SITE REDESIGN AT CROZET ELEMENTARY

A Research Paper submitted to the Department of Civil & Environmental Engineering
In Partial Fulfillment of the Requirements for the Degree
Bachelor of Science in Civil Engineering

By

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

ADVISOR
Donna T. Chen, Department of Civil Engineering

PROBLEM STATEMENT

Crozet Elementary School in Albemarle County, Virginia, is expecting a sizable increase in the number of enrolled students due to redistricting between Crozet and Brownsville Elementary. This larger student population has prompted the need for the construction of an additional academic wing, as well as supporting site elements such as parking, access, and playground space. The goal of this capstone project is to work with professional engineers from Timmons Group, a land development firm, to develop and design site improvements at Crozet Elementary School. The site redesign will focus specifically on the school parking lot and traffic circulation, with the goals of increasing the number of both bus and car parking spaces available as well as separating bus circulation and car circulation on the site as much as possible. The total number of parking spaces is to include 136 car parking spaces and 12 bus parking spaces, incorporating five handicap accessible spaces as the code requires. Additional considerations include attempting to incorporate a new stormwater management system into a play area for students, relocating any facilities that might be impacted by the redesign such as the outside basketball court, and maintaining the footprint of the existing soccer field.

STATEMENT OF SCOPE

For this project, the goal will be to provide a set of construction documents ideally at a level of completion where a contractor could enact the proposed changes on the site. These construction sheets include an overall layout plan for our final design as well as a site grading and drainage plan, stormwater management plan, and an erosion and sediment control plan for phases 1 and 2 of construction. Pre-construction sheets will include a layout of existing conditions, and a demolition plan detailing items slated for removal on site. These plans will also come with site specific notes and details, as well as additional calculations done for stormwater

management and grading. All of the plans will abide by Albemarle County municipal code and design standards, VDOT regulations and design standards, ADA requirements, and other requirements as set forth by Crozet Elementary School. Relevant standards and details will be cited in the plans. Preliminary designs were made using the PDF editing program, Bluebeam Revu, to provide a general layout of the site and the direction the team intended to take. The final construction documents and site layouts will be completed and published in Civil 3D/AutoCAD, where more specifications of the final design will be addressed.

PROJECT SCHEDULE

In the fall semester, the team stayed fairly on track with the original schedule, albeit making minor alterations to it along the way. These changes came mainly from delays in developing and choosing the initial concept design. The team finished this roughly two weeks after anticipated, primarily due to focusing on changes to the design in Bluebeam Revu which delayed transferring it into Civil 3D AutoCAD. At the end of the fall semester, Timmons Group shared a schedule for the spring they felt would be easier to keep based on the progress in the fall, and their knowledge of what was left to complete. This preliminary spring schedule can be seen in Appendix A.

The primary shift in the work schedule for the spring semester was in the format of the weekly meetings with Timmons Group. Initially in the fall, those meetings were mostly progress updates on what the capstone team had completed that week. In the spring, the Monday progress meeting became more of an informative workshop where the team would learn directly from Timmons about a specific subject, such as stormwater management or grading. The capstone team would then work on this topic throughout the week and reconvene at Timmon's local office where additional guidance and advice could be received from their professionals to revise what

had been accomplished since Monday. These in-office, informal meetings became more frequent throughout the spring semester as capstone members would drop by whenever they needed face-to-face help or a clarification on a difficult component, which helped prevent lack of expertise from causing delays.

There were a number of difficult circumstances affecting group members in their personal lives that did cause issues in keeping to the proposed spring schedule, but by and large team members would step up when others needed additional aid in finishing tasks by set deadlines. However, these situations did result in project deliverables only being fully completed at the beginning of May, and some of the more ambitious components being left out of the final project.

DESIGN

The final deliverable for the capstone project is a complete sheet set of construction documents, with each sheet incorporating a different aspect of construction and design for the site. These individual sheets were also dependent on one another; updating one aspect of the site meant the rest needed to be altered as well. This iterative process meant the design was constantly evolving throughout the course of the project. The capstone team created a 30, 60, and 90% completion sheet set for review and constructive criticism from Timmons Group to help guide subsequent iterations. A brief summary of the main sheets and their completion process can be found below.

Existing Layout: This sheet was the easiest to create as the initial topographical survey and layout of the site was provided by Timmons Group from when they had worked on the project. The layout did need to be updated in terms of what data and layers were and were not visible in order to improve the legibility and presentation of the sheet for viewers.

Demolition Plan: The demolition plan is one of the first sheets in terms of the construction timeline but could only be started once the capstone team knew what the final design was going to look like, in order to know which portions of the existing layout would be kept or needed removal. Once a redesign layout was established, the demolition plan was updated to show where existing parking infrastructure would need to be removed. As the demolition plan was to be in black and white, the indicators for components being removed had to be visually distinct enough for viewers to differentiate between the various materials and components, without different colors but with the aid of a legend. As other sheets were updated, the demolition plan was also updated to accurately reflect the outer extents of removed material.

Notes & Details: The general notes and construction details for this sheet set were derived from existing regulations and standards from both the Virginia Department of Transportation as well as the Albemarle County Design Standards. The construction details became increasingly comprehensive as the capstone team gained a better understanding of what specific infrastructure was needed in the redesign, such as different curb types, traffic stops, and sidewalk requirements.

Erosion & Sediment Control Phase 1: The erosion and sediment control plan was devised into two phases to account for pre and post construction conditions. The first phase consisted of preconstruction conditions and would account for early stages of construction and the demolition phase. In this first phase, the emphasis was on formulating the limits of disturbance for the site and protecting the structures to be kept within our site. Since this sheet did not reference the other sheets created except the existing site layout, designing phase 1 was a relatively uniform process. Upon devising the limits of disturbance, a range of necessary measures were added to ensure that any structures, such as inlets or trees, near or within the vicinity of the limits of disturbances were protected.

Erosion & Sediment Control Phase 2: The second phase of the erosion and sediment control plan accounted for the latter construction conditions. As this sheet depended on the grading & drainage plan and final design layout, the second phase went through much more iterations than the first phase. Changes to these respective sheets would alter the number of inlet protections and the limits of disturbances, so efficient communication between team members was necessary to ensure that changes were uniform across the sheets. This sheet focused on communicating the necessary measures to be in place during the final part of the construction phase to ensure that sediment stays within the premise of our limits of disturbance. With guidance from Timmons Group, this sheet went through a number of revisions to ensure that professionality and legibility was embedded in our design.

E&S Notes & Details: The erosion and sediment control notes and details were derived from existing regulations and standards set by the Virginia Department of Environmental Quality. Timmons Group advised the capstone team on which details to incorporate into the E&S Control plans, which included specific details for silt fences, inlet and outlet protection, tree protection, temporary seeding, and a construction entrance.

Final Design Layout: The redesigned layout for the school underwent the most changes during the course of this project. The capstone team developed a number of different potential layouts, previous iterations of proposed designs can be seen in Appendix B. These iterations included placing the separate bus lot in different locations, such as the northwest or southwest of the site, and the extra parking being added in large lots of twenty four spaces or more. However, these proposed designs were not chosen for further completion based on issues with feasibility of grading and spacing. The southwest slopes proved to be too steep for easy regrading which limited how much parking could be placed there. Ultimately the final design was arranged based

on smaller lot additions and using as much of the pre-existing parking as possible. This final design also separated bus and car traffic by placing the separate bus lot towards the rear of the site, in the northeast corner. This "final" design also underwent several iterations before it was considered complete, the main layout remaining generally the same but with changes such as the addition of an auxiliary lot in the north east to meet the 136 parking spaces requirements.

Grading & Drainage Plan: The development of the grading and drainage plan was an iterative process, much the same as the overall project. There was an immeasurable amount of trial and error involved in creating and editing the proposed surface within Civil 3D. Each adjustment of an elevation or slope often caused a chain reaction, which forced the team to have to use a lot of forethought prior to making changes. The final plan effectively directs surface runoff to the proper inlets and ensures that pedestrians are able to traverse the site safely.

Stormwater Management Plan: The stormwater management plan was based on data collected on both the existing conditions and post development plans. Every change to the land of development and grading caused alterations to the stormwater management plans. Data, including drainage areas, NOAA runoff, curve numbers, and TR-55 time of concentration were all used to create hydrographs. These provided the information needed for energy balance equations. From there, the orifices, weirs, culvers, and pipe dimensions of the underground retention and bioretention garden were adjusted to satisfy the energy balance equations.

DESIGN STANDARDS

There were a number of design standards that were needed for the final design. This included transportation standards, grading standards, environmental standards and more. While Timmons Group did provide the capstone team with some general numbers and direction for design standards, the team had to research Virginia and Albemarle County standards and

regulations. State standards were typically adequate for the project, but the team did reference the Albemarle County Design Standards Manual to ensure the county did not have more stringent requirements that needed to be met. A federal standard incorporated into the project was that of the Americans with Disabilities Act, pertaining to parking. The team had to include a specific number of handicap accessible parking spaces and access aisles into the final design based on the increased size of the parking facilities. The maximum slope of the parking lot and sidewalks had to be 5% in order to be considered accessible.

Standards for stormwater management came from the Virginia Stormwater BMP Clearinghouse, which provides references for meeting Virginia Stormwater Management Program (VSMP) regulations. The VSMP requires the use of the Virginia Runoff Reduction Method (VRRM) to calculate total phosphorus available for removal and post development treatment volume to meet runoff quality and quantity standards. This site also provides a list of recognized Best Management Practices that could be incorporated into the redesign to meet pollutant removal standards. The listed requirements for each BMP, such as required size and runoff rates, helped shape decision making on which practices worked best within the confines of the site. Quantity standards were derived from area totals, hydrographs, runoff curve numbers, and time of concentration.

Erosion and sediment control standards came from the Virginia Department of Environmental Quality. Timmons Group directed the team on which practices they felt were relevant to this project and from there the team gathered relevant notes and details on E&S practices and how they should be arranged on site, which directed the creation of Phase 1 and 2 of the E&S control plan. The Virginia Department of Transportation has a comprehensive set of Road and Bridge Standards that the team used to find construction details for various pieces of

infrastructure around the site. These included curb types, drive aisle standards, and sidewalk and pavement details.

RESULTS

The majority of the fall semester was focused on drafting potential site layouts and determining their effectiveness at meeting the project requirements as well as their feasibility of construction. The rest of the fall the team focused on converting conceptual work into a practical Civil 3D file where additional construction documents could be developed. The bulk of work within Civil 3D occurred in the spring semester, as well as most of the training/education on how to use CAD to complete the redesign to a professional standard. The fall was primarily conceptual while the spring was primarily practical, physically implementing the redesign into software and then into a finished product.

The capstone team was better able to delegate tasks to individual members this spring once the general layout had been mostly finalized. The lack of a central shared server for live updates between all group members did hinder the coordination between given tasks, for example between grading and stormwater, which necessitated a group member to serve as a point person to coordinate and assemble the final product. Many sheets were tightly coupled requiring multiple iterations as changes to one aspect of the design meant other aspects had to be updated to match. At three points during the semester, the team submitted to Timmons Group a sheet set at varying levels of completion: 30, 60, and 90%. The team then used the feedback and comments on those sheet sets to guide the next iteration of construction documents. Towards the end of the semester, this was primarily focused on the presentability and legibility of the content included on those sheets.

CONCLUSION

The capstone team's final design successfully increased Crozet Elementary School's parking capacity up from 86 parking spaces to 136 spaces and 12 dedicated bus spaces, and helped separate car and bus traffic on site with the creation of a bus lot on the northeast area of the site. This design also met ADA standards for the number and location of handicap accessible spaces, and paths to the school. The team was also able to maintain the existing footprint of the soccer field and relocate the existing basketball court from its previous location where the additional academic wing was to be built. While the redesign did include new stormwater management systems, including the bioretention garden adjacent to the bus lot, the team was unable to specifically design the garden as an interactive area for kids as requested by Crozet Elementary staff. Overall, the team was successful in translating this site redesign into a complete sheet set of construction documents. This sheet set can be seen in Appendix C, and is the primary project deliverable.

Due to outside circumstances hindering progress, the team was unable to accomplish everything it set out to do at the start of the school year and had to prioritize certain design aspects. Initially, the team wanted to create a traffic routing simulation to confirm that the redesign traffic plan would improve circulation on site, but never had the time or ability to obtain the knowledge and software to do so. The team also wanted to potentially generate a cut and fill report based on the regrading needed for the new design but did not find time at the end of the semester to do so. Finally, the team considered generating a new utility layout for the redesign but considered that more in the realm of the architect or mechanical engineer and thus omitted it due to time constraints.

The team gained a great deal of knowledge in using Civil 3D from this project, as although there was some education on using Civil 3D in introductory civil classes, the level of expertise needed to meet professional standards was well beyond that. Furthermore, while capstone members had gone through courses on the theory of many of the construction sheets, such as stormwater management or erosion and sediment control, no one had a lot of experience with putting theory into practice and developing a complete design. As such, the guidance and support from Timmons Group was invaluable in completing this project, and the capstone team would like to express their gratitude. The capstone experience was educational on both a technical and professional level for all team members.

APPENDICES

Appendix A - Detailed Schedule

- Spring Schedule developed by Timmons Group

Appendix B - Examples of Previous Designs

- Previous Iterations and 30/60/90% Layout Sheets

Appendix C - Project Deliverables

- Construction Document Sheet Set
- Additional Stormwater Calculations

talk about demo pre Christmas

Appendix A:

JANUARY 2023

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	**2**	**3**	**4**	**5**	**6**	7
8	**9**	**10**	**11**	**12**	**13**	14
15	**16** MLK - no classes	**17**	**18** Classes start sheet set up	**19**	**20**	21
22	**23** Grading Part 1 JS/Kim	**24**	**25**	**26**	**27**	28
29	**30** SWM BMP and continue grading (KB/CG)	**31**	1	2	3	4

FEBRUARY 2023

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
29	30	31	1 Progress Print (50%)	2	3	4
5	6 ESC	7	8	9	10	11
12	13 Review Grading Pipe and inlet layout (JS / KB)	14	15	16	17	18
19	20 Demolition Check in - 90% done	21	22	23	24	25
26	27 SWM Calculation (ECB & KB)	28	1	2	3	4

MARCH 2023

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
26	27	28	1	2	3 print a full set for comments - initial grading, and storm layout (75%)	4
5	6	7 SPRING BREAK	8	9	10 Timmons to send comments back	11
12	13 Go over comments	14	15	16	17	18
19	20 Layout Plan - Annotative	21	22	23	24	25
26	27	28	29	30	31	1

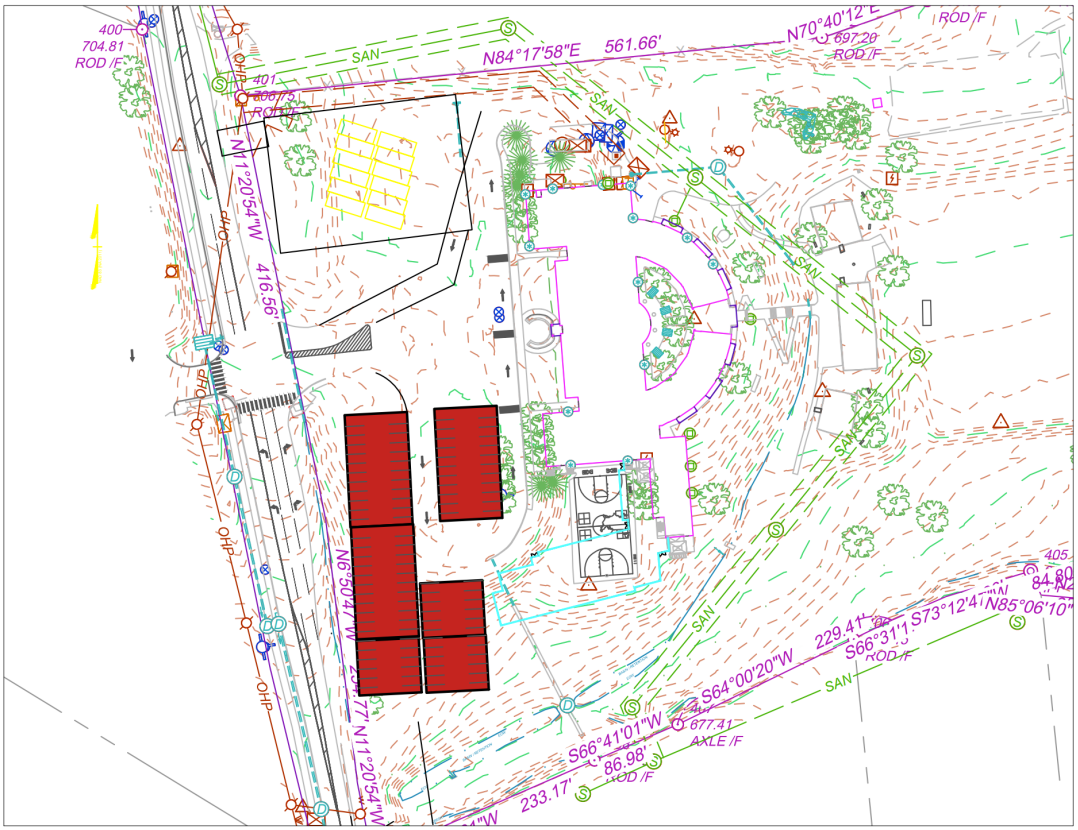
APRIL 2023

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
26	27	28	29	30	31	1
2	3	4	5	6	7	8
9	10	11	12	13	14 Send 95% set for review	15
16	17	18 address comments and cleanup	19	20	21	22
23	24	25 address comments and cleanup	26	27	28	29
30	1	2	3	4	5	6

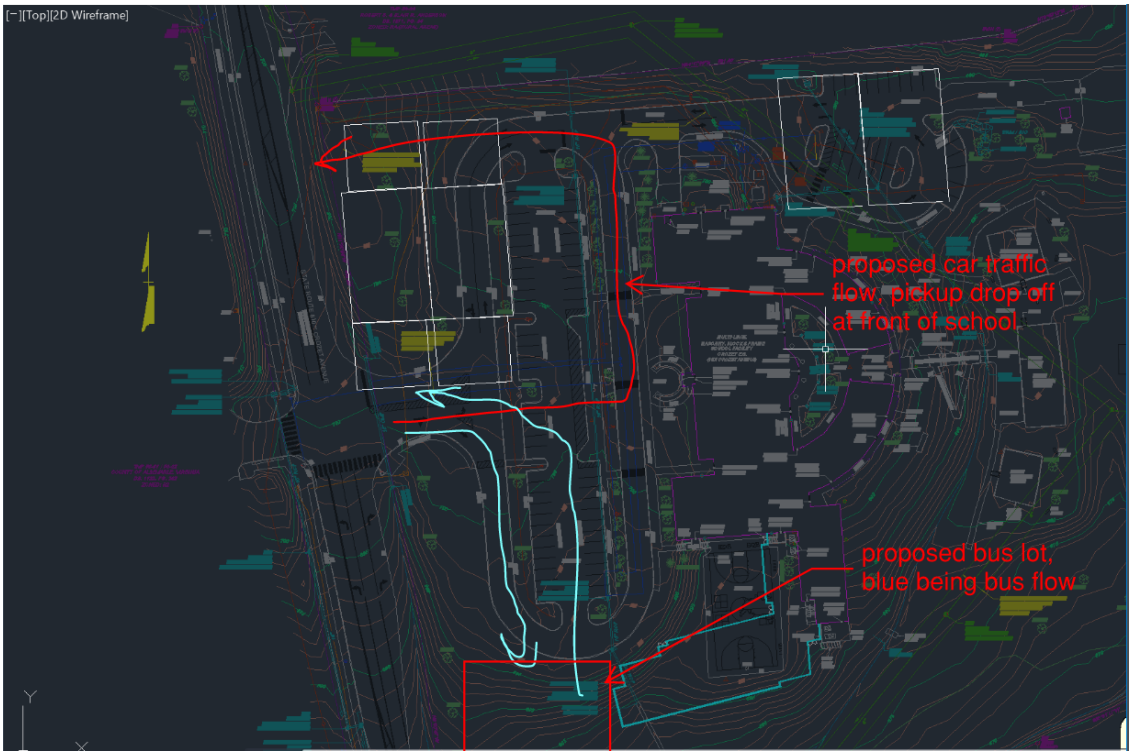
MAY 2023

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
30	**1**	**2** LAST DAY OF CLASSES	**3**	**4**	**5**	6
7	**8**	**9**	**10**	**11**	**12**	13
14	**15**	**16**	**17**	**18**	**19**	20
21	**22**	**23**	**24**	**25**	**26**	27
28	**29**	**30**	**31**	1	2	3

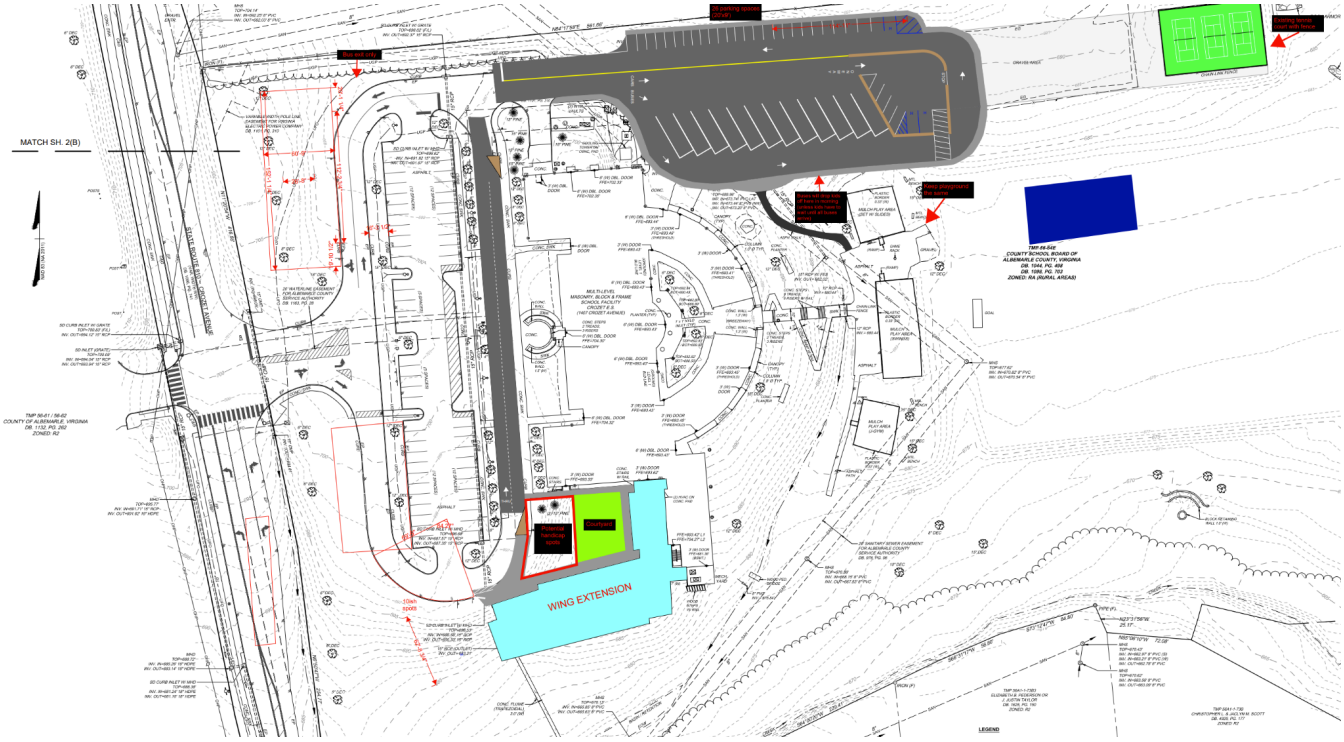
Appendix B



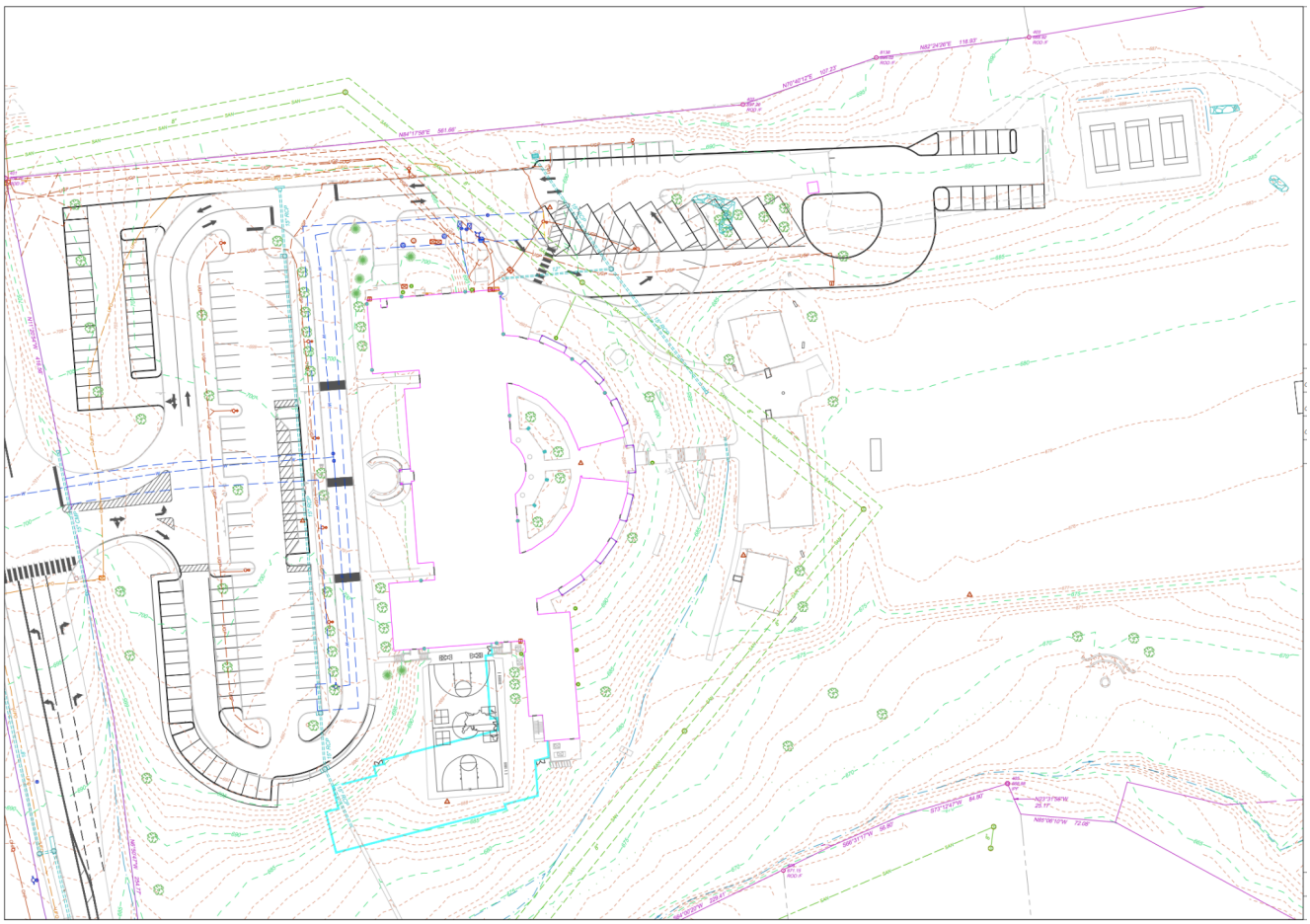
Alternative Design 1



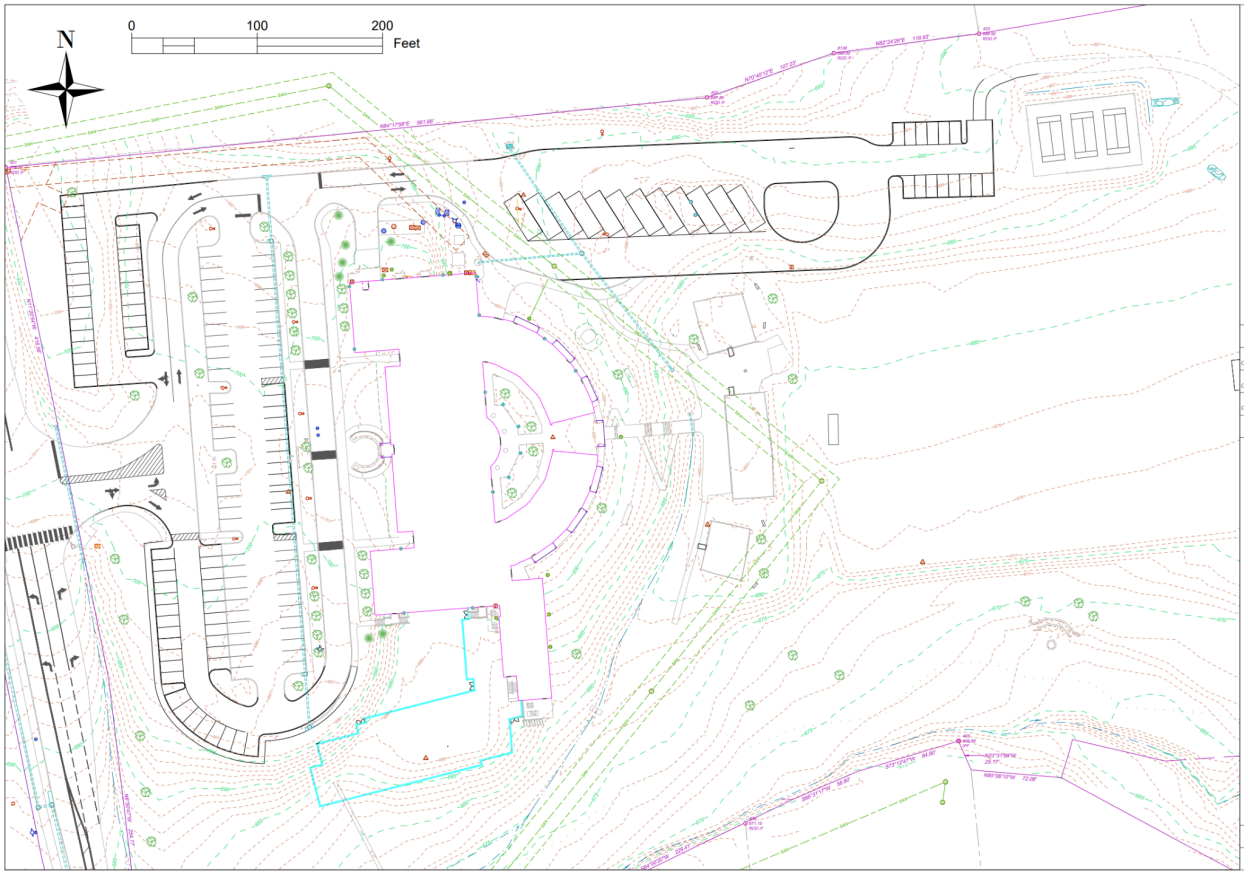
Alternative Design 2



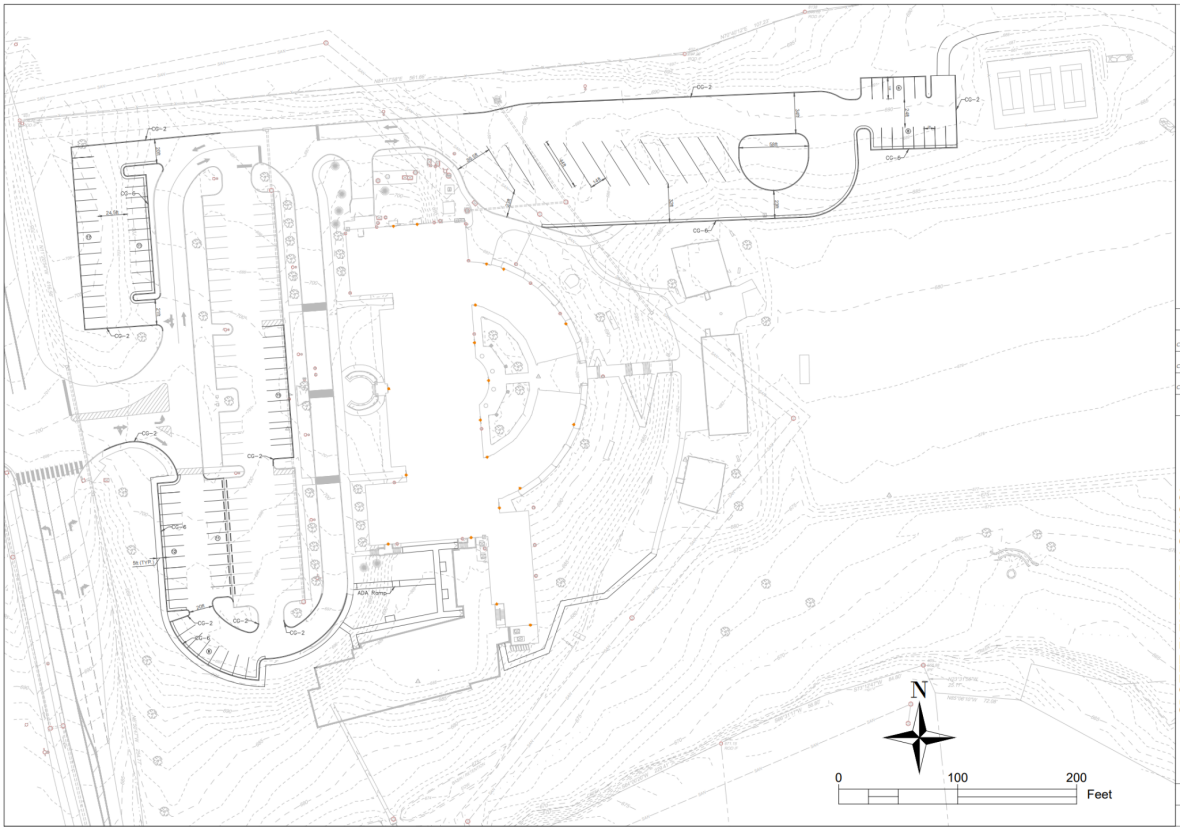
Alternative Design 3: Moved forward with this general layout



Design Layout (30% Sheet Set)



Design Layout (60% Sheet Set)



Design Layout (90% Sheet Set)

Appendix C

Site Redesign at Crozet Elementary

Sheet List Table	
Sheet Number	Sheet Title
C0.0	Cover
C1.0	Existing Layout
C2.0	Demolition Plan
C3.0	Notes & Details
C4.0	E & S Plan Phase 1
C4.1	E & S Plan Phase 2
C4.2	E&S Notes
C4.3	E&S Details
C5.0	Layout Plan
C6.0	Grading & Drainage Plan
C7.0	Stormwater Management Plan
C7.1	Inlet Drainage Area Map
C8.0	Calculations
C8.1	Calculations Continued

SITE DATA:

TAX MAP PARCEL AND OWNER INFO:

Parcel 05600-00-00-064E0
Crozet Elementary School
1407 Crozet Avenue, Crozet, VA, 22932

TOTAL SITE AREA:

21.16 acres

LIMITS OF DISTURBANCE: Make sure this matches with final stormwater calcs

2.497 acres

EXISTING IMPERVIOUS AREA:

0.935 acres

PROPOSED IMPERVIOUS AREA:

2.017 acres

SOURCE OF SURVEY, BOUNDARY, AND TOPOGRAPHY:

Timmons Group
28 Imperial Drive
Staunton, VA, 24401
Joseph C. Medley, L.S.
Conducted 04/21/2020

CURRENT USE: Elementary School

PROPOSED USE: Elementary School

ZONING: Educational

ADJACENT PROPERTIES:

North - Residential
South - Residential
East - Agricultural/Undeveloped
West - Educational

PROJECT REQUIREMENTS:

Parking: 136 parking spaces including 5 ADA parking spaces (1 van accessible),
12 dedicated bus parking spaces
Traffic Circulation: Separate bus and car traffic as much as possible

CONSTRAINTS:

Adhere to Virginia and Albemarle County stormwater regulations
Adhere to Virginia Department of Transportation and Albemarle County design standards

DATE 05/02/23
DRAWN BY Capstone Team
DESIGNED BY Capstone Team
CHECKED BY Capstone Team
SCALE N/A

CROZET ELEMENTARY SCHOOL
ALBEMARLE COUNTY - CROZET
COVER

JOB NO. 1
SHEET NO. C0.0

TMP 56-64
ROBERT S. & BLAIR R. ANDERSON
DB. 1871, PG. 34
ZONED: RA (RURAL AREAS)

TMP 56-64E
COUNTY SCHOOL BOARD OF
ALBEMARLE COUNTY, VIRGINIA
DB. 1044, PG. 498
DB. 1098, PG. 703
ZONED: RA (RURAL AREAS)

TMP 56A1-1-73B3
ELIZABETH B. PEDERSON OR
J. JUSTIN TAYLOR
DB. 1625, PG. 150
ZONED: R2

TMP 56A1-1-73B
CHRISTOPHER L. & JACLYN M. SCOTT
DB. 4929, PG. 177
ZONED: R2

CROZET ELEMENTARY SCHOOL

ALBEMARLE COUNTY - CROZET

EXISTING LAYOUT

DATE	05/02/23
DRAWN BY	Capstone Team
DESIGNED BY	Capstone Team
CHECKED BY	Capstone Team
SCALE	1":30'
JOB NO.	1
SHEET NO.	C1.0

0 100 200 Feet

Remove Curb And Gutter

Remove Asphalt

Remove Curb And Gutter

Remove Gravel Lot

Remove Trees

Remove Shed

Remove Riprap

Remove Bioretention Outfall Pipe/Structure

Electrical Pedestal Will Remain

Remove Chain Link Fence

Existing Sidewalk to Remain

Remove Light Posts

Remove Concrete

Remove Pavement Markings

Remove Asphalt

Remove Drainage Pipe & Inlet

Remove Curb And Gutter

Remove Basketball Court

Legend

- Remove Curb/Gutter
- Remove Tree
- Remove Concrete
- Remove Asphalt
- Remove Structure
- Remove Basketball Court
- Remove Pavement Markings
- Remove Gravel
- Remove Pipe

0 100 200 Feet

N

DATE	05/02/23
DRAWN BY	Capstone Team
DESIGNED BY	Capstone Team
CHECKED BY	Capstone Team
SCALE	1":30'

CROZET ELEMENTARY SCHOOL

ALBEMARLE COUNTY - CROZET

DEMOLITION PLAN

JOB NO.	1
SHEET NO.	C2.0

GENERAL NOTES

1. ALL MATERIALS AND CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH CURRENT VIRGINIA DEPARTMENT OF TRANSPORTATION'S SPECIFICATIONS AND STANDARDS.
2. PRIOR TO ANY CONSTRUCTION, THE CONTRACTOR SHALL CONSULT THE ENGINEER AND VERIFY THE APPROVAL OF THE PLANS BY ALL FEDERAL, STATE AND LOCAL AGENCIES.
3. LAND USE PERMITS (LUP-A) MUST BE OBTAINED FROM THE VIRGINIA DEPARTMENT OF TRANSPORTATION PRIOR TO BEGINNING ANY CONSTRUCTION WITHIN THE EXISTING STATE MAINTAINED RIGHT OF WAY (INCLUDING ACCESS).
4. THE CONTRACTOR SHALL VERIFY THE ELEVATIONS OF ALL POINTS OF CONNECTION OR PROPOSED WORK TO EXISTING CURBS, SANITARY LINES, WATERLINES, ETC, PRIOR TO CONSTRUCTION.
5. UPON DISCOVERY OF SOILS THAT ARE UNSUITABLE FOR FOUNDATIONS, SUBGRADES, OR OTHER ROADWAY CONSTRUCTION PURPOSES, THE CONTRACTOR SHALL IMMEDIATELY CONTACT THE OWNER. THESE AREAS SHALL BE EXCAVATED BELOW PLAN GRADE AS DIRECTED BY THE OWNER, BACKFILLED WITH SUITABLE MATERIAL AND COMPACTED IN ACCORDANCE WITH THE CURRENT VERSION OF THE VDOT ROAD AND BRIDGE STANDARDS AND SPECIFICATIONS.
6. ALL STORM SEWER DESIGN AND CONSTRUCTION TO BE IN ACCORDANCE WITH VDOT I AND I LD-94 (D) 121.13.
7. ALL STORM SEWER PIPE SHALL BE REINFORCED CONCRETE AND GROVE CONCRETE PIPE IN ACCORDANCE WITH ASTM-C-76. PIPE WITHIN THE RIGHT OF WAY SHALL BE MINIMUM CLASS III OR GREATER IN ACCORDANCE WITH CURRENT VDOT STANDARDS AND SPECIFICATIONS.
8. IF PRE-CAST UNITS ARE TO BE USED, VDOT SHALL BE NOTIFIED AND THE MANUFACTURER SHALL SUBMIT DRAWING DETAILS FOR REVIEW. CERTIFICATION AND VDOT STAMP WILL BE REQUIRED ON ALL UNITS.
9. ALL CONCRETE SHALL BE A3-AE (AIR ENTRAINED 3,000 PSI), UNLESS OTHERWISE NOTED.
10. DESIGN CHANGES, SPECIFIED MATERIALS CHANGES AND/OR FIELD CHANGES FROM THE APPROVED PLANS NEED TO BE RESUBMITTED TO THE ENGINEER PRIOR TO PROCEEDING WITH THE WORK. A LETTER OF EXPLANATION SHALL ACCOMPANY THE REVISED PLANS AND/OR THE DRAINAGE CALCULATIONS, WHICH MUST BE SUBMITTED AND APPROVED BY THE ENGINEER.
11. CONTRACTOR SHALL VERIFY LOCATION AND ELEVATION OF ALL UNDERGROUND UTILITIES SHOWN ON PLANS IN AREAS OF CONSTRUCTION PRIOR TO STARTING WORK. CONTACT ENGINEER IMMEDIATELY IF LOCATION OR ELEVATION IS DIFFERENT FROM THAT SHOWN ON PLAN. IF THERE APPEARS TO BE A CONFLICT, AND/OR UPON DISCOVERY OF ANY UTILITY NOT SHOWN ON THIS PLAN, CALL MISS UTILITY OF CENTRAL VIRGINIA AT 1-800-552-7001. THE OWNER SHALL BE RESPONSIBLE FOR THE RELOCATION OF ANY UTILITY WITHIN EXISTING AND/OR PROPOSED RIGHT-OF-WAY REQUIRED BY THE DEVELOPMENT.
12. THE INSTALLATION OF SEWER, WATER, AND GAS MAINS (INCLUDING SERVICE LATERALS AND SLEEVES) SHALL BE COMPLETED PRIOR TO THE PLACEMENT OF AGGREGATE BASE COURSE.
13. ALBEMARLE COUNTY APPROVAL OF CONSTRUCTION PLANS DOES NOT PRECLUDE THE RIGHT TO REQUIRE ADDITIONAL FACILITIES AS DEEMED NECESSARY .
14. A PRIME COAT SEAL BETWEEN THE AGGREGATE BASE AND BITUMINOUS CONCRETE WILL BE REQUIRED AT THE RATE OF 0.30 GALLONS PER SQUARE YARD (REC-250 PRIME COAT) PER VDOT STANDARDS AND SPECIFICATIONS.
15. THE SCHEDULING OF AGGREGATE BASE INSTALLATION AND SUBSEQUENT PAVING ACTIVITIES SHALL ACCOMMODATE FORECAST WEATHER CONDITIONS PER SECTION 315 OF THE ROAD AND BRIDGE SPECIFICATIONS.
16. THE OWNERS REPRESENTATIVE SHALL HAVE APPROVED THE AGGREGATE BASE COURSE(S) FOR DEPTH, TEMPLATE AND PERFORMED THE REQUIRED FIELD INSPECTION (PROOF ROLL) PRIOR TO PLACEMENT OF ANY SURFACE COURSE(S). CONTACT THE OWNER FOR INSPECTION FOR THE AGGREGATE BASE COURSE(S) 48 HOURS PRIOR TO APPLICATION OF THE SURFACE COURSE(S).
17. A GEOTECHNICAL ENGINEER IS TO ASCERTAIN CAUSE AND CERTIFY RECOMMENDED METHOD OF REPAIR FOR ALL PAVEMENT STRUCTURAL FAILURES PRIOR TO STATE ACCEPTANCE.
18. ALL VEGETATION AND ORGANIC MATERIAL MATERIAL IS TO BE REMOVED FROM THE PROPOSED PAVEMENT LIMITS PRIOR TO CONDITIONING OF THE SUBGRADE.
19. CERTIFICATION AND SOURCE OF MATERIALS ARE TO BE SUBMITTED TO THE OWNER FOR ALL MATERIALS AND BE IN ACCORDANCE WITH THE ROAD AND BRIDGE SPECIFICATIONS, AND ROAD AND BRIDGE STANDARDS.
20. ALL APPROACH GUTTERS TO SAG INLETS SHALL MAINTAIN A MINIMUM SLOPE OF 0.004 ft./ft.
21. ALL NEW HANDICAP ACCESSIBLE REQUIREMENTS ON-SITE AND WITHIN ALL NEW STRUCTURES SHALL COMPLY WITH THE 2009 UNIFORM STATEWIDE BUILDING CODE, 2009 VIRGINIA CONSTRUCTION CODE, 2010 ADA STANDARDS FOR ACCESSIBLE DESIGN AND ICC/ANSI A117.1-03.
22. REFER TO SHEET L1.0 FOR ALL LANDSCAPING GENERAL NOTES.
23. VISIBILITY OF ALL MECHANICAL EQUIPMENT FROM THE ENTRANCE CORRIDOR SHALL BE ELIMINATED.
24. ALL WATER LINES, SEWER LINES, AND FIRE LINES FROM THE MAIN TO THE STRUCTURE MUST HAVE A VISUAL INSPECTION PERFORMED BY THE BUILDING DEPARTMENT.
25. ALL ROOFDRAINS SHALL DISCHARGE IN A MANNER NOT TO CAUSE A PUBLIC NUISANCE AND NOT OVER SIDEWALKS.
26. BUILDING OR STRUCTURES BUILT BEFORE JANUARY 1, 1985 MUST HAVE AN ASBESTOS SURVEY PERFORMED IN ORDER TO APPLY FOR A PERMIT. ASBESTOS REMOVAL PERMITS ARE REQUIRED IF POSITIVE FOR SUCH. CONTACT VDOLI FOR ADDITIONAL REQUIREMENTS AND PERMITS FOR DEMOLITION PROJECTS.

ALBEMARLE COUNTY ENGINEERING GENERAL CONSTRUCTION NOTES

1. PRIOR TO ANY CONSTRUCTION WITHIN ANY EXISTING PUBLIC RIGHT OF WAY, INCLUDING CONNECTION TO ANY EXISTING ROAD, A PERMIT SHALL BE OBTAINED FROM THE VIRGINIA DEPARTMENT OF TRANSPORTATION (VDOT). THIS PLAN AS DRAWN MAY NOT ACCURATELY REFLECT THE REQUIREMENTS OF THE PERMIT. WHERE ANY DISCREPANCIES OCCUR THE REQUIREMENTS OF THE PERMIT SHALL GOVERN.
2. ALL MATERIALS AND CONSTRUCTION METHODS SHALL CONFORM TO CURRENT SPECIFICATIONS AND STANDARDS OF VDOT.
3. EROSION AND SILTATION CONTROL MEASURES SHALL BE PROVIDED IN ACCORDANCE WITH THE APPROVED EROSION CONTROL PLAN AND MUST BE INSTALLED PRIOR TO ANY CLEARING, GRADING OR OTHER CONSTRUCTION.
4. ALL SLOPES AND DISTURBED AREAS ARE TO BE FERTILIZED, SEEDED AND MULCHED.
5. THE MAXIMUM ALLOWABLE SLOPE IS 2:1 (HORIZONTAL:VERTICAL). WHERE REASONABLY OBTAINABLE, LESSER SLOPES OF 3:1 OR BETTER ARE TO BE ACHIEVED.
6. PAVED, RIP-RAP OR STABILIZATION MAT LINED DITCH MAY BE REQUIRED WHEN IN THE OPINION OF THE COUNTY ENGINEER, OR DESIGNEE, IT IS DEEMED NECESSARY IN ORDER TO STABILIZE A DRAINAGE CHANNEL.
7. ALL TRAFFIC CONTROL SIGNS SHALL CONFORM WITH THE VIRGINIA MANUAL FOR UNIFORM TRAFFIC CONTROL DEVICES.
8. UNLESS OTHERWISE NOTED ALL CONCRETE PIPE SHALL BE REINFORCED CONCRETE PIPE - CLASS III.
9. ALL EXCAVATION FOR UNDERGROUND PIPE INSTALLATION MUST COMPLY WITH OSHA STANDARDS FOR THE CONSTRUCTION INDUSTRY (29 CFR PART 1926).

