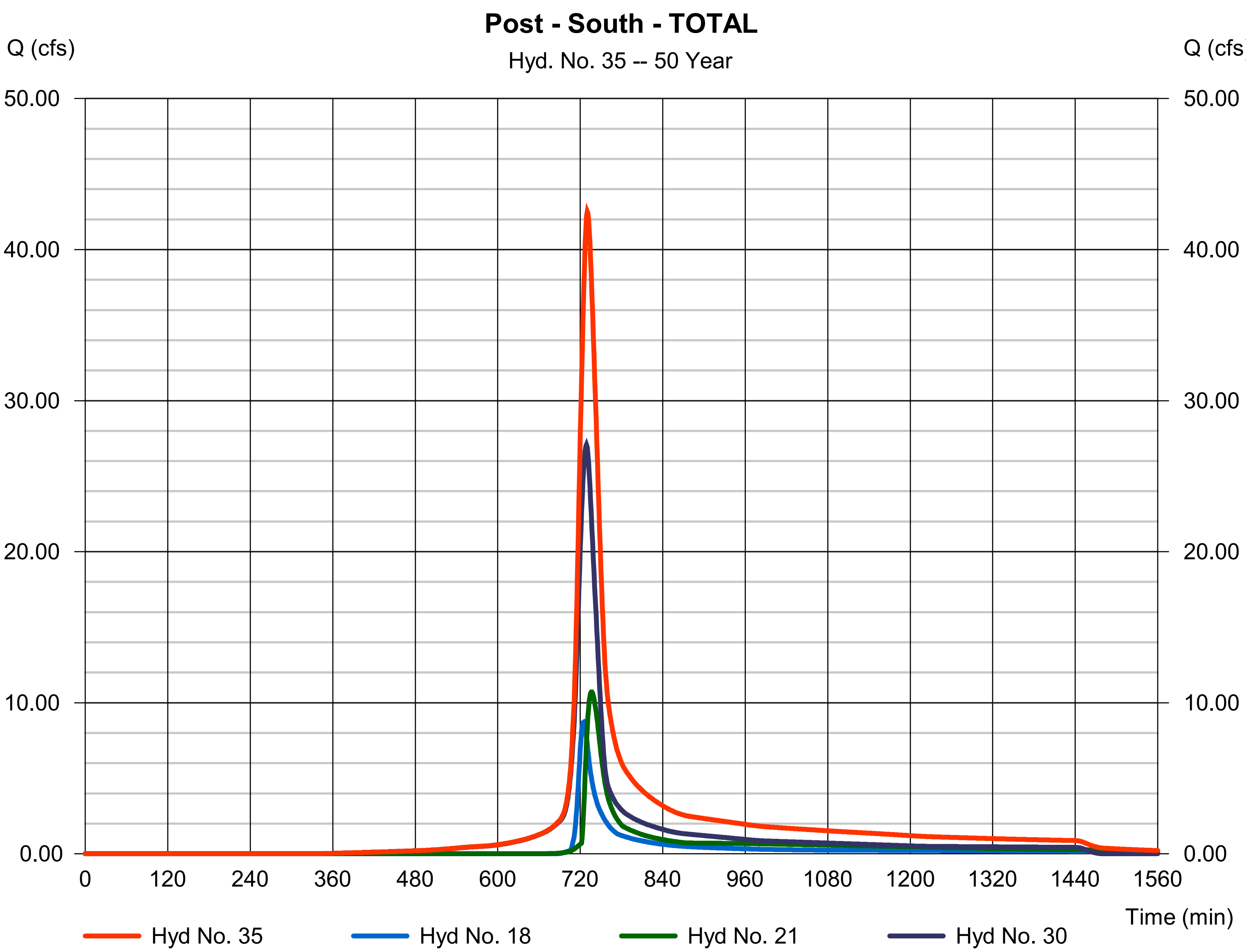
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 35

Post - South - TOTAL

Hydrograph type	= Combine	Peak discharge	= 42.52 cfs
Storm frequency	= 50 yrs	Time to peak	= 730 min
Time interval	= 1 min	Hyd. volume	= 179,062 cuft
Inflow hyds.	= 18, 21, 30	Contrib. drain. area	= 6.960 ac



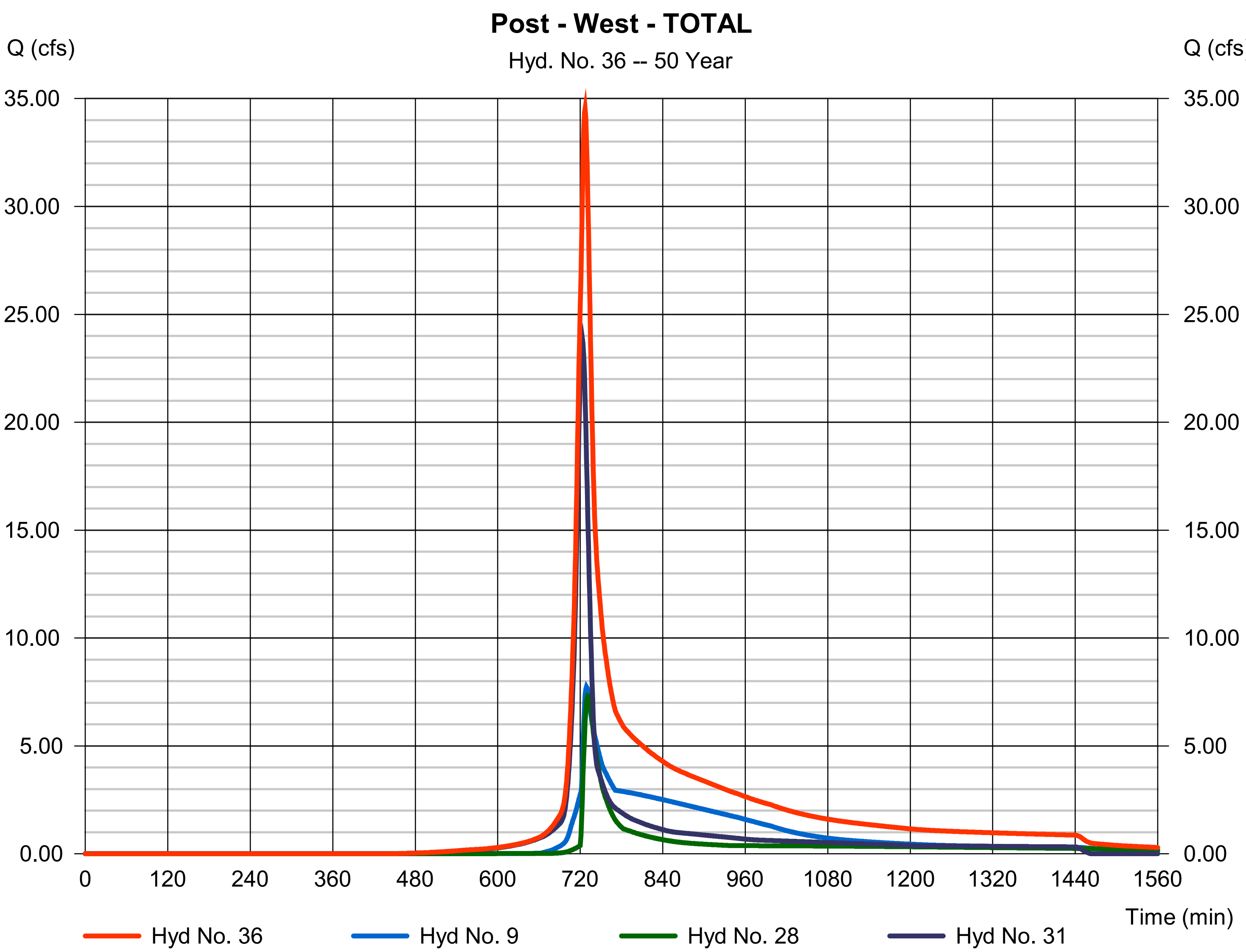
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Thursday, 08 / 5 / 2021

Hyd. No. 36

Post - West - TOTAL

Hydrograph type	= Combine	Peak discharge	= 34.52 cfs
Storm frequency	= 50 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 165,313 cuft
Inflow hyds.	= 9, 28, 31	Contrib. drain. area	= 5.610 ac



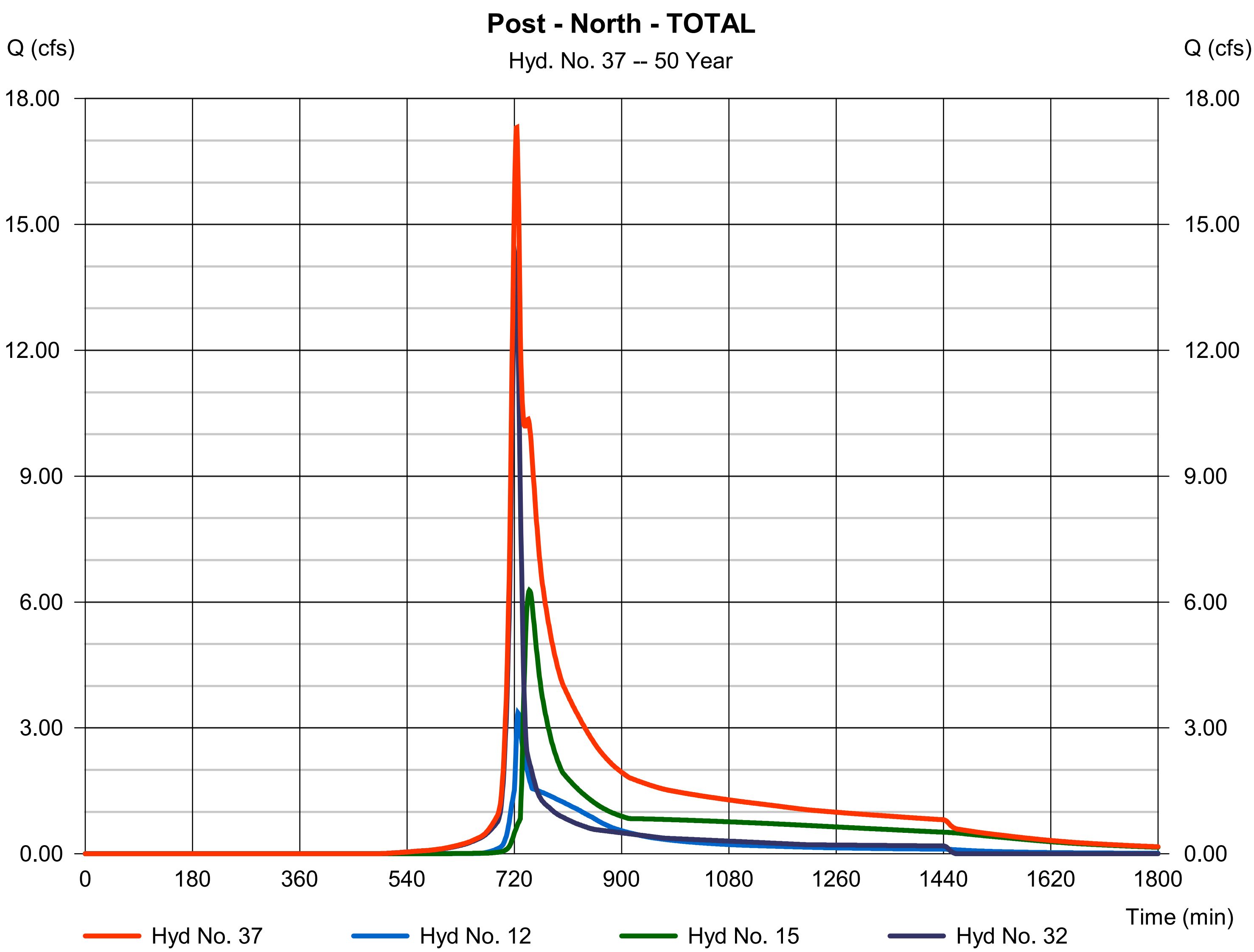
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 37

Post - North - TOTAL

Hydrograph type	= Combine	Peak discharge	= 17.31 cfs
Storm frequency	= 50 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 118,502 cuft
Inflow hyds.	= 12, 15, 32	Contrib. drain. area	= 3.420 ac



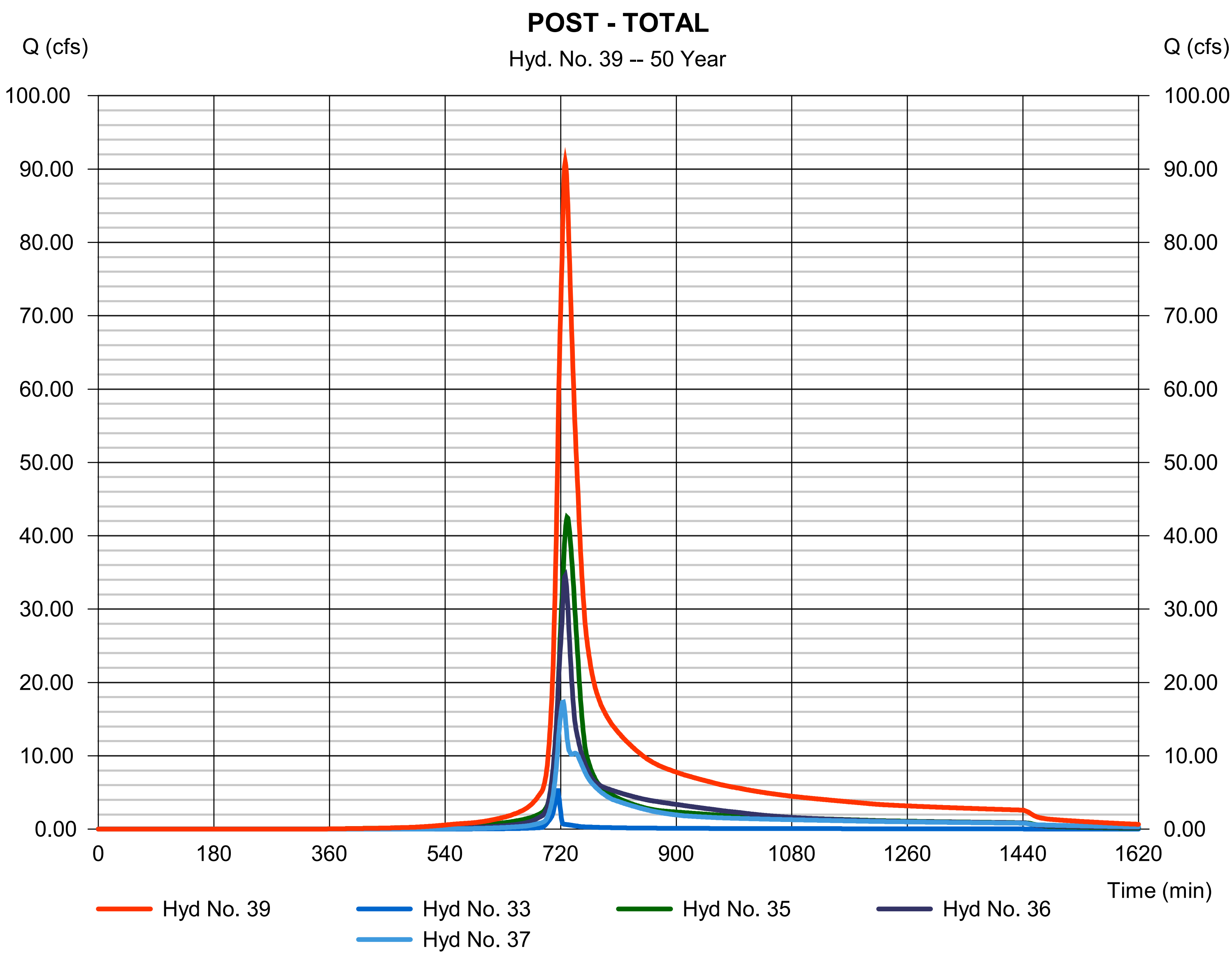
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 39

POST - TOTAL

Hydrograph type	= Combine	Peak discharge	= 90.97 cfs
Storm frequency	= 50 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 472,199 cuft
Inflow hyds.	= 33, 35, 36, 37	Contrib. drain. area	= 0.900 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

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	64.42	1	722	178,650	------	------	------	Pre Development - South
2	SCS Runoff	52.35	1	723	149,506	------	------	------	Pre Development - West
3	SCS Runoff	109.09	1	717	230,718	------	------	------	Pre Development - North
4	SCS Runoff	12.88	1	720	33,077	------	------	------	Pre Development - East
5	Combine	221.35	1	719	591,949	1, 2, 3, 4	------	------	Combined Pre Development
8	SCS Runoff	34.95	1	719	84,844	------	------	------	POST - Basin A
9	Reservoir	15.09	1	727	78,393	8	532.50	40,176	Post - Basin A - Route
11	SCS Runoff	13.42	1	718	30,337	------	------	------	POST - Basin B
12	Reservoir	6.371	1	724	28,379	11	533.16	13,773	Post - Basin B - Route
14	SCS Runoff	22.34	1	727	77,922	------	------	------	POST - Basin C
15	Reservoir	11.02	1	741	71,112	14	532.45	37,057	Post - Basin C - Route
17	SCS Runoff	17.28	1	719	41,176	------	------	------	POST - Basin D
18	Reservoir	11.58	1	724	37,545	17	535.49	14,843	Post - Basin D - Route
20	SCS Runoff	17.21	1	728	63,111	------	------	------	POST - Basin E
21	Reservoir	13.18	1	736	58,149	20	534.06	21,550	Post - Basin E - Route
23	SCS Runoff	4.506	1	720	11,693	------	------	------	POST - Basin F
24	Reservoir	1.854	1	729	11,689	23	535.46	2,964	Post - Basin F - Route
26	SCS Runoff	10.90	1	723	32,406	------	------	------	POST - Basin G
27	Combine	12.71	1	723	44,095	24, 26	------	------	F + G
28	Reservoir	10.23	1	729	40,653	27	533.55	15,307	Post - Basin G - Route
30	SCS Runoff	32.92	1	729	124,189	------	------	------	POST - Undetained - South
31	SCS Runoff	29.81	1	723	85,328	------	------	------	POST - Undetained - West
32	SCS Runoff	17.81	1	722	47,961	------	------	------	POST - Undetained - North
33	SCS Runoff	6.585	1	715	11,800	------	------	------	POST - Undetained - East
35	Combine	55.03	1	729	219,883	18, 21, 30,	------	------	Post - South - TOTAL
36	Combine	52.36	1	725	204,374	9, 28, 31,	------	------	Post - West - TOTAL
37	Combine	24.62	1	723	147,451	12, 15, 32,	------	------	Post - North - TOTAL
39	Combine	128.72	1	726	583,509	33, 35, 36, 37,	------	------	POST - TOTAL

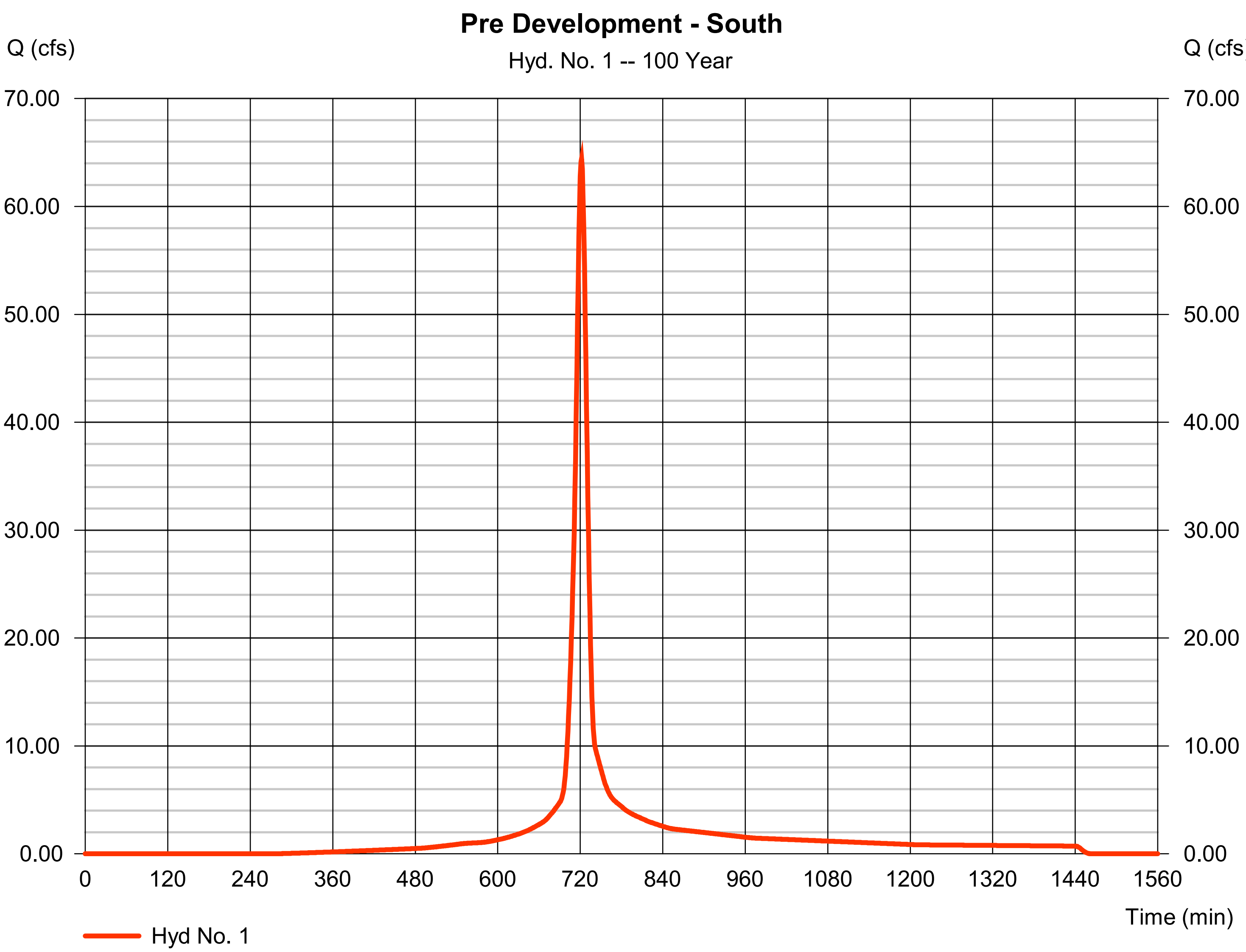
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Thursday, 08 / 5 / 2021

Hyd. No. 1

Pre Development - South

Hydrograph type	= SCS Runoff	Peak discharge	= 64.42 cfs
Storm frequency	= 100 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 178,650 cuft
Drainage area	= 9.910 ac	Curve number	= 84.4
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 13.60 min
Total precip.	= 6.77 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



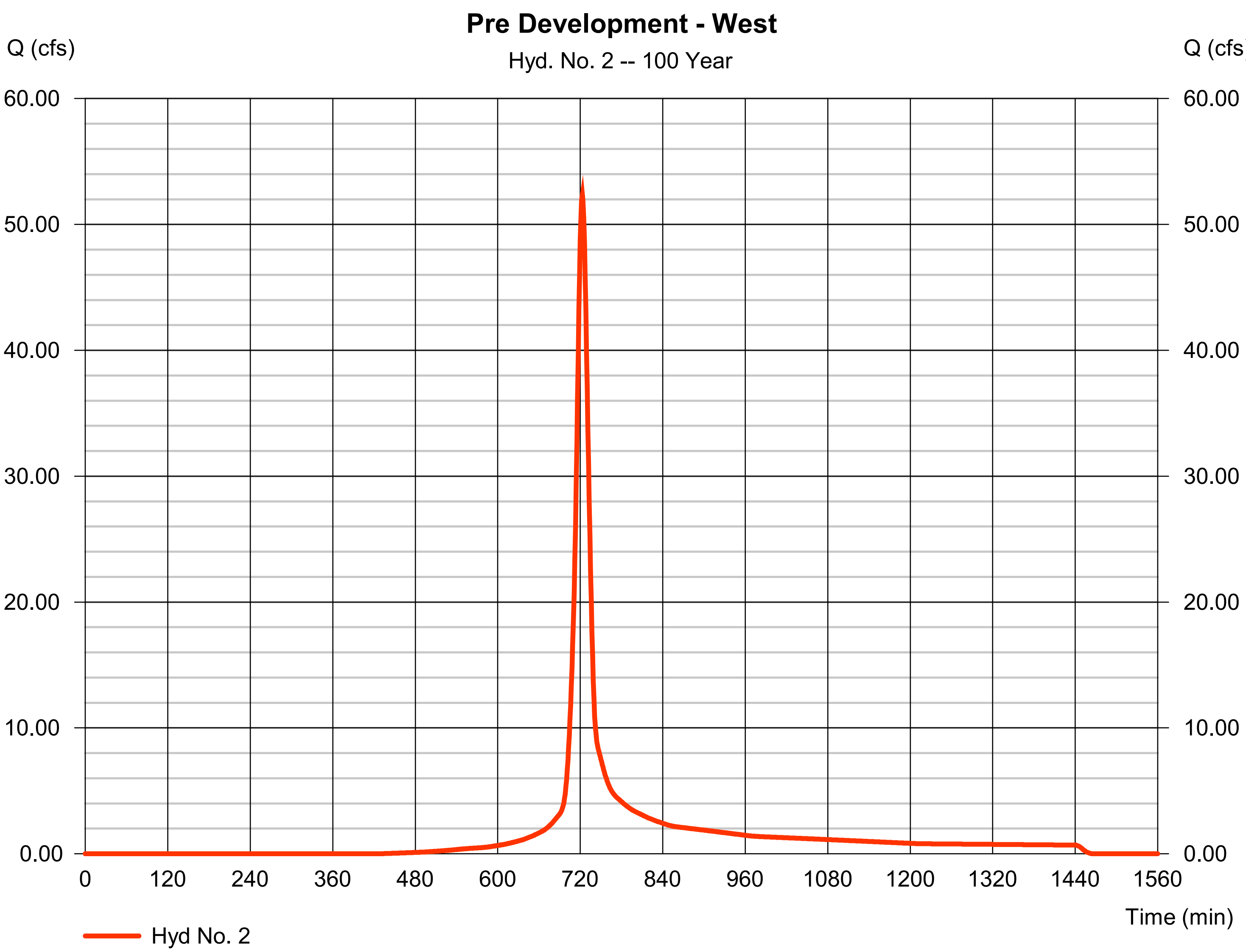
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 2

Pre Development - West

Hydrograph type	= SCS Runoff	Peak discharge	= 52.35 cfs
Storm frequency	= 100 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 149,506 cuft
Drainage area	= 10.250 ac	Curve number	= 75.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 16.30 min
Total precip.	= 6.77 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



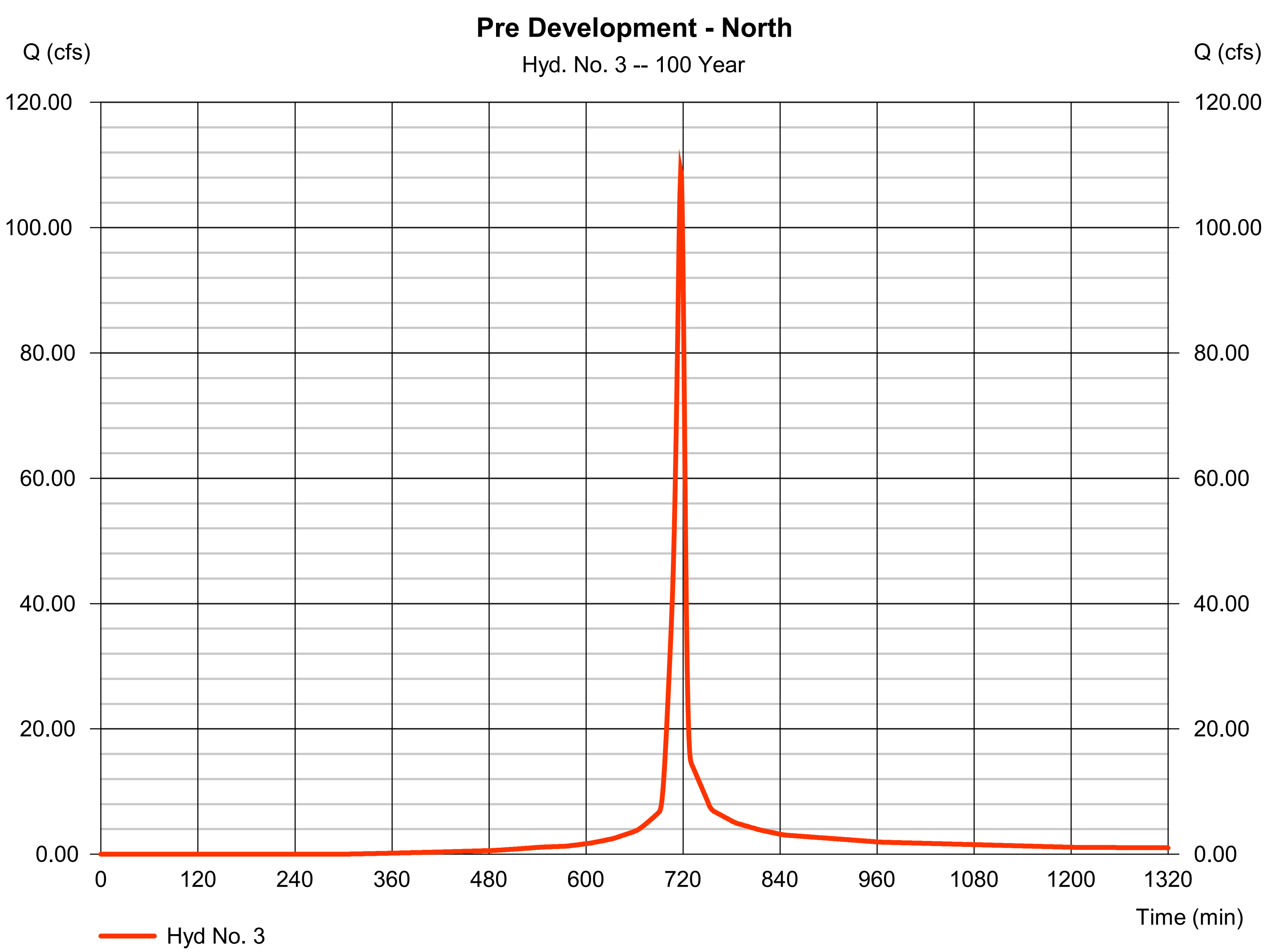
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 3

Pre Development - North

Hydrograph type	= SCS Runoff	Peak discharge	= 109.09 cfs
Storm frequency	= 100 yrs	Time to peak	= 717 min
Time interval	= 1 min	Hyd. volume	= 230,718 cuft
Drainage area	= 12.840 ac	Curve number	= 82.9
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.30 min
Total precip.	= 6.77 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



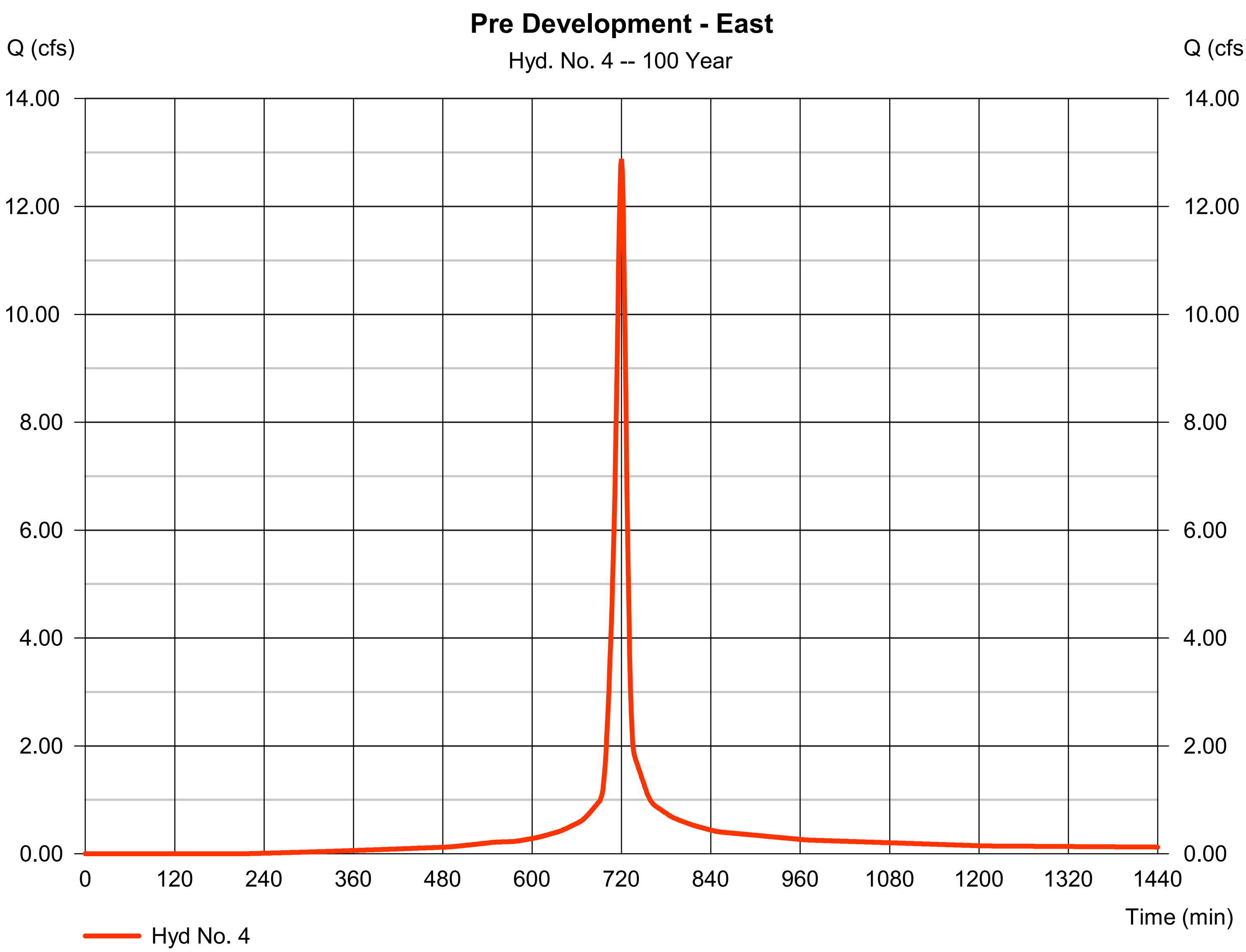
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 4

Pre Development - East

Hydrograph type	= SCS Runoff	Peak discharge	= 12.88 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 1 min	Hyd. volume	= 33,077 cuft
Drainage area	= 1.660 ac	Curve number	= 88.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 11.20 min
Total precip.	= 6.77 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



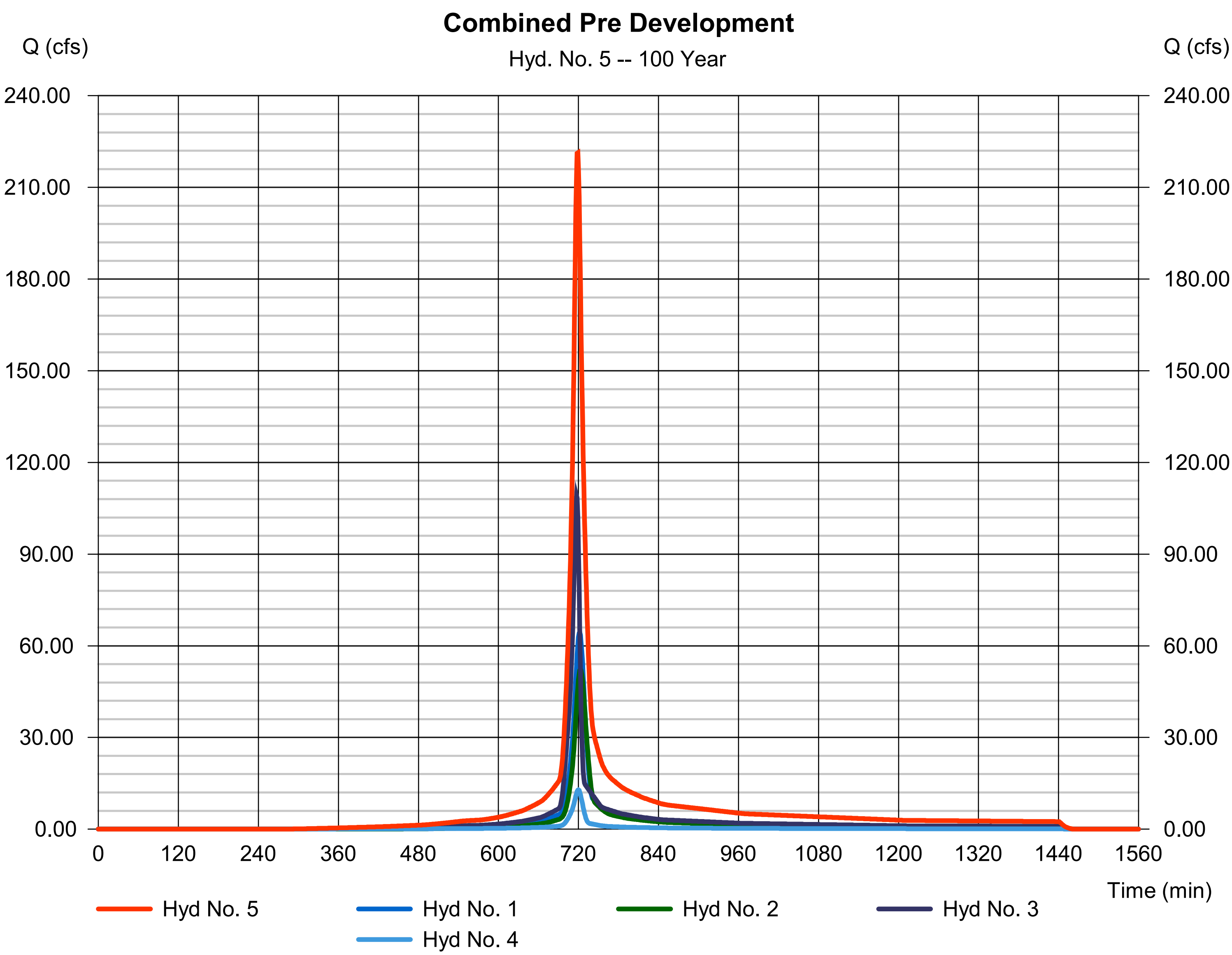
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 5

Combined Pre Development

Hydrograph type	= Combine	Peak discharge	= 221.35 cfs
Storm frequency	= 100 yrs	Time to peak	= 719 min
Time interval	= 1 min	Hyd. volume	= 591,949 cuft
Inflow hyds.	= 1, 2, 3, 4	Contrib. drain. area	= 34.660 ac



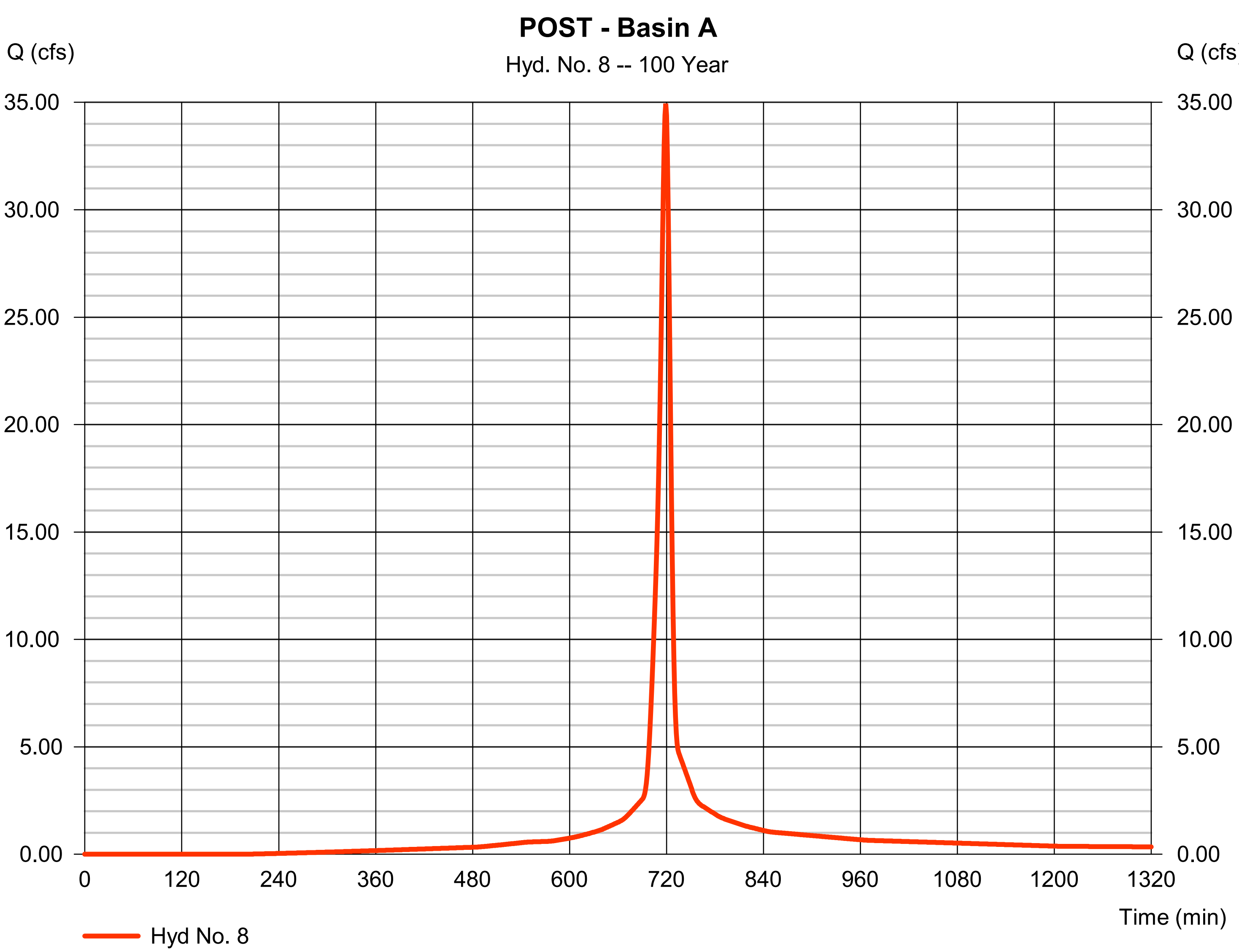
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 8

POST - Basin A

Hydrograph type	= SCS Runoff	Peak discharge	= 34.95 cfs
Storm frequency	= 100 yrs	Time to peak	= 719 min
Time interval	= 1 min	Hyd. volume	= 84,844 cuft
Drainage area	= 4.280 ac	Curve number	= 88.8
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.10 min
Total precip.	= 6.77 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

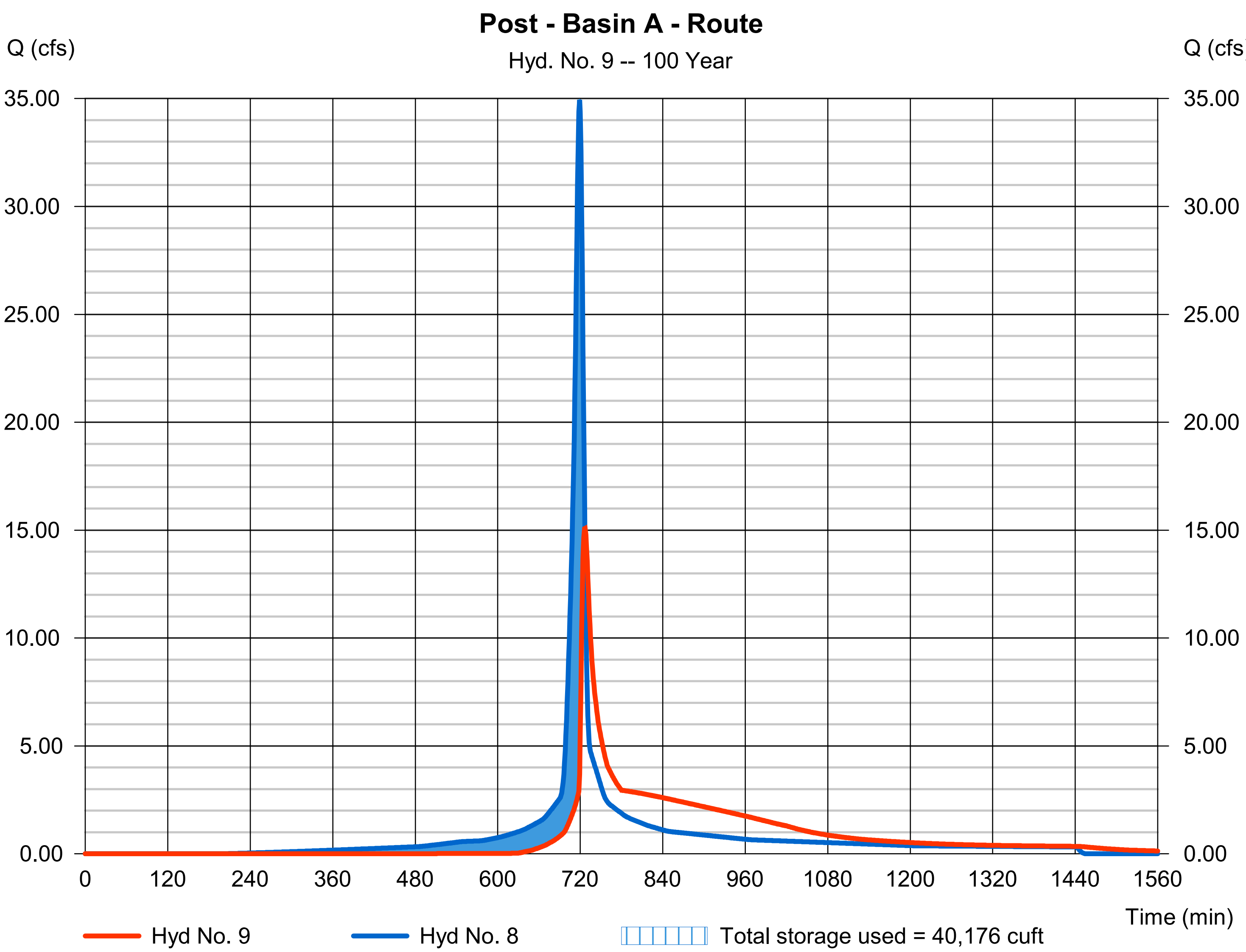
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 9

Post - Basin A - Route

Hydrograph type	= Reservoir	Peak discharge	= 15.09 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 78,393 cuft
Inflow hyd. No.	= 8 - POST - Basin A	Max. Elevation	= 532.50 ft
Reservoir name	= Basin A	Max. Storage	= 40,176 cuft

Storage Indication method used.



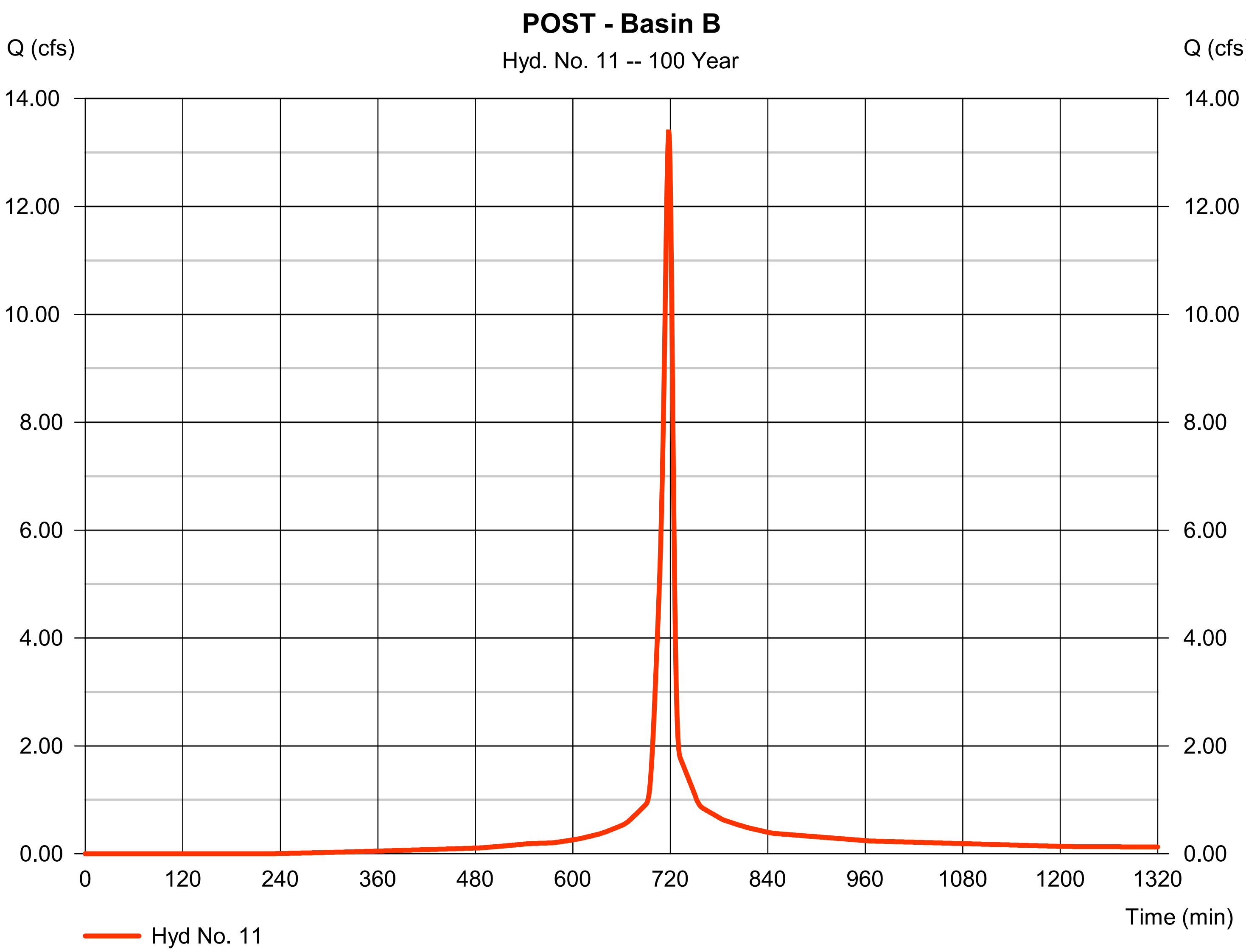
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 11

POST - Basin B

Hydrograph type	= SCS Runoff	Peak discharge	= 13.42 cfs
Storm frequency	= 100 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 30,337 cuft
Drainage area	= 1.620 ac	Curve number	= 87.3
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.90 min
Total precip.	= 6.77 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

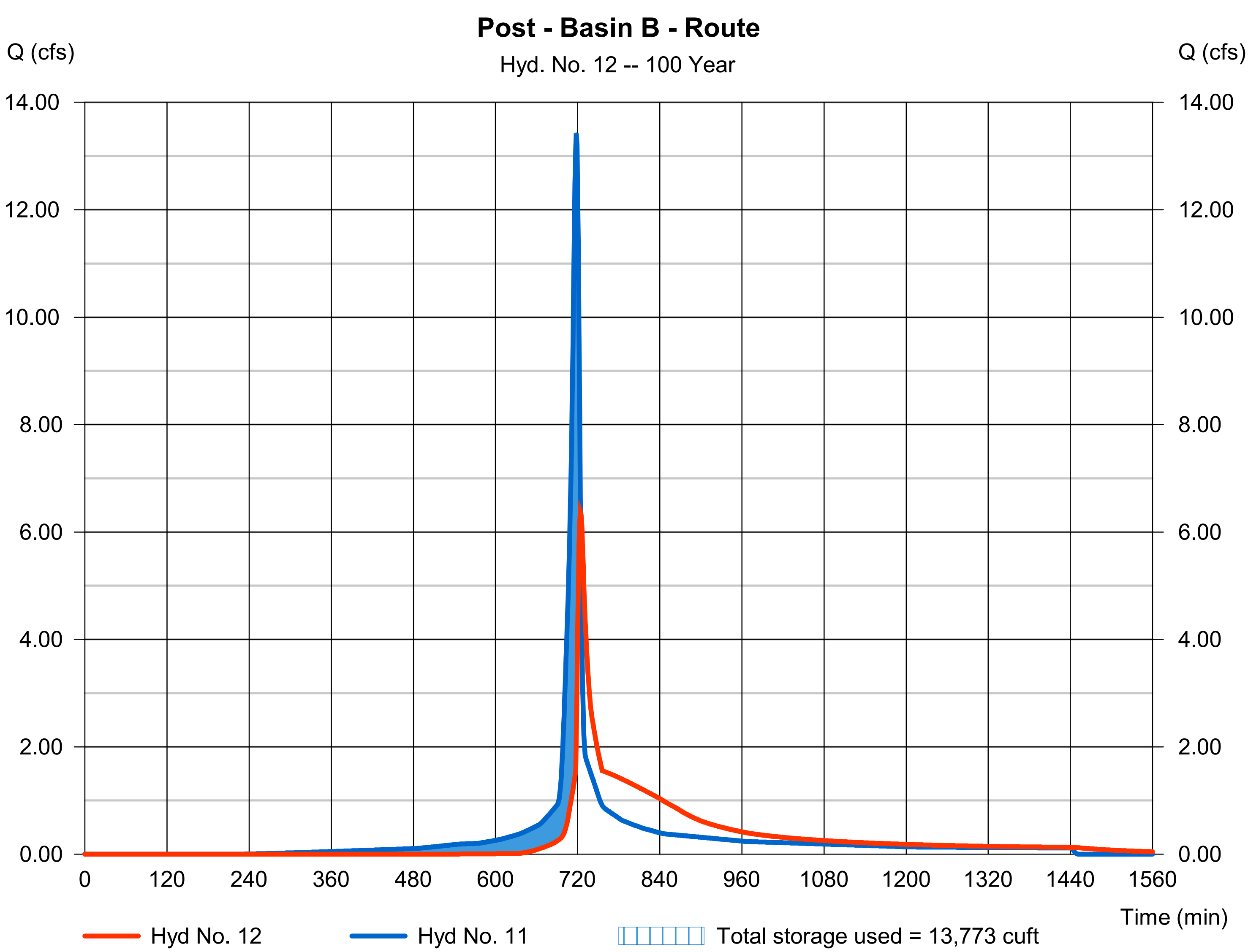
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 12

Post - Basin B - Route

Hydrograph type	= Reservoir	Peak discharge	= 6.371 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 28,379 cuft
Inflow hyd. No.	= 11 - POST - Basin B	Max. Elevation	= 533.16 ft
Reservoir name	= Basin B	Max. Storage	= 13,773 cuft

Storage Indication method used.