ALBEMARLE COUNTY BUILDING NOTES:

1. BUILDING INSPECTIONS MUST VERIFY PROPER ABANDONMENT OF SITE UTILITIES BEFORE CONCEALMENT.
2. WHERE THE FLOOD LEVEL RIMS OF PLUMBING FIXTURES ARE BELOW THE ELEVATION OF THE MANHOLE COVER OF THE NEXT UPSTREAM MANHOLE IN THE PUBLIC SEWER, THE FIXTURES SHALL BE PROTECTED BY A BACKWATER VALVE INSTALLED INT EH BUILDING DRAIN, BRANCH OF THE BUILDING DRAIN OR HORIZONTAL BRANCH SERVING SUCH FIXURES. PLUMBING FIXTURES HAVING FLOOD LEVEL RIMS ABOVE THE ELEVATION OF THE MANHOLE COVER OF THE NEXT UPSTREAM MANHOLE IN THE PUBLIC SHALL NOT DISCHARGE THROUGH A BACKWATER VALVE.
3. ALL WATER, SEWER, AND FIRE LINES REQUIRE NEW INSPECTION AND TESTING PROCEDURES. ALL ACSA PERFORMS ANY TESTING AND INSPECTIONS OF THE PUBLIC SEWER AND WATER MAIN(S).
4. RETAINING WALLS GREATER THAN 3 FEET IN HEIGHT REQUIRE A SEPARATE BUILDING PERMIT. WALLS EXCEEDING 4 FEET IN HEIGHT REQUIRE A STAMPED ENGINEERING DESIGN ALSO. WALLS REQUIRE INSPECTIONS AS OUTLINED IN THE USBC.

FIRE SAFETY NOTES:

1. SMOKING SHALL BE PROHIBITED IN AREAS WHERE SMOKING MAKES CONDITIONS SUCH AS TO MAKE SMOKING A HAZARD AND THESE AREAS SHALL BE DESIGNATED WITH NO SMOKING SIGNS PER VIRGINIA STATEWIDE FIRE PREVENTION CODE.
2. AREAS WHERE SMOKING CAN OCCUR, SHALL HAVE APPROPRIATE RECEPTACLES FOR DISCARDED SMOKING MATERIALS PER STATEWIDE FIRE PREVENTION CODE.
3. PER THE VIRGINIA STATEWIDE FIRE PREVENTION CODE, VEHICULAR ACCESS FOR FIREFIGHTING SHALL BE PROVIDED AT ALL CONSTRUCTION AND DEMOLITION SITES, PROVIDE ACCESS TO WITHIN 100 FT. OF TEMPORARY OR PERMANENT FIRE DEPARTMENT CONNECTIONS, AND HAVE NO OVERHEAD WIRING OR OTHER OVERHEAD OBSTRUCTIONS LOWER THAN 13 FT. 6 INCHES; THIS ACCESS MAY BE VIA PERMANENT OR TEMPORARY ROAD, BUT SHALL BE CAPABLE OF SUPPORTING FIRE APPARATUS IN ALL WEATHER CONDITIONS.
4. CONTRACTOR SHALL ENSURE THE STREET NUMBERS ARE ALWAYS PLAINLY VISIBLE FROM THE FRONTAGE STREET DURING CONSTRUCTION PER THE VIRGINIA STATEWIDE FIRE CODE.
5. AN APPROVED WATER SUPPLY FOR FIREFIGHTING OPERATIONS SHALL BE IN PLACE AND AVAILABLE AS SOON AS COMBUSTIBLE MATERIALS ARRIVE ON SITE.
6. WASTE AND COMBUSTIBLE DEBRIS SHALL BE REMOVED FROM THE BUILDING AT THE END OF EACH DAY AND DISPOSED OF IN ACCORDANCE WITH THE VIRGINIA STATEWIDE FIRE CODE.
7. FIRE EXTINGUISHERS SHALL BE PROVIDED, WITH NOT LESS THAN ONE APPROVED FIRE EXTINGUISHER AT EACH STAIRWELL, ON ALL FLOOR LEVELS WHERE COMBUSTIBLE MATERIALS HAVE ACCUMULATED, IN EVERY STORAGE AND CONSTRUCTION SHED AND IN AREAS OF SPECIAL HAZARDS SUCH AS FLAMMABLE AND COMBUSTIBLE LIQUIDS ARE STORED OR USED, IN ACCORDANCE WITH THE VIRGINIA STATEWIDE CODE.
8. OPERATIONS INVOLVING THE USE OF CUTTING AND WELDING SHALL COMPLY WITH THE VIRGINIA STATEWIDE FIRE PREVENTION CODE AND SHALL REQUIRE A PERMIT FROM THE ALBEMARLE COUNTY FIRE MARSHAL'S OFFICE.

ALBEMARLE COUNTY STORMWATER MANAGEMENT NOTES

1. ALL DAMS AND CONSTRUCTED FILL TO BE WITHIN 95% OF MAXIMUM DRY DENSITY AND 2% OF OPTIMUM MOISTURE CONTENT. ALL FILL MATERIAL TO BE APPROVED BY A GEOTECHNICAL ENGINEER. A GEOTECHNICAL ENGINEER IS TO BE PRESENT DURING CONSTRUCTION OF DAMS.
2. PIPE AND RISER JOINTS ARE TO BE WATERTIGHT WITHIN STORMWATER MANAGEMENT FACILITIES.
3. FOR TEMPORARY SEDIMENT TRAPS OR BASINS WHICH ARE TO BE CONVERTED TO PERMANENT STORMWATER MANAGEMENT FACILITIES; CONVERSION IS NOT TO TAKE PLACE UNTIL THE SITE IS STABILIZED, AND PERMISSION HAS BEEN OBTAINED FROM THE COUNTY EROSION CONTROL INSPECTOR.

BLASTING NOTES

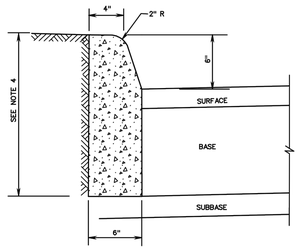
1. BLASTING SHALL NOT BE PERMITTED ON THIS PROJECT.

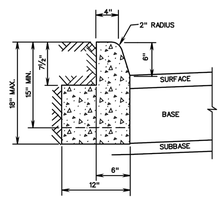
2016 ROAD & BRIDGE STANDARDS

CG-2

NOTES:

1. THIS ITEM MAY BE PRECAST OR CAST IN PLACE.
2. CONCRETE TO BE CLASS A3 IF CAST IN PLACE, 4000 PSI IF PRECAST.
3. CURB HAVING A RADIUS OF 300 FEET OR LESS (ALONG FACE OF CURB) WILL BE PAID FOR AS RADIAL CURB.
4. THE DEPTH OF CURB MAY BE REDUCED AS MUCH AS 3" (10" DEPTH) OR INCREASED AS MUCH AS 3" (22" DEPTH) IN ORDER THAT THE BOTTOM OF CURB WILL COINCIDE WITH THE TOP OF A COURSE OF THE PAVEMENT SUBSTRUCTURE. OTHERWISE, THE DEPTH IS TO BE 16" AS SHOWN. NO ADJUSTMENT IN THE PRICE BID IS TO BE MADE FOR A DECREASE OR AN INCREASE IN DEPTH.
5. CG-2 IS TO BE USED ON ROADWAYS MEETING THE REQUIREMENTS FOR CG-6 AS SHOWN IN APPENDIX A OF THE VDOT ROAD DESIGN MANUAL, IN THE SECTION ON GS URBAN STANDARDS.





ACCEPTABLE ALTERNATIVE IF CURB IS EXTRUDED

SPECIFICATION REFERENCE	STANDARD 6" CURB	VDOT ROAD AND BRIDGE STANDARDS
105 502	VIRGINIA DEPARTMENT OF TRANSPORTATION	REVISION DATE: — SHEET 1 OF 1 201.01

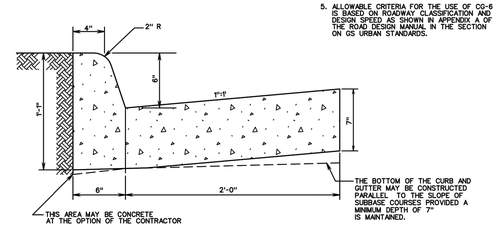
2016 ROAD & BRIDGE STANDARDS

2016 ROAD & BRIDGE STANDARDS

CG-6

NOTES:

1. THIS ITEM MAY BE PRECAST OR CAST IN PLACE.
2. CONCRETE TO BE CLASS A3 IF CAST IN PLACE, 4000 PSI IF PRECAST.
3. COMBINATION CURB & GUTTER HAVING A RADIUS OF 300 FEET OR LESS (ALONG FACE OF CURB) SHALL BE PAID FOR AS RADIAL COMBINATION CURB & GUTTER.
4. FOR USE WITH STABILIZED OPEN-GRADED DRAINAGE LAYER, THE BOTTOM OF THE CURB & GUTTER SHALL BE CONSTRUCTED PARALLEL TO THE SLOPE OF SUBBASE COURSES AND TO THE DEPTH OF THE PAVEMENT.
5. ALLOWABLE CRITERIA FOR THE USE OF CG-6 IS BASED ON ROADWAY CLASSIFICATION AND DESIGN SPEED AS SHOWN IN APPENDIX A OF THE ROAD DESIGN MANUAL IN THE SECTION ON GS URBAN STANDARDS.

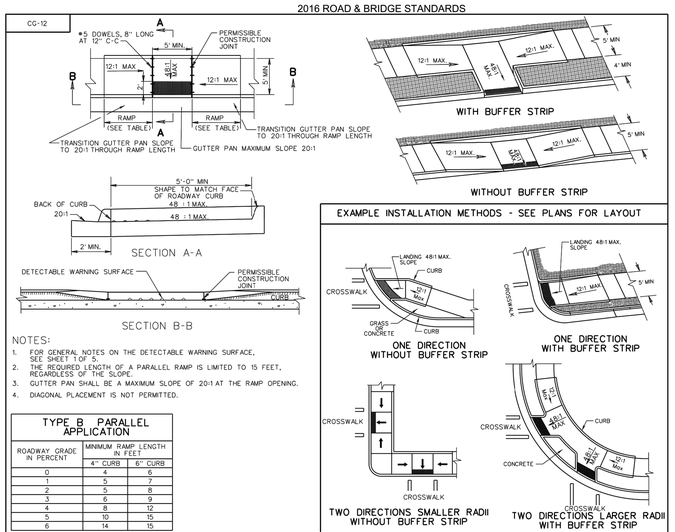


SPECIFICATION REFERENCE	COMBINATION 6" CURB AND GUTTER	VDOT ROAD AND BRIDGE STANDARDS
105 502	VIRGINIA DEPARTMENT OF TRANSPORTATION	REVISION DATE: — SHEET 1 OF 1 201.03

2016 ROAD & BRIDGE STANDARDS

2016 ROAD & BRIDGE STANDARDS

CG-12



NOTES:

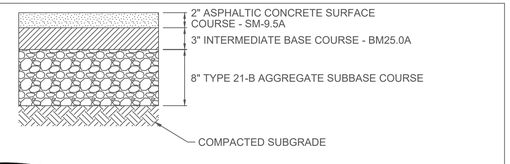
1. FOR GENERAL NOTES ON THE DETECTABLE WARNING SURFACE, SEE SHEET 1 OF 5.
2. THE REQUIRED LENGTH OF A PARALLEL RAMP IS LIMITED TO 15 FEET, REGARDLESS OF THE SLOPE.
3. GUTTER PAN SHALL BE A MAXIMUM SLOPE OF 20:1 AT THE RAMP OPENING.
4. DIAGONAL PLACEMENT IS NOT PERMITTED.

TYPE B PARALLEL APPLICATION		
ROADWAY GRADE IN PERCENT	MINIMUM RAMP LENGTH IN FEET	
	4" CURB	6" CURB
0	4	6
1	5	7
2	5	8
3	6	9
4	8	12
5	10	15
6	14	15

EXAMPLE INSTALLATION METHODS - SEE PLANS FOR LAYOUT

VDOT ROAD AND BRIDGE STANDARDS	A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE.	SPECIFICATION REFERENCE
SHEET 3 OF 5 — REVISION DATE: 04/19 204.03	CG-12 DETECTABLE WARNING SURFACE TYPE B (PARALLEL) APPLICATION VIRGINIA DEPARTMENT OF TRANSPORTATION	105 502 504

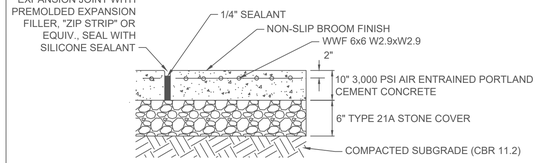
2016 ROAD & BRIDGE STANDARDS



DENOTES HEAVY DUTY ASPHALT PAVEMENT ON PLANS

HEAVY DUTY ASPHALT PAVEMENT SECTION

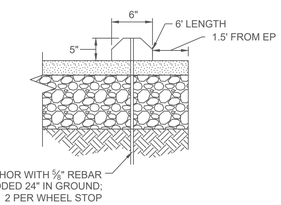
No Scale



DENOTES CONCRETE SERVICE AREA PAVEMENT ON PLANS

HEAVY DUTY CONCRETE SECTION

No Scale



PRECAST CONCRETE WHEEL STOP

No Scale

DATE: 05/02/23
DRAWN BY: Capstone Team
DESIGNED BY: Capstone Team
CHECKED BY: Capstone Team
SCALE: N/A

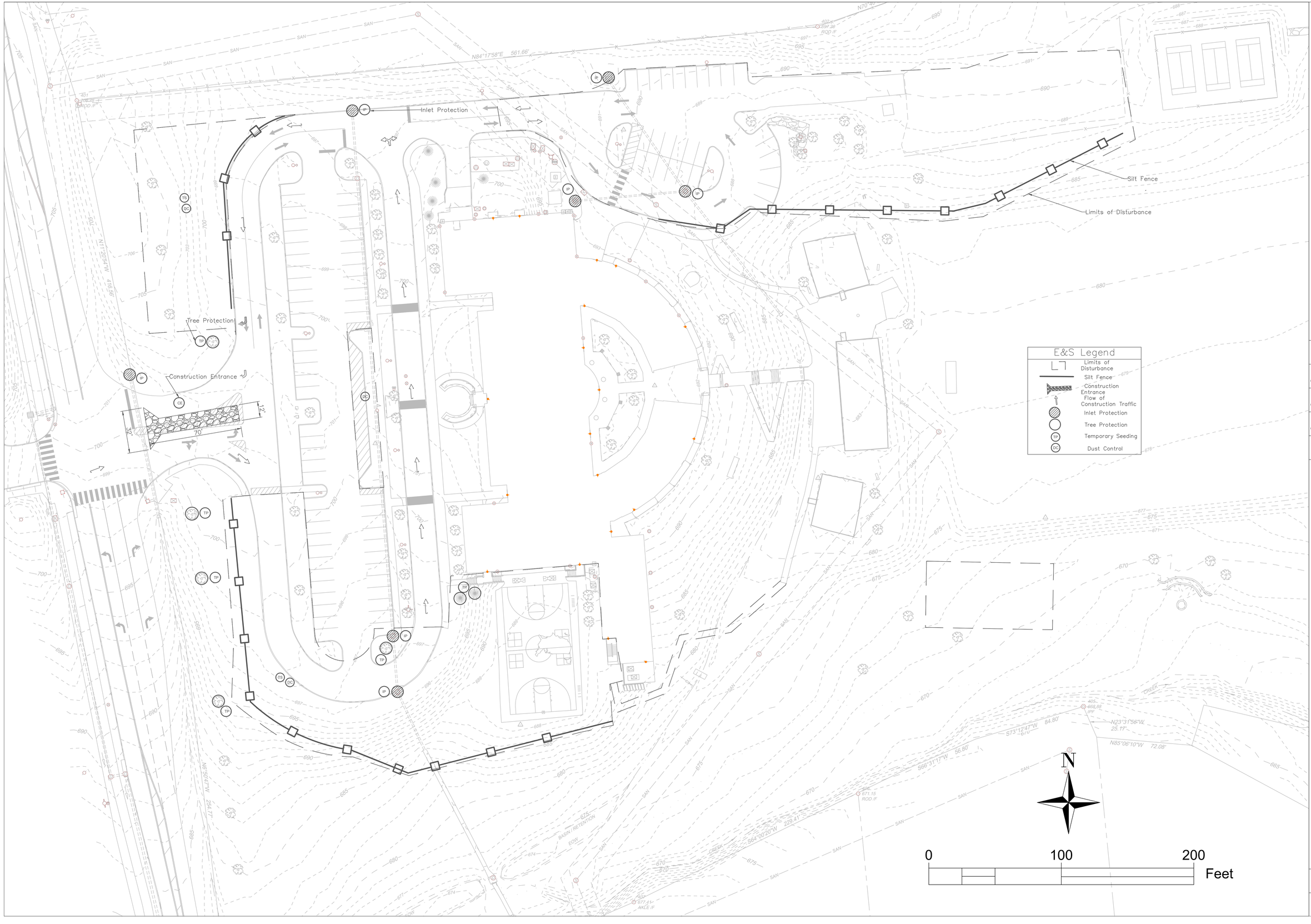
CROZET ELEMENTARY SCHOOL

ALBEMARLE COUNTY - CROZET

NOTES & DETAILS

JOB NO. 1

SHEET NO. C3.0



E&S Legend

- Limits of Disturbance
- Silt Fence
- Construction Entrance
- Flow of Construction Traffic
- Inlet Protection
- Tree Protection
- TP — Temporary Seeding
- DC — Dust Control

DATE	05/02/23
DRAWN BY	Capstone Team
DESIGNED BY	Capstone Team
CHECKED BY	Capstone Team
SCALE	1":30'

CROZET ELEMENTARY SCHOOL

ALBEMARLE COUNTY - CROZET

EROSION & SEDIMENT CONTROL PLAN PHASE 1

JOB NO.	1
SHEET NO.	C4.0

Inlet Protection

Tree Protection

Construction Entrance

Move lighting

Silt Fence

Limits of Disturbance

PS

DC

E&S Legend

- Limits of Disturbance
- Silt Fence
- Construction Entrance
- Flow of Traffic
- Inlet Protection
- Tree Protection
- Permanent Seeding
- Dust Control

0 100 200 Feet

CROZET ELEMENTARY SCHOOL

ALBEMARLE COUNTY - CROZET

EROSION & SEDIMENT CONTROL PLAN PHASE 2

DATE
05/02/23

DRAWN BY
Capstone Team

DESIGNED BY
Capstone Team

CHECKED BY
Capstone Team

SCALE
1":30'

JOB NO.
1

SHEET NO.
C4.1

EROSION AND SEDIMENT CONTROL NARRATIVE

PROJECT DESCRIPTION
THIS PROJECT INCLUDES AN ADDITION TO CROZET ELEMENTARY SCHOOL AND THE REDESIGN OF THE SCHOOL PARKING SYSTEM, INCREASING THE TOTAL AMOUNT OF CAR AND BUS PARKING ON SITE, AS WELL AS CORRESPONDING STORMWATER MANAGEMENT & GRADING TO MEET STATE/COUNTY STANDARDS.

ADJACENT PROPERTY
THE SITE PROPERTY IS BOUNDED BY RESIDENTIAL PARCELS TO THE NORTH AND SOUTH, CROZET AVENUE TO THE WEST, AND AN UNDEVELOPED/AGRICULTURAL PARCEL TO THE EAST.

EXISTING SITE CONDITIONS
THE EXISTING SITE CONSISTS OF THE CROZET ELEMENTARY SCHOOL BUILDING, THE SCHOOL PARKING LOT, AND ADDITIONAL FACILITIES SUCH AS PLAYGROUND SPACE, SPORTS COURTS, EXTERIOR SIDEWALKS, ETC. EXISTING SITE RUNOFF ULTIMATELY FLOWS TO THE SOUTH THROUGH AN EXISTING STORM SYSTEM OR SHEET FLOW UNTIL REACHING AN EXISTING STREAM WHERE IT IS THEN CARRIED OFFSITE.

OFF-SITE AREAS
NO OFF-SITE AREAS WILL BE DISTURBED AS A PART OF THIS PROJECT.

CRITICAL EROSION AREAS
NO CRITICAL EROSION AREA EXIST.

EROSION AND SEDIMENT CONTROL MEASURES
UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE CURRENT ADDITION OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK. THE MINIMUM STANDARDS OF THE VESCH SHALL BE ADHERED TO UNLESS OTHERWISE WAIVED OR APPROVED BY A VARIANCE BY LOCAL AUTHORITIES HAVING JURISDICTION.

EROSION AND SEDIMENT CONTROL MAINTENANCE
ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED IN ACCORDANCE WITH VESCH AND THE CONSTRUCTION SEQUENCE, INCLUDING THE INSPECTION OF ALL MEASURES AFTER ALL RAIN EVENTS.

STRUCTURAL PRACTICES:
1. TEMPORARY CONSTRUCTION ENTRANCE - 3.02 A TEMPORARY CONSTRUCTION ENTRANCE SHALL BE PROVIDED AT THE LOCATION INDICATED ON THE PLANS. IT IS IMPERATIVE THAT THIS MEASURE BE MAINTAINED THROUGHOUT CONSTRUCTION. ITS PURPOSE IS TO REDUCE THE AMOUNT OF MUD TRANSPORTED ONTO PAVED PUBLIC ROADS BY MOTOR VEHICLES OR RUNOFF.
2. SILT FENCE BARRIER - 3.05 SILT FENCE SEDIEMENT BARRIERS SHALL BE INSTALLED DOWNSLOPE OF AREAS WITH MINIMAL GRADES TO FILTER SETTLEMENT LADEN RUNOFF FROM SHEET FLOW AS INDICATED. ITS PRPOSE IS TO PREVENT SEDIMENT FROM LEAVING THE SITE.
3. STORM DRAIN INLET PROTECTION - 3.07 STONE FILTERS SHALL BE PLACED AT THE INLET OF ALL DRAINAGE STRUCTURES AS INDICATED ON PLANS. ITS PURPOSE IS TO PREVENT SEDIMENT FROM ENTERING THE STORM DRAINAGE SYSTEM PRIOR TO PERMANENT STABILIZATION.
4. TREE PROTECTION - 3.38 PROTECTION OF DESIRABLE TRESS FROM MECHANICAL AND OTHER INJUSRY DURING LAND DISTURBING AND CONSTRUCTION ACTIVITY.
5. DUST CONTROL - 3.39 DUST CONTROL IS TO BE USED THROUGH THE SITE IN AREAS SUBJECT TO SURFACE AND AIR MOVEMENT

VEGETATIVE PRACTICES:
6. TEMPORARY SEEDING - 3.31 ALL DENUDED AREAS WHICH WILL BE LEFT DORMANT FOR MORE THAN 30 DAYS SHALL BE SEEDED WITH FAST GERMINATING TEMPORARY VEGETATION IMMEDIATELY FOLLOWING GRADING OF THOSE AREAS. SELECTION OF THE SEED MIXTURE SHALL DEPEND ON THE TIME OF YEAR IT IS APPLIED.
7. PERMANENT SEEDING - 3.32 FOLLOWING GRADING ACTIVITIES, ESTABLISH PERENNIAL VEGETATIVE COVER BY PLANTING SEED TO REDUCE EROSION, STABILIZE DISTURBED AREAS, AND ENHANCE NATURAL BEAUTY.

MANAGEMENT STRATEGIES
1. PROVIDE SEDIMENT TRAPPING MEASURES AS A FIRST STEP IN GRADING, SEED AND MULCH IMMEDIATELY FOLLOWING INSTALLATION.
2. PROVIDE TEMPORARY SEEDING OR OTHER STABILIZATION IMMEDIATELY AFTER GRADING.
3. ISOLATE TRENCHING FOR UTILITIES AND DRAINAGE FROM DOWNSTREAM CONVEYANCES IN ORDER TO MINIMIZE PERIMETER CONTROLS.
4. ALL EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE MAINTAINED UNTIL THEY ARE NO LONGER REQUIRED TO COMPLY WITH THE CONTRACT DOCUMENTS OR STATE LAW.

PERMANENT STABILIZATION
ALL NON-PAVED AREAS DISTURBED BY CONSTRUCTION SHALL BE STABILIZED WITH PERMANENT SEEDING IMMEDIATELY FOLLOWING FINISHED GRADING. SEEDING SHALL BE IN ACCORDANCE WITH STD. & SPEC. 3.32, PERMANENT SEEDING. SEED TYPE SHALL BE AS SPECIFIED FOR "MINIMUM CARE LAWNS" AND "GENERAL SLOPES" IN THE HANDBOOK FOR SLOPES LESS THAN 3:1. FOR SLOPES GREATER THAN 3:1, SEED TYPE SHALL BE AS SPECIFIED FOR "LOW MAINTENANCE SLOPES" IN TABLE 3.32-D OF THE HANDBOOK. FOR MULCH (STRAW OR FIBER) SHALL BE USED ON ALL SEEDED SURFACES. IN ALL SEEDING OPERATIONS SEED, FERTILIZER AND LIME SHALL BE APPLIED PRIOR TO MULCHING.

SEQUENCE OF INSTALLATION
PHASE I
1. A PRE-CONSTRUCTION MEETING IS REQUIRED WITH ALBEMARLE COUNTY E&S INSPECTOR, CONTRACTOR, OWNER, AND ENGINEER. THIS MEETING SHALL TAKE PLACE AT THE COMMUNITY DEVELOPMENT OFFICE. CLEARING LIMITS MUST BE FLAGGED PRIOR TO THE MEETING WITH ONE (1) WEEK OF NOTICE.
2. INSTALL CONSTRUCTION ENTRANCE, TEMPORARY SEEDING, DUST CONTROL, INLET PROTECTION, SILT FENCE, AND TREE PROTECTION. NO WORK SHALL BEGIN IN THOSE AREAS UNTIL ALL ESC MEASURES IN THOSE AREAS ARE INSTALLED.
3. AFTER ALL EROSION AND SEDIMENT CONTROL MEASURES ARE IN PLACE, SITE WORK CON BEGIN.
4. ROUGH GRADE PROJECT AREA.
5. SEED ALL DENUDED AREAS PER VESCH STANDARDS.

PHASE II
1. FINE GRADE PROJECT AREA. APPLY PERMANENT SOIL STABILIZATION TO THESE AREAS WITHIN SEVEN DAYS AFTER FINAL GRADE IS ACHIEVED.
2. APPLY PERMANENT SOIL STABILIZATION TO THESE AREAS WITHIN SEVEN DAYS AFTER FINAL GRADE IS ACHIEVED. SILT FENCE AND INLET PROTECTION MUST BE MAINTAINED THROUGH GRADING AND CONSTRUCTION.
3. ONCE CONSTRUCTION IS COMPLETE AND ALL CONTRIBUTING AREAS ARE STABILIZED, EROSION CONTROL MEASURES CAN BE REMOVED UPON APPROVAL FROM THE E&S INSPECTOR.

GENERAL CONSTRUCTION NOTES FOR EROSION AND SEDIMENT CONTROL

1. THE PLAN APPROVING AUTHORITY MUST BE NOTIFIED ONE WEEK PRIOR TO THE PRE-CONSTRUCTION CONFERENCE, ONE WEEK PRIOR TO THE COMMENCEMENT OF LAND DISTURBING ACTIVITY, AND ONE WEEK PRIOR TO THE FINAL INSPECTION.
2. ALL EROSION AND SEDIMENT CONTROL MEASURES WILL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK AND VIRGINIA REGULATIONS VR 625-02-00 EROSION AND SEDIMENT CONTROL REGULATIONS.
3. ALL EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE PLACED PRIOR TO OR AS THE FIRST STEP IN CLEARING.
4. A COPY OF THE APPROVED EROSION AND SEDIMENT CONTROL PLAN SHALL BE MAINTAINED ON THE SITE AT ALL TIMES.
5. PRIOR TO COMMENCING LAND DISTURBING ACTIVITIES IN AREAS OTHER THAN INDICATED ON THESE PLANS (INCLUDING, BUT NOT LIMITED TO, OFF-SITE BORROW OR WASTE AREAS), THE CONTRACTOR SHALL SUBMIT A SUPPLEMENTARY EROSION CONTROL PLAN TO THE OWNER FOR REVIEW AND APPROVAL BY THE PLAN APPROVING AUTHORITY.
6. THE CONTRACTOR IS RESPONSIBLE FOR INSTALLATION OF ANY ADDITIONAL EROSION CONTROL MEASURES NECESSARY TO PREVENT EROSION AND SEDIMENTATION AS DETERMINED BY THE PLAN APPROVING AUTHORITY.
7. ALL DISTURBED AREAS ARE TO DRAIN TO APPROVED SEDIMENT CONTROL MEASURES AT ALL TIMES DURING LAND DISTURBING ACTIVITIES AND DURING SITE DEVELOPMENT UNTIL FINAL STABILIZATION IS ACHIEVED.
8. DURING DEWATERING OPERATIONS, WATER WILL BE PUMPED INTO AN APPROVED FILTERING DEVICE.
9. THE CONTRACTOR SHALL INSPECT ALL EROSION CONTROL MEASURES PERIODICALLY AND AFTER EACH RUNOFF-PRODUCING EVENT. ANY NECESSARY REPAIRS OR CLEANUP TO MAINTAIN THE EFFECTIVENESS OF THE EROSION CONTROL DEVICES SHALL BE MADE IMMEDIATELY.
10. ALL FILL MATERIAL TO BE TAKEN FROM AN APPROVED, DESIGNATED BORROW AREA.
11. ALL WASTE MATERIALS SHALL BE TAKEN TO AN APPROVED WASTE AREA. EARTH FILL SHALL BE INERT MATERIALS ONLY, FREE OF ROOTS, STUMPS, WOOD, RUBBISH, AND OTHER DEBRIS.
12. BORROW OR WASTE AREAS ARE TO BE RECLAIMED WITHIN 7 DAYS OF COMPLETION PER ZONING ORDINANCE SECTION 5.1.28.
13. ALL INERT MATERIALS SHALL BE TRANSPORTED IN COMPLIANCE WITH SECTION 13-301 OF THE CODE OF ALBEMARLE.
14. BORROW, FILL OR WASTE ACTIVITY INVOLVING INDUSTRIAL-TYPE POWER EQUIPMENT SHALL BE LIMITED TO THE HOURS OF 7:00AM TO 9:00PM.
15. BORROW, FILL OR WASTE ACTIVITY SHALL BE CONDUCTED IN A SAFE MANNER THAT MAINTAINS LATERAL SUPPORT, OR ORDER TO MINIMIZE ANY HAZARD TO PERSONS, PHYSICAL DAMAGE TO ADJACENT LAND AND STRUCTURES/IMPROVEMENTS, AND DAMAGE TO ANY PUBLIC STREET BECAUSE OF SLIDES, SINKING, OR COLLAPSE.
16. THE DEVELOPER SHALL RESERVE THE RIGHT TO INSTALL, MAINTAIN, REMOVE OR CONVERT TO PERMANENT STORMWATER MANAGEMENT FACILITIES WHERE APPLICABLE ALL EROSION CONTROL MEASURES REQUIRED BY THIS PLAN REGARDLESS OF THE SALE OF ANY LOT, UNIT, BUILDING OR OTHER PORTION OF THE PROPERTY.
17. TEMPORARY STABILIZATION SHALL BE TEMPORARY SEEDING AND MULCHING. SEEDING IS TO BE AT 75 LBS/ACRE, AND IN THE MONTHS OF SEPTEMBER TO FEBRUARY TO CONSIST A 50/50 MIX OF ANNUAL RYEGRASS AND CEREAL WINTER RYE, OR IN MARCH AND APRIL TO CONSIST OF ANNUAL RYE, OR MAY THROUGH AUGUST TO CONSIST OF GERMAN MILLET. STRAW MULCH IS TO BE APPLIED AT 80LBS/100SF. ALTERNATIVES ARE SUBJECT TO APPROVAL BY THE COUNTY EROSION CONTROL INSPECTOR.
18. PERMANENT STABILIZATION SHALL BE LIME AND FERTILIZER, PERMANENT SEEDING, AND MULCH. AGRICULTURAL GRADE LIMESTONE SHALL BE APPLIED AT 90LBS/1000SF, INCORPORATED INTO THE TOP 4-6 INCHES OF SOIL. FERTILIZER SHALL BE APPLIED AT 1000LBS/ACRE AND CONSIST OF A 10-20-10 NUTRIENT MIX. PERMANENT SEEDING SHALL BE APPLIED AT 180LBS/ACRE AND CONSIST OF 95% KENTUCKY 31 OR TALL FESCUE AND 0-5% PERENNIAL RYEGRASS OR KENTUCKY BLUEGRASS. STRAW MULCH IS TO BE APPLIED AT 80LBS/100SF. ALTERNATIVES ARE SUBJECT TO APPROVAL BY THE COUNTY EROSION CONTROL INSPECTOR.
19. MAINTENANCE: ALL MEASURES SHALL BE INSPECTED WEEKLY AND AFTER EACH RAINFALL EVENT. ANY DAMAGE OR CLOGGING TO STRUCTURAL MEASURES SHALL BE REPAIRED IMMEDIATELY. SILT TRAPS SHALL BE CLEANED WHEN 50% OF THE WET STORAGE VOLUME IS FILLED WITH SEDIMENT. ALL SEEDED AREAS SHALL BE RESEEDED WHEN NECESSARY TO ACHIEVE A GOOD STAND OF GRASS. SILT FENCE AND DIVERSION DYKES WHICH COLLECT SEDIMENT TO HALF THEIR HEIGHT MUST BE CLEANED AND REPAIRED IMMEDIATELY.
20. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS OF FINAL SITE STABILIZATION, WHEN MEASURES ARE NO LONGER NEEDED, SUBJECT TO APPROVAL BY THE COUNTY EROSION CONTROL INSPECTOR.
21. THIS PLAN SHALL BE VOID IF THE OWNER DOES NOT OBTAIN A PERMIT WTIHIN 1 YEAR OF THE DATE OF APPROVAL. (WATER PROTECTION ORDINANCE SECTION 17-204G.)
22. PERMANENT VEGETATION SHALL BE INSTALLED ON ALL DENUDED AREAS WITHIN NINE (9) MONTHS AFTER THE DATE THE LAND DISTURBING ACTIVITY COMMENCED. (WATER PROTECTION ORDINANCE SECTION 17-207B)

GENERAL EROSION AND SEDIMENT CONTROL NOTES:

ES-1: UNLESS OTHERWISE INDICATED, CONSTRUCT AND MAINTAIN ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE LATEST EDITION OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK AND VIRGINIA REGULATIONS VR 625-02-00 EROSION AND SEDIMENT CONTROL REGULATIONS.

ES-2: THE CONTROLLING EROSION AND SEDIMENT CONTROL AUTHORITY WILL MAKE A CONTINUING REVIEW AND EVALUATION OF THE METHODS AND EFFECTIVENESS OF THE EROSION CONTROL PLAN.

ES-3: PLACE ALL EROSION AND SEDIMENT CONTROL MEASURES PRIOR TO OR AS THE FIRST STEP IN CLEARING, GRADING, OR LAND DISTURBANCE.

ES-4: MAINTAIN A COPY OF THE APPROVED EROSION AND SEDIMENT CONTROL PLAN ON THE SITE AT ALL TIMES.

ES-5: PRIOR TO COMMENCING LAND-DISTURBING ACTIVITIES IN AREAS OTHER THAN INDICATED ON THESE PLANS (INCLUDING, BUT NOT LIMITED TO, OFFSITE BORROW OR WASTE AREA), SUBMIT A SUPPLEMENTARY EROSION CONTROL PLAN TO THE ARCHITECT/ENGINEER AND THE CONTROLLING EROSION AND SEDIMENT CONTROL AUTHORITY FOR REVIEW AND ACCEPTANCE.

ES-6: PROVIDE ADDITIONAL EROSION CONTROL MEASURES NECESSARY TO PREVENT EROSION AND SEDIMENTATION AS DETERMINED BY THE RESPONSIBLE LAND DISTURBER. (MODIFIED NOTE)

ES-7: ALL DISTURBED AREAS SHALL DRAIN TO APPROVED SEDIMENT CONTROL MEASURES AT ALL TIMES DURING LAND-DISTURBING ACTIVITIES AND DURING SITE DEVELOPMENT.

ES-8: DURING DEWATERING OPERATIONS, PUMP WATER INTO AN APPROVED FILTERING DEVICE.

ES-9: INSPECT ALL EROSION CONTROL MEASURES DAILY AND AFTER EACH RUNOFF- PRODUCING RAINFALL EVENT. MAKE ANY NECESSARY REPAIRS OR CLEANUP TO MAINTAIN THE EFFECTIVENESS OF THE EROSION CONTROL DEVICES IMMEDIATELY.

SOILS INFORMATION:

5B - BELVOIR LOAM, 2 TO 7 PERCENT SLOPES, 16 TO 30 INCHES TO FRAGIPAN, SOMEWHAT POORLY DRAINED, HYDROLOGIC SOIL GROUP: D

7B - BRADDOCK LOAM, 2 TO 7 PERCENT SLOPES, MORE THAN 80 INCHES TO RESTRICTIVE FEATURES, WELL DRAINED, HYDROLOGIC SOIL GROUP: B

8C3 - BRADDOCK CLAY LOAM, 7 TO 15 PERCENT SLOPES, SEVERELY ERODED, MORE THAN 80 INCHES TP RESTRICTIVE FEATURES, WELL DRAINED, HYDROLOGIC SOIL GROUP: B

25B - DYKE SILT LOAM, 2 TO 7 PERCENT SLOPES, MORE THAN 80 INCHES TO RESTRICTIVE FEATURES, , WELL DRAINED, HYDROLOGIC SOIL GROUP: B

26C3 - DYKE CLAY LOAM, 7 TO 15 PERCENT SLOPES, SEVERLY ERODED, MORE THAN 80 INCHES TO RESTRICTIVE FEATURES, WELL DRAINED, HYDROLOGIC SOIL GROUP: B

MINIMUM STANDARDS:

AN EROSION AND SEDIMENT CONTROL PROGRAM ADOPTED BY A DISTRICT OR LOCALITY MUST BE CONSISTENT WITH THE FOLLOWING CRITERIA, TECHNIQUES AND METHODS:

MS-1. PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO DENUDED AREAS WITHIN SEVEN DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. TEMPORARY SOIL STABILIZATION SHALL BE APPLIED WITHIN SEVEN DAYS TO DENUDED AREAS THAT MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT FOR LONGER THAN 30 DAYS. PERMANENT STABILIZATION SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT DORMANT FOR MORE THAN ONE YEAR.

MS-2. DURING CONSTRUCTION OF THE PROJECT, SOIL STOCKPILES AND BORROW AREAS SHALL BE STABILIZED OR PROTECTED WITH SEDIMENT TRAPPING MEASURES. THE APPLICANT IS RESPONSIBLE FOR THE TEMPORARY PROTECTION AND PERMANENT STABILIZATION OF ALL SOIL STOCKPILES ON SITE AS WELL AS BORROW AREAS AND SOIL INTENTIONALLY TRANSPORTED FROM THE PROJECT SITE.

MS-3. A PERMANENT VEGETATIVE COVER SHALL BE ESTABLISHED ON DENUDED AREAS NOT OTHERWISE PERMANENTLY STABILIZED. PERMANENT VEGETATION SHALL NOT BE CONSIDERED ESTABLISHED UNTIL A GROUND COVER IS ACHIEVED THAT IS UNIFORM, MATURE ENOUGH TO SURVIVE AND WILL INHIBIT EROSION.

MS-4. SEDIMENT BASINS AND TRAPS, PERIMETER DIKES, SEDIMENT BARRIERS AND OTHER MEASURES INTENDED TO TRAP SEDIMENT SHALL BE CONSTRUCTED AS A FIRST STEP IN ANY LAND-DISTURBING ACTIVITY AND SHALL BE MADE FUNCTIONAL BEFORE UPSLOPE LAND DISTURBANCE TAKES PLACE.

MS-5. STABILIZATION MEASURES SHALL BE APPLIED TO EARTHEN STRUCTURES SUCH AS DAMS, DIKES AND DIVERSIONS IMMEDIATELY AFTER INSTALLATION.

MS-6. SEDIMENT TRAPS AND SEDIMENT BASINS SHALL BE DESIGNED AND CONSTRUCTED BASED UPON THE TOTAL DRAINAGE AREA TO BE SERVED BY THE TRAP OR BASIN.
A. THE MINIMUM STORAGE CAPACITY OF A SEDIMENT TRAP SHALL BE 134 CUBIC YARDS PER ACRE OF DRAINAGE AREA AND THE TRAP SHALL ONLY CONTROL DRAINAGE AREAS LESS THAN THREE ACRES.
B. SURFACE RUNOFF FROM DISTURBED AREAS THAT IS COMPRISED OF FLOW FROM DRAINAGE AREAS GREATER THAN OR EQUAL TO THREE ACRES SHALL BE CONTROLLED BY A SEDIMENT BASIN. THE MINIMUM STORAGE CAPACITY OF A SEDIMENT BASIN SHALL BE 134 CUBIC YARDS PER ACRE OF DRAINAGE AREA. THE OUTFALL SYSTEM SHALL, AT A MINIMUM, MAINTAIN THE STRUCTURAL INTEGRITY OF THE BASIN DURING A 25-YEAR STORM OF 24-HOUR DURATION. RUNOFF COEFFICIENTS USED IN RUNOFF CALCULATIONS SHALL CORRESPOND TO A BARE EARTH CONDITION OR THOSE CONDITIONS EXPECTED TO EXIST WHILE THE SEDIMENT BASIN IS UTILIZED.

MS-7. CUT AND FILL SLOPES SHALL BE DESIGNED AND CONSTRUCTED IN A MANNER THAT WILL MINIMIZE EROSION. SLOPES THAT ARE FOUND TO BE ERODING EXCESSIVELY WITHIN ONE YEAR OF PERMANENT STABILIZATION SHALL BE PROVIDED WITH ADDITIONAL SLOPE STABILIZING MEASURES UNTIL THE PROBLEM IS CORRECTED.

MS-8. CONCENTRATED RUNOFF SHALL NOT FLOW DOWN CUT OR FILL SLOPES UNLESS CONTAINED WITHIN AN ADEQUATE TEMPORARY OR PERMANENT CHANNEL, FLUME OR SLOPE DRAIN STRUCTURE.

MS-9. WHENEVER WATER SEEPS FROM A SLOPE FACE, ADEQUATE DRAINAGE OR OTHER PROTECTION SHALL BE PROVIDED.

MS-10. ALL STORM SEWER INLETS THAT ARE MADE OPERABLE DURING CONSTRUCTION SHALL BE PROTECTED SO THAT SEDIMENT-LADEN WATER CANNOT ENTER THE CONVEYANCE SYSTEM WITHOUT FIRST BEING FILTERED OR OTHERWISE TREATED TO REMOVE SEDIMENT.

MS-11. BEFORE NEWLY CONSTRUCTED STORMWATER CONVEYANCE CHANNELS OR PIPES ARE MADE OPERATIONAL, ADEQUATE OUTLET PROTECTION AND ANY REQUIRED TEMPORARY OR PERMANENT CHANNEL LINING SHALL BE INSTALLED IN BOTH THE CONVEYANCE CHANNEL AND RECEIVING CHANNEL.

MS-12. WHEN WORK IN A LIVE WATERCOURSE IS PERFORMED, PRECAUTIONS SHALL BE TAKEN TO MINIMIZE ENCROACHMENT, CONTROL SEDIMENT TRANSPORT AND STABILIZE THE WORK AREA TO THE GREATEST EXTENT POSSIBLE DURING CONSTRUCTION. NONERODIBLE MATERIAL SHALL BE USED FOR THE CONSTRUCTION OF CAUSEWAYS AND COFFERDAMS. EARTHEN FILL MAY BE USED FOR THESE STRUCTURES IF ARMORED BY NONERODIBLE COVER MATERIALS.

MS-13. WHEN A LIVE WATERCOURSE MUST BE CROSSED BY CONSTRUCTION VEHICLES MORE THAN TWICE IN ANY SIX-MONTH PERIOD, A TEMPORARY VEHICULAR STREAM CROSSING CONSTRUCTED OF NONERODIBLE MATERIAL SHALL BE PROVIDED.

MS-14. ALL APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS PERTAINING TO WORKING IN OR CROSSING LIVE WATERCOURSES SHALL BE MET.

MS-15. THE BED AND BANKS OF A WATERCOURSE SHALL BE STABILIZED IMMEDIATELY AFTER WORK IN THE WATERCOURSE IS COMPLETED.

MS-16. UNDERGROUND UTILITY LINES SHALL BE INSTALLED IN ACCORDANCE WITH THE FOLLOWING STANDARDS IN ADDITION TO OTHER APPLICABLE CRITERIA:
A. NO MORE THAN 500 LINEAR FEET OF TRENCH MAY BE OPENED AT ONE TIME.
B. EXCAVATED MATERIAL SHALL BE PLACED ON THE UPHILL SIDE OF TRENCHES.
C. EFFLUENT FROM DEWATERING OPERATIONS SHALL BE FILTERED OR PASSED THROUGH AN APPROVED SEDIMENT TRAPPING DEVICE, OR BOTH, AND DISCHARGED IN A MANNER THAT DOES NOT ADVERSELY AFFECT FLOWING STREAMS OR OFF-SITE PROPERTY.
D. MATERIAL USED FOR BACKFILLING TRENCHES SHALL BE PROPERLY COMPACTED IN ORDER TO MINIMIZE EROSION AND PROMOTE STABILIZATION.
E. RESTABILIZATION SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THESE REGULATIONS.
F. APPLICABLE SAFETY REGULATIONS SHALL BE COMPLIED WITH.

MS-17. WHERE CONSTRUCTION VEHICLE ACCESS ROUTES INTERSECT PAVED OR PUBLIC ROADS, PROVISIONS SHALL BE MADE TO MINIMIZE THE TRANSPORT OF SEDIMENT BY VEHICULAR TRACKING ONTO THE PAVED SURFACE. WHERE SEDIMENT IS TRANSPORTED ONTO A PAVED OR PUBLIC ROAD SURFACE, THE ROAD SURFACE SHALL BE CLEANED THOROUGHLY AT THE END OF EACH DAY. SEDIMENT SHALL BE REMOVED FROM THE ROADS BY SHOVELING OR SWEEPING AND TRANSPORTED TO A SEDIMENT CONTROL DISPOSAL AREA. STREET WASHING SHALL BE ALLOWED ONLY AFTER SEDIMENT IS REMOVED IN THIS MANNER. THIS PROVISION SHALL APPLY TO INDIVIDUAL DEVELOPMENT LOTS AS WELL AS TO LARGER LAND-DISTURBING ACTIVITIES.

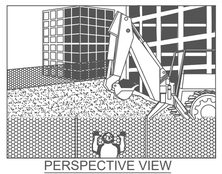
MS-18. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS AFTER FINAL SITE STABILIZATION OR AFTER THE TEMPORARY MEASURES ARE NO LONGER NEEDED, UNLESS OTHERWISE AUTHORIZED BY THE LOCAL PROGRAM AUTHORITY. TRAPPED SEDIMENT AND THE DISTURBED SOIL AREAS RESULTING FROM THE DISPOSITION OF TEMPORARY MEASURES SHALL BE PERMANENTLY STABILIZED TO PREVENT FURTHER EROSION AND SEDIMENTATION.

MS-19. PROPERTIES AND WATERWAYS DOWNSTREAM FROM DEVELOPMENT SITES SHALL BE PROTECTED FROM SEDIMENT DEPOSITION, EROSION AND DAMAGE DUE TO INCREASES IN VOLUME, VELOCITY AND PEAK FLOW RATE OF STORMWATER RUNOFF FOR THE STATED FREQUENCY STORM OF 24-HOUR DURATION IN ACCORDANCE WITH THE STANDARDS AND CRITERIA LISTED IN THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, CHAPTER 8 PAGES 20-24.

DATE
05/02/23
DRAWN BY
Capstone Team
DESIGNED BY
Capstone Team
CHECKED BY
Capstone Team
SCALE
N/A

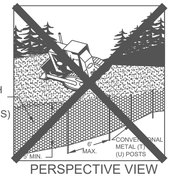
CROZET ELEMENTARY SCHOOL
ALBEMARLE COUNTY - CROZET
EROSION & SEDIMENT CONTROL NOTES

JOB NO.
1
SHEET NO.
C4.2

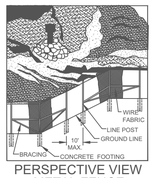


PERSPECTIVE VIEW

POLYETHYLENE FABRIC (ATTACH TO POSTS WITH METAL TIE WIRES)



PERSPECTIVE VIEW
PLASTIC FENCE



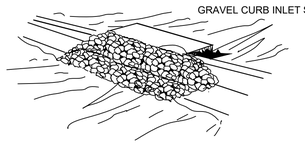
PERSPECTIVE VIEW
METAL FENCE

SAF

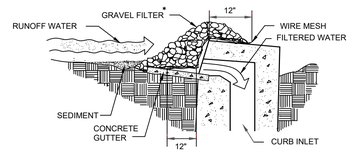
3.1-1

SAFETY FENCE

No Scale



GRAVEL CURB INLET SEDIMENT FILTER



* GRAVEL SHALL BE VDOT #3, #357 OR 5 COARSE AGGREGATE.

IP

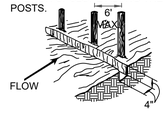
SPECIFIC APPLICATION: THIS METHOD OF INLET PROTECTION IS APPLICABLE AT CURB INLETS WHERE PONDING IN FRONT OF THE STRUCTURE IS NOT LIKELY TO CAUSE INCONVENIENCE OR DAMAGE TO ADJACENT STRUCTURES AND UNPROTECTED AREAS.

3.07- 6

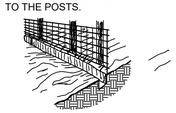
STORMWATER INLET PROTECTION

No Scale

1. SET POSTS AND EXCAVATE A 4"X4" TRENCH UPSLOPE ALONG THE LINE OF POSTS.

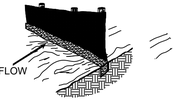


2. STAPLE WIRE FENCING TO THE POSTS.

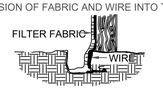


3. ATTACH THE FILTER FABRIC TO THE WIRE FENCE AND EXTEND IT INTO THE TRENCH.

4. BACKFILL AND COMPACT THE EXCAVATED SOIL.



EXTENSION OF FABRIC AND WIRE INTO THE TRENCH.

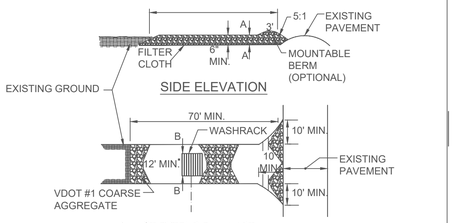


SF

3.05-1

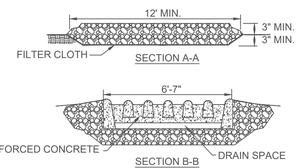
CONSTRUCTION OF A SILT FENCE

No Scale



* MUST EXTEND FULL WIDTH OF INGRESS AND EGRESS OPERATION.

PLAN VIEW

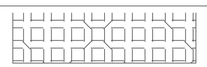


CE

3.02-1

STONE CONSTRUCTION ENTRANCE

No Scale



STANDARD ORANGE VINYL OR PLASTIC CONSTRUCTION FENCE ATTACHED TO POSTS (PRE-WEATHERED WOOD, GALVANIZED STEEL, IRON OR THICK PVC PLASTIC), AT LEAST 40" ABOVE FINISH GRADE WITH SPAN BETWEEN POSTS NO GREATER THAN 6' ON CENTER. EVERY NINTH POST SHALL CONTAIN A WARNING SIGN THAT CLEARLY IDENTIFIES THE FENCE AS A TREE PROTECTION FENCE.

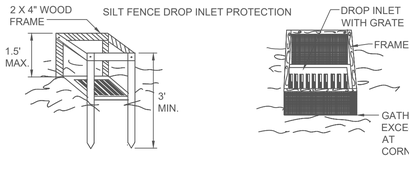
TP

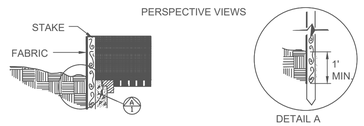
NO SCALE

3.38

TREE PROTECTION

No Scale





ELEVATION OF STAKE AND FABRIC ORIENTATION

SPECIFIC APPLICATION

THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE THE INLET DRAINS A RELATIVELY FLAT AREA (SLOPE NO GREATER THAN 5%) WHERE THE INLET SHEET OR OVERLAND FLOWS (NOT EXCEEDING 1 C.F.S.) ARE TYPICAL. THE METHOD SHALL NOT APPLY TO INLETS RECEIVING CONCENTRATED FLOWS, SUCH AS IN STREET OR HIGHWAY MEDIANS.

IP

3.07-1

STORM DRAIN INLET PROTECTION

No Scale

TABLE 3.32-D
SITE SPECIFIC SEEDING MIXTURES FOR PIEDMONT AREA

	TOTAL LBS. PER ACRE
MINIMUM CARE LAWN	
COMMERCIAL OR RESIDENTIAL	175-200 LBS.
KENTUCKY 31 OR TURF-TYPE TALL FESCUE	90-100%
IMPROVED PERENNIAL RYEGRASS	0-5%
KENTUCKY BLUEGRASS	0-5%
GENERAL SLOPE (3:1 OR LESS)	
KENTUCKY 31 FESCUE	128 LBS.
RED TOP GRASS	2 LBS.
SEASONAL NURSE CROP *	20 LBS.
	150 LBS.
LOW-MAINTENANCE SLOPE (STEEPER THAN 3:1)	
KENTUCKY 31 FESCUE	108 LBS.
RED TOP GRASS	2 LBS.
SEASONAL NURSE CROP *	20 LBS.
CROWNVETCH **	20 LBS.
	150 LBS.

* USE SEASONAL NURSE CROP IN ACCORDANCE WITH SEEDING DATES AS STATED BELOW:
FEBRUARY 16TH THROUGH APRIL..... ANNUAL RYE
MAY 1ST THROUGH AUGUST 15TH..... FOXTAIL MILLET
AUGUST 16TH THROUGH OCTOBER..... ANNUAL RYE
NOVEMBER THROUGH FEBRUARY 15TH..... WINTER RYE

** SUBSTITUTE SERICEA LESPEDEZA FOR CROWNVETCH EAST OF FARMVILLE, VA (MAY THROUGH SEPTEMBER USE HULLED SERICEA, ALL OTHER PERIODS, USE UNHULLED SERICEA). IF FLATPEA IS USED IN LIEU OF CROWNVETCH, INCREASE RATE TO 30 LBS./ACRE. ALL LEGUME SEED MUST BE PROPERLY INOCULATED. WEEPING LOVEGRASS MAY BE ADDED TO ANY SLOPE OR LOW-MAINTENANCE MIX DURING WARMER SEEDING PERIODS; ADD 10-20 LBS./ACRE IN MIXES.

PS

PERMANENT SEEDING MIX FOR PIEDMONT AREA

No Scale

TABLE 3.31-B
ACCEPTABLE TEMPORARY SEEDING PLANT MATERIALS
"QUICK REFERENCE FOR ALL REGIONS"

PLANTING DATES	SPECIES	RATE (LBS./ACRE)
SEPT. 1 - FEB. 15	50/50 MIX OF ANNUAL RYEGRASS (LOLIUM MULTI-FLORUM) & CEREAL (WINTER) RYE (SECALE CEREALE)	50-100
FEB. 16 - APR. 30	ANNUAL RYEGRASS (LOLIUM MULTI-FLORUM)	60-100
MAY 1 - AUG. 31	GERMAN MILLET (SETARIA ITALICA)	50

TS

TEMPORARY SEEDING PLANT MATERIALS

No Scale

DATE
05/02/23
DRAWN BY
Capstone Team
DESIGNED BY
Capstone Team
CHECKED BY
Capstone Team
SCALE
N/A

CROZET ELEMENTARY SCHOOL

ALBEMARLE COUNTY - CROZET

EROSION & SEDIMENT CONTROL DETAILS

JOB NO.
1
SHEET NO.
C4.3

CG-2
New pavement begins
20ft
CG-6
24.5ft
CG-12
21ft
Keep existing ADA space
Move lighting
New pavement begins
CG-2
New pavement begins
3 additional ADA spaces
CG-2
CG-2 Keep existing ADA space
Wheel Stop (TYP.)
New pavement begins
CG-6
5ft (TYP.)
New pavement begins
20ft
CG-2
CG-6
CG-2
CG-2
CG-2
ADA Ramp
30ft
6ft
30ft
Landing
8ft (TYP.)
5ft (TYP.)
Bench platform
Retaining Wall
CG-2
12 Bus Spaces
30.5ft
44ft
14ft
23ft
32ft
58ft
34ft
23ft
CG-6
CG-2
16ft
20ft
24ft
9ft
CG-6
Bioretention Garden
Basketball Court
N84°17'58"E 561.66'
N70°40'12"E 107.23'
N11°20'54"W 416.59'
N6°50'47"W 254.77'
S64°00'20"W 229.41'
S66°31'17"W 56.80'
S73°12'47"W 84.80'
N23°31'56"W 25.17'
N85°06'10"W 72.08'
0
100
200
Feet
N

DATE
05/02/23
DRAWN BY
Capstone Team
DESIGNED BY
Capstone Team
CHECKED BY
Capstone Team
SCALE
1":30'

CROZET ELEMENTARY SCHOOL
ALBEMARLE COUNTY - CROZET
LAYOUT PLAN

JOB NO.
1
SHEET NO.
C5.0

Legend	
BC	Bottom of Curb
ME	Match Existing
EP	Edge of Pavement

BC 700.01'
ME 696.80'
ME 697.72'
BC 698.77'
BC 699.25'
Inv. In = 692.55'
Inv. Out = 692.42'
BC 698.03'
BC 699.02'
ME 699.94'
BC 700.01'
ME 699.99'
ME 700.44'
ME 699.97'
BC 700.09'
ME 700.72'
ME 699.89'
ME 700.52'
BC 699.27'
ADA spaces must have a max. slope of 2% in all directions
Inv. In = 689.63'
Inv. Out = 689.50'
ME 693.99'
ME 694.94'
BC 688.50'
BC 689.90'
BC 690.28'
BC 689.58'
BC 687.53'
BC 688.57'
Inv. In = 686.75'
Inv. Out = 686.65'
BC 687.97'
BC 689.05'
Inv. In = 684.65'
Inv. Out = 684.52'
ME 690.03'
BC 687.11'
BC 685.88'
Inv. In = 685.86'
Inv. Out = 685.71'
Inv. In =689.32'
Inv. Out = 689.19'
BC 697.66'
BC 698.08'
BC 698.11'
ME 698.19'
ME 697.54'
BC 697.66'
Inv. In = 688.42'
Inv. Out = 688.30'
ME 698.05'
ME 697.61'
ME 696.92'
ME 697.77'
EP 697.77'
EP 697.70'
EP 696.16'
EP 696.19'
ME 697.99'
EP 696.04'
EP 696.07'
EP 693.70'
EP 693.77'
Inv. In = 688.72'
Inv. Out = 688.60'
BC 696.07'
FFE 693.42' (First Floor)
FFE 680.75' (Basement)
ME 689.94'
ME 678.88'
ME 678.81'
EP 681.28'
EP 680.16'
EP 679.98'
EP 681.06'
EP 680.58'
EP 680.49'
EP 680.26'
EP 680.09'
EP 671.86'
EP 671.00'
EP 671.41'
EP 670.55'

N

0 100 200 Feet

DATE
05/02/23
DRAWN BY
Capstone Team
DESIGNED BY
Capstone Team
CHECKED BY
Capstone Team
SCALE
1":30'

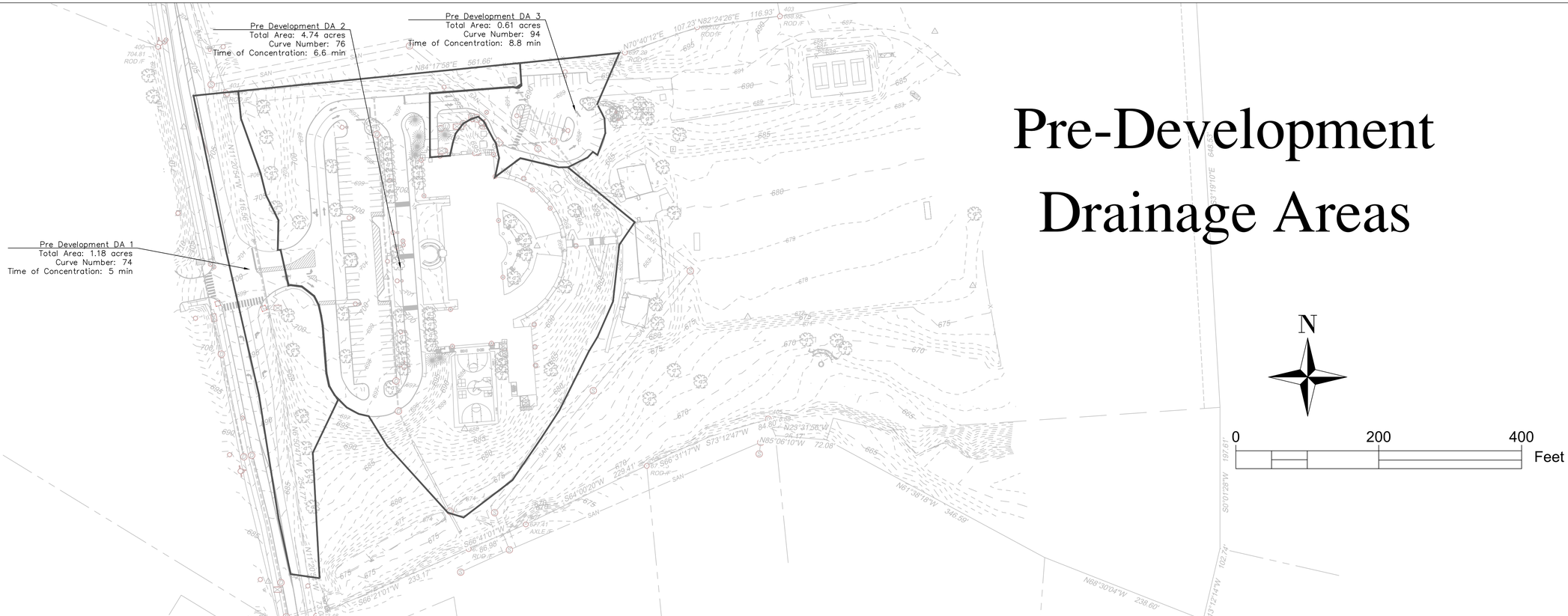
CROZET ELEMENTARY SCHOOL

ALBEMARLE COUNTY - CROZET

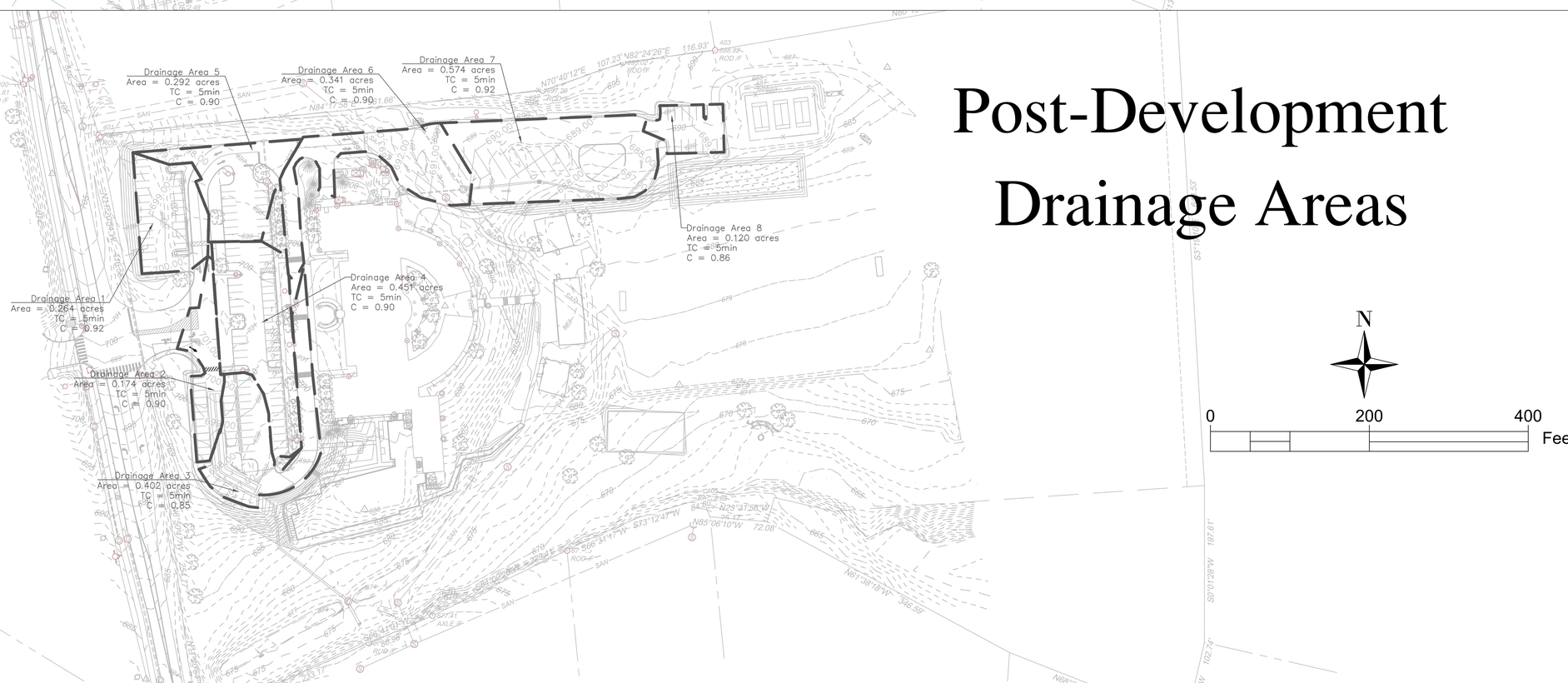
GRADING & DRAINAGE PLAN

JOB NO.
1
SHEET NO.
C6.0

Pre-Development Drainage Areas



Post-Development Drainage Areas



DATE	05/02/23
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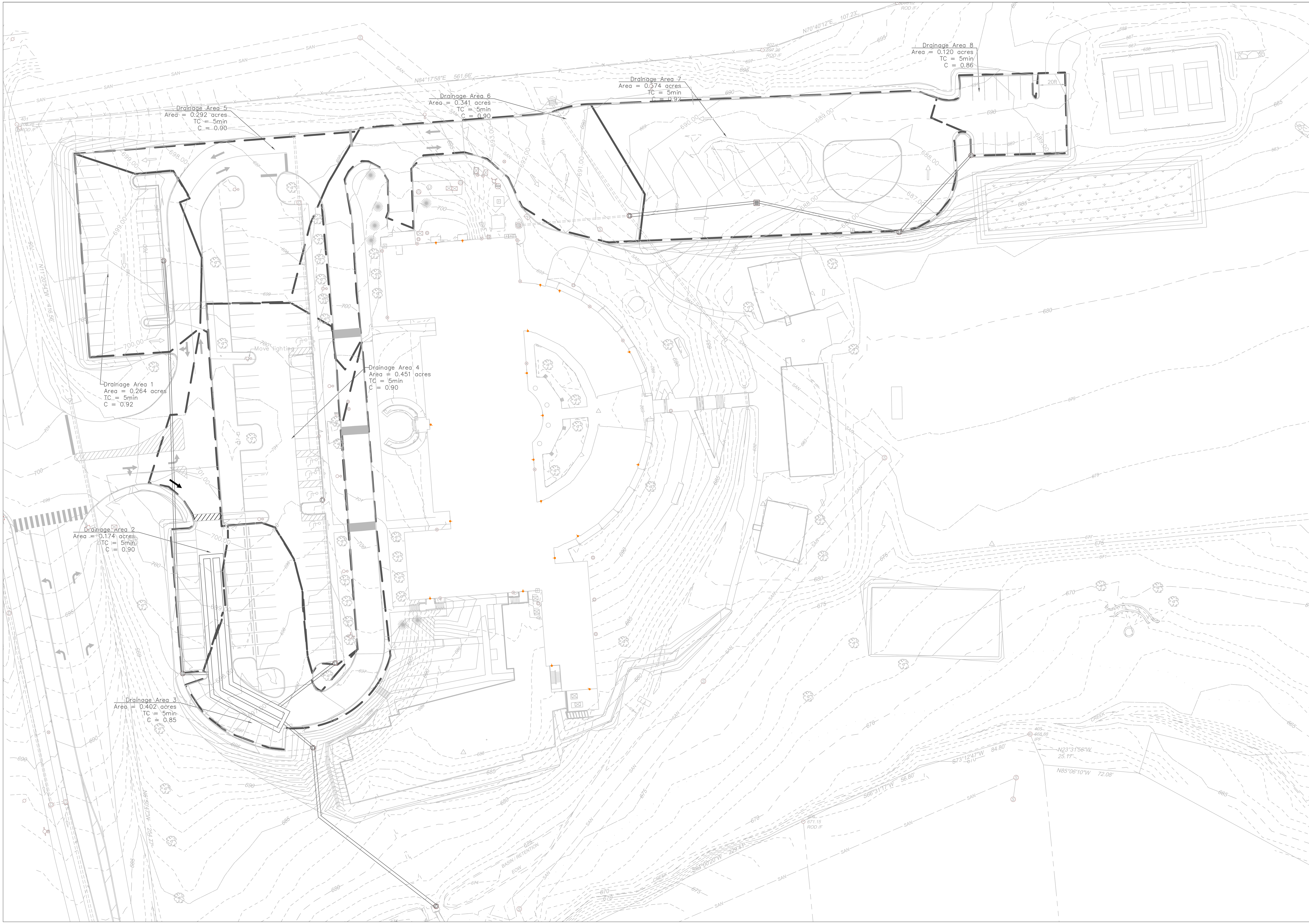
SCALE	1":75'

CROZET ELEMENTARY SCHOOL
ALBEMARLE COUNTY - CROZET
STORMWATER MANAGEMENT PLAN

JOB NO.	1
SHEET NO.	C7.0



DATE
05/02/23
DRAWN BY
Capstone Team
DESIGNED BY
Capstone Team
CHECKED BY
Capstone Team
SCALE
1":30'

CROZET ELEMENTARY SCHOOL

ALBEMARLE COUNTY - CROZET

INLET DRAINAGE AREA MAP

JOB NO.
1
SHEET NO.
C7.1

1-Yr ○ 2-Yr ○ 3-Yr ○ 5-Yr ○ 10-Yr ○ 25-Yr ○ 50-Yr ○ 100-Yr

Hyd. No.	Hydrograph type	Peak flow	Time interval	Time of conc. Tc	Time to peak	Volume	Inflow hyd(s)	Maximum Elevation	Maximum Storage	Hydrograph description
	(origin)	(cfs)	(min)	(min)	(min)	(cuft)		(ft)	(cuft)	
1	SCS Runoff	0.000	2	5.00	0.00	0.000				Post 1
2	SCS Runoff	5.446	2	8.60	720.00	12,467				Post 2
3	SCS Runoff	3.485	2	10.20	722.00	9,119				Post 3
4	SCS Runoff	4.266	2	5.00	716.00	9,084				Post LOD 2
5	SCS Runoff	3.567	2	6.10	716.00	7,296				Post 3 LOD
6	SCS Runoff	9.931	2	6.40	716.00	20,052				Post 2 Total
7	Reservoir	5.667	2		722.00	20,052	6	692.27	2,983	Res

○ 1-Yr ○ 2-Yr ○ 3-Yr ○ 5-Yr ● 10-Yr ○ 25-Yr ○ 50-Yr ○ 100-Yr

Hyd. No.	Hydrograph type	Peak flow	Time interval	Time of conc. Tc	Time to peak	Volume	Inflow hyd(s)	Maximum Elevation	Maximum Storage	Hydrograph description
	(origin)	(cfs)	(min)	(min)	(min)	(cuft)		(ft)	(cuft)	
1	SCS Runoff	3.519	2	5.00	716.00	7,106				Post 1
2	SCS Runoff	14.46	2	8.60	718.00	33,252				Post 2
3	SCS Runoff	9.155	2	10.20	720.00	23,833				Post 3
4	SCS Runoff	6.206	2	5.00	716.00	13,555				Post LOD 2
5	SCS Runoff	5.506	2	6.10	716.00	11,490				Post 3 LOD
6	SCS Runoff	23.89	2	6.40	716.00	49,403				Post 2 Total
7	Reservoir	22.55	2		718.00	49,403	6	694.47	5,603	Res
8	Reservoir	3.565	2		732.00	23,695	3	701.49	9,661	Garden

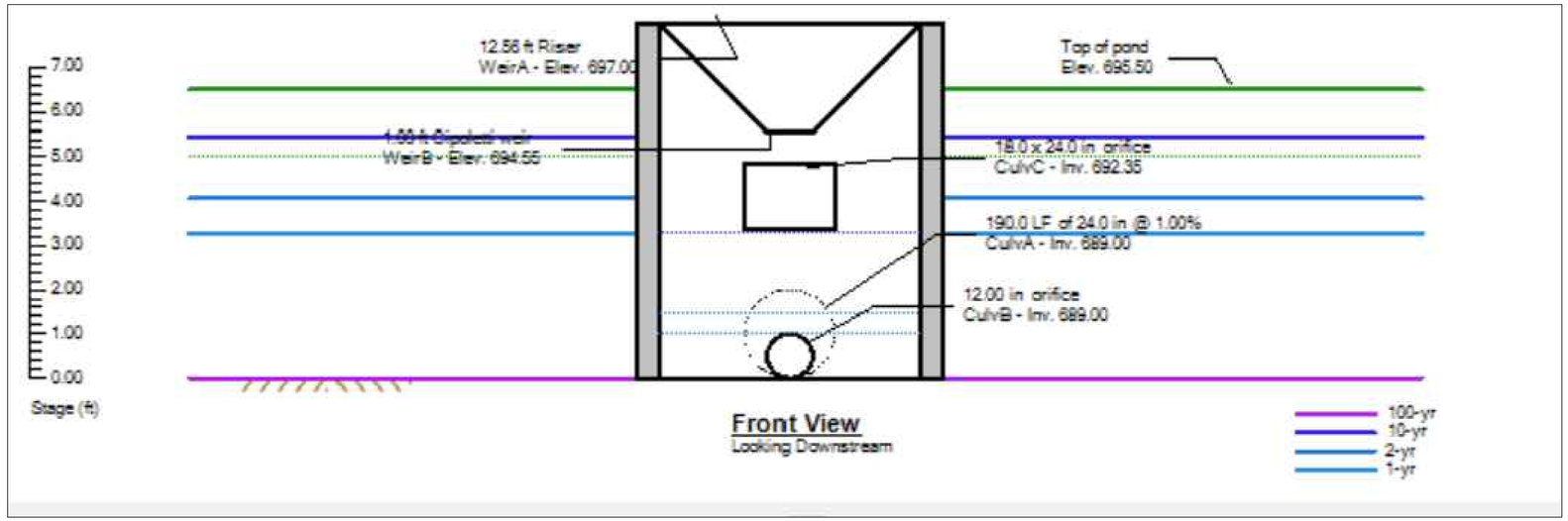
Energy Balance Equations

$Q_{Developed} \leq I.F.*(Q_{Pre\text{-}developed} * RV_{Pre\text{-}Developed})/RV_{Developed}$

Underground Retention:

.8*(2.294*5,249)/9,034 + 5.4 = 6.47

QDeveloped = 5.667 ≤ 6.47



Underwater Retention System Calculations

DATE 05/02/23
DRAWN BY Capstone Team
DESIGNED BY Capstone Team
CHECKED BY Capstone Team
SCALE N/A

CROZET ELEMENTARY SCHOOL
ALBEMARLE COUNTY - CROZET
CALCULATIONS

JOB NO. 1
SHEET NO. C8.0

Contours | Manual | Trapezoid | Chambers

Item	Input
Storage Type =	Contours
Bottom Elev. (ft) =	690.00
Voids (%) =	100.00
Volume by =	Conic

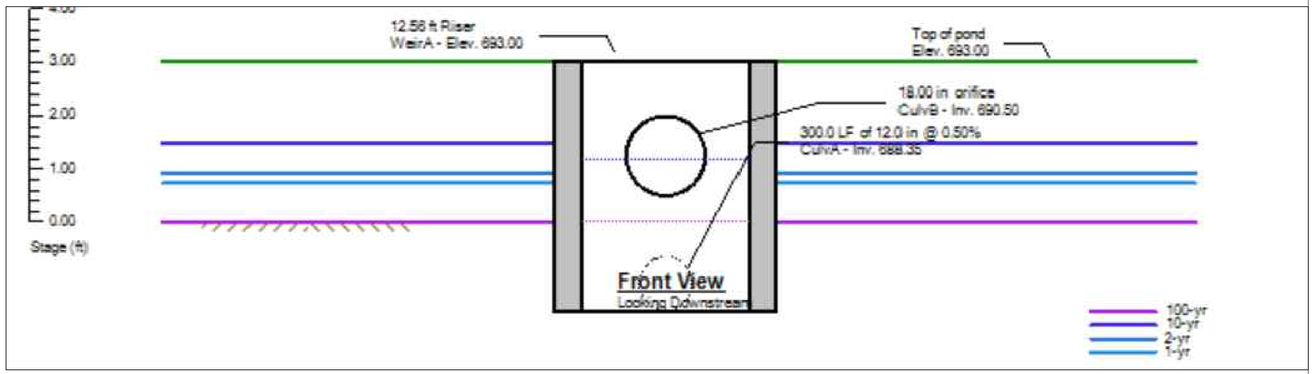
Clear | Apply

Pond Name: Garden

Row	Stage (ft)	Elevation (ft)	Contour (sqft)	Incremental (cuft)	Total (cuft)	Total (cfs)
0	0.00	690.00	5,695	0.000	0.000	0.000
1	1.00	691.00	6,697	6,189	6,189	1.343
2	2.00	692.00	7,946	7,312	13,500	3.903
3	3.00	693.00	9,267	8,597	22,098	4.353
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						

Auto update stage-discharge | Done

Selected storage type is Contours.



Culverts / Orifices

Culv/Orifice	A	B	C	Prf Riser
Rise (in) =	12	18		
Span (in) =	12	18		
No. Barrels =	1	1		
Invert Elev. (ft) =	688.35	690.5		
Length (ft) =	300	0		
Slope (%) =	0.5	0		----
N-Value =	0.013	0.013	0.013	----
Orifice Coeff. =	0.6	0.6	0.6	0.6
Multi-Stage =	n/a	Yes	No	No
Active =	Yes	Yes	Yes	Yes

Weirs

Weir	A	B	C	D
Weir Type =	Riser	Choose...	Choose...	Choose...
Crest Elev (ft) =	693.00			
Crest Length ft) =	12.56			
Weir Coeff. =	3.33	3.33	3.33	3.33
Multi-Stage =	Yes	No	No	No
Active =	Yes	Yes	Yes	Yes

Exfiltration

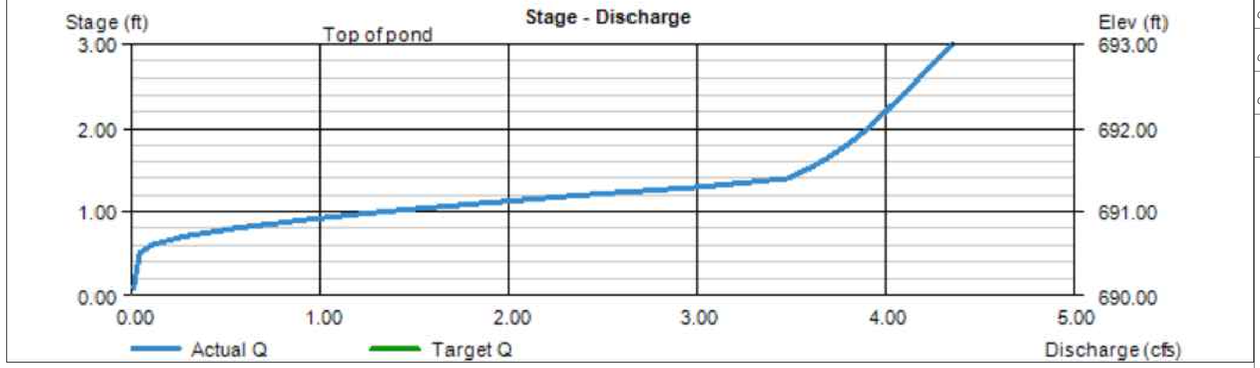
Rate (in/hr)	Apply to	Extract from Outflow Hyd (y/n)
0.50	Contour Area	No

Tailwater

Tailwater Elevation (ft) = 0.00

Compute | Clear

Row	Stage (ft)	Elev (ft)	Culvert / Orifice A (cfs)	Culvert / Orifice B (cfs)	Culvert / Orifice C (cfs)	Culvert / Orifice Prf Riser (cfs)	Weir A (cfs)	Weir B (cfs)	Weir C (cfs)	Weir D (cfs)	Exfil (cfs)	User Defined (cfs)	Total Outflow (cfs)
0	0.00	690.00	0.000	0.000	-	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000



Energy Balance Equations

$$Q_{Developed} \leq I.F.*(Q_{Pre\text{-}developed} * RV_{Pre\text{-}Developed})/RV_{Developed}$$

Bioretention:

$$.8*(2.215*5,354)/9,119 = 1.04$$

$$QDeveloped = 0.354 \leq 1.04$$

Bioretention System Calculations

DATE: 05/02/23
DRAWN BY: Capstone Team
DESIGNED BY: Capstone Team
CHECKED BY: Capstone Team
SCALE: N/A

CROZET ELEMENTARY SCHOOL
ALBEMARLE COUNTY - CROZET
CALCULATIONS CONTINUED

JOB NO. 1
SHEET NO. C8.1

Watershed Model Schematic

Legend

Hyd.	Origin	Description
1	SCS Runoff	Pre 1
2	SCS Runoff	Pre 2
3	SCS Runoff	Pre 3
4	SCS Runoff	Pre 1 LOD
5	SCS Runoff	Pre 2 LOD
6	SCS Runoff	Pre 3 LOD

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	------	1.906	2.785	-------	-------	5.635	-------	-------	11.50	Pre 1
2	SCS Runoff	------	7.937	11.42	-------	-------	22.70	-------	-------	45.33	Pre 2
3	SCS Runoff	------	2.215	2.747	-------	-------	4.285	-------	-------	7.122	Pre 3
4	SCS Runoff	------	0.094	0.188	-------	-------	0.528	-------	-------	1.301	Pre 1 LOD
5	SCS Runoff	------	2.294	3.178	-------	-------	5.951	-------	-------	11.30	Pre 2 LOD
6	SCS Runoff	------	1.621	1.967	-------	-------	2.974	-------	-------	4.853	Pre 3 LOD

Hydrograph Summary Report

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

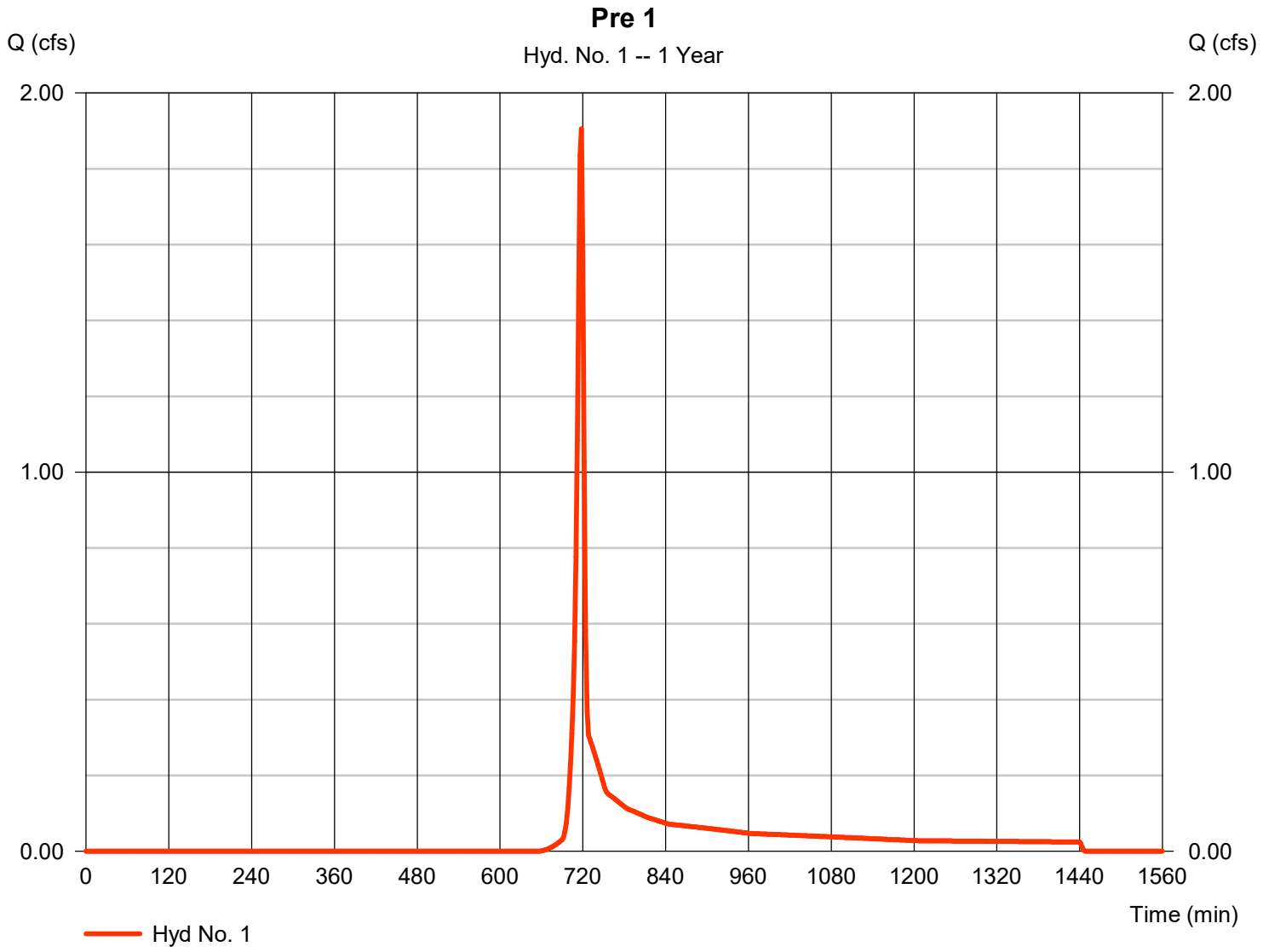
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	1.906	2	718	3,827	------	------	------	Pre 1
2	SCS Runoff	7.937	2	720	18,281	------	------	------	Pre 2
3	SCS Runoff	2.215	2	718	5,354	------	------	------	Pre 3
4	SCS Runoff	0.094	2	718	240	------	------	------	Pre 1 LOD
5	SCS Runoff	2.294	2	720	5,249	------	------	------	Pre 2 LOD
6	SCS Runoff	1.621	2	718	4,224	------	------	------	Pre 3 LOD

Hydrograph Report

Hyd. No. 1

Pre 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.906 cfs
Storm frequency	=	1 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	3,827 cuft
Drainage area	=	1.180 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.07 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



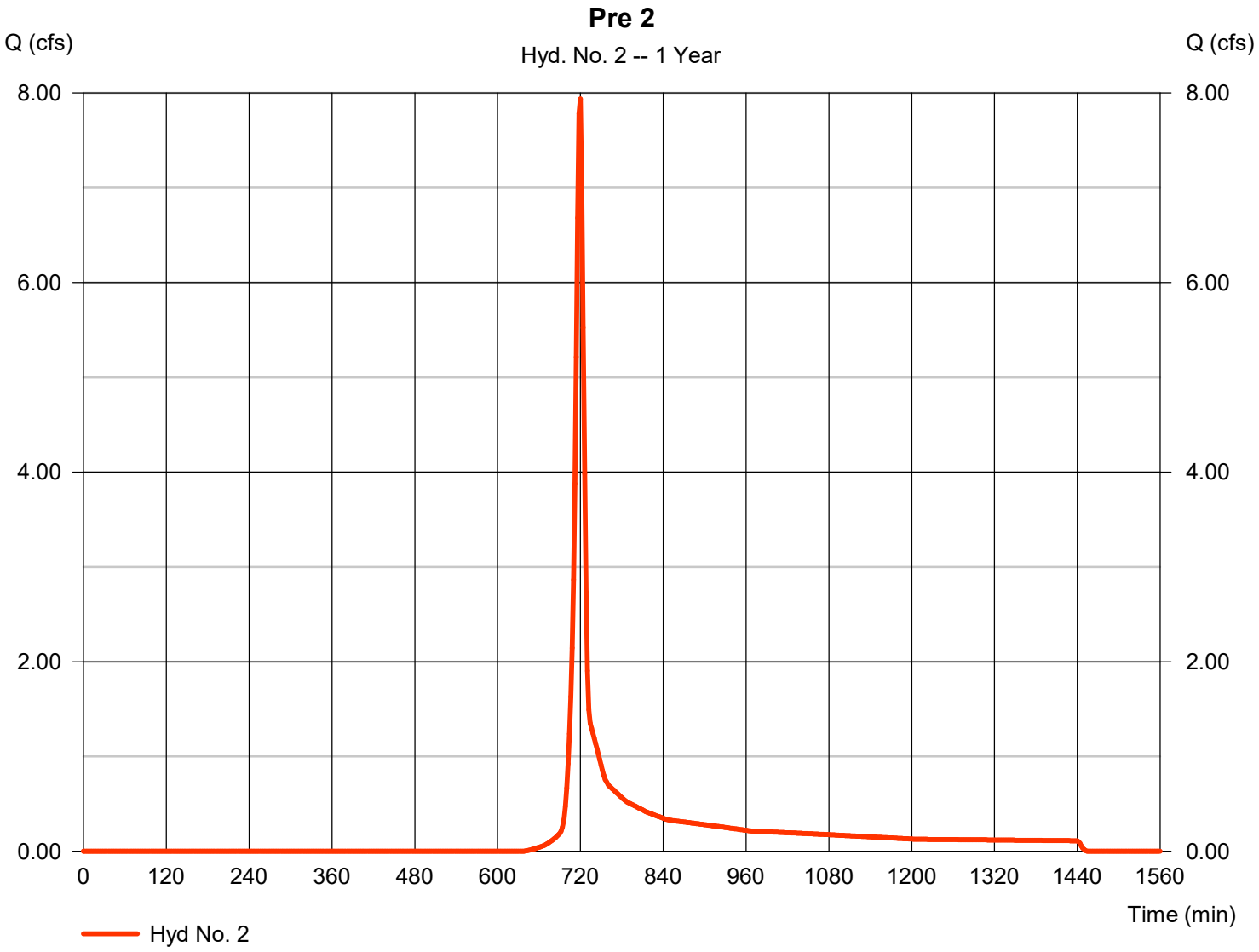
Hydrograph Report

Hyd. No. 2

Pre 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.937 cfs
Storm frequency	=	1 yrs	Time to peak	=	720 min
Time interval	=	2 min	Hyd. volume	=	18,281 cuft
Drainage area	=	4.740 ac	Curve number	=	76*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	6.60 min
Total precip.	=	3.07 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(2.860 x 61) + (1.880 x 98)] / 4.740



TR55 Tc Worksheet

Hyd. No. 2

Pre 2

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.150		0.013		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.71		0.00		0.00		
Land slope (%)	= 8.00		0.00		0.00		
Travel Time (min)	**= 5.23**	**+**	**0.00**	**+**	**0.00**	**=**	**5.23**
Shallow Concentrated Flow							
Flow length (ft)	= 21.00		0.00		0.00		
Watercourse slope (%)	= 1.00		0.00		0.00		
Surface description	= Paved		Unpaved		Paved		
Average velocity (ft/s)	=2.03		0.00		0.00		
Travel Time (min)	**= 0.17**	**+**	**0.00**	**+**	**0.00**	**=**	**0.17**
Channel Flow							
X sectional flow area (sqft)	= 1.23		1.00		0.00		
Wetted perimeter (ft)	= 3.93		6.20		0.00		
Channel slope (%)	= 2.00		7.00		0.00		
Manning's n-value	= 0.013		0.013		0.015		
Velocity (ft/s)	=7.44		8.93		0.00		
Flow length (ft)	({0})441.0		110.0		0.0		
Travel Time (min)	**= 0.99**	**+**	**0.21**	**+**	**0.00**	**=**	**1.19**

Total Travel Time, Tc ..... 6.60 min

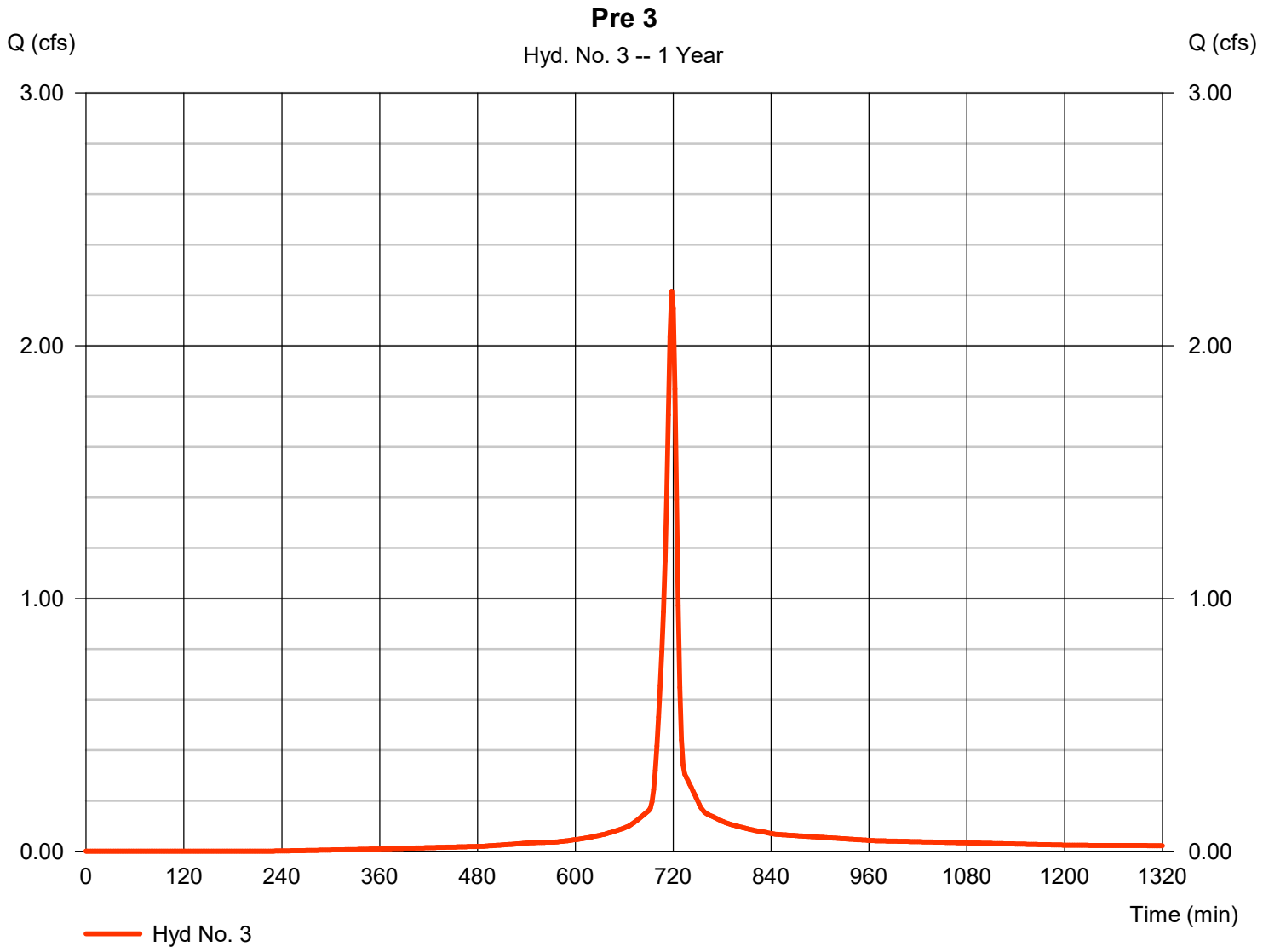
Hydrograph Report

Hyd. No. 3

Pre 3

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.215 cfs
Storm frequency	=	1 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	5,354 cuft
Drainage area	=	0.610 ac	Curve number	=	94*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	8.80 min
Total precip.	=	3.07 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.540 x 98) + (0.070 x 61)] / 0.610