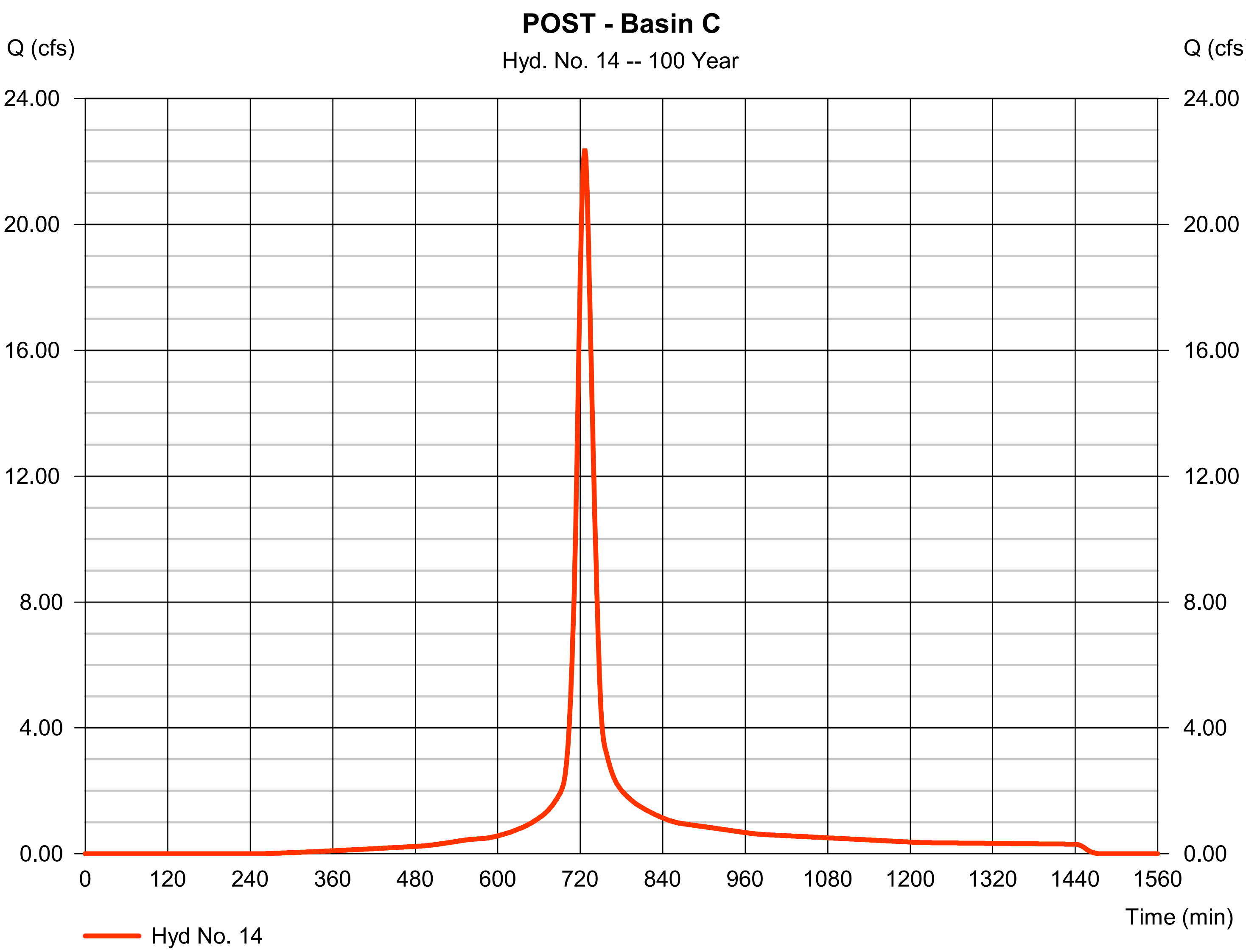
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 14

POST - Basin C

Hydrograph type	= SCS Runoff	Peak discharge	= 22.34 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 77,922 cuft
Drainage area	= 4.210 ac	Curve number	= 86
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 23.00 min
Total precip.	= 6.77 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

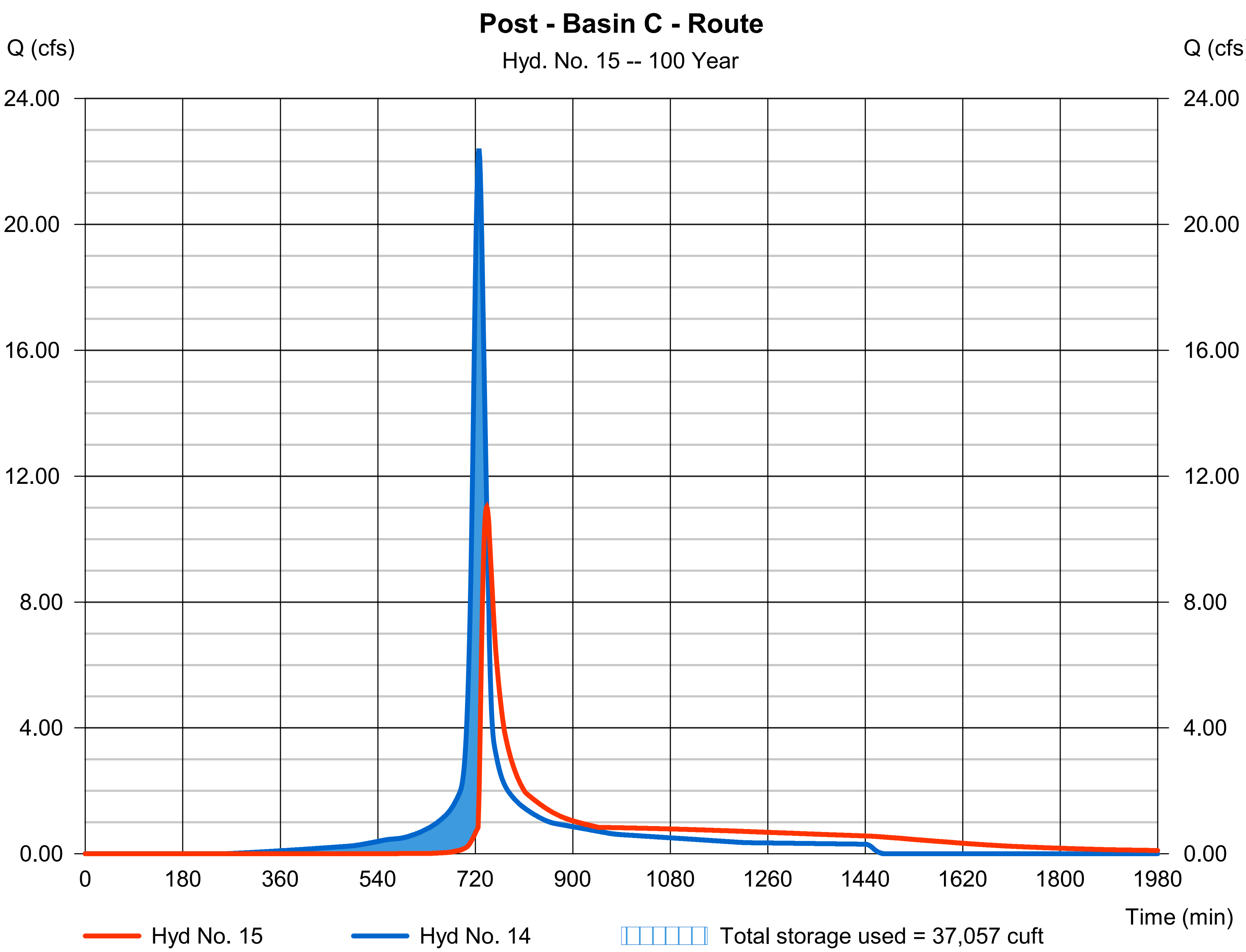
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 15

Post - Basin C - Route

Hydrograph type	= Reservoir	Peak discharge	= 11.02 cfs
Storm frequency	= 100 yrs	Time to peak	= 741 min
Time interval	= 1 min	Hyd. volume	= 71,112 cuft
Inflow hyd. No.	= 14 - POST - Basin C	Max. Elevation	= 532.45 ft
Reservoir name	= Basin C	Max. Storage	= 37,057 cuft

Storage Indication method used.



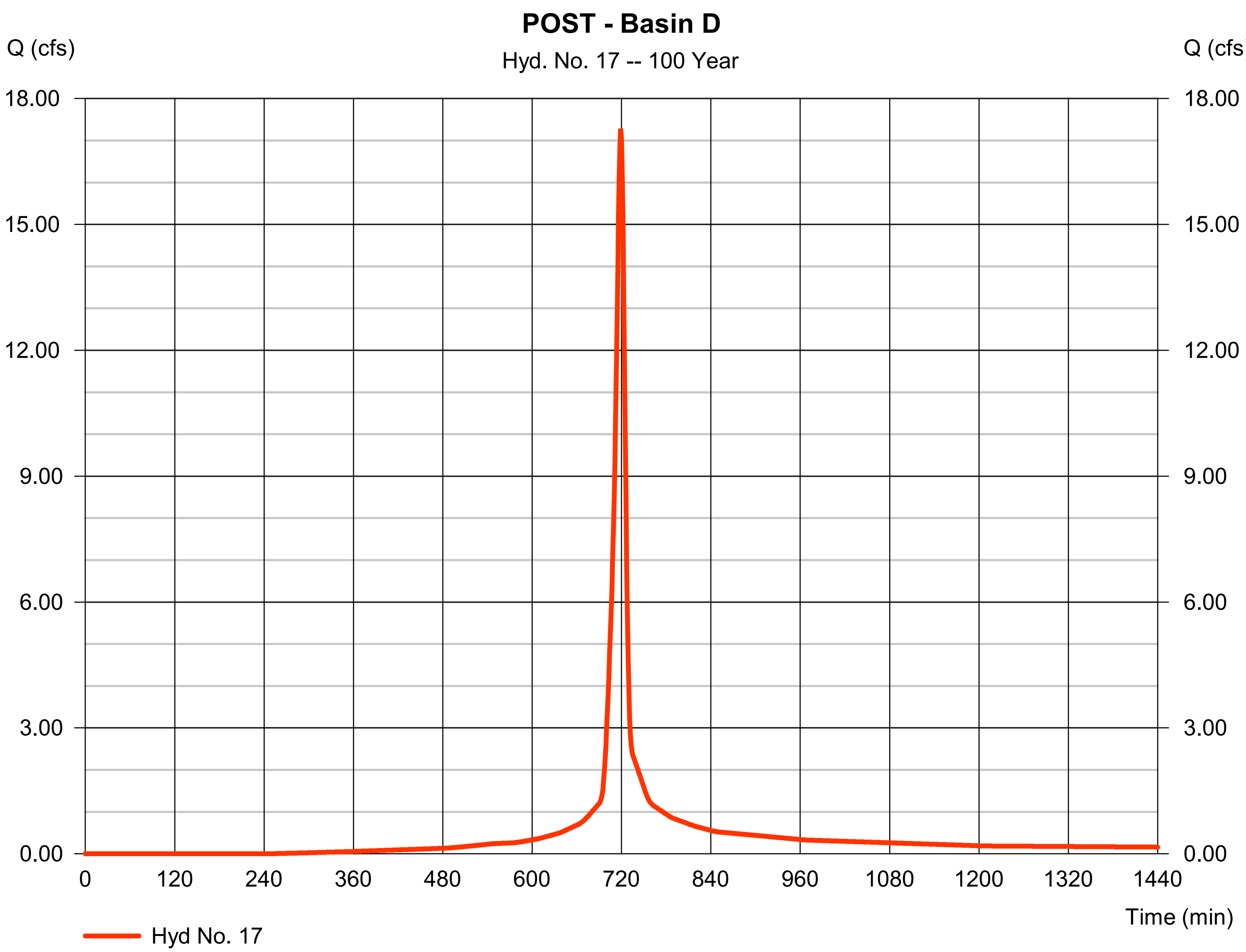
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 17

POST - Basin D

Hydrograph type	= SCS Runoff	Peak discharge	= 17.28 cfs
Storm frequency	= 100 yrs	Time to peak	= 719 min
Time interval	= 1 min	Hyd. volume	= 41,176 cuft
Drainage area	= 2.200 ac	Curve number	= 86.1
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.60 min
Total precip.	= 6.77 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

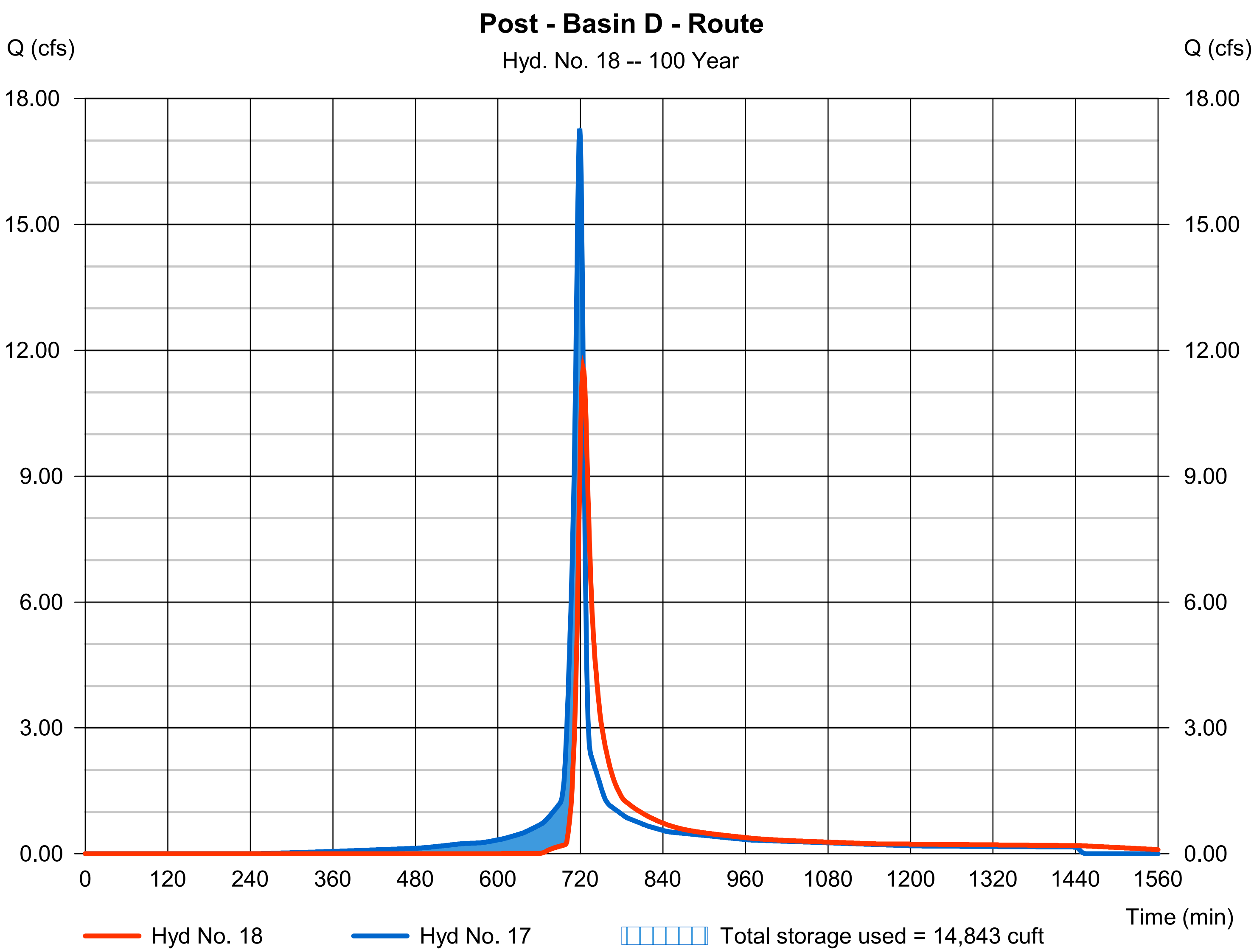
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Thursday, 08 / 5 / 2021

Hyd. No. 18

Post - Basin D - Route

Hydrograph type	= Reservoir	Peak discharge	= 11.58 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 37,545 cuft
Inflow hyd. No.	= 17 - POST - Basin D	Max. Elevation	= 535.49 ft
Reservoir name	= Basin D	Max. Storage	= 14,843 cuft

Storage Indication method used.



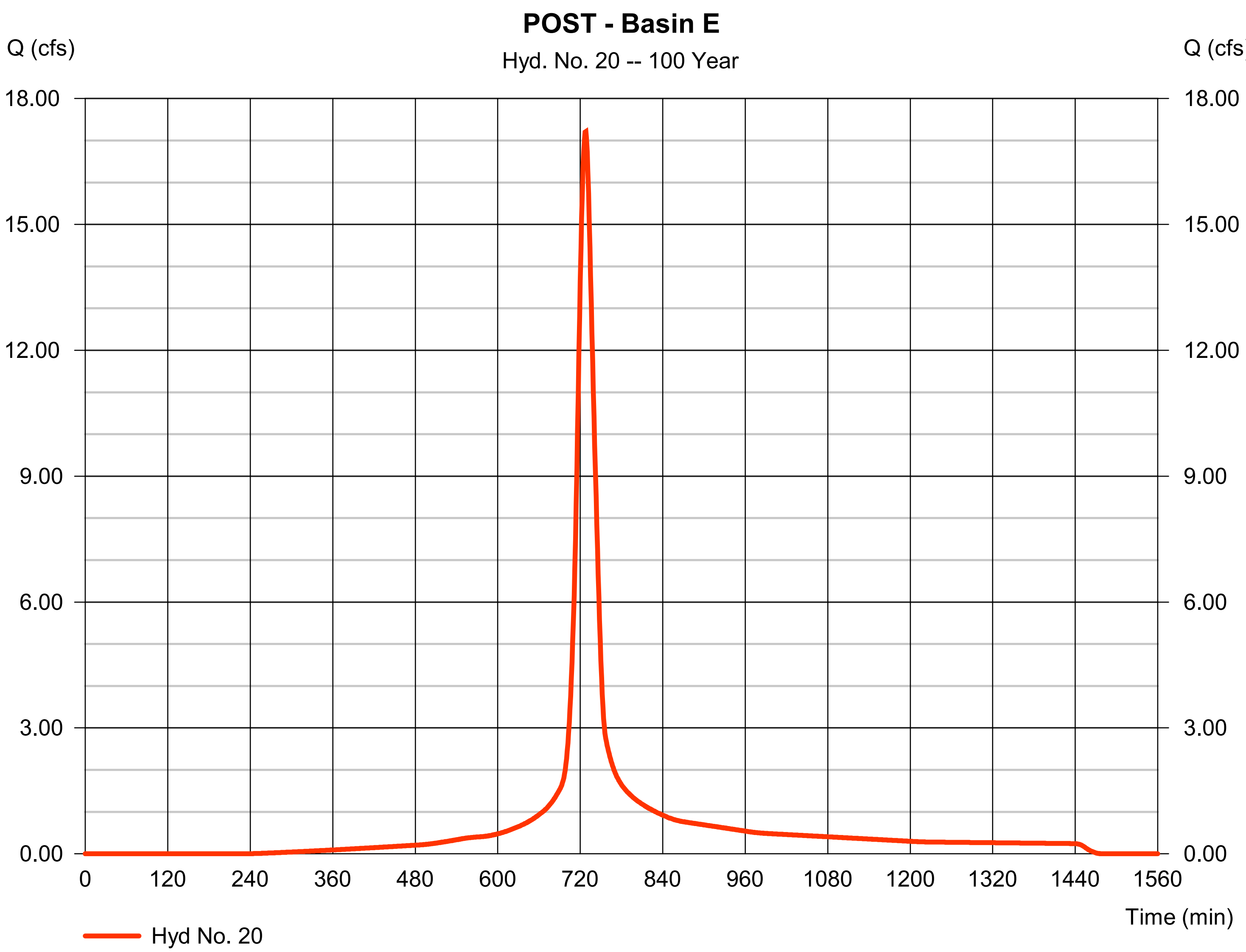
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 20

POST - Basin E

Hydrograph type	= SCS Runoff	Peak discharge	= 17.21 cfs
Storm frequency	= 100 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 63,111 cuft
Drainage area	= 3.300 ac	Curve number	= 87.1
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 25.30 min
Total precip.	= 6.77 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

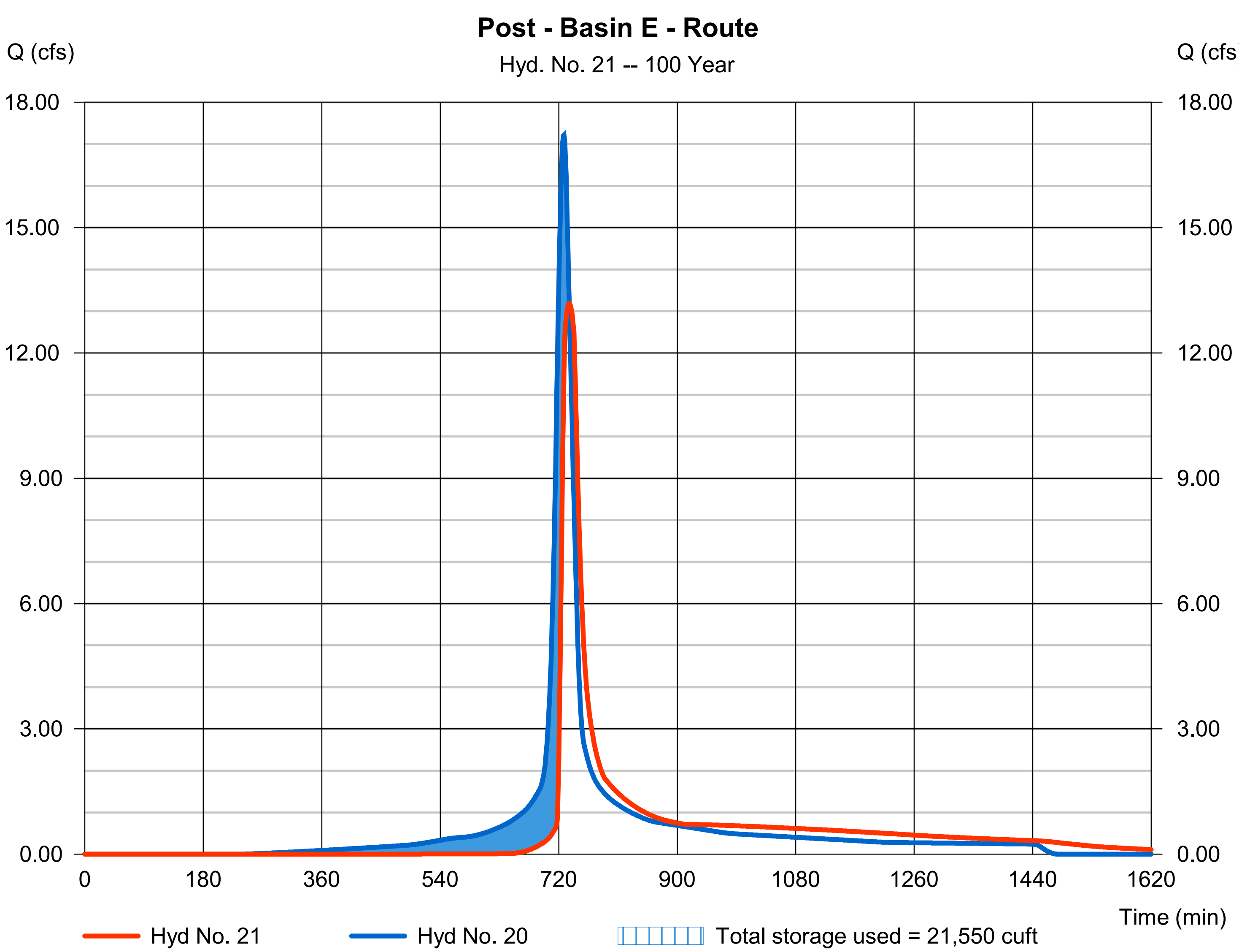
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 | Thursday, 08 / 5 / 2021

Hyd. No. 21

Post - Basin E - Route

Hydrograph type	= Reservoir	Peak discharge	= 13.18 cfs
Storm frequency	= 100 yrs	Time to peak	= 736 min
Time interval	= 1 min	Hyd. volume	= 58,149 cuft
Inflow hyd. No.	= 20 - POST - Basin E	Max. Elevation	= 534.06 ft
Reservoir name	= Basin E	Max. Storage	= 21,550 cuft

Storage Indication method used.



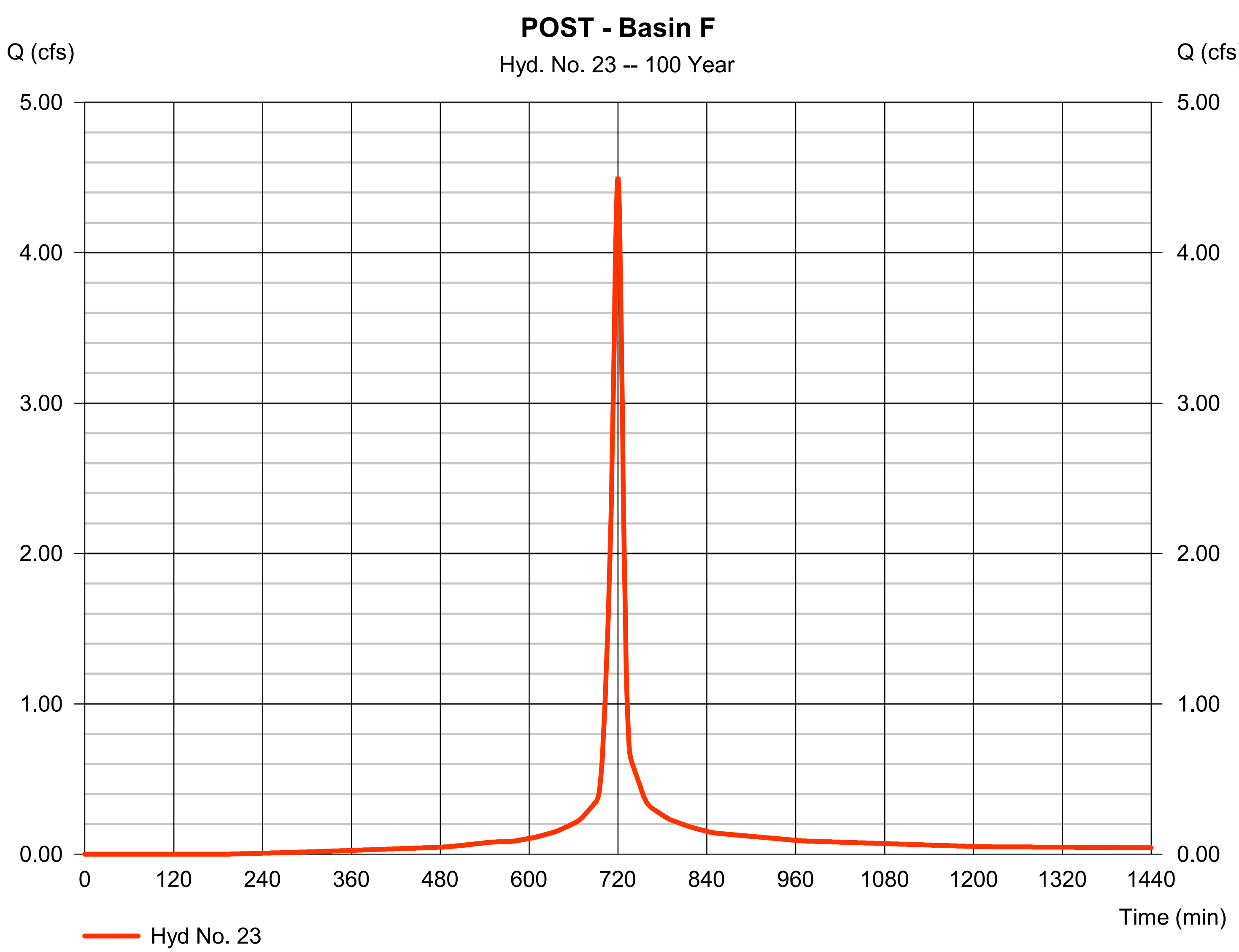
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Thursday, 08 / 5 / 2021

Hyd. No. 23

POST - Basin F

Hydrograph type	= SCS Runoff	Peak discharge	= 4.506 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 1 min	Hyd. volume	= 11,693 cuft
Drainage area	= 0.570 ac	Curve number	= 89.6
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 10.20 min
Total precip.	= 6.77 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

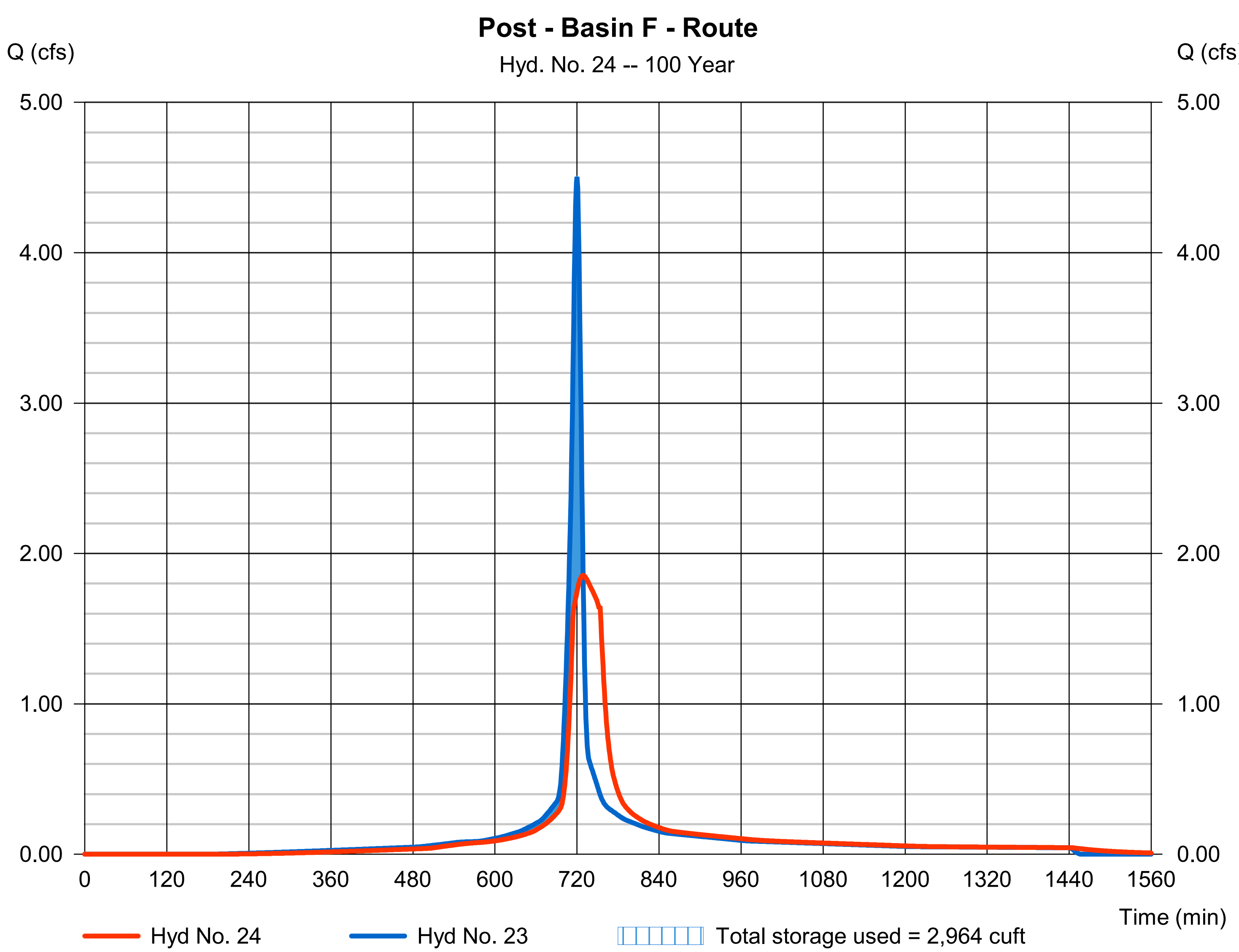
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 24

Post - Basin F - Route

Hydrograph type	= Reservoir	Peak discharge	= 1.854 cfs
Storm frequency	= 100 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 11,689 cuft
Inflow hyd. No.	= 23 - POST - Basin F	Max. Elevation	= 535.46 ft
Reservoir name	= Basin F	Max. Storage	= 2,964 cuft

Storage Indication method used.



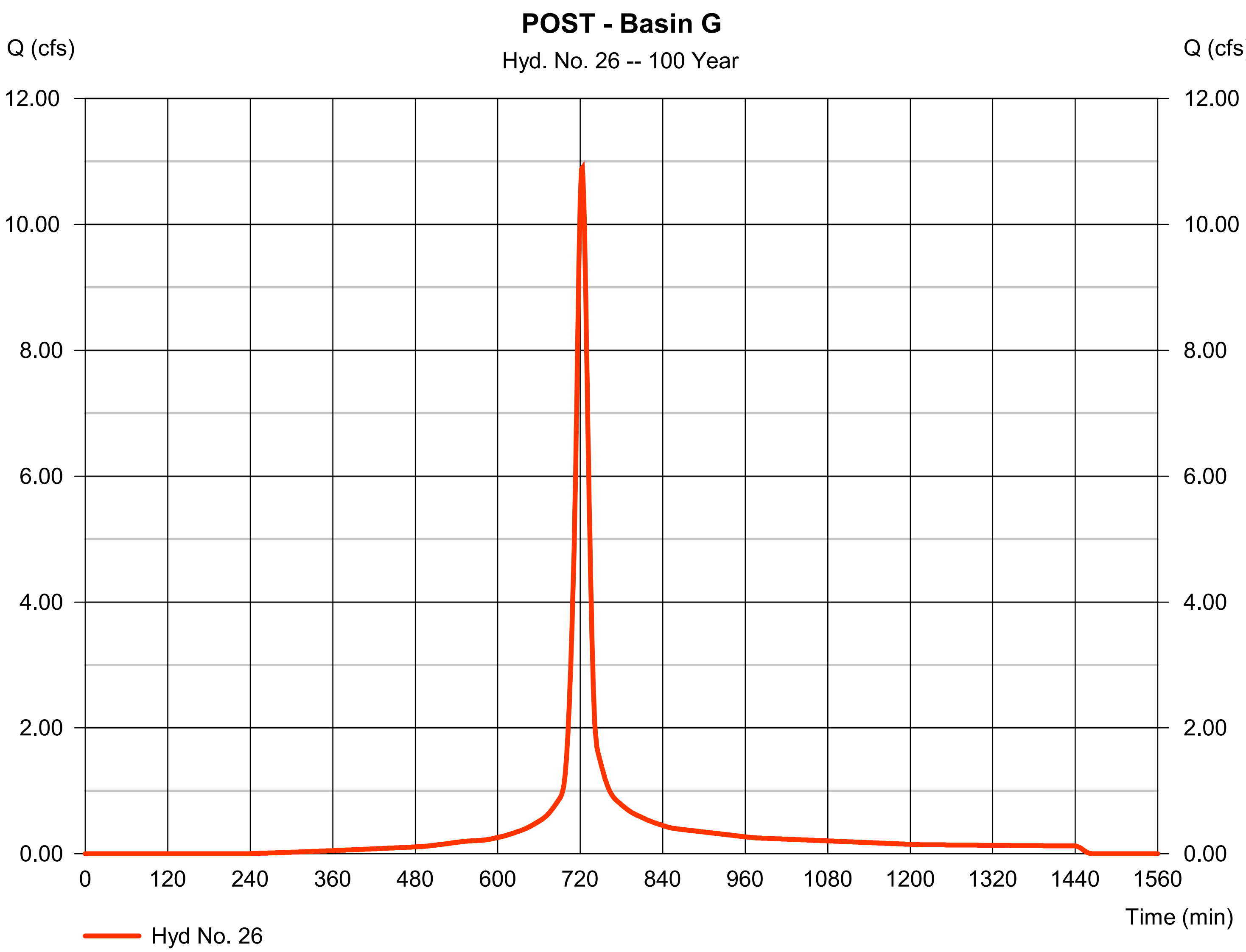
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 26

POST - Basin G

Hydrograph type	= SCS Runoff	Peak discharge	= 10.90 cfs
Storm frequency	= 100 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 32,406 cuft
Drainage area	= 1.670 ac	Curve number	= 87.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 15.80 min
Total precip.	= 6.77 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



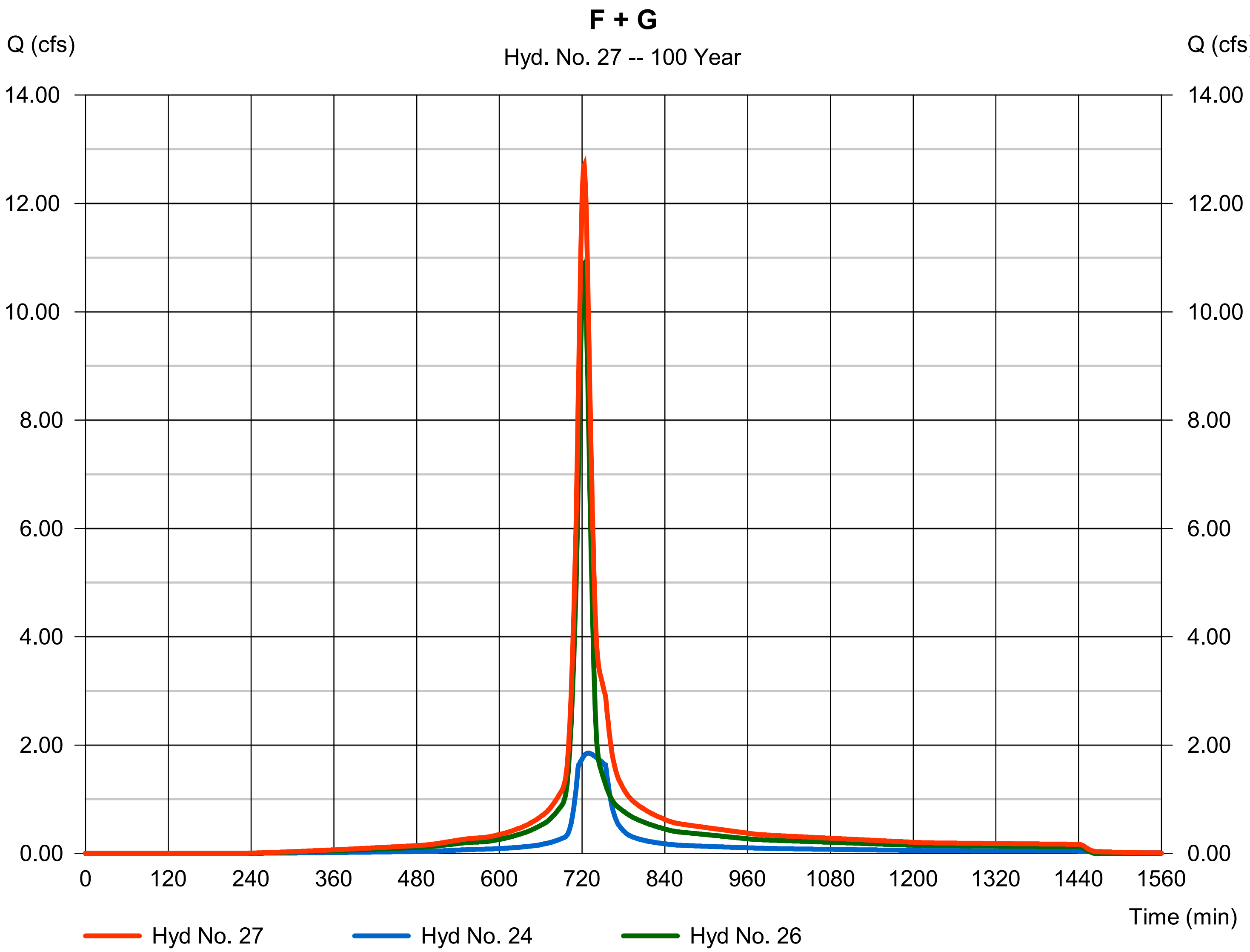
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 27

F + G

Hydrograph type	= Combine	Peak discharge	= 12.71 cfs
Storm frequency	= 100 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 44,095 cuft
Inflow hyds.	= 24, 26	Contrib. drain. area	= 1.670 ac



Hydrograph Report

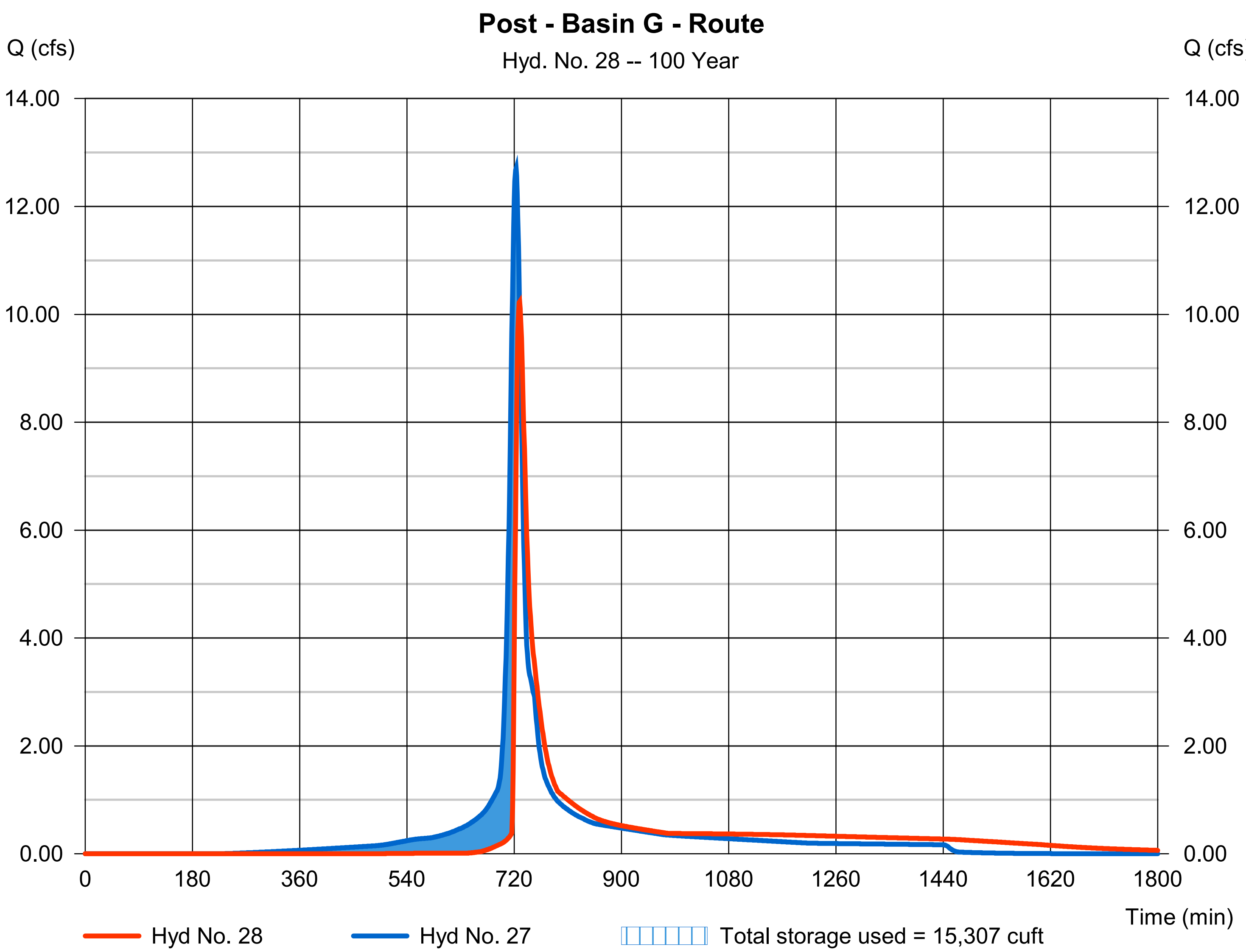
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 28

Post - Basin G - Route

Hydrograph type	= Reservoir	Peak discharge	= 10.23 cfs
Storm frequency	= 100 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 40,653 cuft
Inflow hyd. No.	= 27 - F + G	Max. Elevation	= 533.55 ft
Reservoir name	= Basin G	Max. Storage	= 15,307 cuft

Storage Indication method used.



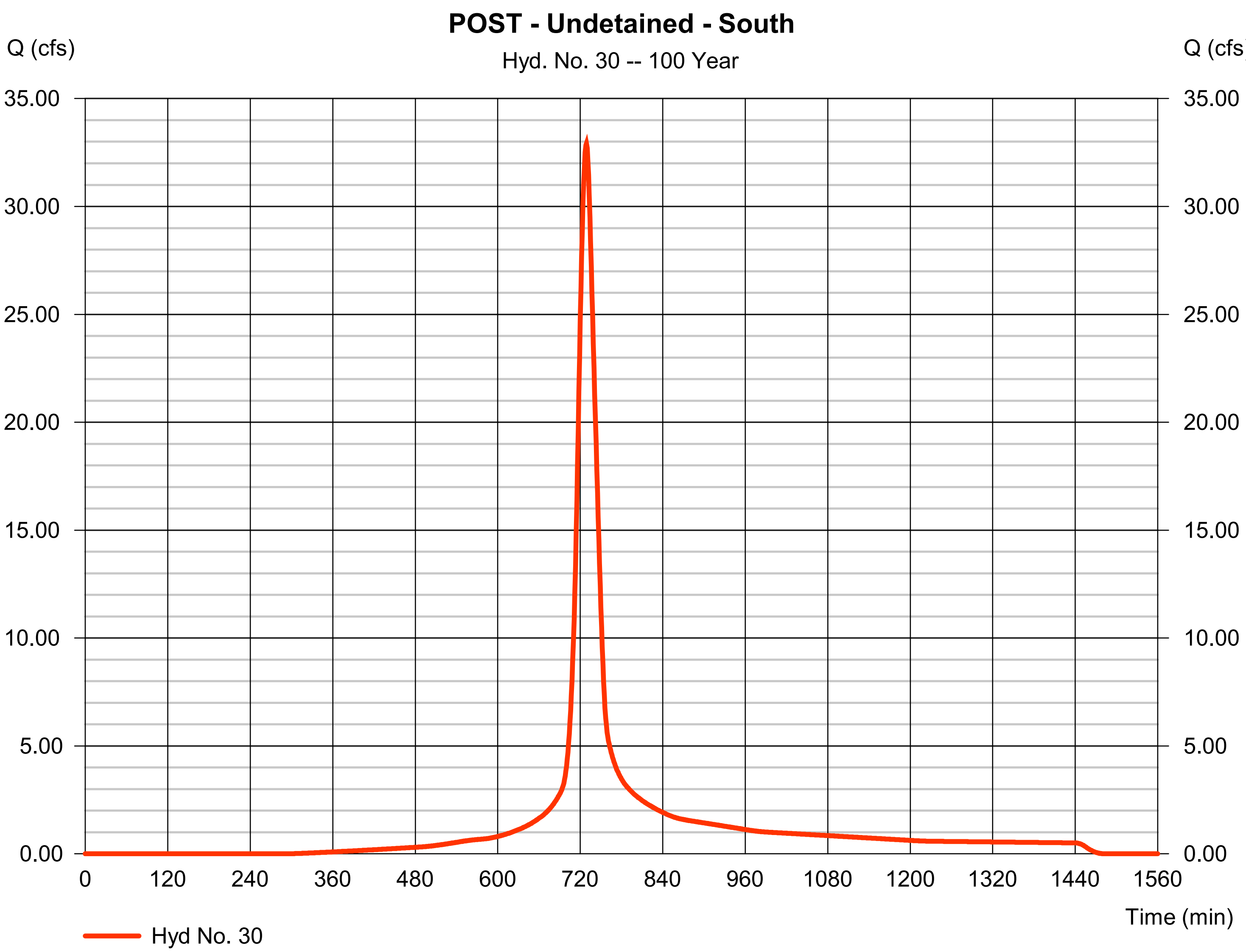
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Thursday, 08 / 5 / 2021

Hyd. No. 30

POST - Undetained - South

Hydrograph type	= SCS Runoff	Peak discharge	= 32.92 cfs
Storm frequency	= 100 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 124,189 cuft
Drainage area	= 6.960 ac	Curve number	= 83.6
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 26.40 min
Total precip.	= 6.77 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



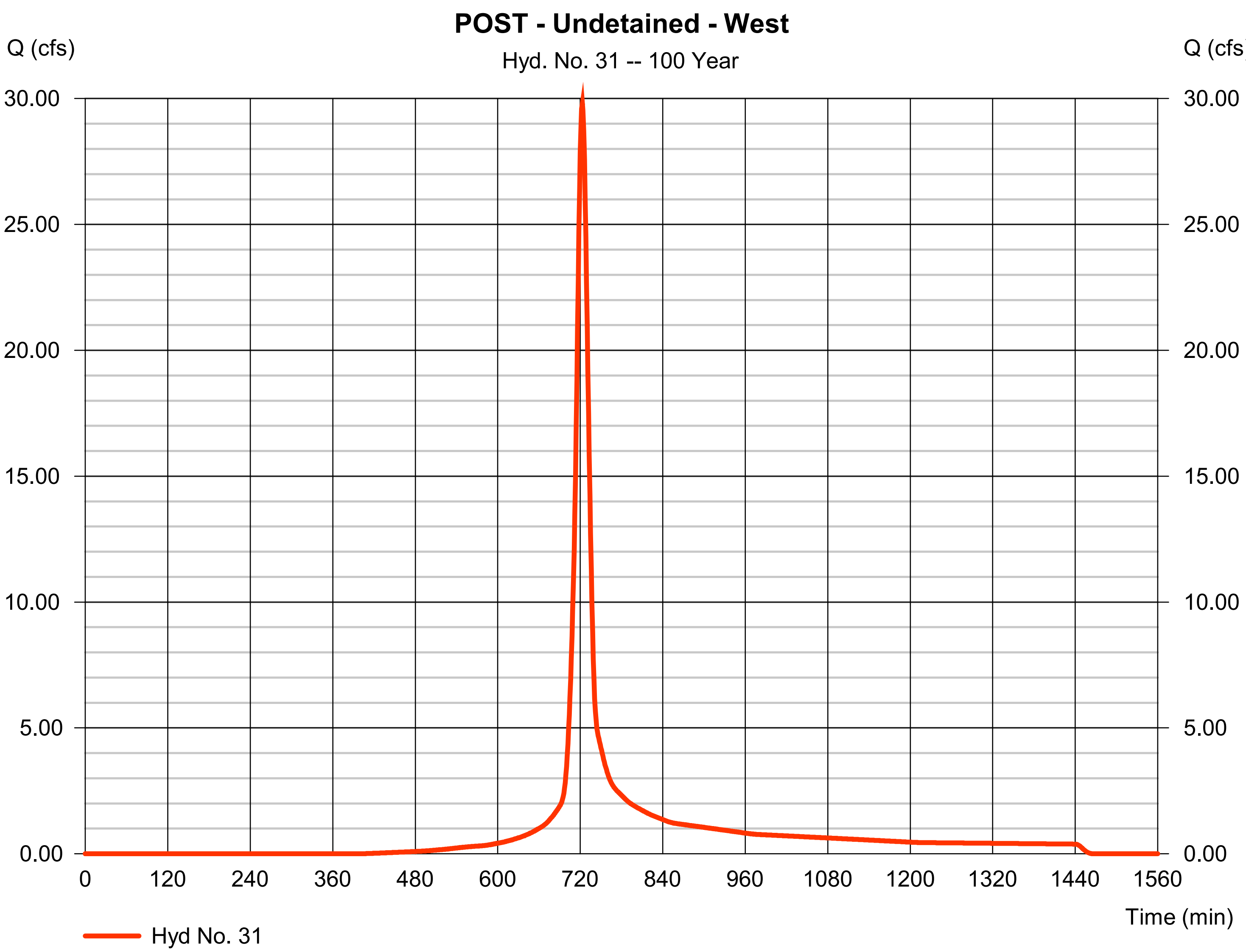
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 31

POST - Undetained - West

Hydrograph type	= SCS Runoff	Peak discharge	= 29.81 cfs
Storm frequency	= 100 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 85,328 cuft
Drainage area	= 5.610 ac	Curve number	= 76.8
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 16.30 min
Total precip.	= 6.77 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



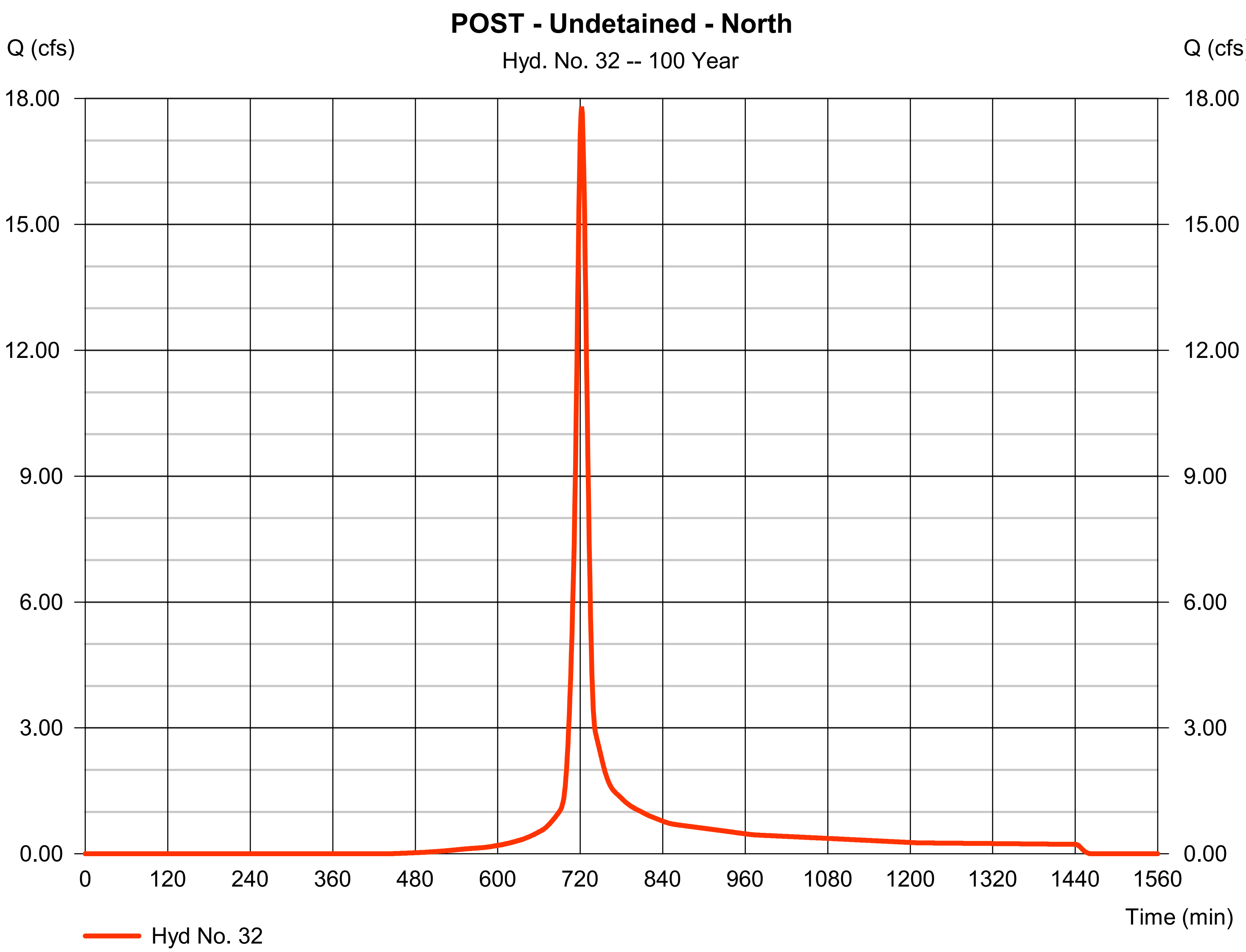
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 32

POST - Undetained - North

Hydrograph type	= SCS Runoff	Peak discharge	= 17.81 cfs
Storm frequency	= 100 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 47,961 cuft
Drainage area	= 3.420 ac	Curve number	= 74.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 14.70 min
Total precip.	= 6.77 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