TR55 Tc Worksheet

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

Hyd. No. 3

Pre 3

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.150		0.013		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.71		0.00		0.00		
Land slope (%)	= 7.00		0.00		0.00		
Travel Time (min)	**= 5.51**	**+**	**0.00**	**+**	**0.00**	**=**	**5.51**
Shallow Concentrated Flow							
Flow length (ft)	= 45.00		36.00		0.00		
Watercourse slope (%)	= 1.50		1.00		0.00		
Surface description	= Paved		Unpaved		Paved		
Average velocity (ft/s)	=2.49		1.61		0.00		
Travel Time (min)	**= 0.30**	**+**	**0.37**	**+**	**0.00**	**=**	**0.67**
Channel Flow							
X sectional flow area (sqft)	= 1.23		0.79		6.50		
Wetted perimeter (ft)	= 3.93		3.14		23.00		
Channel slope (%)	= 1.50		0.10		1.50		
Manning's n-value	= 0.015		0.015		0.026		
Velocity (ft/s)	=5.59						
			1.25				
					3.01		
Flow length (ft)	({0})115.0		20.0		360.0		
Travel Time (min)	**= 0.34**	**+**	**0.27**	**+**	**1.99**	**=**	**2.60**

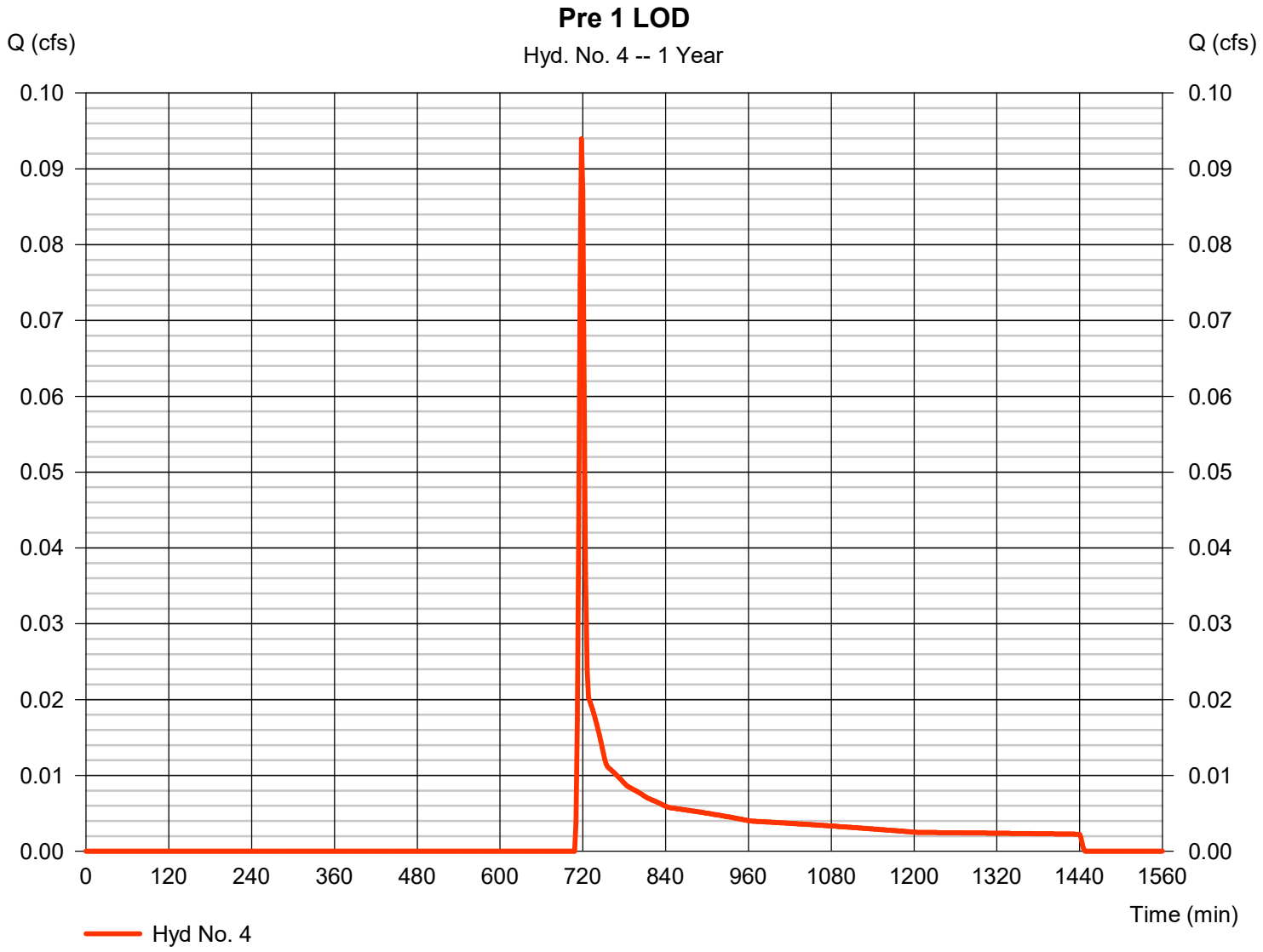
Total Travel Time, Tc ..... 8.80 min

Hydrograph Report

Hyd. No. 4

Pre 1 LOD

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.094 cfs
Storm frequency	=	1 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	240 cuft
Drainage area	=	0.180 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.07 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



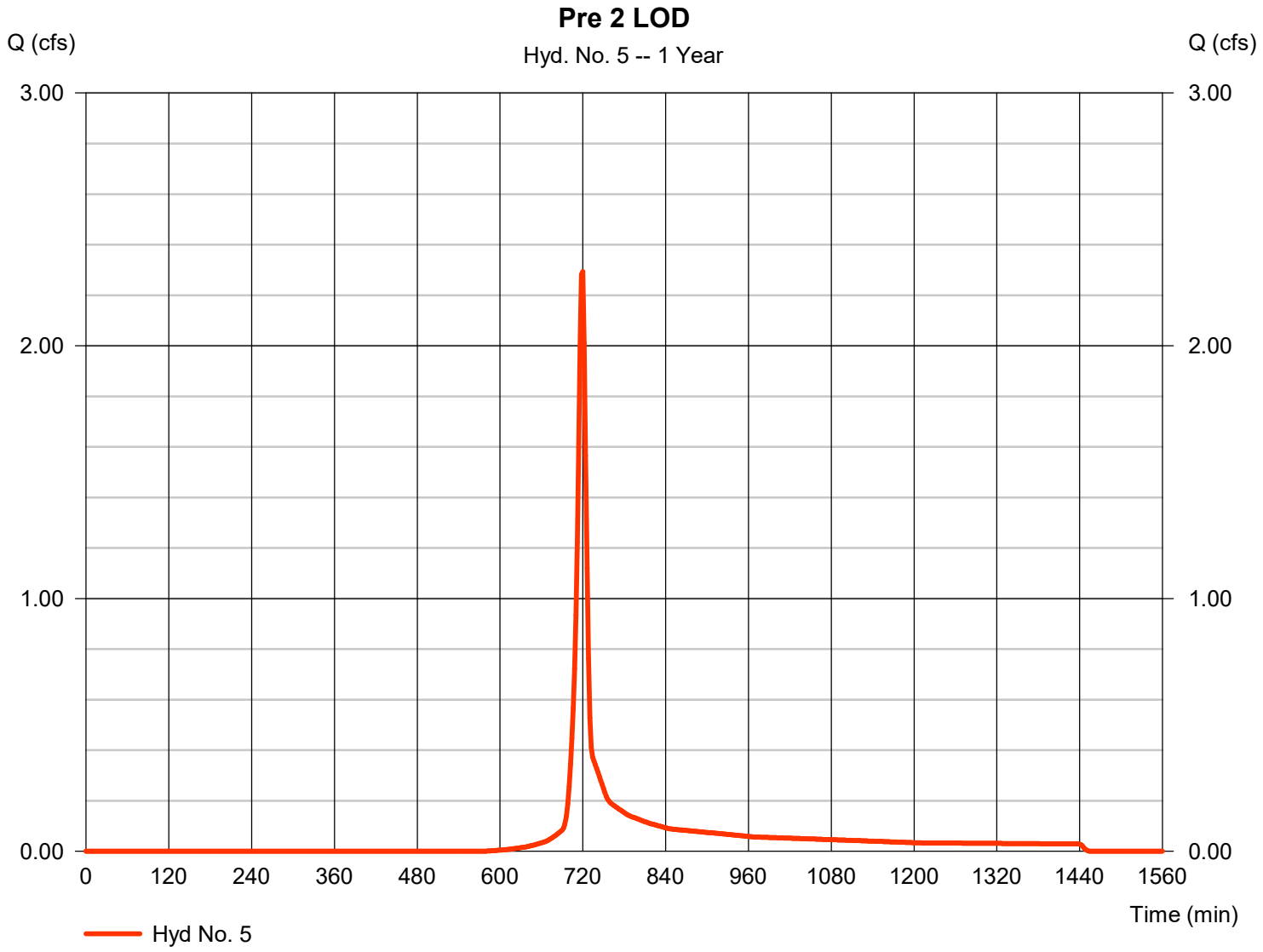
Hydrograph Report

Hyd. No. 5

Pre 2 LOD

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.294 cfs
Storm frequency	=	1 yrs	Time to peak	=	720 min
Time interval	=	2 min	Hyd. volume	=	5,249 cuft
Drainage area	=	1.110 ac	Curve number	=	80*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	6.60 min
Total precip.	=	3.07 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.560 x 98) + (0.550 x 61)] / 1.110



TR55 Tc Worksheet

Hyd. No. 5

Pre 2 LOD

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.150		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.71		3.71		0.00		
Land slope (%)	= 8.00		0.00		0.00		
Travel Time (min)	**= 5.22**	**+**	**0.00**	**+**	**0.00**	**=**	**5.22**
Shallow Concentrated Flow							
Flow length (ft)	= 21.00		0.00		0.00		
Watercourse slope (%)	= 1.00		0.00		0.00		
Surface description	= Paved		Paved		Paved		
Average velocity (ft/s)	=2.03		0.00		0.00		
Travel Time (min)	**= 0.17**	**+**	**0.00**	**+**	**0.00**	**=**	**0.17**
Channel Flow							
X sectional flow area (sqft)	= 1.23		1.00		0.00		
Wetted perimeter (ft)	= 3.93		6.20		0.00		
Channel slope (%)	= 2.00		7.00		0.00		
Manning's n-value	= 0.013		0.013		0.015		
Velocity (ft/s)	=7.44		8.93		0.00		
Flow length (ft)	({0})441.0		110.0		0.0		
Travel Time (min)	**= 0.99**	**+**	**0.21**	**+**	**0.00**	**=**	**1.19**

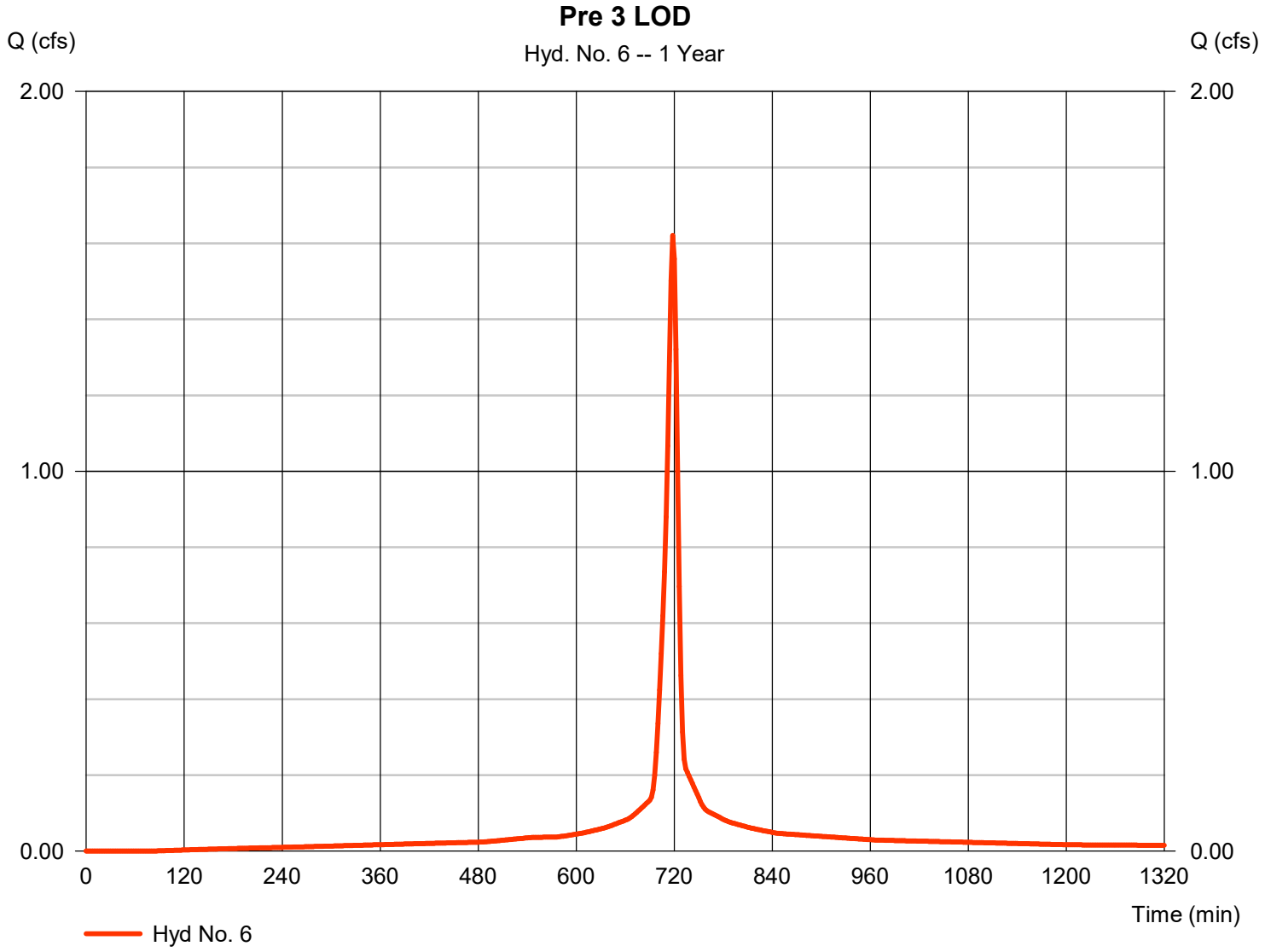
Total Travel Time, Tc ..... 6.60 min

Hydrograph Report

Hyd. No. 6

Pre 3 LOD

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.621 cfs
Storm frequency	=	1 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	4,224 cuft
Drainage area	=	0.410 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	9.20 min
Total precip.	=	3.07 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



TR55 Tc Worksheet

Hyd. No. 6

Pre 3 LOD

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.150		0.011		0.011		
Flow length (ft)	= 95.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.71		0.00		0.00		
Land slope (%)	= 4.00		0.00		0.00		
Travel Time (min)	**= 6.62**	**+**	**0.00**	**+**	**0.00**	**=**	**6.62**
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)	= 1.23		0.79		6.50		
Wetted perimeter (ft)	= 3.93		3.14		23.00		
Channel slope (%)	= 1.50		0.10		1.50		
Manning's n-value	= 0.015		0.015		0.026		
Velocity (ft/s)	=5.59						
			1.25				
					3.01		
Flow length (ft)	({0})115.0		20.0		360.0		
Travel Time (min)	**= 0.34**	**+**	**0.27**	**+**	**1.99**	**=**	**2.60**

Total Travel Time, Tc ..... 9.20 min

Hydrograph Summary Report

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

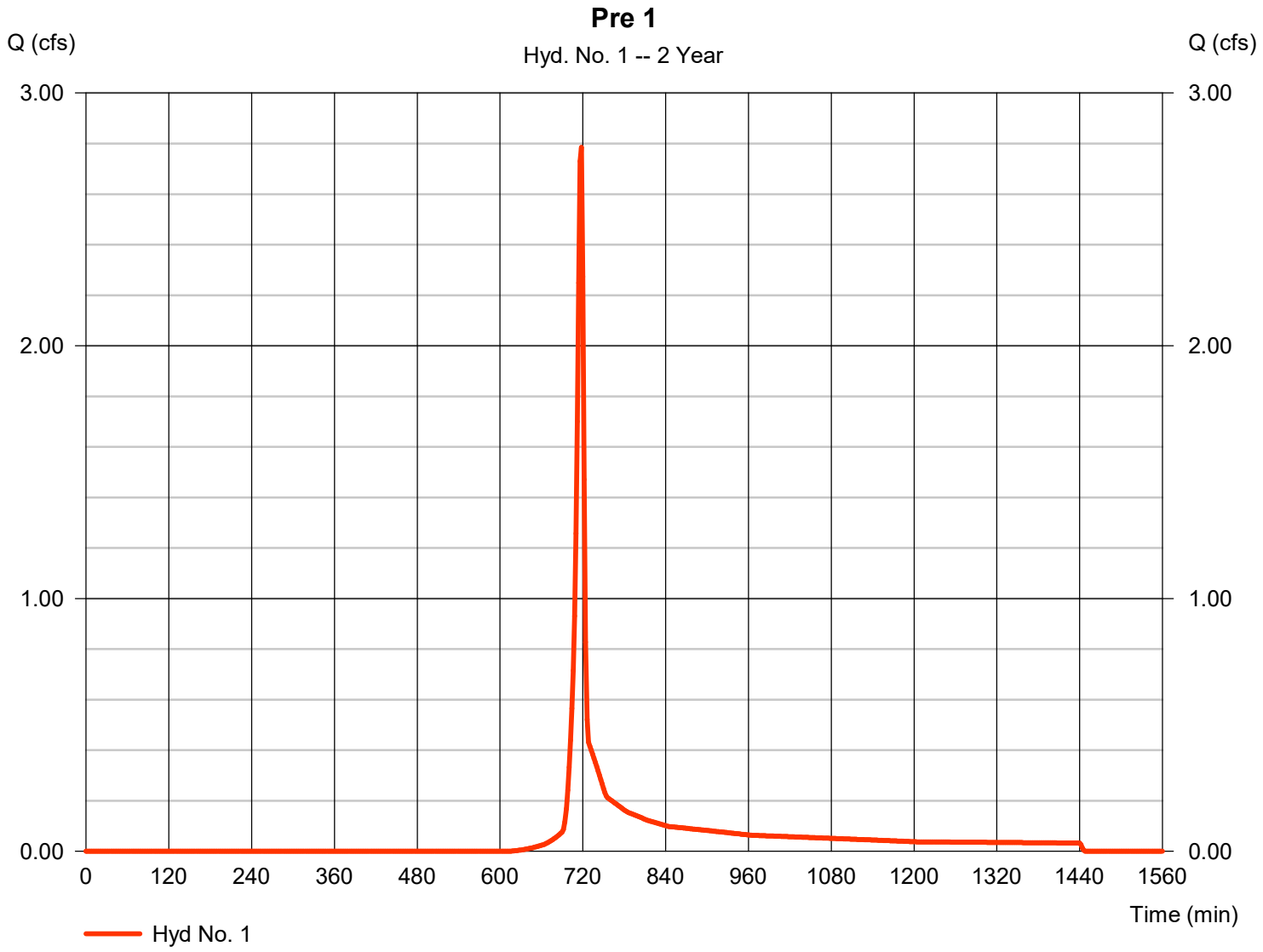
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	2.785	2	718	5,569	------	------	------	Pre 1
2	SCS Runoff	11.42	2	720	26,146	------	------	------	Pre 2
3	SCS Runoff	2.747	2	718	6,733	------	------	------	Pre 3
4	SCS Runoff	0.188	2	718	410	------	------	------	Pre 1 LOD
5	SCS Runoff	3.178	2	718	7,271	------	------	------	Pre 2 LOD
6	SCS Runoff	1.967	2	718	5,173	------	------	------	Pre 3 LOD

Hydrograph Report

Hyd. No. 1

Pre 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.785 cfs
Storm frequency	=	2 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	5,569 cuft
Drainage area	=	1.180 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.71 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



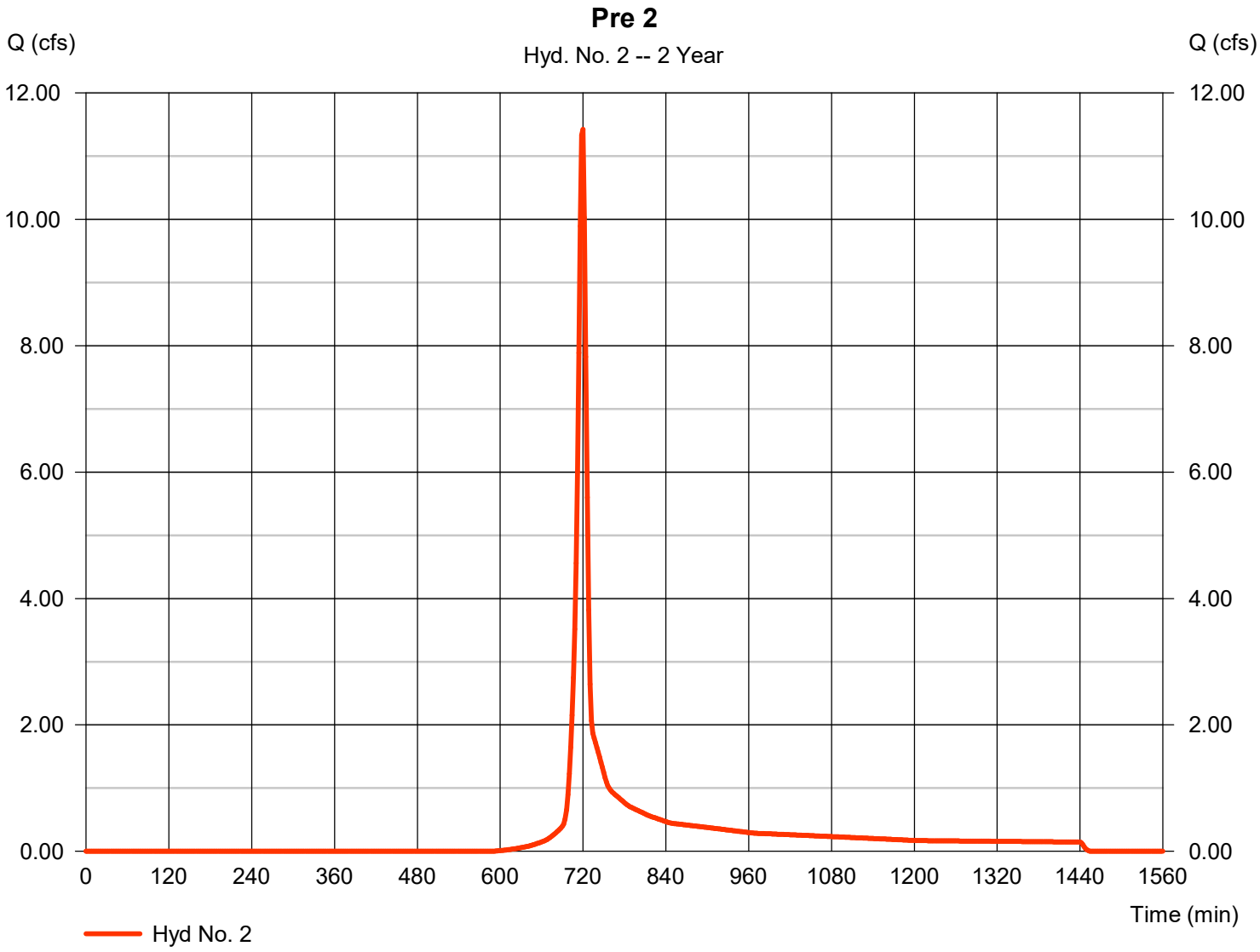
Hydrograph Report

Hyd. No. 2

Pre 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	11.42 cfs
Storm frequency	=	2 yrs	Time to peak	=	720 min
Time interval	=	2 min	Hyd. volume	=	26,146 cuft
Drainage area	=	4.740 ac	Curve number	=	76*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	6.60 min
Total precip.	=	3.71 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(2.860 x 61) + (1.880 x 98)] / 4.740



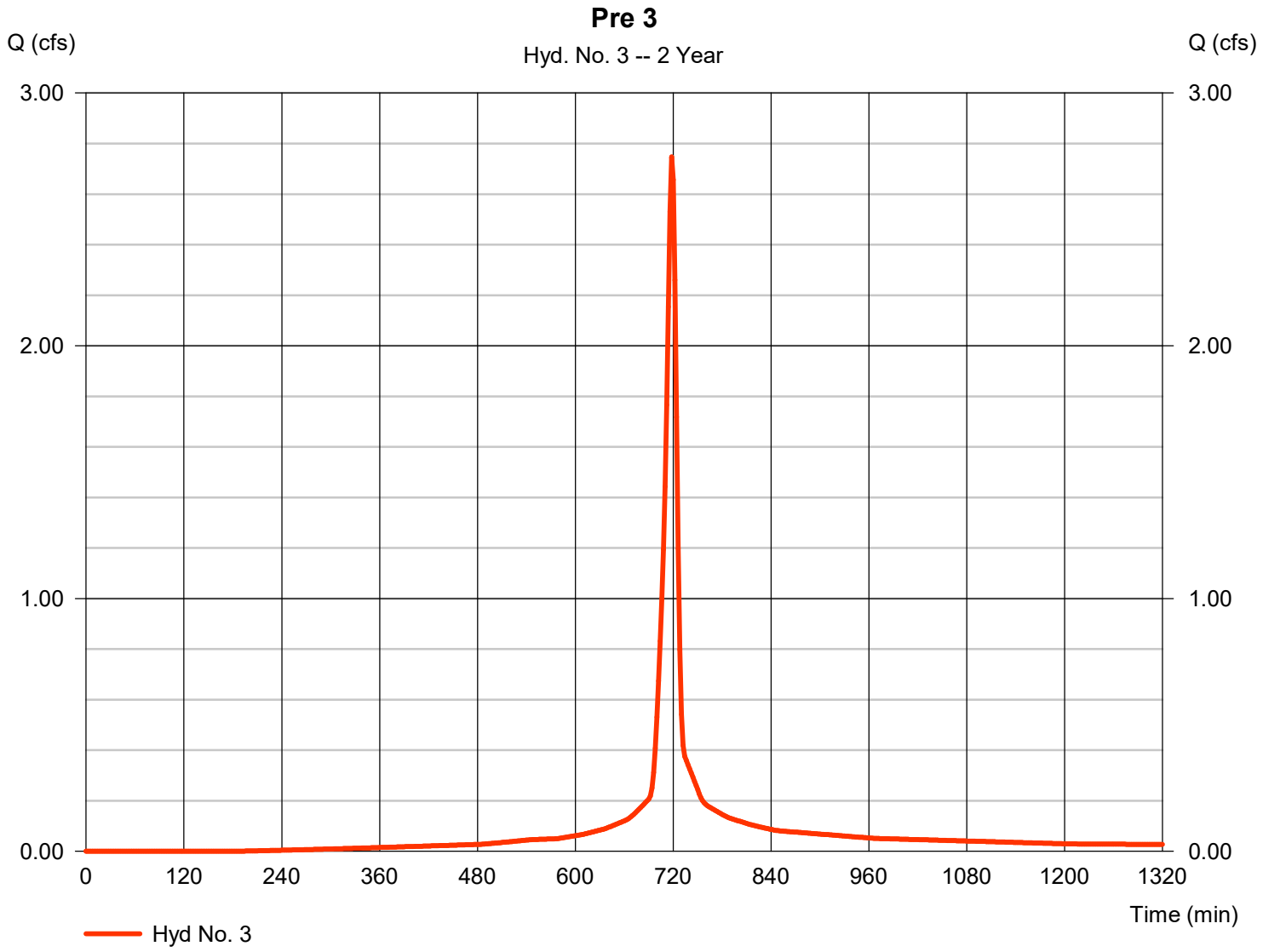
Hydrograph Report

Hyd. No. 3

Pre 3

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.747 cfs
Storm frequency	=	2 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	6,733 cuft
Drainage area	=	0.610 ac	Curve number	=	94*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	8.80 min
Total precip.	=	3.71 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.540 x 98) + (0.070 x 61)] / 0.610

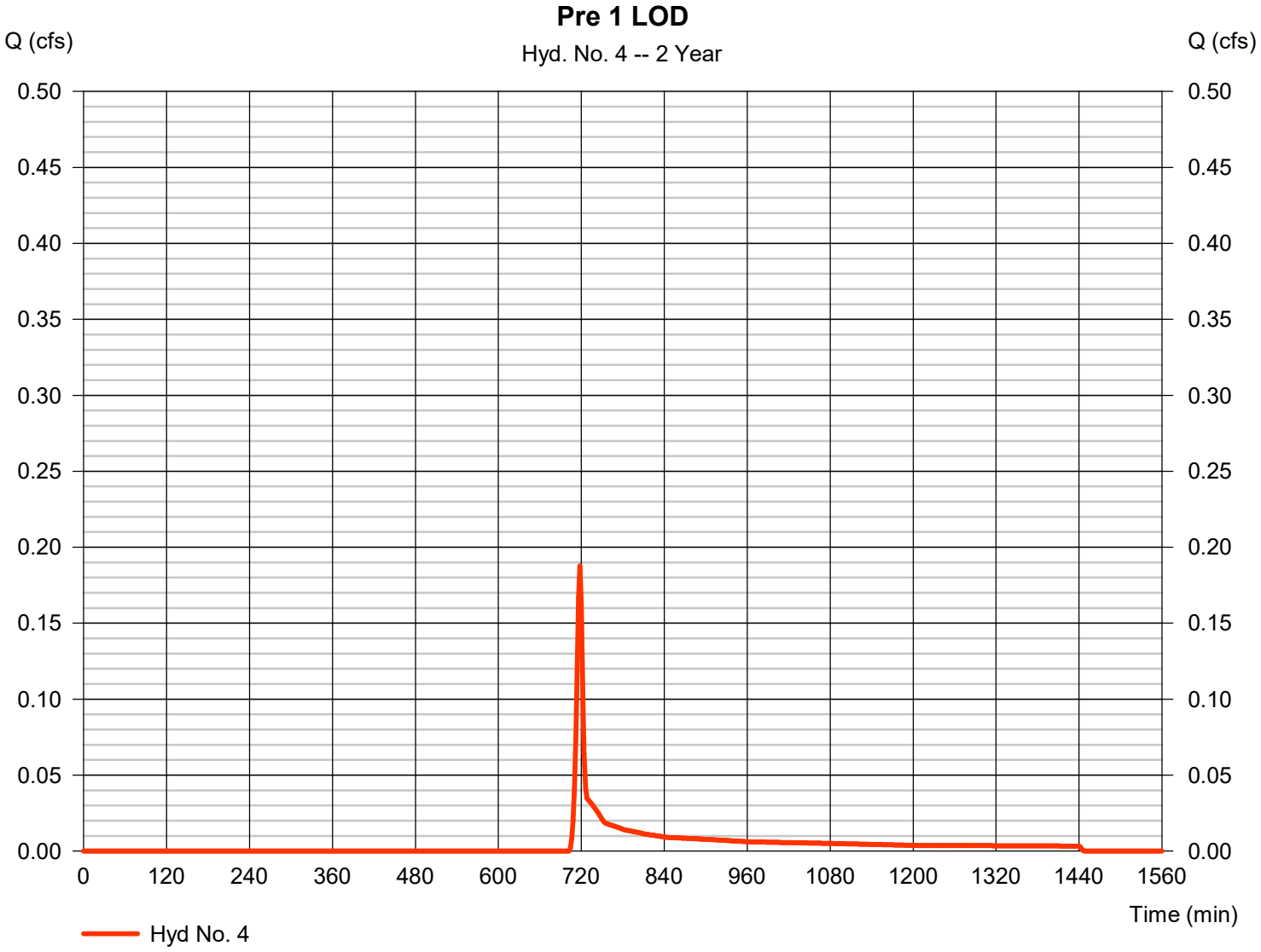


Hydrograph Report

Hyd. No. 4

Pre 1 LOD

Hydrograph type	= SCS Runoff	Peak discharge	= 0.188 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 410 cuft
Drainage area	= 0.180 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.71 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



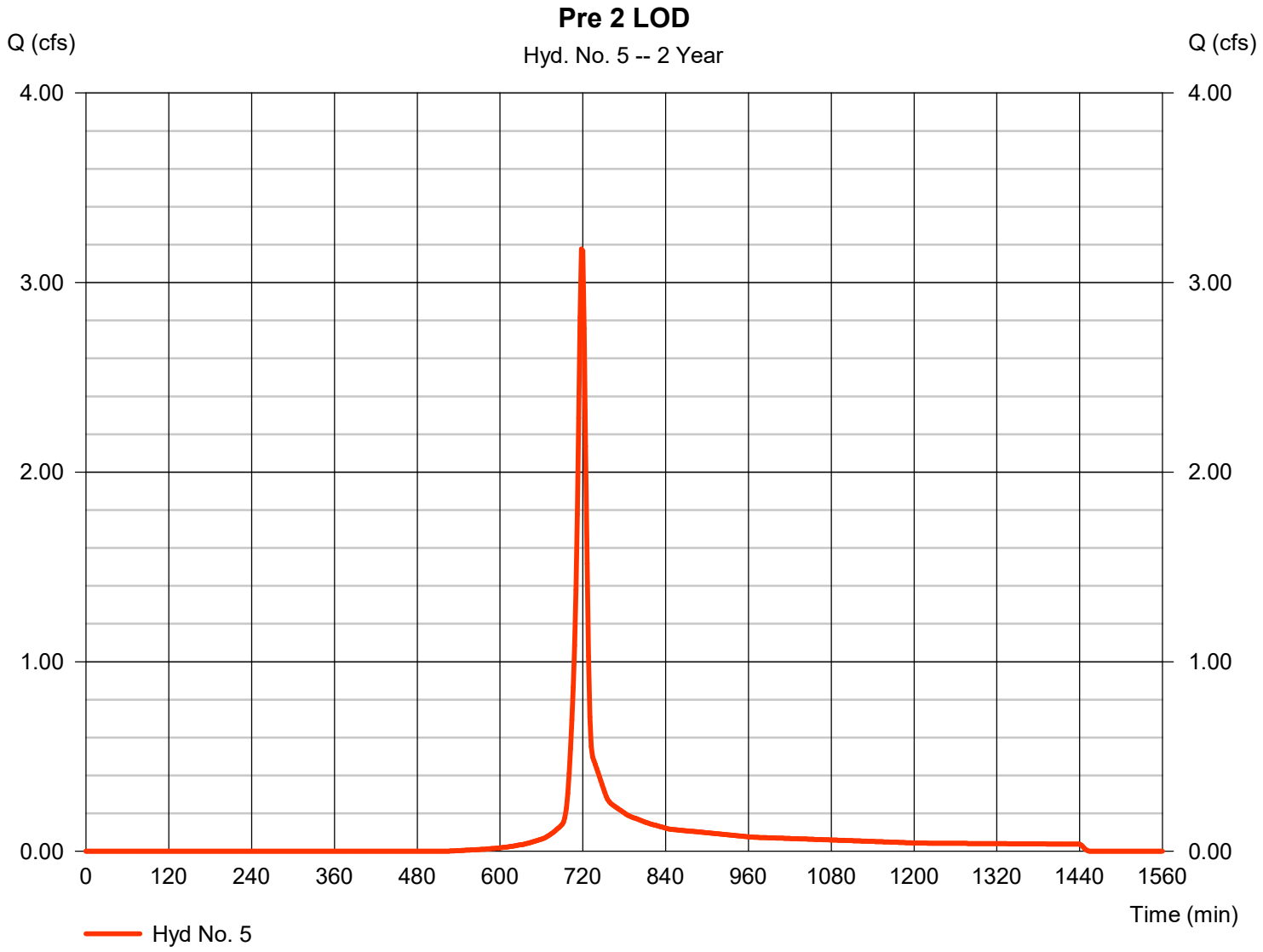
Hydrograph Report

Hyd. No. 5

Pre 2 LOD

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.178 cfs
Storm frequency	=	2 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	7,271 cuft
Drainage area	=	1.110 ac	Curve number	=	80*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	6.60 min
Total precip.	=	3.71 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.560 x 98) + (0.550 x 61)] / 1.110

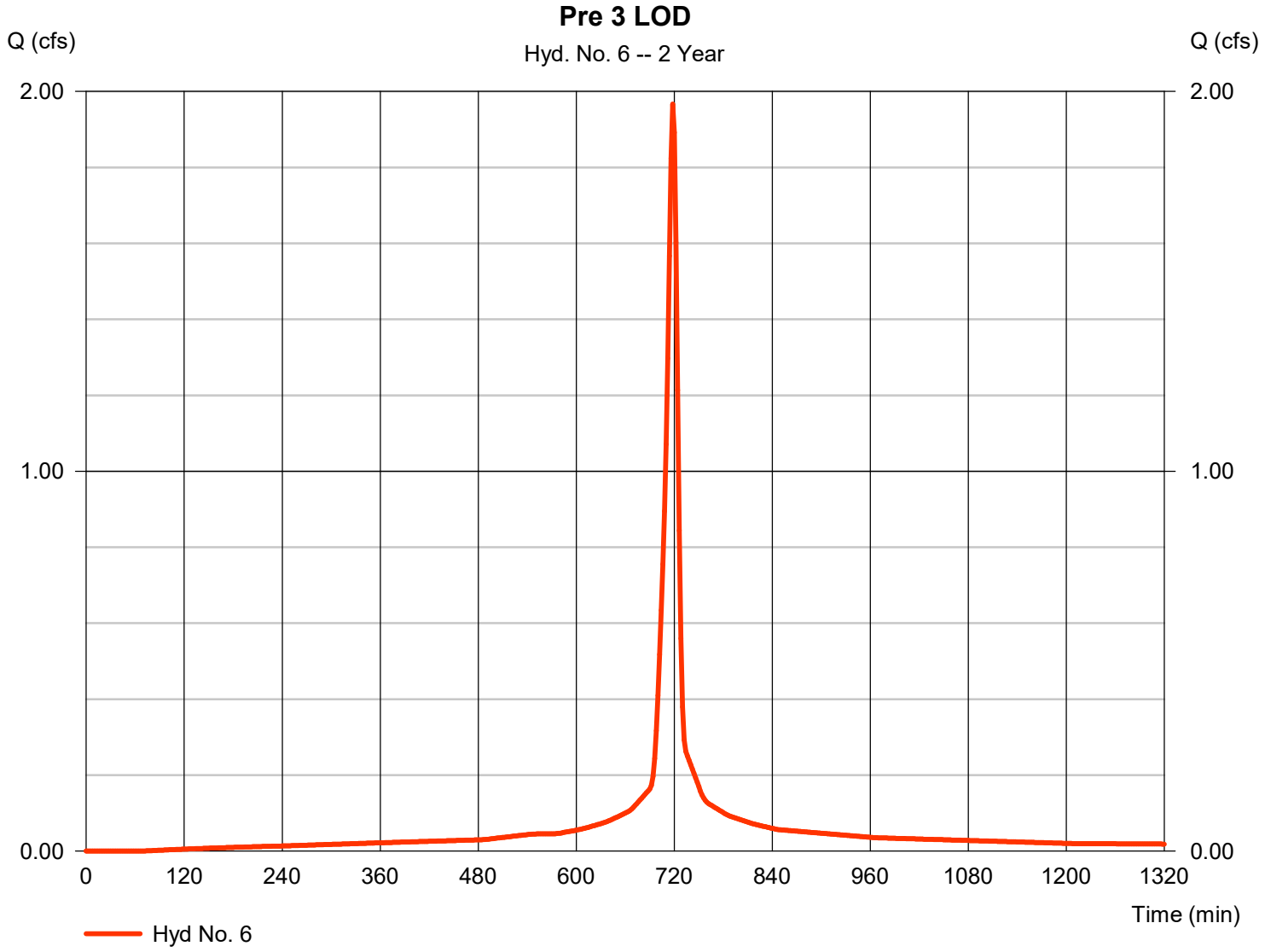


Hydrograph Report

Hyd. No. 6

Pre 3 LOD

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.967 cfs
Storm frequency	=	2 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	5,173 cuft
Drainage area	=	0.410 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	9.20 min
Total precip.	=	3.71 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Summary Report

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

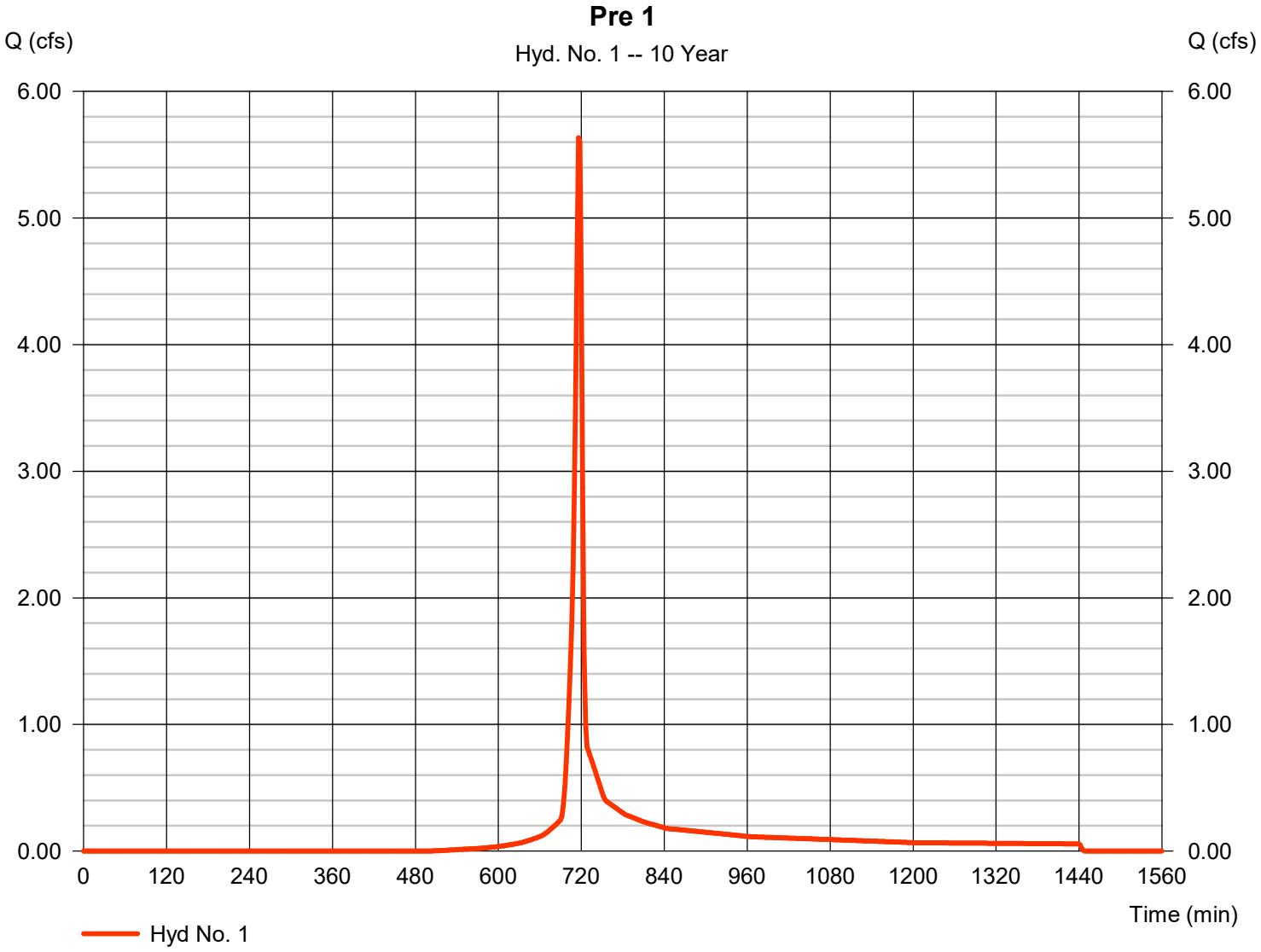
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	5.635	2	716	11,385	------	------	------	Pre 1
2	SCS Runoff	22.70	2	718	51,975	------	------	------	Pre 2
3	SCS Runoff	4.285	2	718	10,808	------	------	------	Pre 3
4	SCS Runoff	0.528	2	718	1,060	------	------	------	Pre 1 LOD
5	SCS Runoff	5.951	2	718	13,718	------	------	------	Pre 2 LOD
6	SCS Runoff	2.974	2	718	7,951	------	------	------	Pre 3 LOD

Hydrograph Report

Hyd. No. 1

Pre 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.635 cfs
Storm frequency	=	10 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	11,385 cuft
Drainage area	=	1.180 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.58 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



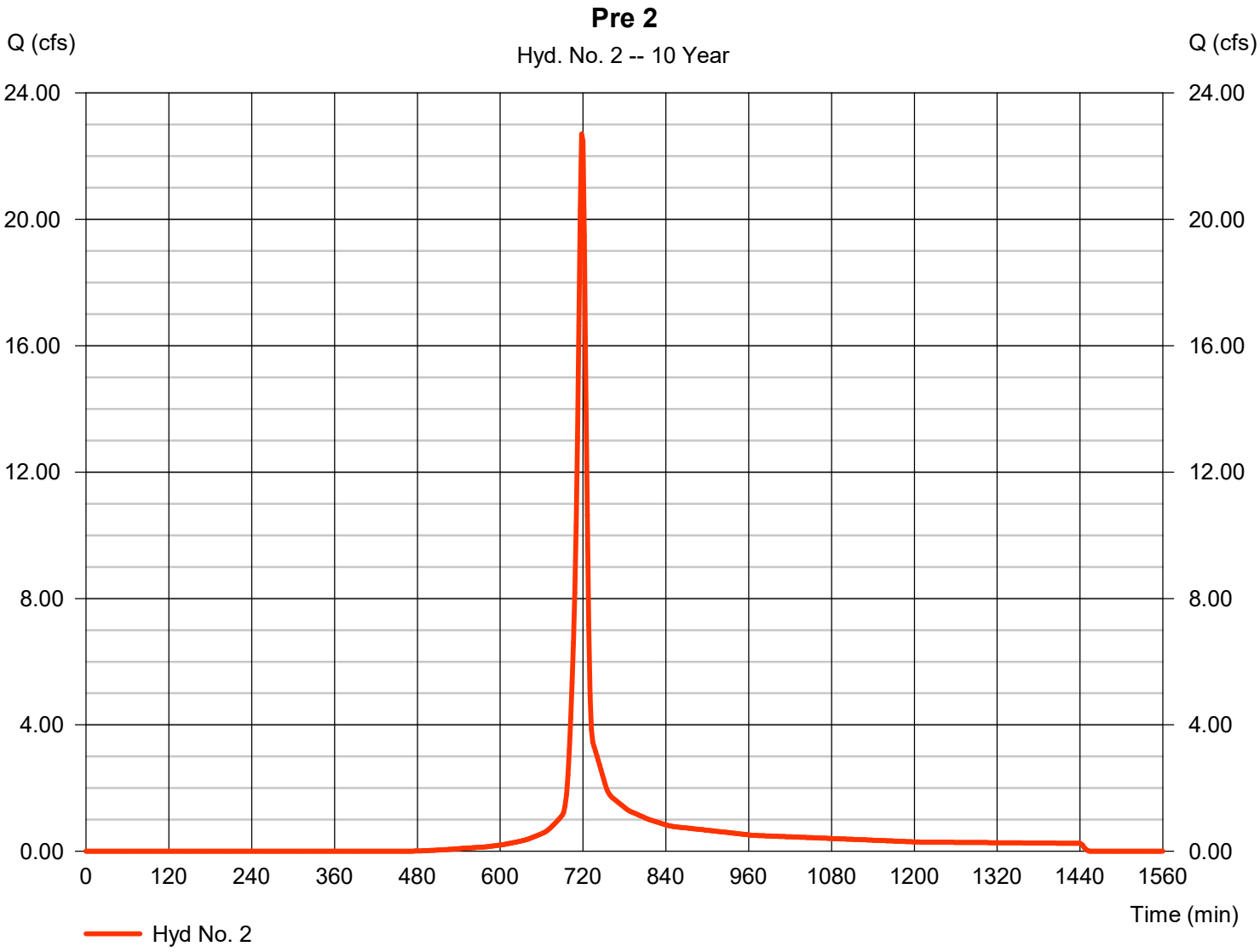
Hydrograph Report

Hyd. No. 2

Pre 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	22.70 cfs
Storm frequency	=	10 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	51,975 cuft
Drainage area	=	4.740 ac	Curve number	=	76*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	6.60 min
Total precip.	=	5.58 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(2.860 x 61) + (1.880 x 98)] / 4.740