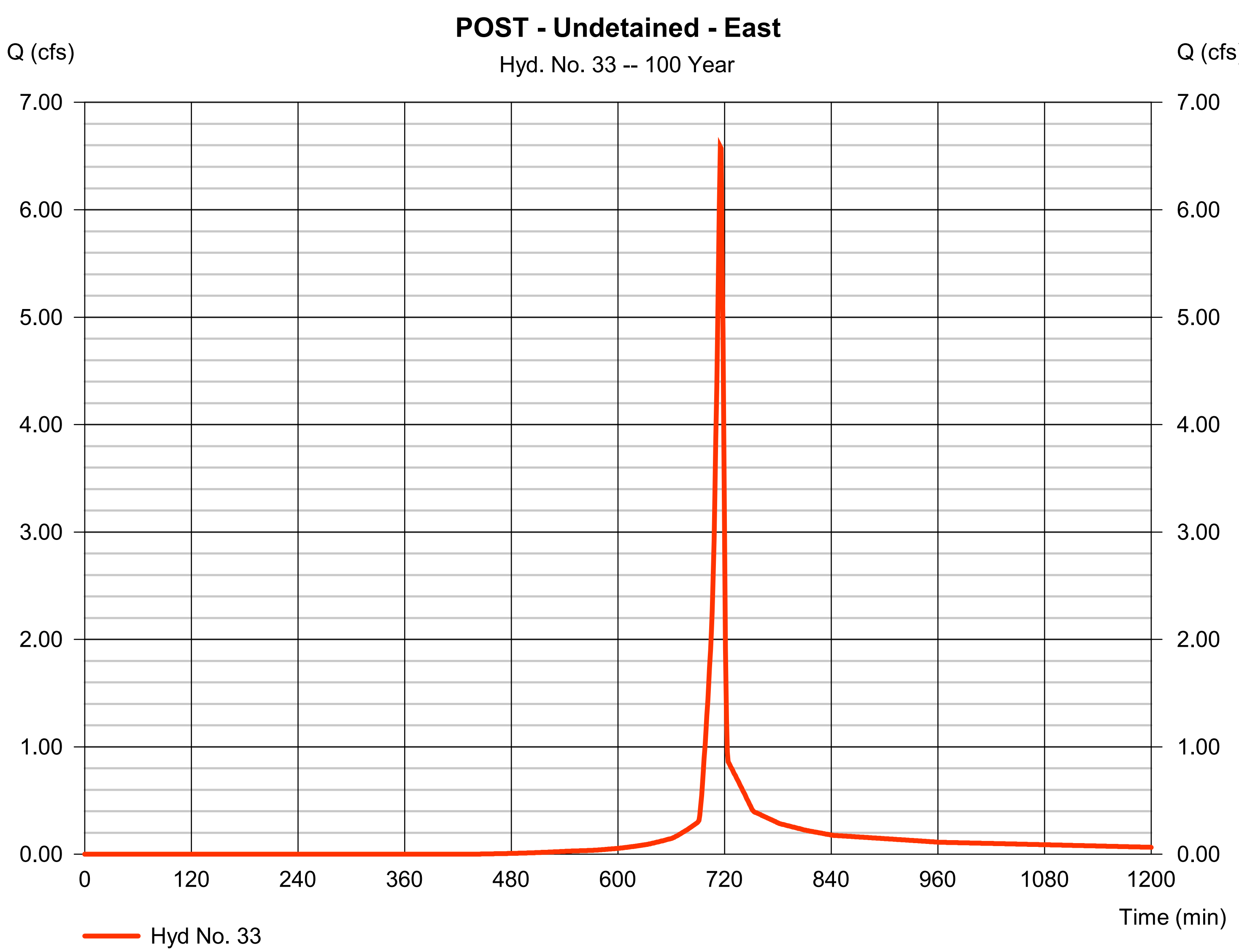
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 33

POST - Undetained - East

Hydrograph type	= SCS Runoff	Peak discharge	= 6.585 cfs
Storm frequency	= 100 yrs	Time to peak	= 715 min
Time interval	= 1 min	Hyd. volume	= 11,800 cuft
Drainage area	= 0.900 ac	Curve number	= 74.1
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 2.00 min
Total precip.	= 6.77 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



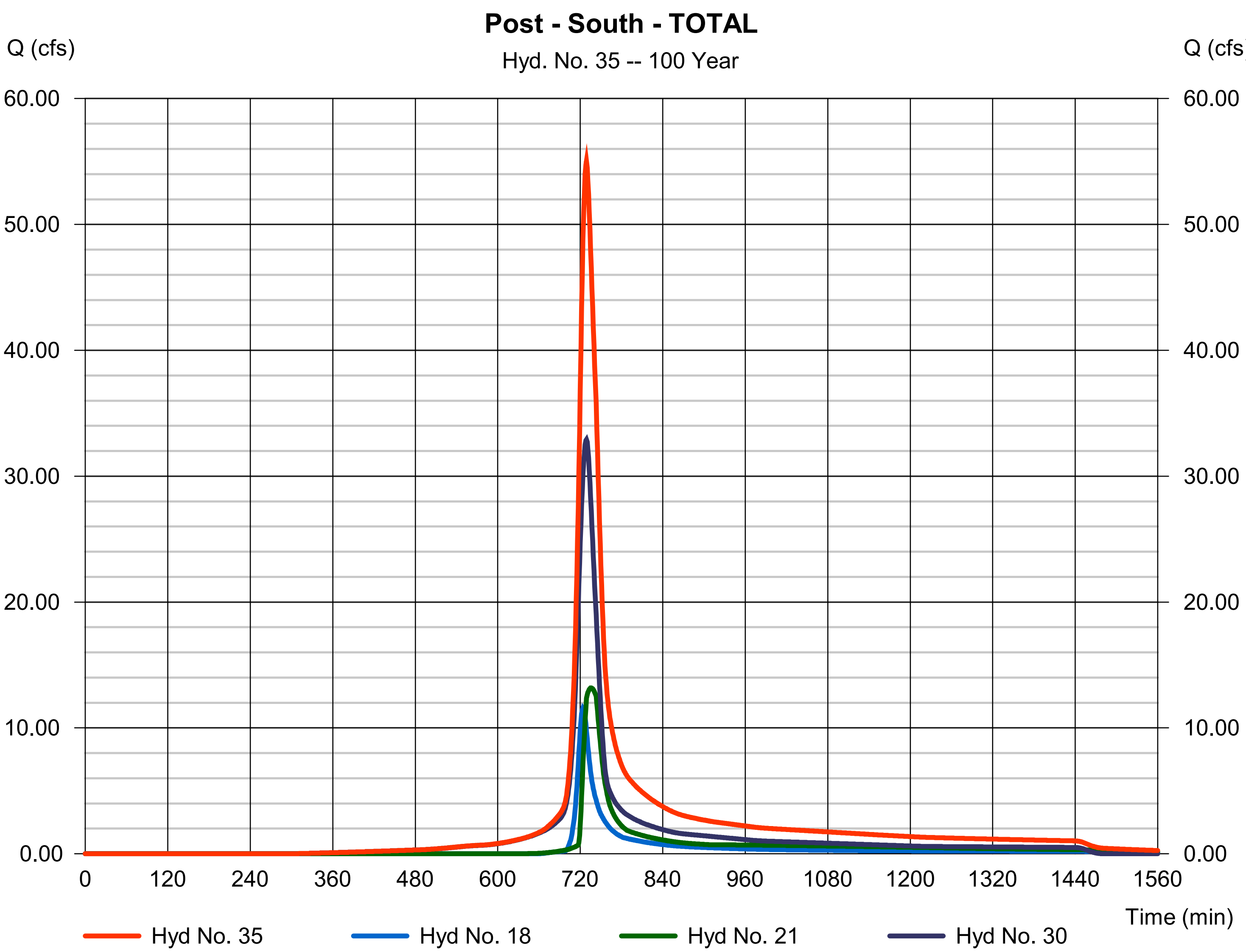
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 35

Post - South - TOTAL

Hydrograph type	= Combine	Peak discharge	= 55.03 cfs
Storm frequency	= 100 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 219,883 cuft
Inflow hyds.	= 18, 21, 30	Contrib. drain. area	= 6.960 ac



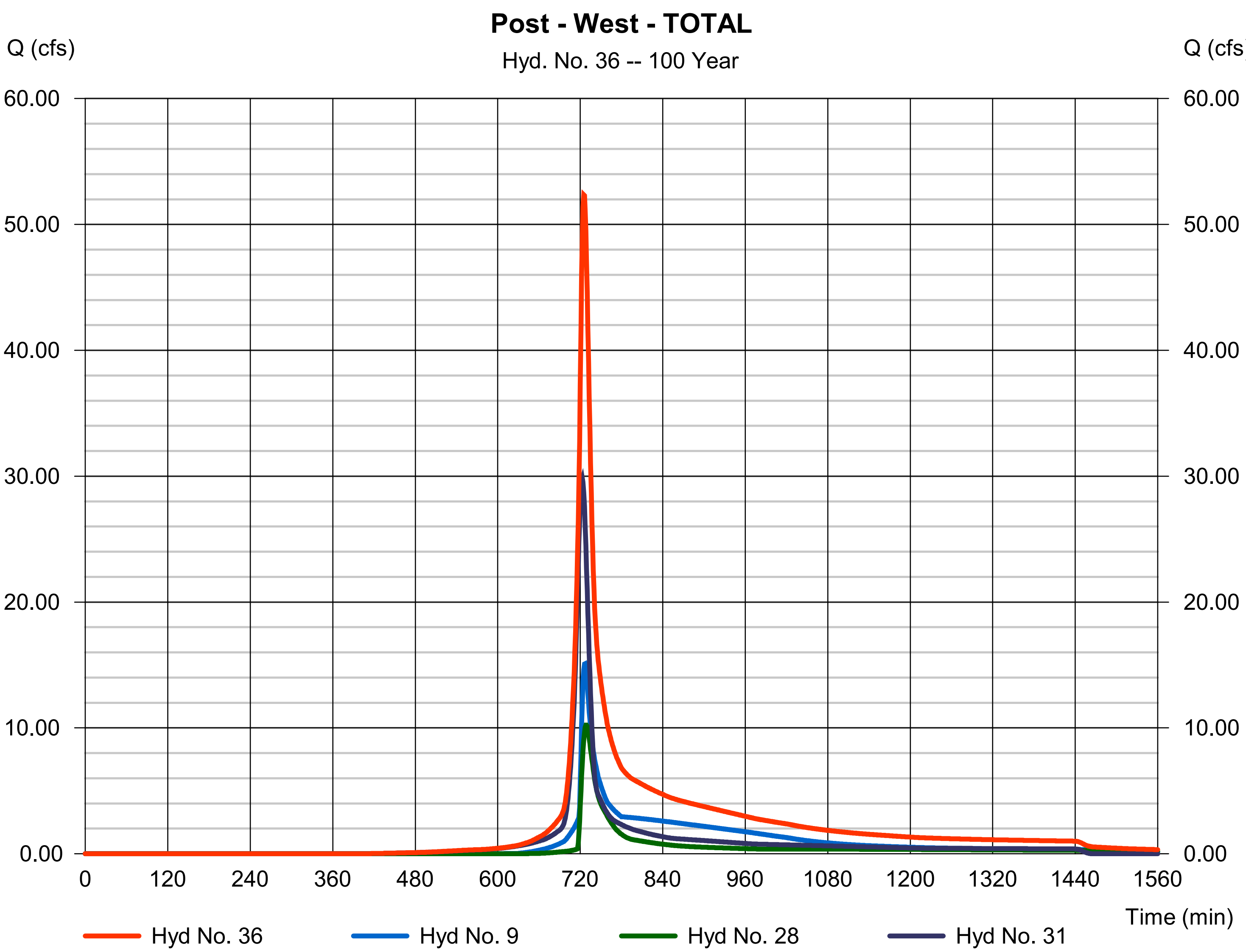
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 36

Post - West - TOTAL

Hydrograph type	= Combine	Peak discharge	= 52.36 cfs
Storm frequency	= 100 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 204,374 cuft
Inflow hyds.	= 9, 28, 31	Contrib. drain. area	= 5.610 ac



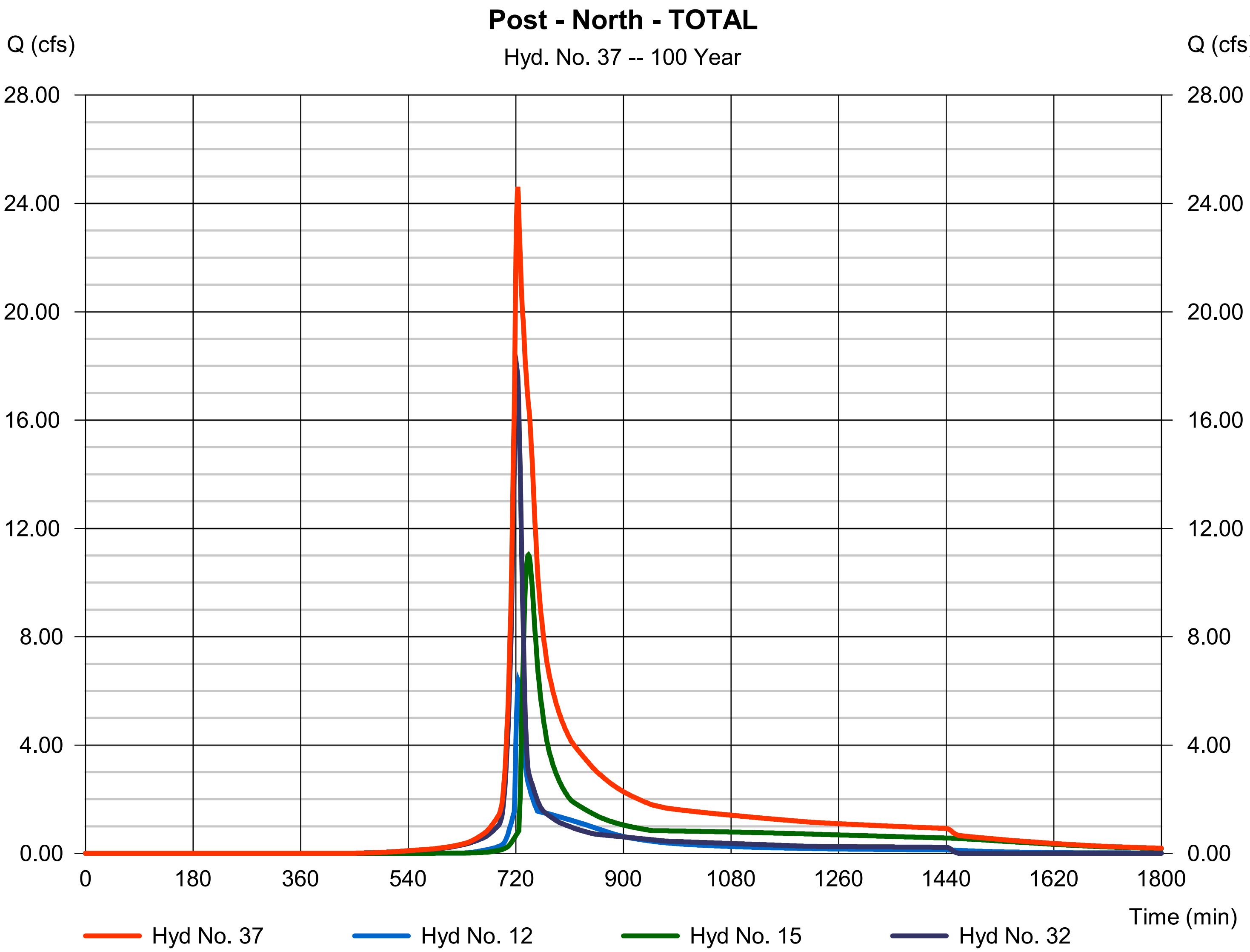
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Thursday, 08 / 5 / 2021

Hyd. No. 37

Post - North - TOTAL

Hydrograph type	= Combine	Peak discharge	= 24.62 cfs
Storm frequency	= 100 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 147,451 cuft
Inflow hyds.	= 12, 15, 32	Contrib. drain. area	= 3.420 ac



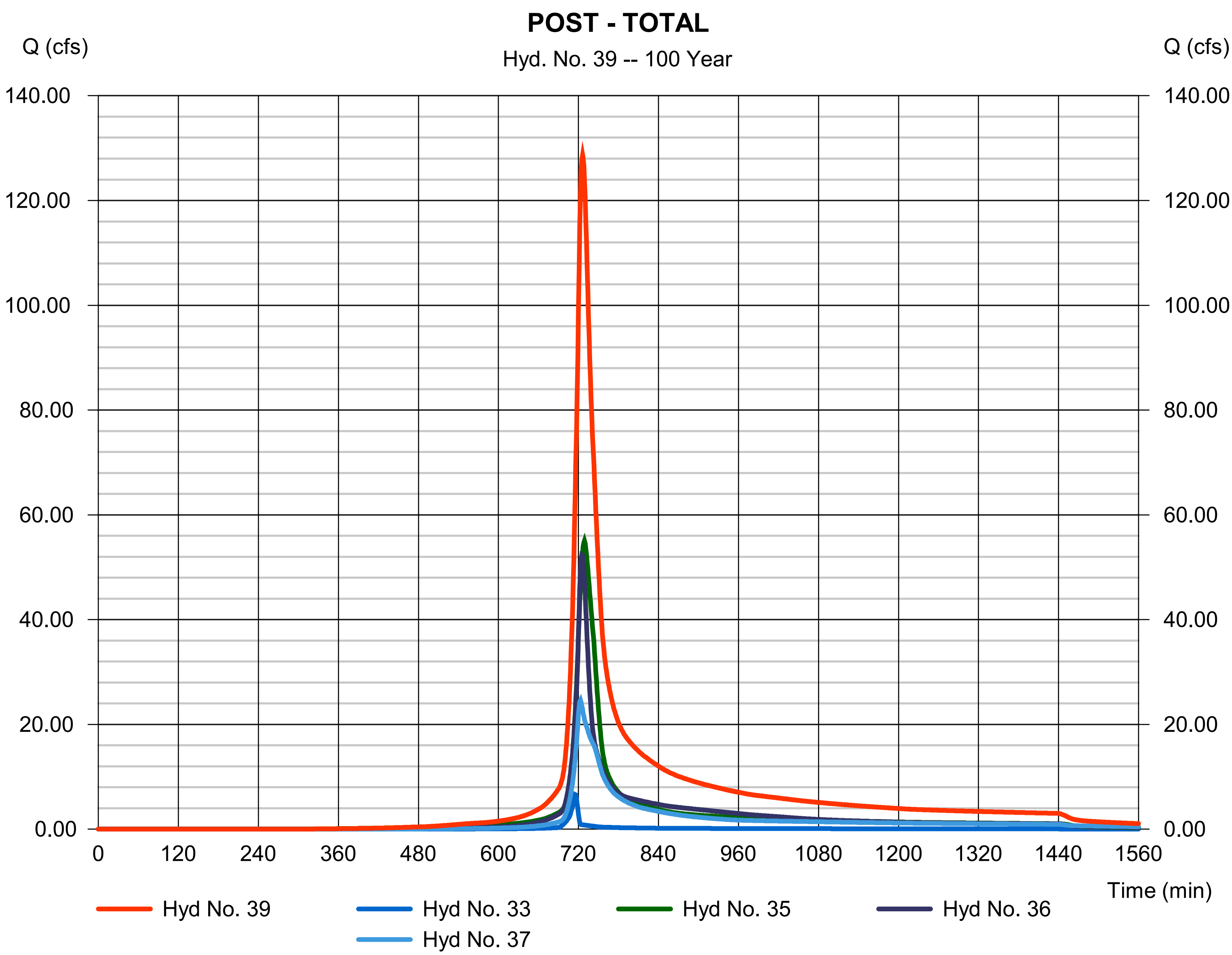
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Thursday, 08 / 5 / 2021

Hyd. No. 39

POST - TOTAL

Hydrograph type	= Combine	Peak discharge	= 128.72 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 583,509 cuft
Inflow hyds.	= 33, 35, 36, 37	Contrib. drain. area	= 0.900 ac



Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin A.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin A(0.625 in).EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 530.80
Cleanout Elevation = 530

Basin A
Dewater time from 2 Yr. Storm
WSE to basin bottom elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
530.80	0.329	1.20	
530.61	0.270	0.62	0.7869
530.32	0.182	0.05	3.1823
530.03	0.094	0.01	36.1630
530.00	0.092	0.01	2.085

Total Basin Empty Time

42.2173 Hours or 1.76 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin A.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin A(0.625 in).EO

Basin A
Dewater time from 2 Yr. Storm WSE to top of internal water storage elevation.

Basin Outflow Multiplier = 1
Top of Riser Elevation = 530.80
Cleanout Elevation = 529

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
530.80	0.329	1.20	
530.61	0.270	0.62	0.7869
530.32	0.182	0.05	3.1823
530.03	0.094	0.01	36.1630
529.74	0.074	0.01	25.0681
529.45	0.062	0.01	20.2184
529.16	0.050	0.00	29.6104
529.00	0.043	0.00	31.554

Total Basin Empty Time

146.5829 Hours or 6.11 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin A.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin A(0.625 in).EO

Basin A
Dewater time from 10 Yr. Storm WSE to basin bottom elevation.

Basin Outflow Multiplier = 1
Top of Riser Elevation = 531.47
Cleanout Elevation = 530

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
531.47	0.551	2.36	
531.18	0.453	1.98	0.5459
530.89	0.358	1.49	0.6639
530.61	0.270	0.62	1.0125
530.32	0.182	0.05	3.1823
530.03	0.094	0.01	36.1630
530.00	0.092	0.01	2.085

Total Basin Empty Time

43.6527 Hours or 1.82 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin A.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin A(0.625 in).EO

Basin A
Dewater time from 10 Yr. Storm WSE to top of internal water storage elevation.

Basin Outflow Multiplier = 1
Top of Riser Elevation = 531.47
Cleanout Elevation = 529

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
531.47	0.551	2.36	
531.18	0.453	1.98	0.5459
530.89	0.358	1.49	0.6639
530.61	0.270	0.62	1.0125
530.32	0.182	0.05	3.1823
530.03	0.094	0.01	36.1630
529.74	0.074	0.01	25.0681
529.45	0.062	0.01	20.2184
529.16	0.050	0.00	29.6104
529.00	0.043	0.00	31.554

Total Basin Empty Time

148.0183 Hours or 6.17 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin A.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin A(0.625 in).EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 532.26
Cleanout Elevation = 530

Basin A
Dewater time from 50 Yr. Storm
WSE to basin bottom elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
532.26	0.831	7.81	
532.05	0.752	3.51	0.1689
531.76	0.651	2.70	0.3937
531.47	0.552	2.37	0.4733
531.18	0.453	1.98	0.5523
530.89	0.358	1.49	0.6639
530.61	0.270	0.62	1.0125
530.32	0.182	0.05	3.1823
530.03	0.094	0.01	36.1630
530.00	0.092	0.01	2.085

Total Basin Empty Time

44.6951 Hours or 1.86 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin A.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin A(0.625 in).EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 532.26
Cleanout Elevation = 529

Basin A
Dewater time from 50 Yr. Storm WSE to top of internal water storage elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
532.26	0.831	7.81	
532.05	0.752	3.51	0.1689
531.76	0.651	2.70	0.3937
531.47	0.552	2.37	0.4733
531.18	0.453	1.98	0.5523
530.89	0.358	1.49	0.6639
530.61	0.270	0.62	1.0125
530.32	0.182	0.05	3.1823
530.03	0.094	0.01	36.1630
529.74	0.074	0.01	25.0681
529.45	0.062	0.01	20.2184
529.16	0.050	0.00	29.6104
529.00	0.043	0.00	31.554

Total Basin Empty Time

149.0607 Hours or 6.21 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin A.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin A(0.625 in).EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 532.50
Cleanout Elevation = 530

Basin A
Dewater time from 100 Yr. Storm
WSE to basin bottom elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
532.50	0.923	14.57	
532.34	0.863	9.51	0.0605
532.05	0.752	3.51	0.2050
531.76	0.651	2.70	0.3937
531.47	0.552	2.37	0.4733
531.18	0.453	1.98	0.5523
530.89	0.358	1.49	0.6639
530.61	0.270	0.62	1.0125
530.32	0.182	0.05	3.1823
530.03	0.094	0.01	36.1630
530.00	0.092	0.01	2.085

Total Basin Empty Time

44.7917 Hours or 1.87 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin A.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin A(0.625 in).EO

Basin A
Dewater time from 100 Yr. Storm WSE to top of internal water storage elevation.

Basin Outflow Multiplier = 1
Top of Riser Elevation = 532.50
Cleanout Elevation = 529

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
532.50	0.923	14.57	
532.34	0.863	9.51	0.0605
532.05	0.752	3.51	0.2050
531.76	0.651	2.70	0.3937
531.47	0.552	2.37	0.4733
531.18	0.453	1.98	0.5523
530.89	0.358	1.49	0.6639
530.61	0.270	0.62	1.0125
530.32	0.182	0.05	3.1823
530.03	0.094	0.01	36.1630
529.74	0.074	0.01	25.0681
529.45	0.062	0.01	20.2184
529.16	0.050	0.00	29.6104
529.00	0.043	0.00	31.554

Total Basin Empty Time

149.1573 Hours or 6.21 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin B.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin B.EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 532.20
Cleanout Elevation = 531.90

Basin B
Dewater time from 2 Yr. Storm
WSE to basin bottom elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
532.20	0.112	0.38	
532.01	0.073	0.07	2.0976
531.90	0.063	0.04	2.167

Total Basin Empty Time

4.2641 Hours or 0.18 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin B.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin B.EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 532.20
Cleanout Elevation = 530.90

Basin B
Dewater time from 2 Yr. Storm WSE to top of internal water storage elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
532.20	0.112	0.38	
532.01	0.073	0.07	2.0976
531.77	0.050	0.01	6.6546
531.54	0.044	0.01	8.5961
531.31	0.038	0.01	10.6775
531.07	0.031	0.00	15.6177
530.90	0.027	0.00	23.626

Total Basin Empty Time

67.2697 Hours or 2.80 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin B.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin B.EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 532.55
Cleanout Elevation = 531.90

Basin B
Dewater time from 10 Yr. Storm
WSE to basin bottom elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
532.55	0.184	1.10	
532.48	0.169	0.99	0.1745
532.24	0.121	0.45	0.8082
532.01	0.073	0.07	2.2281
531.90	0.063	0.04	2.167

Total Basin Empty Time

5.3773 Hours or 0.22 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin B.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin B.EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 532.55
Cleanout Elevation = 530.90

Basin B
Dewater time from 10 Yr. Storm WSE to top of internal water storage elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
532.55	0.184	1.10	
532.48	0.169	0.99	0.1745
532.24	0.121	0.45	0.8082
532.01	0.073	0.07	2.2281
531.77	0.050	0.01	6.6546
531.54	0.044	0.01	8.5961
531.31	0.038	0.01	10.6775
531.07	0.031	0.00	15.6177
530.90	0.027	0.00	23.626

Total Basin Empty Time

68.3829 Hours or 2.85 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin B.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin B.EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 533.03
Cleanout Elevation = 531.90

Basin B
Dewater time from 50 Yr. Storm WSE to basin bottom elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
533.03	0.285	3.64	
532.94	0.265	2.04	0.0859
532.71	0.217	1.34	0.3430
532.48	0.169	0.99	0.4966
532.24	0.121	0.45	0.8082
532.01	0.073	0.07	2.2281
531.90	0.063	0.04	2.167

Total Basin Empty Time

6.1283 Hours or 0.26 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin B.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin B.EO

Basin B
Dewater time from 50 Yr. Storm WSE to top of internal water storage elevation.

Basin Outflow Multiplier = 1
Top of Riser Elevation = 533.03
Cleanout Elevation = 530.90

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
533.03	0.285	3.64	
532.94	0.265	2.04	0.0859
532.71	0.217	1.34	0.3430
532.48	0.169	0.99	0.4966
532.24	0.121	0.45	0.8082
532.01	0.073	0.07	2.2281
531.77	0.050	0.01	6.6546
531.54	0.044	0.01	8.5961
531.31	0.038	0.01	10.6775
531.07	0.031	0.00	15.6177
530.90	0.027	0.00	23.626

Total Basin Empty Time

69.1339 Hours or 2.88 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin B.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin B.EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 533.16
Cleanout Elevation = 531.90

Basin B
Dewater time from 100 Yr. Storm
WSE to basin bottom elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
533.16	0.315	6.07	
532.94	0.265	2.04	0.1516
532.71	0.217	1.34	0.3430
532.48	0.169	0.99	0.4966
532.24	0.121	0.45	0.8082
532.01	0.073	0.07	2.2281
531.90	0.063	0.04	2.167

Total Basin Empty Time

6.1940 Hours or 0.26 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin B.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin B.EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 533.16
Cleanout Elevation = 530.90

Basin B
Dewater time from 100 Yr. Storm WSE to top of internal water storage elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
533.16	0.315	6.07	
532.94	0.265	2.04	0.1516
532.71	0.217	1.34	0.3430
532.48	0.169	0.99	0.4966
532.24	0.121	0.45	0.8082
532.01	0.073	0.07	2.2281
531.77	0.050	0.01	6.6546
531.54	0.044	0.01	8.5961
531.31	0.038	0.01	10.6775
531.07	0.031	0.00	15.6177
530.90	0.027	0.00	23.626

Total Basin Empty Time

69.1997 Hours or 2.88 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin C.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin C.EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 531.40
Cleanout Elevation = 531

Basin C
Dewater time from 2 Yr. Storm
WSE to basin bottom elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
531.40	0.328	0.33	
531.37	0.313	0.29	0.5919
531.13	0.200	0.06	7.8956
531.00	0.161	0.03	10.379

Total Basin Empty Time

18.8663 Hours or 0.79 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin C.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin C.EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 531.40
Cleanout Elevation = 530

Basin C
Dewater time from 100 Yr. Storm WSE to top of internal water storage elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
531.40	0.328	0.33	
531.37	0.313	0.29	0.5919
531.13	0.200	0.06	7.8956
530.89	0.130	0.01	23.7487
530.66	0.113	0.01	15.3584
530.42	0.097	0.01	18.8578
530.18	0.081	0.01	26.3213
530.00	0.068	0.00	43.882

Total Basin Empty Time

136.6557 Hours or 5.69 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin C.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin C.EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 531.88
Cleanout Elevation = 531

Basin C
Dewater time from 10 Yr. Storm
WSE to basin bottom elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
531.88	0.559	0.89	
531.84	0.540	0.75	0.2770
531.61	0.427	0.58	2.0655
531.37	0.313	0.29	3.1501
531.13	0.200	0.06	7.8956
531.00	0.161	0.03	10.379

Total Basin Empty Time

23.7670 Hours or 0.99 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin C.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin C.EO

Basin C
Dewater time from 10 Yr. Storm WSE to top of internal water storage elevation.

Basin Outflow Multiplier = 1
Top of Riser Elevation = 531.88
Cleanout Elevation = 530

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
531.88	0.559	0.89	
531.84	0.540	0.75	0.2770
531.61	0.427	0.58	2.0655
531.37	0.313	0.29	3.1501
531.13	0.200	0.06	7.8956
530.89	0.130	0.01	23.7487
530.66	0.113	0.01	15.3584
530.42	0.097	0.01	18.8578
530.18	0.081	0.01	26.3213
530.00	0.068	0.00	43.882

Total Basin Empty Time

141.5563 Hours or 5.90 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin C.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin C.EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 532.29
Cleanout Elevation = 531

Basin C
Dewater time from 50 Yr. Storm
WSE to basin bottom elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
532.29	0.768	5.93	
532.08	0.657	1.65	0.3544
531.84	0.540	0.75	1.1815
531.61	0.427	0.58	2.0655
531.37	0.313	0.29	3.1501
531.13	0.200	0.06	7.8956
531.00	0.161	0.03	10.379

Total Basin Empty Time

25.0259 Hours or 1.04 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin C.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin C.EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 532.29
Cleanout Elevation = 530

Basin C
Dewater time from 50 Yr. Storm WSE to top of internal water storage elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
532.29	0.768	5.93	
532.08	0.657	1.65	0.3544
531.84	0.540	0.75	1.1815
531.61	0.427	0.58	2.0655
531.37	0.313	0.29	3.1501
531.13	0.200	0.06	7.8956
530.89	0.130	0.01	23.7487
530.66	0.113	0.01	15.3584
530.42	0.097	0.01	18.8578
530.18	0.081	0.01	26.3213
530.00	0.068	0.00	43.882

Total Basin Empty Time

142.8152 Hours or 5.95 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin C.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin C.EO

Basin C
Dewater time from 100 Yr. Storm WSE to basin bottom elevation.

Basin Outflow Multiplier = 1
Top of Riser Elevation = 532.45
Cleanout Elevation = 531

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
532.45	0.852	8.37	
532.32	0.782	6.45	0.1154
532.08	0.657	1.65	0.3721
531.84	0.540	0.75	1.1815
531.61	0.427	0.58	2.0655
531.37	0.313	0.29	3.1501
531.13	0.200	0.06	7.8956
531.00	0.161	0.03	10.379

Total Basin Empty Time

25.1590 Hours or 1.05 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin C.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin C.EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 532.45
Cleanout Elevation = 530

Basin C
Dewater time from 100 Yr. Storm WSE to top of internal water storage elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
532.45	0.852	8.37	
532.32	0.782	6.45	0.1154
532.08	0.657	1.65	0.3721
531.84	0.540	0.75	1.1815
531.61	0.427	0.58	2.0655
531.37	0.313	0.29	3.1501
531.13	0.200	0.06	7.8956
530.89	0.130	0.01	23.7487
530.66	0.113	0.01	15.3584
530.42	0.097	0.01	18.8578
530.18	0.081	0.01	26.3213
530.00	0.068	0.00	43.882

Total Basin Empty Time

142.9483 Hours or 5.96 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin D.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin D.EO

Basin D
Dewater time from 2 Yr. Storm
WSE to basin bottom elevation.

Basin Outflow Multiplier = 1
Top of Riser Elevation = 535.02
Cleanout Elevation = 534

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
535.02	0.175	1.20	
534.89	0.143	0.22	0.5527
534.63	0.129	0.18	0.8181
534.37	0.116	0.13	1.0735
534.11	0.102	0.03	2.1104
534.00	0.097	0.02	2.597

Total Basin Empty Time

7.1516 Hours or 0.30 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin D.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin D.EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 535.02
Cleanout Elevation = 533

Basin D
Dewater time from 2 Yr. Storm WSE to top of internal water storage elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
535.02	0.175	1.20	
534.89	0.143	0.22	0.5527
534.63	0.129	0.18	0.8181
534.37	0.116	0.13	1.0735
534.11	0.102	0.03	2.1104
533.84	0.089	0.01	8.4340
533.58	0.076	0.01	17.8575
533.32	0.063	0.01	23.7372
533.05	0.051	0.00	45.6177
533.00	0.048	0.00	21.527

Total Basin Empty Time

121.7283 Hours or 5.07 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin D.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin D.EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 535.20
Cleanout Elevation = 534

Basin D
Dewater time from 10 Yr. Storm
WSE to basin bottom elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
535.20	0.227	3.31	
535.16	0.211	2.27	0.0723
534.89	0.143	0.22	0.6608
534.63	0.129	0.18	0.8181
534.37	0.116	0.13	1.0735
534.11	0.102	0.03	2.1104
534.00	0.097	0.02	2.597

Total Basin Empty Time

7.3320 Hours or 0.31 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin D.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin D.EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 535.20
Cleanout Elevation = 533

Basin D
Dewater time from 10 Yr. Storm WSE to top of internal water storage elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
535.20	0.227	3.31	
535.16	0.211	2.27	0.0723
534.89	0.143	0.22	0.6608
534.63	0.129	0.18	0.8181
534.37	0.116	0.13	1.0735
534.11	0.102	0.03	2.1104
533.84	0.089	0.01	8.4340
533.58	0.076	0.01	17.8575
533.32	0.063	0.01	23.7372
533.05	0.051	0.00	45.6177
533.00	0.048	0.00	21.527

Total Basin Empty Time

121.9086 Hours or 5.08 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin D.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin D.EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 535.40
Cleanout Elevation = 534

Basin D
Dewater time from 50 Yr. Storm
WSE to basin bottom elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
535.40	0.307	8.23	
535.16	0.211	2.27	0.2207
534.89	0.143	0.22	0.6608
534.63	0.129	0.18	0.8181
534.37	0.116	0.13	1.0735
534.11	0.102	0.03	2.1104
534.00	0.097	0.02	2.597

Total Basin Empty Time

7.4803 Hours or 0.31 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin D.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin D.EO

Basin D
Dewater time from 50 Yr. Storm WSE to top of internal water storage elevation.

Basin Outflow Multiplier = 1
Top of Riser Elevation = 535.40
Cleanout Elevation = 533

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
535.40	0.307	8.23	
535.16	0.211	2.27	0.2207
534.89	0.143	0.22	0.6608
534.63	0.129	0.18	0.8181
534.37	0.116	0.13	1.0735
534.11	0.102	0.03	2.1104
533.84	0.089	0.01	8.4340
533.58	0.076	0.01	17.8575
533.32	0.063	0.01	23.7372
533.05	0.051	0.00	45.6177
533.00	0.048	0.00	21.527

Total Basin Empty Time

122.0570 Hours or 5.09 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin D.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin D.EO

Basin D
Dewater time from 100 Yr. Storm
WSE to basin bottom elevation.

Basin Outflow Multiplier = 1
Top of Riser Elevation = 535.49
Cleanout Elevation = 534

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
535.49	0.342	10.28	
535.42	0.315	8.75	0.0347
535.16	0.211	2.27	0.2286
534.89	0.143	0.22	0.6608
534.63	0.129	0.18	0.8181
534.37	0.116	0.13	1.0735
534.11	0.102	0.03	2.1104
534.00	0.097	0.02	2.597

Total Basin Empty Time

7.5229 Hours or 0.31 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin D.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin D.EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 535.49
Cleanout Elevation = 533

Basin D
Dewater time from 100 Yr. Storm WSE to top of internal water storage elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
535.49	0.342	10.28	
535.42	0.315	8.75	0.0347
535.16	0.211	2.27	0.2286
534.89	0.143	0.22	0.6608
534.63	0.129	0.18	0.8181
534.37	0.116	0.13	1.0735
534.11	0.102	0.03	2.1104
533.84	0.089	0.01	8.4340
533.58	0.076	0.01	17.8575
533.32	0.063	0.01	23.7372
533.05	0.051	0.00	45.6177
533.00	0.048	0.00	21.527

Total Basin Empty Time

122.0996 Hours or 5.09 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin E.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin E.EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 533.22
Cleanout Elevation = 532.50

Basin E
Dewater time from 2 Yr. Storm
WSE to basin bottom elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
533.22	0.251	0.46	
533.11	0.219	0.33	0.9940
532.82	0.143	0.04	4.8093
532.53	0.074	0.01	30.7720
532.50	0.073	0.01	1.643

Total Basin Empty Time

38.2179 Hours or 1.59 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin E.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin E.EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 533.22
Cleanout Elevation = 531.50

Basin E
Dewater time from 2 Yr. Storm WSE to top of internal water storage elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
533.22	0.251	0.46	
533.11	0.219	0.33	0.9940
532.82	0.143	0.04	4.8093
532.53	0.074	0.01	30.7720
532.24	0.059	0.01	19.6093
531.95	0.049	0.01	16.1388
531.66	0.039	0.00	23.8270
531.50	0.034	0.00	25.121

Total Basin Empty Time

121.2715 Hours or 5.05 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin E.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin E.EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 533.67
Cleanout Elevation = 532.50

Basin E
Dewater time from 10 Yr. Storm
WSE to basin bottom elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
533.67	0.379	3.18	
533.40	0.301	0.64	0.4946
533.11	0.219	0.33	2.0339
532.82	0.143	0.04	4.8093
532.53	0.074	0.01	30.7720
532.50	0.073	0.01	1.643

Total Basin Empty Time

39.7523 Hours or 1.66 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin E.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin E.EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 533.67
Cleanout Elevation = 531.50

Basin E
Dewater time from 10 Yr. Storm WSE to top of internal water storage elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
533.67	0.379	3.18	
533.40	0.301	0.64	0.4946
533.11	0.219	0.33	2.0339
532.82	0.143	0.04	4.8093
532.53	0.074	0.01	30.7720
532.24	0.059	0.01	19.6093
531.95	0.049	0.01	16.1388
531.66	0.039	0.00	23.8270
531.50	0.034	0.00	25.121

Total Basin Empty Time

122.8059 Hours or 5.12 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin E.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin E.EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 533.94
Cleanout Elevation = 532.50

Basin E
Dewater time from 50 Yr. Storm
WSE to basin bottom elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
533.94	0.456	10.08	
533.68	0.383	3.31	0.1312
533.40	0.301	0.64	0.5031
533.11	0.219	0.33	2.0339
532.82	0.143	0.04	4.8093
532.53	0.074	0.01	30.7720
532.50	0.073	0.01	1.643

Total Basin Empty Time

39.8920 Hours or 1.66 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin E.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin E.EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 533.94
Cleanout Elevation = 531.50

Basin E
Dewater time from 50 Yr. Storm WSE to top of internal water storage elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
533.94	0.456	10.08	
533.68	0.383	3.31	0.1312
533.40	0.301	0.64	0.5031
533.11	0.219	0.33	2.0339
532.82	0.143	0.04	4.8093
532.53	0.074	0.01	30.7720
532.24	0.059	0.01	19.6093
531.95	0.049	0.01	16.1388
531.66	0.039	0.00	23.8270
531.50	0.034	0.00	25.121

Total Basin Empty Time

122.9456 Hours or 5.12 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin E.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin E.EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 534.06
Cleanout Elevation = 532.50

Basin E
Dewater time from 100 Yr. Storm WSE to basin bottom elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
534.06	0.495	12.12	
533.97	0.465	10.98	0.0306
533.68	0.383	3.31	0.1393
533.40	0.301	0.64	0.5031
533.11	0.219	0.33	2.0339
532.82	0.143	0.04	4.8093
532.53	0.074	0.01	30.7720
532.50	0.073	0.01	1.643

Total Basin Empty Time

39.9307 Hours or 1.66 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin E.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin E.EO

Basin E
Dewater time from 100 Yr. Storm WSE to top of internal water storage elevation.

Basin Outflow Multiplier = 1
Top of Riser Elevation = 534.06
Cleanout Elevation = 531.50

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
534.06	0.495	12.12	
533.97	0.465	10.98	0.0306
533.68	0.383	3.31	0.1393
533.40	0.301	0.64	0.5031
533.11	0.219	0.33	2.0339
532.82	0.143	0.04	4.8093
532.53	0.074	0.01	30.7720
532.24	0.059	0.01	19.6093
531.95	0.049	0.01	16.1388
531.66	0.039	0.00	23.8270
531.50	0.034	0.00	25.121

Total Basin Empty Time

122.9843 Hours or 5.12 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin G.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin G.EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 532.75
Cleanout Elevation = 532

Basin G
Dewater time from 2 Yr. Storm
WSE to basin bottom elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
532.75	0.182	0.27	
532.63	0.160	0.23	1.0391
532.37	0.112	0.07	3.8686
532.11	0.066	0.01	14.1723
532.00	0.057	0.01	9.560

Total Basin Empty Time

28.6395 Hours or 1.19 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin G.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin G.EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 532.75
Cleanout Elevation = 531

Basin G
Dewater time from 2 Yr. Storm WSE to top of internal water storage elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
532.75	0.182	0.27	
532.63	0.160	0.23	1.0391
532.37	0.112	0.07	3.8686
532.11	0.066	0.01	14.1723
531.84	0.045	0.01	25.0046
531.58	0.038	0.01	8.9991
531.32	0.032	0.01	11.9620
531.05	0.026	0.00	22.6293
531.00	0.024	0.00	10.885

Total Basin Empty Time

98.5595 Hours or 4.11 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin G.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin G.EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 533.16
Cleanout Elevation = 532

Basin G
Dewater time from 10 Yr. Storm
WSE to basin bottom elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
533.16	0.262	1.62	
533.16	0.262	1.58	0.0034
532.89	0.209	0.32	0.6804
532.63	0.160	0.23	2.1029
532.37	0.112	0.07	3.8686
532.11	0.066	0.01	14.1723
532.00	0.057	0.01	9.560

Total Basin Empty Time

30.3871 Hours or 1.27 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin G.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin G.EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 533.16
Cleanout Elevation = 531

Basin G
Dewater time from 10 Yr. Storm WSE to top of internal water storage elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
533.16	0.262	1.62	
533.16	0.262	1.58	0.0034
532.89	0.209	0.32	0.6804
532.63	0.160	0.23	2.1029
532.37	0.112	0.07	3.8686
532.11	0.066	0.01	14.1723
531.84	0.045	0.01	25.0046
531.58	0.038	0.01	8.9991
531.32	0.032	0.01	11.9620
531.05	0.026	0.00	22.6293
531.00	0.024	0.00	10.885

Total Basin Empty Time

100.3071 Hours or 4.18 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin G.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin G.EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 533.39
Cleanout Elevation = 532

Basin G
Dewater time from 50 Yr. Storm
WSE to basin bottom elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
533.39	0.312	6.77	
533.16	0.262	1.58	0.1454
532.89	0.209	0.32	0.6804
532.63	0.160	0.23	2.1029
532.37	0.112	0.07	3.8686
532.11	0.066	0.01	14.1723
532.00	0.057	0.01	9.560

Total Basin Empty Time

30.5291 Hours or 1.27 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin G.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin G.EO

Basin G
Dewater time from 50 Yr. Storm WSE to top of internal water storage elevation.

Basin Outflow Multiplier = 1
Top of Riser Elevation = 533.39
Cleanout Elevation = 531

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
533.39	0.312	6.77	
533.16	0.262	1.58	0.1454
532.89	0.209	0.32	0.6804
532.63	0.160	0.23	2.1029
532.37	0.112	0.07	3.8686
532.11	0.066	0.01	14.1723
531.84	0.045	0.01	25.0046
531.58	0.038	0.01	8.9991
531.32	0.032	0.01	11.9620
531.05	0.026	0.00	22.6293
531.00	0.024	0.00	10.885

Total Basin Empty Time

100.4491 Hours or 4.19 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin G.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin G.EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 533.47
Cleanout Elevation = 532

Basin G
Dewater time from 100 Yr. Storm WSE to basin bottom elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
533.47	0.329	8.75	
533.42	0.319	7.47	0.0158
533.16	0.262	1.58	0.1522
532.89	0.209	0.32	0.6804
532.63	0.160	0.23	2.1029
532.37	0.112	0.07	3.8686
532.11	0.066	0.01	14.1723
532.00	0.057	0.01	9.560

Total Basin Empty Time

30.5517 Hours or 1.27 Days

Basin Empty Time Calculation

F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin G.ES
F:\Projects\20914 Ausley Construction - Williamsport Ballpark Inc. (Sports Fields Complex)\SWM\VTPSUHM\Basin G.EO

Basin Outflow Multiplier = 1
Top of Riser Elevation = 533.47
Cleanout Elevation = 531

Basin G
Dewater time from 100 Yr. Storm WSE to top of internal water storage elevation.

Elevation (ft)	Storage (acre-ft)	Outflow (cfs)	Time (hours)
533.47	0.329	8.75	
533.42	0.319	7.47	0.0158
533.16	0.262	1.58	0.1522
532.89	0.209	0.32	0.6804
532.63	0.160	0.23	2.1029
532.37	0.112	0.07	3.8686
532.11	0.066	0.01	14.1723
531.84	0.045	0.01	25.0046
531.58	0.038	0.01	8.9991
531.32	0.032	0.01	11.9620
531.05	0.026	0.00	22.6293
531.00	0.024	0.00	10.885

Total Basin Empty Time

100.4717 Hours or 4.19 Days

APPENDIX 6

NPDES SPREADSHEET CALCULATIONS

General Information

Instructions | General | Volume | Rate | Quality

Project Name: **Williamport Ballpark, Inc.**

Application Type: **Individual NPDES Application**

County: **Lycoming**

Municipality: **Williamsport City**

Project Type: **Redevelopment**

◉ New Project ○ Minor / Major Amendment

Area: **28.51** acres
(In Watershed)

Total Earth Disturbance: **28.51** acres
(In Watershed)

No. of Post-Construction Discharge Points: **7**

Start DP Numbering at: **001**

Discharge Point (DP) No.	Drainage Area (DA) (acres)	Earth Disturbance in DA (acres)	Existing Impervious in DA (acres)	Proposed Impervious in DA (acres)	Receiving Waters	Ch. 93 Class	Structural BMP(s)
001	4.28	4.28	0.00	0.20	Discharge to Non-Surface Waters	WWF	Yes
002	1.62	1.62	0.01	0.09	Discharge to Non-Surface Waters	WWF	Yes
003	4.21	4.21	0.88	0.26	Discharge to Non-Surface Waters	WWF	Yes
004	2.20	2.20	0.15	0.08	Discharge to Non-Surface Waters	WWF	Yes

005	3.30	3.30	1.25	0.17	Discharge to Non-Surface Waters	WWF	Yes
006	0.57	0.57	0.09	0.37	Discharge to Non-Surface Waters	WWF	Yes
007	1.67	1.67	0.47	0.92	Discharge to Non-Surface Waters	WWF	Yes
Undetained Areas	10.66	10.66	1.25	3.49	Discharge to Storm Sewers (non-MS4)	WWF	
Totals:	**28.51**	**28.51**	**4.1**	**5.58**			

Volume Management

Project: Williamport Ballpark, Inc.

Instructions | General | *Volume* | Rate | Quality

2-Year / 24-Hour Storm Event (NOAA Atlas 14): **2.84** inches

Alternative 2-Year / 24-Hour Storm Event: inches

Alternative Source:

Pre-Construction Conditions: *No. Rows:* **4**

☐ *Exempt from Meadow in Good Condition* ☑ *Automatically Calculate CN, Ia, Runoff and Volume*

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Pervious as Meadow	11.00	C	71	0.817	0.67	26,759
Impervious Areas: Streets and Roads - Gravel (Including ROW)	13.39	C	89	0.247	1.76	85,343
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	3.29	C	98	0.041	2.61	31,158
Impervious as Meadow	0.82	C	71	0.817	0.67	1,995
TOTAL (ACRES):	**28.50**				**TOTAL (CF):**	**145,255**

Post-Construction Conditions: *No. Rows:* **3**

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	12.13	C	74	0.703	0.81	35,595
Fallow - Bare Soil	10.94	C	91	0.198	1.92	76,349

Impervious Areas: Streets and Roads - Paved; Curbs and Storm Sewers (Excluding ROW)	5.43	C	98	0.041	2.61	51,425
TOTAL (ACRES):	**28.50**				**TOTAL (CF):**	**163,369**

NET CHANGE IN VOLUME TO MANAGE (CF): 18,114

Non-Structural BMP Volume Credits:

☐ Tree Planting Credit

☐ Other (attach calculations):

Structural BMP Volume Credits: *No. Structural BMPs:* **7** *Start BMP Numbering at:* **1**

DP No.	BMP No.	BMP Name	MRC?	Discharge	Incremental BMP DA (acres)	Volume Routed to BMP (CF)	Infiltration / Vegetated Area (SF)	Infiltration Rate (in/hr)	Infiltration Period (hrs)	Vegetated?	Media Depth (ft)	Storage Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)
001	1	Rain Garden / Bioretention	Y	Off-Site	4.28	27,799	12,449	0.00	1	Yes	2.0	7,154	**0**	**6,548**
002	2	Rain Garden / Bioretention	Y	Off-Site	1.62	9,941	7,785	0.00	1	Yes	2.0	2,491	**0**	**4,095**
003	3	Rain Garden / Bioretention	Y	Off-Site	4.21	24,568	19,842	0.00	1	Yes	2.0	5,953	**0**	**10,437**
004	4	Rain Garden / Bioretention	Y	Off-Site	2.20	12,866	13,996	0.00	1	Yes	2.0	4,199	**0**	**7,362**
005	5	Rain Garden / Bioretention	Y	Off-Site	3.30	20,084	9,885	0.00	1	Yes	2.0	4,990	**0**	**5,200**
006	6	Wet Pond / Retention Basin	-	to BMP No. 7	0.57	4,070	35	0.00	1	Yes	0.5	0	**0**	**6**
007	7	Rain Garden / Bioretention	Y	Off-Site	1.67	10,890	6,428	0.00	1	Yes	2.0	3,472	**0**	**3,381**

Totals:	37,029

INFILTRATION & ET CREDITS (CF):	37,029
MANAGED RELEASE CREDIT (CF):	69,125
NET CHANGE IN VOLUME TO MANAGE (CF):	18,114
TOTAL CREDITS (CF):	106,154

VOLUME REQUIREMENT SATISFIED

Rate Control

Project: Williamport Ballpark, Inc.

Instructions | General | Volume | *Rate* | Quality

Precipitation Amounts:

NOAA 2-Year 24-Hour Storm Event (in):	**2.84**	Alternative 2-Year 24-Hour Storm Event (in):	
NOAA 10-Year 24-Hour Storm Event (in):	**4.09**	Alternative 10-Year 24-Hour Storm Event (in):	
NOAA 50-Year 24-Hour Storm Event (in):	**5.82**	Alternative 50-Year 24-Hour Storm Event (in):	
NOAA 100-Year 24-Hour Storm Event (in):	**6.77**	Alternative 100-Year 24-Hour Storm Event (in):	

☑ **Report Summary of Peak Rates Only**

Attach model input and output data or other calculations to support the rates reported below.

	Peak Discharge Rates (cfs)			
	Pre-Construction	**Post-Construction**	**Net Change**	
2-Year Storm:	**61.51**	**25.14**	**-36.37**	***Rate Control Satisfied***
10-Year Storm:	**111.89**	**51.48**	**-60.41**	***Rate Control Satisfied***
50-Year Storm:	**185.27**	**93.49**	**-91.78**	***Rate Control Satisfied***
100-Year Storm:	**226.19**	**132.69**	**-93.50**	***Rate Control Satisfied***

Water Quality

Project: Williamport Ballpark, Inc.