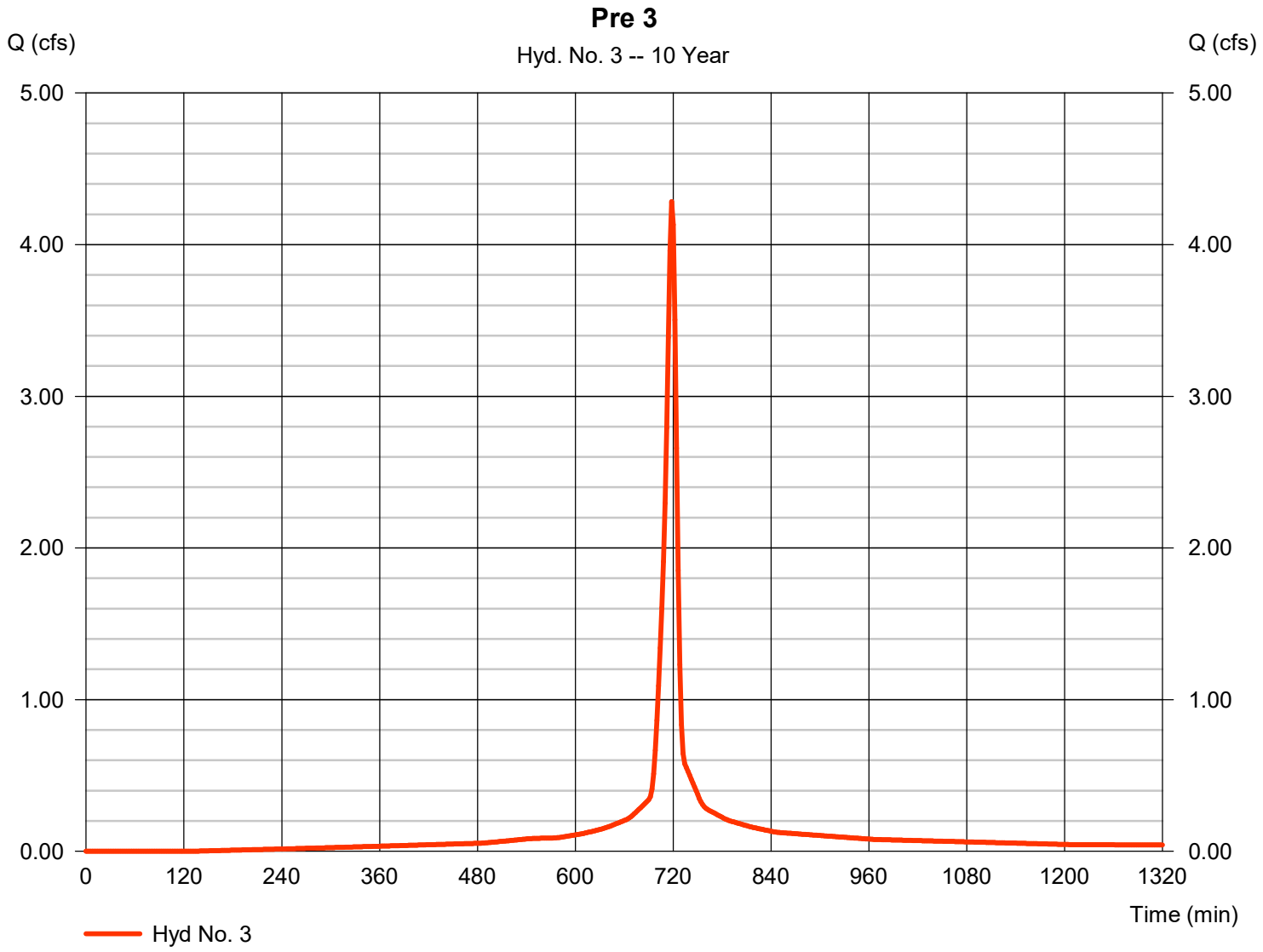
Hydrograph Report

Hyd. No. 3

Pre 3

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.285 cfs
Storm frequency	=	10 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	10,808 cuft
Drainage area	=	0.610 ac	Curve number	=	94*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	8.80 min
Total precip.	=	5.58 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.540 x 98) + (0.070 x 61)] / 0.610

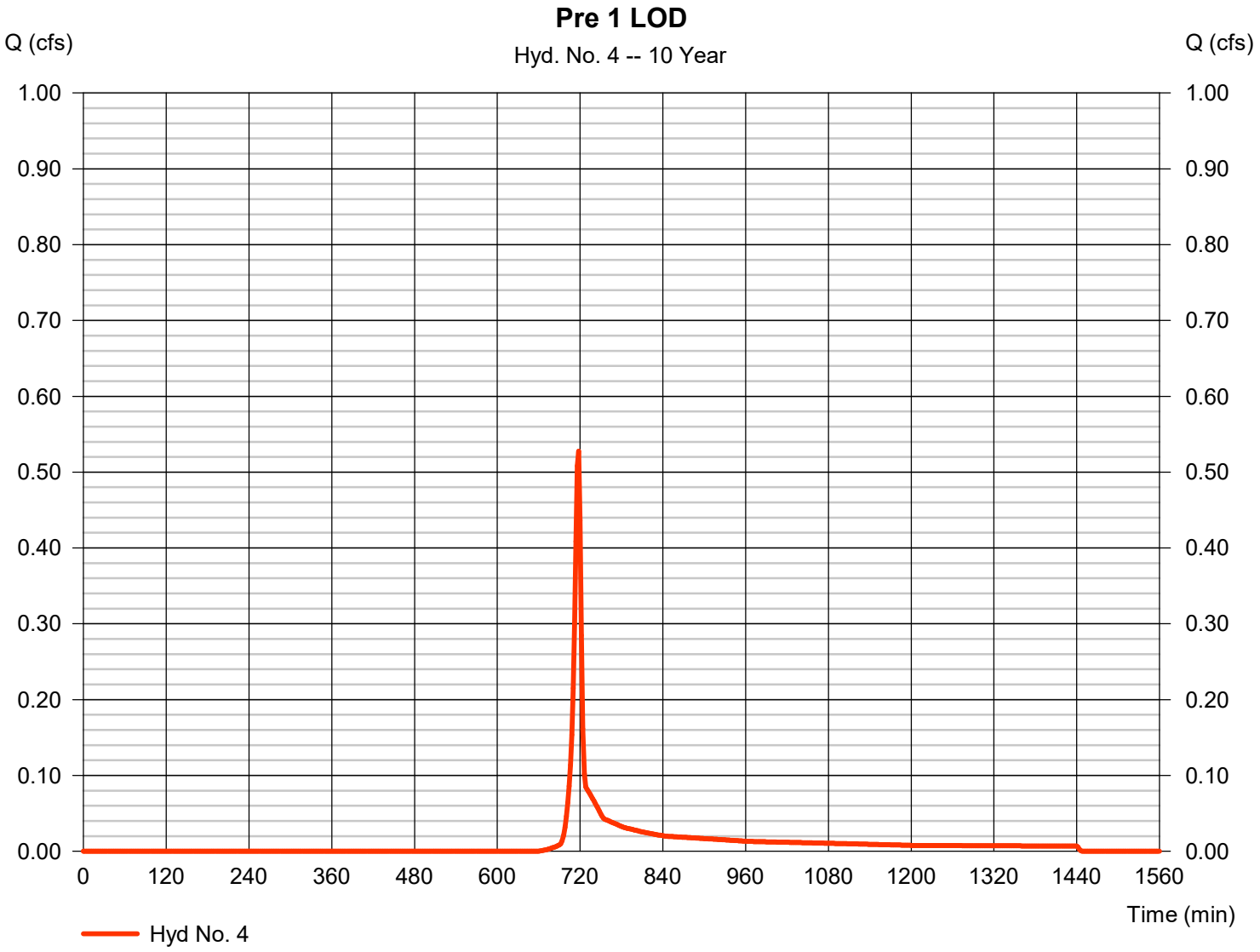


Hydrograph Report

Hyd. No. 4

Pre 1 LOD

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.528 cfs
Storm frequency	=	10 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	1,060 cuft
Drainage area	=	0.180 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.58 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



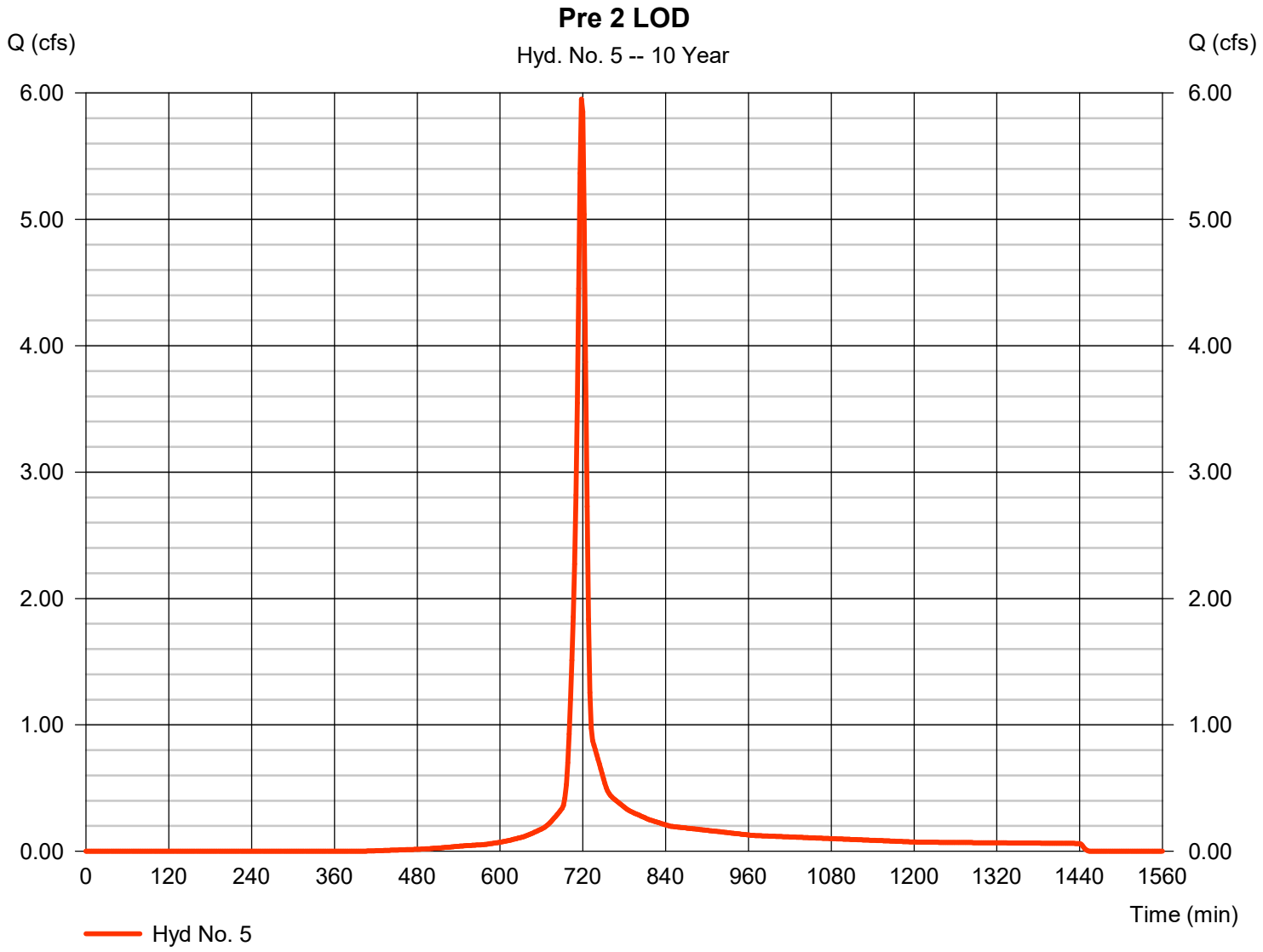
Hydrograph Report

Hyd. No. 5

Pre 2 LOD

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.951 cfs
Storm frequency	=	10 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	13,718 cuft
Drainage area	=	1.110 ac	Curve number	=	80*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	6.60 min
Total precip.	=	5.58 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.560 x 98) + (0.550 x 61)] / 1.110

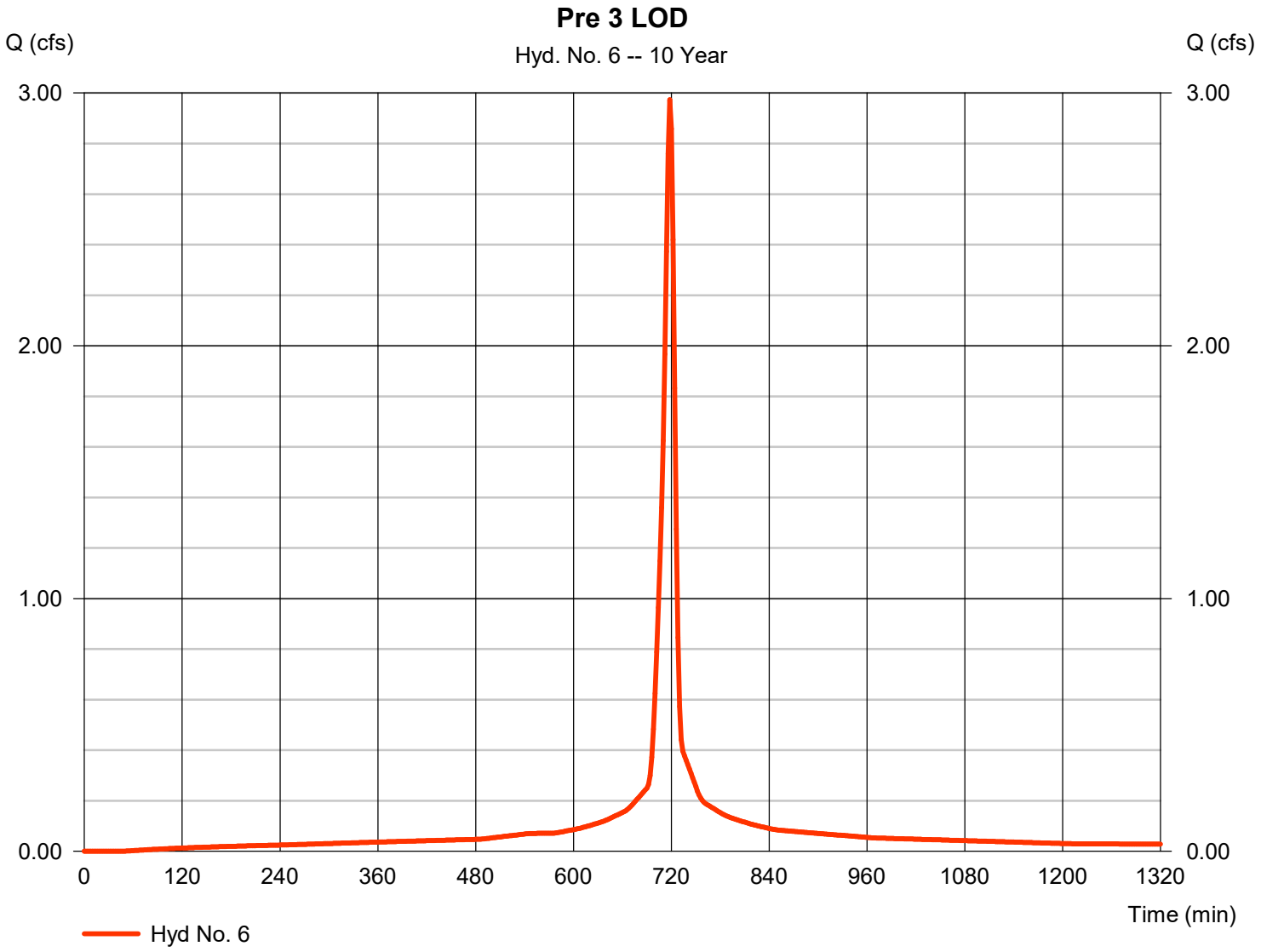


Hydrograph Report

Hyd. No. 6

Pre 3 LOD

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.974 cfs
Storm frequency	=	10 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	7,951 cuft
Drainage area	=	0.410 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	9.20 min
Total precip.	=	5.58 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Summary Report

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

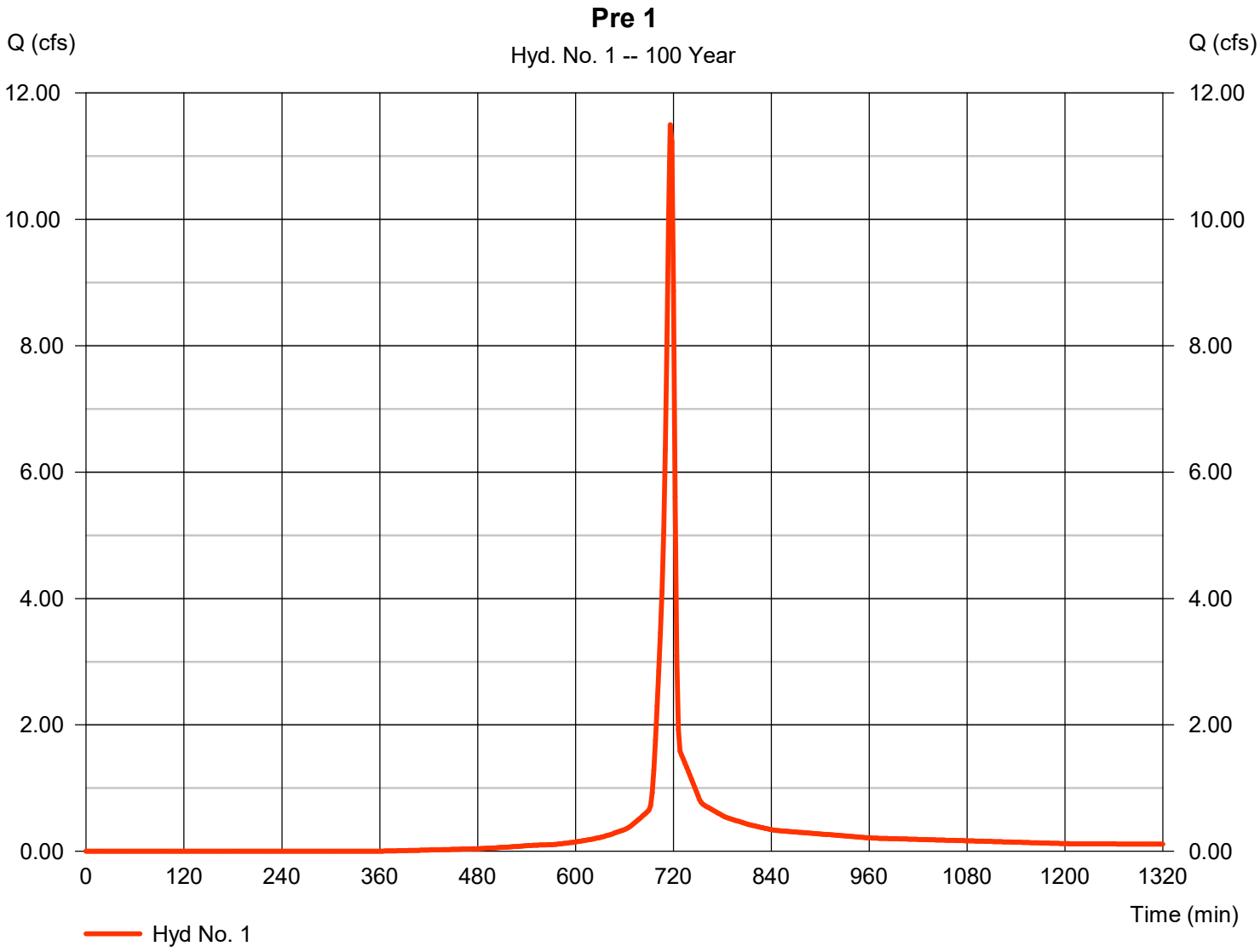
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	11.50	2	716	23,700	------	------	------	Pre 1
2	SCS Runoff	45.33	2	718	105,814	------	------	------	Pre 2
3	SCS Runoff	7.122	2	718	18,504	------	------	------	Pre 3
4	SCS Runoff	1.301	2	718	2,626	------	------	------	Pre 1 LOD
5	SCS Runoff	11.30	2	718	26,771	------	------	------	Pre 2 LOD
6	SCS Runoff	4.853	2	718	13,156	------	------	------	Pre 3 LOD

Hydrograph Report

Hyd. No. 1

Pre 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	11.50 cfs
Storm frequency	=	100 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	23,700 cuft
Drainage area	=	1.180 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	9.08 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



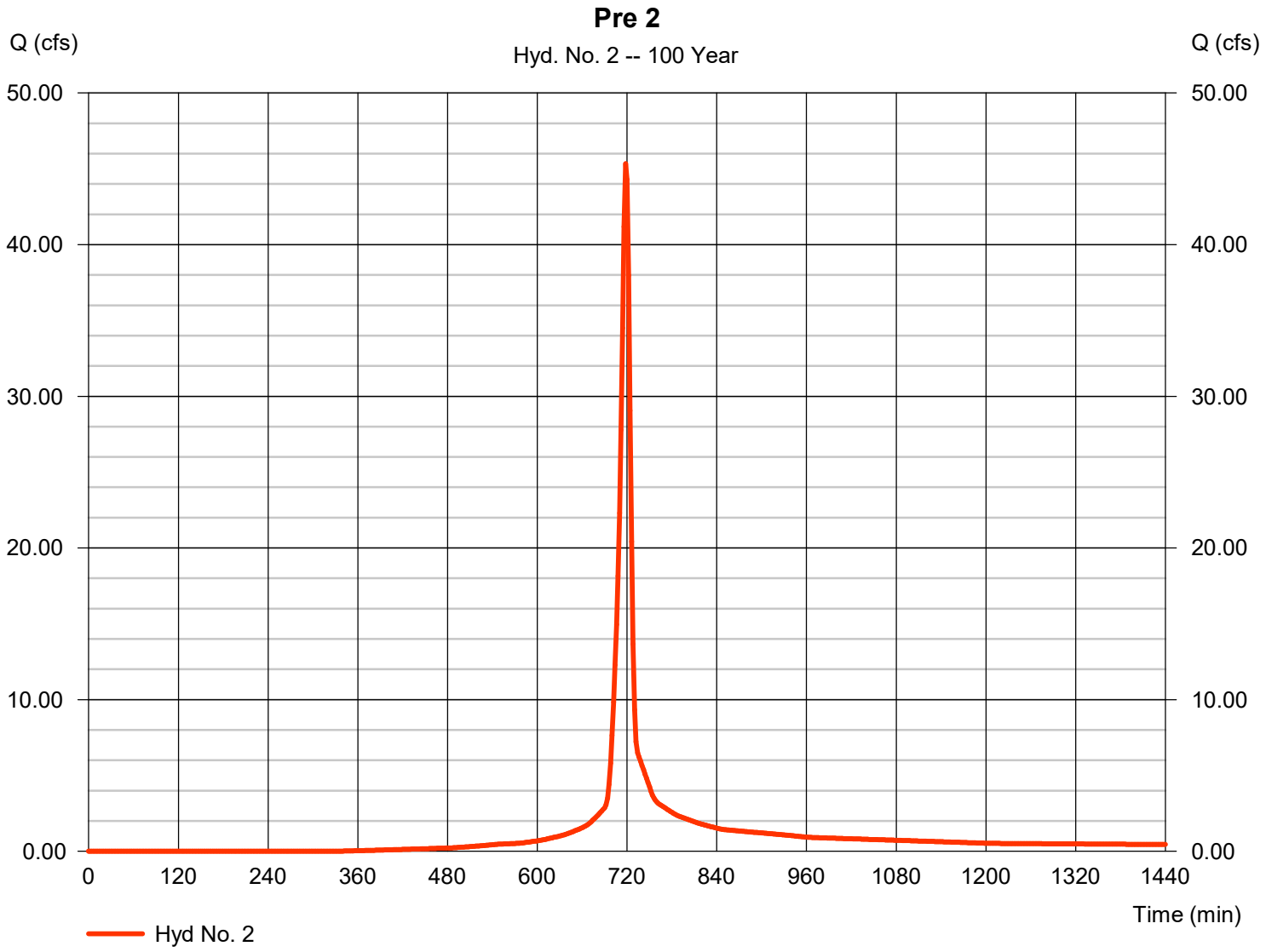
Hydrograph Report

Hyd. No. 2

Pre 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	45.33 cfs
Storm frequency	=	100 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	105,814 cuft
Drainage area	=	4.740 ac	Curve number	=	76*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	6.60 min
Total precip.	=	9.08 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(2.860 x 61) + (1.880 x 98)] / 4.740



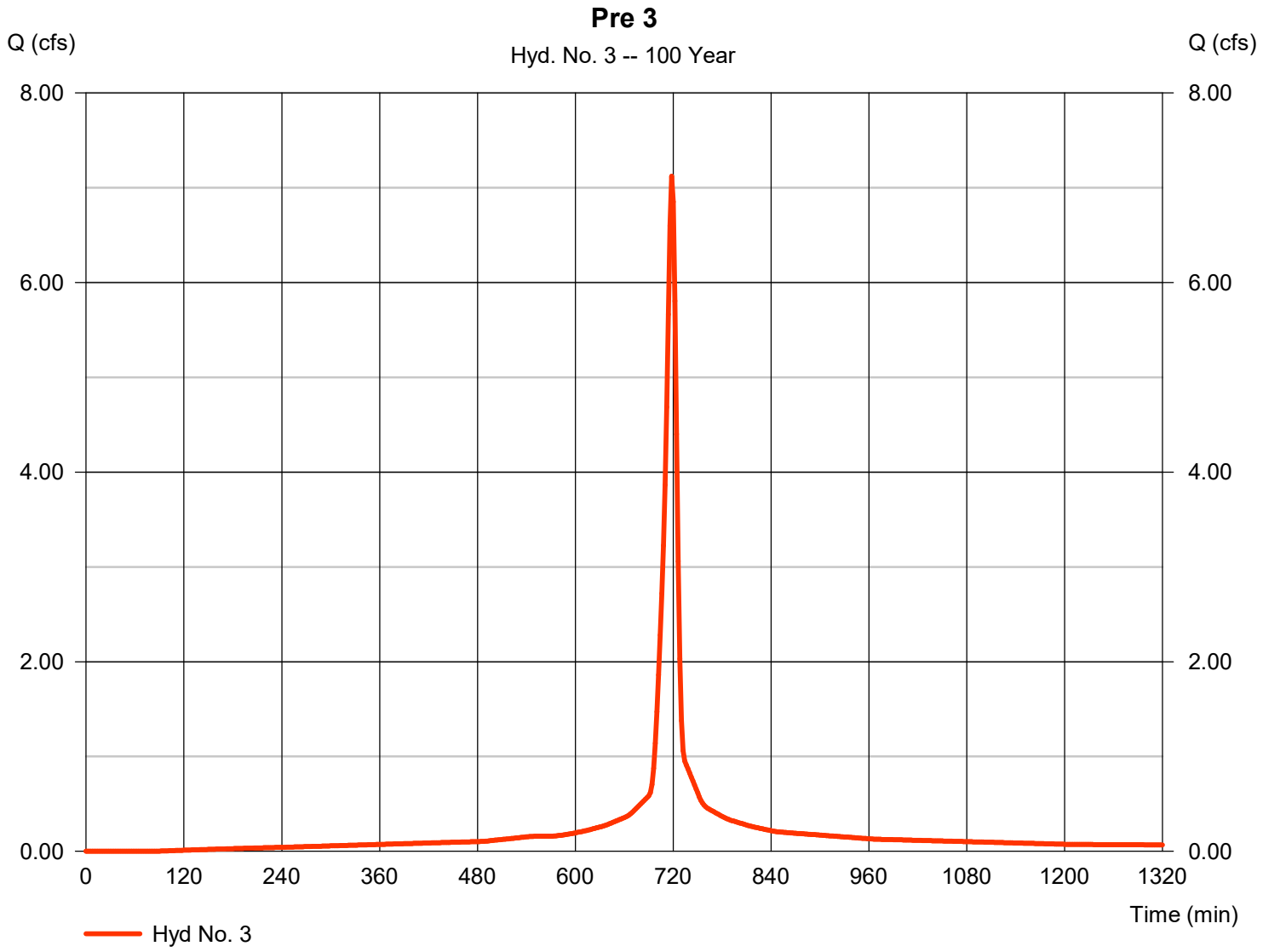
Hydrograph Report

Hyd. No. 3

Pre 3

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.122 cfs
Storm frequency	=	100 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	18,504 cuft
Drainage area	=	0.610 ac	Curve number	=	94*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	8.80 min
Total precip.	=	9.08 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.540 x 98) + (0.070 x 61)] / 0.610

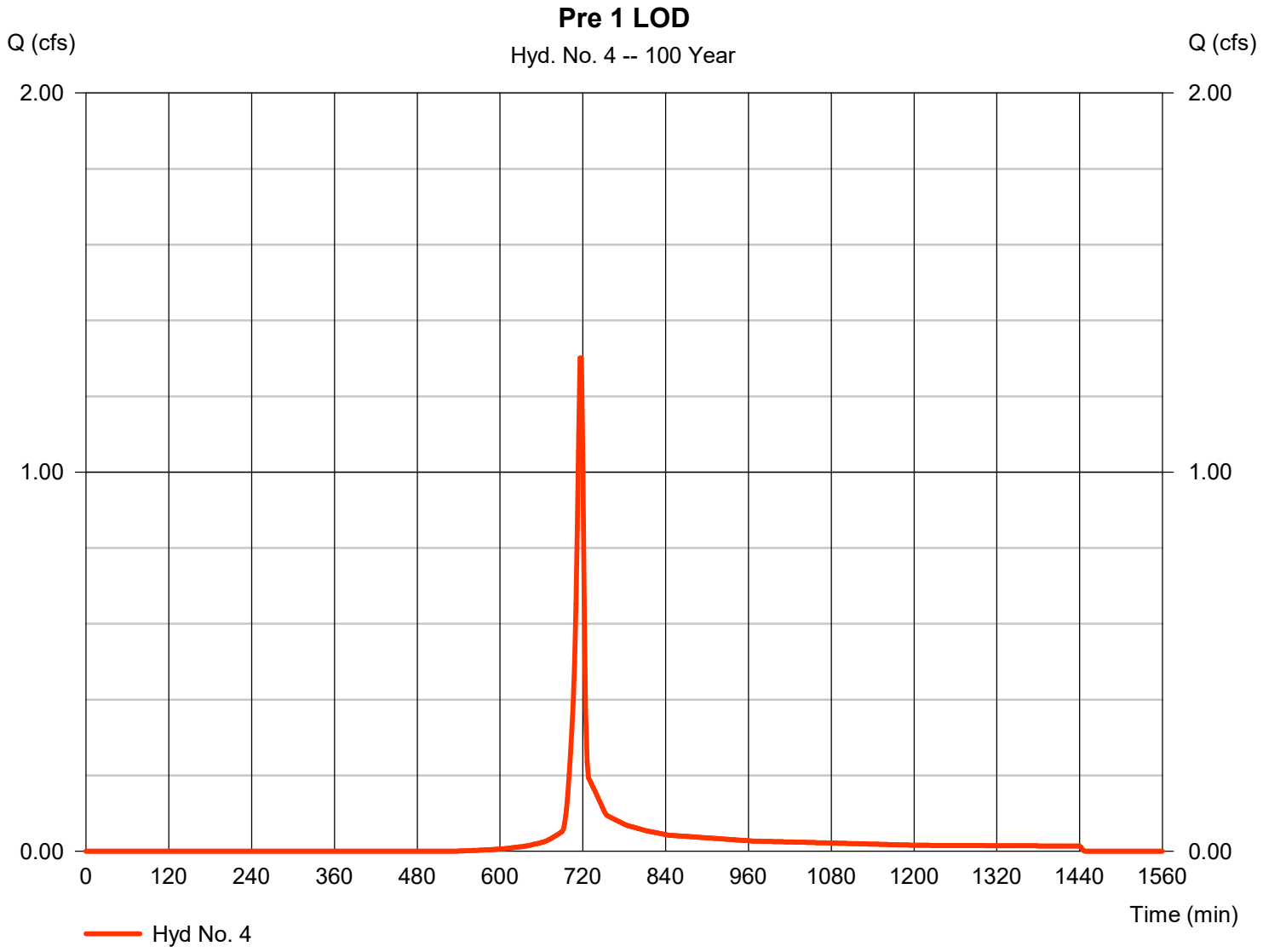


Hydrograph Report

Hyd. No. 4

Pre 1 LOD

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.301 cfs
Storm frequency	=	100 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	2,626 cuft
Drainage area	=	0.180 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	9.08 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



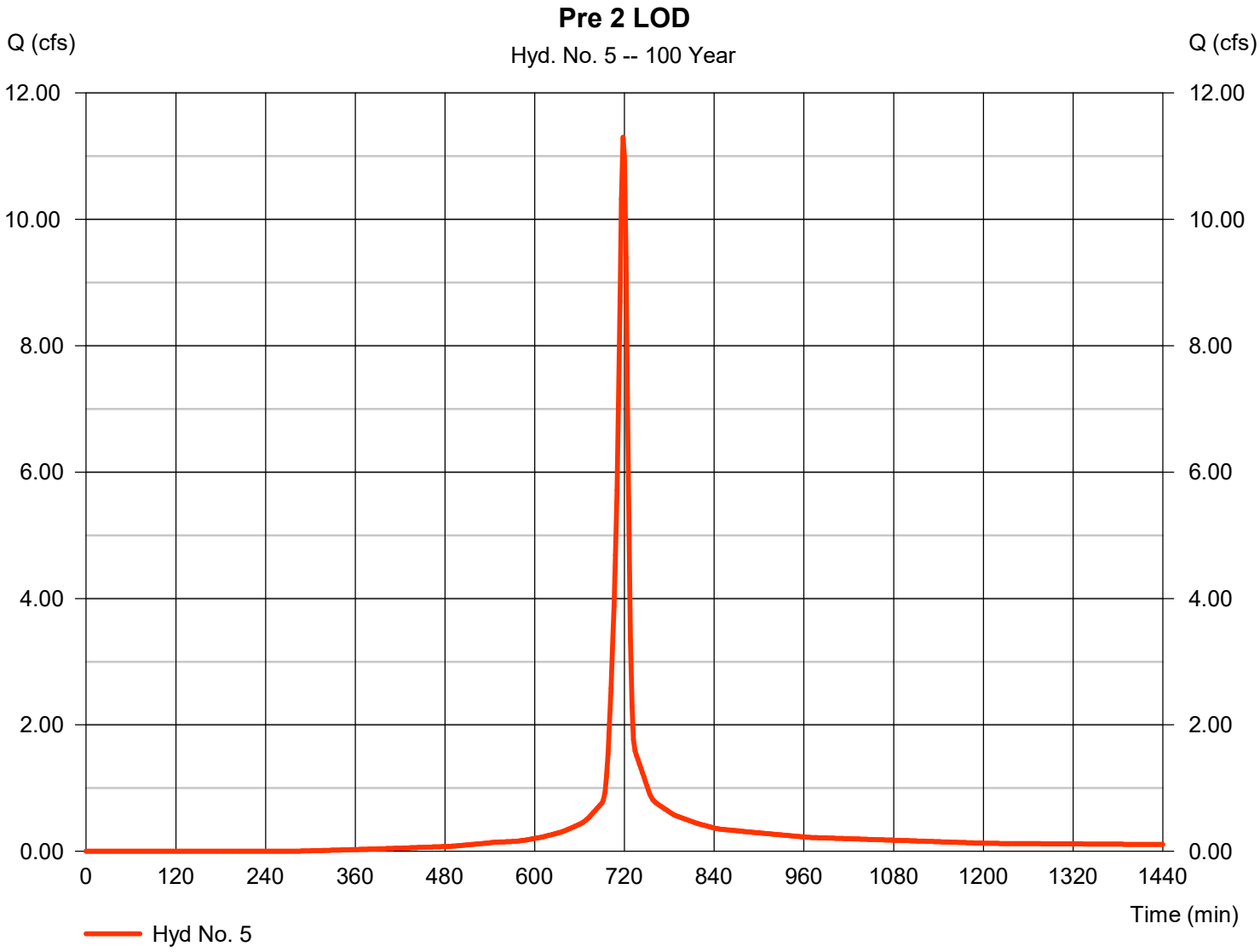
Hydrograph Report

Hyd. No. 5

Pre 2 LOD

Hydrograph type	=	SCS Runoff	Peak discharge	=	11.30 cfs
Storm frequency	=	100 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	26,771 cuft
Drainage area	=	1.110 ac	Curve number	=	80*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	6.60 min
Total precip.	=	9.08 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.560 x 98) + (0.550 x 61)] / 1.110

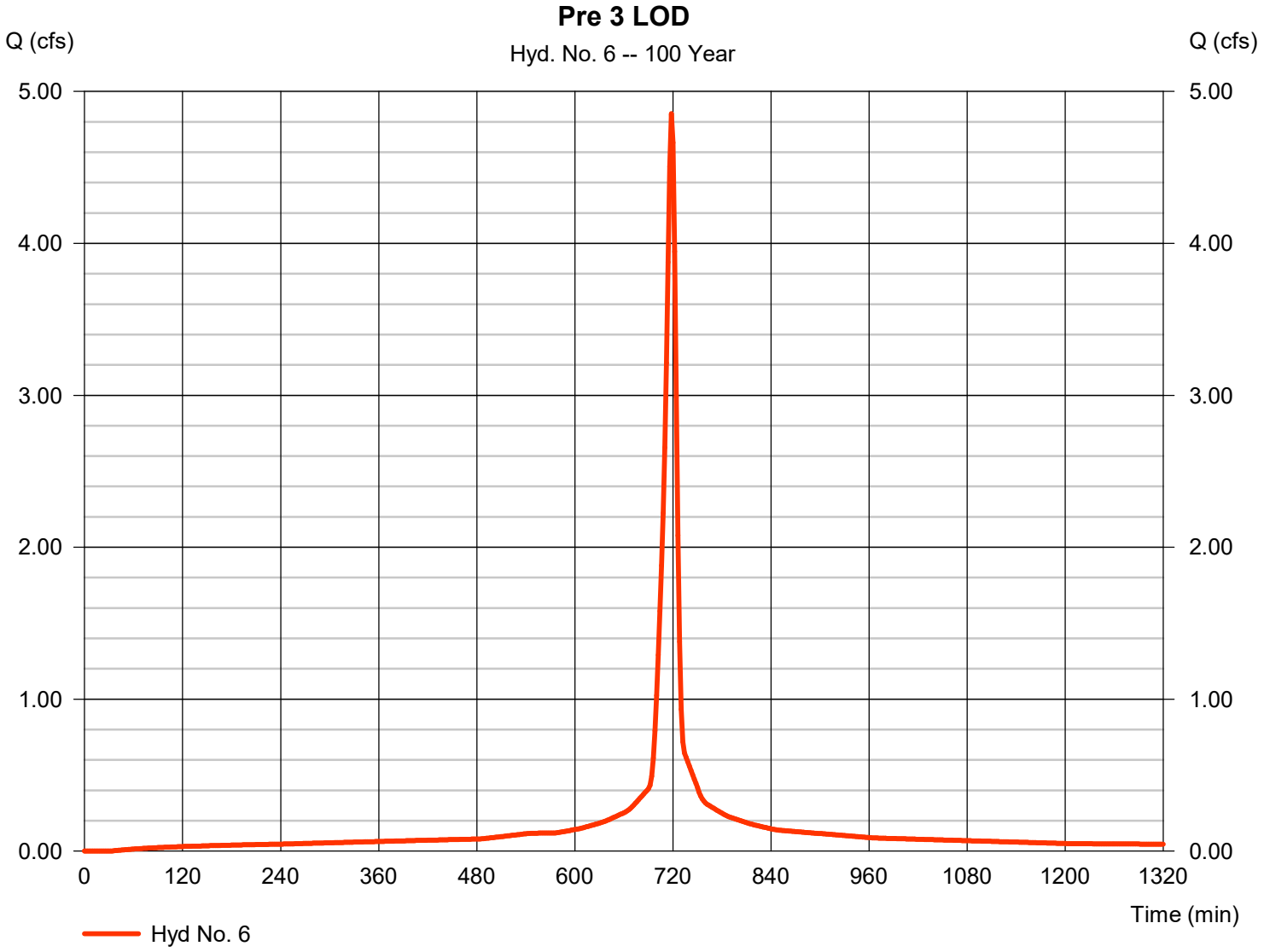


Hydrograph Report

Hyd. No. 6

Pre 3 LOD

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.853 cfs
Storm frequency	=	100 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	13,156 cuft
Drainage area	=	0.410 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	9.20 min
Total precip.	=	9.08 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

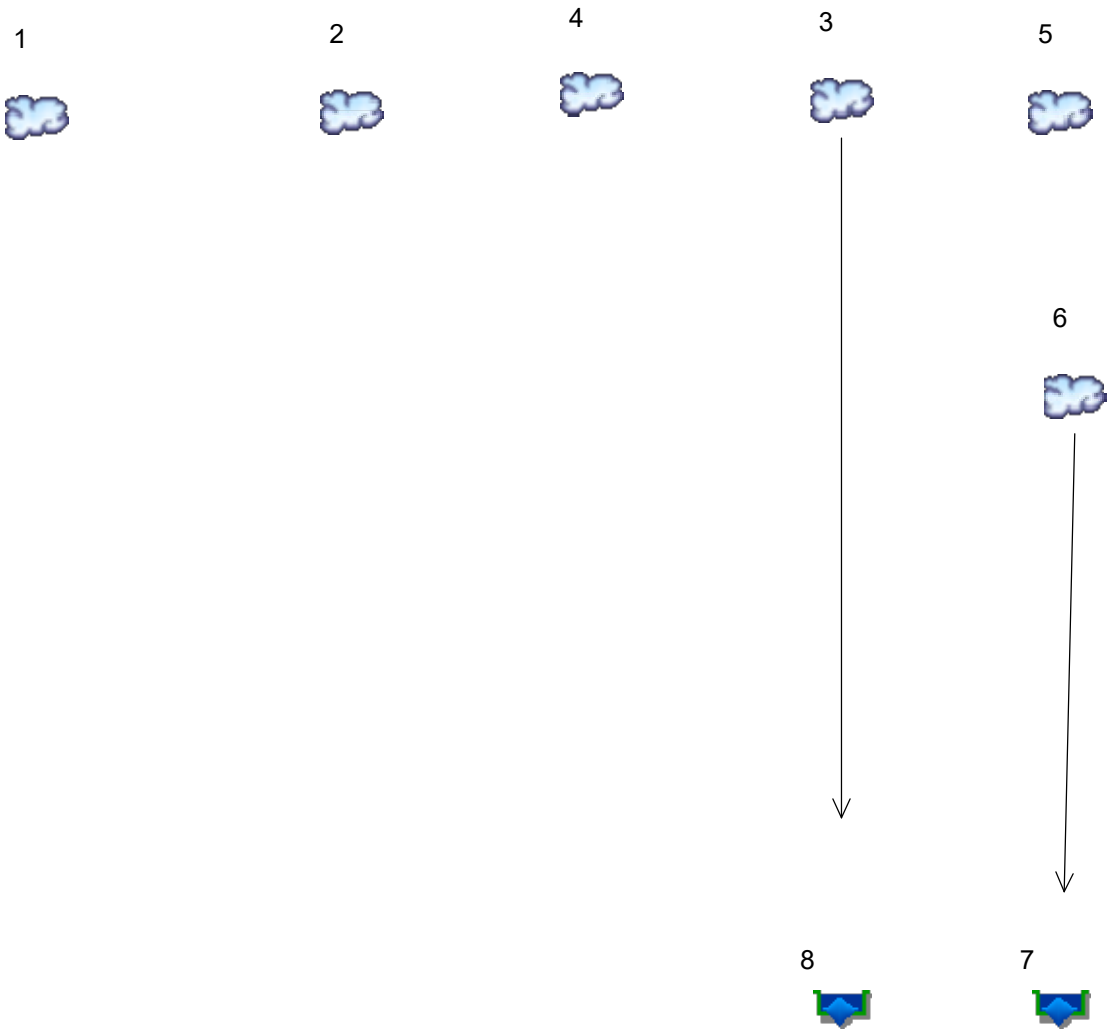


Hydraflow Table of Contents

Pre Hydro.gpw

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

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	Post 1
2	SCS Runoff	Post 2
3	SCS Runoff	Post 3
4	SCS Runoff	Post LOD 2
5	SCS Runoff	Post 3 LOD
6	SCS Runoff	Post 2 Total
7	Reservoir	Res
8	Reservoir	Garden

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	------	0.000	1.008	-------	-------	3.519	-------	-------	0.000	Post 1
2	SCS Runoff	------	5.446	7.598	-------	-------	14.46	-------	-------	0.000	Post 2
3	SCS Runoff	------	3.485	4.864	-------	-------	9.155	-------	-------	0.000	Post 3
4	SCS Runoff	------	4.266	2.823	-------	-------	6.206	-------	-------	0.000	Post LOD 2
5	SCS Runoff	------	3.567	2.167	-------	-------	5.506	-------	-------	0.000	Post 3 LOD
6	SCS Runoff	------	9.931	13.40	-------	-------	23.89	-------	-------	0.000	Post 2 Total
7	Reservoir	6	5.667	10.17	-------	-------	22.55	-------	-------	0.000	Res
8	Reservoir	3	0.354	1.034	-------	-------	3.565	-------	-------	0.000	Garden

Hydrograph Summary Report

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

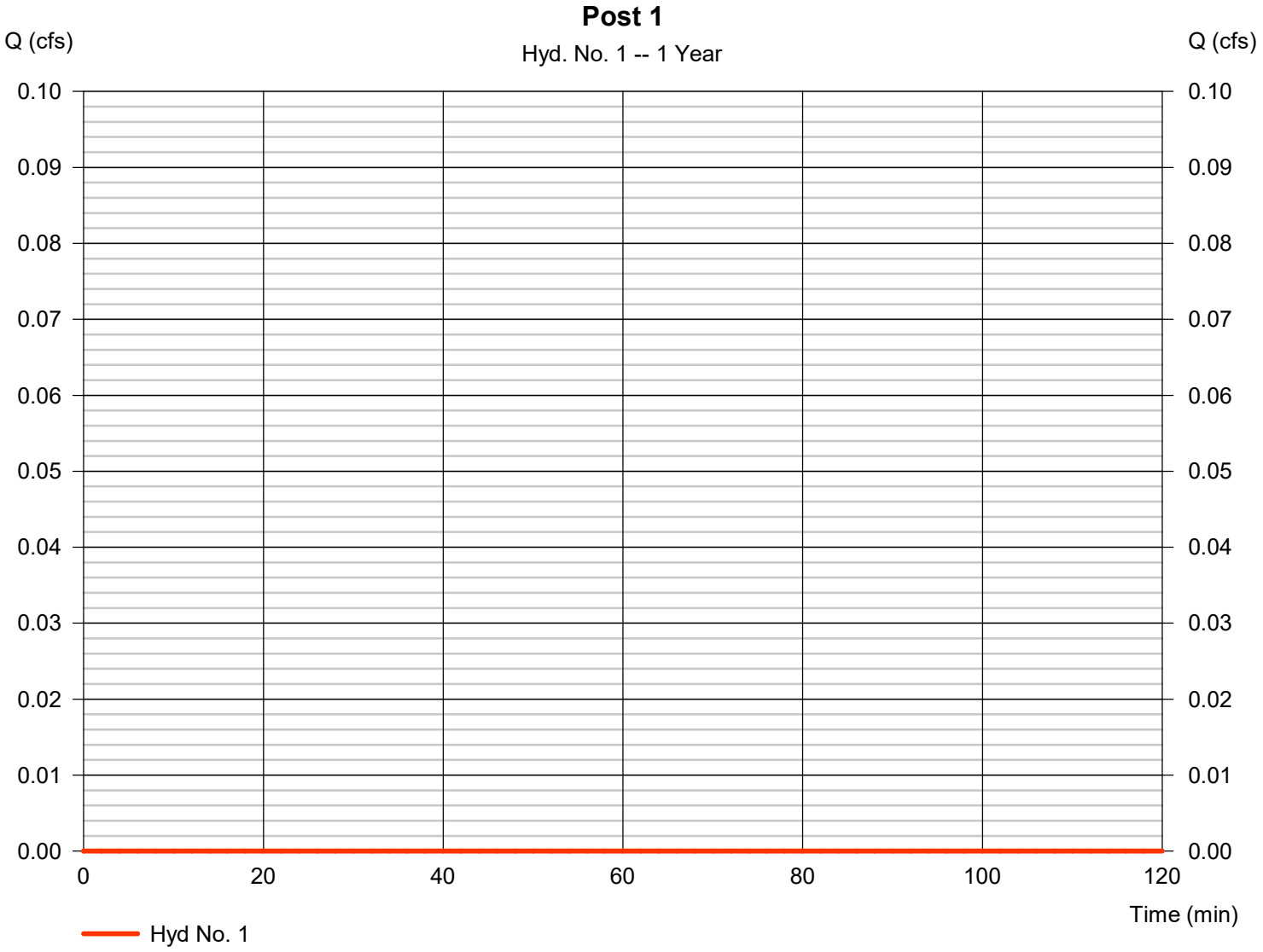
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.000	2	n/a	0	------	------	------	Post 1
2	SCS Runoff	5.446	2	720	12,467	------	------	------	Post 2
3	SCS Runoff	3.485	2	722	9,119	------	------	------	Post 3
4	SCS Runoff	4.266	2	716	9,084	------	------	------	Post LOD 2
5	SCS Runoff	3.567	2	716	7,296	------	------	------	Post 3 LOD
6	SCS Runoff	9.931	2	716	20,052	------	------	------	Post 2 Total
7	Reservoir	5.667	2	722	20,052	6	692.28	2,983	Res
8	Reservoir	0.354	2	760	8,991	3	700.73	4,493	Garden