PRINT

Instructions | General | Volume | Rate | *Quality*

Pre-Construction Pollutant Loads:

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Pervious as Meadow	Grassland/Herbaceous	11.00	C	26,759	48.8	0.22	2.30	81.54	0.37	3.84
Impervious Areas: Streets and Roads - Gravel (Including ROW)	Highway (general)	13.39	C	85,343	141.0	0.43	2.65	751.40	2.29	14.12
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	3.29	C	31,158	65.0	0.29	2.05	126.46	0.56	3.99
Impervious as Meadow	Grassland/Herbaceous	0.82	C	1,995	48.8	0.22	2.30	6.08	0.03	0.29
	TOTAL (ACRES):	**28.50**					**TOTALS:**	**965.48**	**3.25**	**22.24**

Post-Construction Pollutant Loads (without BMPs):

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	12.13	C	35,595	78.0	0.25	1.25	173.37	0.56	2.78

Fallow - Bare Soil	Cultivated Crops	10.94	C	76,349	216.0	1.07	7.70	######	5.10	36.71
Impervious Areas: Streets and Roads - Paved; Curbs and Storm Sewers (Excluding ROW)	Urban Highway	5.43	C	51,425	142.0	0.32	3.00	455.98	1.03	9.63
	TOTAL (ACRES):	**28.50**					**TOTALS:**	**######**	**6.68**	**49.12**

POLLUTANT LOAD REDUCTION REQUIREMENTS (LBS): **693.63** | **3.43** | **26.88**

☑ **Characterize Undetained Areas (for Untreated Stormwater)** *No. Rows:*

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	**7.21**	**C**	**74**	**0.703**	**0.81**	**21,157**

Non-Structural BMP Water Quality Credits:

☑ Pervious Undetained Area Credit

TSS	TP	TN
16.12	**0.06**	**0.46**

☐ Other (attach calculations)

Structural BMP Water Quality Credits:

☑ *Use default BMP Outflows and Median BMP Outflow Concentrations*

DP No.	BMP No.	BMP Name	MRC?	BMP DA (acres)	Vol. Routed to BMP (CF)	Inf. & ET Credits (CF)	Capture & Buffer Credits (CF)	Outflow (CF)	Outflow Conc. (mg/L)			Pollutant Loads (lbs)		
									TSS	TP	TN	TSS	TP	TN
001	1	Rain Garden / Bioretention	Y	4.28	27,799	6,548		21,251	-	-	-	-	-	-
002	2	Rain Garden / Bioretention	Y	1.62	9,941	4,095		5,846	-	-	-	-	-	-

003	3	Rain Garden / Bioretention	Y	4.21	24,568	10,437		14,131	-	-	-	-	-	-
004	4	Rain Garden / Bioretention	Y	2.20	12,866	7,362		5,504	-	-	-	-	-	-
005	5	Rain Garden / Bioretention	Y	3.30	20,084	5,200		14,884	-	-	-	-	-	-
006	6	Wet Pond / Retention Basin	-	0.57	4,070	6		4,064	-	-	-	-	-	-
007	7	Rain Garden / Bioretention	Y	1.67	10,890	3,381		7,509	-	-	-	-	-	-

	TSS	TP	TN
POLLUTANT LOADS FROM STRUCTURAL BMP (TREATED) OUTFLOWS (LBS):	**0.00**	**0.00**	**0.00**
POLLUTANT LOADS FROM UNTREATED STORMWATER (LBS):	**234.51**	**0.92**	**5.80**
NON-STRUCTURAL BMP WATER QUALITY CREDITS (LBS):	**16.12**	**0.06**	**0.46**
NET POLLUTANT LOADS FROM SITE, POST-CONSTRUCTION (LBS):	**218.39**	**0.86**	**5.34**
POLLUTANT LOADS FROM SITE, PRE-CONSTRUCTION (LBS):	**965.48**	**3.25**	**22.24**

WATER QUALITY REQUIREMENT SATISFIED

CERTIFICATION

I certify under penalty of law and subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities) that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further certify that the structure, function, and calculations contained in this spreadsheet have not been modified in comparison to the spreadsheet DEP has posted to its website or, if modifications were made, an explanation of the modifications made is attached to this spreadsheet.

Robert E. Myers	3/16/2021
Spreadsheet User Name	Date

APPENDIX 7

SOIL MAP & DESCRIPTIONS

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for
Lycoming County, Pennsylvania

Williamsport Ballpark, Inc.

February 17, 2021

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

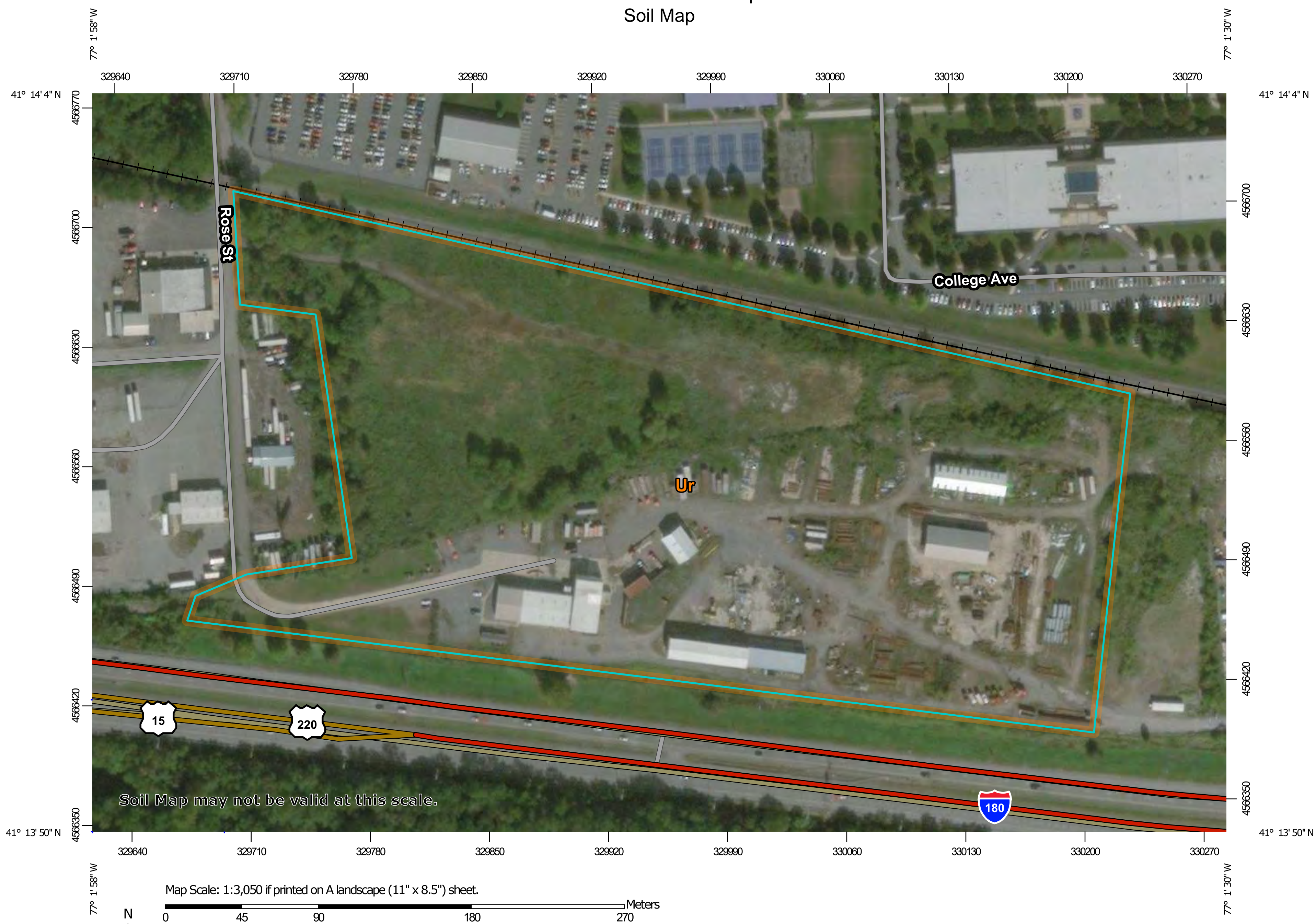
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map



Map Scale: 1:3,050 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 45, 90, 180, 270

Feet: 0, 100, 200, 400, 600

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

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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

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

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

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

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

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

Soil Survey Area: Lycoming County, Pennsylvania
Survey Area Data: Version 15, Jun 5, 2020

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

Date(s) aerial images were photographed: May 25, 2010—Nov 11, 2016

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ur	Urban land	27.1	100.0%
Totals for Area of Interest		**27.1**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Lycoming County, Pennsylvania

Ur—Urban land

Map Unit Setting

National map unit symbol: l304
Mean annual precipitation: 38 to 46 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 140 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 90 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Parent material: Human transported material

Minor Components

Wet spots

Percent of map unit: 2 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Wet spots

Percent of map unit: 1 percent
Landform: Depressions

Soil Information for All Uses

Suitabilities and Limitations for Use

The Suitabilities and Limitations for Use section includes various soil interpretations displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each interpretation.

Land Classifications

Land Classifications are specified land use and management groupings that are assigned to soil areas because combinations of soil have similar behavior for specified practices. Most are based on soil properties and other factors that directly influence the specific use of the soil. Example classifications include ecological site classification, farmland classification, irrigated and nonirrigated land capability classification, and hydric rating.

Hydric Rating by Map Unit (Williamsport Ballpark, Inc.)

This rating indicates the percentage of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of nonhydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is rated based on its respective components and the percentage of each component within the map unit.

The thematic map is color coded based on the composition of hydric components. The five color classes are separated as 100 percent hydric components, 66 to 99 percent hydric components, 33 to 65 percent hydric components, 1 to 32 percent hydric components, and less than one percent hydric components.

In Web Soil Survey, the Summary by Map Unit table that is displayed below the map pane contains a column named 'Rating'. In this column the percentage of each map unit that is classified as hydric is displayed.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

References:

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.

Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.

Custom Soil Resource Report
Map—Hydric Rating by Map Unit (Williamsport Ballpark, Inc.)

Map Scale: 1:3,050 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 45 90 180 270

Feet: 0 100 200 400 600

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Lines

- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Points

- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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

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

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

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

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

Soil Survey Area: Lycoming County, Pennsylvania
Survey Area Data: Version 15, Jun 5, 2020

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

Date(s) aerial images were photographed: May 25, 2010—Nov 11, 2016

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

Table—Hydric Rating by Map Unit (Williamsport Ballpark, Inc.)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Ur	Urban land	2	27.1	100.0%
Totals for Area of Interest			**27.1**	**100.0%**

Rating Options—Hydric Rating by Map Unit (Williamsport Ballpark, Inc.)

Aggregation Method: Percent Present

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

AOI Inventory

This folder contains a collection of tabular reports that present a variety of soil information. Included are various map unit description reports, special soil interpretation reports, and data summary reports.

Map Unit Description (Brief, Generated) (Williamsport Ballpark, Inc.)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, provide information on the composition of map units and properties of their components.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

The Map Unit Description (Brief, Generated) report displays a generated description of the major soils that occur in a map unit. Descriptions of non-soil (miscellaneous areas) and minor map unit components are not included. This description is generated from the underlying soil attribute data.

Additional information about the map units described in this report is available in other Soil Data Mart reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the Soil Data Mart reports define some of the properties included in the map unit descriptions.

Report—Map Unit Description (Brief, Generated) (Williamsport Ballpark, Inc.)

Lycoming County, Pennsylvania

Map Unit: Ur—Urban land

Component: Urban land (90%)

Generated brief soil descriptions are created for major soil components. The Urban land is a miscellaneous area.

Component: Wet spots (2%)

Generated brief soil descriptions are created for major soil components. The Wet spots soil is a minor component.

Component: Wet spots (1%)

Generated brief soil descriptions are created for major soil components. The Wet spots soil is a minor component.

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APPENDIX 8

REFERENCE MATERIALS

NOAA Atlas 14, Volume 2, Version 3
Location name: Williamsport, Pennsylvania, USA*
Latitude: 41.2322°, Longitude: -77.0282°
Elevation: 536.12 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.333 (0.302-0.365)	0.396 (0.360-0.434)	0.460 (0.418-0.505)	0.505 (0.458-0.555)	0.561 (0.507-0.616)	0.603 (0.544-0.662)	0.642 (0.575-0.705)	0.682 (0.608-0.751)	0.737 (0.653-0.814)	0.777 (0.685-0.863)
10-min	0.517 (0.469-0.567)	0.618 (0.562-0.678)	0.715 (0.649-0.785)	0.780 (0.707-0.857)	0.858 (0.776-0.942)	0.914 (0.824-1.00)	0.966 (0.866-1.06)	1.02 (0.908-1.12)	1.08 (0.960-1.20)	1.13 (0.998-1.26)
15-min	0.634 (0.575-0.695)	0.756 (0.687-0.829)	0.878 (0.797-0.964)	0.960 (0.870-1.05)	1.06 (0.958-1.16)	1.13 (1.02-1.24)	1.20 (1.08-1.32)	1.27 (1.13-1.39)	1.35 (1.20-1.49)	1.42 (1.25-1.57)
30-min	0.839 (0.761-0.920)	1.01 (0.919-1.11)	1.20 (1.09-1.32)	1.33 (1.21-1.46)	1.50 (1.35-1.64)	1.62 (1.46-1.78)	1.73 (1.55-1.90)	1.85 (1.65-2.03)	2.00 (1.77-2.21)	2.12 (1.87-2.35)
60-min	1.02 (0.929-1.12)	1.24 (1.13-1.36)	1.51 (1.37-1.66)	1.70 (1.54-1.86)	1.94 (1.76-2.13)	2.13 (1.92-2.34)	2.32 (2.08-2.54)	2.51 (2.24-2.76)	2.77 (2.45-3.06)	2.98 (2.63-3.31)
2-hr	1.17 (1.05-1.29)	1.41 (1.27-1.56)	1.73 (1.56-1.90)	1.98 (1.79-2.18)	2.35 (2.10-2.58)	2.65 (2.37-2.92)	2.99 (2.65-3.29)	3.37 (2.96-3.71)	3.95 (3.43-4.37)	4.44 (3.82-4.93)
3-hr	1.25 (1.14-1.39)	1.51 (1.37-1.67)	1.85 (1.68-2.05)	2.14 (1.93-2.37)	2.56 (2.30-2.83)	2.92 (2.60-3.22)	3.33 (2.94-3.67)	3.79 (3.31-4.18)	4.49 (3.87-4.98)	5.11 (4.35-5.70)
6-hr	1.56 (1.41-1.74)	1.88 (1.70-2.10)	2.30 (2.08-2.56)	2.65 (2.39-2.95)	3.17 (2.84-3.51)	3.62 (3.21-4.01)	4.12 (3.63-4.57)	4.68 (4.07-5.20)	5.54 (4.75-6.19)	6.31 (5.33-7.08)
12-hr	1.95 (1.77-2.18)	2.34 (2.12-2.62)	2.88 (2.60-3.22)	3.33 (3.00-3.71)	4.00 (3.58-4.45)	4.59 (4.07-5.10)	5.26 (4.61-5.85)	6.02 (5.21-6.71)	7.20 (6.13-8.07)	8.26 (6.92-9.30)
24-hr	2.37 (2.19-2.58)	2.84 (2.62-3.10)	3.51 (3.24-3.83)	4.09 (3.76-4.45)	4.99 (4.56-5.40)	5.82 (5.27-6.27)	6.77 (6.08-7.27)	7.90 (7.02-8.45)	9.70 (8.49-10.3)	11.4 (9.81-12.1)
2-day	2.76 (2.54-3.02)	3.31 (3.04-3.62)	4.08 (3.75-4.45)	4.75 (4.35-5.17)	5.79 (5.26-6.27)	6.74 (6.09-7.29)	7.85 (7.04-8.47)	9.14 (8.10-9.84)	11.2 (9.80-12.0)	13.1 (11.3-14.1)
3-day	2.94 (2.71-3.21)	3.51 (3.24-3.84)	4.31 (3.97-4.70)	4.99 (4.59-5.44)	6.06 (5.53-6.57)	7.03 (6.38-7.61)	8.15 (7.34-8.80)	9.47 (8.43-10.2)	11.6 (10.2-12.4)	13.5 (11.7-14.5)
4-day	3.11 (2.88-3.40)	3.71 (3.44-4.06)	4.54 (4.20-4.95)	5.24 (4.83-5.71)	6.34 (5.80-6.87)	7.33 (6.67-7.93)	8.47 (7.65-9.14)	9.79 (8.76-10.5)	11.9 (10.5-12.8)	13.8 (12.1-14.9)
7-day	3.61 (3.38-3.89)	4.30 (4.02-4.63)	5.19 (4.86-5.58)	5.96 (5.56-6.40)	7.13 (6.60-7.64)	8.18 (7.52-8.75)	9.37 (8.56-10.0)	10.7 (9.74-11.5)	12.9 (11.5-13.8)	14.9 (13.1-15.8)
10-day	4.17 (3.91-4.47)	4.94 (4.63-5.31)	5.91 (5.54-6.35)	6.74 (6.28-7.22)	7.97 (7.40-8.53)	9.06 (8.36-9.68)	10.3 (9.44-11.0)	11.7 (10.6-12.5)	13.8 (12.5-14.7)	15.7 (14.0-16.8)
20-day	5.74 (5.40-6.11)	6.75 (6.36-7.19)	7.88 (7.41-8.37)	8.81 (8.28-9.36)	10.2 (9.56-10.8)	11.4 (10.6-12.1)	12.7 (11.8-13.5)	14.2 (13.1-15.0)	16.3 (14.9-17.3)	18.2 (16.5-19.4)
30-day	7.19 (6.81-7.63)	8.43 (7.97-8.94)	9.67 (9.14-10.2)	10.7 (10.1-11.3)	12.2 (11.5-12.9)	13.5 (12.7-14.2)	14.9 (13.9-15.7)	16.4 (15.2-17.3)	18.5 (17.1-19.6)	20.4 (18.7-21.6)
45-day	9.13 (8.67-9.62)	10.6 (10.1-11.2)	12.0 (11.4-12.7)	13.2 (12.5-13.9)	14.8 (14.0-15.7)	16.2 (15.3-17.1)	17.6 (16.6-18.6)	19.1 (18.0-20.2)	21.3 (19.9-22.5)	23.2 (21.5-24.5)
60-day	11.0 (10.5-11.6)	12.8 (12.2-13.5)	14.4 (13.7-15.1)	15.7 (14.9-16.5)	17.5 (16.6-18.4)	19.1 (18.0-20.0)	20.7 (19.5-21.7)	22.4 (21.1-23.4)	24.8 (23.2-26.0)	26.8 (25.0-28.1)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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PF graphical

NOAA Atlas 14, Volume 2, Version 3
Location name: Williamsport, Pennsylvania, USA*
Latitude: 41.2322°, Longitude: -77.0282°
Elevation: 536.12 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

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PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	4.00 (3.62-4.38)	4.75 (4.32-5.21)	5.52 (5.02-6.06)	6.06 (5.50-6.66)	6.73 (6.08-7.39)	7.24 (6.53-7.94)	7.70 (6.90-8.46)	8.18 (7.30-9.01)	8.84 (7.84-9.77)	9.32 (8.22-10.4)
10-min	3.10 (2.81-3.40)	3.71 (3.37-4.07)	4.29 (3.89-4.71)	4.68 (4.24-5.14)	5.15 (4.66-5.65)	5.48 (4.94-6.02)	5.80 (5.20-6.37)	6.10 (5.45-6.73)	6.50 (5.76-7.18)	6.79 (5.99-7.54)
15-min	2.54 (2.30-2.78)	3.02 (2.75-3.32)	3.51 (3.19-3.86)	3.84 (3.48-4.22)	4.24 (3.83-4.66)	4.52 (4.08-4.97)	4.80 (4.30-5.27)	5.06 (4.52-5.58)	5.40 (4.79-5.98)	5.66 (4.99-6.28)
30-min	1.68 (1.52-1.84)	2.02 (1.84-2.22)	2.41 (2.18-2.64)	2.67 (2.42-2.93)	2.99 (2.71-3.29)	3.23 (2.92-3.55)	3.46 (3.11-3.81)	3.69 (3.30-4.07)	4.00 (3.55-4.43)	4.24 (3.74-4.71)
60-min	1.02 (0.929-1.12)	1.24 (1.13-1.36)	1.51 (1.37-1.66)	1.70 (1.54-1.86)	1.94 (1.76-2.13)	2.13 (1.92-2.34)	2.32 (2.08-2.54)	2.51 (2.24-2.76)	2.77 (2.45-3.06)	2.98 (2.63-3.31)
2-hr	0.584 (0.527-0.642)	0.705 (0.638-0.778)	0.862 (0.780-0.950)	0.990 (0.894-1.09)	1.17 (1.05-1.29)	1.33 (1.19-1.46)	1.50 (1.33-1.65)	1.69 (1.48-1.86)	1.97 (1.71-2.18)	2.22 (1.91-2.47)
3-hr	0.417 (0.378-0.462)	0.501 (0.455-0.555)	0.617 (0.559-0.683)	0.712 (0.642-0.788)	0.853 (0.765-0.941)	0.973 (0.867-1.07)	1.11 (0.978-1.22)	1.26 (1.10-1.39)	1.50 (1.29-1.66)	1.70 (1.45-1.90)
6-hr	0.261 (0.236-0.291)	0.313 (0.284-0.350)	0.384 (0.347-0.428)	0.443 (0.399-0.493)	0.529 (0.474-0.587)	0.604 (0.537-0.670)	0.687 (0.606-0.763)	0.781 (0.680-0.868)	0.926 (0.793-1.03)	1.05 (0.891-1.18)
12-hr	0.162 (0.147-0.181)	0.195 (0.176-0.217)	0.239 (0.216-0.267)	0.276 (0.249-0.308)	0.332 (0.297-0.369)	0.381 (0.338-0.423)	0.437 (0.383-0.486)	0.500 (0.432-0.557)	0.598 (0.508-0.669)	0.685 (0.574-0.772)
24-hr	0.099 (0.091-0.108)	0.118 (0.109-0.129)	0.146 (0.135-0.159)	0.171 (0.156-0.185)	0.208 (0.190-0.225)	0.243 (0.219-0.261)	0.282 (0.253-0.303)	0.329 (0.293-0.352)	0.404 (0.354-0.430)	0.473 (0.409-0.502)
2-day	0.057 (0.053-0.063)	0.069 (0.063-0.075)	0.085 (0.078-0.093)	0.099 (0.091-0.108)	0.121 (0.110-0.131)	0.140 (0.127-0.152)	0.163 (0.147-0.176)	0.190 (0.169-0.205)	0.234 (0.204-0.251)	0.274 (0.236-0.293)
3-day	0.041 (0.038-0.045)	0.049 (0.045-0.053)	0.060 (0.055-0.065)	0.069 (0.064-0.076)	0.084 (0.077-0.091)	0.098 (0.089-0.106)	0.113 (0.102-0.122)	0.131 (0.117-0.142)	0.161 (0.141-0.172)	0.187 (0.162-0.201)
4-day	0.032 (0.030-0.035)	0.039 (0.036-0.042)	0.047 (0.044-0.052)	0.055 (0.050-0.059)	0.066 (0.060-0.072)	0.076 (0.069-0.083)	0.088 (0.080-0.095)	0.102 (0.091-0.110)	0.124 (0.109-0.133)	0.144 (0.126-0.155)
7-day	0.021 (0.020-0.023)	0.026 (0.024-0.028)	0.031 (0.029-0.033)	0.035 (0.033-0.038)	0.042 (0.039-0.045)	0.049 (0.045-0.052)	0.056 (0.051-0.060)	0.064 (0.058-0.068)	0.077 (0.069-0.082)	0.088 (0.078-0.094)
10-day	0.017 (0.016-0.019)	0.021 (0.019-0.022)	0.025 (0.023-0.026)	0.028 (0.026-0.030)	0.033 (0.031-0.036)	0.038 (0.035-0.040)	0.043 (0.039-0.046)	0.049 (0.044-0.052)	0.058 (0.052-0.061)	0.066 (0.059-0.070)
20-day	0.012 (0.011-0.013)	0.014 (0.013-0.015)	0.016 (0.015-0.017)	0.018 (0.017-0.019)	0.021 (0.020-0.023)	0.024 (0.022-0.025)	0.026 (0.025-0.028)	0.030 (0.027-0.031)	0.034 (0.031-0.036)	0.038 (0.034-0.040)
30-day	0.010 (0.009-0.011)	0.012 (0.011-0.012)	0.013 (0.013-0.014)	0.015 (0.014-0.016)	0.017 (0.016-0.018)	0.019 (0.018-0.020)	0.021 (0.019-0.022)	0.023 (0.021-0.024)	0.026 (0.024-0.027)	0.028 (0.026-0.030)
45-day	0.008 (0.008-0.009)	0.010 (0.009-0.010)	0.011 (0.011-0.012)	0.012 (0.012-0.013)	0.014 (0.013-0.014)	0.015 (0.014-0.016)	0.016 (0.015-0.017)	0.018 (0.017-0.019)	0.020 (0.018-0.021)	0.021 (0.020-0.023)
60-day	0.008 (0.007-0.008)	0.009 (0.008-0.009)	0.010 (0.010-0.010)	0.011 (0.010-0.011)	0.012 (0.012-0.013)	0.013 (0.013-0.014)	0.014 (0.014-0.015)	0.016 (0.015-0.016)	0.017 (0.016-0.018)	0.019 (0.017-0.020)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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PF graphical

GEOTECHNICAL ENGINEERING STUDY

Williamsport Ballpark, Inc.
City of Williamsport, Lycoming County, Pennsylvania
Project No. CCS2024

Prepared for:

Mr. Gary Pate, P.E., D.B.I.A.
Hawbaker Engineering, LLC
1952 Waddle Road
Suite 201
State College, PA 16803

Prepared by:

CENTRE CONSULTING

Centre Concrete Company
2280 East College Avenue
State College, PA 16801

October 8, 2020

October 8, 2020

Mr. Gary Pate, P.E., D.B.I.A.
Hawbaker Engineering, LLC
1952 Waddle Road
Suite 201
State College, PA 16803

RE: Geotechnical Engineering Study
Williamsport Ballpark, Inc.
City of Williamsport, Lycoming County, Pennsylvania
Project No. CCS2024

Dear Mr. Pate:

Centre Concrete Company operating as Centre Consulting Services (CCS) has completed the geotechnical engineering study for the proposed Williamsport Ballpark, Inc. project located in the City of Williamsport, Lycoming County, Pennsylvania.

This portion of the exploration consisted of advancing 50 test borings, laboratory testing, performing engineering analyses and preparing this written report of findings and conclusions.

Should you have any questions or require additional information, please contact us.

Sincerely,

CENTRE CONSULTING SERVICES

James. P. Thornton, Jr., P.E.
Senior Geotechnical Engineer

Paul R. Thomas, P.E.
Geotechnical Engineer

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL JAMES P. THORNTON, JR. ENGINEER PE-083051-E

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Williamsport Ballpark, Inc.
City of Williamsport, Lycoming County, Pennsylvania
Project No. CCS2024

1.0 PURPOSE AND SCOPE

The purpose of this study was to determine the general subsurface conditions at all testing locations, and to evaluate those conditions with respect to the concept and design of a foundation system as well as site work for the proposed construction.

The evaluations and recommendations presented in this report were developed from an analysis of the project characteristics and an interpretation of the general subsurface conditions at the site based on testing information. The soil descriptions shown on the test boring logs represent the approximate boundaries between underlying materials; however, these transitions may be gradual. Such variations can best be evaluated during construction/excavation and, if necessary, any minor design changes can be made at that time.

An evaluation of the site with respect to potential construction problems as well as recommendations regarding earthwork and inspection are also included. The inspection is considered necessary to verify the subsurface conditions and to verify that the soils related construction phases are performed properly. The Appendix contains a summary of the field and laboratory work on which this report is based.

Our services for this project were performed in accordance with a CCS Proposal sent to Mr. Gary Pate, P.E., D.B.I.A., Senior Construction Manager with Hawbaker Engineering, LLC via email on July 20, 2020. Authorization to perform this exploration and analysis was given in the form of a verbal notice to proceed from Mr. Pate.

2.0 PROJECT CHARACTERISTICS

The project is located in the City of Williamsport, Lycoming County, Pennsylvania. More specifically, the site is located at the former Susquehanna Supply property with access extending west off of Maynard Street. The property is bounded by Bayard Printing Group to the east, Rose Street to the west, S.R. 220/I-180 to the south and a railway line to the north. The general location of the site is shown on a Site Location Map presented in Appendix B.

It was described to us by others that the site had been used as a landfill prior to Susquehanna Supply, and that landfill waste is still present at some locations at the site subsurface. This information has been determined during previous subsurface explorations at the site, and was confirmed during our subsurface exploration. To address any environmental concerns, representatives of BAI Group were present during drilling operations.

The project footprint and test boring locations are shown on a site plan prepared by Hawbaker Engineering, LLC and received from Mr. Pate via email on July 23, 2020. A modified version of that drawing is included in Appendix D as our Test Boring Location Plan.

At the time of the investigation, the site surface was highly variable with areas of concrete and gravel fill, asphalt pavement, concrete pavement, and moderate to heavy underbrush and vegetation with some mature trees. Several structures and concrete slabs associated with the former Susquehanna Supply were also present, mainly at the southern and western portions of the site. Of particular note is that portions of the concrete sidewalks and pavements surrounding these structures exhibited noticeable distress in the form of differential settlement.

According to topographic contours shown on the Hawbaker Engineering, LLC site plan, and based upon our observations prior to and during the drilling operations, the site surface is variable, although predominantly level throughout the majority of the project area. Ground surface elevations at the test boring locations were determined in the field by Hawbaker Engineering, LLC personnel and provided by Mr. Pate via email on September 10, 2020. According to this information, ground surface elevations at the test boring locations range between 513 and 542 feet.

General project information was provided by Mr. Pate. According to this information, we understand that the proposed project will consist of the redevelopment of the site into a baseball complex with approximately six (6) playing fields. Various support structures will also be constructed including concessions and restrooms. The locations of the structures and fields and the proposed site grades had not been determined at the time of this report. For the purpose of our analysis, we have assumed that all structures will be single-story, slab-on-grade, and will consist either of pre-engineered metal or conventional masonry buildings. We have also assumed that finished site grades will not require significant cuts or fills.

Precise structural loading information was not available at the time of this report. For the purpose of our analysis, we have assumed light loading conditions with maximum unfactored column, wall and floor loads of 50 kips, 2 kips per lineal foot and 150 pounds per square foot, respectively. Maximum tolerable total and differential settlement values of 1 inch were utilized for this evaluation.

3.0 GEOLOGIC INFORMATION

According to the Department of Environmental Resources, Office of Resources Management, Bureau of Topographic and Geologic Survey (1982), geologic formations at the proposed site consist of both the Onondaga and Old Port Formations, undivided (Doo) and the Hamilton Group (Dh). A description of these formations is provided in the following subsections.

3.1 Onondaga and Old Port Formations, Undivided

The Onondaga Formation consists of olive green weathering, medium gray limestone and calcareous shale with claystone in the lower part. The bedrock is moderately resistant to weathering to a deep depth and excavation of the bedrock is typically difficult. Foundation stability is generally good provided that excavations are extended to sound material.

The Old Port Formation contains diverse rock types including sandstone, chert, shale, and limestone. This formation includes in descending order; *Ridgeley Member* – fine to very coarse grained, light gray, porous sandstone; *Shriver Member* – dark gray to black chert that weathers to light gray to white or yellow brown; *Mandata and Corriganville Members* – gray to brown, silty to very sandy shale, siltstone, and chert; *New Creek Member* – medium gray to dark gray calcareous shale and interbedded light to medium gray limestone. These rock formations are variably, but mostly resistant to weathering, excavations are typically difficult and foundation stability is generally good.

3.2 Hamilton Group

The uppermost part of this group consists of olive gray to medium olive gray, fossiliferous siltstone and shale interbedded with fine grained, medium dark gray sandstone. Oolitic hematite occurs in a zone near the top and near the middle, light to medium gray, medium to coarse grained sandstone and several thin conglomerate beds occur. The base of the unit is characterized by medium to dark-gray, fine grained sandstone and dark gray to black, fissile shale. The bedrock is moderately to poorly resistant to weathering and excavation is moderately easy to difficult. Cut-slope stability to is good in sandstone and fair in shale, and foundation stability is good provided that excavations are extended to sound material.

4.0 FIELD EXPLORATION

Prior to commencement of field operations, the project was registered with the Pennsylvania One Call System, Inc. Field operations were also coordinated with numerous utility locators in response to the One Call. Note that numerous utilities are present throughout the project area, with some associated with the former Susquehanna Supply and some that appear unrelated to that facility. We recommend that the contractors verify the locations of any utilities prior to commencement of construction activities.

A total of fifty (50) Standard Penetration Test (SPT) borings were drilled at the site. Fifty-four (54) test borings had been proposed; however, test borings TB-1, TB-3, TB-5 and TB-9 were not drilled due to uncertainties regarding the locations of subsurface utilities. The test borings and corresponding ground surface elevations were surveyed in the field by Hawbaker Engineering, LLC personnel. The locations of the test borings are shown on the Test Boring Location Plan included in Appendix D of this report.

The test borings were extended to depths ranging between 8.0 and 40.0 feet below the existing site surface. The borings were advanced with a casing advancer and the subsurface soils were sampled until appropriate depths were achieved. Note that hollow stem augers were attempted to be used for numerous borings and could not be advanced due to large concrete fragments, boulders and/or other miscellaneous debris within the upper layer of fill materials. Samples were taken by driving a 1-3/8-inch I.D. (2-inch O.D.) split-spoon sampler in accordance with ASTM D-1586 specifications. The sampler was driven in 24-inch intervals with a 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler between 6 and 18 inches within the sampling interval is designated as the "Penetration Resistance" or "N" value. The penetration resistance is an index of the soil strength and compression characteristics.

Representative portions of each soil sample were placed in sealed containers and transported to CCS's laboratory. In the laboratory, the samples were visually examined by CCS personnel to verify the driller's field classifications.

Auger refusal on bedrock was not encountered within any of the test borings, therefore rock coring operations were not utilized for the project. All test borings were backfilled with PennDOT Class B Controlled Low Strength Material (CLSM or “flowable fill”) at the conclusion of the test boring operations.

5.0 LABORATORY TESTING

In addition to the visual classification of the soil samples, moisture content determination tests were performed on representative samples. The moisture content is the ratio of the weight of the water in the sample to the dry weight of the sample. These tests were performed in general compliance with ASTM D2216.

Moisture-plasticity characteristics of eight (8) composite soil sample were determined by means of the Atterberg Limits test. The test determines the moisture content at which the soil transitions from a plastic state to a viscous liquid (Liquid Limit - LL) and the moisture content at which the soil changes from a plastic state to a semi-solid state (Plastic Limit - PL). The difference between the Liquid Limit and Plastic Limit is the Plasticity Index - PI. The test procedure was performed in compliance with ASTM D4318.

Particle-size analyses were performed on the same soil samples in compliance with ASTM D422. The procedure includes a sieve analysis for particle sizes greater than the #200 sieve and a hydrometer analysis for particle sizes smaller than the #200 sieve. Using this information, the samples were classified using the Unified Soil Classification System (USCS), ASTM D2487.

The following is a summary of the soil classification results with individual results enclosed in Appendix H:

Location of Composite Sample	Liquid Limit (LL)	Plasticity Index (PI)	USCS
TB-4, 0-10’	---	NP	SM
TB-40 & TB-48, 0-8’	---	NP	SM
TB-53, 0-4	---	NP	SM
TB-54, 0-4	---	NP	SM
TB-4, 38-40	---	NP	ML
TB-40 & TB-48, 23-25’	---	NP	ML
TB-53, 32-34’	---	NP	GM
TB-54, 28-32’	---	NP	ML

6.0 SUBSURFACE CONDITIONS

Details of the subsurface conditions encountered are shown on the Test Boring Logs included in Appendix F of this report. A general summary of the test borings is presented in Appendix E and a brief description of the subsurface conditions is outlined below.

6.1 Overburden Fill Materials

The site surface at the test boring locations consists of fill placed as overburden cover atop the landfill materials. The overburden fill materials are highly variable in composition and contain varying amounts of concrete fragments, sand, gravel, cobbles, boulders, asphalt, brick and clay. These fill materials were encountered within all test borings and extend to depths ranging between 3 and 10 feet below the existing surface grades. Reference Section 5.0 and Appendix H for soil classification results of selected overburden fill samples.

It is important to note that elevated blow counts and split-spoon refusal were encountered within this stratum at many test boring locations due to increased particle size. In addition, several of the test borings required offsets due to large subsurface obstructions (concrete, boulders and/or metal). Due to the composition of the overburden fill, this material is considered uncontrolled.

Representative photographs of the overburden fill materials are included in Appendix G. These photographs were taken during installation of temporary groundwater monitoring wells near test borings TB-9 and TB-49. Installation of the temporary groundwater monitoring wells at these locations required that the fill materials be excavated with a track-hoe to penetrate beyond the overburden fill. At test boring location TB-49, the fill material contained concrete slabs large enough that a hydraulic rock breaker was required for excavation.

6.2 Landfill Waste

Landfill waste was encountered beneath the overburden fill materials within all test borings except for TB-25 and TB-33, which are located at the far eastern edge of the property. The landfill waste consists of various rubbish including plastic, metal, wood, organics, etc. and extends to depths ranging between 8 and 38 feet where encountered.

It is important to note that the landfill waste cannot be defined as soil due to its composition. In addition, the blow counts were

highly variable, with encountered conditions ranging from weight-of-hammer to split-spoon refusal. As such, these materials are considered uncontrolled and highly compressible.

Test borings TB-6, TB-12, TB-24 TB-28 and TB-34 were terminated within the landfill waste.

6.3 Natural Materials

Natural alluvial soils were encountered beneath the landfill waste within most of the test borings. These materials were also encountered directly beneath the overburden fill materials within test borings TB-25 and TB-33. The natural alluvial soils consist predominantly of silt, sand and gravel sized particles and extend to termination depth at all locations where these materials were encountered. These soils have moisture contents ranging between 1.5 and 38.7 percent and exhibit a very loose to very dense relative density. In general, the more fine-grained soils (silt and sand) were in a less dense condition, with more coarse-grained soils (gravel) exhibiting higher densities. Reference Section 5.0 and Appendix H for soil classification results of representative natural soil samples.

6.4 Groundwater Conditions

A groundwater table was encountered within many of the test borings within the natural alluvial soil stratum at depths on the order of 25 to 35 feet. These depths are logical given that relatively dry conditions would have been necessary for the initial construction of the landfill.

Due to the fact that water was continuously introduced into the borings for advancement purposes, accurate groundwater elevations could not be determined at the time of the drilling operations. Groundwater levels fluctuate seasonally as a function of precipitation, the permeability of the subsurface materials, and the proximity to nearby water bodies and wetlands.

6.5 Site Seismicity

According to the 2012 International Building Code, Section 1613.3.2 (Chapter 20 of ASCE 7), seismic Site Class E should be specified for this project.

7.0 EVALUATIONS AND RECOMMENDATIONS

The subject site is considered suitable for the proposed construction, provided the geotechnical recommendations and suggested construction guidelines presented in this report are utilized in both the design and construction phases of this project.

Due to the fact that specific details of the project had not been determined at the time of this report, it is imperative that CCS be provided with more complete design information to determine the applicability of the recommendations contained herein. If there are any changes to the project characteristics, or if different subsurface conditions are encountered during construction, CCS should be consulted so that the recommendations of this report can be reviewed and revised, if necessary.

7.1 General Site Preparation

Site preparation should include the removal of topsoil, all frozen, wet, soft or very loose soils, and any other deleterious materials. In addition, any remaining vegetation, foundations, floor slabs and pavements should be removed. These operations should be performed in a manner consistent with good erosion and sediment control practices.

Prior to placement of structural fill, all areas of the site should be proof-compacted. The purpose of the proof-compaction is to provide surficial densification of the bearing soils and to locate any near surface pockets of soft or loose soils which may require undercutting or other form of modification. **This is particularly important in evaluating the surficial fill materials present throughout the construction footprint. Any or otherwise unstable areas should be repaired prior to fill placement.**

A Geotechnical Engineer or experienced Soils Technician should witness the proof-compacting operations and determine whether any areas require undercutting and/or stabilization.

7.2 General Fill and Environmental Considerations

As previously discussed, the overburden fill materials are highly variable in composition and contain extensive zones of large concrete fragments, boulders, etc. It should be expected that a significant portion of the fill will require processing (i.e. sorting, crushing and/or grading) to facilitate reuse as fill for the project, even in non-structural areas such as playing fields and grass areas. **Consequently, it is likely that significant import of fill materials may be required to facilitate construction of the project.**

In addition, we expect that a minimum depth of cover will be required between the subsurface landfill materials and the final site grades. Any recommendations contained in environmental studies for the site should be considered in the final design, and our report does not purport to address any environmental aspects of the proposed construction.

7.3 Structural Fill Selection, Placement and Compaction

Structural fill is defined as all fill placed under and around foundations, grade slabs, utilities, sidewalks, and roadways. Suitability of backfill material should be evaluated during construction based upon its intended use.

If imported fill material is required, those materials should have Unified Soil Classifications of CL or better, contain no rock greater than 3 inches in diameter, and should not contain more than 1 percent (by weight) of organic matter or other deleterious material. Uniformly graded materials, such as PennDOT 2B or AASHTO #57 stone, can only be utilized as structural fill with the permission of the Geotechnical Engineer. Lateral confinement of poorly graded materials will be required in order to limit horizontal movement and subsequent settlement or instability of the structural fill.

Potentially expansive materials such as mine tailings, pyritic shale and slag should not be used as structural fill. Any fill or aggregate containing more than 0.1% total sulfur by weight as determined by ASTM D4239 should be evaluated by Wet-Dry Durability testing in accordance with PennDOT Test Method No. 519 in order to determine the potential for expansion by sulfide to sulfate conversion. The interpretation of the expansive shale test results should be conducted by a qualified geotechnical engineer or engineering geologist.

All fill should be placed in relatively horizontal 8 inch (maximum) loose lifts and should be compacted to a minimum of 100 percent of the Standard Proctor (ASTM D 698) maximum dry density. Field moisture contents should be maintained within 2 percent of the optimum moisture content in order to facilitate adequate compaction.

7.4 Foundations

Based on the subsurface conditions encountered during our field exploration program and our understanding of the proposed project, conventional shallow foundations will be most appropriate and economical for the project. **Use of conventional shallow foundations will be contingent upon the size, composition and loading conditions of the proposed structures, and this information should be provided to CCS when determined so that we may either confirm or revise the recommendations contained herein.**

To facilitate construction atop the existing landfill waste materials, we recommend conventional shallow mat foundations to evenly distribute the structural loads over the entire building footprints. To create a stable and uniform bearing surface, we recommend that all conventional shallow mat foundations be overexcavated a minimum of 3 feet below the proposed bearing elevation with backfill consisting of PennDOT 2A stone. To better stabilize the foundation bearing material, and to facilitate proper compaction of the PennDOT 2A stone, we further recommend that a layer of geogrid reinforcement (Tensar TX160 or equivalent) be placed at a depth of 2 feet below the top of stone elevation. All overexcavations and stone/geogrid placement should extend a minimum of 5 feet beyond the footprint of the mat foundations in all dimensions. The PennDOT 2A stone should be placed and compacted according to Section 7.3 of this report.

Dependent upon the composition of the fill materials encountered during overexcavation and dependent upon the final site grading scenario, additional subgrade modification may become necessary, particularly where the overburden fill thickness is minimal. This additional modification could include further overexcavation and/or placement of additional geogrid reinforcement layers.

Conventional shallow mat foundations bearing upon a modified subgrade as described above can be sized based upon a net allowable bearing capacity of 2,000 pounds per square foot. In addition, a modulus of subgrade reaction of 25 pounds per square inch per inch (psi/in) can be utilized for mat foundation design.

Any soft, wet or unstable soils should be overexcavated to sound material and be backfilled with properly compacted PennDOT 2A stone. We recommend that all foundation bearing material evaluations be performed by a qualified Soils Technician under the direct supervision of a Geotechnical Engineer. We also recommend a minimum footing width of 3 feet.

Assuming the net loading on the conventional shallow foundations does not exceed 2,000 pounds per square foot and the recommendations in this report are followed, total post-construction total and differential settlement should be less than the assumed tolerable values. All exterior footings and footings in unheated areas should extend a minimum of 42 inches below final exterior grades to provide adequate protection from frost damage.

7.5 Groundwater and Drainage

Groundwater levels fluctuate seasonally as a function of precipitation, the permeability of the subsurface materials and the proximity to nearby water bodies and wetlands. Based upon the depth to groundwater at the site, it is unlikely that significant groundwater will be encountered during earthmoving operations and foundation construction.

If groundwater is encountered, it must be removed from the excavations. A gravity drainage system or open pump(s) or series of pumps should be sufficient for these temporary purposes, although the contractor may determine that a more elaborate dewatering system is required. If conditions are encountered that cannot be handled in such a manner, the Geotechnical Engineer should be consulted.

7.6 Ground-Supported Slabs

Floor slabs should be supported on approved natural material or newly placed and compacted structural fill. The slab subgrade should be prepared in accordance with the procedures outlined in Sections 7.1 and 7.3 of this report. **In particular, the slab subgrade should be thoroughly proofrolled to delineate any soft or loose areas requiring undercutting and/or stabilization.** The in-place materials and properly compacted structural fill are expected to provide a subgrade modulus of reaction (k) of 25 pounds per square inch per inch (psi/inch).

To reduce stress concentrations on any grade slabs and to provide a uniform bearing surface that may be associated with dissimilar fill materials, we recommend a minimum of 12 inches of compacted PennDOT 2A stone be placed between all grade slabs and the underlying subgrade. The stone will also act as a drainage course for any moisture below the slabs.

We also recommend that construction joints on the slab surface and isolation joints between the slab and structural walls be provided (such that the slab would be ground-supported).

If construction sequencing results in a significant time gap between initial grading and a point when the contractor is ready to place concrete slabs-on-grade, environmental conditions and construction traffic often disturb the subgrade soils. Provisions should be made in the construction specifications for the restoration of the subgrade soils to a stable condition prior to the placement of the concrete for the floor slabs.

7.7 Pavement Design Considerations

All pavements should be designed in accordance with PennDOT or AASHTO standards based upon anticipated traffic loading and frequency for the intended service life. The subgrade should be prepared according to Sections 7.1, 7.2 and 7.3. All pavements should contain adequate surface and subsurface drainage.

The design pavement section for this project will be dependent upon many factors, especially upon the final site grading and depth of cover (i.e. thickness of overburden fill). This material thickness will have a significant influence on the California Bearing Ratio (CBR) that should be utilized for design of the pavement section. Other important design considerations which will affect the pavement thickness are intended service life and traffic frequency and loading conditions.

As a baseline for estimating purposes, we anticipate that a typical pavement subgrade will consist of 18 inches of compacted PennDOT 2A stone underlain by a layer of geogrid reinforcement (Tensar TX160 or equivalent. We also anticipate that some pavement areas may be able to be value engineered as "light duty" sections where traffic will consist of passenger cars only. CCS should be provided with design and traffic loading information when available to provide further recommendations regarding the appropriate pavement section.

8.0 REMARKS

This report has been prepared to aid in the evaluation of the site for the proposed construction. It is considered that adequate recommendations have been provided to serve as a basis for design and additional recommendations can be provided as needed.

These analyses and recommendations are, of necessity, based on the information made available to us at the time of the actual writing of the report and the onsite surface and subsurface conditions which existed at the time the exploratory borings were drilled.

If subsurface conditions are encountered which differ from those reported herein, this office should be notified immediately so that the analyses and recommendations can be reviewed and/or revised as necessary. We also recommended that:

1. We are given the opportunity to review any plans and specifications in order to comment on the interaction of the soil conditions as described herein and the design requirements.

2. A Geotechnical Engineer or experienced Soils Technician be present at the site during the construction phase to verify installation according to the approved plans and specifications. This is particularly important during excavation, foundation construction, and placement and compaction of fill materials.

Please note that successful completion of the project is dependent on your compliance with all of the recommendations provided in this report. While represented separately, the recommendations represent work that is intertwined.

Our professional services have been performed, our findings obtained, and our recommendations prepared in accordance with accepted engineering principles and practices. CCS assumes no responsibility for interpretations made by others based on work or recommendation.

APPENDIX A

GENERAL GEOTECHNICAL NOTES

CENTRE CONSULTING

General Geotechnical Notes

SOIL PROPERTY SYMBOLS

N	Standard Penetration Resistance - Blows per foot of a 140 pound hammer falling 30 inches on a 2" O.D. split-spoon sampler.
q_p	Pocket Penetrometer measurement of unconfined compressive strength - tsf
M_c	Soil Moisture Content - %.
GR	Graphical Representation of the soil strata (see below).
LL	Liquid Limit - %.
PI	Plasticity Index - %.
REC	Percent Core Recovery - Ratio of the length of rock core obtained, to the core interval.
RQD	Rock Quality Designation - Ratio of the sum of core segments greater than 4", to the core interval.
▼	Apparent Groundwater Level at time noted after boring completion.

CONSISTENCY AND RELATIVE DENSITY CLASSIFICATION | RELATIVE PROPORTIONS

Cohesive Soils	q_p - (tsf)	"N"	Granular Soils	SPT "N" Value	Descriptive Term	Percent
Very Soft	0.00-0.2	0-3	Very Loose	0 - 4	Trace	1 - 10
Soft	0.25-0.50	4-5	Loose	5 - 10	Little	11 - 20
Firm (Medium)	0.50-1.00	6-9	Slightly Compact	11 - 20	Some	21 - 35
Stiff	1.00-2.00	10-16	Medium Dense	21 - 30	And	36 – 50
Very Stiff	2.00-4.00	17-30	Dense	31 - 50	With	<15
Hard	4.00+	31+	Very Dense	50+		

PARTICLE SIZE

Boulders	>12 in	Coarse Sand	4.75 mm – 2.0 mm	Silt	0.075 mm - 0.002 mm
Cobbles	12 in - 3 in	Medium Sand	2.0 mm - 0.425 mm	Clay	< 0.002 mm
Gravel	3 in – 4.75 mm	Fine Sand	0.425 mm - 0.075 mm		

SOIL/ROCK STRATA LEGEND

Clays	Limestone/Dolomite
Silts	Shale
Sands & Gravels	Sandstone
Organic Materials	Landfill Waste
Fill Materials	Coal/Bitumen

ROCK QUALITY DESCRIPTION

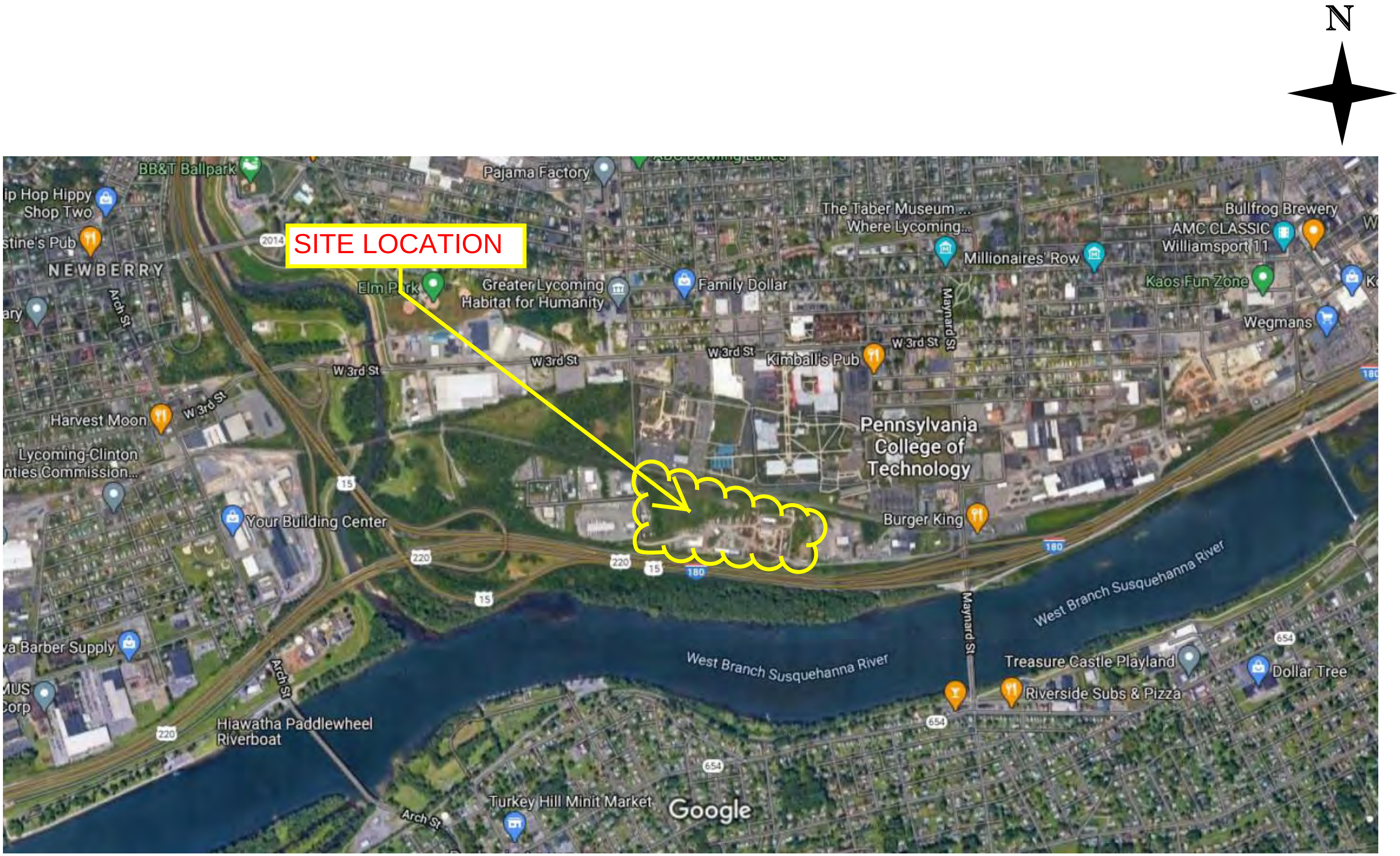
RQD	Rock Quality
0 - 25%	Very Poor
25 - 50%	Poor
50 - 75%	Fair
75 - 90%	Good
90 - 100%	Excellent

RELEVANT TERMS:

- Fill: Encountered soils that were placed by man. Fill soils may be controlled (engineered structural fill) or uncontrolled fills that may contain rubble and/or debris. Density standards proceed (least to greatest) by order of slightly compact – compact – well compacted.
- Disintegrated Rock: Residual soil material with rock-like properties, very dense, N = 60 to 50/0".
- Karst: Descriptive term which denotes the potential for solutioning of the limestone/dolomite rock and the development of sinkholes.
- Alluvium: Recently deposited soils placed by water action, typically stream or river floodplain soils.

APPENDIX B

SITE LOCATION MAP



SITE LOCATION MAP

Williamsport Ballpark, Inc.
City of Williamsport, Lycoming County, PA
Project No. CCS2024

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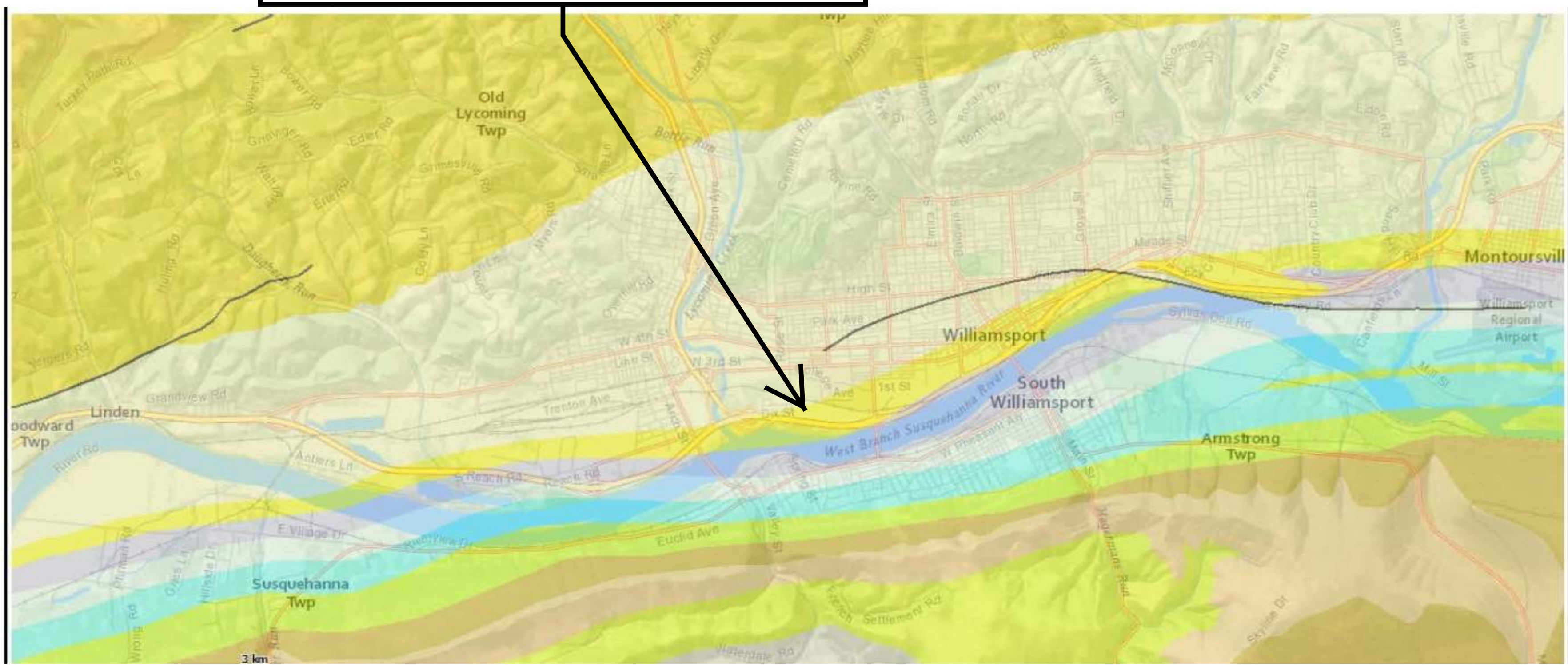
APPENDIX C

USGS GEOLOGY MAP

N

SITE LOCATION - Onondaga and Old Port Formations, undivided (Doo), and Hamilton Group (Dh)



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USGS GEOLOGY MAP

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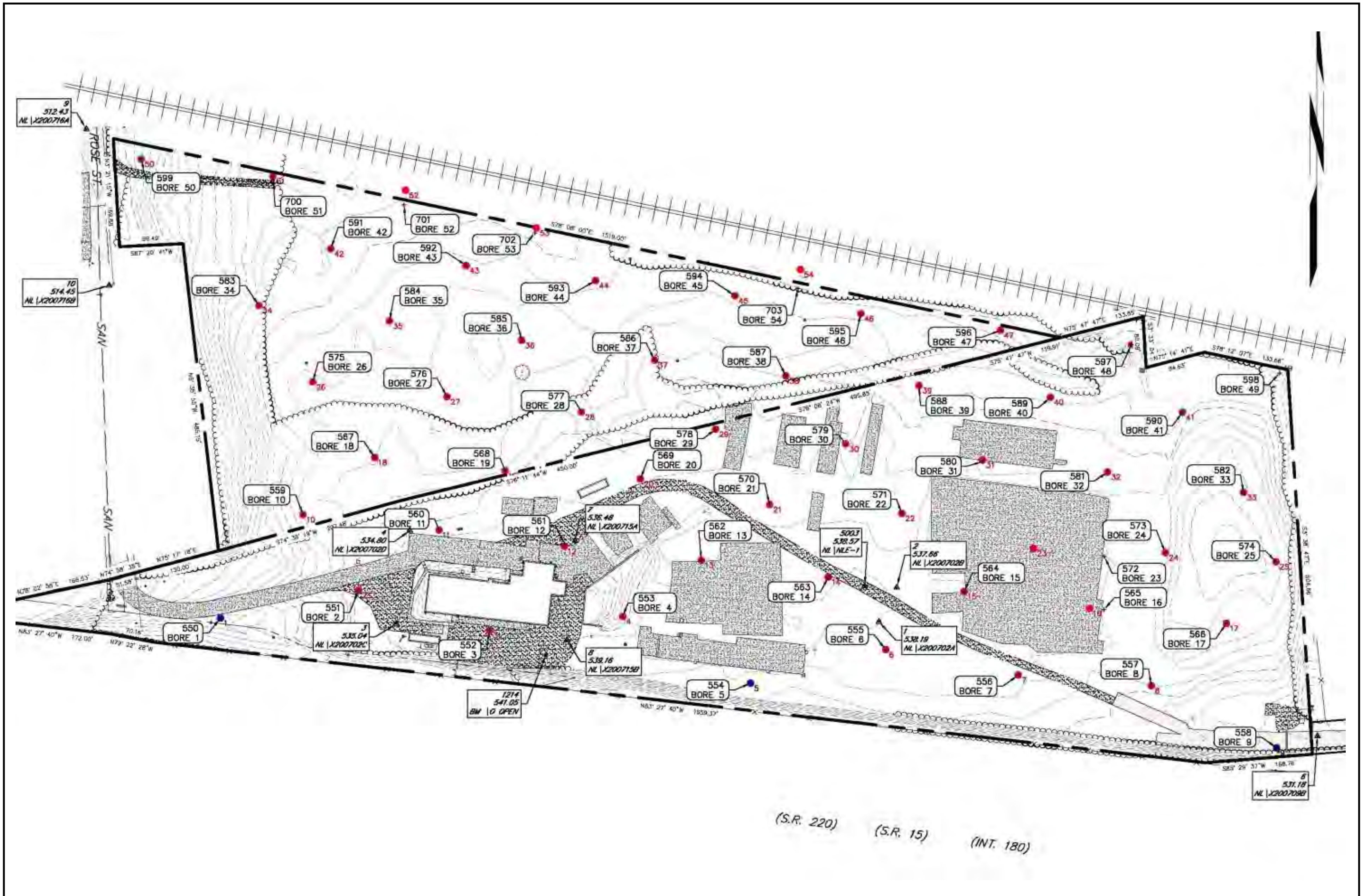
APPENDIX D

TEST BORING LOCATION PLAN



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APPENDIX E

TEST BORING SUMMARY

TEST BORING SUMMARY
WILLIAMSPORT BALLPARK, INC. – CCS2024

Test Boring	Depth (ft)	Ground Surface Elevation (ft)	Overburden Fill Depth (ft)	Landfill Waste Depth (ft)	Top of Landfill Waste Elevation (ft)
TB-1	NOT DRILLED				
TB-2	35.0	534.56	3.0	28.0	531.6
TB-3	NOT DRILLED				
TB-4	40.0	541.60	10.0	38.0	531.6
TB-5	NOT DRILLED				
TB-6	10.0	537.66	7.0	See Note	530.7
TB-7	38.0	537.32	4.0	35.0	533.3
TB-8	35.0	536.00	4.0	33.0	532.0
TB-9	NOT DRILLED				
TB-10	33.0	531.57	4.0	29.0	527.6
TB-11	35.0	535.41	4.0	30.0	531.4
TB-12	32.0	536.29	6.0	See Note	530.3
TB-13	40.0	536.45	10.0	35.0	526.5
TB-14	37.0	537.82	4.0	35.0	533.8
TB-15	39.0	537.73	6.0	28.0	531.7
TB-16	40.0	536.90	8.0	33.0	528.9
TB-17	25.0	538.94	4.0	18.0	534.9
TB-18	32.0	532.73	4.0	30.0	528.7
TB-19	30.0	535.44	4.0	28.0	531.4
TB-20	30.0	535.87	4.0	28.0	531.9
TB-21	35.0	536.41	6.0	33.0	530.4
TB-22	34.0	536.46	6.0	30.0	530.5
TB-23	40.0	537.22	4.0	33.0	533.2
TB-24	8.0	536.74	4.0	See Note	532.7
TB-25	14.0	539.62	8.0	None	531.6
TB-26	32.0	531.46	4.0	28.0	527.5
TB-27	36.0	532.78	4.0	34.0	528.8
TB-28	32.0	533.76	6.0	32.0+	527.8
TB-29	32.0	535.12	4.0	30.0	531.1
TB-30	30.0	535.64	6.0	28.0	529.6
TB-31	30.0	535.84	6.0	28.0	529.8
TB-32	27.0	535.57	4.0	None	531.6
TB-33	10.0	539.88	8.0	See Note	531.9
TB-34	18.0	528.74	4.0	See Note	524.7
TB-35	30.0	532.01	6.0	26.0	526.0
TB-36	30.0	532.20	4.0	28.0	528.2
TB-37	34.0	534.18	4.0	32.0	530.2
TB-38	36.0	533.90	6.0	34.0	527.9
TB-39	30.0	533.01	8.0	23.0	525.0
TB-40	25.0	533.54	4.0	23.0	529.5
TB-41	40.0	533.92	4.0	23.0	529.9
TB-42	30.0	529.17	8.0	23.0	521.2
TB-43	30.0	530.94	5.0	28.0	525.9
TB-44	34.0	530.65	4.0	32.0	526.7
TB-45	34.0	531.81	6.0	32.0	525.8
TB-46	30.0	531.37	4.0	28.0	527.4
TB-47	28.0	530.59	4.0	26.0	526.6
TB-48	25.0	531.71	8.0	23.0	523.7
TB-49	25.0	530.10	8.0	23.0	522.1
TB-50	20.0	513.37	3.0	8.0	510.4
TB-51	30.0	528.11	6.0	20.0	522.1
TB-52	30.0	528.91	4.0	27.0	524.9
TB-53	34.0	529.84	4.0	31.0	525.8
TB-54	32.0	531.17	8.0	28.0	523.2

Note: These test borings were terminated within the landfill waste and prior to encountering natural soils.

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APPENDIX F

TEST BORING LOGS

CENTRE CONSULTING

Test Boring Log

Boring: TB-2

Project Name: Williamsport Ballpark, Inc. **Date of Work:** 8/24/2020

Site: City of Williamsport, Lycoming County **File No.:** CCS2024

Driller: Matt Bellew **Drill Rig:** Acker Rebel **Core Bit:** N/A

Auger Type: 3" Casing **Method:** ASTM D-1586 **Elevation:** 534.56'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, gravel and ash, dry (UNCONTROLLED)		S-1	14-29-29-17	50+	---	2.7	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
5	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-2	15-9-4-3	13	---	---	
			S-3	4-3-5-3	8	---	---	
			S-4	4-3-50/0.4	50+	---	---	
10			S-5	20-14-50/0.3	50+	---	---	
15			S-6	7-10-7-5	17	---	---	
20			S-7	16-20-5-6	25	---	---	
25			S-8	4-1-3-7	4	---	---	
30	NATURAL SOILS - Brown silty sand, very loose, wet		S-9	woh-woh-woh-2	0	---	28.4	
	NATURAL SOILS - Brown silty sand and gravel, slightly compact to medium dense, wet		S-10	7-5-6-9	11	---	25.0	
35			S-11	5-12-17-13	29	---	8.6	
40	End of Boring - 35.0'							

Test Boring Log

Boring: TB-4

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/19/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	541.60'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, cobbles, gravel and ash, dry (UNCONTROLLED)		S-1	12-26-50/0.2	50+	---	5.9	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	50/0.4	50+	---	8.7	
5			S-3	-	-	---		
			S-4	19-21-19-21	40	---	5.6	
10			S-5	15-3-4-10	7	---	3.1	
	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)							
15			S-6	22-8-10-15	18	---	---	
20			S-7	10-3-7-7	10	---	---	
25			S-8	50/0.1	50+	---	---	
30			S-9	7-3-5-3	8	---	---	
35			S-10	20-4-8-5	12	---	---	
40	NATURAL SOILS - Brown sandy silt, slightly compact, wet		S-11	8-10-5-6	15	---	28.8	

End of boring - 40.0'

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Test Boring Log

Boring: TB-6

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/17/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	537.66'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete, fragments, sand, gravel and clay dry to damp (UNCONTROLLED)		S-1	30-28-24	28	---	5.3	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	No Sample	---	---	4.5	
5			S-3	11-23-20-11	43	---	8.7	
	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-4	5-4-12-10	16	---	10.0	
10			S-5	17-5-5-5	10	---	---	
	End of boring - 10.0'							Auger Refusal - 10.0'
15								
20								
25								
30								
35								
40								

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Test Boring Log

Boring: TB-7

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/17/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	537.32'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, sand and gravel, dry (UNCONTROLLED)		S-1	10-12-15-12	27	---	8.5	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	11-11-17-21	28	---	1.8	
5	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-3	8-3-4-8	7	---	3.8	
			S-4	7-3-3-5	6	---	---	
10			S-5	5-4-6-5	10	---	---	
15			S-6	7-7-5-12	12	---	---	
20			S-7	6-3-2-3	5	---	---	
25			S-8	3-4-6-3	10	---	---	
30			S-9	4-4-3-2	7	---	---	
			S-10	woh-woh-woh-woh	0	---	---	
35			S-11	2-3-4-8	7	---	---	
	NATURAL SOILS - Brown sand and gravel with cobbles and boulders, very dense, moist to wet		S-12	8-7-14-26	21	---	---	
			S-13	37-45-42-50/0.5	50+	---	6.5	
40	End of boring - 38.0'							

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Test Boring Log

Boring: TB-8

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/11 & 8/12/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	536.00'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, sand and gravel, dry (UNCONTROLLED)		S-1	7-15-8-6	23	---	7.5	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	9-7-7-4	14	---	4.3	
5	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-3	3-8-10-5	18	---	---	
			S-4	3-4-5-5	9	---	---	
10			S-5	9-21-14-9	35	---	---	
15			S-6	4-6-7-8	13	---	---	
20			S-7	5-4-3-4	7	---	---	
25			S-8	8-3-3-2	6	---	---	
30			S-9	3-3-3-6	6	---	---	
35	NATURAL SOILS - Brown sand and gravel, dense, moist to wet		S-10	12-20-23-28	43	---	7.8	
40	End of boring - 35.0'							

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Test Boring Log

Boring: TB-10

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/24/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	531.57'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
0–4	FILL - Varying amounts of concrete fragments, sand, gravel and clay, damp to wet (UNCONTROLLED)		S-1	4-6-4-2	10	---	6.9	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	5-2-2-2	4	---	20.9	
4–29	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-3	13-42-14-45	50+	---	---	
			S-4	46-4-7-6	11	---	---	
			S-5	6-4-4-6	8	---	---	
			S-6	4-2-5-6	7	---	---	
			S-7	9-4-2-3	6	---	---	
			S-8	2-woh-1-woh	1	---	---	
			S-9	2-1-3-3	4	---	---	
			S-10	4-3-3-3	6	---	---	
29–33	NATURAL SOILS - Brown silty sand and gravel, slightly compact, wet		S-11	8-7-8-9	15	---	14.3	
			S-12	7-7-4-4	11	---	20.0	
33	End of boring - 33.0'							

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Test Boring Log

Boring: TB-11

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	7/31/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	535.41'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, sand and gravel, dry (UNCONTROLLED)		S-1	10-18-17-15	35	---	5.3	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	17-18-14-7	32	---	5.4	
5	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-3	7-5-1-2	6	---	---	
			S-4	2-2-3-3	5	---	---	
10			S-5	29-9-5-8	14	---	---	
15			S-6	6-4-5-7	9	---	---	
20			S-7	18-7-6-17	13	---	---	
25			S-8	7-6-5-4	11	---	---	
30			S-9	4-1-2-3	3	---	---	
35	NATURAL SOILS - Brown silty sand and gravel, medium dense, wet		S-10	11-12-13-9	25	---	32.0	
40	End of boring - 35.0'							

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CENTRE CONSULTING

Test Boring Log

Boring: TB-12

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/20/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	536.29'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, sand and gravel, dry (UNCONTROLLED)		S-1	18-22-39-41	50+	---	4.4	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	43-40-42-41	50+	---	4.1	
5			S-3	20-16-7-5	23	---	9.6	
	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-4	6-4-6-3	10	---	---	
10			S-5	2-3-4-4	7	---	---	
15			S-6	4-3-2-3	5	---	---	
20			S-7	10-4-5-7	9	---	---	
25			S-8	7-3-4-3	7	---	---	
30			S-9	21-9-8-7	17	---	---	
			S-10	5-7-7-5	14	---	---	
35	End of Boring - 32.0'							
40								

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Test Boring Log

Boring: TB-13

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/19/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	536.45'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
0–10	FILL - Varying amounts of concrete fragments, cobbles, boulders, sand and gravel (UNCONTROLLED)		S-1	40-50/0.2	50+	---	3.1	
			S-2	50/0.3	50+	---	5.5	
5			S-3	20-12-4-3	16	---	---	No Recovery
			S-4	4-4-23-22	27	---	9.0	
10			S-5	12-26-50/0.5	50+	---	---	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
10–35	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)							
15			S-6	2-8-10-5	18	---	---	
20			S-7	6-3-7-12	10	---	---	
25			S-8	4-5-3-3	8	---	---	
30			S-9	12-17-6-6	23	---	---	
			S-10	6-7-5-4	12	---	---	
35			S-11	10-3-2-2	5	---	---	
	NATURAL SOILS - Brown silty sand with gravel, very loose, wet		S-12	3-1-3-4	4	---	32.2	
40	NATURAL SOILS - Brown sand and gravel, slightly compact, wet		S-13	15-10-10-11	20	---	9.3	

End of boring - 40.0'

Test Boring Log

Boring: TB-14

Project Name: Williamsport Ballpark, Inc. **Date of Work:** 8/17 & 8/18/2020

Site: City of Williamsport, Lycoming County **File No.:** CCS2024

Driller: Matt Bellew **Drill Rig:** Acker Rebel **Core Bit:** N/A

Auger Type: 3" Casing **Method:** ASTM D-1586 **Elevation:** 537.82'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, cobbles, boulders, sand and gravel, dry (UNCONTROLLED)		S-1	41-50-36-41	50+	---	4.4	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	47-50/0.2	50+	---	3.4	
5	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-3	10-11-8-4	19	---	---	
			S-4	6-4-4-3	8	---	---	
10			S-5	9-2-3-50/0.3	5	---	---	
15			S-6	16-5-12-14	17	---	---	
20			S-7	4-6-5-7	11	---	---	
25			S-8	4-15-10-7	25	---	---	
30			S-9	11-8-3-5	11	---	---	
			S-10	3-2-1-2	3	---	---	
35			S-11	4-5-5-7	10	---	---	
	NATURAL SOILS - Brown sand and gravel, slightly compact, wet		S-12	7-8-11-12	19	---	11.0	
40	End of boring - 37.0'							

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CENTRE CONSULTING

Test Boring Log

Boring: TB-15

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/17/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	537.73'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, silt, sand and gravel, dry to wet (UNCONTROLLED)		S-1	4-12-18-19	30	---	8.0	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	16-4-5-6	9	---	22.7	
5			S-3	11-3-5-4	8	---	1.6	
	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-4	14-5-3-9	8	---	---	
10			S-5	5-4-6-38	10	---	---	
15			S-6	6-2-14-14	16	---	---	
20			S-7	8-7-4-2	11	---	---	
25			S-8	2-1-2-5	3	---	---	
30	NATURAL SOILS - Brown silty sand with gravel, very loose to loose, wet		S-9	4-3-3-3	6	---	22.4	
			S-10	3-3-3-3	6	---	22.8	
35			S-11	3-1-3-6	4	---	22.1	
	NATURAL SOILS - Brown sand and gravel with cobbles and boulders, very dense, wet		S-12	11-50/0.3	50+	---	16.8	
40	End of boring - 39.0'							

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Test Boring Log

Boring: TB-16

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	7/31/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Mike Barrick	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	536.90'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
0–8	FILL - Varying amounts of concrete fragments, gravel, cobbles and boulders, dry (UNCONTROLLED)		S-1	12-15-11-14	26	---	7.4	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	26-50/0.5	50+	---	4.6	
			S-3	15-12-8-8	20	---	4.5	
			S-4	10-14-14-50/0.2	28	---	7.7	
8–33	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-5	2-4-4-6	8	---	---	
			S-6	5-2-3-3	5	---	---	
			S-7	3-7-3-3	10	---	---	
			S-8	5-3-3-6	6	---	---	
			S-9	7-7-4-5	11	---	---	
			S-10	9-9-6-3	15	---	---	
33–40	NATURAL SOILS - Brown sand and gravel with cobbles and boulders, slightly compact to very dense, wet		S-11	woh-2-18-39	20	---	7.7	
			S-12	50/0.4	50+	---	1.5	

End of boring - 40.0'

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Test Boring Log

Boring: TB-17

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/12/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	538.94'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, gravel, cobbles and boulders, dry (UNCONTROLLED)		S-1	23-47-14-9	50+	---	2.4	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	8-6-7-8	13	---	6.3	
5	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-3	7-18-9-7	27	---	---	
			S-4	46-26-8-6	34	---	---	
10			S-5	2-3-3-3	6	---	---	
15			S-6	50/0.4	50+	---	---	
20	NATURAL SOILS - Brown sandy silt, loose, wet		S-7	woh-2-3-5	5	---	19.6	
25			S-8	2-3-3-4	6	---	18.3	
	End of boring - 25.0'							
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CENTRE CONSULTING

Test Boring Log

Boring: TB-18

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/25/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	532.73'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, sand, gravel, asphalt and clay, moist (UNCONTROLLED)		S-1	11-19-11-10	30	---	10.3	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	6-4-3-3	7	---	10.1	
5	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-3	5-6-6-3	12	---	---	
			S-4	5-8-10-4	18	---	---	
			S-5	7-1-1-2	2	---	---	
10								
15			S-6	5-5-2-6	7	---	---	
20			S-7	7-2-4-3	6	---	---	
25			S-8	9-7-4-4	11	---	---	
30			S-9	woh-woh-woh-woh	0	---	---	
	NATURAL SOILS - Brown silty sand, trace gravel, very loose, wet		S-10	woh-woh-2-3	2	---	30.4	
	End of boring -32.0'							
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CENTRE CONSULTING

Test Boring Log

Boring: TB-19

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/20/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	535.44'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
0–4	FILL - Varying amounts of concrete fragments, sand and gravel, dry (UNCONTROLLED)		S-1	15-33-20-29	50+	---	4.6	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	19-50/0.2	50+	---	5.9	
4–28	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-3	3-3-3-2	6	---	---	
			S-4	2-2-2-3	4	---	---	
			S-5	4-3-5-4	8	---	---	
			S-6	12-5-9-7	14	---	---	
			S-7	5-4-5-4	9	---	---	
			S-8	3-3-1-3	4	---	---	
28–30	NATURAL SOILS - Brown sandy silt, very loose, wet		S-9	woh-1-2-3	3	---	35.6	
30	End of boring - 30.0'							

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Test Boring Log

Boring: TB-20

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/19/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	535.87'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, cobbles, boulders, sand and gravel, dry to damp (UNCONTROLLED)		S-1	42-50/0.3	50+	---	1.2	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	50/0.5	50+	---	9.0	
5	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-3	6-5-5-5	10	---	---	
			S-4	10-8-6-6	14	---	---	
10			S-5	2-2-1-2	3	---	---	
15			S-6	12-5-3-3	8	---	---	
20			S-7	4-2-5-4	7	---	---	
25			S-8	6-3-5-8	8	---	---	
30	NATURAL SOILS - Brown sandy silt, very loose, wet		S-9	2-1-woh-2	1	---	30.8	
	End of boring - 30.0'							
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Test Boring Log

Boring: TB-21

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/18/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	536.41'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, cobbles, boulders, sand and gravel, dry to damp (UNCONTROLLED)		S-1	14-12-26-19	38	---	4.9	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	17-30-50/0.2	50+	---	11.0	
5			S-3	5-6-4-6	10	---	3.1	
	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-4	5-13-37-14	50	---	---	
10			S-5	8-5-5-6	10	---	---	
15			S-6	7-5-4-8	9	---	---	
20			S-7	4-2-3-3	5	---	---	
25			S-8	9-9-5-5	14	---	---	
30			S-8	10-10-11-5	21	---	---	
			S-8	5-3-5-6	8	---	---	
35	NATURAL SOILS - Brown sand and gravel, medium dense, wet		S-8	8-12-13-10	25	---	13.5	
40	End of boring - 35.0'							

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Test Boring Log

Boring: TB-22

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/14/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	536.46'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, sand, gravel and clay, dry to damp (UNCONTROLLED)		S-1	12-27-31-36	50+	---	7.8	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	16-14-12-29	26	---	8.0	
5			S-3	3-3-12-9	15	---	2.6	
	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-4	8-8-8-11	16	---	---	
10			S-5	4-2-4-7	6	---	---	
15			S-6	5-5-7-5	12	---	---	
20			S-7	10-19-8-5	27	---	---	
25			S-8	7-5-4-3	9	---	---	
30			S-9	3-1-2-2	3	---	---	
	NATURAL SOILS - Brown silty sand and gravel, loose to dense, wet		S-10	4-5-5-3	10	---	14.8	
			S-11	5-2-3-1	5	---	14.5	
35	End of boring - 34.0'							
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Test Boring Log

Boring: TB-23

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	7/31/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Mike Barrick	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	537.22'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, cobbles, boulders, sand and gravel, dry (UNCONTROLLED)		S-1	16-17-50/0.1	50+	---	3.6	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	50/0.2	50+	---	1.3	
5	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-3	3-6-3-6	9	---	---	
			S-4	4-3-1-5	4	---	---	
10			S-5	4-10-5-4	15	---	---	
15			S-6	4-3-3-2	6	---	---	
20			S-7	3-3-3-4	6	---	---	
25			S-8	4-1-2-3	3	---	---	
30			S-9	22-8-4-3	12	---	---	
35	NATURAL SOILS - Brown silty sand and gravel with cobbles and boulders, loose to very dense, wet		S-10	woh-2-6-27	8	---	10.6	
40			S-11	50/0.2	50+	---	1.9	

End of boring - 40.0'

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Test Boring Log

Boring: TB-24

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/10/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	536.74'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, sand, gravel and shale, dry to damp (UNCONTROLLED)		S-1	5-11-50/0.5	50+	---	7.1	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	25-50/0.4	50+	---	9.3	
5	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-3	12-10-10-7	20	---	---	
			S-4	9-7-7-4	14	---	---	
	End of boring - 8.0'							Auger Refusal - 8.0'
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Test Boring Log

Boring: TB-25

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/12/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	539.62'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, sand, gravel and brick, dry to wet (UNCONTROLLED)		S-1	15-13-10-8	23	---	8.5	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	8-7-9-15	16	---	3.6	
5			S-3	50/0.1	50+	---	24.8	
10	NATURAL SOILS -Light brown silty silty sand and gravel, slightly compact		S-4	8-8-5-4	13	---	---	
	NATURAL SOILS - Brown sand and gravel, very dense, wet		S-5	50/0.4	50+	---	4.5	
15	End of boring - 14.0'							
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Test Boring Log

Boring: TB-26

Project Name:	Williamsport Ballpark, Inc.	**Date of Work:**	8/26/2020
Site:	City of Williamsport, Lycoming County	**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel
Core Bit:	N/A		
Auger Type:	3" Casing	**Method:**	ASTM D-1586
Elevation:	531.46'		

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
0–4	FILL - Varying amounts of concrete fragments, sand, gravel and brick, dry (UNCONTROLLED)		S-1	4-9-6-4	15	---	3.0	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	4-2-5-6	7	---	3.2	
4–28	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-3	16-17-12-15	29	---	---	
			S-4	11-16-10-14	26	---	---	
			S-5	5-9-7-5	16	---	---	
			S-6	7-16-13-10	29	---	---	
			S-7	6-5-6-4	11	---	---	
			S-8	12-3-3-2	6	---	---	
28–32	NATURAL SOILS - Brown silty sand and gravel, very loose, wet		S-9	woh-woh-woh-2	0	---	22.9	
			S-10	woh-woh-woh-2	0	---	26.8	
32	End of boring - 32.0'							

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Test Boring Log

Boring: TB-27

Project Name:	Williamsport Ballpark, Inc.	**Date of Work:**	8/26/2020
Site:	City of Williamsport, Lycoming County	**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:** Acker Rebel	**Core Bit:** N/A
Auger Type:	3" Casing	**Method:** ASTM D-1586	**Elevation:** 532.78'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, sand, gravel, clay and brick, dry (UNCONTROLLED)		S-1	9-13-11-12	24	---	7.3	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	13-30-14-11	44	---	6.5	
5	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-3	9-15-24-20	39	---	---	
			S-4	11-4-11-8	15	---	---	
10			S-5	5-2-6-4	8	---	---	
15			S-6	4-3-2-4	5	---	---	
20			S-7	4-3-2-3	5	---	---	
25			S-8	6-13-17-11	30	---	---	
30			S-9	2-1-1-1	2	---	---	
			S-10	woh-woh-woh-woh	0	---	---	
35	NATURAL SOILS - Brown sandy silt, some gravel, very loose, wet		S-11	woh-woh-woh-3	0	---	27.7	
	End of boring - 36.0'							
40								

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Test Boring Log

Boring: TB-28

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/27/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	533.76'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, sand, gravel and organics dry to wet (UNCONTROLLED)		S-1	6-22-19-13	41	---	2.6	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	13-8-8-6	16	---	17.9	
5			S-3	3-3-4-5	7	---	28.2	
	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-4	10-14-16-11	30	---	---	
10			S-5	4-5-7-11	12	---	---	
15			S-6	9-9-6-26	15	---	---	
20			S-7	10-5-8-5	13	---	---	
25			S-8	13-10-5-7	15	---	---	
30			S-8	woh-1-2-3	3	---	---	
35	End of boring - 32.0'							
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Test Boring Log

Boring: TB-29

Project Name:	Williamsport Ballpark, Inc.	**Date of Work:**	8/18/2020
Site:	City of Williamsport, Lycoming County	**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel
Core Bit:	N/A	**Auger Type:**	3" Casing
Method:	ASTM D-1586	**Elevation:**	535.12'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, cobbles, brick, sand, gravel and ash, damp to wet (UNCONTROLLED)		S-1	7-21-13-8	34	---	7.6	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	45-33-50/0.1	50+	---	28.9	
5	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-3	19-19-8-7	27	---	---	
			S-4	8-15-5-4	20	---	---	
10			S-5	10-9-12-8	21	---	---	
15			S-6	6-21-50/0.3	50+	---	---	
20			S-7	9-30-25-17	50+	---	---	
25			S-8	8-6-4-3	10	---	---	
30			S-9	woh-woh-woh-2	0	---	---	
	NATURAL SOILS - Brown silty sand, very loose, wet		S-10	3-2-1-2	3	---	23.6	
	End of boring - 32.0'							
35								
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Test Boring Log

Boring: TB-30

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/18/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	535.64'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, brick, sand and gravel, dry to moist (UNCONTROLLED)		S-1	12-11-8-5	19	---	2.9	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	9-14-9-15	23	---	13.0	
5			S-3	7-12-12-7	24	---	4.2	
	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-4	6-9-8-7	17	---	---	
10			S-5	11-9-12-9	21	---	---	
15			S-6	7-3-14-13	17	---	---	
20			S-7	17-18-28-13	46	---	---	
25			S-8	3-2-3-3	5	---	---	
30	NATURAL SOILS - Brown sandy silt, trace gravel, loose, wet		S-9	7-3-3-6	6	---	38.7	
	End of boring - 30.0'							
35								
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Test Boring Log

Boring: TB-31

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/13/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	535.84'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, sand, gravel and clay, damp to moist (UNCONTROLLED)		S-1	6-5-7-10	12	---	8.7	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	6-4-4-4	8	---	18.3	
5			S-3	4-2-3-3	5	---	17.7	
	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-4	6-5-4-2	9	---	---	
10			S-5	21-7-4-4	11	---	---	
15			S-6	50/0.5	50+	---	---	
20			S-7	3-7-4-7	11	---	---	
25			S-8	3-2-3-4	5	---	---	
30	NATURAL SOILS - Brown sandy silt with gravel, very loose, wet		S-9	woh-woh-woh-woh	0	---	26.1	
	End of boring - 30.0'							
35								
40								

Test Boring Log

Boring: TB-32

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/13/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	535.57'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
0–4	FILL - Varying amounts of concrete fragments, sand and gravel, dry (UNCONTROLLED)		S-1	8-15-14-19	29	---	7.3	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	28-19-10-6	29	---	4.0	
4–23	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-3	5-3-3-5	6	---	---	
			S-4	10-7-6-6	13	---		
			S-5	7-9-4-2	13	---	---	
			S-6	10-5-5-6	10	---	---	
			S-7	6-5-3-3	8	---	---	
23–27	NATURAL SOILS - Brown sandy silt, loose, wet		S-8	4-4-3-4	7	---	22.4	
			S-9	4-4-6-5	10	---	19.1	
27	End of boring - 27.0'							

Test Boring Log

Boring: TB-33

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/12/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	539.88'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, sand, gravel, brick and ash, dry to damp (UNCONTROLLED)		S-1	7-4-11-10	15	---	4.9	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
5			S-2	11-13-17-22	30	---	4.7	
			S-3	7-7-8-10	15	---	11.9	
			S-4	11-14-9-18	23	---	7.5	
10	NATURAL SOILS - Brown silty sand and gravel, dense, wet		S-5	14-2-33-50/0.4	35	---	28.6	
	End of Boring - 10.0'							
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Test Boring Log

Boring: TB-34

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/25/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	528.74'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, sand and gravel, dry (UNCONTROLLED)		S-1	8-13-50/0.5	50+	---	2.0	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	50/0.5	50+	---	4.7	
5	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-3	17-16-15-10	31	---	---	
			S-4	12-10-11-12	21	---	---	
10			S-5	2-3-6-3	9	---	---	
15			S-6	11-7-8-5	15	---	---	
			S-7	35-50-12-11	50+	---	---	
20	End of boring - 18.0'							
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Boring: TB-35

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/26/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	532.01'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, sand, gravel, brick, clay and ash, dry to damp (UNCONTROLLED)		S-1	4-15-13-7	28	---	10.4	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	8-10-8-5	18	---	8.6	
5			S-3	4-3-5-2	8	---	11.7	
	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-4	4-3-2-8	5	---	---	
10			S-5	7-5-7-14	12	---	---	
15			S-6	6-3-7-5	10	---	---	
20			S-7	9-4-6-5	10	---	---	
25			S-8	4-2-woh-woh	2	---	---	
	NATURAL SOILS - Brown silty sand and gravel, loose to slightly compact, wet		S-9	woh-9-11-10	20	---	14.4	
30			S-10	7-5-4-4	9	---	19.3	
	End of boring - 30.0'							
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Boring: TB-36

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/27/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	532.20'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, sand, gravel, organics and clay, moist (UNCONTROLLED)		S-1	5-10-14-11	24	---	4.3	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	7-4-5-6	9	---	24.3	
5	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-3	3-9-8-5	17	---	---	
			S-4	5-3-50/0.3	50+	---	---	
10			S-5	5-3-4-4	7	---	---	
15			S-6	7-6-6-5	12	---	---	
20			S-7	9-9-9-10	18	---	---	
25			S-8	8-7-9-11	16	---	---	
30	NATURAL SOILS - Brown silty sand, trace gravel, very loose, wet		S-9	woh-woh-1-1	1	---	22.6	
	End of boring - 30.0'							
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Test Boring Log

Boring: TB-37

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/28/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	534.18'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, sand, gravel, organics and clay, damp (UNCONTROLLED)		S-1	11-29-26-20	28	---	6.5	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	17-16-11-9	27	---	11.6	
5	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-3	8-5-3-3	8	---	---	
			S-4	6-3-4-5	7	---	---	
10			S-5	4-5-3-3	8	---	---	
15			S-6	4-2-4-3	6	---	---	
20			S-7	6-4-4-10	8	---	---	
25			S-8	5-1-3-2	4	---	---	
30			S-9	2-1-1-2	2	---	---	
			S-10	4-4-5-11	9	---	---	
	NATURAL SOILS - Brown silty sand and gravel, medium dense, wet		S-11	11-12-10-9	22	---	14.6	
35	End of boring - 34.0'							
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Test Boring Log

Boring: TB-38

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/31/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	533.90'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, sand, gravel, brick and asphalt, dry to damp (UNCONTROLLED)		S-1	4-20-24-29	28	---	3.7	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	7-8-8-13	16	---	4.6	
5			S-3	6-9-6-3	15	---	11.8	
	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-4	11-4-6-3	10	---	---	
10			S-5	2-2-1-2	3	---	---	
15			S-6	7-4-4-4	4	---	---	
20			S-7	4-8-6-4	14	---	---	
25			S-8	10-6-6-4	12	---	---	
30			S-9	29-5-7-8	12	---	---	
			S-10	6-3-2-5	5	---	---	
			S-11	8-7-6-7	13	---	---	
35	NATURAL SOILS - Brown silty sand and gravel, slightly compact, wet		S-12	3-3-8-23	11	---	21.1	
	End of boring - 36.0'							
40								

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Test Boring Log

Boring: TB-39

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/14/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	533.01'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, sand and gravel, dry to moist (UNCONTROLLED)		S-1	9-10-48-50/0.1	50+	---	14.0	
			S-2	36-50/0.2	50+	---	14.3	
5			S-3	50/0.1	50+	---	---	No Recovery
			S-4	11-18-50/0.2	50+	---	6.2	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
10	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-5	6-4-2-3	6	---	---	
15			S-6	50/0.5	50+	---	---	
20			S-7	14-12-7-10	19	---	---	
25	NATURAL SOILS - Brown sand and gravel, slightly compact to medium dense, moist		S-8	10-6-6-7	12	---	---	
			S-9	4-8-3-4	11	---	---	
30			S-10	10-14-13-17	27	---	10.5	
	End of boring - 30.0'							
35								
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Boring: TB-40

Project Name: Williamsport Ballpark, Inc. **Date of Work:** 8/11/2020

Site: City of Williamsport, Lycoming County **File No.:** CCS2024

Driller: Matt Bellew **Drill Rig:** Acker Rebel **Core Bit:** N/A

Auger Type: 3" Casing **Method:** ASTM D-1586 **Elevation:** 533.54'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
0–5	FILL - Varying amounts of concrete fragments, sand and gravel, medium dense to dense (UNCONTROLLED)		S-1	10-18-17-7	35	---	---	No Recovery
			S-2	20-14-10-7	24	---	---	No Recovery
5–24	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-3	13-8-7-7	15	---	---	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-4	8-7-6-7	13	---	---	
			S-5	3-3-4-4	7	---	---	
			S-6	11-13-7-6	20	---	---	
			S-7	6-4-2-2	6	---	---	
24–25	NATURAL SOILS - Brown sandy silt, loose, wet		S-8	4-3-5-4	8	---	---	
25	End of boring - 25.0'							

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Test Boring Log

Boring: TB-41

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/10/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	533.92'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, sand and gravel,damp (UNCONTROLLED)		S-1	6-31-46-31	50+	---	11.3	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	21-26-15-19	41	---	11.0	
5	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-3	5-6-6-17	12	---	5.7	
			S-4	4-2-2-1	4	---	8.0	
10			S-5	3-3-3-4	6	---	7.8	
15			S-6	5-8-8-26	16	---	---	No Recovery
20			S-7	6-6-5-3	11	---	23.6	
25	NATURAL SOILS - Brown sandy silt, very loose, wet		S-8	woh-woh-woh-3	0	---	21.2	
30	NATURAL SOILS - Brown sand and gravel, some cobbles and boulders, dense to very dense, wet		S-9	woh-16-28-25	44	---	6.0	
35			S-10	50/0.4	50+	---	11.4	
40			S-11	15-22-28-36	50	---	8.0	

End of boring - 40.0'

Test Boring Log

Boring: TB-42

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/25/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	529.17'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
0–8.0	FILL - Varying amounts of concrete fragments, sand, gravel and brick, dry to damp (UNCONTROLLED)		S-1	10-13-12-10	25	---	9.0	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	7-5-7-6	12	---	9.3	
			S-3	1-1-3-8	4	---	8.3	
			S-4	24-22-13-6	35	---	16.5	
8.0–23.0	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-5	4-27-6-6	33	---	---	
			S-6	13-8-12-6	20	---	---	
			S-7	8-4-4-6	8	---	---	
23.0–28.0	NATURAL SOILS - Brown sandy silt, medium dense, wet		S-8	2-10-14-10	24	---	26.3	
28.0–30.0	NATURAL SOILS - Brown sand and gravel, medium dense, wet		S-9	12-12-14-25	26	---	5.7	
30.0	End of boring - 30.0'							

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Test Boring Log

Boring: TB-43

Project Name:	Williamsport Ballpark, Inc.	**Date of Work:**	8/26/2020
Site:	City of Williamsport, Lycoming County	**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel
Core Bit:	N/A		
Auger Type:	3" Casing	**Method:**	ASTM D-1586
Elevation:	530.94'		

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, sand, gravel, brick and ash, dry to damp (UNCONTROLLED)		S-1	14-12-3-3	15	---	5.7	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	4-2-3-3	5	---	21.4	
5	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-3	10-5-6-3	11	---	---	
			S-4	10-5-6-3	11	---	---	
10			S-5	5-4-5-4	9	---	---	
15			S-6	5-7-9-8	16	---	---	
20			S-7	14-6-9-7	15	---	---	
25			S-8	4-2-2-2	4	---	---	
30	NATURAL SOILS - Brown silty sand, loose, wet		S-9	5-3-2-1	5	---	18.1	
	End of boring - 30.0'							
35								
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Test Boring Log

Boring: TB-44

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/28/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	530.65'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, sand, gravel, organics and ash, dry (UNCONTROLLED)		S-1	12-18-14-12	32	---	4.1	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	9-12-13-6	25	---	6.6	
5	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-3	4-3-4-5	7	---	---	
			S-4	4-3-1-1	4	---	---	
			S-5	6-11-3-3	14	---	---	
10								
15			S-6	48-7-7-6	14	---	---	
20			S-7	5-4-7-26	11	---	---	
25			S-8	9-25-24-15	49	---	---	
30			S-9	3-1-1-1	2	---	---	
			S-10	2-2-1-2	3	---	---	
	NATURAL SOILS - Brown silty sand and gravel, loose, wet		S-11	2-2-3-5	5	---	29.5	
35	End of boring - 34.0'							
40								

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Test Boring Log

Boring: TB-45

Project Name:	Williamsport Ballpark, Inc.	**Date of Work:**	8/28/2020
Site:	City of Williamsport, Lycoming County	**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel
Core Bit:	N/A	**Auger Type:**	3" Casing
Method:	ASTM D-1586	**Elevation:**	531.81'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, sand, gravel, ash and clay, dry to damp (UNCONTROLLED)		S-1	6-7-18-14	25	---	3.2	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	7-11-10-14	21	---	11.4	
5			S-3	15-12-11-19	23	---	10.6	
	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-4	12-7-5-8	12	---	---	
10			S-5	6-3-3-3	6	---	---	
15			S-6	5-5-7-5	12	---	---	
20			S-7	10-4-12-8	16	---	---	
25			S-8	1-3-4-5	7	---	---	
30			S-9	1-2-3-2	5	---	---	
			S-10	3-1-1-7	2	---	---	
	NATURAL SOILS - Brown sand and gravel, slightly compact, wet		S-11	22-11-8-10	19	---	11.1	
35	End of boring - 34.0'							
40								

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Test Boring Log

Boring: TB-46

Project Name:	Williamsport Ballpark, Inc.	**Date of Work:**	8/31/2020
Site:	City of Williamsport, Lycoming County	**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel
Core Bit:	N/A	**Auger Type:**	3" Casing
Method:	ASTM D-1586	**Elevation:**	531.37'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, sand and gravel, dry (UNCONTROLLED)		S-1	3-8-10-9	18	---	4.0	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	4-10-4-4	14	---	3.7	
5	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-3	3-4-22-29	26	---	---	
			S-4	18-5-4-4	9	---	---	
			S-5	9-15-4-5	19	---	---	
10								
15			S-6	4-4-2-5	6	---	---	
20			S-7	6-4-3-4	7	---	---	
25			S-8	8-6-21-9	27	---	---	
30	NATURAL SOILS - Brown silty sand and gravel, slightly compact, wet		S-9	9-6-9-18	15	---	12.1	
	End of boring - 30.0'							
35								
40								

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Test Boring Log

Boring: TB-47

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/14/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	530.59'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
0–4	FILL - Varying amounts of concrete fragments, sand and gravel, dry (UNCONTROLLED)		S-1	6-6-14-10	20	---	3.3	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	50/0.1	50+	---	1.5	
4–26	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-3	14-7-7-6	14	---	---	
			S-4	6-2-1-1	3	---	---	
			S-5	10-3-4-3	7	---	---	
			S-6	16-14-20-5	34	---	---	
			S-7	8-4-3-8	7	---	---	
			S-8	14-5-5-5	10	---	---	
26–28	NATURAL SOILS - Brown silty sand and gravel, very dense, wet		S-9	17-24-34-50/0.1	50+	---	9.6	
28	End of boring - 28.0'							

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Boring: TB-48

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/11/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	531.71'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, sand and gravel, dry to moist (UNCONTROLLED)		S-1	26-50/0.4	50+	---	8.2	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	50/0.2	50+	---	30.8	
5			S-3	31-16-12-10	28	---	21.8	
			S-4	30-50/0.1	50+	---	---	
10	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-5	2-1-50/0.5	50+	---	---	
15			S-6	9-7-10-13	17	---	---	
20			S-7	16-17-8-6	25	---	---	
25	NATURAL SOILS - Brown sandy silt, very loose, wet		S-8	woh-woh-2-5	2	---	19.6	
30	End of boring - 25.0'							
35								
40								

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Test Boring Log

Boring: TB-49

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/10/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	530.10'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, sand and gravel, damp to wet (UNCONTROLLED)		S-1	4-6-7-9	13	---	8.9	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	7-50/0.5	50+	---	26.4	
5			S-3	7-50/0.3	50+	---	23.6	
			S-4	32-50/0.3	50+	---	10.4	
10	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-5	21-8-5-4	13	---	---	
15			S-6	4-7-6-4	13	---	---	
20			S-7	2-2-2-2	4	---	---	
25	NATURAL SOILS - Brown sandy silt, very loose, wet		S-8	1-1-2-1	3	---	25.5	
30	End of boring - 25.0'							
35								
40								

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Test Boring Log

Boring: TB-50

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/24/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	513.37'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, sand and gravel, dry (UNCONTROLLED)		S-1	19-17-9-4	26	---	8.2	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
5	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-2	6-5-3-3	8	---	---	
			S-3	5-3-3-1	6	---	---	
			S-4	2-1-1-1	2	---	---	
10	NATURAL SOILS - Brown sandy silt, very loose, wet		S-5	woh-woh-woh-woh	0	---	32.0	
15	NATURAL SOILS - Brown silty sand and gravel, dense to very dense, wet		S-6	37-12-19-16	31	---	12.0	
20			S-7	16-23-28-28	50+	---	9.8	
25	End of boring - 20.0'							
30								
35								
40								

Test Boring Log

Boring: TB-51

Project Name:	Williamsport Ballpark, Inc.	**Date of Work:**	8/25/2020
Site:	City of Williamsport, Lycoming County	**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel
Core Bit:	N/A		
Auger Type:	3" Casing	**Method:**	ASTM D-1586
Elevation:	528.11'		

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
0–6	FILL - Varying amounts of concrete fragments, sand and gravel, dry (UNCONTROLLED)		S-1	8-19-22-15	41	---	2.4	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	4-2-4-5	6	---	3.2	
			S-3	6-6-10-15	16	---	---	
6–20	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-4	8-11-8-11	19	---	---	
			S-5	5-4-7-12	11	---	---	
			S-6	9-9-10-9	19	---	---	
			S-7	6-7-5-3	12	---	---	
20–25	NATURAL SOILS - Brown sandy silt, very loose, wet		S-8	3-3-1-1	4	---	23.1	
25–30	NATURAL SOILS - Brown sand and gravel, slightly compact, wet		S-9	5-7-7-13	14	---	11.0	
30	End of boring - 30.0'							

Depth scale: 5, 10, 15, 20, 25, 30, 35, 40

Test Boring Log

Boring: TB-52

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/26/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	528.91'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, sand, gravel and brick, dry (UNCONTROLLED)		S-1	7-16-13-23	29	---	4.9	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	5-3-3-2	6	---	6.1	
5	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-3	woh-woh-1-2	1	---	---	
			S-4	7-8-9-8	17	---	---	
10			S-5	5-3-4-6	7	---	---	
15			S-6	10-15-8-6	23	---	---	
20			S-7	4-3-3-2	6	---	---	
25			S-8	2-woh-1-woh	1	---	---	
30	NATURAL SOILS - Brown sand and gravel, medium dense, wet		S-9	8-9-12-10	21	---	12.5	
	End of boring - 30.0'							
35								
40								

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Test Boring Log

Boring: TB-53

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/27/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	529.84'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, sand and gravel, dry (UNCONTROLLED)		S-1	3-11-25-14	36	---	1.6	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	8-7-3-3	10	---	4.2	
5	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-3	3-5-1-1	6	---	---	
			S-4	2-3-8-25	11	---	---	
10			S-5	21-10-4-4	14	---	---	
15			S-6	8-4-18-13	22	---	---	
20			S-7	13-8-16-15	24	---	---	
25			S-8	6-4-5-3	9	---	---	
30			S-9	6-1-1-1	2	---	---	
			S-10	4-27-14-12	41	---	---	
	NATURAL SOILS - Brown sand and gravel, medium dense to dense, wet		S-11	4-13-11-13	24	---	9.3	
35	End of boring - 34.0'							
40								

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Test Boring Log

Boring: TB-54

Project Name:	Williamsport Ballpark, Inc.			**Date of Work:**	8/31/2020
Site:	City of Williamsport, Lycoming County			**File No.:**	CCS2024
Driller:	Matt Bellew	**Drill Rig:**	Acker Rebel	**Core Bit:**	N/A
Auger Type:	3" Casing	**Method:**	ASTM D-1586	**Elevation:**	531.17'

Depth (ft)	Description	GR	Sample No.	Blow Counts	"N" Value	q_p (tsf)	M_c (%)	Remarks
	FILL - Varying amounts of concrete fragments, sand, gravel and ash, dry to damp (UNCONTROLLED)		S-1	5-11-19-17	30	---	3.0	Groundwater not encountered prior to introduction of water into the boring for advancement purposes. Reference section 5.3 of the Geotechnical Engineering Study for further information regarding groundwater levels.
			S-2	11-8-7-7	15	---	11.8	
5			S-3	4-11-50/0.4	50+	---	8.6	
			S-4	15-22-9-4	31	---	13.7	
10	LANDFILL WASTE - Various rubbish (plastic, metal, wood, organics, etc.), moist to wet (UNCONTROLLED)		S-5	4-3-4-3	7	---	---	
15			S-6	3-3-2-5	5	---	---	
20			S-7	7-8-9-9	17	---	---	
25			S-8	6-4-5-4	9	---	---	
30	NATURAL SOILS - Brown sandy silt, very loose to loose, wet		S-9	woh-1-2-3	3	---	25.2	
			S-10	3-4-6-6	10	---	24.8	
35	End of boring - 32.0'							
40								

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APPENDIX G

FILL MATERIAL PHOTOGRAPHS

PHOTOGRAPH 1 – Fill Materials Near TB-9

PHOTOGRAPH 2 – Fill Materials Near TB-9

PHOTOGRAPH 3 – Fill Materials Near TB-9

PHOTOGRAPH 4 – Fill Materials Near TB-9

PHOTOGRAPH 5 – Fill Materials Near TB-49

PHOTOGRAPH 6 – Fill Materials Near TB-49

PHOTOGRAPH 7 – Fill Materials Near TB-49

PHOTOGRAPH 8 – Fill Materials Near TB-49

APPENDIX H

LABORATORY TESTING DATA

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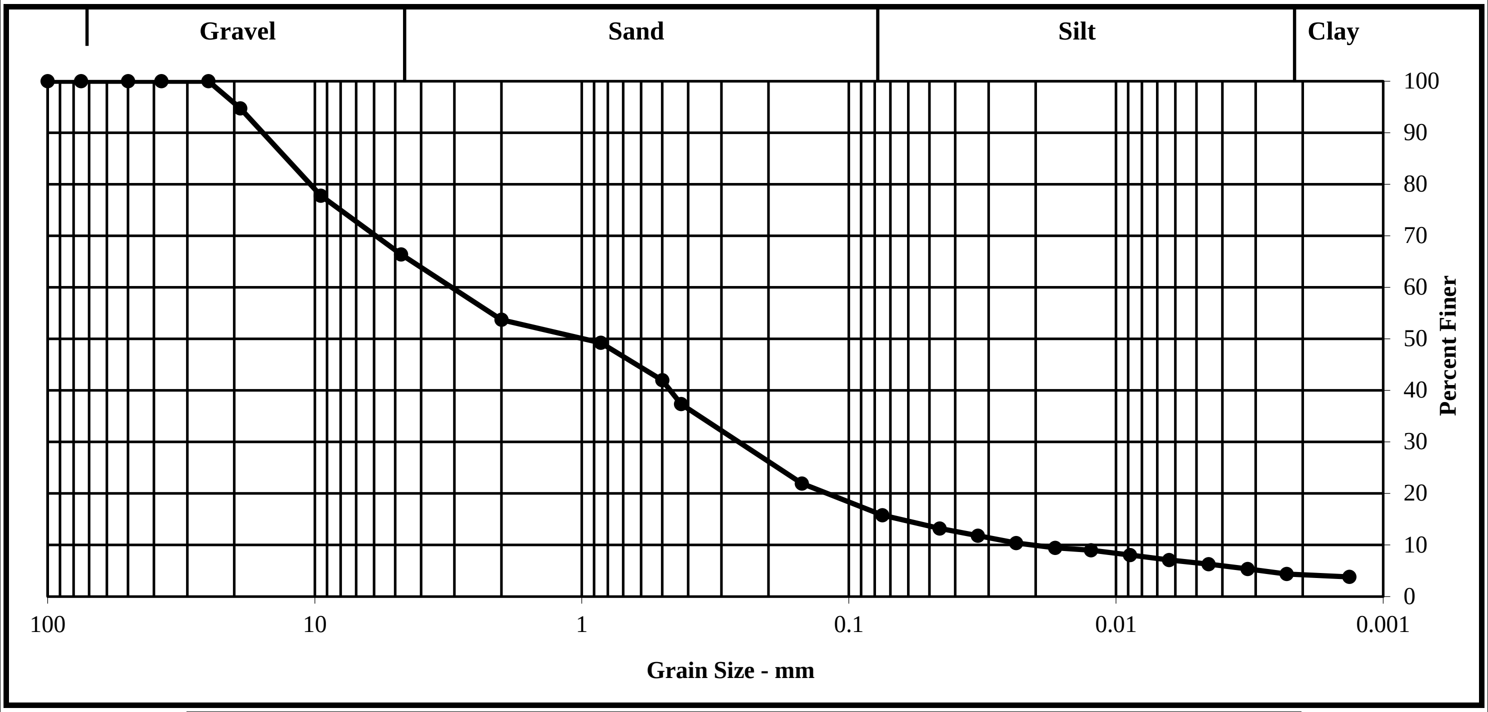
Hydrometer Analysis Test Report - ASTM D422



% +3"	% Gravel	% Sand	% Silt	% Clay	USCS	LL	PI
0.0	33.6	50.6	11.4	4.4	SM	-	NP

Sieve Size (inches)	Sieve Size (mm)	Percent Finer
4	100.0	100.0
3	75.0	100.0
2	50.0	100.0
1 1/2	37.5	100.0
1	25.0	100.0
3/4	19.0	94.7
3/8	9.50	77.8

Sieve Number	Sieve Size (mm)	Percent Finer
#4	4.75	66.4
#10	2.00	53.7
#20	0.850	49.2
#35	0.500	42.0
#40	0.425	37.3
#100	0.150	21.9
#200	0.075	15.8

Grain Size		Coefficients	
D_{60}	3.364	C_c	1.23
D_{30}	0.295	C_u	160.20
D_{10}	0.021		

Project: Williamsport Ballpark, Inc.