Hydrograph Report

Hyd. No. 1

Post 1

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Drainage area	= 1.000 ac	Curve number	= 78
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.07 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



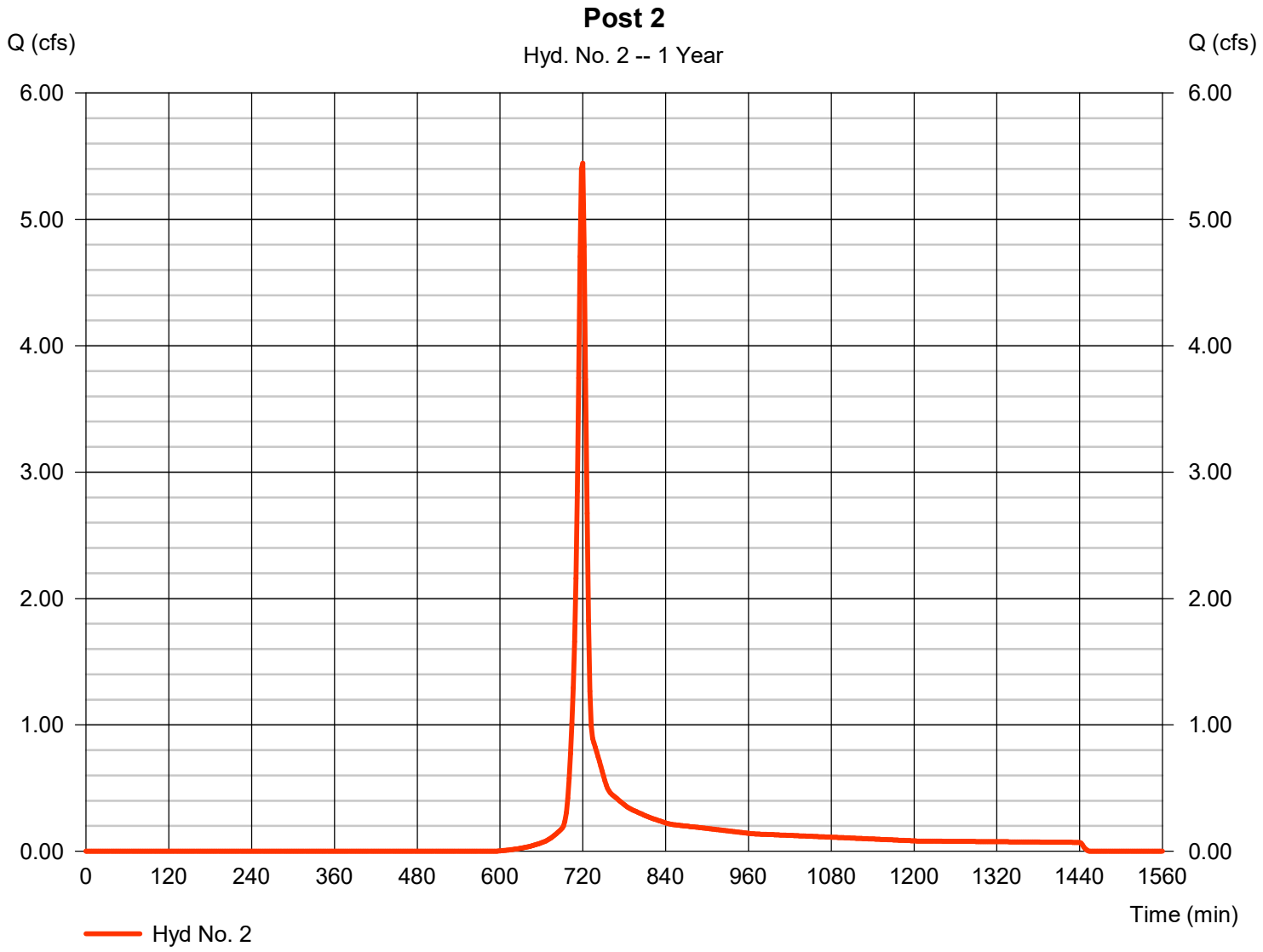
Hydrograph Report

Hyd. No. 2

Post 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.446 cfs
Storm frequency	=	1 yrs	Time to peak	=	720 min
Time interval	=	2 min	Hyd. volume	=	12,467 cuft
Drainage area	=	2.770 ac	Curve number	=	79*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	8.60 min
Total precip.	=	3.07 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.420 x 61) + (1.350 x 98)] / 2.770



TR55 Tc Worksheet

Hyd. No. 2

Post 2

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.150		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 2.20		0.00		0.00		
Land slope (%)	= 8.00		0.00		0.00		
Travel Time (min)	**= 6.79**	**+**	**0.00**	**+**	**0.00**	**=**	**6.79**
Shallow Concentrated Flow							
Flow length (ft)	= 85.00		0.00		0.00		
Watercourse slope (%)	= 4.00		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=3.23		0.00		0.00		
Travel Time (min)	**= 0.44**	**+**	**0.00**	**+**	**0.00**	**=**	**0.44**
Channel Flow							
X sectional flow area (sqft)	= 1.23		0.00		0.00		
Wetted perimeter (ft)	= 3.93		0.00		0.00		
Channel slope (%)	= 2.00		0.00		0.00		
Manning's n-value	= 0.013		0.015		0.015		
Velocity (ft/s)	=7.44						
			0.00				
					0.00		
Flow length (ft)	({0})618.0		0.0		0.0		
Travel Time (min)	**= 1.38**	**+**	**0.00**	**+**	**0.00**	**=**	**1.38**

Total Travel Time, Tc ..... 8.60 min

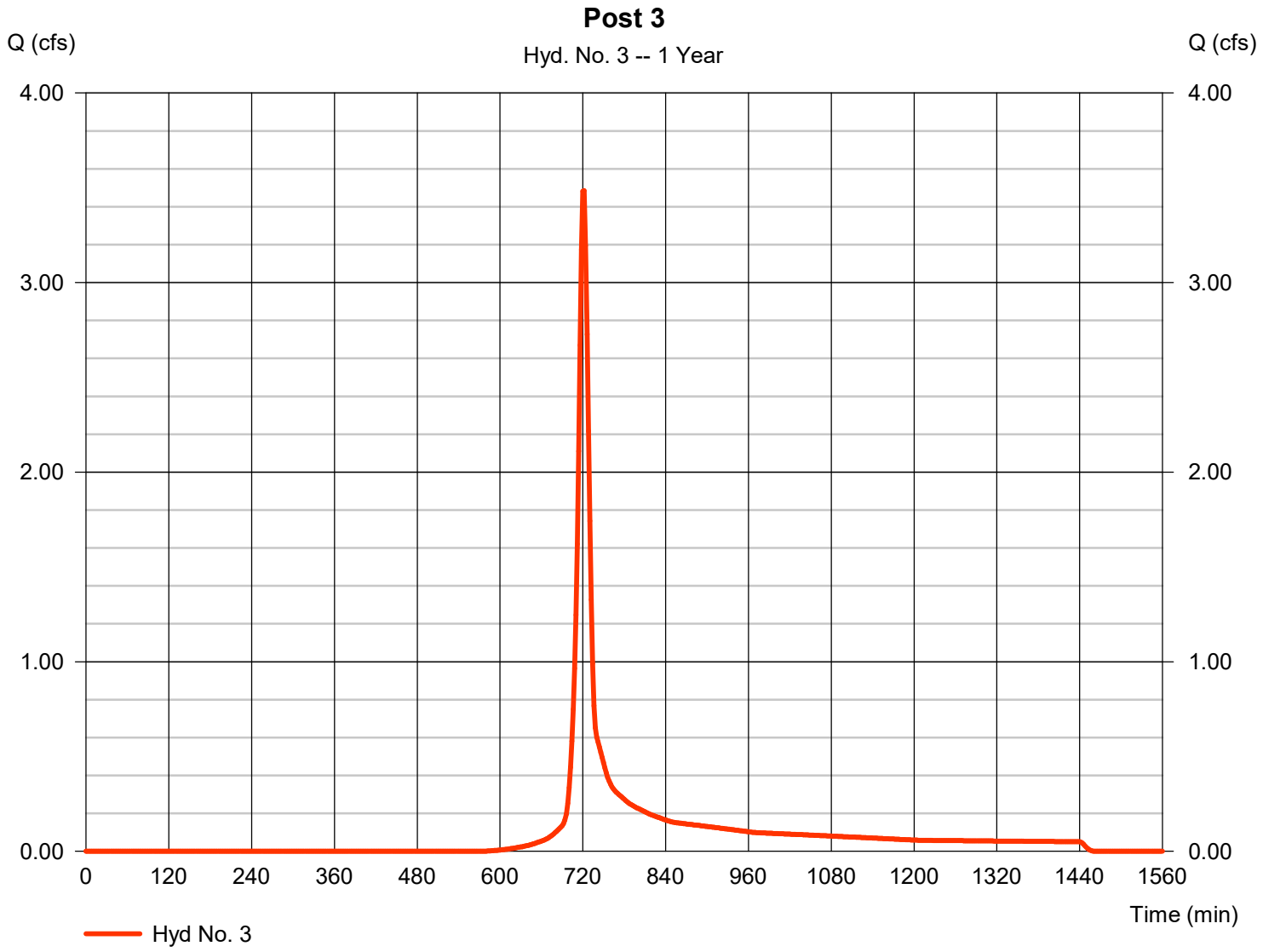
Hydrograph Report

Hyd. No. 3

Post 3

Hydrograph type	= SCS Runoff	Peak discharge	= 3.485 cfs
Storm frequency	= 1 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 9,119 cuft
Drainage area	= 1.870 ac	Curve number	= 80*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 10.20 min
Total precip.	= 3.07 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.980 x 98) + (0.890 x 61)] / 1.870



TR55 Tc Worksheet

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

Hyd. No. 3

Post 3

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.150		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 2.20		0.00		0.00		
Land slope (%)	= 7.00		0.00		0.00		
Travel Time (min)	**= 7.16**	**+**	**0.00**	**+**	**0.00**	**=**	**7.16**
Shallow Concentrated Flow							
Flow length (ft)	= 150.00		0.00		0.00		
Watercourse slope (%)	= 5.00		0.00		0.00		
Surface description	= Paved		Paved		Paved		
Average velocity (ft/s)	=4.55		0.00		0.00		
Travel Time (min)	**= 0.55**	**+**	**0.00**	**+**	**0.00**	**=**	**0.55**
Channel Flow							
X sectional flow area (sqft)	= 1.23		0.79		6.50		
Wetted perimeter (ft)	= 3.93		3.14		12.00		
Channel slope (%)	= 1.50		0.10		1.50		
Manning's n-value	= 0.015		0.015		0.026		
Velocity (ft/s)	=5.59						
			1.25				
					4.65		
Flow length (ft)	({0})307.0		20.0		360.0		
Travel Time (min)	**= 0.92**	**+**	**0.27**	**+**	**1.29**	**=**	**2.47**

Total Travel Time, Tc ..... 10.20 min

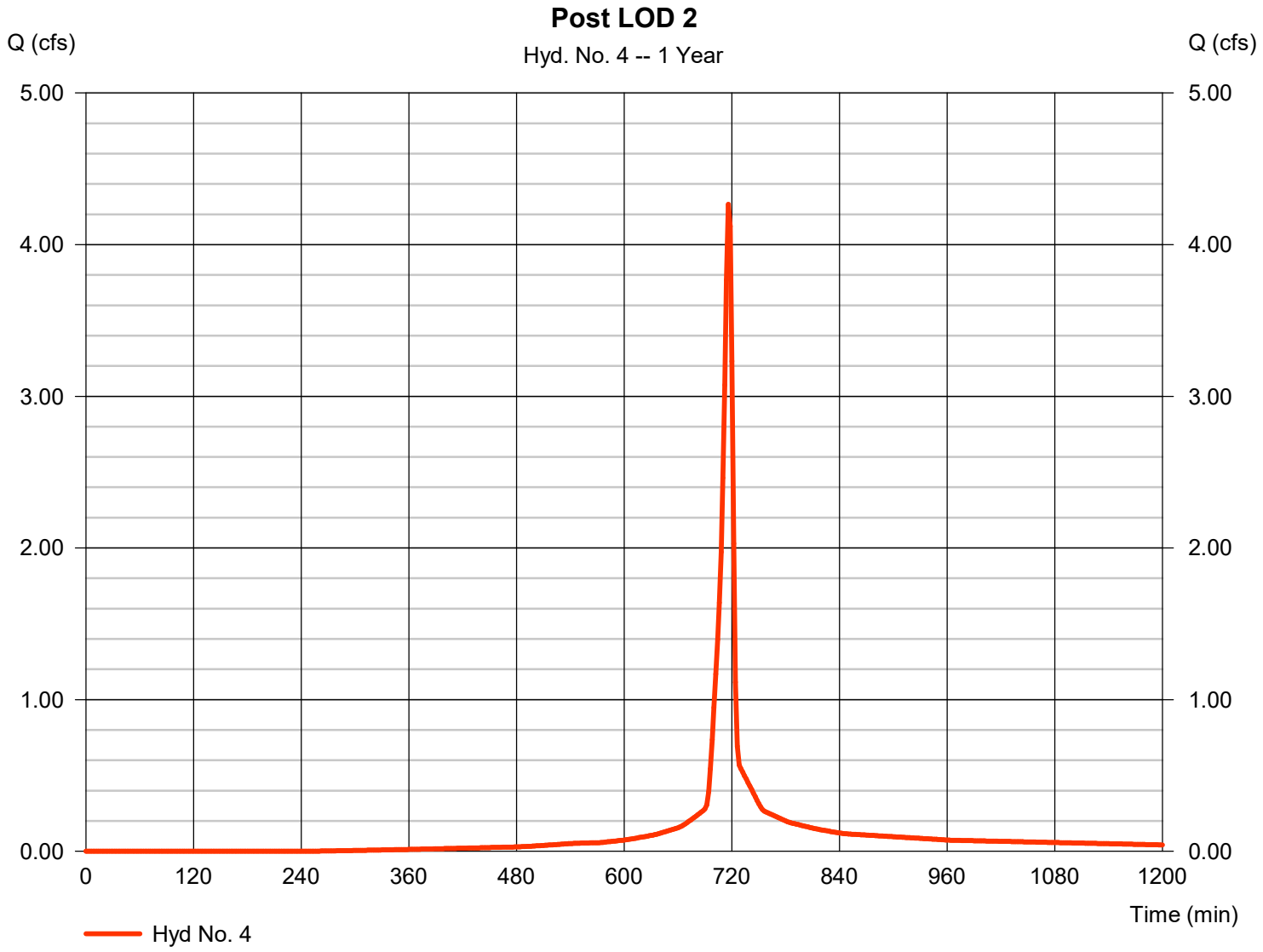
Hydrograph Report

Hyd. No. 4

Post LOD 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.266 cfs
Storm frequency	=	1 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	9,084 cuft
Drainage area	=	1.150 ac	Curve number	=	93*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.07 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.170 x 61) + (0.980 x 98)] / 1.150



TR55 Tc Worksheet

Hyd. No. 4

Post LOD 2

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.011		0.150		0.011		
Flow length (ft)	= 83.0		17.0		0.0		
Two-year 24-hr precip. (in)	= 2.20		2.20		0.00		
Land slope (%)	= 7.00		3.50		0.00		
Travel Time (min)	**= 0.76**	**+**	**2.29**	**+**	**0.00**	**=**	**3.05**
Shallow Concentrated Flow							
Flow length (ft)	= 103.00		0.00		0.00		
Watercourse slope (%)	= 2.00		0.00		0.00		
Surface description	= Paved		Paved		Paved		
Average velocity (ft/s)	=2.87		0.00		0.00		
Travel Time (min)	**= 0.60**	**+**	**0.00**	**+**	**0.00**	**=**	**0.60**
Channel Flow							
X sectional flow area (sqft)	= 1.23		0.00		0.00		
Wetted perimeter (ft)	= 3.93		0.00		0.00		
Channel slope (%)	= 2.00		0.00		0.00		
Manning's n-value	= 0.013		0.015		0.015		
Velocity (ft/s)	=7.44						
			0.00				
					0.00		
Flow length (ft)	({0})618.0		0.0		0.0		
Travel Time (min)	**= 1.38**	**+**	**0.00**	**+**	**0.00**	**=**	**1.38**

Total Travel Time, Tc ..... 5.00 min

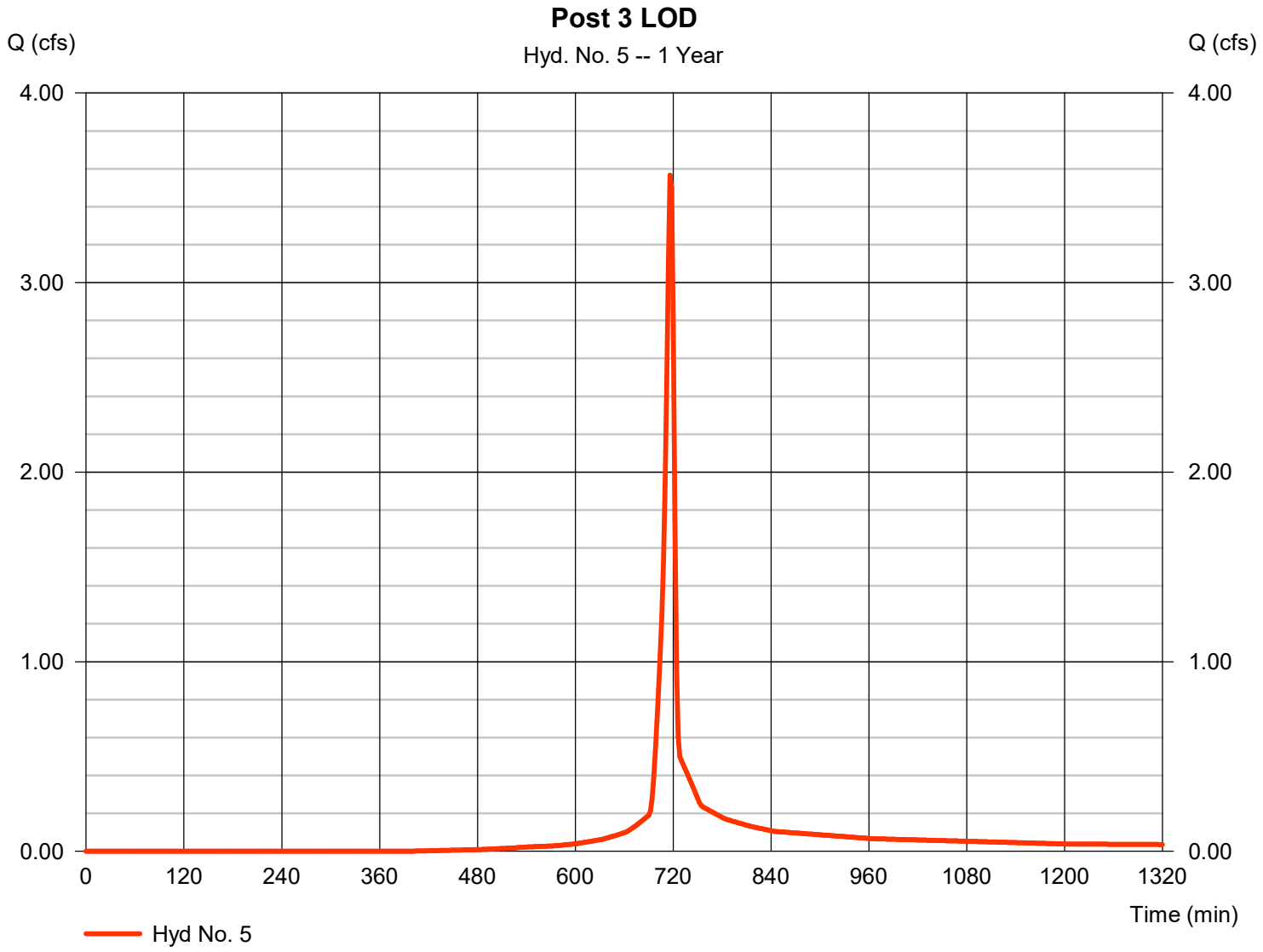
Hydrograph Report

Hyd. No. 5

Post 3 LOD

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.567 cfs
Storm frequency	=	1 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	7,296 cuft
Drainage area	=	1.140 ac	Curve number	=	88*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	6.10 min
Total precip.	=	3.07 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.830 x 98) + (0.310 x 61)] / 1.140



TR55 Tc Worksheet

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

Hyd. No. 5

Post 3 LOD

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.150		0.011		0.011		
Flow length (ft)	= 24.0		74.0		0.0		
Two-year 24-hr precip. (in)	= 2.20		2.20		0.00		
Land slope (%)	= 8.00		4.00		0.00		
Travel Time (min)	**= 2.17**	**+**	**0.87**	**+**	**0.00**	**=**	**3.04**
Shallow Concentrated Flow							
Flow length (ft)	= 150.00		0.00		0.00		
Watercourse slope (%)	= 5.00		0.00		0.00		
Surface description	= Paved		Paved		Paved		
Average velocity (ft/s)	=4.55		0.00		0.00		
Travel Time (min)	**= 0.55**	**+**	**0.00**	**+**	**0.00**	**=**	**0.55**
Channel Flow							
X sectional flow area (sqft)	= 1.23		0.79		6.50		
Wetted perimeter (ft)	= 3.93		3.14		12.00		
Channel slope (%)	= 1.50		0.10		1.50		
Manning's n-value	= 0.015		0.015		0.026		
Velocity (ft/s)	=5.59						
			1.25				
					4.65		
Flow length (ft)	({0})307.0		20.0		360.0		
Travel Time (min)	**= 0.92**	**+**	**0.27**	**+**	**1.29**	**=**	**2.47**

Total Travel Time, Tc ..... 6.10 min

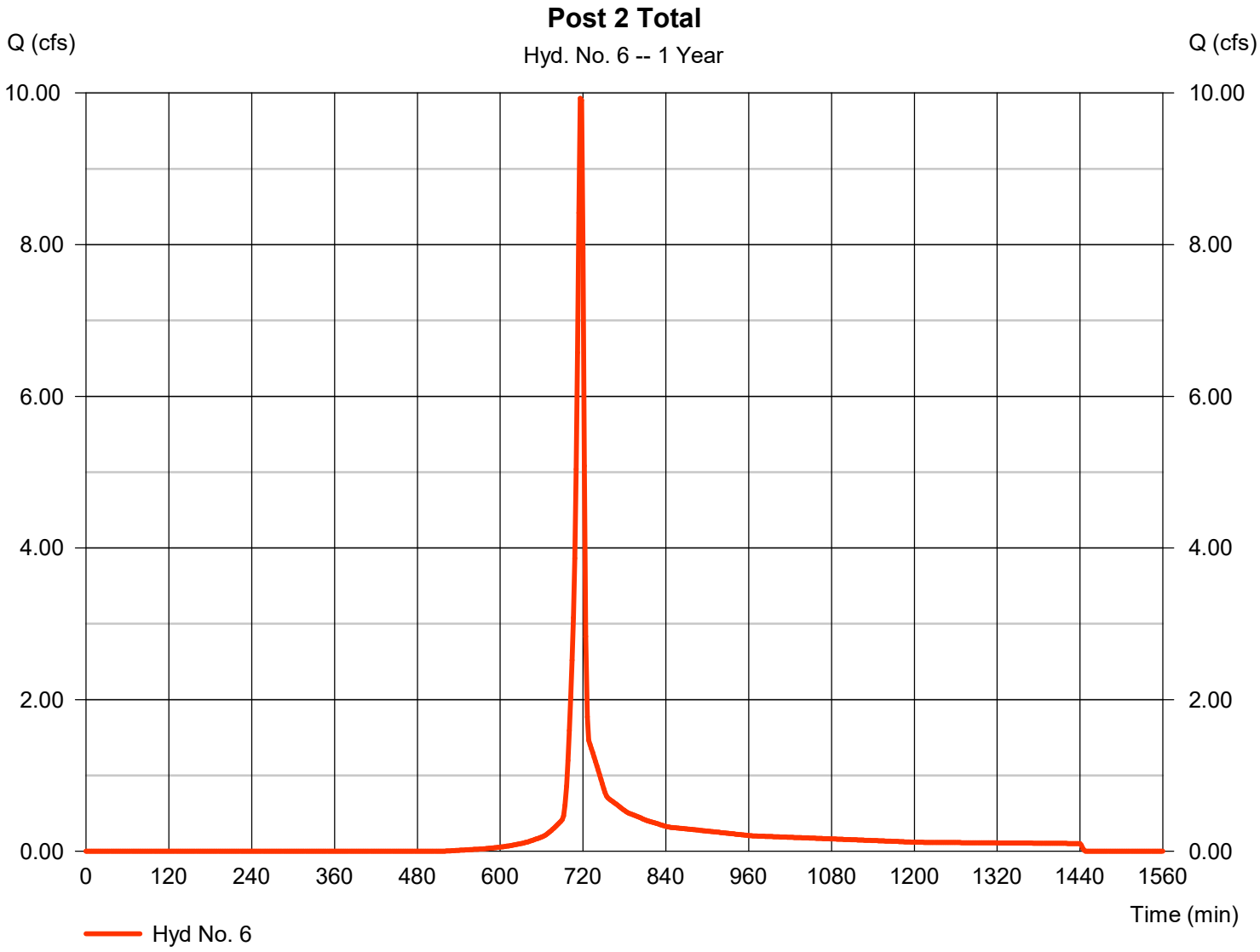
Hydrograph Report

Hyd. No. 6

Post 2 Total

Hydrograph type	=	SCS Runoff	Peak discharge	=	9.931 cfs
Storm frequency	=	1 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	20,052 cuft
Drainage area	=	3.920 ac	Curve number	=	83*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	6.40 min
Total precip.	=	3.07 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.590 x 61) + (2.330 x 98)] / 3.920



TR55 Tc Worksheet

Hyd. No. 6

Post 2 Total

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)	= 3.71		3.71		0.00		
Land slope (%)	= 8.00		0.00		0.00		
Travel Time (min)	**= 4.66**	**+**	**0.00**	**+**	**0.00**	**=**	**4.66**
Shallow Concentrated Flow							
Flow length (ft)	= 85.00		0.00		0.00		
Watercourse slope (%)	= 4.00		0.00		0.00		
Surface description	= Paved		Paved		Paved		
Average velocity (ft/s)	=4.07		0.00		0.00		
Travel Time (min)	**= 0.35**	**+**	**0.00**	**+**	**0.00**	**=**	**0.35**
Channel Flow							
X sectional flow area (sqft)	= 1.23		0.00		0.00		
Wetted perimeter (ft)	= 3.93		0.00		0.00		
Channel slope (%)	= 2.00		0.00		0.00		
Manning's n-value	= 0.013		0.015		0.015		
Velocity (ft/s)	=7.44						
			0.00				
					0.00		
Flow length (ft)	({0})618.0		0.0		0.0		
Travel Time (min)	**= 1.38**	**+**	**0.00**	**+**	**0.00**	**=**	**1.38**

Total Travel Time, Tc ..... 6.40 min

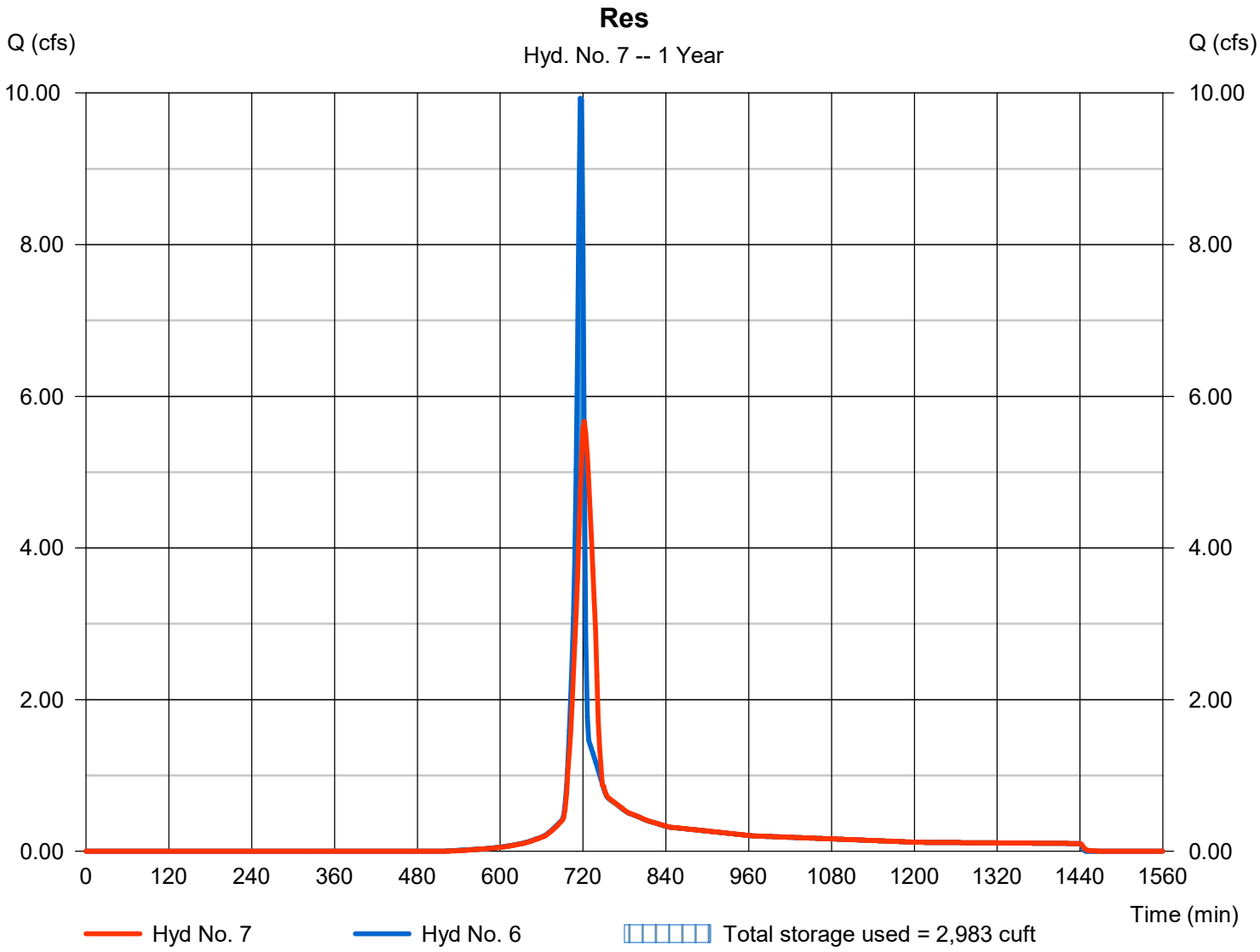
Hydrograph Report

Hyd. No. 7

Res

Hydrograph type	=	Reservoir	Peak discharge	=	5.667 cfs
Storm frequency	=	1 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	20,052 cuft
Inflow hyd. No.	=	6 - Post 2 Total	Max. Elevation	=	692.28 ft
Reservoir name	=	Underground Retention	Max. Storage	=	2,983 cuft

Storage Indication method used.



Pond No. 1 - Underground Retention

Pond Data

UG Chambers -Invert elev. = 689.00 ft, Rise x Span = 5.00 x 5.00 ft, Barrel Len = 300.00 ft, No. Barrels = 1, Slope = 0.50%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	689.00	n/a	0	0
0.65	689.65	n/a	75	75
1.30	690.30	n/a	363	438
1.95	690.95	n/a	685	1,123
2.60	691.60	n/a	875	1,998
3.25	692.25	n/a	949	2,947
3.90	692.90	n/a	948	3,895
4.55	693.55	n/a	874	4,769
5.20	694.20	n/a	685	5,454
5.85	694.85	n/a	362	5,817
6.50	695.50	n/a	75	5,892

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	12.00	18.00	0.00
Span (in)	= 24.00	12.00	24.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 689.00	689.00	692.35	0.00
Length (ft)	= 190.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.50	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)	= 12.56	1.00	0.00	0.00
Crest El. (ft)	= 697.00	694.55	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	Ciplti	---	---
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).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	689.00	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.06	8	689.07	0.01 ic	0.01 ic	0.00	---	0.00	0.00	---	---	---	---	0.015
0.13	15	689.13	0.06 ic	0.06 ic	0.00	---	0.00	0.00	---	---	---	---	0.056
0.19	23	689.20	0.13 ic	0.13 ic	0.00	---	0.00	0.00	---	---	---	---	0.127
0.26	30	689.26	0.22 ic	0.22 ic	0.00	---	0.00	0.00	---	---	---	---	0.223
0.32	38	689.33	0.35 ic	0.34 ic	0.00	---	0.00	0.00	---	---	---	---	0.337
0.39	45	689.39	0.48 ic	0.47 ic	0.00	---	0.00	0.00	---	---	---	---	0.473
0.46	53	689.46	0.64 ic	0.64 ic	0.00	---	0.00	0.00	---	---	---	---	0.636
0.52	60	689.52	0.80 ic	0.80 ic	0.00	---	0.00	0.00	---	---	---	---	0.796
0.58	68	689.59	1.00 ic	0.99 ic	0.00	---	0.00	0.00	---	---	---	---	0.992
0.65	75	689.65	1.20 ic	1.20 ic	0.00	---	0.00	0.00	---	---	---	---	1.200
0.71	111	689.72	1.41 ic	1.41 ic	0.00	---	0.00	0.00	---	---	---	---	1.412
0.78	148	689.78	1.64 ic	1.62 ic	0.00	---	0.00	0.00	---	---	---	---	1.621
0.85	184	689.84	1.83 ic	1.83 ic	0.00	---	0.00	0.00	---	---	---	---	1.832
0.91	220	689.91	2.08 ic	2.05 ic	0.00	---	0.00	0.00	---	---	---	---	2.054
0.98	257	689.97	2.28 ic	2.25 ic	0.00	---	0.00	0.00	---	---	---	---	2.247
1.04	293	690.04	2.39 ic	2.39 ic	0.00	---	0.00	0.00	---	---	---	---	2.393
1.11	329	690.10	2.59 ic	2.52 ic	0.00	---	0.00	0.00	---	---	---	---	2.519
1.17	366	690.17	2.70 ic	2.66 ic	0.00	---	0.00	0.00	---	---	---	---	2.657
1.24	402	690.23	2.81 ic	2.79 ic	0.00	---	0.00	0.00	---	---	---	---	2.789
1.30	438	690.30	2.92 ic	2.91 ic	0.00	---	0.00	0.00	---	---	---	---	2.914
1.37	507	690.36	3.03 ic	3.03 ic	0.00	---	0.00	0.00	---	---	---	---	3.034
1.43	575	690.43	3.15 ic	3.15 ic	0.00	---	0.00	0.00	---	---	---	---	3.150
1.50	644	690.49	3.27 ic	3.26 ic	0.00	---	0.00	0.00	---	---	---	---	3.261
1.56	712	690.56	3.39 ic	3.37 ic	0.00	---	0.00	0.00	---	---	---	---	3.368
1.63	781	690.63	3.52 ic	3.47 ic	0.00	---	0.00	0.00	---	---	---	---	3.472
1.69	849	690.69	3.64 ic	3.57 ic	0.00	---	0.00	0.00	---	---	---	---	3.573
1.75	918	690.76	3.67 ic	3.67 ic	0.00	---	0.00	0.00	---	---	---	---	3.674
1.82	986	690.82	3.78 ic	3.78 ic	0.00	---	0.00	0.00	---	---	---	---	3.784
1.88	1,055	690.89	3.90 ic	3.89 ic	0.00	---	0.00	0.00	---	---	---	---	3.887
1.95	1,123	690.95	4.03 ic	3.98 ic	0.00	---	0.00	0.00	---	---	---	---	3.977
2.02	1,211	691.02	4.07 ic	4.07 ic	0.00	---	0.00	0.00	---	---	---	---	4.068

Continues on next page...

Underground Retention

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
2.08	1,298	691.08	4.17 ic	4.17 ic	0.00	---	0.00	0.00	---	---	---	---	4.174
2.14	1,386	691.15	4.30 ic	4.26 ic	0.00	---	0.00	0.00	---	---	---	---	4.262
2.21	1,473	691.21	4.44 ic	4.34 ic	0.00	---	0.00	0.00	---	---	---	---	4.344
2.28	1,561	691.28	4.45 ic	4.45 ic	0.00	---	0.00	0.00	---	---	---	---	4.447
2.34	1,648	691.34	4.58 ic	4.53 ic	0.00	---	0.00	0.00	---	---	---	---	4.528
2.40	1,736	691.41	4.61 ic	4.61 ic	0.00	---	0.00	0.00	---	---	---	---	4.612
2.47	1,823	691.47	4.72 ic	4.71 ic	0.00	---	0.00	0.00	---	---	---	---	4.705
2.54	1,911	691.53	4.87 ic	4.78 ic	0.00	---	0.00	0.00	---	---	---	---	4.780
2.60	1,998	691.60	4.87 ic	4.87 ic	0.00	---	0.00	0.00	---	---	---	---	4.873
2.66	2,093	691.66	5.01 ic	4.95 ic	0.00	---	0.00	0.00	---	---	---	---	4.948
2.73	2,188	691.73	5.03 ic	5.03 ic	0.00	---	0.00	0.00	---	---	---	---	5.030
2.80	2,283	691.79	5.16 ic	5.11 ic	0.00	---	0.00	0.00	---	---	---	---	5.110
2.86	2,377	691.86	5.19 ic	5.19 ic	0.00	---	0.00	0.00	---	---	---	---	5.186
2.92	2,472	691.92	5.31 ic	5.27 ic	0.00	---	0.00	0.00	---	---	---	---	5.267
2.99	2,567	691.99	5.34 ic	5.34 ic	0.00	---	0.00	0.00	---	---	---	---	5.339
3.06	2,662	692.05	5.46 ic	5.42 ic	0.00	---	0.00	0.00	---	---	---	---	5.420
3.12	2,757	692.12	5.49 ic	5.49 ic	0.00	---	0.00	0.00	---	---	---	---	5.489
3.18	2,852	692.18	5.61 ic	5.57 ic	0.00	---	0.00	0.00	---	---	---	---	5.569
3.25	2,947	692.25	5.64 ic	5.64 ic	0.00	---	0.00	0.00	---	---	---	---	5.637
3.32	3,042	692.32	5.76 ic	5.71 ic	0.00	---	0.00	0.00	---	---	---	---	5.714
3.38	3,136	692.38	5.91 ic	5.78 ic	0.04 ic	---	0.00	0.00	---	---	---	---	5.811
3.44	3,231	692.45	6.06 ic	5.84 ic	0.20 ic	---	0.00	0.00	---	---	---	---	6.035
3.51	3,326	692.51	6.37 ic	5.88 ic	0.44 ic	---	0.00	0.00	---	---	---	---	6.313
3.58	3,421	692.58	6.69 ic	5.92 ic	0.73 ic	---	0.00	0.00	---	---	---	---	6.645
3.64	3,516	692.64	7.02 ic	5.95 ic	1.06 ic	---	0.00	0.00	---	---	---	---	7.017
3.70	3,610	692.71	7.48 ic	5.98 ic	1.44 ic	---	0.00	0.00	---	---	---	---	7.422
3.77	3,705	692.77	7.96 ic	6.00 ic	1.85 ic	---	0.00	0.00	---	---	---	---	7.858
3.84	3,800	692.84	8.33 ic	6.03 ic	2.30 ic	---	0.00	0.00	---	---	---	---	8.328
3.90	3,895	692.90	8.91 ic	6.05 ic	2.78 ic	---	0.00	0.00	---	---	---	---	8.829
3.96	3,982	692.97	9.38 ic	6.08 ic	3.28 ic	---	0.00	0.00	---	---	---	---	9.361
4.03	4,070	693.03	10.00 ic	6.09 ic	3.82 ic	---	0.00	0.00	---	---	---	---	9.904
4.09	4,157	693.09	10.48 ic	6.10 ic	4.38 ic	---	0.00	0.00	---	---	---	---	10.48
4.16	4,245	693.16	11.16 ic	6.11 ic	4.96 ic	---	0.00	0.00	---	---	---	---	11.07
4.22	4,332	693.22	11.70 ic	6.12 ic	5.57 ic	---	0.00	0.00	---	---	---	---	11.70
4.29	4,420	693.29	12.33 ic	6.13 ic	6.21 ic	---	0.00	0.00	---	---	---	---	12.33
4.36	4,507	693.35	12.99 ic	6.13 ic	6.86 ic	---	0.00	0.00	---	---	---	---	12.99
4.42	4,594	693.42	13.66 ic	6.12 ic	7.54 ic	---	0.00	0.00	---	---	---	---	13.66
4.49	4,682	693.48	14.33 ic	6.10 ic	8.23 ic	---	0.00	0.00	---	---	---	---	14.33
4.55	4,769	693.55	15.02 ic	6.06 ic	8.95 ic	---	0.00	0.00	---	---	---	---	15.02
4.61	4,838	693.61	15.71 ic	6.02 ic	9.69 ic	---	0.00	0.00	---	---	---	---	15.71
4.68	4,906	693.68	16.42 ic	5.98 ic	10.44 ic	---	0.00	0.00	---	---	---	---	16.42
4.74	4,975	693.74	17.15 ic	5.93 ic	11.22 ic	---	0.00	0.00	---	---	---	---	17.15
4.81	5,043	693.81	17.89 ic	5.87 ic	12.01 ic	---	0.00	0.00	---	---	---	---	17.88
4.88	5,112	693.88	18.54 ic	5.82 ic	12.72 ic	---	0.00	0.00	---	---	---	---	18.54
4.94	5,180	693.94	19.04 ic	5.80 ic	13.24 ic	---	0.00	0.00	---	---	---	---	19.04
5.01	5,249	694.01	19.52 ic	5.78 ic	13.74 ic	---	0.00	0.00	---	---	---	---	19.52
5.07	5,317	694.07	19.99 ic	5.76 ic	14.23 ic	---	0.00	0.00	---	---	---	---	19.99
5.14	5,386	694.14	20.44 ic	5.74 ic	14.70 ic	---	0.00	0.00	---	---	---	---	20.44
5.20	5,454	694.20	20.88 ic	5.73 ic	15.15 ic	---	0.00	0.00	---	---	---	---	20.88
5.26	5,491	694.27	21.30 ic	5.71 ic	15.59 ic	---	0.00	0.00	---	---	---	---	21.30
5.33	5,527	694.33	21.72 ic	5.70 ic	16.02 ic	---	0.00	0.00	---	---	---	---	21.72
5.39	5,563	694.40	22.12 ic	5.68 ic	16.44 ic	---	0.00	0.00	---	---	---	---	22.12
5.46	5,599	694.46	22.51 ic	5.67 ic	16.85 ic	---	0.00	0.00	---	---	---	---	22.51
5.53	5,636	694.53	22.90 ic	5.65 ic	17.24 ic	---	0.00	0.00	---	---	---	---	22.89
5.59	5,672	694.59	23.28 oc	5.62 ic	17.63 ic	---	0.00	0.03	---	---	---	---	23.28
5.66	5,708	694.66	23.69 oc	5.56 ic	18.01 ic	---	0.00	0.11	---	---	---	---	23.69
5.72	5,744	694.72	24.11 oc	5.49 ic	18.39 ic	---	0.00	0.23	---	---	---	---	24.11
5.79	5,780	694.78	24.54 oc	5.41 ic	18.75 ic	---	0.00	0.38	---	---	---	---	24.54
5.85	5,817	694.85	24.98 oc	5.32 ic	19.11 ic	---	0.00	0.55	---	---	---	---	24.98
5.91	5,824	694.91	25.42 oc	5.22 ic	19.46 ic	---	0.00	0.73	---	---	---	---	25.42
5.98	5,832	694.98	25.79 oc	5.16 ic	19.70 ic	---	0.00	0.94	---	---	---	---	25.79
6.05	5,839	695.04	26.00 oc	5.15 ic	19.69 ic	---	0.00	1.16	---	---	---	---	26.00
6.11	5,847	695.11	26.22 oc	5.15 ic	19.67 ic	---	0.00	1.40	---	---	---	---	26.22
6.18	5,854	695.17	26.44 oc	5.14 ic	19.65 ic	---	0.00	1.65	---	---	---	---	26.44
6.24	5,862	695.24	26.66 oc	5.13 ic	19.61 ic	---	0.00	1.91	---	---	---	---	26.66
6.31	5,869	695.30	26.88 oc	5.12 ic	19.57 ic	---	0.00	2.18	---	---	---	---	26.88
6.37	5,877	695.37	27.11 oc	5.11 ic	19.53 ic	---	0.00	2.47	---	---	---	---	27.11
6.44	5,884	695.43	27.34 oc	5.10 ic	19.47 ic	---	0.00	2.77	---	---	---	---	27.34
6.50	5,892	695.50	27.57 oc	5.08 ic	19.41 ic	---	0.00	3.08	---	---	---	---	27.57

...End

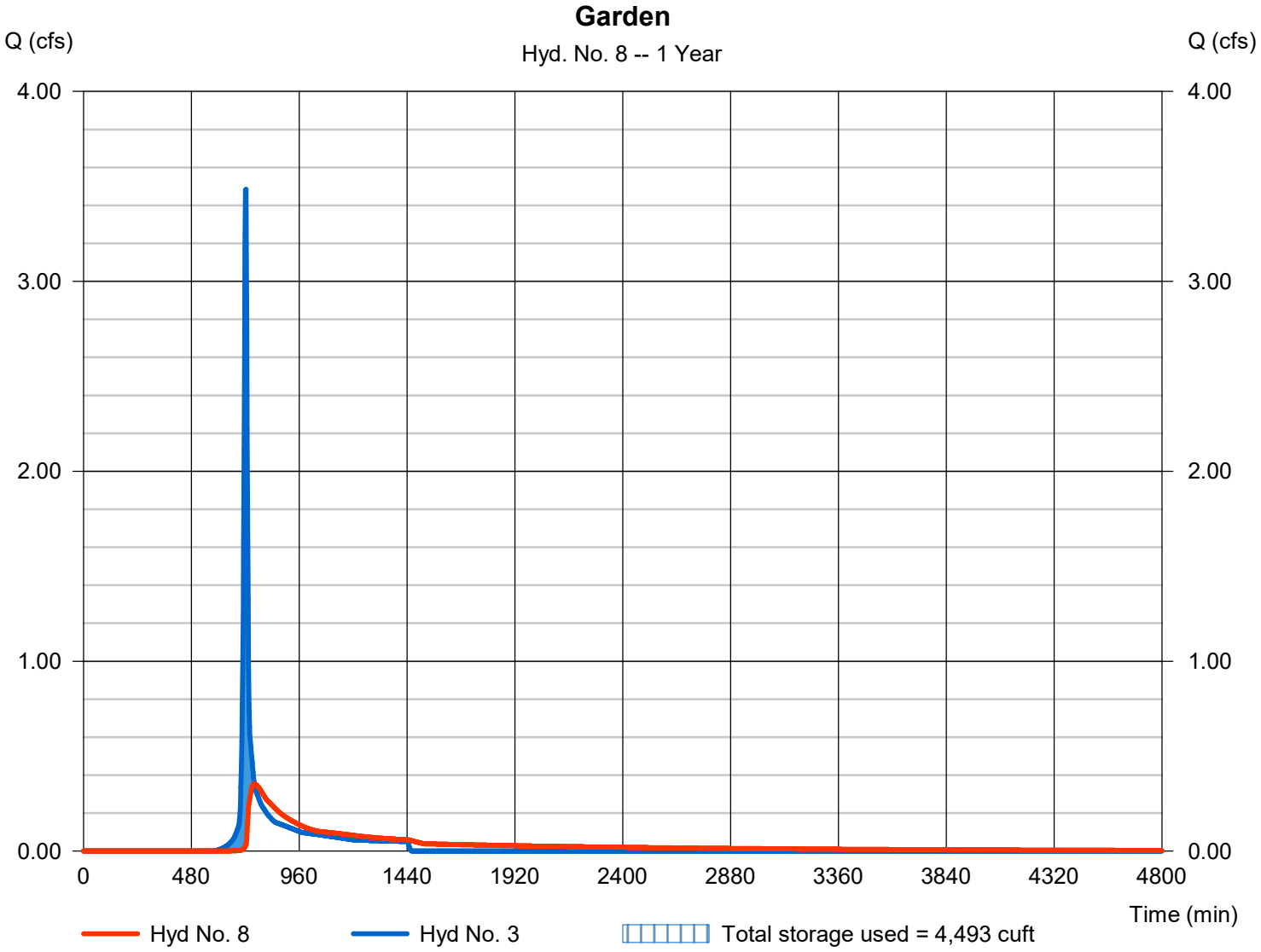
Hydrograph Report

Hyd. No. 8

Garden

Hydrograph type	=	Reservoir	Peak discharge	=	0.354 cfs
Storm frequency	=	1 yrs	Time to peak	=	760 min
Time interval	=	2 min	Hyd. volume	=	8,991 cuft
Inflow hyd. No.	=	3 - Post 3	Max. Elevation	=	700.73 ft
Reservoir name	=	Garden	Max. Storage	=	4,493 cuft

Storage Indication method used. Outflow includes exfiltration.