File Number: CCS2024

Sample Location: FILL MATERIAL
Composite: TB-4, 0-10'

Date: 23-Sep-20

Material Description: Medium Brown Silty Sand With Gravel

Client: Hawbaker Engineering, LLC

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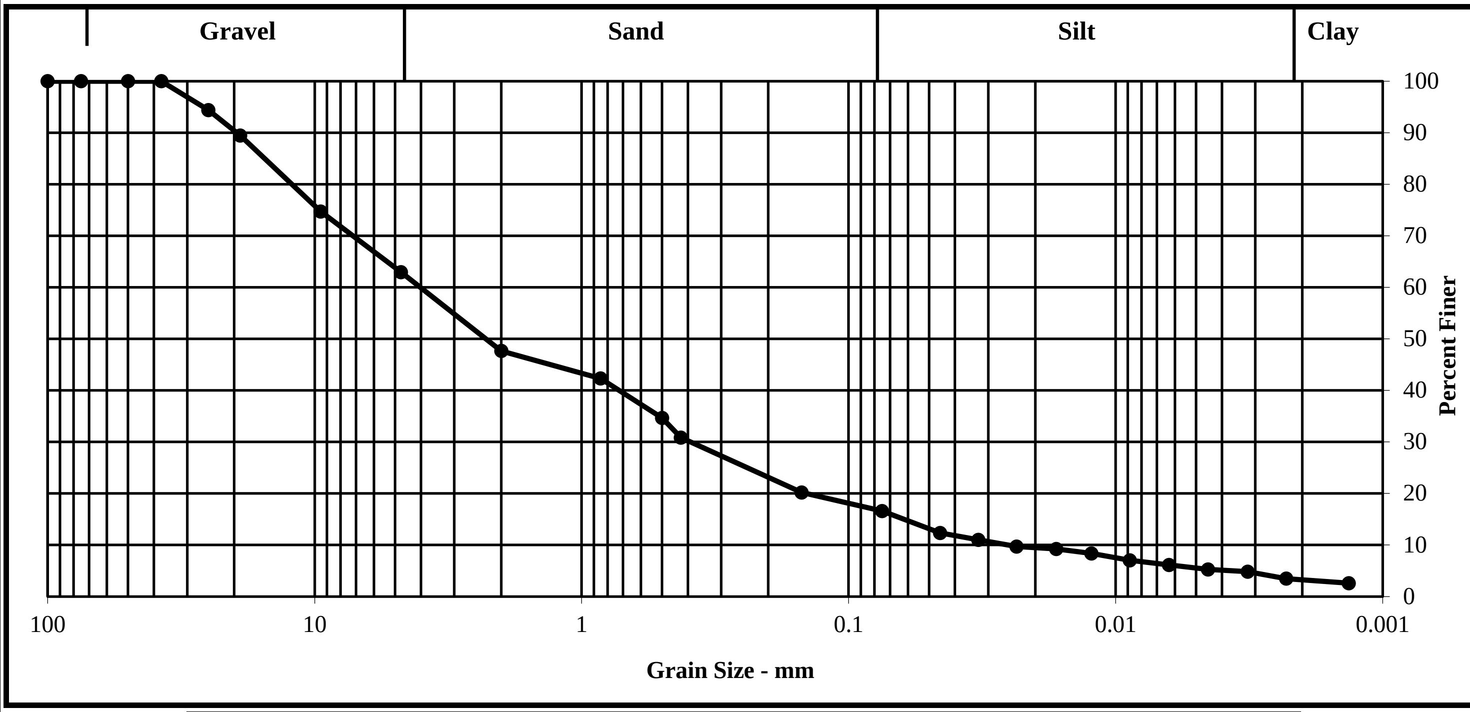
Hydrometer Analysis Test Report - ASTM D422



% +3"	% Gravel	% Sand	% Silt	% Clay	USCS	LL	PI
0.0	37.1	46.4	13.1	3.5	SM	-	NP

Sieve Size (inches)	Sieve Size (mm)	Percent Finer
4	100.0	100.0
3	75.0	100.0
2	50.0	100.0
1 1/2	37.5	100.0
1	25.0	94.4
3/4	19.0	89.5
3/8	9.50	74.7

Sieve Number	Sieve Size (mm)	Percent Finer
#4	4.75	62.9
#10	2.00	47.7
#20	0.850	42.3
#35	0.500	34.7
#40	0.425	30.8
#100	0.150	20.2
#200	0.075	16.6

Grain Size		Coefficients	
D_{60}	3.883	C_c	1.64
D_{30}	0.404	C_u	151.69
D_{10}	0.026		

Project: Williamsport Ballpark, Inc.

File Number: CCS2024

Sample Location: FILL MATERIAL
Composite: TB-40 & TB-48, 0-8'

Date: 23-Sep-20

Material Description: Medium Brown Silty Sand With Gravel

Client: Hawbaker Engineering, LLC

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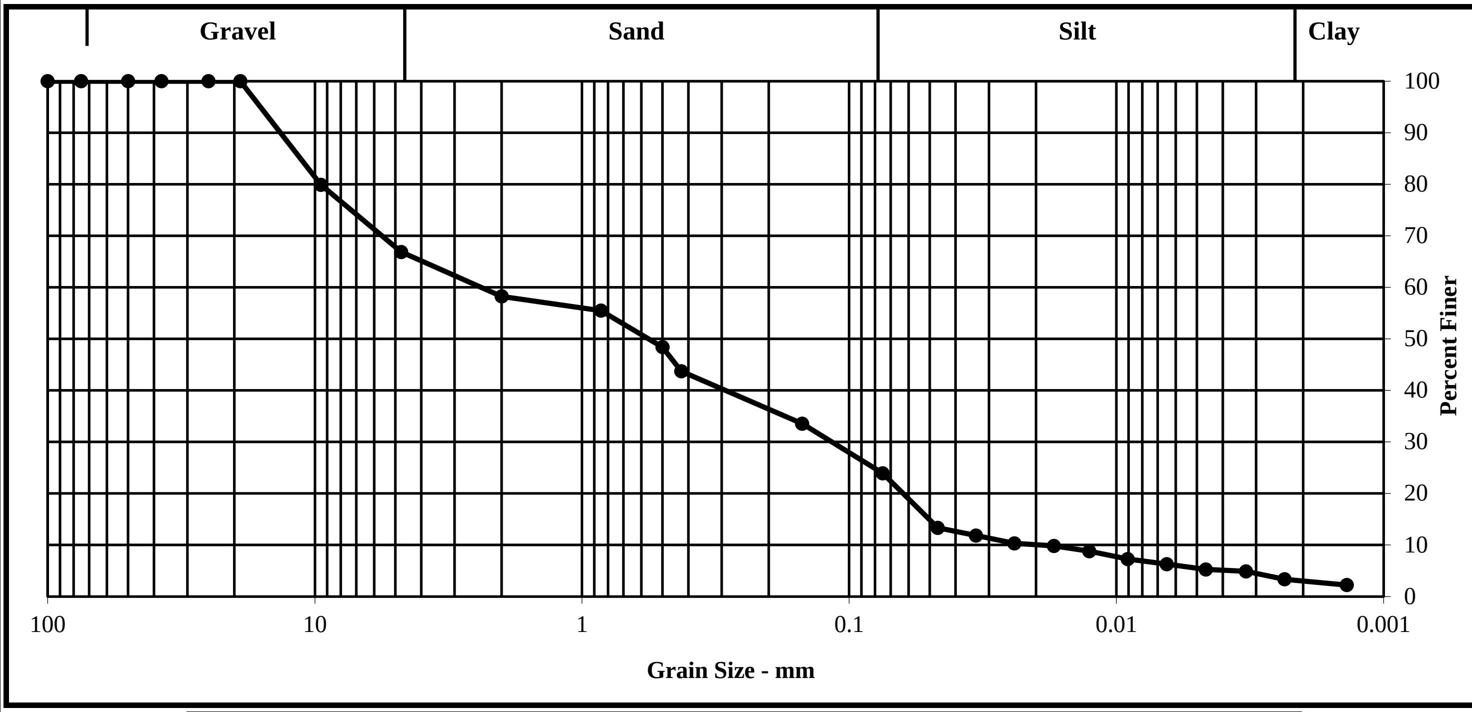


% +3"	% Gravel	% Sand	% Silt	% Clay	USCS	LL	PI
0.0	33.1	42.9	20.5	3.4	SM	-	NP

Sieve Size (inches)	Sieve Size (mm)	Percent Finer
4	100.0	100.0
3	75.0	100.0
2	50.0	100.0
1 1/2	37.5	100.0
1	25.0	100.0
3/4	19.0	100.0
3/8	9.50	79.9

Sieve Number	Sieve Size (mm)	Percent Finer
#4	4.75	66.9
#10	2.00	58.2
#20	0.850	55.5
#35	0.500	48.4
#40	0.425	43.7
#100	0.150	33.5
#200	0.075	23.9

Grain Size		Coefficients	
D_{60}	2.569	C_c	0.29
D_{30}	0.123	C_u	129.10
D_{10}	0.020		

Project: Williamsport Ballpark, Inc.

File Number: CCS2024

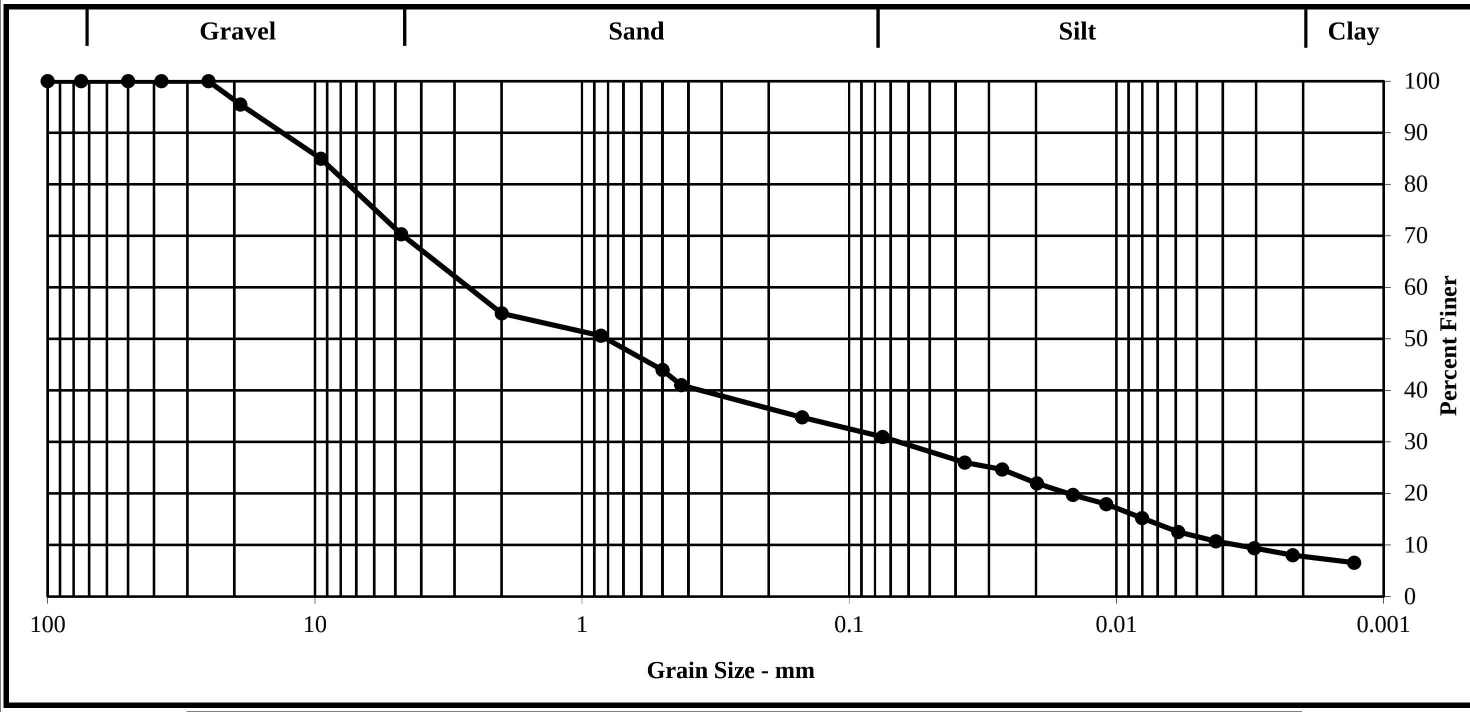
Sample Location: FILL MATERIAL
Composite: TB-53, 0-4'

Date: 23-Sep-20

Material Description: Medium Brown Silty Sand With Gravel

Client: Hawbaker Engineering, LLC

Hydrometer Analysis Test Report - ASTM D422



% +3"	% Gravel	% Sand	% Silt	% Clay	USCS	LL	PI
0.0	29.7	39.3	23.0	8.0	SM	-	NP

Sieve Size (inches)	Sieve Size (mm)	Percent Finer
4	100.0	100.0
3	75.0	100.0
2	50.0	100.0
1 1/2	37.5	100.0
1	25.0	100.0
3/4	19.0	95.5
3/8	9.50	84.9

Sieve Number	Sieve Size (mm)	Percent Finer
#4	4.75	70.3
#10	2.00	54.9
#20	0.850	50.6
#35	0.500	44.0
#40	0.425	41.0
#100	0.150	34.8
#200	0.075	31.0

Grain Size		Coefficients	
D_{60}	2.911	C_c	0.43
D_{30}	0.067	C_u	808.53
D_{10}	0.004		

Project: Williamsport Ballpark, Inc.

File Number: CCS2024

Sample Location: FILL MATERIAL
Composite: TB-54, 0-4'

Date: 23-Sep-20

Material Description: Medium Brown Silty Sand With Gravel

Client: Hawbaker Engineering, LLC

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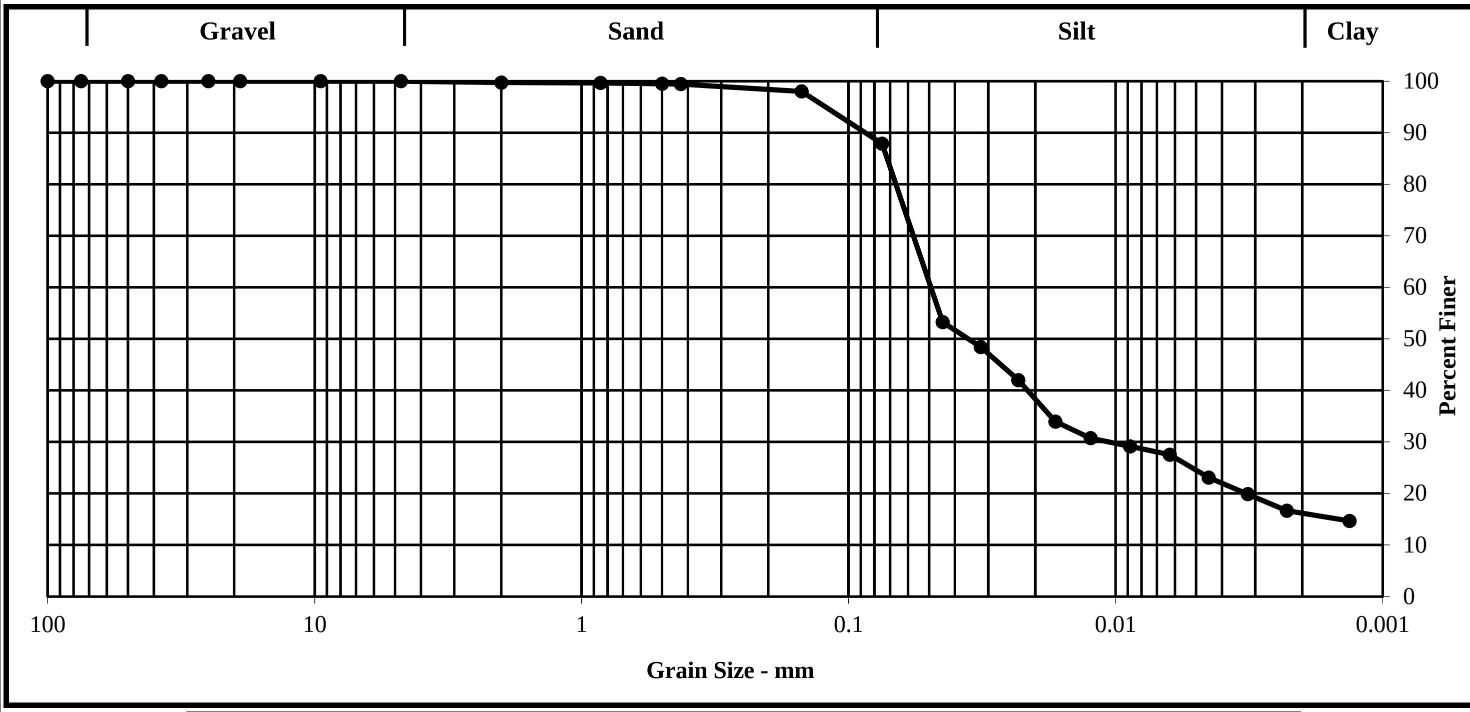
Hydrometer Analysis Test Report - ASTM D422



% +3"	% Gravel	% Sand	% Silt	% Clay	USCS	LL	PI
0.0	0.0	12.1	71.2	16.7	ML	-	NP

Sieve Size (inches)	Sieve Size (mm)	Percent Finer
4	100.0	100.0
3	75.0	100.0
2	50.0	100.0
1 1/2	37.5	100.0
1	25.0	100.0
3/4	19.0	100.0
3/8	9.50	100.0

Sieve Number	Sieve Size (mm)	Percent Finer
#4	4.75	100.0
#10	2.00	99.7
#20	0.850	99.7
#35	0.500	99.5
#40	0.425	99.4
#100	0.150	98.0
#200	0.075	87.9

Grain Size		Coefficients	
D_{60}	0.051	C_c	2.31
D_{30}	0.011	C_u	50.50
D_{10}	0.001		

Project: Williamsport Ballpark, Inc.

File Number: CCS2024

Sample Location: NATURAL SOILS
Composite: TB-4, 38-40'

Date: 23-Sep-20

Material Description: Medium Brown Silt

Client: Hawbaker Engineering, LLC

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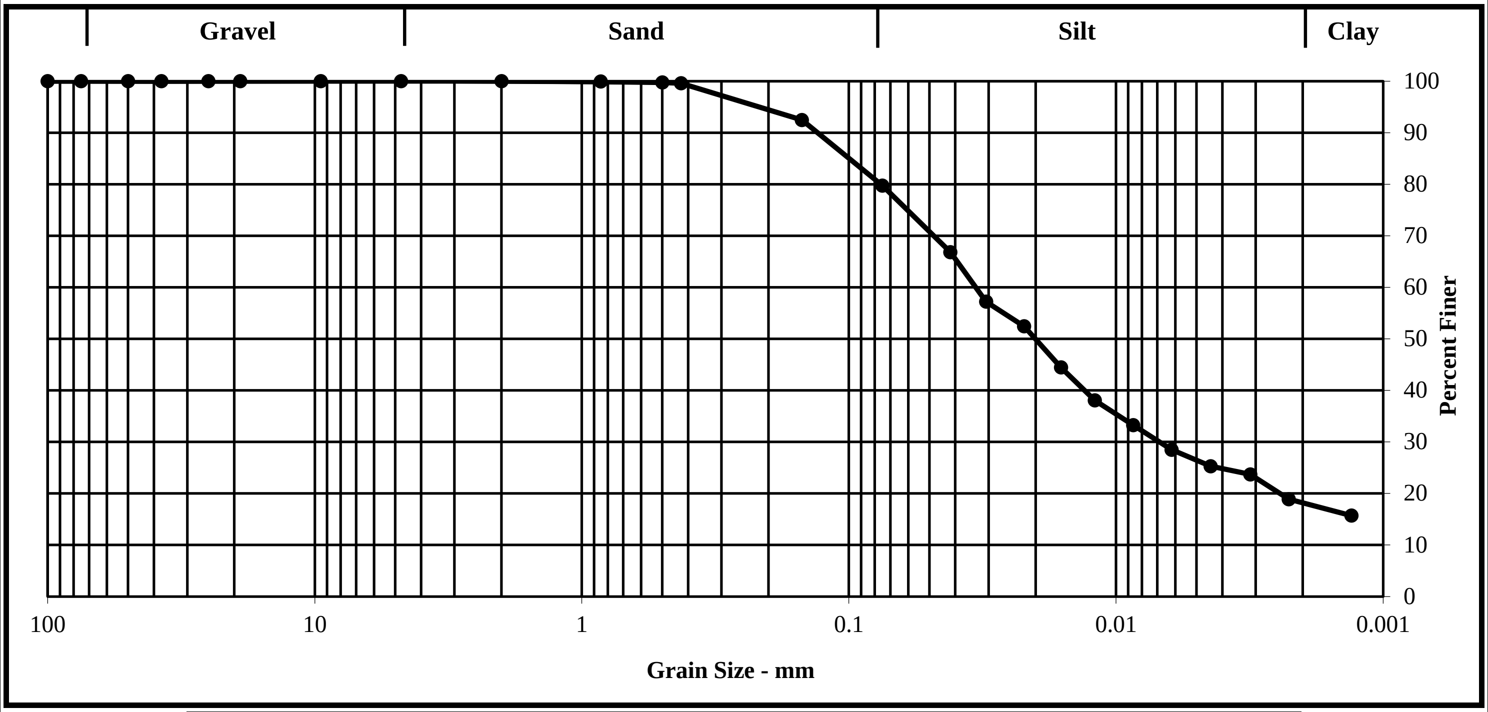
Hydrometer Analysis Test Report - ASTM D422



% +3"	% Gravel	% Sand	% Silt	% Clay	USCS	LL	PI
0.0	0.0	20.3	60.8	18.9	ML	-	NP

Sieve Size (inches)	Sieve Size (mm)	Percent Finer
4	100.0	100.0
3	75.0	100.0
2	50.0	100.0
1 1/2	37.5	100.0
1	25.0	100.0
3/4	19.0	100.0
3/8	9.50	100.0

Sieve Number	Sieve Size (mm)	Percent Finer
#4	4.75	100.0
#10	2.00	100.0
#20	0.850	99.9
#35	0.500	99.8
#40	0.425	99.6
#100	0.150	92.5
#200	0.075	79.7

Grain Size		Coefficients	
D_{60}	0.034	C_c	1.45
D_{30}	0.007	C_u	33.90
D_{10}	0.001		

Project: Williamsport Ballpark, Inc.

File Number: CCS2024

Sample Location: NATURAL SOILS
Composite: TB-40 & TB-48, 23-25'

Date: 23-Sep-20

Material Description: Medium Brown Silt With Sand

Client: Hawbaker Engineering, LLC

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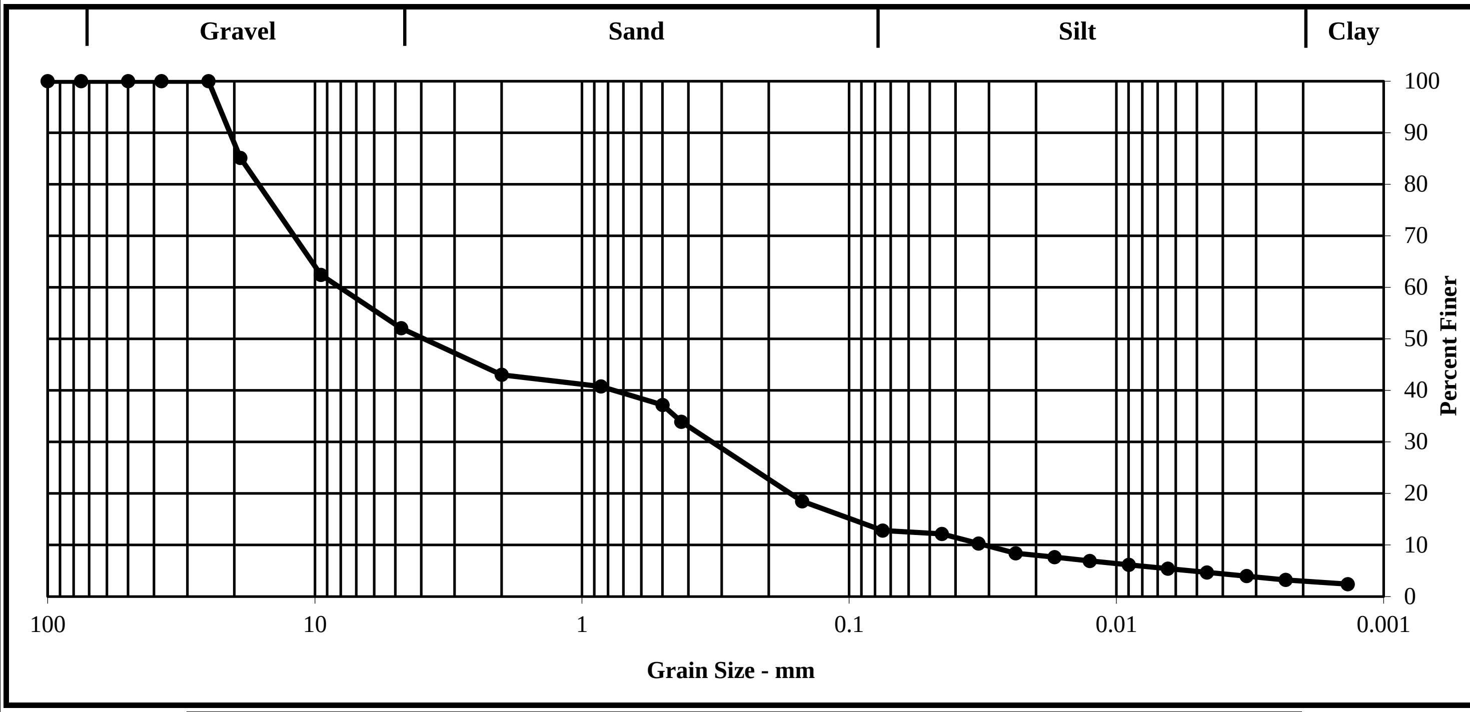
Hydrometer Analysis Test Report - ASTM D422



% +3"	% Gravel	% Sand	% Silt	% Clay	USCS	LL	PI
0.0	47.9	39.3	9.6	3.2	GM	-	NP

Sieve Size (inches)	Sieve Size (mm)	Percent Finer
4	100.0	100.0
3	75.0	100.0
2	50.0	100.0
1 1/2	37.5	100.0
1	25.0	100.0
3/4	19.0	85.1
3/8	9.50	62.4

Sieve Number	Sieve Size (mm)	Percent Finer
#4	4.75	52.1
#10	2.00	43.0
#20	0.850	40.8
#35	0.500	37.2
#40	0.425	33.9
#100	0.150	18.5
#200	0.075	12.8

Grain Size		Coefficients	
D_{60}	8.393	C_c	0.48
D_{30}	0.355	C_u	267.30
D_{10}	0.031		

Project: Williamsport Ballpark, Inc.

File Number: CCS2024

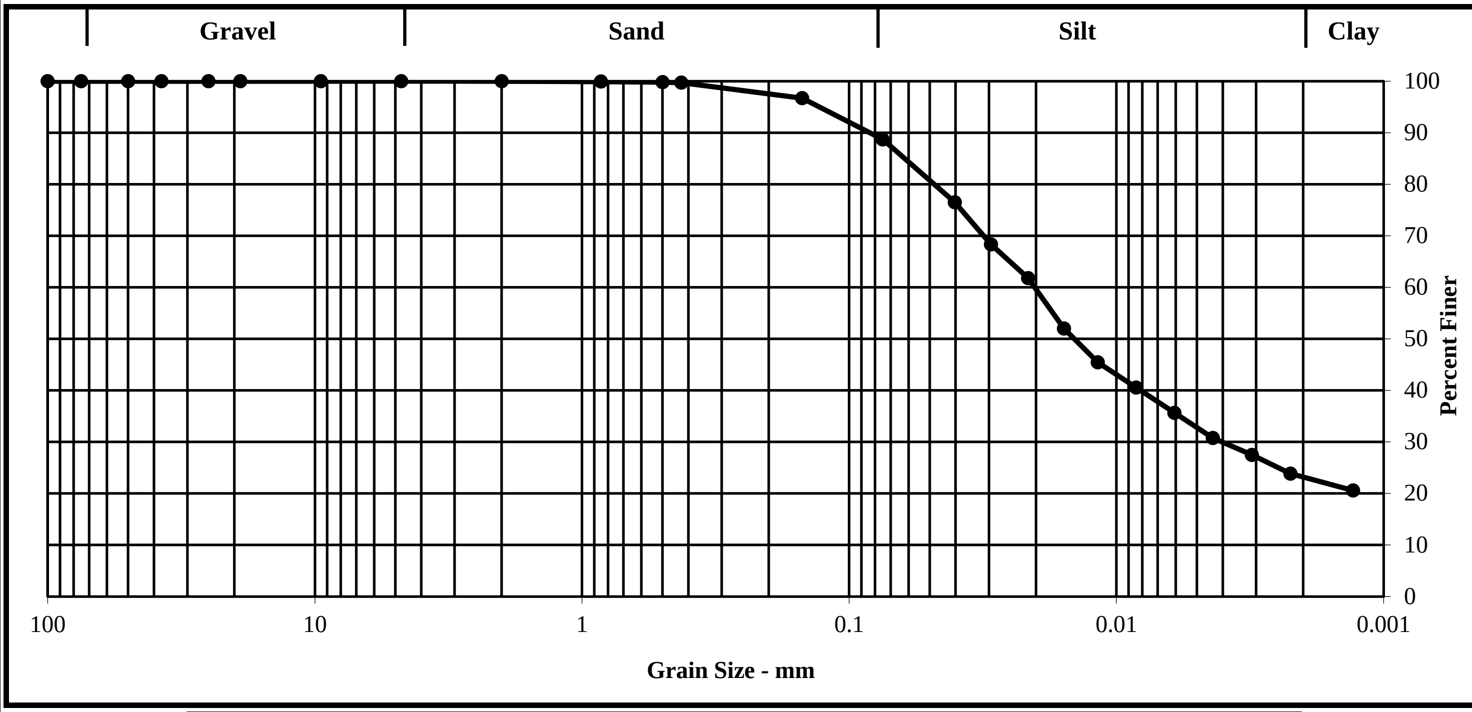
Sample Location: NATURAL SOILS
Composite: TB-53, 32-34'

Date: 23-Sep-20

Material Description: Medium Brown Silty Gravel With Sand

Client: Hawbaker Engineering, LLC

Hydrometer Analysis Test Report - ASTM D422



% +3"	% Gravel	% Sand	% Silt	% Clay	USCS	LL	PI
0.0	0.0	11.3	64.9	23.8	ML	-	NP

Sieve Size (inches)	Sieve Size (mm)	Percent Finer
4	100.0	100.0
3	75.0	100.0
2	50.0	100.0
1 1/2	37.5	100.0
1	25.0	100.0
3/4	19.0	100.0
3/8	9.50	100.0

Sieve Number	Sieve Size (mm)	Percent Finer
#4	4.75	100.0
#10	2.00	100.0
#20	0.850	99.9
#35	0.500	99.8
#40	0.425	99.7
#100	0.150	96.7
#200	0.075	88.7

Grain Size		Coefficients	
D_{60}	0.020	C_c	0.82
D_{30}	0.004	C_u	20.40
D_{10}	0.001		

Project: Williamsport Ballpark, Inc.

File Number: CCS2024

Sample Location: NATURAL SOILS
Composite: TB-54, 28-32'

Date: 23-Sep-20

Material Description: Medium Brown Silty Gravel With Sand

Client: Hawbaker Engineering, LLC

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF CLEAN WATER

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) DISCHARGES OF STORMWATER ASSOCIATED WITH CONSTRUCTION ACTIVITIES ANTIDEGRADATION ANALYSIS MODULE 3

Applicant: **Williamsport Ballpark, Inc.** Project Site Name: **Former Susquehanna Supply Property**

Surface Water Name: **UNT Susquehanna River** Surface Water Use: **WWF**

ANTIDEGRADATION – EROSION AND SEDIMENT CONTROL (E&S) PLAN

☐ A **Non-Discharge Alternative will be utilized** for the project that will either individually or collectively eliminate the net change in stormwater volume, rate, and quality for storm events up to and including the 2-year/24-hour storm during earth disturbance activities.

Identify the E&S BMP(s) that will be utilized to achieve the non-discharge alternative:

- ☐ Alternative Siting: Location
- ☐ Alternative Siting: Configuration
- ☐ Alternative Siting: Location of Discharge
- ☐ Other: ____
- ☐ Limiting Extent & Duration of Disturbance
- ☐ Riparian Buffer (150 ft min.)
- ☐ Riparian Forest Buffer (150 ft min.)
- ☐ Limited Disturbed Area

Explain how the E&S BMP(s) will individually or collectively eliminate the net change in stormwater volume, rate, and quality for storm events up to and including the 2-year/24-hour storm during earth disturbance activities.

If a **Non-Discharge Alternative will not be utilized**, explain the rationale for non-selection, including why none of the alternatives are considered environmentally sound and cost-effective.

☒ **Antidegradation Best Combination of Technologies (ABACT) BMP(s) will be utilized** for the project that will either individually or collectively manage the net change in stormwater volume, rate, and quality for storm events up to and including the 2-year/24-hour storm during earth disturbance activities.

Identify the ABACT E&S BMP(s) that will be utilized:

- ☐ Rock Construction Entrance with Wash Rack
- ☐ Wheel Wash
- ☐ Pumped Water Filter Bag with Sump Pit
- ☐ Compost Filter Berm (HQ Only)
- ☐ Silt Fence with Vegetative Filter Strip
- ☐ Wood Chip Filter Berm (HQ Only)
- ☐ Sediment Basin with Perforated Riser (HQ Only)
- ☐ Stone Inlet Protection with Compost Layer (HQ Only)
- ☐ Embankment Sediment Trap with Compost Layer (HQ Only)
- ☐ Sediment Trap with Perforated Riser (HQ Only)
- ☐ Erosion Control Blankets within 50 ft of Surface Waters
- ☐ Flocculant with PAMs
- ☐ Rock Construction Entrance with Street Sweeping
- ☐ Pumped Water Filter Bag with Compost Sock Ring
- ☒ Compost Filter Sock
- ☐ Weighted Sediment Filter Tube (HQ Only)
- ☐ Super Silt Fence with Vegetative Filter Strip
- ☐ Vegetative Filter Strip (HQ Only)
- ☐ Sediment Basin with Skimmer
- ☐ Compost Filter Sock Sediment Trap
- ☐ Embankment Sediment Trap with Compost Sock
- ☐ Sediment Trap with Skimmer
- ☒ Immediate Stabilization
- ☐ Vegetative Conveyance

☐ Riparian Buffer (< 150 ft) ☐ Riparian Forest Buffer (< 150 ft)

☐ Approved Alternative: ______________________

Explain how the E&S BMP(s) will individually or collectively manage the net change in stormwater volume, rate, and quality for storm events up to and including the 2-year/24-hour storm during the earth disturbance activities.

Compost filter socks will be placed downstream of disturbance to help capture sediment at the cause. Disturbed areas will be stablized with straw, erosion matting or gravel as soon as final grades are reached. Any discharge will occur across vegetated areas to help remove any remaining sediment.

ANTIDEGRADATION – POST-CONSTRUCTION STORMWATER MANAGEMENT (PCSM) PLAN

☐ A **Non-Discharge Alternative will be utilized** for the project that either individually or collectively eliminate the net change in stormwater volume, rate, and quality for storm events up to and including the 2-year/24-hour storm after earth disturbance activities.

Identify the PCSM BMPs that will be used to achieve the non-discharge alternative:

- ☐ Alternative Siting: Location
- ☐ Low Impact Development
- ☐ Alternative Siting: Configuration
- ☐ Riparian Buffer (150-ft. min.)
- ☐ Alternative Siting: Location of Discharge
- ☐ Riparian Forest Buffer (150-ft. min.)
- ☐ Infiltration
- ☐ Water Reuse
- ☐ Other: ______________________

Explain how the PCSM BMP(s) will individually or collectively eliminate the net change in stormwater volume, rate, and quality for storm events up to and including the 2-year/24-hour storm after earth disturbance activities.

If a **Non-Discharge Alternative will not be utilized**, explain the rationale for non-selection, including why none of the alternatives are considered environmentally sound and cost-effective.

☒ **Antidegradation Best Combination of Technologies (ABACT) has been selected** for the project that will either individually or collectively manage the net change in stormwater volume, rate, and quality for storm events up to and including the 2-year/24-hour storm after earth disturbance activities.

Identify the ABACT PSCM BMPs that will be utilized:

- ☐ Rain Garden (with Infiltration)
- ☒ Disconnection of Impervious / Roof Area
- ☒ Rain Garden (without Infiltration)
- ☐ Pervious Pavement with Infiltration Bed
- ☐ Constructed Filter
- ☐ Infiltration Basin
- ☐ Vegetated Swale
- ☐ Infiltration Bed
- ☐ Vegetated Filter Strip
- ☐ Infiltration Trench
- ☐ Constructed Wetland
- ☒ Soil Amendment
- ☐ Wet Pond
- ☐ Dry Well / Seepage Pit
- ☐ Dry Extended Detention Basin
- ☐ Infiltration Berm / Retentive Grading
- ☐ Water Quality Device
- ☐ Protect Sensitive / Special Value Features
- ☐ Spray / Drip Irrigation
- ☐ Street Sweeping
- ☐ Rain Barrel
- ☐ Green Roof

☐ Protect / Utilize Natural Flow Pathways (on-site)

☐ Approved Alternative: ______________________________

Explain how the PCSM BMP(s) will individually or collectively manage the net change in stormwater volume, rate, and quality for storm events up to and including the 2-year/24-hour storm after earth disturbance activities.

Roof area will be piped directly a vegetated basin to avoid surface flow over the hospitality area. Infiltration is not permitted since the over a former landfill. Impermeable liners will be installed under all the MRC basin to ensure infiltration does not occur. Amended soils will be added to the bottom of the MRC basins to help filter the water prior to leaving the basin throught the underdrain outlet. Other impervious areas are designed to sheet flow to vegetated areas around the site.

CERTIFICATION

I certify under penalty of law and subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities) that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Jason Fink
Applicant Name (type or print legibly)

President/CEO
Official Title

Jason Fink
Applicant Signature

March 9, 2021
Date Signed

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF CLEAN WATER

BASIN A

MANAGED RELEASE CONCEPT (MRC) DESIGN SUMMARY

Complete One Design Summary Sheet for Each BMP Designed for MRC

GENERAL INFORMATION

Applicant Name: **Williamsport Ballpark, Inc.**
Project Name: **Synthetic Sports Fields Complex**
Applicant Address: **102 West Fourth Street**
Municipality: **City of Williamsport**
City, State, Zip: **Williamsport, PA 17701**
County: **Lycoming**

Permit Type: ☐ NPDES PAG-02 ☒ NPDES IP ☐ ESCGP ☐ ESP

	Pre-Development	Post-Development	Change
Impervious Area (acres):	0.00	0.21	+0.21

MRC BMP INFORMATION

MRC BMP Type: **Rain Garden** Stormwater BMP Manual Section: **6.4.5**

Will the BMP Include Vegetation? ☒ Yes ☐ No

If Yes, Identify Proposed Vegetation: **grass mix**

For Non-Vegetated BMPs Will There Be Pre- or Post-Treatment? ☐ Yes (Pre-) ☐ Yes (Post-) ☐ No

If Yes, Identify Proposed Pre- or Post-Treatment:

Name of Surface Water to Receive MRC BMP Discharges: **UNT to Susquehanna River**

Designated Use of Surface Water: **WWF** Existing Use of Surface Water (if different): **WWF**

Is the Surface Water Impaired? ☒ Yes ☐ No

If Yes, Identify Cause(s): **PCB**

Will the BMP have an impermeable liner? ☒ Yes ☐ No

If Yes, explain why a liner is proposed: **Infiltration is not wanted since site is located on top of old landfill**

BMP Media Description: **70% topsoil (30% sand)/30% compost**

Are Any Deviations from MRC Design Standards Proposed? ☒ Yes ☐ No

If Yes, Identify Deviations: **drainage area to facility exceed recommeded 3 acres**

MRC BMP DESIGN VALUES AND STANDARDS

Parameter	Design Value	Design Standard
Actual Contributing Impervious Area to BMP (acres)	**0.21**	
Equivalent Contributing Impervious Area to BMP (acres)	**1.96**	
Total Drainage Area to BMP (acres)	**4.28**	
MRC BMP Release Rate (cfs)	**0.01**	*No greater than 0.01 cfs / acre of equivalent contributing impervious*
Underdrain Outflow Rate During 1.2-Inch/2-Hour Storm (cfs)	**0.01**	*<= MRC BMP Release Rate (cfs)*
Maximum Storm Event Routed to MRC BMP	**100 yr./24 hr.**	

MRC BMP Design Summary
Revised, August 25, 2020

Parameter	Design Value	Design Standard
BMP Footprint Area (ft^2)	**12,449**	
Bottom BMP Elevation (Native Soils) (ft)	**528.00**	
2-Yr/24-Hr Storm Ponding Depth (ft)	**531.00**	*1 ft (recommended) (2 ft max)*
Maximum Ponding Depth (ft)	**2.41**	*4 ft (max)*
Overflow Bypass Elevation (ft)	**531.70**	
Media Depth (ft)	**2**	*2 ft (min) – 4 ft (max)*
Media Void Space (%)	**30**	
Internal Water Storage (IWS) Depth (ft)	**1**	*1 ft recommended*
Top of IWS Elevation (ft)	**529**	
Underdrain Pipe Diameter (in)	**4**	
Underdrain Orifice Diameter (in)	**5/8**	
Underdrain Outlet Elevation (ft)	**529**	
IWS Available for Routing (%)	**15**	*50% max*
Separation Distance (Groundwater) (ft)	**>2'**	*1 ft (min) (2 ft recommended)*
Infiltration Rate (in/hr)	**0**	
Volume of Overflow During 1.2-Inch/2-Hour Storm (cf)	**0**	*0 (No overflow allowed)*
1-Yr/24-Hr **Pre**-Development Peak Rate (cfs)	**6.95****	***Post combined West drainage area***
2-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**1.29**	*1-Yr/24-Hr Pre-Development Peak Rate (or per approved Act 167 Plan)*
10-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**2.36**	*10-Yr/24-Hr Pre-Development Peak Rate*
50-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**7.73**	*50-Yr/24-Hr Pre-Development Peak Rate*
100-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**15.09**	*100-Yr/24-Hr Pre-Development Peak Rate*
Total 2-Yr/24-Hr Runoff Volume Managed by BMP (cf)	**27,799**	
Ponding Time @ 2-Yr/24-Hr Storm (hrs)	**42.22, 6.11**	*72 hrs (surface), 7 days (underground)*
Ponding Time @ 10-Yr/24-Hr Storm (hrs)	**43.65, 6.17**	*72 hrs (surface), 7 days (underground)*
Ponding Time @ 50-Yr/24-Hr Storm (hrs)	**44.70, 6.21**	*72 hrs (surface), 7 days (underground)*
Ponding Time @ 100-Yr/24-Hr Storm (hrs)	**44.80, 6.21**	*72 hrs (surface), 7 days (underground)*

Robert E. Myers
Licensed P.E. Name

Robt E Myers
Licensed P.E. Signature

PE 075926
License No.

August 6, 2021
Date

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
Robert E. Myers
ENGINEER
No. PE075926

Licensed Professional's Seal

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

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DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF CLEAN WATER

BASIN B

MANAGED RELEASE CONCEPT (MRC) DESIGN SUMMARY

Complete One Design Summary Sheet for Each BMP Designed for MRC

GENERAL INFORMATION

Applicant Name: **Williamsport Ballpark, Inc.** Project Name: **Synthetic Sports Fields Complex**

Applicant Address: **102 West Fourth Street** Municipality: **City of Williamsport**

City, State, Zip: **Williamsport, PA 17701** County: **Lycoming**

Permit Type: ☐ NPDES PAG-02 ☒ NPDES IP ☐ ESCGP ☐ ESP

	Pre-Development	Post-Development	Change
Impervious Area (acres):	0.01	0.09	+0.08

MRC BMP INFORMATION

MRC BMP Type: **Rain Garden** Stormwater BMP Manual Section: **6.4.5**

Will the BMP Include Vegetation? ☒ Yes ☐ No

If Yes, Identify Proposed Vegetation: **grass mix**

For Non-Vegetated BMPs Will There Be Pre- or Post-Treatment? ☐ Yes (Pre-) ☐ Yes (Post-) ☐ No

If Yes, Identify Proposed Pre- or Post-Treatment:

Name of Surface Water to Receive MRC BMP Discharges: **UNT to Susquehanna River**

Designated Use of Surface Water: **WWF** Existing Use of Surface Water (if different): **WWF**

Is the Surface Water Impaired? ☒ Yes ☐ No

If Yes, Identify Cause(s): **PCB**

Will the BMP have an impermeable liner? ☒ Yes ☐ No

If Yes, explain why a liner is proposed: **Infiltration is not wanted since site is located on top of old landfill**

BMP Media Description: **70% topsoil (30% sand)/30% compost**

Are Any Deviations from MRC Design Standards Proposed? ☐ Yes ☒ No

If Yes, Identify Deviations:

MRC BMP DESIGN VALUES AND STANDARDS

Parameter	Design Value	Design Standard
Actual Contributing Impervious Area to BMP (acres)	**0.09**	
Equivalent Contributing Impervious Area to BMP (acres)	**0.68**	
Total Drainage Area to BMP (acres)	**1.62**	
MRC BMP Release Rate (cfs)	**0.01**	*No greater than 0.01 cfs / acre of equivalent contributing impervious*
Underdrain Outflow Rate During 1.2-Inch/2-Hour Storm (cfs)	**0.01**	*<= MRC BMP Release Rate (cfs)*
Maximum Storm Event Routed to MRC BMP	**100 yr./24 hr.**	

MRC BMP Design Summary
Revised, August 25, 2020

Parameter	Design Value	Design Standard
BMP Footprint Area (ft^2)	**7,785**	
Bottom BMP Elevation (Native Soils) (ft)	**529.90**	
2-Yr/24-Hr Storm Ponding Depth (ft)	**532.20**	*1 ft (recommended) (2 ft max)*
Maximum Ponding Depth (ft)	**1.26**	*4 ft (max)*
Overflow Bypass Elevation (ft)	**532.90**	
Media Depth (ft)	**2**	*2 ft (min) – 4 ft (max)*
Media Void Space (%)	**30**	
Internal Water Storage (IWS) Depth (ft)	**1**	*1 ft recommended*
Top of IWS Elevation (ft)	**530.90**	
Underdrain Pipe Diameter (in)	**4**	
Underdrain Orifice Diameter (in)	**5/8**	
Underdrain Outlet Elevation (ft)	**530.90**	
IWS Available for Routing (%)	**15**	*50% max*
Separation Distance (Groundwater) (ft)	**>2'**	*1 ft (min) (2 ft recommended)*
Infiltration Rate (in/hr)	**0**	
Volume of Overflow During 1.2-Inch/2-Hour Storm (cf)	**0**	*0 (No overflow allowed)*
1-Yr/24-Hr **Pre**-Development Peak Rate (cfs)	**22.81****	***Post combined North drainage area***
2-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**0.39**	*1-Yr/24-Hr Pre-Development Peak Rate (or per approved Act 167 Plan)*
10-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**1.13**	*10-Yr/24-Hr Pre-Development Peak Rate*
50-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**3.36**	*50-Yr/24-Hr Pre-Development Peak Rate*
100-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**6.37**	*100-Yr/24-Hr Pre-Development Peak Rate*
Total 2-Yr/24-Hr Runoff Volume Managed by BMP (cf)	**9,941**	
Ponding Time @ 2-Yr/24-Hr Storm (hrs)	**4.3, 2.80**	*72 hrs (surface), 7 days (underground)*
Ponding Time @ 10-Yr/24-Hr Storm (hrs)	**5.4, 2.85**	*72 hrs (surface), 7 days (underground)*
Ponding Time @ 50-Yr/24-Hr Storm (hrs)	**6.1, 2.88**	*72 hrs (surface), 7 days (underground)*
Ponding Time @ 100-Yr/24-Hr Storm (hrs)	**6.2, 2.88**	*72 hrs (surface), 7 days (underground)*

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Robt E Myers
Licensed P.E. Signature

PE 075926
License No.

3/8/2021
Date

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
Robert E. Myers
ENGINEER
No. PE075926
Licensed Professional's Seal

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BUREAU OF CLEAN WATER

BASIN C

MANAGED RELEASE CONCEPT (MRC) DESIGN SUMMARY

Complete One Design Summary Sheet for Each BMP Designed for MRC

GENERAL INFORMATION

Applicant Name: **Williamsport Ballpark, Inc.**
Project Name: **Synthetic Sports Fields Complex**
Applicant Address: **102 West Fourth Street**
Municipality: **City of Williamsport**
City, State, Zip: **Williamsport, PA 17701**
County: **Lycoming**

Permit Type: ☐ NPDES PAG-02 ☒ NPDES IP ☐ ESCGP ☐ ESP

	Pre-Development	Post-Development	Change
Impervious Area (acres):	0.88	0.26	-0.62

MRC BMP INFORMATION

MRC BMP Type: **Rain Garden** Stormwater BMP Manual Section: **6.4.5**

Will the BMP Include Vegetation? ☒ Yes ☐ No

If Yes, Identify Proposed Vegetation:

For Non-Vegetated BMPs Will There Be Pre- or Post-Treatment? ☐ Yes (Pre-) ☐ Yes (Post-) ☐ No

If Yes, Identify Proposed Pre- or Post-Treatment:

Name of Surface Water to Receive MRC BMP Discharges: **UNT to Susquehanna River**

Designated Use of Surface Water: **WWF** Existing Use of Surface Water (if different): **WWF**

Is the Surface Water Impaired? ☒ Yes ☐ No

If Yes, Identify Cause(s): **PCB**

Will the BMP have an impermeable liner? ☒ Yes ☐ No

If Yes, explain why a liner is proposed: **Infiltration is not wanted since site is located on top of old landfill**

BMP Media Description: **70% topsoil (30% sand)/30% compost**

Are Any Deviations from MRC Design Standards Proposed? ☐ Yes ☒ No

If Yes, Identify Deviations: **drainage area to facility exceed recommeded 3 acres**

MRC BMP DESIGN VALUES AND STANDARDS

Parameter	Design Value	Design Standard
Actual Contributing Impervious Area to BMP (acres)	**0.26**	
Equivalent Contributing Impervious Area to BMP (acres)	**1.64**	
Total Drainage Area to BMP (acres)	**4.21**	
MRC BMP Release Rate (cfs)	**0.01**	*No greater than 0.01 cfs / acre of equivalent contributing impervious*
Underdrain Outflow Rate During 1.2-Inch/2-Hour Storm (cfs)	**0.01**	*<= MRC BMP Release Rate (cfs)*
Maximum Storm Event Routed to MRC BMP	**100 yr./24 hr.**	

MRC BMP Design Summary
Revised, August 25, 2020

Parameter	Design Value	Design Standard
BMP Footprint Area (ft^2)	**19,842**	
Bottom BMP Elevation (Native Soils) (ft)	**529.00**	
2-Yr/24-Hr Storm Ponding Depth (ft)	**531.40**	*1 ft (recommended) (2 ft max)*
Maximum Ponding Depth (ft)	**1.45**	*4 ft (max)*
Overflow Bypass Elevation (ft)	**532.00**	
Media Depth (ft)	**2**	*2 ft (min) – 4 ft (max)*
Media Void Space (%)	**30**	
Internal Water Storage (IWS) Depth (ft)	**1**	*1 ft recommended*
Top of IWS Elevation (ft)	**530.00**	
Underdrain Pipe Diameter (in)	**4**	
Underdrain Orifice Diameter (in)	**3/4**	
Underdrain Outlet Elevation (ft)	**530.00**	
IWS Available for Routing (%)	**15**	*50% max*
Separation Distance (Groundwater) (ft)	**>2'**	*1 ft (min) (2 ft recommended)*
Infiltration Rate (in/hr)	**0**	
Volume of Overflow During 1.2-Inch/2-Hour Storm (cf)	**0**	*0 (No overflow allowed)*
1-Yr/24-Hr **Pre**-Development Peak Rate (cfs)	**22.81**	*****Post combined North drainage area***
2-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**0.38**	*1-Yr/24-Hr Pre-Development Peak Rate (or per approved Act 167 Plan)*
10-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**0.77**	*10-Yr/24-Hr Pre-Development Peak Rate*
50-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**6.28**	*50-Yr/24-Hr Pre-Development Peak Rate*
100-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**11.02**	*100-Yr/24-Hr Pre-Development Peak Rate*
Total 2-Yr/24-Hr Runoff Volume Managed by BMP (cf)	**24,568**	
Ponding Time @ 2-Yr/24-Hr Storm (hrs)	**18.9, 5.69**	*72 hrs (surface), 7 days (underground)*
Ponding Time @ 10-Yr/24-Hr Storm (hrs)	**23.7, 5.90**	*72 hrs (surface), 7 days (underground)*
Ponding Time @ 50-Yr/24-Hr Storm (hrs)	**25.0, 5.95**	*72 hrs (surface), 7 days (underground)*
Ponding Time @ 100-Yr/24-Hr Storm (hrs)	**25.2, 5.96**	*72 hrs (surface), 7 days (underground)*

Robert E. Myers
Licensed P.E. Name

Robt E Myers
Licensed P.E. Signature

PE 075926
License No.

Date Aug 6, 2021

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
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DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF CLEAN WATER

BASIN D

MANAGED RELEASE CONCEPT (MRC) DESIGN SUMMARY

Complete One Design Summary Sheet for Each BMP Designed for MRC

GENERAL INFORMATION

Applicant Name: **Williamsport Ballpark, Inc.** Project Name: **Synthetic Sports Fields Complex**

Applicant Address: **102 West Fourth Street** Municipality: **City of Williamsport**

City, State, Zip: **Williamsport, PA 17701** County: **Lycoming**

Permit Type: ☐ NPDES PAG-02 ☒ NPDES IP ☐ ESCGP ☐ ESP

	Pre-Development	Post-Development	Change
Impervious Area (acres):	0.15	0.08	-0.07

MRC BMP INFORMATION

MRC BMP Type: **Rain Garden** Stormwater BMP Manual Section: **6.4.5**

Will the BMP Include Vegetation? ☒ Yes ☐ No

If Yes, Identify Proposed Vegetation:

For Non-Vegetated BMPs Will There Be Pre- or Post-Treatment? ☐ Yes (Pre-) ☐ Yes (Post-) ☐ No

If Yes, Identify Proposed Pre- or Post-Treatment:

Name of Surface Water to Receive MRC BMP Discharges: **UNT to Susquehanna River**

Designated Use of Surface Water: **WWF** Existing Use of Surface Water (if different): **WWF**

Is the Surface Water Impaired? ☒ Yes ☐ No

If Yes, Identify Cause(s): **PCB**

Will the BMP have an impermeable liner? ☒ Yes ☐ No

If Yes, explain why a liner is proposed: **Infiltration is not wanted since site is located on top of old landfill**

BMP Media Description: **70% topsoil (30% sand)/30% compost**

Are Any Deviations from MRC Design Standards Proposed? ☐ Yes ☒ No

If Yes, Identify Deviations:

MRC BMP DESIGN VALUES AND STANDARDS

Parameter	Design Value	Design Standard
Actual Contributing Impervious Area to BMP (acres)	**0.08**	
Equivalent Contributing Impervious Area to BMP (acres)	**0.85**	
Total Drainage Area to BMP (acres)	**2.20**	
MRC BMP Release Rate (cfs)	**0.01**	*No greater than 0.01 cfs / acre of equivalent contributing impervious*
Underdrain Outflow Rate During 1.2-Inch/2-Hour Storm (cfs)	**0.01**	*<= MRC BMP Release Rate (cfs)*
Maximum Storm Event Routed to MRC BMP	**100 yr./24 hr.**	

MRC BMP Design Summary
Revised, August 25, 2020

Parameter	Design Value	Design Standard
BMP Footprint Area (ft^2)	**13,996**	
Bottom BMP Elevation (Native Soils) (ft)	**532.00**	
2-Yr/24-Hr Storm Ponding Depth (ft)	**535.02**	*1 ft (recommended) (2 ft max)*
Maximum Ponding Depth (ft)	**1.49**	*4 ft (max)*
Overflow Bypass Elevation (ft)	**535.00**	
Media Depth (ft)	**2**	*2 ft (min) – 4 ft (max)*
Media Void Space (%)	**30**	
Internal Water Storage (IWS) Depth (ft)	**1**	*1 ft recommended*
Top of IWS Elevation (ft)	**533.00**	
Underdrain Pipe Diameter (in)	**4**	
Underdrain Orifice Diameter (in)	**5/8**	
Underdrain Outlet Elevation (ft)	**533.00**	
IWS Available for Routing (%)	**15**	*50% max*
Separation Distance (Groundwater) (ft)	**>2'**	*1 ft (min) (2 ft recommended)*
Infiltration Rate (in/hr)	**0**	
Volume of Overflow During 1.2-Inch/2-Hour Storm (cf)	**0**	*0 (No overflow allowed)*
1-Yr/24-Hr **Pre**-Development Peak Rate (cfs)	**13.84**	*****Post combined South drainage area***
2-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**0.41**	*1-Yr/24-Hr Pre-Development Peak Rate (or per approved Act 167 Plan)*
10-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**3.18**	*10-Yr/24-Hr Pre-Development Peak Rate*
50-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**8.72**	*50-Yr/24-Hr Pre-Development Peak Rate*
100-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**11.58**	*100-Yr/24-Hr Pre-Development Peak Rate*
Total 2-Yr/24-Hr Runoff Volume Managed by BMP (cf)	**12,866**	
Ponding Time @ 2-Yr/24-Hr Storm (hrs)	**7.2, 5.07**	*72 hrs (surface), 7 days (underground)*
Ponding Time @ 10-Yr/24-Hr Storm (hrs)	**7.3, 5.08**	*72 hrs (surface), 7 days (underground)*
Ponding Time @ 50-Yr/24-Hr Storm (hrs)	**7.5, 5.09**	*72 hrs (surface), 7 days (underground)*
Ponding Time @ 100-Yr/24-Hr Storm (hrs)	**7.5, 5.09**	*72 hrs (surface), 7 days (underground)*

Robert E. Myers
Licensed P.E. Name

Robert E Myers
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3/8/2021
Date

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
Robert E. Myers
ENGINEER
No. PE075926
Licensed Professional's Seal

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

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BUREAU OF CLEAN WATER

BASIN E

MANAGED RELEASE CONCEPT (MRC) DESIGN SUMMARY

Complete One Design Summary Sheet for Each BMP Designed for MRC

GENERAL INFORMATION

Applicant Name: **Williamsport Ballpark, Inc.** Project Name: **Synthetic Sports Fields Complex**

Applicant Address: **102 West Fourth Street** Municipality: **City of Williamsport**

City, State, Zip: Williamsport, PA 17701 County: **Lycoming**

Permit Type: ☐ NPDES PAG-02 ☒ NPDES IP ☐ ESCGP ☐ ESP

	Pre-Development	Post-Development	Change
Impervious Area (acres):	1.25	0.17	-1.08

MRC BMP INFORMATION

MRC BMP Type: **Rain Garden** Stormwater BMP Manual Section: **6.4.5**

Will the BMP Include Vegetation? ☒ Yes ☐ No

If Yes, Identify Proposed Vegetation:

For Non-Vegetated BMPs Will There Be Pre- or Post-Treatment? ☐ Yes (Pre-) ☐ Yes (Post-) ☐ No

If Yes, Identify Proposed Pre- or Post-Treatment:

Name of Surface Water to Receive MRC BMP Discharges: **UNT to Susquehanna River**

Designated Use of Surface Water: **WWF** Existing Use of Surface Water (if different): **WWF**

Is the Surface Water Impaired? ☒ Yes ☐ No

If Yes, Identify Cause(s): **PCB**

Will the BMP have an impermeable liner? ☒ Yes ☐ No

If Yes, explain why a liner is proposed: **Infiltration is not wanted since site is located on top of old landfill**

BMP Media Description: **70% topsoil (30% sand)/30% compost**

Are Any Deviations from MRC Design Standards Proposed? ☒ Yes ☐ No

If Yes, Identify Deviations: **drainage area to facility exceed recommeded 3 acres**

MRC BMP DESIGN VALUES AND STANDARDS

Parameter	Design Value	Design Standard
Actual Contributing Impervious Area to BMP (acres)	**0.17**	
Equivalent Contributing Impervious Area to BMP (acres)	**1.37**	
Total Drainage Area to BMP (acres)	**3.30**	
MRC BMP Release Rate (cfs)	**0.01**	*No greater than 0.01 cfs / acre of equivalent contributing impervious*
Underdrain Outflow Rate During 1.2-Inch/2-Hour Storm (cfs)	**0.01**	*<= MRC BMP Release Rate (cfs)*
Maximum Storm Event Routed to MRC BMP	**100 yr./24 hr.**	

MRC BMP Design Summary
Revised, August 25, 2020

Parameter	Design Value	Design Standard
BMP Footprint Area (ft^2)	**9,885**	
Bottom BMP Elevation (Native Soils) (ft)	**530.50**	
2-Yr/24-Hr Storm Ponding Depth (ft)	**0.50**	*1 ft (recommended) (2 ft max)*
Maximum Ponding Depth (ft)	**1.56**	*4 ft (max)*
Overflow Bypass Elevation (ft)	**533.50**	
Media Depth (ft)	**2**	*2 ft (min) – 4 ft (max)*
Media Void Space (%)	**30**	
Internal Water Storage (IWS) Depth (ft)	**1**	*1 ft recommended*
Top of IWS Elevation (ft)	**531.50**	
Underdrain Pipe Diameter (in)	**4**	
Underdrain Orifice Diameter (in)	**5/8**	
Underdrain Outlet Elevation (ft)	**531.50**	
IWS Available for Routing (%)	**15**	*50% max*
Separation Distance (Groundwater) (ft)	**>2'**	*1 ft (min) (2 ft recommended)*
Infiltration Rate (in/hr)	**0**	
Volume of Overflow During 1.2-Inch/2-Hour Storm (cf)	**0**	*0 (No overflow allowed)*
1-Yr/24-Hr **Pre**-Development Peak Rate (cfs)	**13.84**	*****Post combined South drainage area***
2-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**0.50**	*1-Yr/24-Hr Pre-Development Peak Rate (or per approved Act 167 Plan)*
10-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**3.29**	*10-Yr/24-Hr Pre-Development Peak Rate*
50-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**10.71**	*50-Yr/24-Hr Pre-Development Peak Rate*
100-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**13.18**	*100-Yr/24-Hr Pre-Development Peak Rate*
Total 2-Yr/24-Hr Runoff Volume Managed by BMP (cf)	**20,084**	
Ponding Time @ 2-Yr/24-Hr Storm (hrs)	**38.2, 5.05**	*72 hrs (surface), 7 days (underground)*
Ponding Time @ 10-Yr/24-Hr Storm (hrs)	**39.8, 5.12**	*72 hrs (surface), 7 days (underground)*
Ponding Time @ 50-Yr/24-Hr Storm (hrs)	**39.9, 5.12**	*72 hrs (surface), 7 days (underground)*
Ponding Time @ 100-Yr/24-Hr Storm (hrs)	**39.9, 5.12**	*72 hrs (surface), 7 days (underground)*

Robert E. Myers
Licensed P.E. Name

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License No.

Date 3/8/2021

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BASIN G

MANAGED RELEASE CONCEPT (MRC) DESIGN SUMMARY

Complete One Design Summary Sheet for Each BMP Designed for MRC

GENERAL INFORMATION

Applicant Name: **Williamsport Ballpark, Inc.** Project Name: **Synthetic Sports Fields Complex**

Applicant Address: **102 West Fourth Street** Municipality: **City of Williamsport**

City, State, Zip: Williamsport, PA 17701 County: **Lycoming**

Permit Type: ☐ NPDES PAG-02 ☒ NPDES IP ☐ ESCGP ☐ ESP

	Pre-Development	Post-Development	Change
Impervious Area (acres):	0.47	0.92	+0.45

MRC BMP INFORMATION

MRC BMP Type: **Rain Garden** Stormwater BMP Manual Section: **6.4.5**

Will the BMP Include Vegetation? ☒ Yes ☐ No

If Yes, Identify Proposed Vegetation:

For Non-Vegetated BMPs Will There Be Pre- or Post-Treatment? ☐ Yes (Pre-) ☐ Yes (Post-) ☐ No

If Yes, Identify Proposed Pre- or Post-Treatment:

Name of Surface Water to Receive MRC BMP Discharges: **UNT to Susquehanna River**

Designated Use of Surface Water: **WWF** Existing Use of Surface Water (if different): **WWF**

Is the Surface Water Impaired? ☒ Yes ☐ No

If Yes, Identify Cause(s): **PCB**

Will the BMP have an impermeable liner? ☒ Yes ☐ No

If Yes, explain why a liner is proposed: **Infiltration is not wanted since site is located on top of old landfill**

BMP Media Description: **70% topsoil (30% sand)/30% compost**

Are Any Deviations from MRC Design Standards Proposed? ☐ Yes ☒ No

If Yes, Identify Deviations:

MRC BMP DESIGN VALUES AND STANDARDS

Parameter	Design Value	Design Standard
Actual Contributing Impervious Area to BMP (acres)	**0.92**	
Equivalent Contributing Impervious Area to BMP (acres)	**0.95**	
Total Drainage Area to BMP (acres)	**1.67**	
MRC BMP Release Rate (cfs)	**0.01**	*No greater than 0.01 cfs / acre of equivalent contributing impervious*
Underdrain Outflow Rate During 1.2-Inch/2-Hour Storm (cfs)	**0.01**	*<= MRC BMP Release Rate (cfs)*
Maximum Storm Event Routed to MRC BMP	**100 yr./24 hr.**	

MRC BMP Design Summary
Revised, August 25, 2020

Parameter	Design Value	Design Standard
BMP Footprint Area (ft^2)	**6,428**	
Bottom BMP Elevation (Native Soils) (ft)	**530.00**	
2-Yr/24-Hr Storm Ponding Depth (ft)	**533.01**	*1 ft (recommended) (2 ft max)*
Maximum Ponding Depth (ft)	**1.46**	*4 ft (max)*
Overflow Bypass Elevation (ft)	**533.00**	
Media Depth (ft)	**2**	*2 ft (min) – 4 ft (max)*
Media Void Space (%)	**30**	
Internal Water Storage (IWS) Depth (ft)	**1**	*1 ft recommended*
Top of IWS Elevation (ft)	**531.00**	
Underdrain Pipe Diameter (in)	**4**	
Underdrain Orifice Diameter (in)	**5/8**	
Underdrain Outlet Elevation (ft)	**531.00**	
IWS Available for Routing (%)	**15**	*50% max*
Separation Distance (Groundwater) (ft)	**>2'**	*1 ft (min) (2 ft recommended)*
Infiltration Rate (in/hr)	**0**	
Volume of Overflow During 1.2-Inch/2-Hour Storm (cf)	**0**	*0 (No overflow allowed)*
1-Yr/24-Hr **Pre**-Development Peak Rate (cfs)	**6.95**	***** Post combined West drainage area***
2-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**0.28**	*1-Yr/24-Hr Pre-Development Peak Rate (or per approved Act 167 Plan)*
10-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**1.72**	*10-Yr/24-Hr Pre-Development Peak Rate*
50-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**6.97**	*50-Yr/24-Hr Pre-Development Peak Rate*
100-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**9.67**	*100-Yr/24-Hr Pre-Development Peak Rate*
Total 2-Yr/24-Hr Runoff Volume Managed by BMP (cf)	**10,890**	
Ponding Time @ 2-Yr/24-Hr Storm (hrs)	**28.6, 4.11**	*72 hrs (surface), 7 days (underground)*
Ponding Time @ 10-Yr/24-Hr Storm (hrs)	**30.4, 4.18**	*72 hrs (surface), 7 days (underground)*
Ponding Time @ 50-Yr/24-Hr Storm (hrs)	**30.5, 4.19**	*72 hrs (surface), 7 days (underground)*
Ponding Time @ 100-Yr/24-Hr Storm (hrs)	**30.6, 4.19**	*72 hrs (surface), 7 days (underground)*

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Robt E Myers
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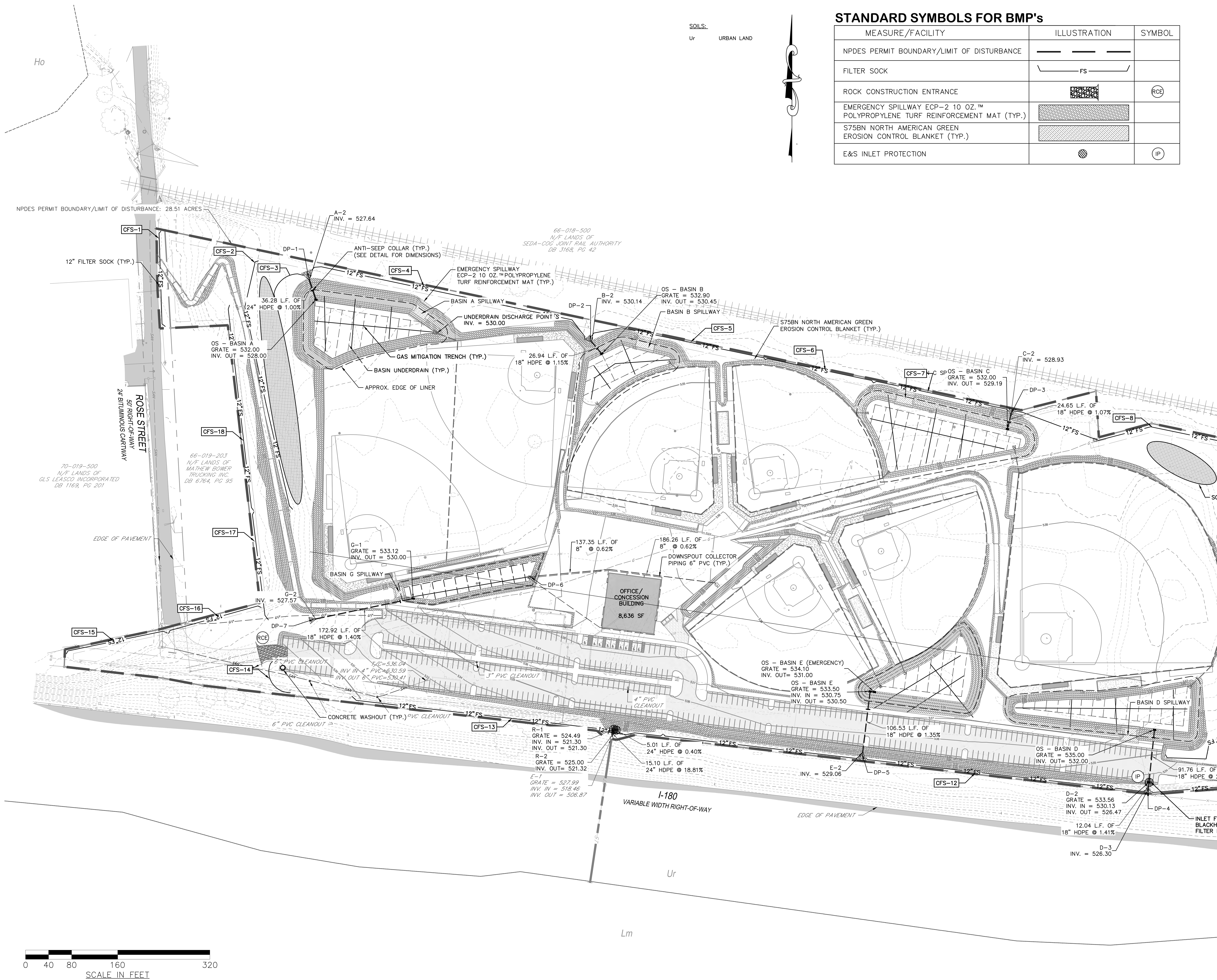
PE 075926
License No.

3/8/2021
Date

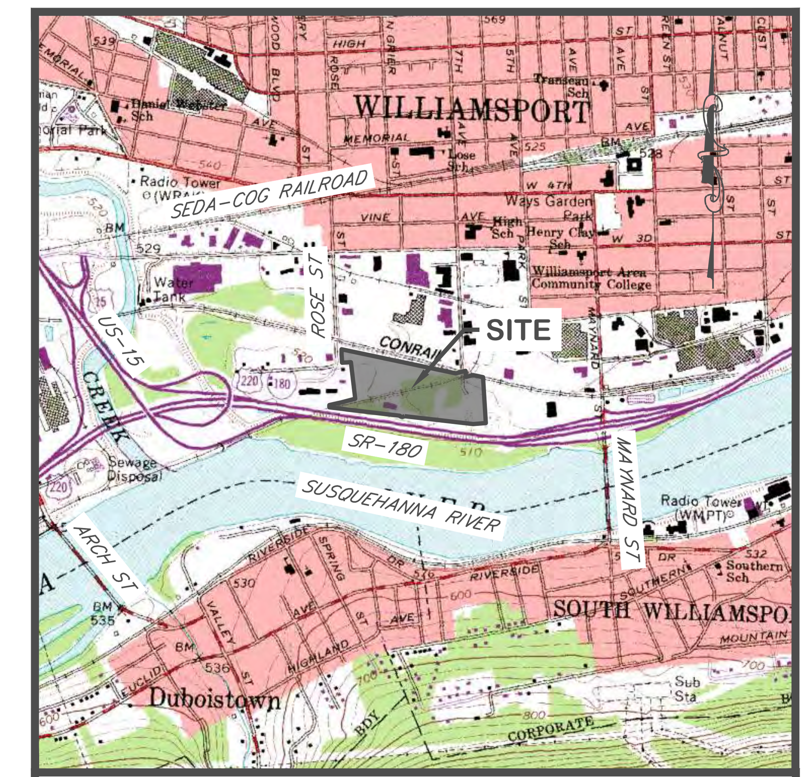
COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
Robert E. Myers
ENGINEER
No. PE075926

Licensed Professional's Seal



STANDARD SYMBOLS FOR BMP's

MEASURE/FACILITY	ILLUSTRATION	SYMBOL
NPDES PERMIT BOUNDARY/LIMIT OF DISTURBANCE	— — —	
FILTER SOCK	FS	
ROCK CONSTRUCTION ENTRANCE		RCE
EMERGENCY SPILLWAY ECP-2 10 OZ.™ POLYPROPYLENE TURF REINFORCEMENT MAT (TYP.)		
S75BN NORTH AMERICAN GREEN EROSION CONTROL BLANKET (TYP.)		
E&S INLET PROTECTION		IP



LOCATION MAP 1"=2000'

DATE	REVISION	REV. BY
05/01/24	REVISED PER CLIENT FOR CONSTRUCTION	REM
08/04/21	REVISED PER DEP COMMENTS DATED 08/04/2021	

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL ENGINEER
ROBERT E. MYERS

LOCATION: CITY OF WILLIAMSPORT CLINTON COUNTY, PA
OWNER: WILLIAMSPORT BALLPARK, INC.
SCALE: 1"=80'
DESIGN: REM
DRAWN: CMM

E&S PLAN

EROSION & SEDIMENTATION CONTROL PLAN FOR WILLIAMSPORT BALLPARK, INC.

HAWBAKER ENGINEERING
1952 Waddle Road, Suite 201 State College, Pa 16803
1-800-284-8590
hawbakerengineering.com

DATE: MARCH 17, 2021
JOB NUMBER: 20914
SHEET NUMBER: E&S 1 OF 4

STANDARD E&S PLAN NOTES

THE FOLLOWING NOTES SHOULD BE PLACED ON THE E&S PLAN DRAWINGS.

1. ALL EARTH DISTURBANCES, INCLUDING CLEARING AND GRUBBING AS WELL AS CUTS AND FILLS SHALL BE DONE IN ACCORDANCE WITH THE APPROVED E&S PLAN. A COPY OF THE APPROVED DRAWINGS (STAMPED, SIGNED AND DATED BY THE REVIEWING AGENCY) MUST BE AVAILABLE AT THE PROJECT SITE AT ALL TIMES. THE REVIEWING AGENCY SHALL BE NOTIFIED OF ANY CHANGES TO THE APPROVED PLAN PRIOR TO IMPLEMENTATION OF THOSE CHANGES. THE REVIEWING AGENCY MAY REQUIRE A WRITTEN SUBMITTAL OF THOSE CHANGES FOR REVIEW AND APPROVAL AT ITS DISCRETION.

2. AT LEAST 7 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES, INCLUDING CLEARING AND GRUBBING, THE OWNER AND/OR OPERATOR SHALL INVITE ALL CONTRACTORS, THE LANDOWNER, APPROPRIATE MUNICIPAL OFFICIALS, THE E&S PLAN PREPARER, THE PCSM PLAN PREPARER, THE LICENSED PROFESSIONAL RESPONSIBLE FOR OVERSIGHT OF CRITICAL STAGES OF IMPLEMENTATION OF THE PCSM PLAN, AND A REPRESENTATIVE FROM THE LOCAL CONSERVATION DISTRICT TO AN ON–SITE PRECONSTRUCTION MEETING.

3. AT LEAST 3 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES, OR EXPANDING INTO AN AREA PREVIOUSLY UNMARKED, THE PENNSYLVANIA ONE CALL SYSTEM INC. SHALL BE NOTIFIED AT 1–800–242–1776 FOR THE LOCATION OF EXISTING UNDERGROUND UTILITIES.

4. ALL EARTH DISTURBANCE ACTIVITIES SHALL PROCEED IN ACCORDANCE WITH THE SEQUENCE PROVIDED ON THE PLAN DRAWINGS. DEVIATION FROM THAT SEQUENCE MUST BE APPROVED IN WRITING FROM THE LOCAL CONSERVATION DISTRICT OR BY THE DEPARTMENT PRIOR TO IMPLEMENTATION.

5. AREAS TO BE FILLED ARE TO BE CLEARED, GRUBBED, AND STRIPPED OF TOPSOIL TO REMOVE TREES, VEGETATION, ROOTS AND OTHER OBJECTIONABLE MATERIAL.

6. CLEARING, GRUBBING, AND TOPSOIL STRIPPING SHALL BE LIMITED TO THOSE AREAS DESCRIBED IN EACH STAGE OF THE CONSTRUCTION SEQUENCE. GENERAL SITE CLEARING, GRUBBING AND TOPSOIL STRIPPING MAY NOT COMMENCE IN ANY STAGE OR PHASE OF THE PROJECT UNTIL THE E&S BMPS SPECIFIED BY THE BMP SEQUENCE FOR THAT STAGE OR PHASE HAVE BEEN INSTALLED AND ARE FUNCTIONING AS DESCRIBED IN THIS E&S PLAN.

7. AT NO TIME SHALL CONSTRUCTION VEHICLES BE ALLOWED TO ENTER AREAS OUTSIDE THE LIMIT OF DISTURBANCE BOUNDARIES SHOWN ON THE PLAN MAPS. THESE AREAS MUST BE CLEARLY MARKED AND FENCED OFF BEFORE CLEARING AND GRUBBING OPERATIONS BEGIN.

8. TOPSOIL REQUIRED FOR THE ESTABLISHMENT OF VEGETATION SHALL BE STOCKPILED AT THE LOCATION(S) SHOWN ON THE PLAN MAPS(S) IN THE AMOUNT NECESSARY TO COMPLETE THE FINISH GRADING OF ALL EXPOSED AREAS THAT ARE TO BE STABILIZED BY VEGETATION. EACH STOCKPILE SHALL BE PROTECTED IN THE MANNER SHOWN ON THE PLAN DRAWINGS. STOCKPILE HEIGHTS SHALL NOT EXCEED 35 FEET. STOCKPILE SLOPES SHALL BE 2H:1V OR FLATTER.

9. IMMEDIATELY UPON DISCOVERING UNFORESEEN CIRCUMSTANCES POSING THE POTENTIAL FOR ACCELERATED EROSION AND/OR SEDIMENT POLLUTION, THE OPERATOR SHALL IMPLEMENT APPROPRIATE BEST MANAGEMENT PRACTICES TO MINIMIZE THE POTENTIAL FOR EROSION AND SEDIMENT POLLUTION AND NOTIFY THE LOCAL CONSERVATION DISTRICT AND/OR THE REGIONAL OFFICE OF THE DEPARTMENT.

10. ALL BUILDING MATERIALS AND WASTES SHALL BE REMOVED FROM THE SITE AND RECYCLED OR DISPOSED OF IN ACCORDANCE WITH THE DEPARTMENT'S SOLID WASTE MANAGEMENT REGULATIONS AT 25 PA. CODE 260.1 ET SEQ., 271.1, AND 287.1 ET. SEQ. NO BUILDING MATERIALS OR WASTES OR UNUSED BUILDING MATERIALS SHALL BE BURNED, BURIED, DUMPED, OR DISCHARGED AT THE SITE.

11. ALL OFF–SITE WASTE AND BORROW AREAS MUST HAVE AN E&S PLAN APPROVED BY THE LOCAL CONSERVATION DISTRICT OR THE DEPARTMENT FULLY IMPLEMENTED PRIOR TO BEING ACTIVATED.

12. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ANY MATERIAL BROUGHT ON SITE IS CLEAN FILL. FORM FP–001 MUST BE RETAINED BY THE PROPERTY OWNER FOR ANY FILL MATERIAL AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE BUT QUALIFYING AS CLEAN FILL DUE TO ANALYTICAL TESTING.

13. ALL PUMPING OF WATER FROM ANY WORK AREA SHALL BE DONE ACCORDING TO THE PROCEDURE DESCRIBED IN THIS PLAN, OVER UNDISTURBED VEGETATED AREAS.

14. UNTIL THE SITE IS STABILIZED, ALL EROSION AND SEDIMENT BMPS SHALL BE MAINTAINED PROPERLY. MAINTENANCE SHALL INCLUDE INSPECTIONS OF ALL EROSION AND SEDIMENT BMPS AFTER EACH RUNOFF EVENT AND ON A WEEKLY BASIS. ALL PREVENTATIVE AND REMEDIAL MAINTENANCE WORK, INCLUDING CLEAN OUT, REPAIR, REPLACEMENT, REGRADING, RESEEDING, REMULCHING AND RENETTING MUST BE PERFORMED IMMEDIATELY. IF THE E&S BMPS FAIL TO PERFORM AS EXPECTED, REPLACEMENT BMPS, OR MODIFICATIONS OF THOSE INSTALLED WILL BE REQUIRED.

15. A LOG SHOWING DATES THAT E&S BMPS WERE INSPECTED AS WELL AS ANY DEFICIENCIES FOUND AND THE DATE THEY WERE CORRECTED SHALL BE MAINTAINED ON THE SITE AND BE MADE AVAILABLE TO REGULATORY AGENCY OFFICIALS AT THE TIME OF INSPECTION.

16. SEDIMENT TRACKED ONTO ANY PUBLIC ROADWAY OR SIDEWALK SHALL BE RETURNED TO THE CONSTRUCTION SITE BY THE END OF EACH WORK DAY AND DISPOSED IN THE MANNER DESCRIBED IN THIS PLAN. IN NO CASE SHALL THE SEDIMENT BE WASHED, SHOVELED, OR SWEPT INTO ANY ROADSIDE DITCH, STORM SEWER, OR SURFACE WATER.

17. ALL SEDIMENT REMOVED FROM BMPS SHALL BE DISPOSED OF IN THE MANNER DESCRIBED ON THE PLAN DRAWINGS.

18. AREAS WHICH ARE TO BE TOPSOILED SHALL BE SCARIFIED TO A MINIMUM DEPTH OF 3 TO 5 INCHES –– 6 TO 12 INCHES ON COMPACTED SOILS –– PRIOR TO PLACEMENT OF TOPSOIL. AREAS TO BE VEGETATED SHALL HAVE A MINIMUM 4 INCHES OF TOPSOIL IN PLACE PRIOR TO SEEDING AND MULCHING. FILL OUTSLOPES SHALL HAVE A MINIMUM OF 2 INCHES OF TOPSOIL.

19. ALL FILLS SHALL BE COMPACTED AS REQUIRED TO REDUCE EROSION, SLIPPAGE, SETTLEMENT, SUBSIDENCE OR OTHER RELATED PROBLEMS. FILL INTENDED TO SUPPORT BUILDINGS, STRUCTURES AND CONDUITS, ETC. SHALL BE COMPACTED IN ACCORDANCE WITH LOCAL REQUIREMENTS OR CODES.

20. ALL EARTHEN FILLS SHALL BE PLACED IN COMPACTED LAYERS NOT TO EXCEED 9 INCHES IN THICKNESS.

21. FILL MATERIALS SHALL BE FREE OF FROZEN PARTICLES, BRUSH, ROOTS, SOD, OR OTHER FOREIGN OR OBJECTIONABLE MATERIALS THAT WOULD INTERFERE WITH OR PREVENT CONSTRUCTION OF SATISFACTORY FILLS.

22. FROZEN MATERIALS OR SOFT, MUCKY, OR HIGHLY COMPRESSIBLE MATERIALS SHALL NOT BE INCORPORATED INTO FILLS.

23. FILL SHALL NOT BE PLACED ON SATURATED OR FROZEN SURFACES.

24. SEEPS OR SPRINGS ENCOUNTERED DURING CONSTRUCTION SHALL BE HANDLED IN ACCORDANCE WITH THE STANDARD AND SPECIFICATION FOR SUBSURFACE DRAIN OR OTHER APPROVED METHOD.

25. ALL GRADED AREAS SHALL BE PERMANENTLY STABILIZED IMMEDIATELY UPON REACHING FINISHED GRADE. CUT SLOPES IN COMPETENT BEDROCK AND ROCK FILLS NEED NOT BE VEGETATED. SEEDED AREAS WITHIN 50 FEET OF A SURFACE WATER, OR AS OTHERWISE SHOWN ON THE PLAN DRAWINGS, SHALL BE BLANKETED ACCORDING TO THE STANDARDS OF THIS PLAN.

26. IMMEDIATELY AFTER EARTH DISTURBANCE ACTIVITIES CEASE IN ANY AREA OR SUBAREA OF THE PROJECT, THE OPERATOR SHALL STABILIZE ALL DISTURBED AREAS. DURING NON–GERMINATING MONTHS, MULCH OR PROTECTIVE BLANKETING SHALL BE APPLIED AS DESCRIBED IN THE PLAN. AREAS NOT AT FINISHED GRADE, WHICH WILL BE REACTIVATED WITHIN 1 YEAR, MAY BE STABILIZED IN ACCORDANCE WITH THE TEMPORARY STABILIZATION SPECIFICATIONS. THOSE AREAS WHICH WILL NOT BE REACTIVATED WITHIN 1 YEAR SHALL BE STABILIZED IN ACCORDANCE WITH THE PERMANENT STABILIZATION SPECIFICATIONS.

27. PERMANENT STABILIZATION IS DEFINED AS A MINIMUM UNIFORM, PERENNIAL 70% VEGETATIVE COVER OR OTHER PERMANENT NON–VEGETATIVE COVER WITH A DENSITY SUFFICIENT TO RESIST ACCELERATED EROSION. CUT AND FILL SLOPES SHALL BE CAPABLE OF RESISTING FAILURE DUE TO SLUMPING, SLIDING, OR OTHER MOVEMENTS.

28. E&S BMPS SHALL REMAIN FUNCTIONAL AS SUCH UNTIL ALL AREAS TRIBUTARY TO THEM ARE PERMANENTLY STABILIZED OR UNTIL THEY ARE REPLACED BY ANOTHER BMP APPROVED BY THE LOCAL CONSERVATION DISTRICT OR THE DEPARTMENT.

29. UPON COMPLETION OF ALL EARTH DISTURBANCE ACTIVITIES AND PERMANENT STABILIZATION OF ALL DISTURBED AREAS, THE OWNER AND/OR OPERATOR SHALL CONTACT THE LOCAL CONSERVATION DISTRICT FOR AN INSPECTION PRIOR TO REMOVAL/CONVERSION OF THE E&S BMPS.

30. AFTER FINAL SITE STABILIZATION HAS BEEN ACHIEVED, TEMPORARY EROSION AND SEDIMENT BMPS MUST BE REMOVED OR CONVERTED TO PERMANENT POST CONSTRUCTION STORMWATER MANAGEMENT BMPS. AREAS DISTURBED DURING REMOVAL OR CONVERSION OF THE BMPS SHALL BE STABILIZED IMMEDIATELY. IN ORDER TO ENSURE RAPID REVEGETATION OF DISTURBED AREAS, SUCH REMOVAL/CONVERSIONS ARE TO BE DONE ONLY DURING THE GERMINATING SEASON.

31. UPON COMPLETION OF ALL EARTH DISTURBANCE ACTIVITIES AND PERMANENT STABILIZATION OF ALL DISTURBED AREAS, THE OWNER AND/OR OPERATOR SHALL CONTACT THE LOCAL CONSERVATION DISTRICT TO SCHEDULE A FINAL INSPECTION.

32. FAILURE TO CORRECTLY INSTALL E&S BMPS, FAILURE TO PREVENT SEDIMENT–LADEN RUNOFF FROM LEAVING THE CONSTRUCTION SITE, OR FAILURE TO TAKE IMMEDIATE CORRECTIVE ACTION TO RESOLVE FAILURE OF E&S BMPS MAY RESULT IN ADMINISTRATIVE, CIVIL, AND/OR CRIMINAL PENALTIES BEING INSTITUTED BY THE DEPARTMENT AS DEFINED IN SECTION 602 OF THE PENNSYLVANIA CLEAN STREAMS LAW. THE CLEAN STREAMS LAW PROVIDES FOR UP TO $10,000 PER DAY IN CIVIL PENALTIES, UP TO $10,000 IN SUMMARY CRIMINAL PENALTIES, AND UP TO $25,000 IN MISDEMEANOR CRIMINAL PENALTIES FOR EACH VIOLATION.

33. CONCRETE WASH WATER SHALL BE HANDLED IN THE MANNER DESCRIBED ON THE PLAN DRAWINGS. IN NO CASE SHALL IT BE ALLOWED TO ENTER ANY SURFACE WATERS OR GROUNDWATER SYSTEMS.

34. ALL CHANNELS SHALL BE KEPT FREE OF OBSTRUCTIONS INCLUDING BUT NOT LIMITED TO FILL, ROCKS, LEAVES, WOODY DEBRIS, ACCUMULATED SEDIMENT, EXCESS VEGETATION, AND CONSTRUCTION MATERIAL/WASTES.

35. UNDERGROUND UTILITIES CUTTING THROUGH ANY ACTIVE CHANNEL SHALL BE IMMEDIATELY BACKFILLED AND THE CHANNEL RESTORED TO ITS ORIGINAL CROSS–SECTION AND PROTECTIVE LINING. ANY BASE FLOW WITHIN THE CHANNEL SHALL BE CONVEYED PAST THE WORK AREA IN THE MANNER DESCRIBED IN THIS PLAN UNTIL SUCH RESTORATION IS COMPLETE.

36. CHANNELS HAVING RIPRAP, RENO MATTRESS, OR GABION LININGS MUST BE SUFFICIENTLY OVER–EXCAVATED SO THAT THE DESIGN DIMENSIONS WILL BE PROVIDED AFTER PLACEMENT OF THE PROTECTIVE LINING.

37. EROSION CONTROL BLANKETING SHALL BE INSTALLED ON ALL SLOPES 3H:1V OR STEEPER WITHIN 50 FEET OF A SURFACE WATER AND ON ALL OTHER DISTURBED AREAS SPECIFIED ON THE PLAN MAPS AND/OR DETAIL SHEETS.

38. FILL MATERIAL FOR EMBANKMENTS SHALL BE FREE OF ROOTS, OR OTHER WOODY VEGETATION, ORGANIC MATERIAL, LARGE STONES, AND OTHER OBJECTIONABLE MATERIALS. THE EMBANKMENT SHALL BE COMPACTED IN MAXIMUM LAYERED LIFTS AT 98% DENSITY.

BEST MANAGEMENT PRACTICE CONTROL MEASURES

ACCELERATED EROSION OF DISTURBED AREAS WILL BE CONTROLLED DURING CONSTRUCTION BY TEMPORARY AND PERMANENT BEST MANAGEMENT PRACTICES (BMP). TEMPORARY BMP'S FOR THIS PROJECT WILL CONSIST OF A STABILIZED CONSTRUCTION ENTRANCE, PUMPED WATER FILTER BAG (IF NECESSARY), SUMP PIT (IF NECESSARY), COMPOST FILTER SOCKS, RIPRAP APRONS AT PIPE OUTLET, INLET FILTER BAGS, EROSION CONTROL BLANKETS ON SLOPES 3:1 OR GREATER AND TEMPORARY SEEDING.

PERMANENT BMP'S WILL CONSIST OF MRC BASINS, DETENTION BASIN AND PERMANENT VEGETATION. THE LOCATION AND STAGING OF BMP'S ARE SHOWN ON THE SESPCP.

SCHEDULE OF BMP INSTALLATION AND EARTHMOVING ACTIVITIES

1. CONDUCT AN ON–SITE PRE–CONSTRUCTION MEETING WITH RESOURCE CONSERVATION PERSONNEL FROM THE LYCOMING COUNTY CONSERVATION DISTRICT (LCCD) SEVEN (7) DAYS PRIOR TO BEGINNING CONSTRUCTION.
2. PLACE A PA ONE–CALL FOR CONSTRUCTION BEFORE ANY EARTH DISTURBANCE IS TO OCCUR. THIS SHOULD TAKE PLACE THREE (3) TO 10 WORKING DAYS PRIOR TO THE START OF CONSTRUCTION.
3. ALTHOUGH NO ROCK CONSTRUCTION ENTRANCE IS PROPOSED AT THE SITE ENTRANCE(S)/EXIT(S) ONTO ROSE STREET AND MAYNARD STREET THE CONTRACTOR IS RESPONSIBLE FOR REMOVING ANY SEDIMENT THAT MAY BE TRACKED ONTO A PUBLIC OR PRIVATE ROAD OFF THEIR PROPERTY. IF THE CONTRACTOR CANNOT MANAGE THE AMOUNT OF SEDIMENT TRACKED ONTO A PUBLIC OR PROVIDE ROADWAY, A ROCK CONSTRUCTION ENTRANCE(S) MAY NEED TO BE INSTALLED. THE ROCK CONSTRUCTION ENTRANCE DETAIL WILL BE ADDED TO THE PLANS IN THE EVENT IT IS NEEDED.
4. INSTALL COMPOST FILTER SOCK WHERE INDICATED ON THE SESPCP. INSTALL FILTER SOCK IN ACCORDANCE WITH THE GUIDELINES SHOWN ON THE SESPCP.
5. STRIP TOPSOIL AND STOCKPILE AS SHOWN ON THE PLANS.
6. DURING THE CONSTRUCTION OF THIS PROJECT, GARBAGE LOCATED WITHIN THE LANDFILL UNDER THIS SITE WILL BE IMPACTED. WHEN GARBAGE IS ENCOUNTERED, IT WILL BE LOADED ONTO DUMP TRUCKS AND TRANSPORTED TO THE LOCAL DEP REGULATED LANDFILL AND BE DISPOSAL OF IN ACCORDANCE WITH STATE REGULATIONS.
7. BEGIN CUTTING AND FILLING OPERATION FOR EACH BASEBALL FIELD. AS FINAL GRADES ARE REACHED, INSTALL BALLFIELD UNDRAIN COLLECTOR PIPING. ONCE BALLFIELD UNDERDRAIN COLLECTOR PIPE IS INSTALLED, GEOTEXTILE CAN BE INSTALLED UNDER THE ENTIRE FIELD. AFTER COMPLETION OF THE INSTALLED GEOTEXTILE, THE FLAT UNDERDRAINS CAN BE INSTALLED. DURING THIS SAME TIME THE PERIMETER CONCRETE CURBING CAN BE POURED. ONCE FORMS ARE STRIPPED, THE FIELD DRAINAGE STONE CAN BE INSTALLED TO TURF SUBGRADE.
8. AFTER DRAINAGE AREA TO MRC BASINS ARE STABILIZED WITH GEOTEXTILE AND STONE, BEGIN MRC CONSTRUCTION. EXCAVATE TO SUBGRADE ELEVATION OF BASIN. IF NECESSARY, INSTALL MATERIAL MEETING THE SPECIFICATIONS TO PROTECT THE LINER. INSTALL BASIN LINER, OUTLET STRUCTURE, OUTLET PIPE AND ASSOCIATED RIPRAP APRON. INSTALL UNDRAIN NETWORK AND CONNECT TO OUTLET STRUCTURE. INSTALL TOPSOIL, SAND & COMPOST/MULCH MEDIUM OVER LINER IN THE FACILITY. ONCE FINAL GRADES ARE REACHED, SEED FACILITY AND ANY AREA FENCED FROM PUBLIC ACCESS WITH REINDERS NO MOW/LOW GROW SEED MIX. INSTALL EROSION MATTING ON BASIN SIDE SLOPES AND INSTALL THE PERMANENT EROSION MATTING IN BASIN SPILLWAY.
9. ONCE SUBGRADE FOR THE BUILDING HAS BEEN REACHED, POUR FOOTERS AND BEGIN TO INSTALL THE FOUNDATION.
10. ONCE FINAL SUBGRADE IS REACHED, PLACE 2A TO STABILIZE ALL DISTURBED AREA THAT FALL UNDER PROPOSED PAVING OR CONCRETE. IN THE EVENT CHIP/SEAL IS USED IN LIEU OF CONVENTION PAVEMENT SECTION. KEEP TOP OF CHIP/SEAL AT AN ELEVATION EQUIVALENT TO THE PROPOSED PAVEMENT SECTION THICKNESS SO PAVEMENT COULD BE ADDED A LATER DATE. THIS WILL REQUIRE STONE WEDGES TO BE INSTALLED ALONG TRANSITION AREAS ALONG SIDEWALKS, HANDICAPPED PARKING AND SITE ENTRANCES AND EXISTS.
11. ONCE ALL UTILITIES HAVE BEEN EXTENDED TO THE BUILDING, PLACE SITE CONCRETE AND THEN SITE PAVING.
12. PRIOR TO PLACING TOPSOIL ON THE TOP OF THE FILL AREAS, SCARIFY BY LOOSEN THE SUBGRADE, PLACE TOPSOIL AND SOIL AMENDMENTS AS SHOWN ON THE PLAN, SEEDING AND MULCH OR APPLY EROSION MATTING ON SLOPES 3:1 OR STEEPER. AREAS THAT WILL BE FENCED OFF FROM THE PUBLIC WILL BE SEEDED WITH REINDERS NO MOW/LOW GROW SEED MIX AND THE REMAINING AREAS WILL BE SEEDED WITH THE SPECIFIED LAWN MIX.
13. ONCE A MINIMUM UNIFORM 70% PERENNIAL VEGETATIVE COVER HAS BEEN ESTABLISHED OVER THE DISTURBED AREA, SCHEDULE A PROJECT CLOSE–OUT CONFERENCE WITH RESOURCE CONSERVATION PERSONNEL FROM THE CCCD. UPON CONFIRMATION WITH THE CCCD PERSONNEL, REMOVE BMP CONTROL MEASURES FROM STABILIZED AREAS. IMMEDIATELY SEED AND MULCH ANY AREAS DISTURBED WHEN REMOVING TEMPORARY BMPS.

BMP REMOVAL SCHEDULE

EROSION AND SEDIMENTATION POLLUTION CONTROL BMP'S SHALL BE MAINTAINED UNTIL PERMANENT STABILIZATION IS COMPLETED. PERMANENT STABILIZATION SHALL BE A MINIMUM UNIFORM 70% PERENNIAL VEGETATIVE COVER. IMMEDIATELY SEED AND MULCH ANY AREAS DISTURBED DURING THE REMOVAL OF THE BMP'S USING THE PERMANENT SEED MIXTURE.

BMP OPERATING AND MAINTENANCE PROGRAM

IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO INSTALL AND MAINTAIN ALL EROSION AND SEDIMENTATION POLLUTION CONTROL DEVICES WEEKLY AND AFTER EVERY RAIN EVENT IN ACCORDANCE WITH THE FOLLOWING:

BLACKHAWK™ ADVANCED INLET FILTER MAT:

INLET FILTER MAT SHOULD BE INSPECTED ON A WEEKLY BASIS AND AFTER EACH RUNOFF EVENT. INLET FILTER MAT SHOULD BE CLEANED AND REINSTALLED WHEN DEBRIS ACCUMULATES. DAMAGED INLET FILTER MATS SHOULD BE REPLACED. NEEDED REPAIRS SHOULD BE INITIATED IMMEDIATELY AFTER THE INSPECTION.

COMPOST FILTER SOCKS:

INSTALL COMPOST FILTER SOCK WHERE INDICATED ON THE SESPCP. TRAFFIC SHALL NOT BE PERMITTED TO CROSS COMPOST FILTER SOCKS. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1/2 THE ABOVE GROUND HEIGHT. INSPECT COMPOST FILTER SOCKS WEEKLY AND AFTER EACH RUNOFF EVENT. DAMAGED SOCKS SHALL BE REPLACED OR REPAIRED WITHIN 24 HOURS. REMOVE COMPOST FILTER SOCKS UPON PERMANENT STABILIZATION OF TRIBUTARY AREA.

CONCRETE WASHOUT:

INSTALL CONCRETE WASHOUT WHERE INDICATED ON THE SESPCP PLANS IF CONCRETE WASHOUT IS INTENDED TO OCCUR AT THE WASTE AREA. ACCUMULATED DRIED CONCRETE SHALL BE REMOVED WHEN IT REACHES 1/2 THE ABOVE GROUND HEIGHT OF THE FILTER SOCK, CRUSHED AND DISPOSED OF IN THE WASTE AREA. INSPECT PERIMETER FILTER SOCK PRIOR TO EACH USE. DAMAGED FILTER SOCK SHALL BE REPLACED IMMEDIATELY PRIOR TO USE. REMOVE AND DISPOSE OF FILTER SOCK WHEN CONCRETE WASHOUT IS NO LONGER NEEDED.

EROSION CONTROL BLANKET:

INSTALL PER MANUFACTURER'S SPECIFICATIONS. EROSION CONTROL BLANKET SHOULD BE INSPECTED WEEKLY AND AFTER RUNOFF EVENT. THE EROSION CONTROL MAT MUST CONTACT THE SOIL. IF AFTER A RUNOFF EVENT A VOID BETWEEN THE MAT AND SOIL DEVELOPS, CORRECTIVE ACTION MUST BE TAKEN TO ENSURE CONTACT BETWEEN THE MAT AND SOIL.

FILTER BAG INLET PROTECTION:

FILTER BAGS SHOULD TRAP ALL PARTICLES LARGER THAN 150 MICRONS. WHEREVER FILTER BAGS ARE USED, THEY SHOULD BE INSTALLED ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS. TYPICAL INSTALLATION DETAILS ARE SHOWN ON THE DRAWINGS. NOTE: FILTER BAGS DESIGNED TO FIT OVER THE INLET GRATE SHALL NOT BE USED. USE OF SUCH FILTER BAGS COULD RESULT IN A SEVERE REDUCTION OF THE INLET CAPACITY RESULTING IN FLOODING OR RUNOFF BYPASSING THE INLET. INLET FILTER BAGS SHOULD BE INSPECTED ON A WEEKLY BASIS AND AFTER EACH RUNOFF EVENT. FILTER BAGS SHOULD BE CLEANED AND/OR REPLACED WHEN THE BAG IS ½ FULL. DAMAGED FILTER BAGS SHOULD BE REPLACED. NEEDED REPAIRS SHOULD BE INITIATED IMMEDIATELY AFTER THE INSPECTION.

RIP–RAP APRON

INSTALL RIP–RAP APRONS WHERE SHOWN ON THE SESPCP IN ACCORDANCE WITH THE DETAILS. REMOVE ACCUMULATED SEDIMENT OR DEBRIS AS NEEDED. INSPECT RIP–RAP APRONS WEEKLY AND AFTER EACH RUNOFF EVENT. REPAIR DAMAGED APRONS OR REPLACE IN A TIMELY MANNER.

STABILIZED CONSTRUCTION ENTRANCE:

STABILIZED CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE. AT THE END OF EACH CONSTRUCTION DAY, ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE.

WHEN THE ENGINEER, CONTRACTOR, TOWNSHIP OFFICIAL, COUNTY OR STATE ENGINEER DETERMINES THAT BMP CONTROL MEASURES ARE NECESSARY THAT WERE NOT FORESEEN IN THE DESIGN STAGE, INSTALL THE APPROPRIATE CONTROL(S). IF SUCH MEASURES REQUIRE DESIGN, CONTACT THE PROJECT ENGINEER. ANY AREA DISTURBED SHALL BE SEEDED AND MULCHED IMMEDIATELY IF NOT TO BE UTILIZED WITHIN TWO DAYS.

RECYCLING AND DISPOSAL OF WASTE

INDIVIDUALS RESPONSIBLE FOR EARTH DISTURBANCE ACTIVITIES MUST ENSURE THAT PROPER MECHANISMS ARE IN PLACE TO CONTROL WASTE MATERIAL. CONSTRUCTION WASTE INCLUDES, BUT IS NOT LIMITED TO, THE FOLLOWING:

1. EXCESS SOIL MATERIALS
2. TREES, SHRUBS AND BRUSH REMOVED DURING CLEARING AND GRUBBING
3. SANITARY WASTES
4. CONCRETE WASH WATER
5. PACKAGING MATERIALS (WOOD, PAPER, PLASTIC, STYROFOAM, ETC.)
6. SCRAP OR SURPLUS BUILDING MATERIALS (METALS, RUBBER, PLASTIC, GLASS, MASONRY PRODUCTS, AND OTHER SOLID WASTE MATERIALS)
7. PETROLEUM PRODUCTS, PAINT AND THINNERS, CLEANING SOLVENTS, CURING COMPOUNDS AND SIMILAR MATERIALS
8. DEMOLITION DEBRIS
9. UNLESS OTHERWISE DIRECTED, EXCESS SOIL AND EXCAVATED MATERIAL MAY BE USED FOR FILL MATERIAL ON SITE OR OFF SITE. COORDINATE WITH OWNER AND CENTRE COUNTY CONSERVATION DISTRICT. ANY MATERIAL THAT IS IMPORTED OR EXPORTED FROM SITE WILL BE CLASSIFIED AS CLEAN FILL PER THE PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION.
10. TREES, SHRUBS AND BRUSH SHALL BE CHIPPED WHEN POSSIBLE AND REUSED AS MULCH. DO NOT BURN WITHOUT PERMISSION.
11. WHERE POSSIBLE WASTES SHALL BE RECYCLED. WHERE NOT PRACTICAL WASTES SHALL BE PROPERLY DISPOSED OF AT A PERMITTED LANDFILL FACILITY. THE CONTRACTOR IS ENCOURAGED TO CONSULT THE RECYCLING HOTLINE OR LOCAL SOLID WASTE MANAGEMENT AGENCY.
12. CONTRACTOR SHALL PRACTICE GOOD HOUSEKEEPING INCLUDING, BUT LIMITED TO, THE FOLLOWING:
    a. NEAT, ORDERLY, AND CENTRALIZED STORAGE OF MATERIALS AND WASTES;
    b. CONTROL OF LITTER PROVIDING CONTAINERS WITH LIDS, IF NEEDED;
    c. REGULAR DISPOSAL;
    d. PROMPT CLEANUP OF ANY SPILLS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS OR IN ACCORDANCE WITH REGULATORY REQUIREMENTS. UTILIZE A SPECIALTY FIRM, IF REQUIRED;
    e. PROMPT CLEANUP OF SEDIMENTS WITHIN THE SITE AND ONTO ADJACENT ROADWAYS;
    f. KEEP DUST WITHIN TOLERABLE LIMITS BY USING WATER OR OTHER APPROVED DUST SUPPRESSORS.

MEASURES SHOULD BE PLANNED AND IMPLEMENTED FOR HOUSEKEEPING, MATERIALS MANAGEMENT, AND LITTER CONTROL. WHENEVER POSSIBLE, RECYCLING OF EXCESS MATERIALS IS PREFERRED, RATHER THAN DISPOSAL. RECYCLE AND/OR DISPOSE OF ALL EXCESS MATERIAL IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL REGULATIONS. COMPLY WITH AIR QUALITY, WATER QUALITY, SOLID WASTE MANAGEMENT POLICIES, ETC.

THERMAL IMPACTS ANALYSIS

MOST THERMAL IMPACTS OCCUR DURING THE FIRST FLUSH OF A RAIN FROM IMPERVIOUS AREAS DURING THE HOT SUMMER MONTHS. THE STORMWATER MANAGEMENT FOR THE SITE WAS DESIGNED SUCH THAT THE IMPERVIOUS AREAS SHEET FLOW TO GRASSED AREAS OR FLOW DIRECTLY INTO A STORMWATER FACILITY. THERMAL IMPACTS WILL BE MITIGATED QUICKLY BY DIRECTING RUNOFF FROM THE IMPERVIOUS AREAS TO VEGETATED AREAS. SINCE INFILTRATION IS NOT FEASIBLE DUE TO THE PROJECT BEING CONSTRUCTED ON TOP OF AN OLD LANDFILL, THE MRC FACILITIES WILL RELEASE WATER AT A SIMILAR RATE AS IF IT WHERE INFILTRATED INTO THE GROUND. THE BASINS ARE SIZED TO CAPTURE THE FIRST FLUSH FROM EACH OF THE DRAINAGE AREAS WHICH IS TYPICALLY THE WARMEST. THE VEGETATED FACILITIES AND UNDERGROUND STORMWATER PIPING WILL AID IN COOLING THE RUNOFF UNTIL IT IS SLOWLY DISCHARGED TO THE NATURAL DRAINAGE WAY.

MANAGEMENT OF FILL (CLEAN FILL POLICY)

A. ALL MATERIAL FROM EXCAVATIONS THAT IS NOT SUITABLE OR NEEDED FOR BACKFILL, OR NEEDED FOR BACKFILL OR ANY FILL MATERIAL BROUGHT INTO THE PROJECT SITE FOR BACKFILL SHALL COMPLY WITH THE PA DEP MANAGEMENT OF FILL POLICY ("THE FILL POLICY").

B. KEY PROVISIONS OF "THE FILL POLICY"

1. THERE IS A NEW CATEGORY OF MATERIAL CALL "REGULATED FILL". REGULATED FILL CAN BE USED UNDER A GENERAL PERMIT AS A CONSTRUCTION MATERIAL TO GRADE AREAS. MAXIMUM CONCENTRATION STANDARDS FOR REGULATED FILL ARE TO BE THE ACT 2 STATEWIDE HEALTH STANDARDS (NON–RESIDENTIAL). THE ACTUAL LIMITS ARE IN TABLE GP–1A AND B OF THE FILL GUIDANCE DOCUMENT.

2. TO DETERMINE IF FILL IS CONTAMINATED, ENVIRONMENTAL DUE DILIGENCE SHOULD BE PERFORMED. IN MOST CASES, TESTING WILL ALSO BE REQUIRED IF THE QUANTITIES ARE > 125 C.Y.