Pond No. 2 - Garden

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 700.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	700.00	5,695	0	0
1.00	701.00	6,635	6,158	6,158
2.00	702.00	7,729	7,174	13,333
3.00	703.00	9,004	8,358	21,690

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	18.00	0.00	0.00
Span (in)	= 12.00	18.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 698.35	700.50	0.00	0.00
Length (ft)	= 300.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.56	0.00	0.00	0.00
Crest El. (ft)	= 703.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.500 (by Contour)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	700.00	0.00	0.00	---	---	0.00	---	---	---	0.000	---	0.000
0.10	616	700.10	2.81 oc	0.00	---	---	0.00	---	---	---	0.008	---	0.008
0.20	1,232	700.20	2.81 oc	0.00	---	---	0.00	---	---	---	0.015	---	0.015
0.30	1,848	700.30	2.81 oc	0.00	---	---	0.00	---	---	---	0.023	---	0.023
0.40	2,463	700.40	2.81 oc	0.00	---	---	0.00	---	---	---	0.031	---	0.031
0.50	3,079	700.50	2.81 oc	0.00	---	---	0.00	---	---	---	0.038	---	0.038
0.60	3,695	700.60	2.81 oc	0.06 ic	---	---	0.00	---	---	---	0.046	---	0.104
0.70	4,311	700.70	2.81 oc	0.22 ic	---	---	0.00	---	---	---	0.054	---	0.272
0.80	4,927	700.80	2.81 oc	0.49 ic	---	---	0.00	---	---	---	0.061	---	0.551
0.90	5,543	700.90	2.81 oc	0.84 ic	---	---	0.00	---	---	---	0.069	---	0.911
1.00	6,158	701.00	2.81 oc	1.27 ic	---	---	0.00	---	---	---	0.077	---	1.342
1.10	6,876	701.10	2.81 oc	1.78 ic	---	---	0.00	---	---	---	0.078	---	1.856
1.20	7,593	701.20	2.81 oc	2.32 ic	---	---	0.00	---	---	---	0.079	---	2.395
1.30	8,311	701.30	2.96 oc	2.96 ic	---	---	0.00	---	---	---	0.081	---	3.040
1.40	9,028	701.40	3.40 oc	3.40 ic	---	---	0.00	---	---	---	0.082	---	3.483
1.50	9,746	701.50	3.49 oc	3.49 ic	---	---	0.00	---	---	---	0.083	---	3.576
1.60	10,463	701.60	3.57 oc	3.57 ic	---	---	0.00	---	---	---	0.084	---	3.655
1.70	11,180	701.70	3.64 oc	3.64 ic	---	---	0.00	---	---	---	0.086	---	3.725
1.80	11,898	701.80	3.70 oc	3.70 ic	---	---	0.00	---	---	---	0.087	---	3.790
1.90	12,615	701.90	3.76 oc	3.76 ic	---	---	0.00	---	---	---	0.088	---	3.848
2.00	13,333	702.00	3.81 oc	3.81 ic	---	---	0.00	---	---	---	0.089	---	3.901
2.10	14,168	702.10	3.86 oc	3.86 ic	---	---	0.00	---	---	---	0.091	---	3.948
2.20	15,004	702.20	3.90 oc	3.90 ic	---	---	0.00	---	---	---	0.092	---	3.994
2.30	15,840	702.30	3.95 oc	3.95 ic	---	---	0.00	---	---	---	0.094	---	4.041
2.40	16,676	702.40	3.99 oc	3.99 ic	---	---	0.00	---	---	---	0.095	---	4.086
2.50	17,512	702.50	4.03 oc	4.03 ic	---	---	0.00	---	---	---	0.097	---	4.131
2.60	18,347	702.60	4.08 oc	4.08 ic	---	---	0.00	---	---	---	0.098	---	4.176
2.70	19,183	702.70	4.12 oc	4.12 ic	---	---	0.00	---	---	---	0.100	---	4.221
2.80	20,019	702.80	4.16 oc	4.16 ic	---	---	0.00	---	---	---	0.101	---	4.263
2.90	20,855	702.90	4.20 oc	4.20 ic	---	---	0.00	---	---	---	0.103	---	4.307
3.00	21,690	703.00	4.25 oc	4.25 ic	---	---	0.00	---	---	---	0.104	---	4.350

Hydrograph Summary Report

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

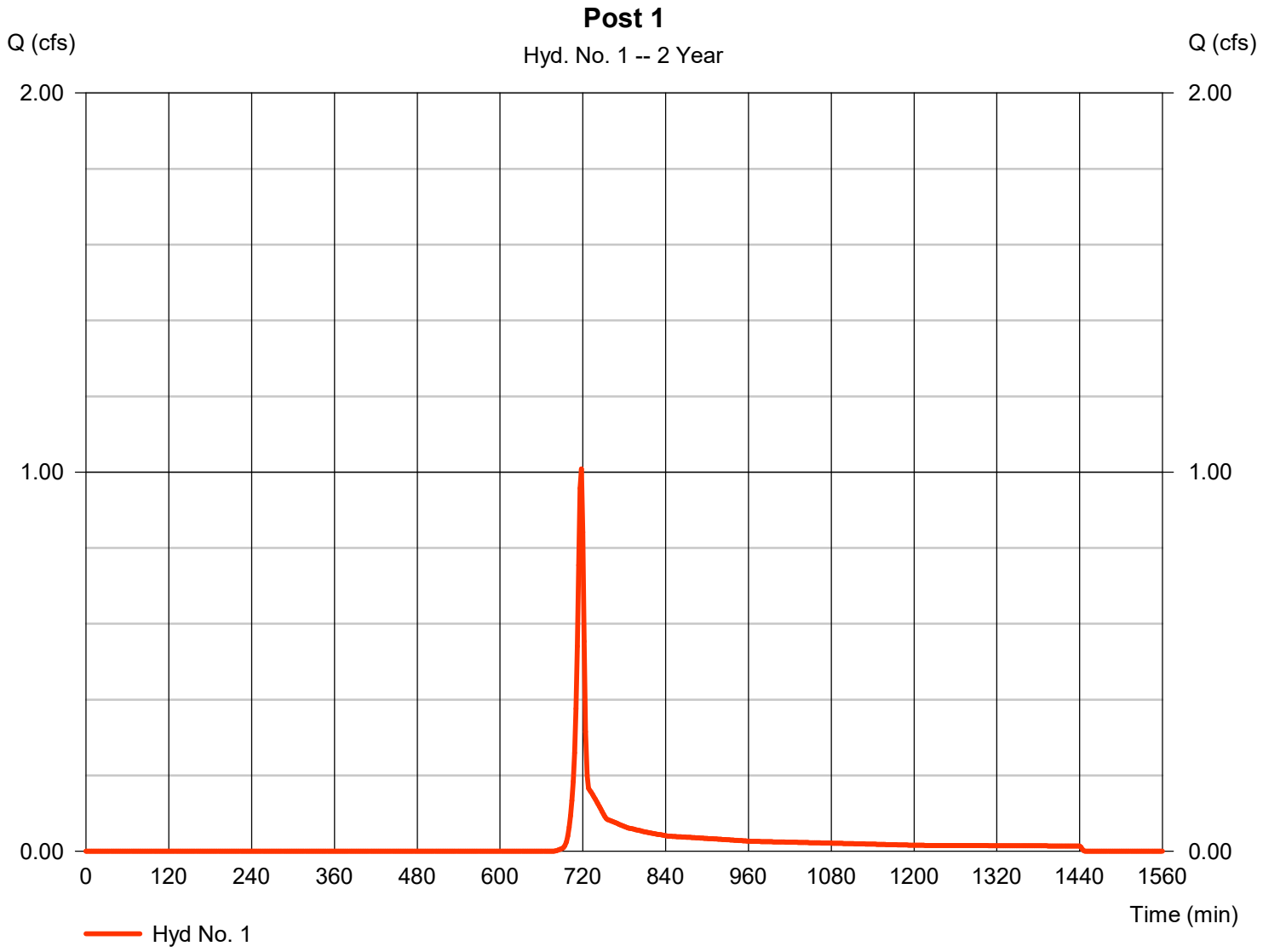
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	1.008	2	718	2,044	------	------	------	Post 1
2	SCS Runoff	7.598	2	718	17,403	------	------	------	Post 2
3	SCS Runoff	4.864	2	720	12,632	------	------	------	Post 3
4	SCS Runoff	2.823	2	716	5,866	------	------	------	Post LOD 2
5	SCS Runoff	2.167	2	716	4,379	------	------	------	Post 3 LOD
6	SCS Runoff	13.40	2	716	27,168	------	------	------	Post 2 Total
7	Reservoir	10.17	2	720	27,167	6	693.06	4,111	Res
8	Reservoir	1.034	2	736	12,500	3	700.93	5,718	Garden

Hydrograph Report

Hyd. No. 1

Post 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.008 cfs
Storm frequency	=	2 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	2,044 cuft
Drainage area	=	1.000 ac	Curve number	=	78
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.71 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



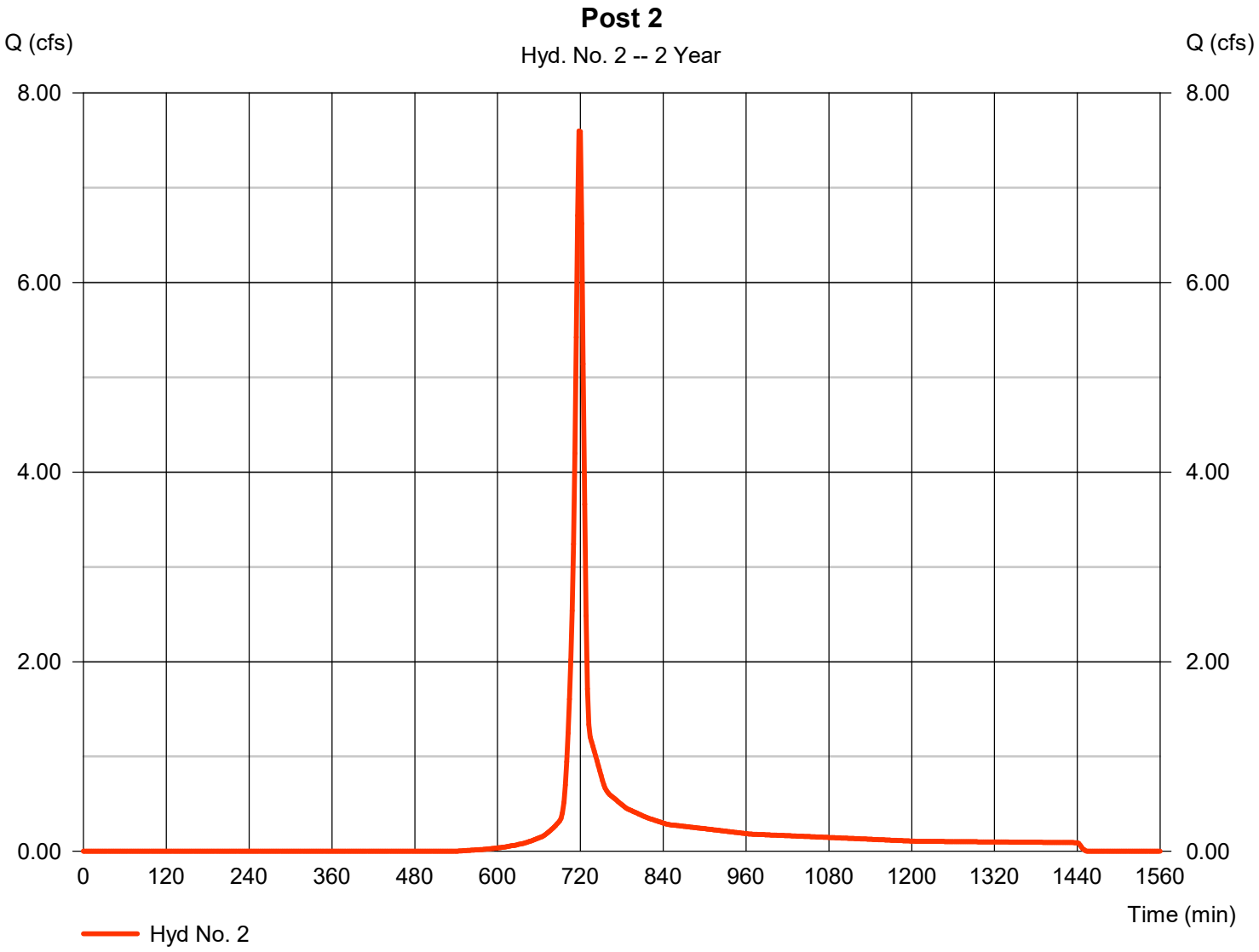
Hydrograph Report

Hyd. No. 2

Post 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.598 cfs
Storm frequency	=	2 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	17,403 cuft
Drainage area	=	2.770 ac	Curve number	=	79*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	8.60 min
Total precip.	=	3.71 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.420 x 61) + (1.350 x 98)] / 2.770



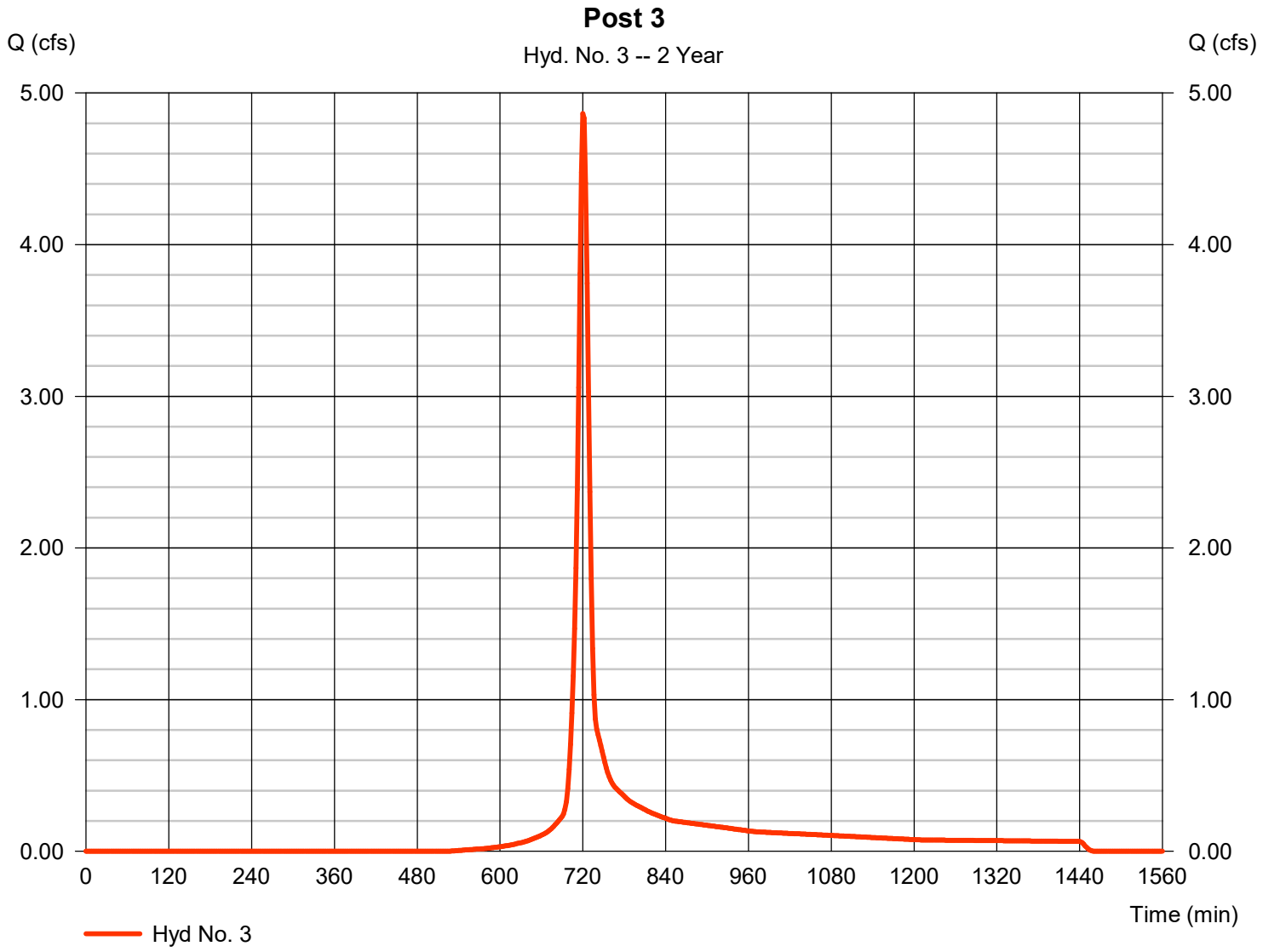
Hydrograph Report

Hyd. No. 3

Post 3

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.864 cfs
Storm frequency	=	2 yrs	Time to peak	=	720 min
Time interval	=	2 min	Hyd. volume	=	12,632 cuft
Drainage area	=	1.870 ac	Curve number	=	80*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	10.20 min
Total precip.	=	3.71 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.980 x 98) + (0.890 x 61)] / 1.870



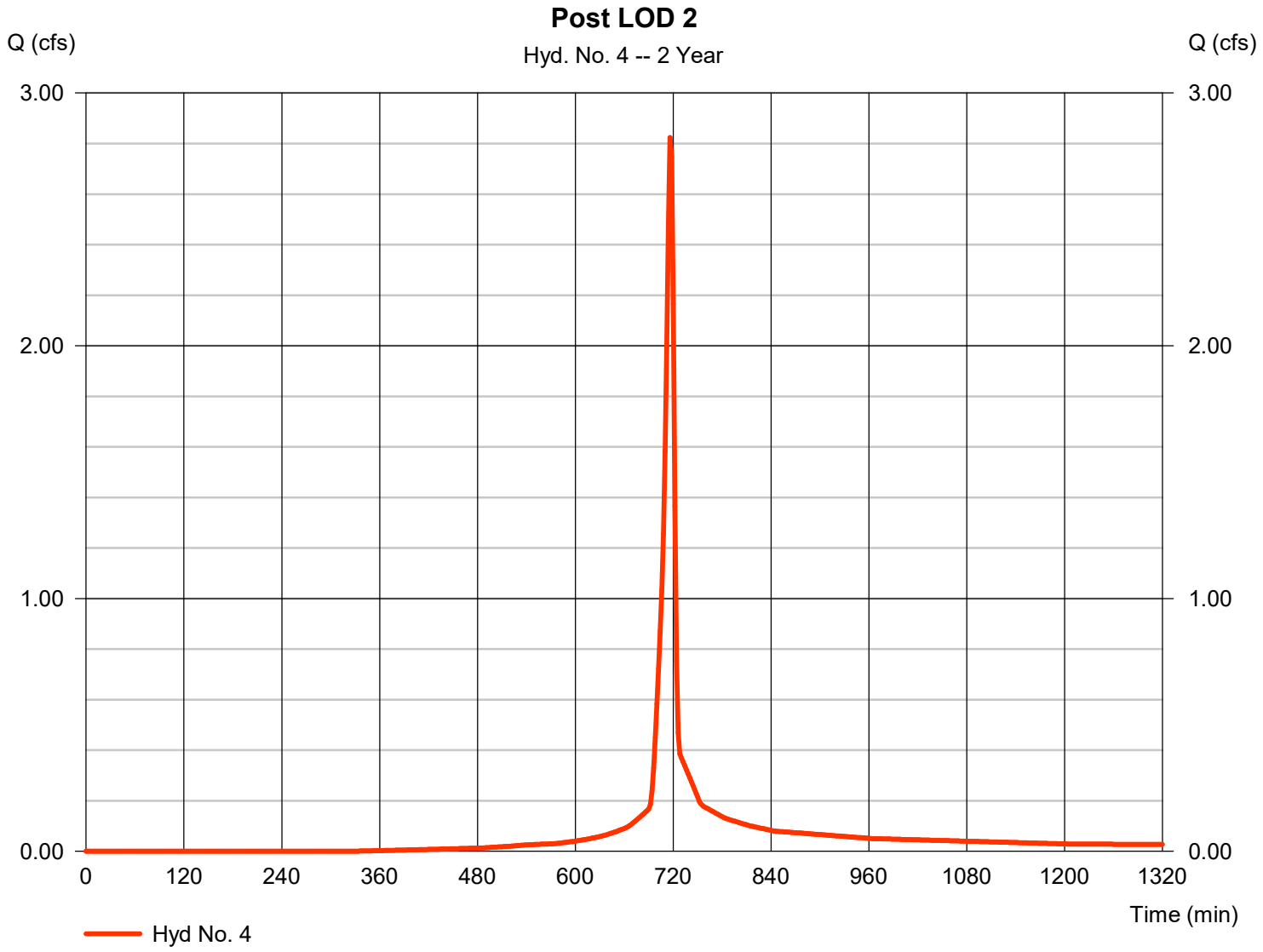
Hydrograph Report

Hyd. No. 4

Post LOD 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.823 cfs
Storm frequency	=	2 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	5,866 cuft
Drainage area	=	1.150 ac	Curve number	=	93*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.71 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.170 x 61) + (0.980 x 98)] / 1.150



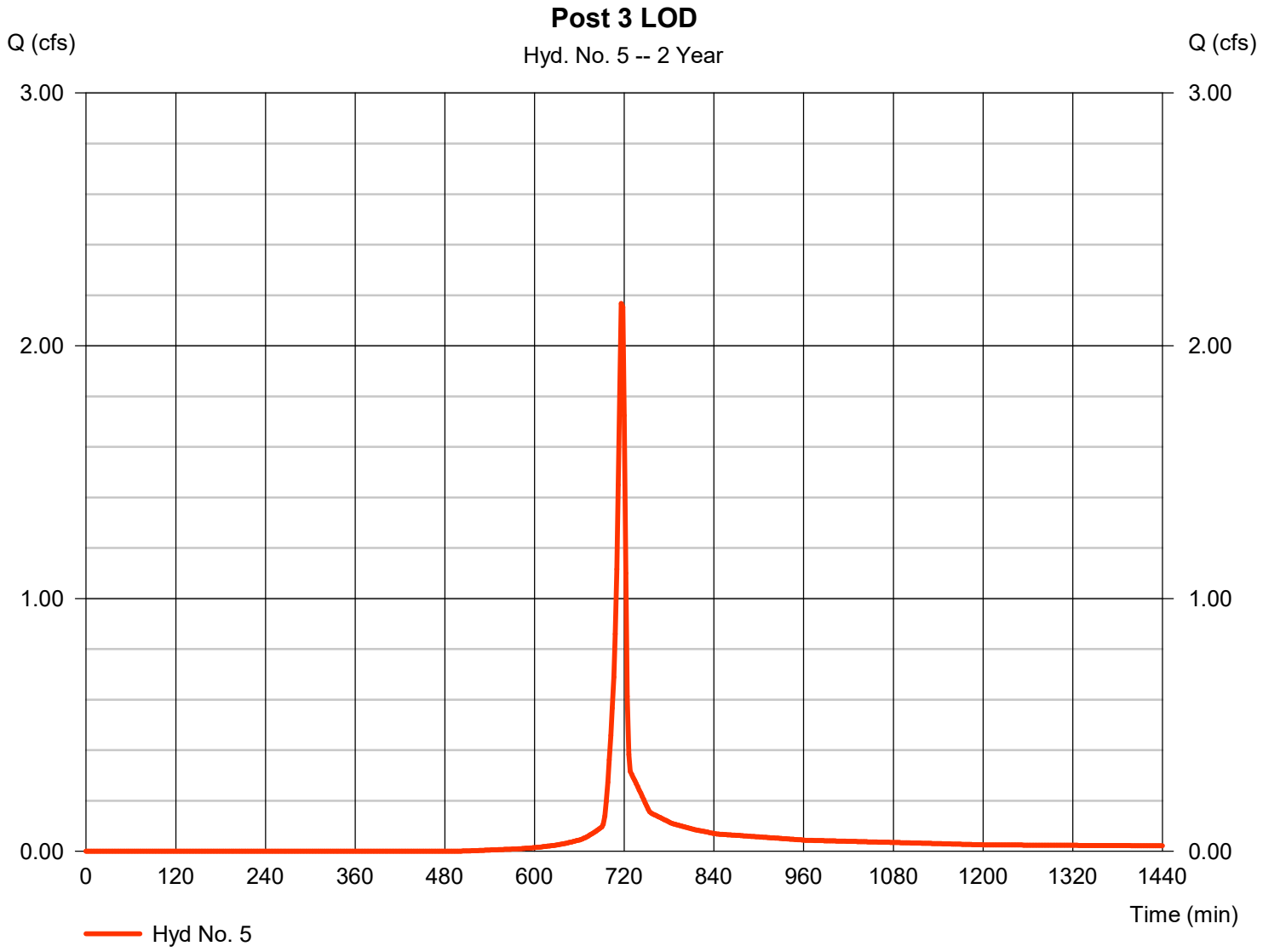
Hydrograph Report

Hyd. No. 5

Post 3 LOD

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.167 cfs
Storm frequency	=	2 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	4,379 cuft
Drainage area	=	1.140 ac	Curve number	=	88*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	6.10 min
Total precip.	=	3.71 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.830 x 98) + (0.310 x 61)] / 1.140



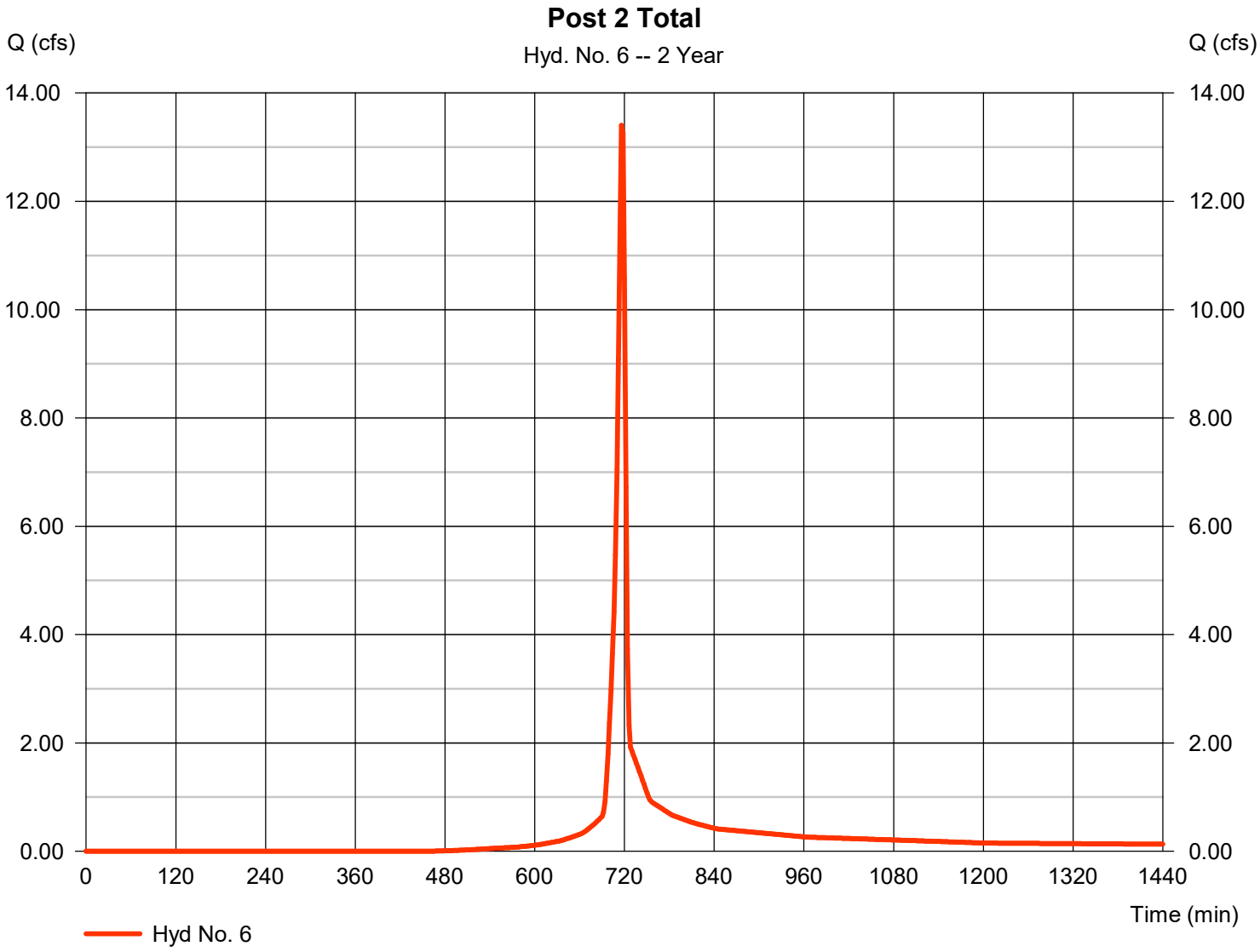
Hydrograph Report

Hyd. No. 6

Post 2 Total

Hydrograph type	=	SCS Runoff	Peak discharge	=	13.40 cfs
Storm frequency	=	2 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	27,168 cuft
Drainage area	=	3.920 ac	Curve number	=	83*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	6.40 min
Total precip.	=	3.71 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.590 x 61) + (2.330 x 98)] / 3.920



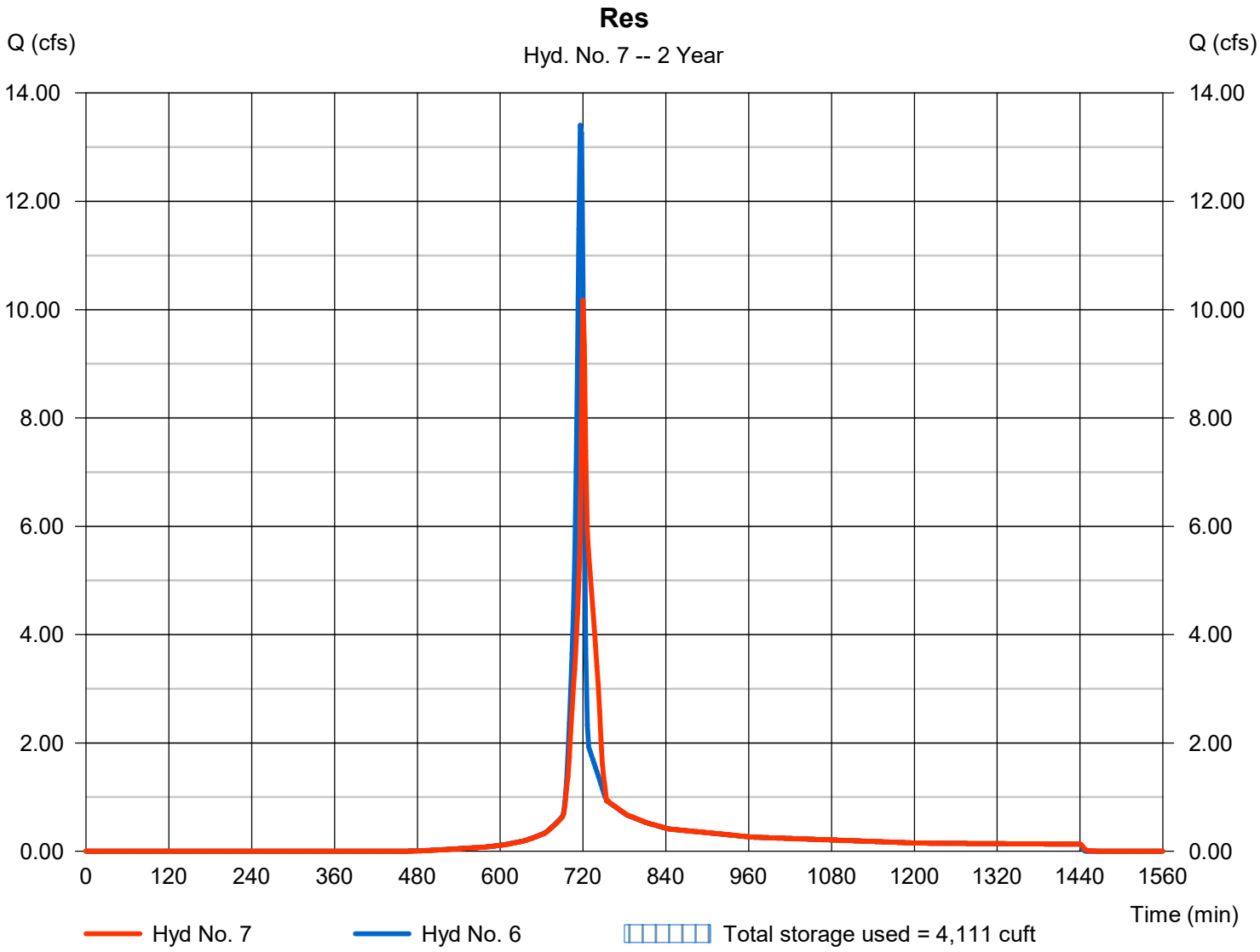
Hydrograph Report

Hyd. No. 7

Res

Hydrograph type	=	Reservoir	Peak discharge	=	10.17 cfs
Storm frequency	=	2 yrs	Time to peak	=	720 min
Time interval	=	2 min	Hyd. volume	=	27,167 cuft
Inflow hyd. No.	=	6 - Post 2 Total	Max. Elevation	=	693.06 ft
Reservoir name	=	Underground Retention	Max. Storage	=	4,111 cuft

Storage Indication method used.



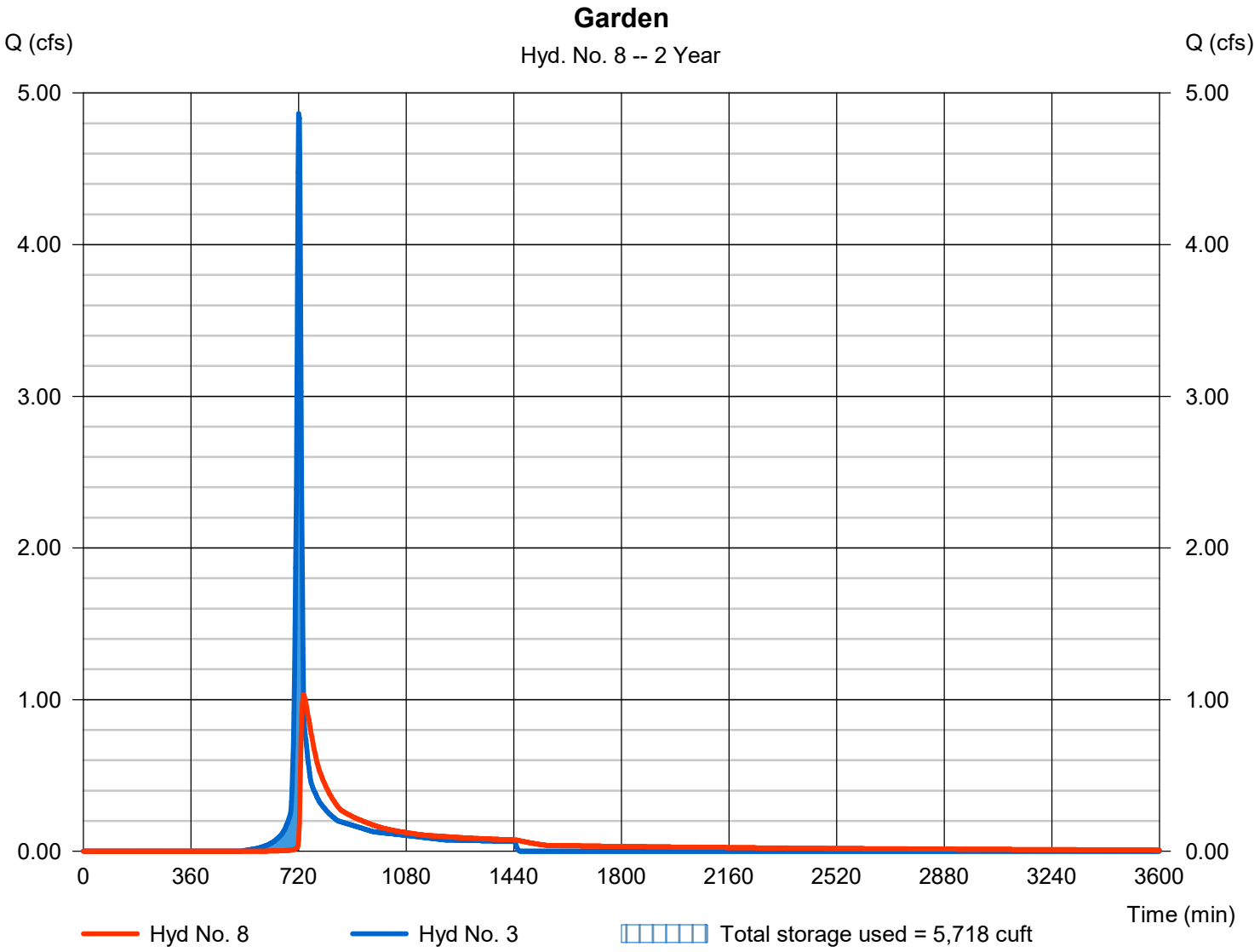
Hydrograph Report

Hyd. No. 8

Garden

Hydrograph type	=	Reservoir	Peak discharge	=	1.034 cfs
Storm frequency	=	2 yrs	Time to peak	=	736 min
Time interval	=	2 min	Hyd. volume	=	12,500 cuft
Inflow hyd. No.	=	3 - Post 3	Max. Elevation	=	700.93 ft
Reservoir name	=	Garden	Max. Storage	=	5,718 cuft

Storage Indication method used. Outflow includes exfiltration.



Hydrograph Summary Report

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

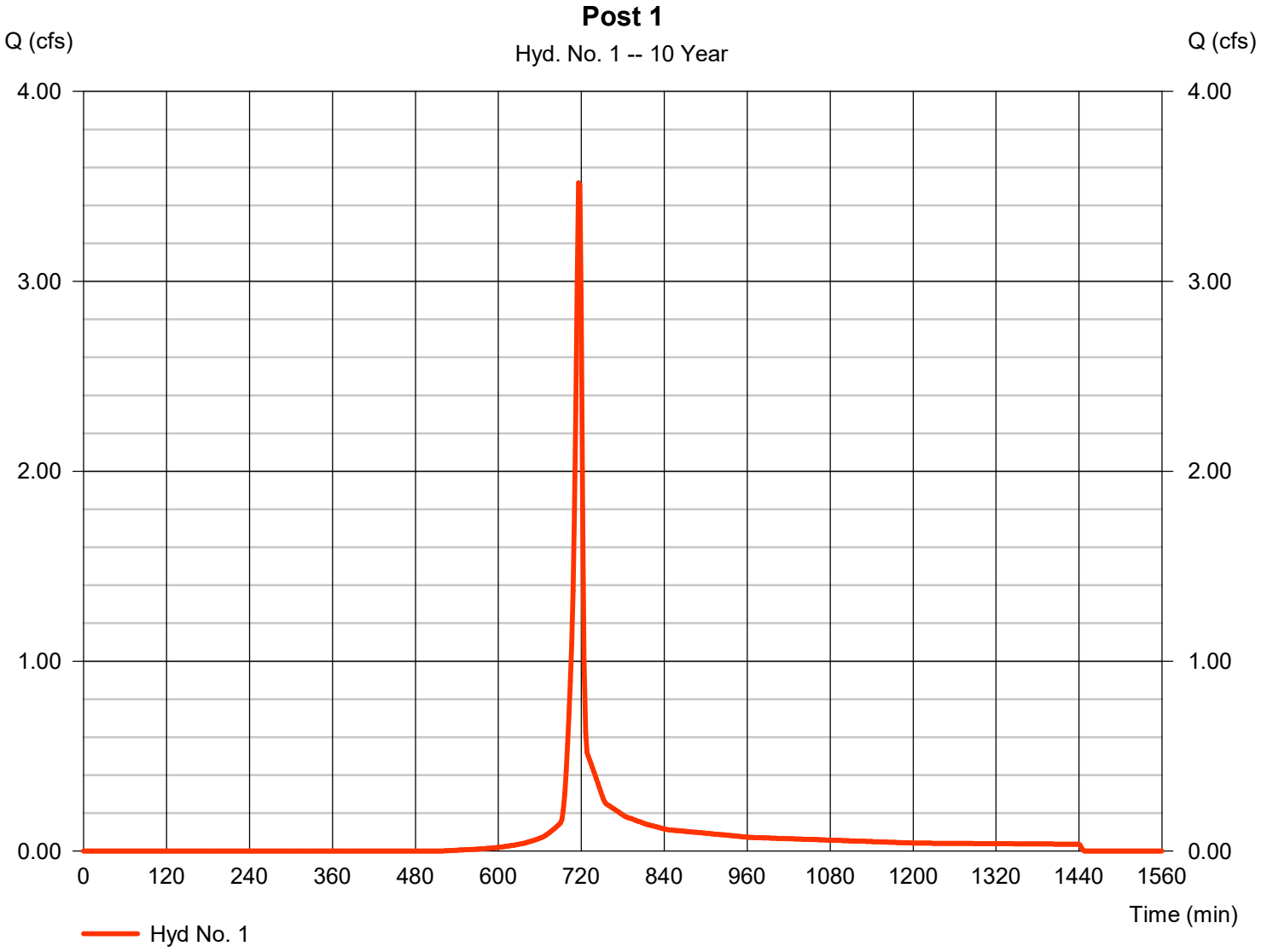
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	3.519	2	716	7,106	------	------	------	Post 1
2	SCS Runoff	14.46	2	718	33,252	------	------	------	Post 2
3	SCS Runoff	9.155	2	720	23,833	------	------	------	Post 3
4	SCS Runoff	6.206	2	716	13,555	------	------	------	Post LOD 2
5	SCS Runoff	5.506	2	716	11,490	------	------	------	Post 3 LOD
6	SCS Runoff	23.89	2	716	49,403	------	------	------	Post 2 Total
7	Reservoir	22.55	2	718	49,403	6	694.47	5,603	Res
8	Reservoir	3.565	2	732	23,695	3	701.49	9,661	Garden

Hydrograph Report

Hyd. No. 1

Post 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.519 cfs
Storm frequency	=	10 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	7,106 cuft
Drainage area	=	1.000 ac	Curve number	=	78
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.58 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



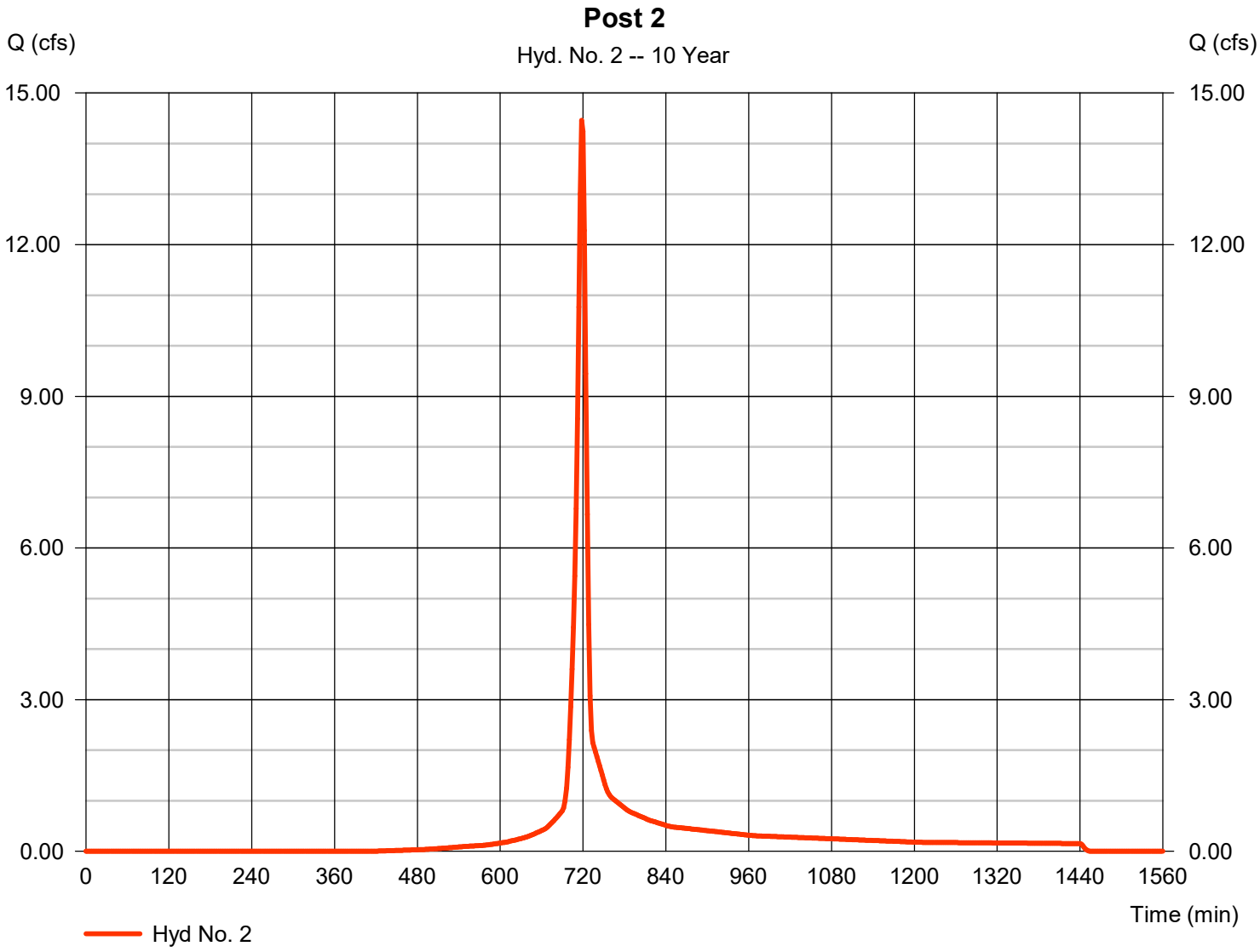
Hydrograph Report

Hyd. No. 2

Post 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	14.46 cfs
Storm frequency	=	10 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	33,252 cuft
Drainage area	=	2.770 ac	Curve number	=	79*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	8.60 min
Total precip.	=	5.58 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.420 x 61) + (1.350 x 98)] / 2.770