3. MATERIAL WHICH IS ABOVE REGULATED FILL NUMERIC CONCENTRATIONS MUST BE MANAGED AS WASTE.

4. REGULATED FILL MATERIALS MOVED TO ACT 2 BROWNFIELDS SITES DO NOT HAVE TO APPLY FOR GENERAL PERMIT APPLICABILITY.

5. A DEP FORM MUST BE USED TO DOCUMENT THE RECEIPT OF CLEAN FILL WHICH HAS BE AFFECTED BY A SPILL OR RELEASE.

6. HAZARDOUS FILL MATERIAL ENCOUNTERED MUST BE HANDLED UNDER THE PROVISIONS OF THE WASTE MANAGEMENT ACT.

C. PROJECT SPECIFIC REQUIREMENTS:

1. SITING LIMITATIONS

    a. THE CONTRACTOR SHALL BE REQUIRED TO HAVE IN PLACE A MANIFEST POLICY TO TRACK ALL FILL MATERIALS HAULED OFF SITE TO PROVIDE RECORD OF ORIGIN AND FINAL PLACEMENT OF ALL FILL. THE MANIFEST POLICY AND PROCEDURES SHALL BE MUTUALLY AGREED UPON BY THE OWNER AND CONTRACTOR PRIOR TO THE START OF CONSTRUCTION. APPROPRIATE RECORD KEEPING PRACTICES MUST BE FOLLOWED.

    b. ANY FILL MATERIAL THAT IS CONSIDERED "SUSPECT" OR THAT REQUIRES TESTING SHALL BE SEGREGATED ON–SITE AND MARKED/IDENTIFIED UNTIL ANALYTICAL RESULTS ARE RECEIVED. SEGREGATION AND MANAGEMENT OF "SUSPECT" FILL SHALL BE PERFORMED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER. IF THE ANALYTICAL RESULTS CONCLUDE THE FILL TO BE A "REGULATED FILL", THE CONTRACTOR SHALL, WITHIN THE REQUIREMENTS OF THE FILL POLICY AFTER RECEIVING A NOTICE FROM THE OWNER, LOAD THE REGULATED FILL AND HAUL IT TO A PERMITTED SITE FOR FINAL DISPOSAL.

    c. THE CONTRACTOR, AT THE DISCRETION OF THE OWNER, SHALL TAKE SAMPLES AND PROVIDE THEM TO THE OWNER FOR ANALYSIS WITHIN ANY EXCAVATED AREAS IN THE PROJECT SITE(S). THE CONTRACTOR WILL COVER THE COSTS OF ALL ANALYTICAL COSTS AS PART OF THE ALLOWANCE ITEM.

    d. IT SHALL BE THE INTENT TO KEEP ALL FILL WITHIN THE PROPERTY AND RIGHT OF WAYS FOR THIS PROJECT. ANY EXCESS FILL NOT REQUIRED FOR THE PROJECT WILL BE REQUIRED TO FOLLOW THE FILL POLICY AND THE REQUIREMENTS WITHIN THESE CONTRACT DOCUMENTS.

    e. CONTRACTOR SHALL BE RESPONSIBLE TO NOTIFY THE OWNER OF ANY SUSPECTED FILL MATERIAL ENCOUNTERED FOR FURTHER EVALUATION AND DIRECTION ON HOW TO PROCEED.

    f. CONTRACTOR SHALL BE REQUIRED TO REVIEW THE PA DEP MANAGEMENT OF FILL POLICY PRIOR TO BIDDING AND BE FULLY AWARE OF THE POLICY'S CONDITIONS.

SEEDING SCHEDULES

TEMPORARY SEEDING

- AG. GRADE LIME 410 LBS. PER 1,000 SY (OR AS PER SOIL TEST)
- FERTILIZER 10–10–10 100 LBS. PER 1,000 SY (OR AS PER SOIL TEST)
- ANNUAL RYE GRASS 10 LBS. PER 1,000 SY
- HAY OR STRAW MULCH 1,240 LBS. PER 1,000 SY

TOPSOIL PILES OR ROUGH GRADED AREAS THAT SIT MORE THAN FOUR DAYS WILL BE SEEDED WITH THE ABOVE SPECIFICATIONS. THIS SEEDING WILL PROVIDE TEMPORARY SURFACE PROTECTION FOR THE SOIL SO AS TO REDUCE THE AMOUNT AND RATE OF SURFACE WATER RUNOFF AND THEREBY REDUCE THE YIELD OF SEDIMENT MATERIAL.

PERMANENT SEEDING

PERMANENT CONTROL MEASURES TO MINIMIZE EROSION AND SEDIMENTATION ARE AS FOLLOWS:

STABILIZATION OF SOIL AS SOON AS POSSIBLE WITH PERENNIAL VEGETATION WILL BE THE PRIMARY CONTROL MEASURE. PERMANENT SEEDING WILL BE WITH A SCHEDULE AND PROCEDURE SIMILAR TO THE FOLLOWING:

1. ROUGH GRADE TOPSOIL AND REMOVE ALL DEBRIS, LARGE STONES AND CONSTRUCTION MATERIALS IN EXCESS OF ONE (1) INCH.
2. APPLY AG. GRADE LIME AT MINIMUM 2,480 LBS PER 1,000 SY OR AS SPECIFIED BY AN ACTUAL SOIL TEST OF PLACED TOPSOIL.
3. APPLY BASIC FERTILIZER 10–20–20 AT MINIMUM 210 LBS. PER 1,000 SY OR AS SPECIFIED BY AN ACTUAL SOIL TEST OF PLACED TOPSOIL.
4. APPLY EVEN LAYER OF COMPOST.
5. TILL ALL ABOVE MATERIALS THOROUGHLY INTO A 2–4" SOIL DEPTH.
6. FINISH GRADE FOR SEEDING.
7. APPLY SEED AS FOLLOWS (% BY WEIGHT):
   LAWNS, PARKS, GROUNDS AND COMMERCIAL PROPERTIES
   a. SUNNY AREAS AND WELL–DRAIN SOILS – 3–4 LBS. PER 1,000 SQ. FT.
      40–60% KENTUCKY BLUEGRASS
      20–40% FINE FESCUES
      10% – PERENNIAL RYEGRASS
   b. REINDERS NO MOW/LOW GROW SEED MIX – 4–6 LBS. PER 1,000 SQ. FT.
      45% SPARTAN II HARD FESCUE
      40% QUARTO SHEEP FESCUE
      15% – TURF TYPE ANNUAL RYEGRASS
   c. OVER SEEDING OR RENOVATION OF LAWNS – 4–6 LBS. PER 1,000 SQ. FT.
      PERENNIAL RYEGRASS
8. TIME OF SEEDING:
   SPRING (MARCH 15 – JUNE 1)
   FALL (AUG. 1 – OCT. 15)
9. SEEDING DATES MAY BE EXTENDED WHERE PROJECT AND PREVAILING WEATHER CONDITIONS WARRANT. IF PERMANENT SEEDING IS NOT PRACTICAL DUE TO THE TIME OF YEAR, DISTURBED AREA SHALL BE SEEDED WITH AN ANNUAL RYE GRASS AND MULCHED WITH STRAW AT A RATE OF 3 TONS PER ACRE.
10. RAKE OR DRAG TO COVER SEED LIGHTLY.
11. ROLL LIGHTLY TO PLACE SEED IN CONTACT WITH THE SOIL.
12. APPLY STRAW MULCH AT A RATE OF 1,240 LBS. PER 1000 SY.
13. ANCHOR MULCH WITH MULCH BINDER AT MANUFACTURER'S RECOMMENDED RATES.

DATE	REVISION	BY
05/01/24	REVISED PER CLIENT FOR CONSTRUCTION	REM
08/04/21	REVISED PER DEP COMMENTS DATED 08/04/2021	

REV.

ROBERT E. MYERS
ENGINEER
No. PE075928

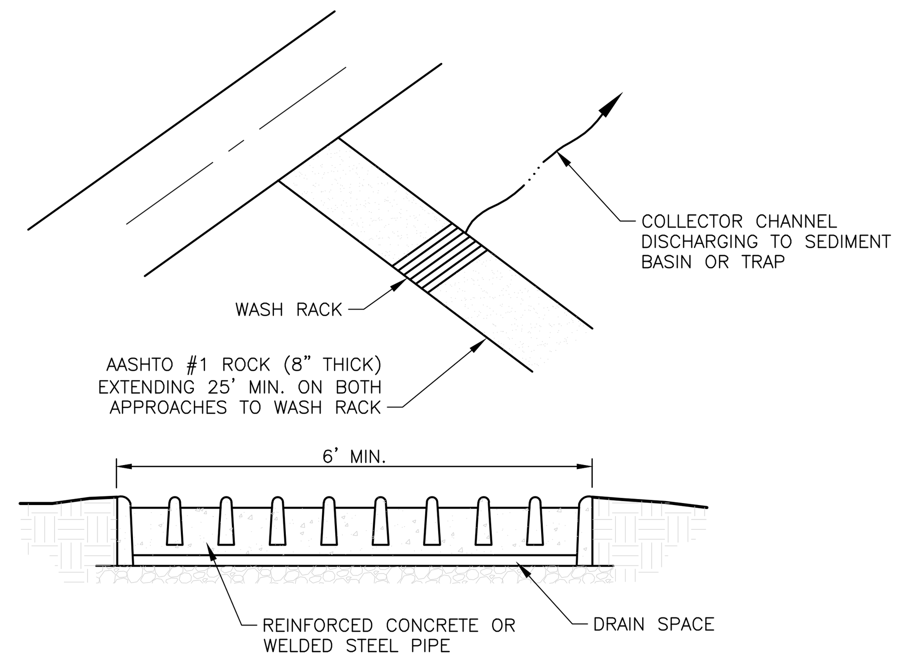
LOCATION: CITY OF WILLIAMSPORT, CLINTON COUNTY, PA
OWNER: WILLIAMSPORT BALLPARK, INC.
SCALE: N/A
DRAWN: REM
DESIGN: REM

E&S NOTES

EROSION & SEDIMENTATION CONTROL PLAN FOR WILLIAMSPORT BALLPARK, INC.

HAWBAKER ENGINEERING
1952 Waddle Road, Suite 201 State College, Pa 16803
1-800-284-8590 hawbakerengineering.com

DATE: MARCH 17, 2021
JOB NUMBER: 20914
SHEET NUMBER: E&S 2 OF 4



NOTES:

WASH RACK SHALL BE 20 FEET (MIN.) WIDE OR TOTAL WIDTH OF ACCESS.

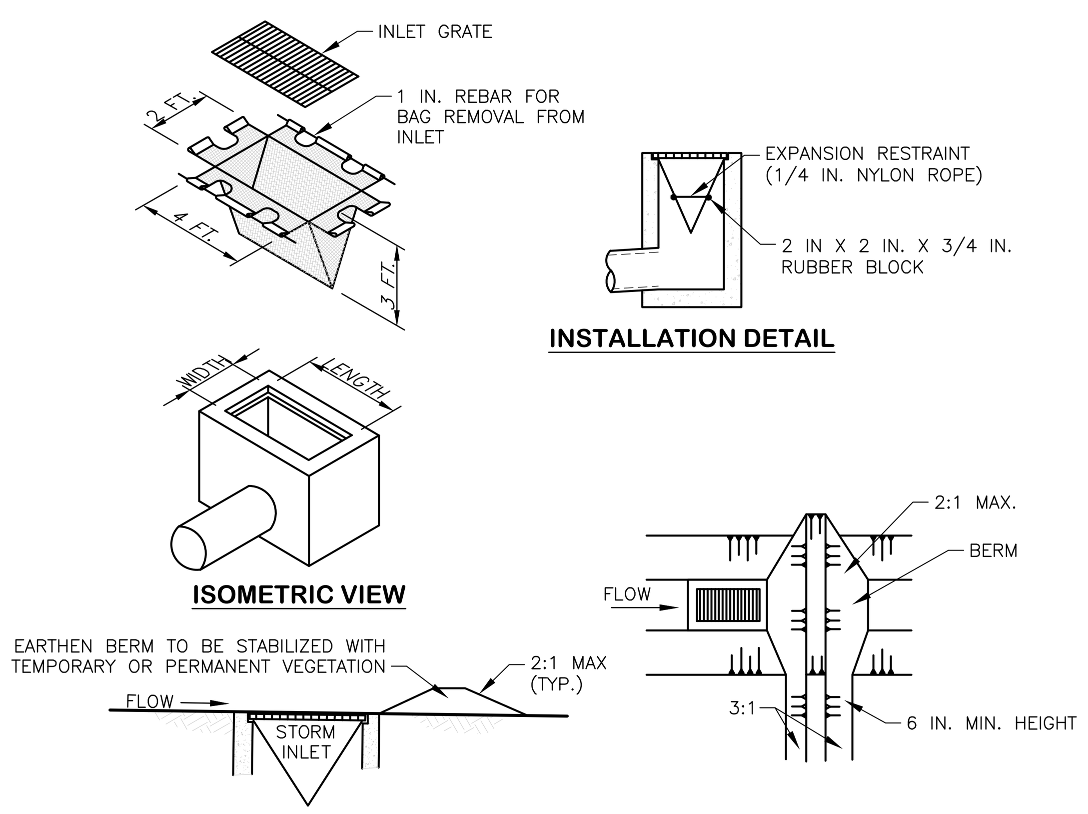
WASH RACK SHALL BE DESIGNED AND CONSTRUCTED TO ACCOMMODATE ANTICIPATED CONSTRUCTION VEHICULAR TRAFFIC.

A WATER SUPPLY SHALL BE MADE AVAILABLE TO WASH THE WHEELS OF ALL VEHICLES EXITING THE SITE.

MAINTENANCE: ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE OF ROCK MATERIAL SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE. DRAIN SPACE UNDER WASH RACK SHALL BE KEPT OPEN AT ALL TIMES. DAMAGE TO THE WASH RACK SHALL BE REPAIRED PRIOR TO FURTHER USE OF THE RACK. ALL SEDIMENT DEPOSITED ON ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE IMMEDIATELY. WASHING THE ROADWAY OR SWEEPING THE DEPOSITS INTO ROADWAY DITCHES, SEWERS, CULVERTS, OR OTHER DRAINAGE COURSES IS NOT ACCEPTABLE.

STANDARD CONSTRUCTION DETAIL #3-2
ROCK CONSTRUCTION ACCESS WITH WASH RACK

NOT TO SCALE



NOTES:

MAXIMUM DRAINAGE AREA = 1/2 ACRE.

INLET PROTECTION SHALL NOT BE REQUIRED FOR INLET TRIBUTARY TO SEDIMENT BASIN OR TRAP. BERMS SHALL BE REQUIRED FOR ALL INSTALLATIONS.

ROLLED EARTHEN BERM IN ROADWAY SHALL BE MAINTAINED UNTIL ROADWAY IS STONED. ROAD SUBBASE BERM ON ROADWAY SHALL BE MAINTAINED UNTIL ROADWAY IS PAVED. EARTHEN BERM IN CHANNEL SHALL BE MAINTAINED UNTIL PERMANENT STABILIZATION IS COMPLETED OR REMAIN PERMANENTLY.

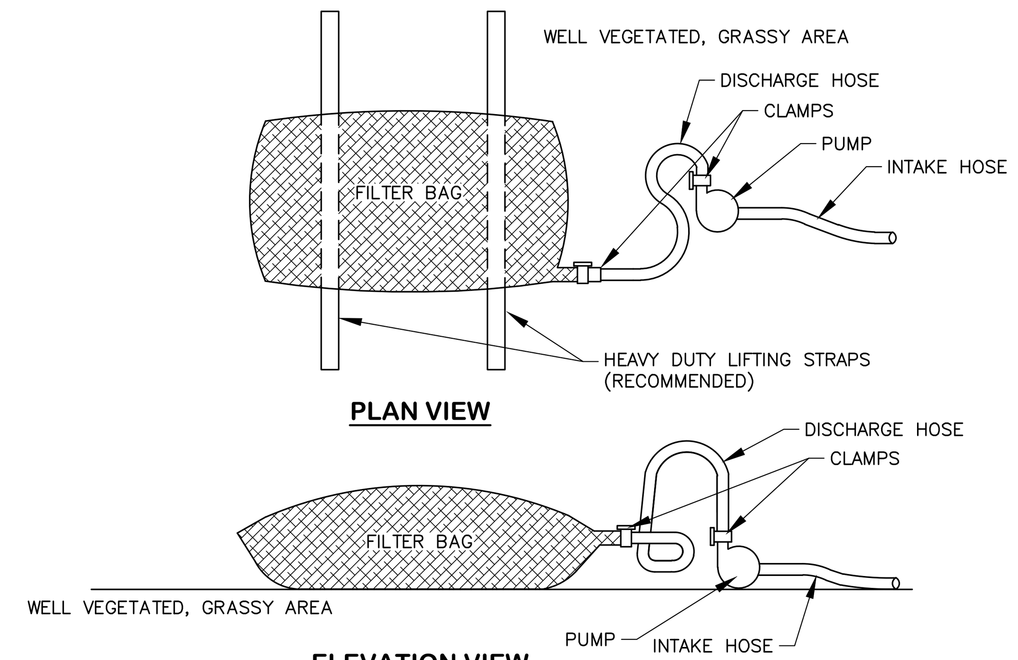
AT A MINIMUM, THE FABRIC SHALL HAVE A MINIMUM GRAB TENSILE STRENGTH OF 120 LBS., A MINIMUM BURST STRENGTH OF 200 PSI, AND A MINIMUM TRAPEZOIDAL TEAR STRENGTH OF 50 LBS. FILTER BAGS SHALL BE CAPABLE OF TRAPPING ALL PARTICLES NOT PASSING A NO. 40 SIEVE.

INLET FILTER BAGS SHALL BE INSPECTED ON A WEEKLY BASIS AND AFTER EACH RUNOFF EVENT. BAGS SHALL BE EMPTIED AND RINSED OR REPLACED WHEN HALF FULL OR WHEN FLOW CAPACITY HAS BEEN REDUCED SO AS TO CAUSE FLOODING OR BYPASSING OF THE INLET. DAMAGED OR CLOGGED BAGS SHALL BE REPLACED. A SUPPLY SHALL BE MAINTAINED ON SITE FOR REPLACEMENT OF BAGS. ALL NEEDED REPAIRS SHALL BE INITIATED IMMEDIATELY AFTER THE INSPECTION. DISPOSE ACCUMULATED SEDIMENT AS WELL AS ALL USED BAGS ACCORDING TO THE PLAN NOTES.

DO NOT USE ON MAJOR PAVED ROADWAYS WHERE PONDING MAY CAUSE TRAFFIC HAZARDS.

STANDARD CONSTRUCTION DETAIL #4-16
FILTER BAG INLET PROTECTION - TYPE M INLET

NOT TO SCALE



NOTES:

LOW VOLUME FILTER BAGS SHALL BE MADE FROM NON-WOVEN GEOTEXTILE MATERIAL SEWN WITH HIGH STRENGTH, DOUBLE STITCHED "J" TYPE SEAMS. THEY SHALL BE CAPABLE OF TRAPPING PARTICLES LARGER THAN 150 MICRONS. HIGH VOLUME FILTER BAGS SHALL BE MADE FROM WOVEN GEOTEXTILES THAT MEET THE FOLLOWING STANDARDS:

PROPERTY	TEST METHOD	MINIMUM STANDARD
AVG. WIDE WIDTH STRENGTH	ASTM D-4884	60 LB/IN
GRAB TENSILE	ASTM D-4632	205 LB
PUNCTURE	ASTM D-4833	110 LB
MULLEN BURST	ASTM D-3786	350 PSI
UV RESISTANCE	ASTM D-4355	70%
AOS % RETAINED	ASTM D-4751	80 SIEVE

A SUITABLE MEANS OF ACCESSING THE BAG WITH MACHINERY REQUIRED FOR DISPOSAL PURPOSES SHALL BE PROVIDED. FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME 1/2 FULL OF SEDIMENT. SPARE BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT OF THOSE THAT HAVE FAILED OR ARE FILLED. BAGS SHALL BE PLACED ON STRAPS TO FACILITATE REMOVAL UNLESS BAGS COME WITH LIFTING STRAPS ALREADY ATTACHED.

BAGS SHALL BE LOCATED IN WELL-VEGETATED (GRASSY) AREA, AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE UNDERLAYMENT AND FLOW PATH SHALL BE PROVIDED. BAGS MAY BE PLACED ON FILTER STONE TO INCREASE DISCHARGE CAPACITY. BAGS SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%. FOR SLOPES EXCEEDING 5%, CLEAN ROCK OR OTHER NON-ERODIBLE AND NON-POLLUTING MATERIAL MAY BE PLACED UNDER THE BAG TO REDUCE SLOPE STEEPNESS.

NO DOWNSLOPE SEDIMENT BARRIER IS REQUIRED FOR MOST INSTALLATIONS. COMPOST BERM OR COMPOST FILTER SOCK SHALL BE INSTALLED BELOW BAGS LOCATED IN HQ OR EV WATERSHEDS, WITHIN 50 FEET OF ANY RECEIVING SURFACE WATER OR WHERE GRASSY AREA IS NOT AVAILABLE.

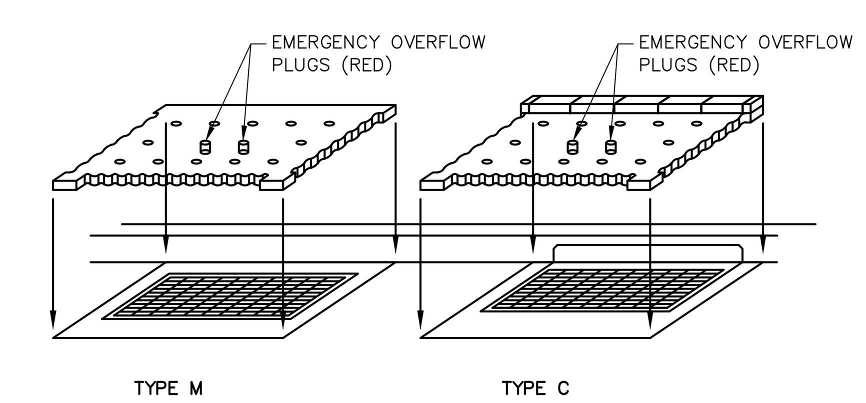
THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE BAGS IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY CLAMPED. A PIECE OF PVC PIPE IS RECOMMENDED FOR THIS PURPOSE.

THE PUMPING RATE SHALL BE NO GREATER THAN 750 GPM OR 1/2 THE MAXIMUM SPECIFIED BY THE MANUFACTURER, WHICHEVER IS LESS. PUMP INTAKES SHALL BE FLOATING AND SCREENED.

FILTER BAGS SHALL BE INSPECTED DAILY. IF ANY PROBLEM IS DETECTED, PUMPING SHALL CEASE IMMEDIATELY AND NOT RESUME UNTIL THE PROBLEM IS CORRECTED.

STANDARD CONSTRUCTION DETAIL #3-16
PUMPED WATER FILTER BAG

NOT TO SCALE



NOTES:

-PRIOR TO INSTALLATION, INLET GRATE SURFACE AND SURROUNDING AREA SHALL BE CLEANED AND CLEARED OF DEBRIS. INLET FILTER MAT SHALL BE INSTALLED WITH A MINIMUM 2" OVERLAP FROM EDGE OF GRATE TO EDGE OF MAT WITH STRAIGHT EDGE FLUSH TO CURB FACE. ADJUST MAT BY HAND UNTIL PLACEMENT ALLOWS FOR OPTIMAL MAGNETIC ADHESION TO GRATE SURFACE.

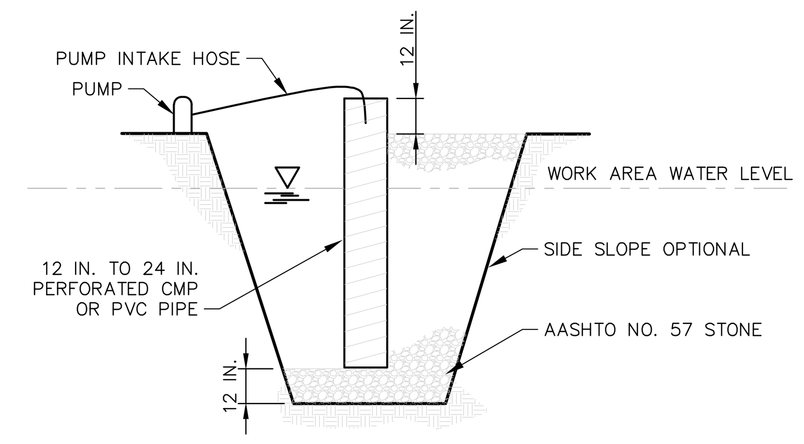
- PREINSTALLED RED EMERGENCY OVERFLOW PLUGS CAN BE REMOVED IN THE EVENT OF FLOODING TO ALLOW FOR RAPID DEWATERING. AFTER DEWATERING, THE INLET FILTER MAT SHALL BE LIFTED AND THOROUGHLY CLEANED OR REPLACED AND THE AND THE EMERGENCY OVERFLOW PLUGS SHALL BE REINSTALLED. IF GRATE IS AT LOWEST POINT OF STREET, REMOVAL OF ONE PLUG WILL ALLOW FOR EXPECTED DEWATERING AT ALL TIMES.

-INLET FILTER MATS SHALL BE INSPECTED ON A WEEKLY BASIS AND AFTER EACH RUNOFF EVENT. AS NEEDED, INLET FILTER MATS SHALL BE LIFTED AND RINSED OR REPLACED. WHEN FLOW CAPACITY HAS BEEN REDUCED SO AS TO CAUSE FLOODING OR BYPASSING OF THE INLET OR THE INLET FILTER MAT BECOMES COMPRESSED DUE TO HEAVY TRAFFIC, REPLACEMENT IS REQUIRED.

-A SUPPLY OF SPARE INLET FILTER MATS SHALL BE MAINTAINED ON SITE. ALL NECESSARY REPAIRS SHALL BE INITIATED IMMEDIATELY AFTER THE INSPECTION. DISPOSE ACCUMULATED SEDIMENT AS WELL AS ALL USED MATS ACCORDING TO THE PLAN NOTES.

BLACKHAWK INLET FILTER SYSTEM

NOT TO SCALE



NOTES:

LOCATE SUMP AT LOW POINT IN WORK AREA AND OUTSIDE OF CONSTRUCTION ACTIVITY. WHEREVER RUNOFF FROM A WORK AREA FLOWS DIRECTLY TO THE SUMP AREA, A FILTER BAG SHALL BE ATTACHED AT THE DISCHARGE POINT UNLESS PUMPING TO A SEDIMENT BASIN OR SEDIMENT TRAP.

MINIMUM DIAMETER OF PIT BOTTOM SHALL BE 24" LARGER THAN PIPE DIAMETER. MINIMUM DEPTH OF PIT SHALL BE 24" BELOW WATER LEVEL IN WORK AREA (INCLUDING THE AASHTO #57 STONE). 12" TO 24" PERFORATED CMP OR PVC PIPE SHALL BE SET ON 12" OF CLEAN AASHTO # 57 STONE.

VOID SPACE AROUND PIPE SHALL BE FILLED WITH AASHTO # 57 STONE. PIPE TO EXTEND 12" MIN. ABOVE TOP OF STONE AND/OR WATER BEING PUMPED FROM WORK AREA.

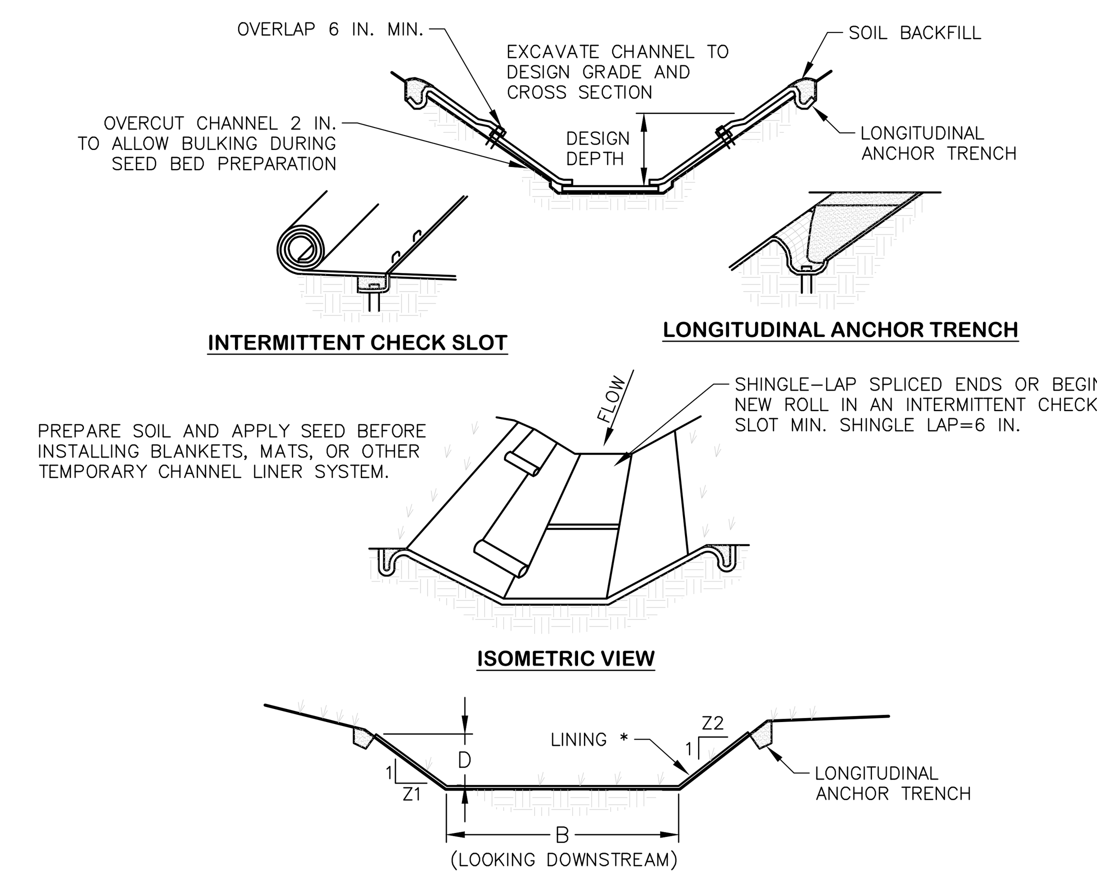
SET PUMP INTAKE INSIDE STANDPIPE.

DISCHARGE FROM PUMP SHALL BE TO A STABLE AREA BELOW DISTURBANCES FROM THE WORK ZONE.

SUMP MAY BE USED IN CONJUNCTION WITH FILTER BAG WHERE ADDITIONAL FILTERING IS NEEDED.

STANDARD CONSTRUCTION DETAIL #3-17
SUMP PIT

NOT TO SCALE



* SEE MANUFACTURER'S LINING INSTALLATION DETAIL FOR STAPLE PATTERNS, VEGETATIVE STABILIZATION FOR SOIL AMENDMENTS, SEED MIXTURES AND MULCHING INFORMATION

CHANNEL NO.	STATIONS	BOTTOM WIDTH B (FT)	DEPTH D (FT)	TOP WIDTH W (FT)	Z1 (FT)	Z2 (FT)	LINING *
MRC BASIN A	SPILLWAY	20	1	26	3	3	EAST COAST EROSION CONTROL ECP-2 10 OZ. PERMANENT EROSION CONTROL BLANKET
MRC BASIN B	SPILLWAY	20	1	26	3	3	EAST COAST EROSION CONTROL ECP-2 10 OZ. PERMANENT EROSION CONTROL BLANKET
MRC BASIN C	SPILLWAY	20	1	26	3	3	EAST COAST EROSION CONTROL ECP-2 10 OZ. PERMANENT EROSION CONTROL BLANKET
MRC BASIN D	SPILLWAY	20	1.5	29	3	3	EAST COAST EROSION CONTROL ECP-2 10 OZ. PERMANENT EROSION CONTROL BLANKET
MRC BASIN G	SPILLWAY	15	1.5	24	3	3	EAST COAST EROSION CONTROL ECP-2 10 OZ. PERMANENT EROSION CONTROL BLANKET

NOTES:

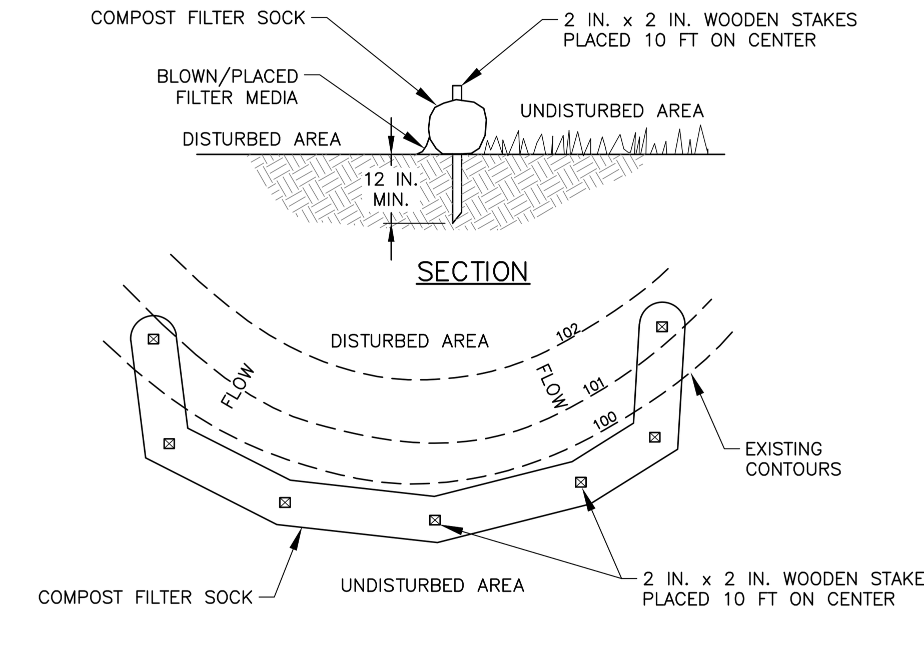
ANCHOR TRENCHES SHALL BE INSTALLED AT BEGINNING AND END OF CHANNEL IN THE SAME MANNER AS LONGITUDINAL ANCHOR TRENCHES.

CHANNEL DIMENSIONS SHALL BE CONSTANTLY MAINTAINED. CHANNEL SHALL BE CLEANED WHENEVER TOTAL CHANNEL DEPTH IS REDUCED BY 25% AT ANY LOCATION.
SEDIMENT DEPOSITS SHALL BE REMOVED WITHIN 24 HOURS OF DISCOVERY OR AS SOON AS SOIL CONDITIONS PERMIT ACCESS TO CHANNEL WITHOUT FURTHER DAMAGE. DAMAGED LINING SHALL BE REPAIRED OR REPLACED WITHIN 48 HOURS OF DISCOVERY.

NO MORE THAN ONE THIRD OF THE SHOOT (GRASS LEAF) SHALL BE REMOVED IN ANY MOWING. GRASS HEIGHT SHALL BE MAINTAINED BETWEEN 2 AND 3 INCHES UNLESS OTHERWISE SPECIFIED. EXCESS VEGETATION SHALL BE REMOVED FROM PERMANENT CHANNELS TO ENSURE SUFFICIENT CHANNEL CAPACITY.

STANDARD CONSTRUCTION DETAIL #6-1
VEGETATED CHANNEL

NOT TO SCALE



NOTES:

SOCK FABRIC SHALL MEET STANDARDS OF TABLE 4.1 OF THE PA DEP EROSION CONTROL MANUAL. COMPOST SHALL MEET THE STANDARDS OF TABLE 4.2 OF THE PA DEP EROSION CONTROL MANUAL.

COMPOST FILTER SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE BARRIER SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN BARRIER ALIGNMENT. MAXIMUM SLOPE LENGTH ABOVE ANY BARRIER SHALL NOT EXCEED THAT SPECIFIED FOR THE SIZE OF THE SOCK AND THE SLOPE OF ITS TRIBUTARY AREA.

TRAFFIC SHALL NOT BE PERMITTED TO CROSS COMPOST FILTER SOCKS.

ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1/2 THE ABOVE GROUND HEIGHT OF THE BARRIER AND DISPOSED IN THE MANNER DESCRIBED ELSEWHERE IN THE PLAN.

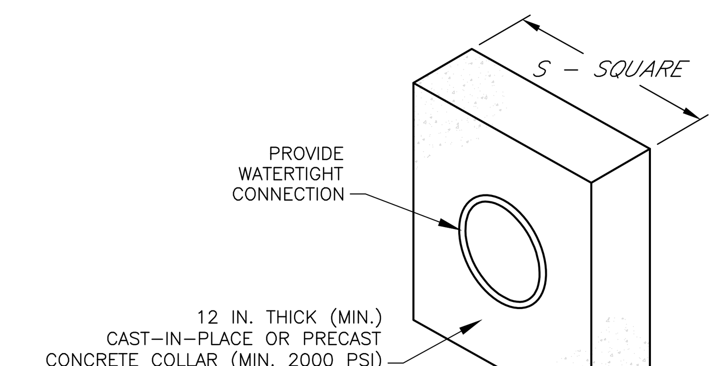
COMPOST FILTER SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION.

BIODEGRADABLE COMPOST FILTER SOCKS SHALL BE REPLACED AFTER 6 MONTHS; PHOTODEGRADABLE SOCKS AFTER 1 YEAR. POLYPROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.

UPON STABILIZATION OF THE AREA TRIBUTARY TO THE SOCK, STAKES SHALL BE REMOVED. THE SOCK MAY BE LEFT IN PLACE AND VEGETATED OR REMOVED. IN THE LATTER CASE, THE MESH SHALL BE CUT OPEN AND THE MULCH SPREAD AS A SOIL SUPPLEMENT.

STANDARD CONSTRUCTION DETAIL #4-1
COMPOST FILTER SOCK

NOT TO SCALE



BASIN OR TRAP NO.	PIPE SIZE (IN)	S (IN)	NO. OF COLLARS	RISER TO FIRST COLLAR (FT)	COLLAR SPACING (FT)
MRC BASIN A	24	90	1	15	N/A
MRC BASIN B	18	54	1	10	N/A
MRC BASIN C	18	66	1	10	N/A
MRC BASIN D	18	66	1	12	N/A
MRC BASIN E	18	84	1	30	N/A
MRC BASIN G	18	66	1	20	N/A

NOTES:

ALL COLLARS SHALL BE INSTALLED SO AS TO BE WATERTIGHT.

COLLAR SIZE AND SPACING SHALL BE AS INDICATED WITHIN TABLE.

STANDARD CONSTRUCTION DETAIL #7-16
CONCRETE ANTI-SEEP COLLAR FOR PERMANENT BASINS OR TRAPS

NOT TO SCALE

DATE	REVISION	BY
05/01/24	REVISED PER CLIENT FOR CONSTRUCTION	REM
08/04/21	REVISED PER DEP COMMENTS DATED 08/04/2021	

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL ENGINEER
ROBERT E. MYERS

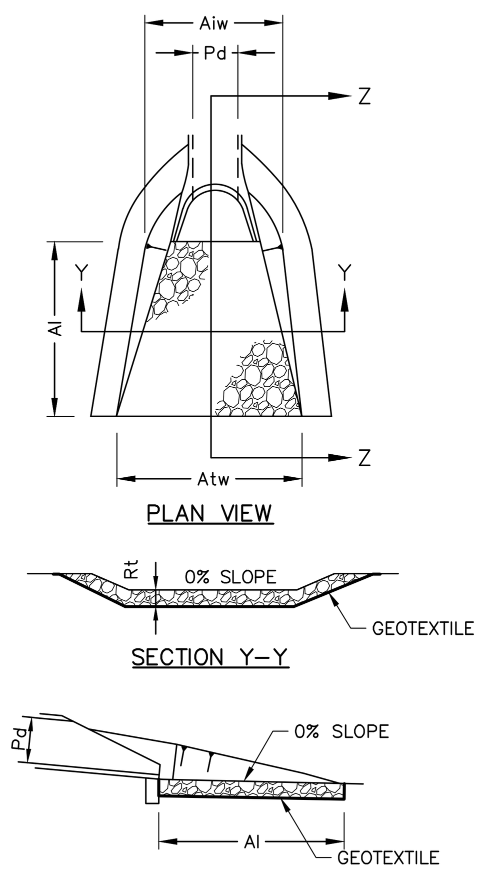
LOCATION: CITY OF WILLIAMSPORT CLINTON COUNTY, PA
OWNER: WILLIAMSPORT BALLPARK, INC.
SCALE: N/A
DESIGN: REM
DRAWN: REM

E&S DETAILS

EROSION & SEDIMENTATION CONTROL PLAN FOR WILLIAMSPORT BALLPARK, INC.

HAWBAKER ENGINEERING
1952 Waddle Road, Suite 201 State College, Pa 16803
1-800-284-8590 hawbakerengineering.com

DATE: MARCH 17, 2021
JOB NUMBER: 20914
SHEET NUMBER: E&S 3 OF 4



OUTLET NO.	PIPE DIA Pd (IN)	RIPRAP		APRON		
		SIZE R–_	THICK. Rt (IN)	LENGTH Al (FT)	INITIAL WIDTH Aiw (FT)	TERMINAL WIDTH Atw (FT)
A–2	24	R–4	18	12	6	18.
C1–1	18	R–3	9	7	4.5	7.3
B–2	18	R–3	9	8	4.5	12.5
LL3–1	10	R–3	9	4	2.5	4.1
LL3–2	12	R–3	9	4	3	4.6
C–2	18	R–4	18	10	4.5	14.5
LL4–1	10	R–3	9	5	2.5	4.1
LL4–2	12	R–3	9	4	3	4.6
C2–3	15	R–4	18	6	3.75	6.15
D–3	18	R–4	18	10	4.5	14.5
C2–1	15	R–4	18	6	3.75	6.15
E–2	18	R–4	18	12	4.5	16.5
LL5–1	12	R–4	18	4	3	4.6
LL6–2	12	R–3	9	4	3	4.6
LL6–3	10	R–3	9	4	2.5	4.1
F–2	10	R–3	9	4	2.5	4.1
G–2	18	R–4	18	8	4.5	12.5

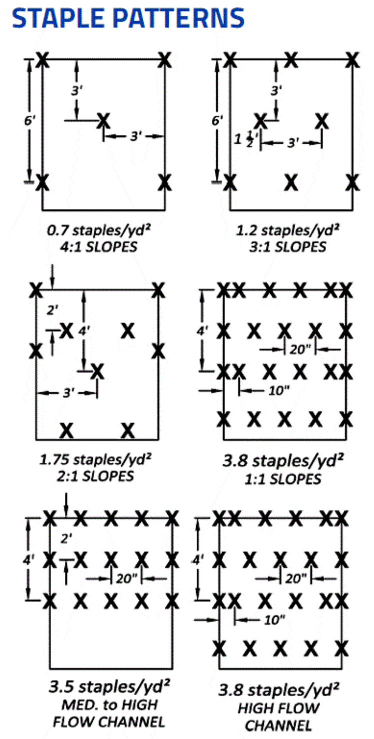
NOTES:

ALL APRONS SHALL BE CONSTRUCTED TO THE DIMENSIONS SHOWN. TERMINAL WIDTHS SHALL BE ADJUSTED AS NECESSARY TO MATCH RECEIVING CHANNELS.

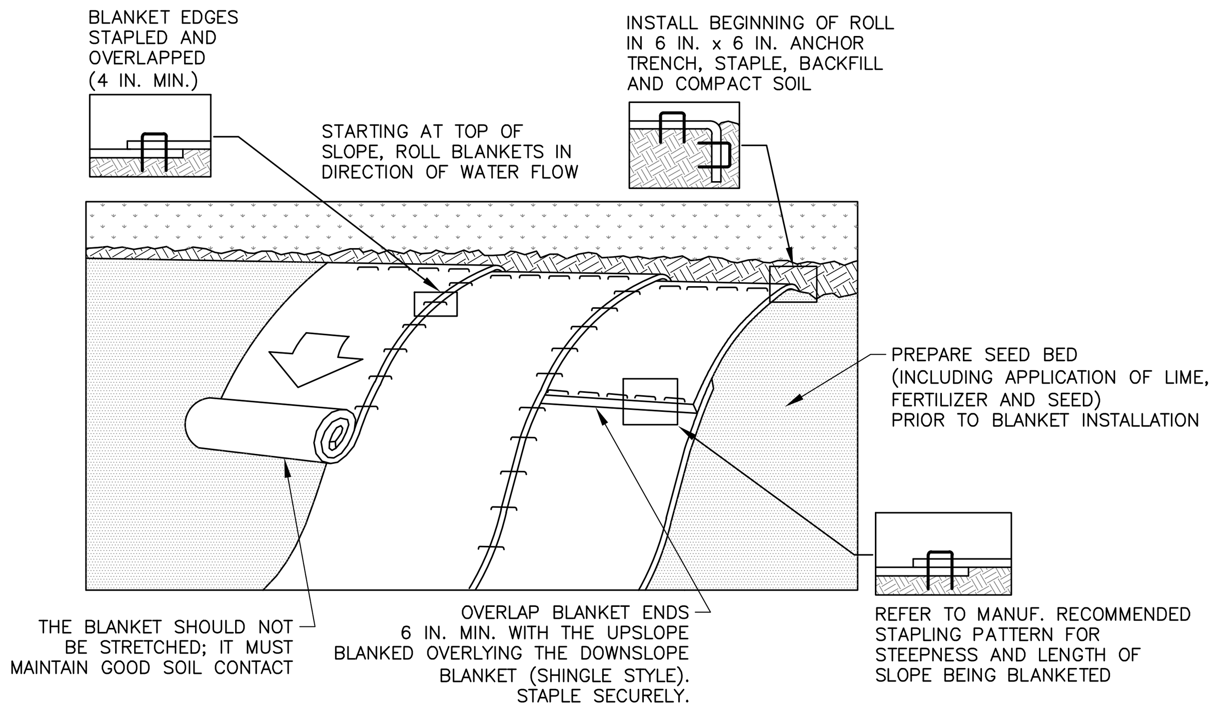
ALL APRONS SHALL BE INSPECTED AT LEAST WEEKLY AND AFTER EACH RUNOFF EVENT. DISPLACED RIPRAP WITHIN THE APRON SHALL BE REPLACED IMMEDIATELY.

STANDARD CONSTRUCTION DETAIL #9-1
RIPRAP APRON AT PIPE OUTLET
WITH FLARED END SECTION OR ENDWALL
NOT TO SCALE

STAPLE PATTERNS



EAST COAST EROSION CONTROL
STAPLE PATTERN GUIDE
NOT TO SCALE



NOTES:

SEED AND SOIL AMENDMENTS SHALL BE APPLIED ACCORDING TO THE RATES IN THE PLAN DRAWINGS PRIOR TO INSTALLING THE BLANKET.

PROVIDE ANCHOR TRENCH AT TOE OF SLOPE IN SIMILAR FASHION AS AT TOP OF SLOPE.

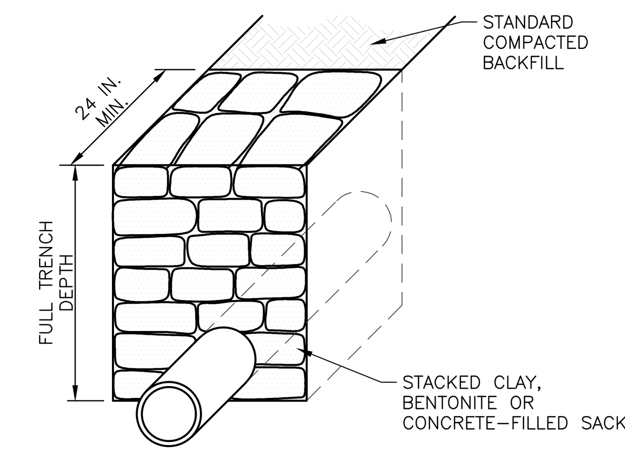
SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS, AND GRASS.

BLANKET SHALL HAVE GOOD CONTINUOUS CONTACT WITH UNDERLYING SOIL THROUGHOUT ENTIRE LENGTH. LAY BLANKET LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH SOIL. DO NOT STRETCH BLANKET.

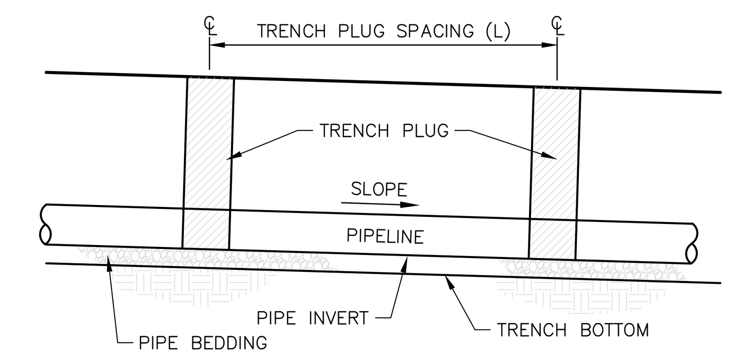
THE BLANKET SHALL BE STAPLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

BLANKETED AREAS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT UNTIL PERENNIAL VEGETATION IS ESTABLISHED TO A MINIMUM UNIFORM 70% COVERAGE THROUGHOUT THE BLANKETED AREA. DAMAGED OR DISPLACED BLANKETS SHALL BE RESTORED OR REPLACED WITHIN 4 CALENDAR DAYS.

STANDARD CONSTRUCTION DETAIL #11-1
EROSION CONTROL BLANKET INSTALLATION
NOT TO SCALE



SECTION VIEW



PROFILE VIEW

PA DEP EROSION CONTROL MANUAL TABLE 13.1
MAXIMUM SPACING AND MATERIALS FOR TRENCH PLUGS

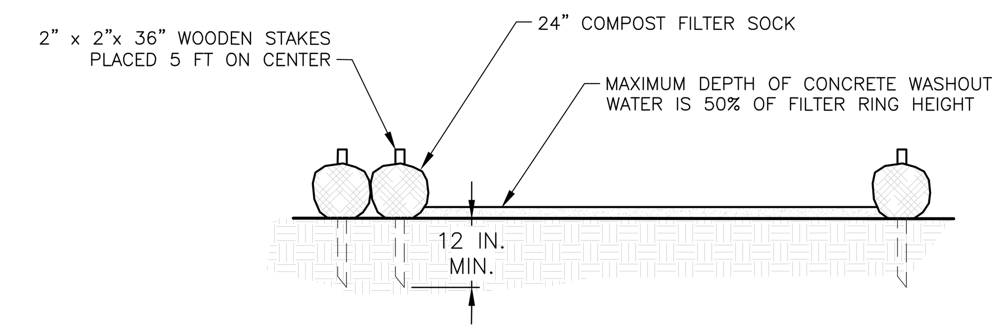
TRENCH SLOPE (%)	SPACING L (FT)	PLUG MATERIAL
< 5	1000	* CLAY, BENTONITE, OR CONCRETE FILLED SACKS
5 – 15	500	* CLAY, BENTONITE, OR CONCRETE FILLED SACKS
15 – 25	300	* CLAY, BENTONITE, OR CONCRETE FILLED SACKS
25 – 35	200	* CLAY, BENTONITE, OR CONCRETE FILLED SACKS
35 – 100	100	* CLAY, BENTONITE, OR CONCRETE FILLED SACKS
> 100	50	CEMENT BAGS (WETTED) OR MORTARED STONE

* TOPSOIL MAY NOT BE USED TO FILL SACKS

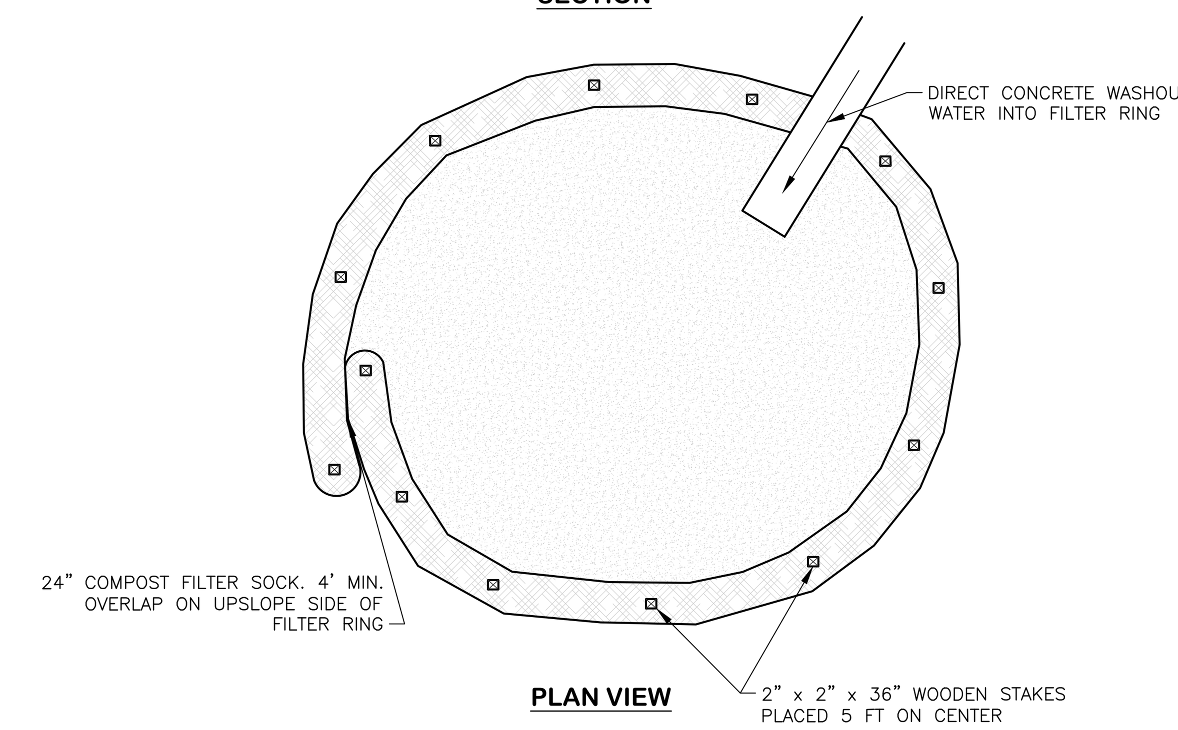
NOTES:

IMPERVIOUS TRENCH PLUGS ARE REQUIRED FOR ALL STREAM, RIVER, WETLAND, OR OTHER WATER BODY CROSSINGS.

STANDARD CONSTRUCTION DETAIL #13-4
TRENCH PLUG INSTALLATION
NOT TO SCALE



SECTION



PLAN VIEW

NOTES:

INSTALL ON FLAT GRADE FOR OPTIMUM PERFORMANCE.

A SUITABLE IMPERVIOUS GEOMEMBRANE SHOULD BE PLACED AT THE LOCATION OF THE WASHOUT PRIOR TO INSTALLING THE SOCKS.

18" DIAMETER FILTER SOCK MAY BE STACKED ONTO DOUBLE 24" DIAMETER SOCKS IN PYRAMIDAL CONFIGURATION FOR ADDED HEIGHT.

ACCUMULATED MATERIALS SHALL BE REMOVED WHEN IT REACHES 75% CAPACITY.

PLASTIC LINERS SHOULD BE REPLACED WITH EACH CLEANING OF THE WASHOUT FACILITY.

ALL CONCRETE WASHOUT FACILITIES SHOULD BE INSPECTED DAILY. DAMAGED OR LEAKING WASHOUTS SHOULD BE DEACTIVATED AND REPAIRED OR REPLACED IMMEDIATELY.

COMPOST SOCK WASHOUT INSTALLATION
NOT TO SCALE

DATE	REVISION	BY
05/01/24	REVISED PER CLIENT FOR CONSTRUCTION	REM
08/04/21	REVISED PER DEP COMMENTS DATED 08/04/2021	

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
ROBERT E. MYERS
ENGINEER

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OWNER: WILLIAMSPORT BALLPARK, INC.
SCALE: N/A
DRAWN: REM
DESIGN: REM

E&S DETAILS

EROSION & SEDIMENTATION CONTROL PLAN FOR WILLIAMSPORT BALLPARK, INC.

HAWBAKER ENGINEERING
1952 Waddle Road, Suite 201 State College, Pa 16803
1-800-284-8590 hawbakerengineering.com

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SHEET NUMBER: E&S 4 OF 4