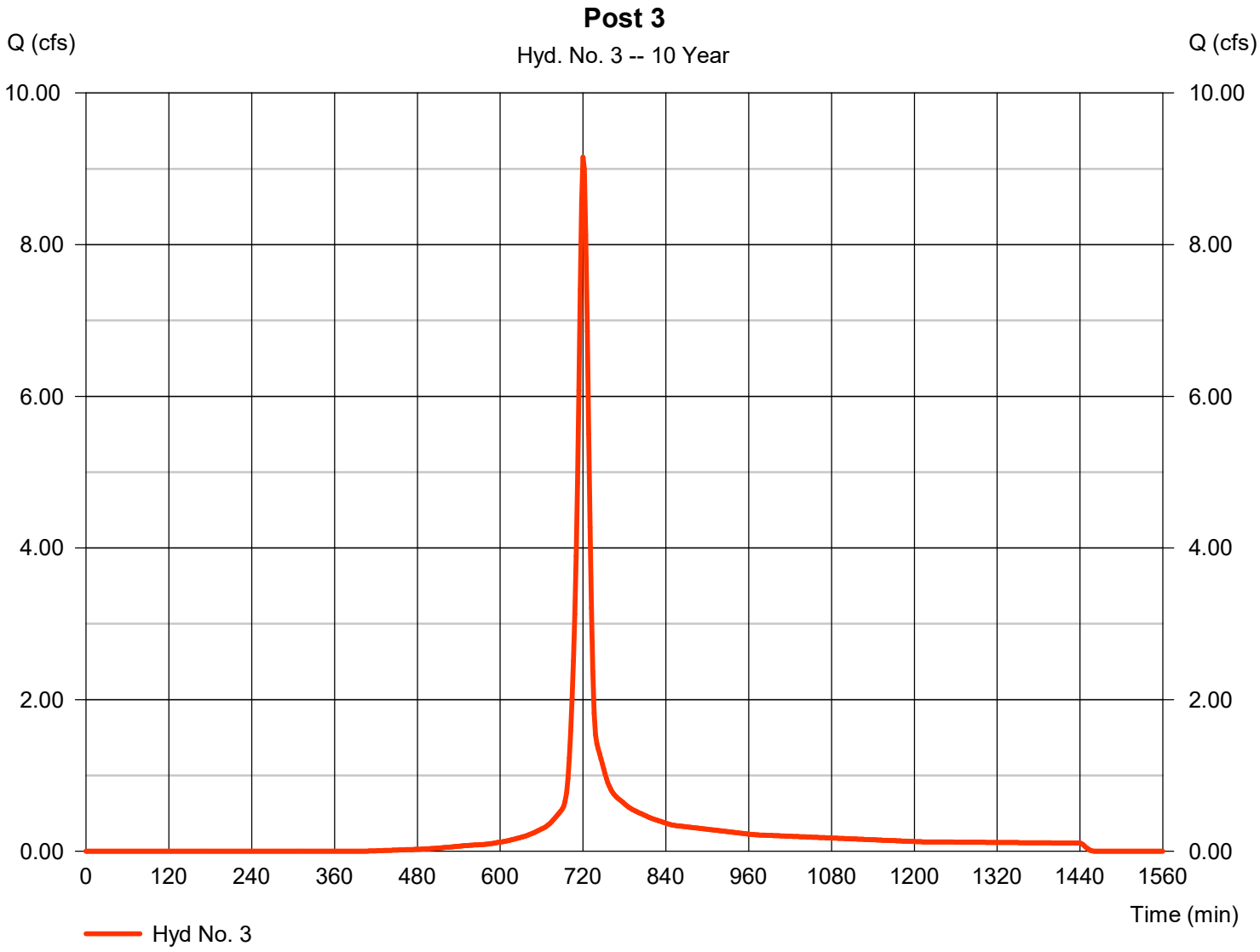
Hydrograph Report

Hyd. No. 3

Post 3

Hydrograph type	= SCS Runoff	Peak discharge	= 9.155 cfs
Storm frequency	= 10 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 23,833 cuft
Drainage area	= 1.870 ac	Curve number	= 80*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 10.20 min
Total precip.	= 5.58 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.980 x 98) + (0.890 x 61)] / 1.870



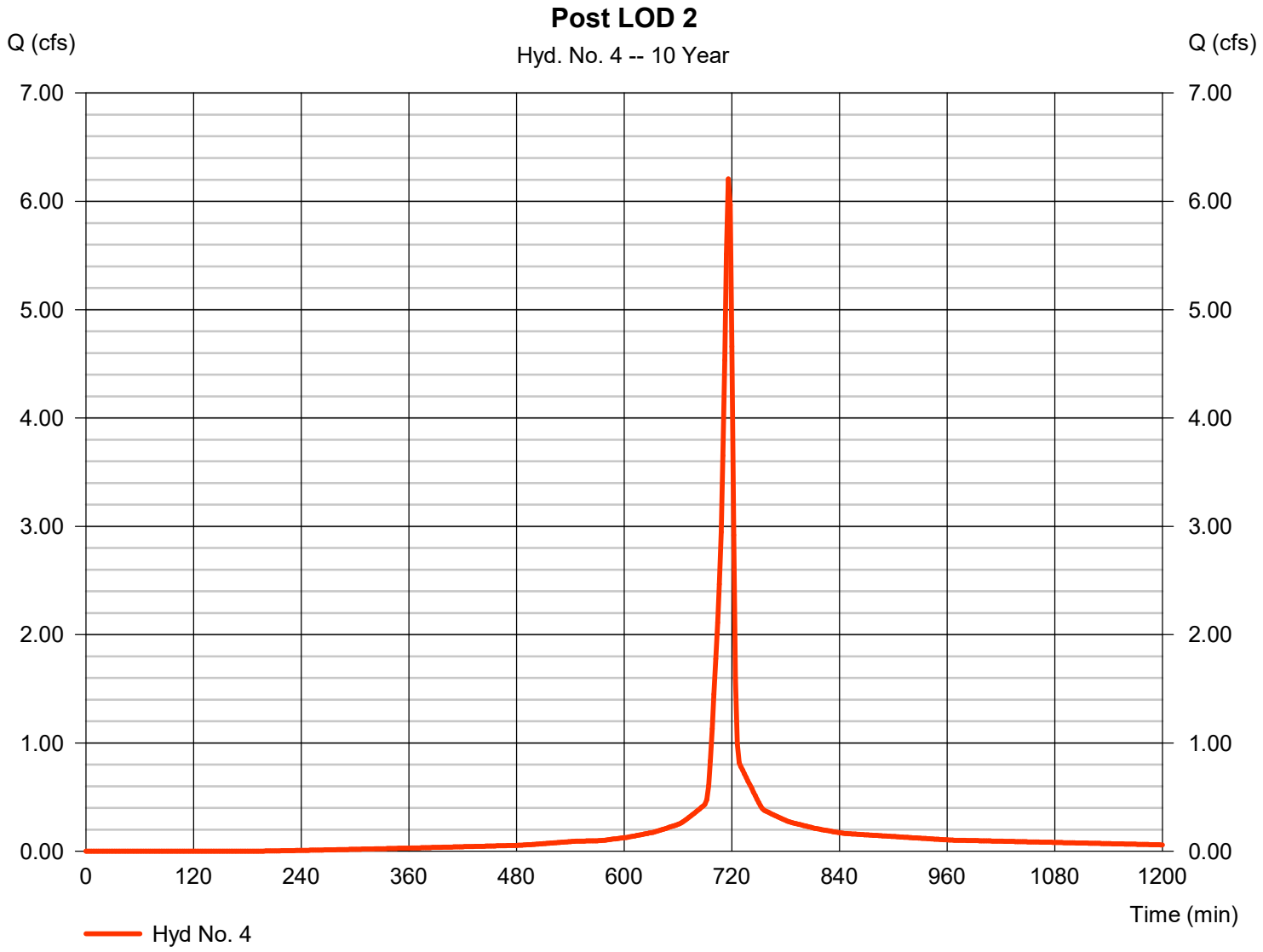
Hydrograph Report

Hyd. No. 4

Post LOD 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	6.206 cfs
Storm frequency	=	10 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	13,555 cuft
Drainage area	=	1.150 ac	Curve number	=	93*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.58 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.170 x 61) + (0.980 x 98)] / 1.150



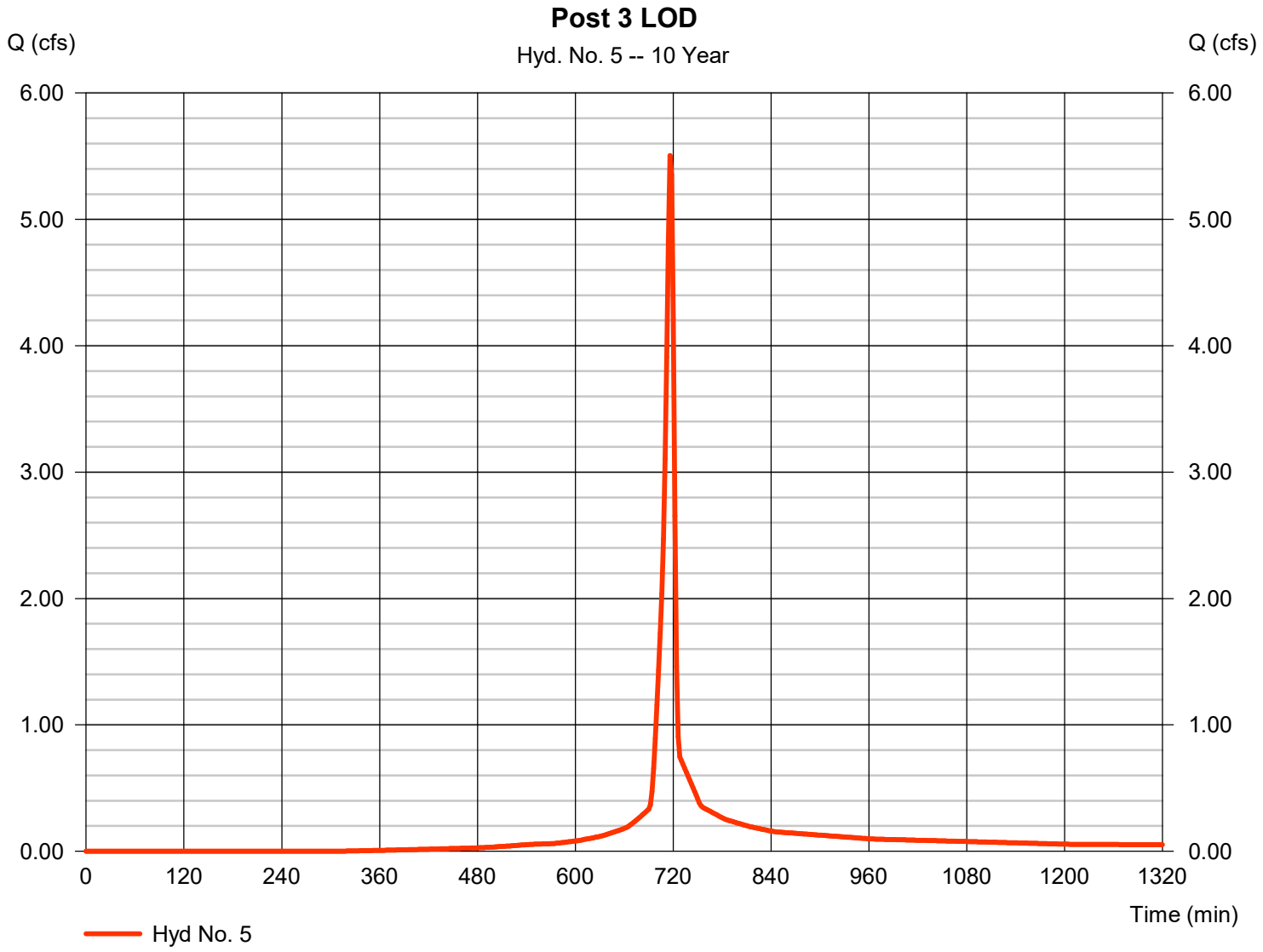
Hydrograph Report

Hyd. No. 5

Post 3 LOD

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.506 cfs
Storm frequency	=	10 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	11,490 cuft
Drainage area	=	1.140 ac	Curve number	=	88*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	6.10 min
Total precip.	=	5.58 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.830 x 98) + (0.310 x 61)] / 1.140



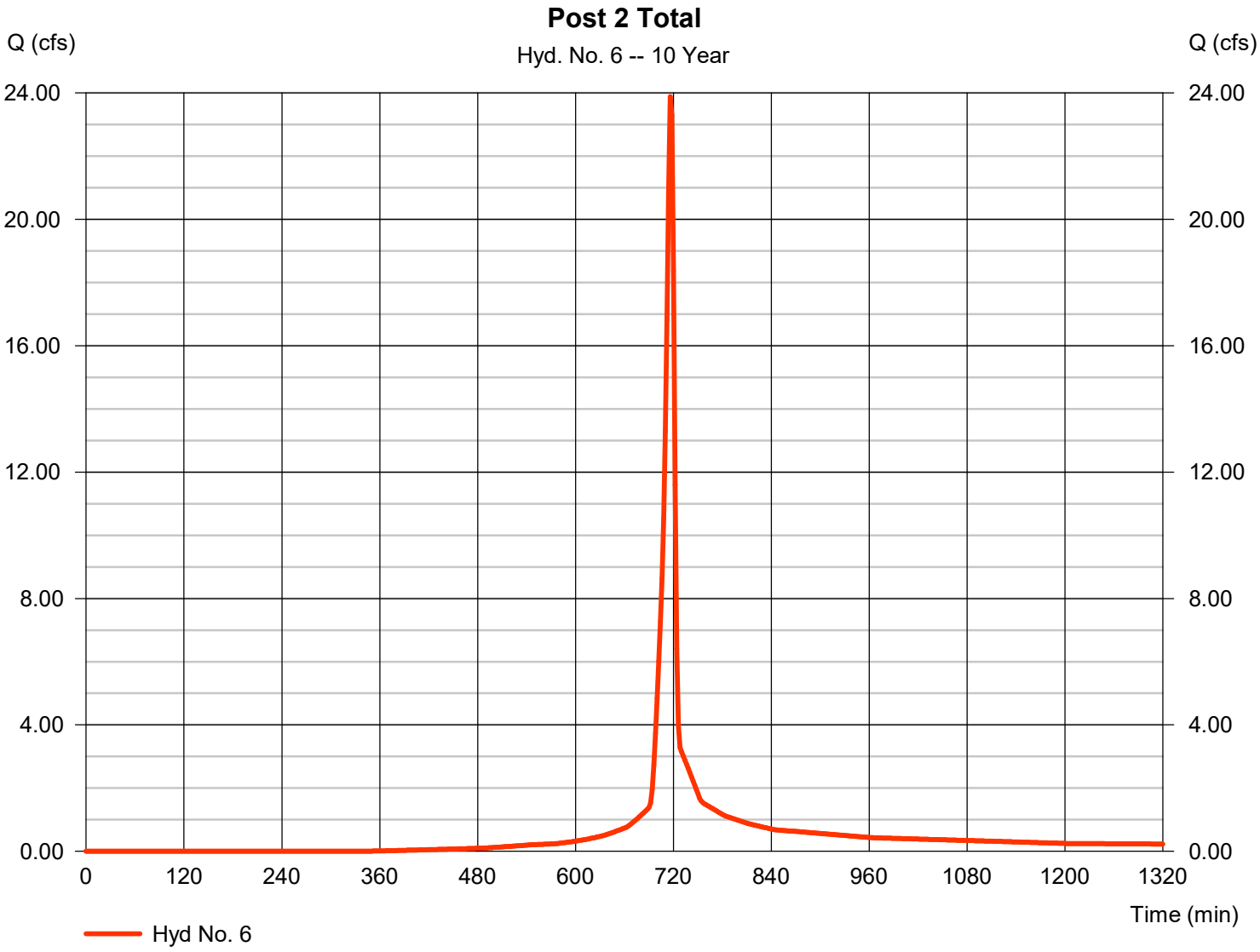
Hydrograph Report

Hyd. No. 6

Post 2 Total

Hydrograph type	=	SCS Runoff	Peak discharge	=	23.89 cfs
Storm frequency	=	10 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	49,403 cuft
Drainage area	=	3.920 ac	Curve number	=	83*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	6.40 min
Total precip.	=	5.58 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.590 x 61) + (2.330 x 98)] / 3.920



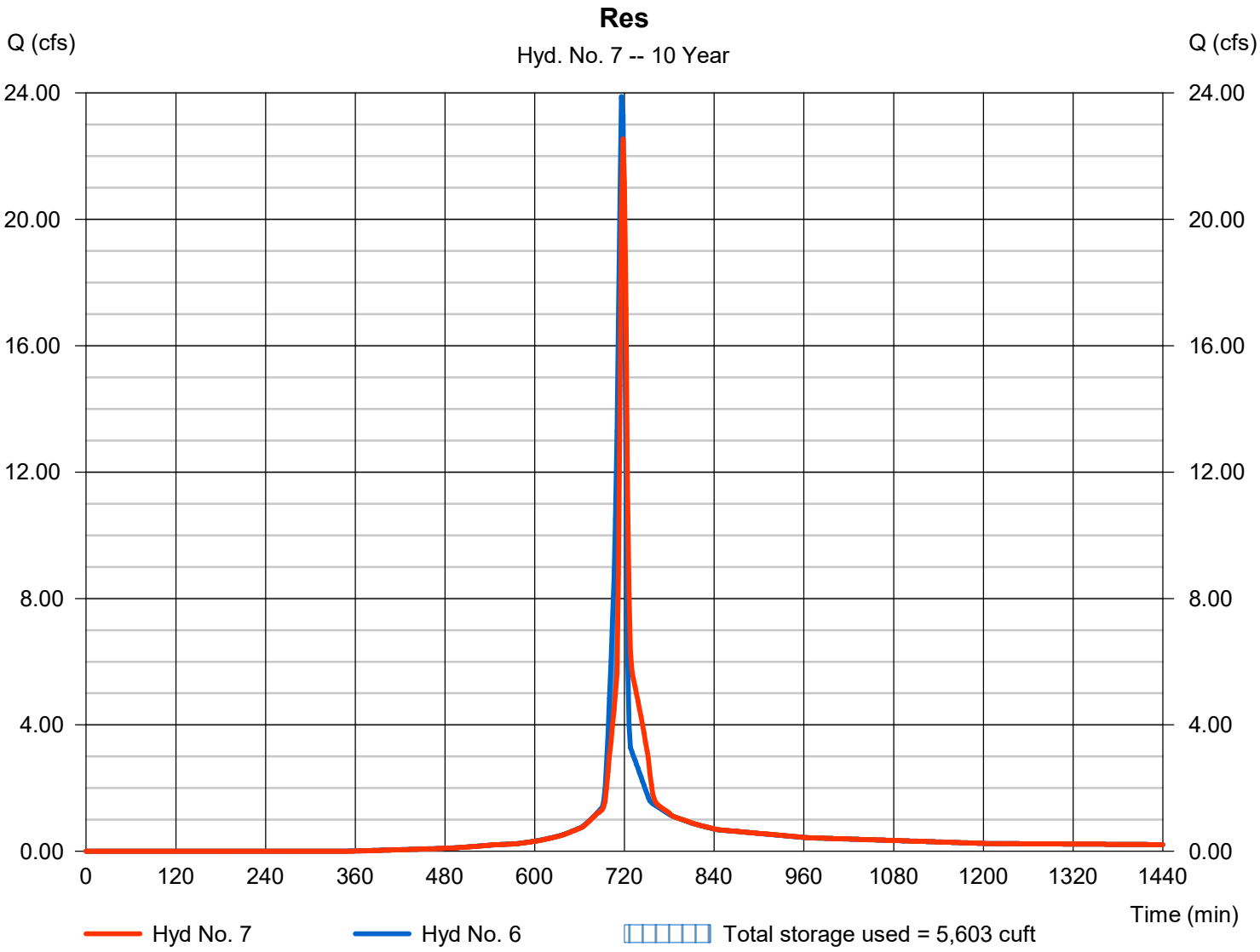
Hydrograph Report

Hyd. No. 7

Res

Hydrograph type	=	Reservoir	Peak discharge	=	22.55 cfs
Storm frequency	=	10 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	49,403 cuft
Inflow hyd. No.	=	6 - Post 2 Total	Max. Elevation	=	694.47 ft
Reservoir name	=	Underground Retention	Max. Storage	=	5,603 cuft

Storage Indication method used.



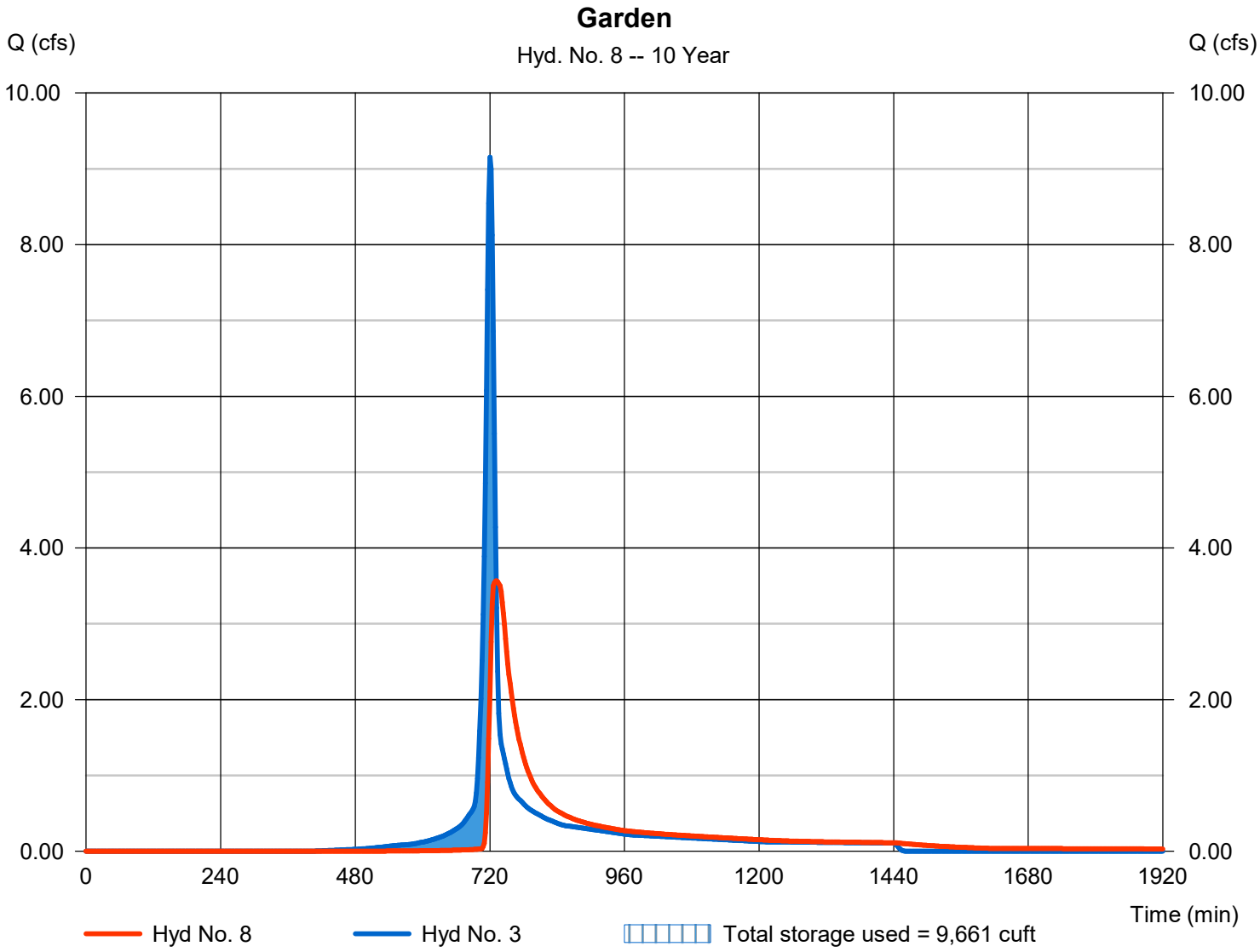
Hydrograph Report

Hyd. No. 8

Garden

Hydrograph type	=	Reservoir	Peak discharge	=	3.565 cfs
Storm frequency	=	10 yrs	Time to peak	=	732 min
Time interval	=	2 min	Hyd. volume	=	23,695 cuft
Inflow hyd. No.	=	3 - Post 3	Max. Elevation	=	701.49 ft
Reservoir name	=	Garden	Max. Storage	=	9,661 cuft

Storage Indication method used. Outflow includes exfiltration.



Hydrograph Summary Report

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

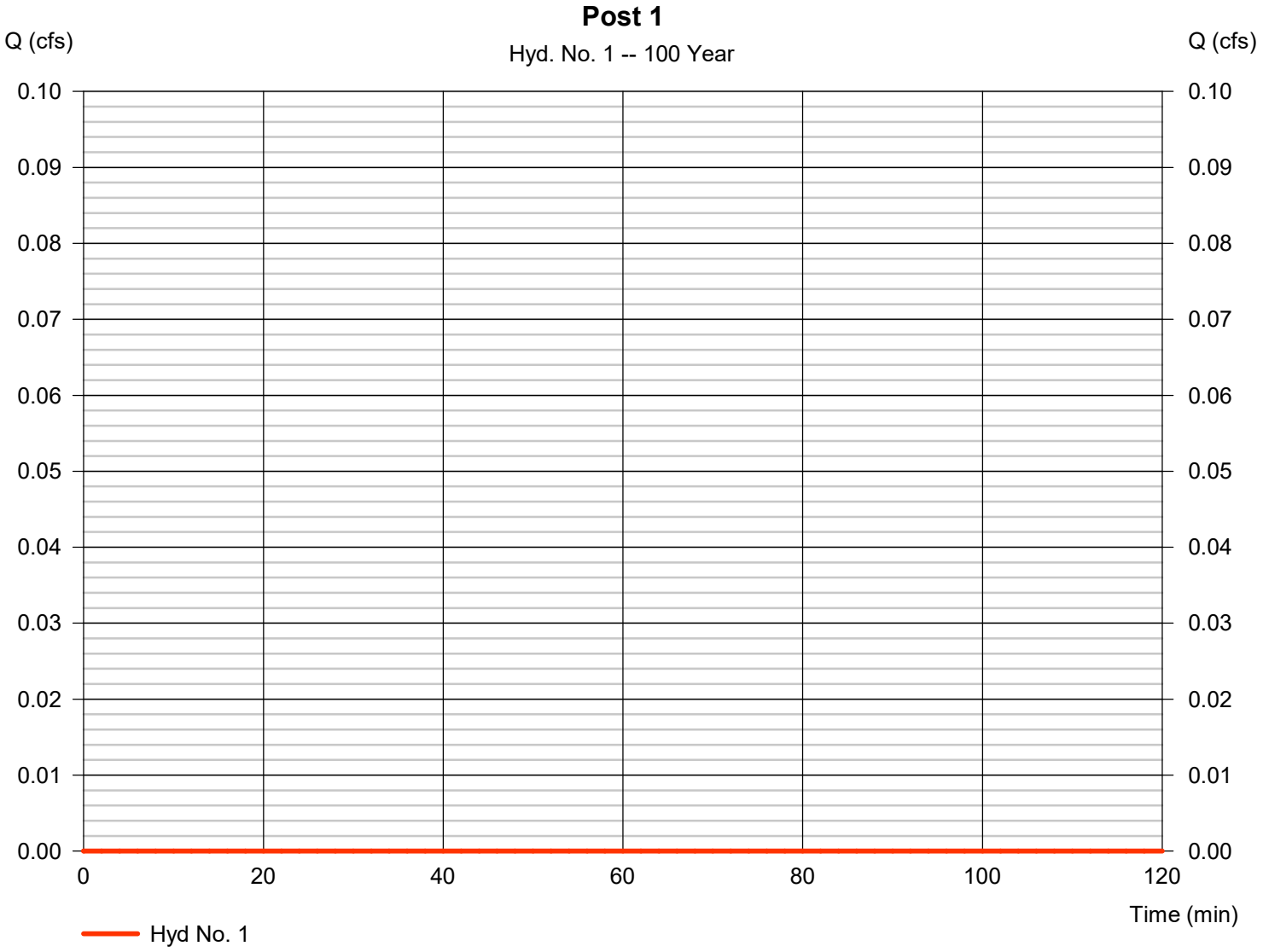
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.000	2	n/a	0	------	------	------	Post 1
2	SCS Runoff	0.000	2	n/a	0	------	------	------	Post 2
3	SCS Runoff	0.000	2	n/a	0	------	------	------	Post 3
4	SCS Runoff	0.000	2	n/a	0	------	------	------	Post LOD 2
5	SCS Runoff	0.000	2	n/a	0	------	------	------	Post 3 LOD
6	SCS Runoff	0.000	2	n/a	0	------	------	------	Post 2 Total
7	Reservoir	0.000	2	n/a	0	6	689.00	0.000	Res
8	Reservoir	0.000	2	n/a	0	3	700.00	0.000	Garden

Hydrograph Report

Hyd. No. 1

Post 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0 cuft
Drainage area	=	1.000 ac	Curve number	=	78
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	7.95 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



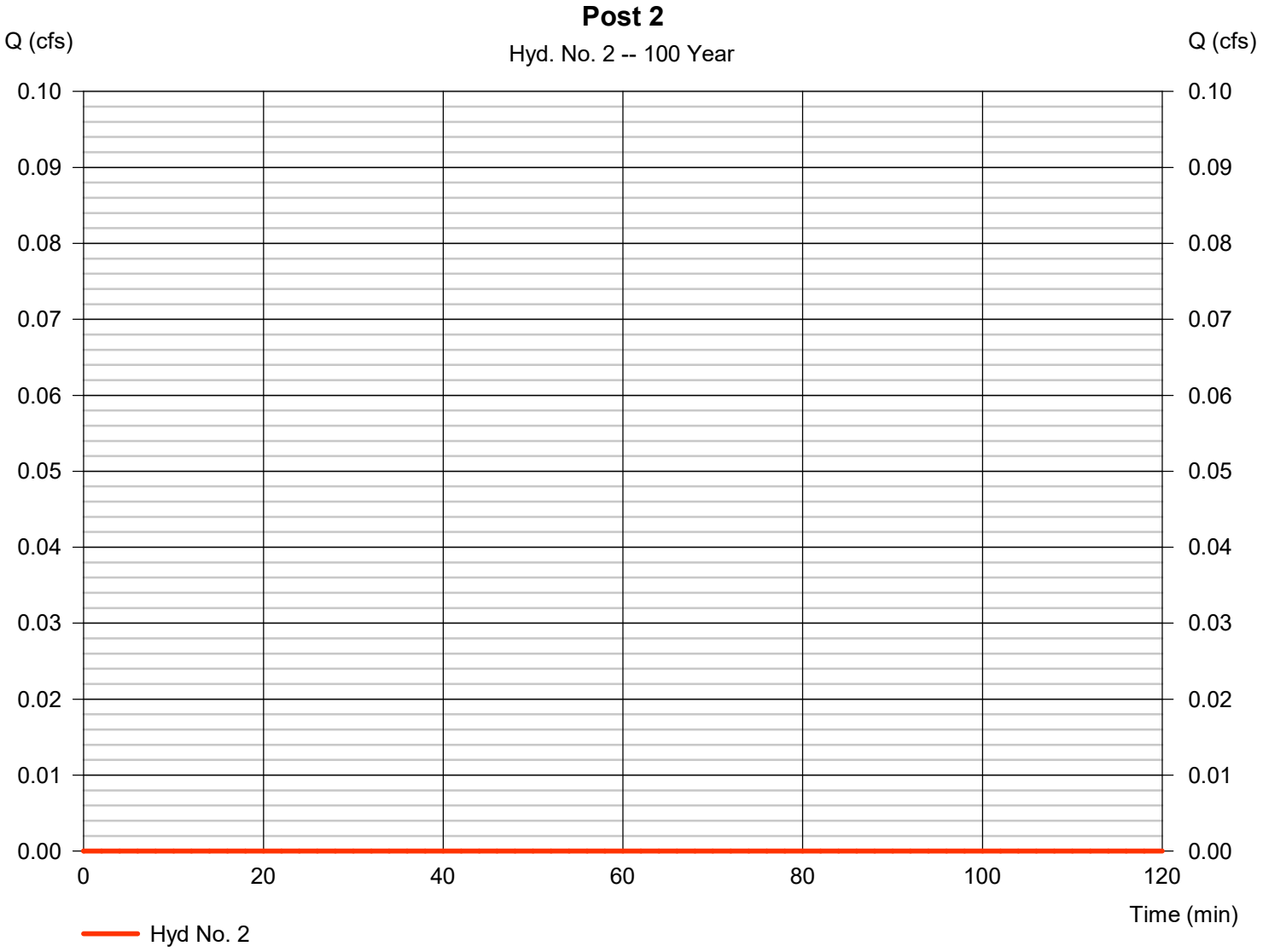
Hydrograph Report

Hyd. No. 2

Post 2

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 100 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Drainage area	= 2.770 ac	Curve number	= 79*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.60 min
Total precip.	= 7.95 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(1.420 x 61) + (1.350 x 98)] / 2.770



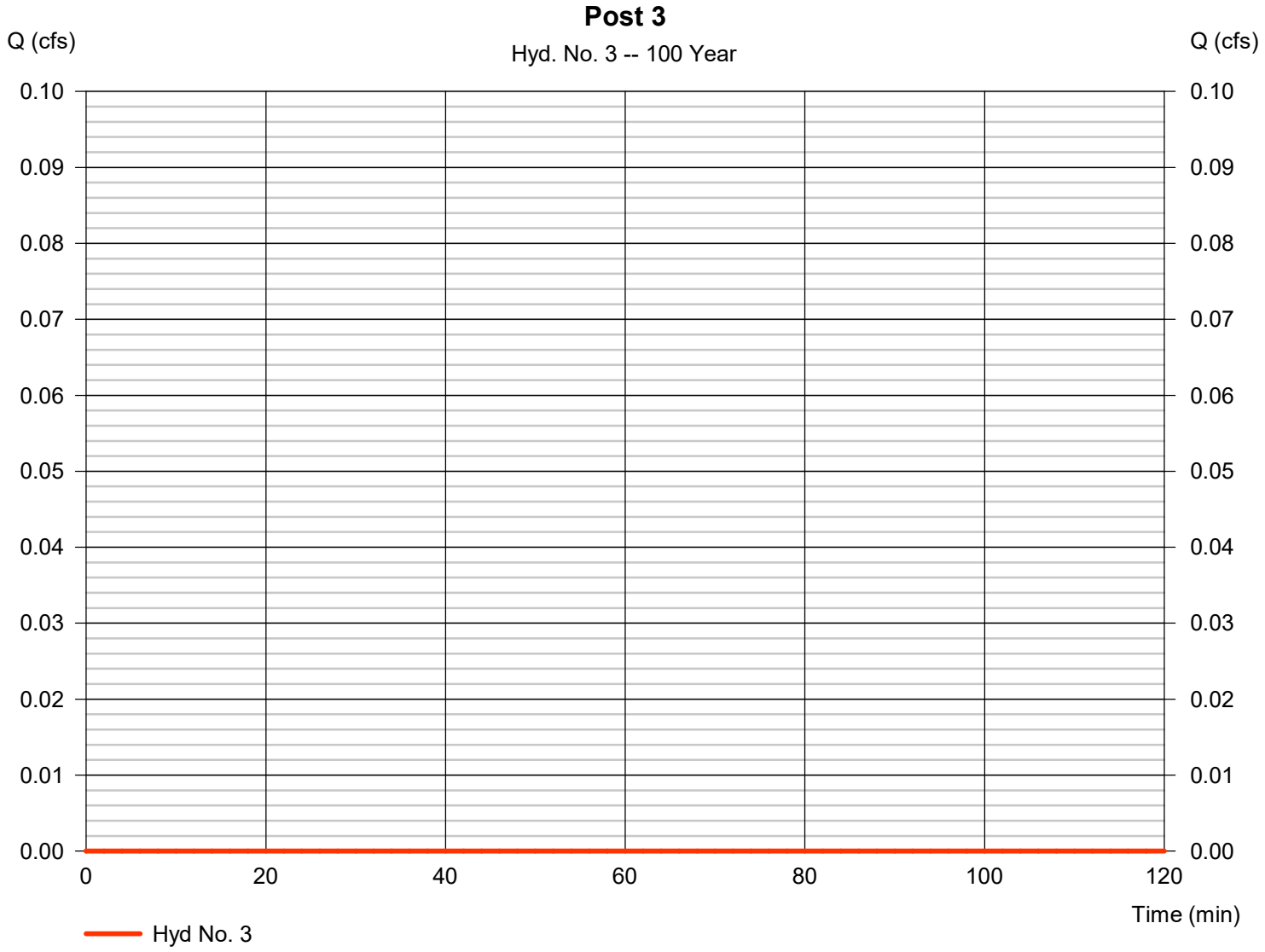
Hydrograph Report

Hyd. No. 3

Post 3

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0 cuft
Drainage area	=	1.870 ac	Curve number	=	80*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	10.20 min
Total precip.	=	7.95 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.980 x 98) + (0.890 x 61)] / 1.870



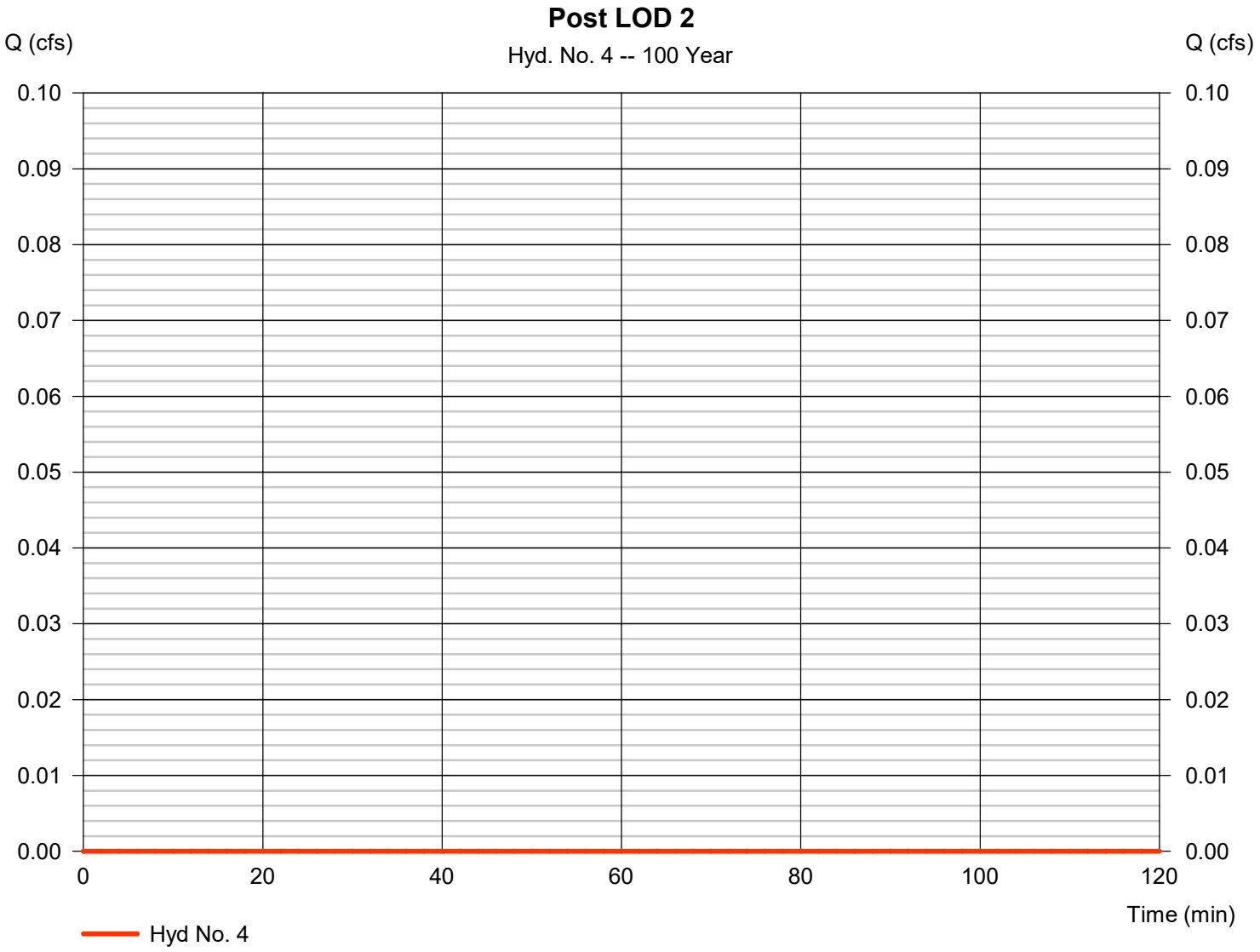
Hydrograph Report

Hyd. No. 4

Post LOD 2

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 100 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Drainage area	= 1.150 ac	Curve number	= 93*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.95 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.170 x 61) + (0.980 x 98)] / 1.150



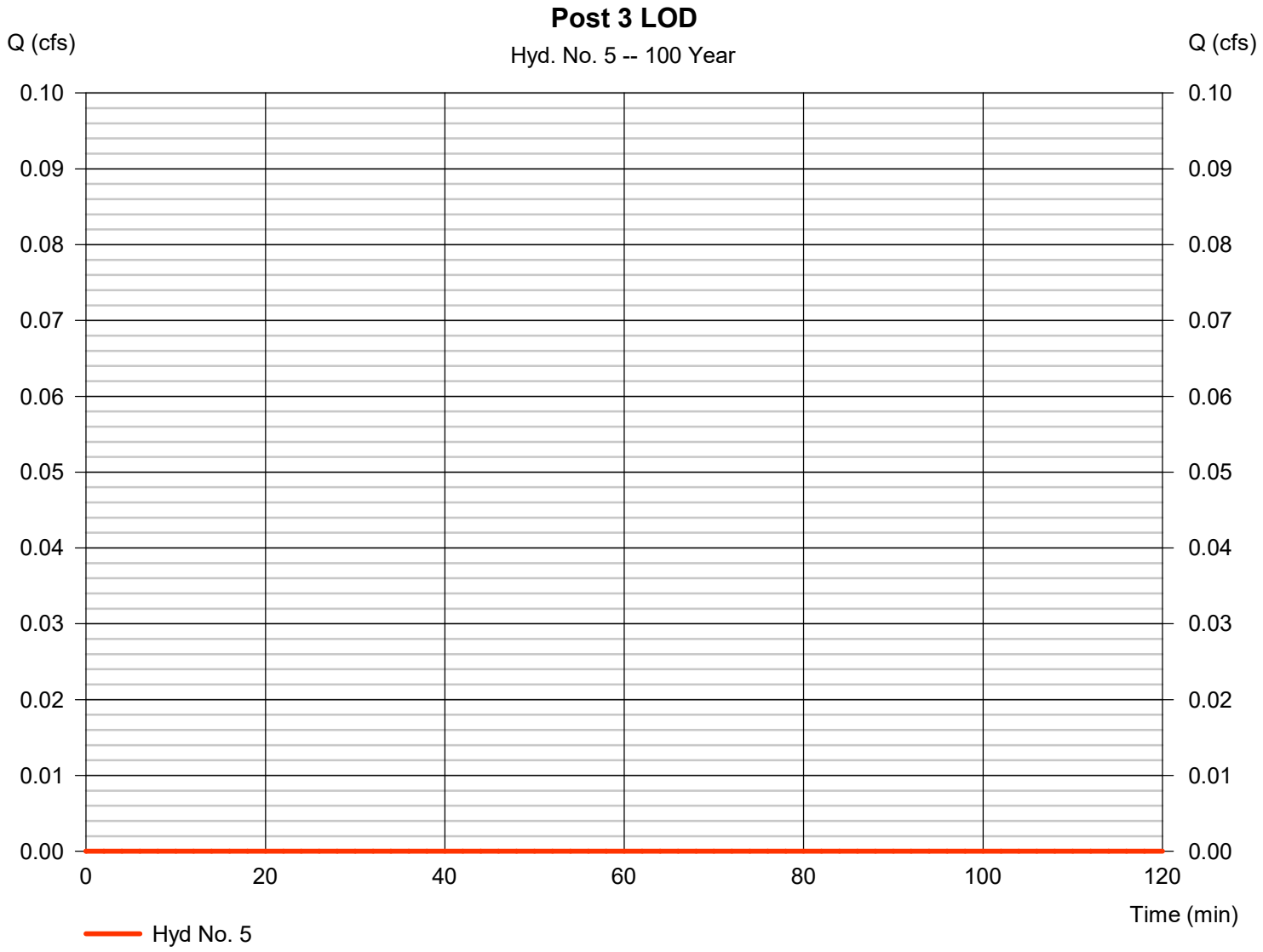
Hydrograph Report

Hyd. No. 5

Post 3 LOD

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0 cuft
Drainage area	=	1.140 ac	Curve number	=	88*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	6.10 min
Total precip.	=	7.95 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.830 x 98) + (0.310 x 61)] / 1.140



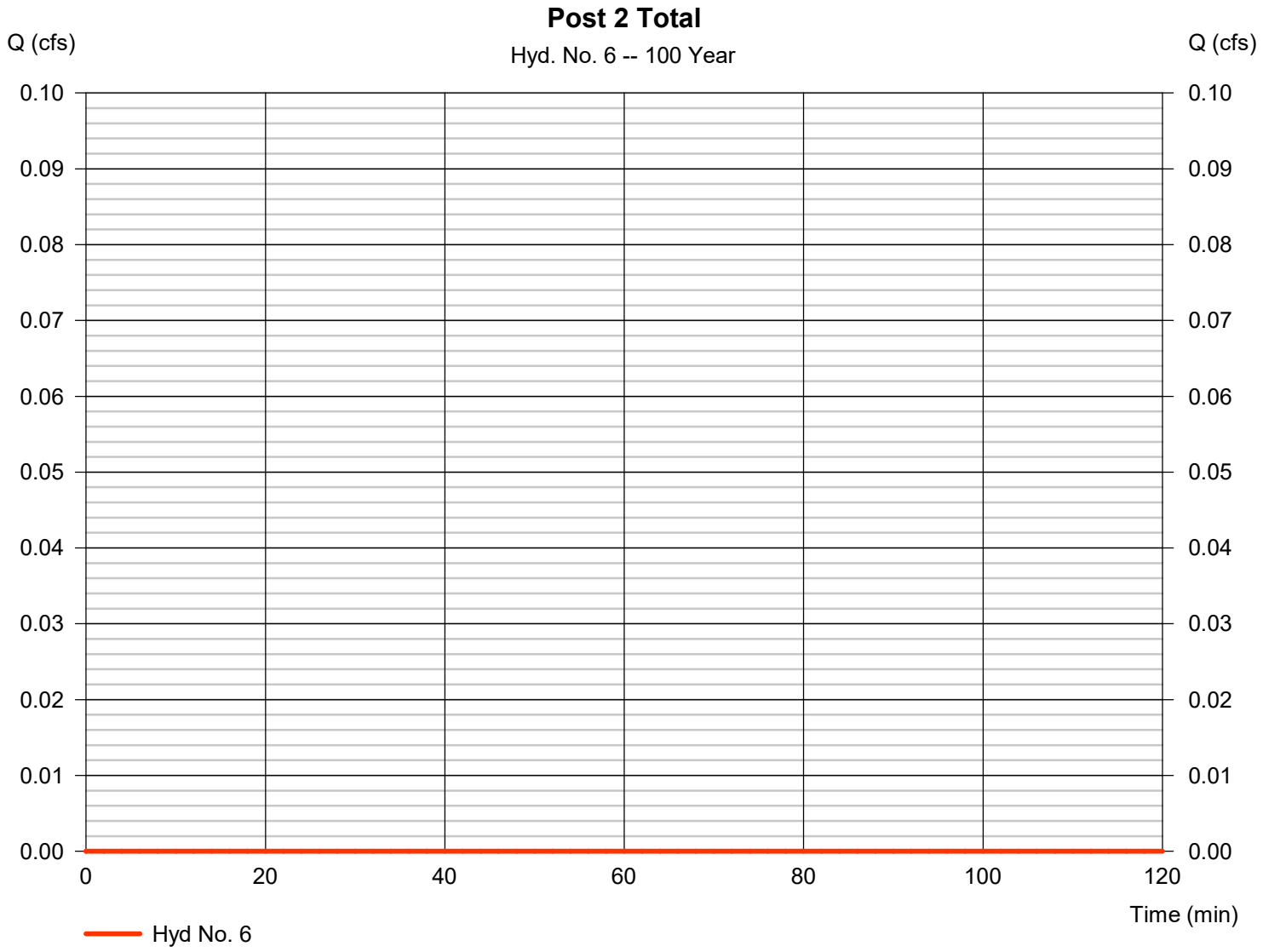
Hydrograph Report

Hyd. No. 6

Post 2 Total

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0 cuft
Drainage area	=	3.920 ac	Curve number	=	83*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	6.40 min
Total precip.	=	7.95 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.590 x 61) + (2.330 x 98)] / 3.920



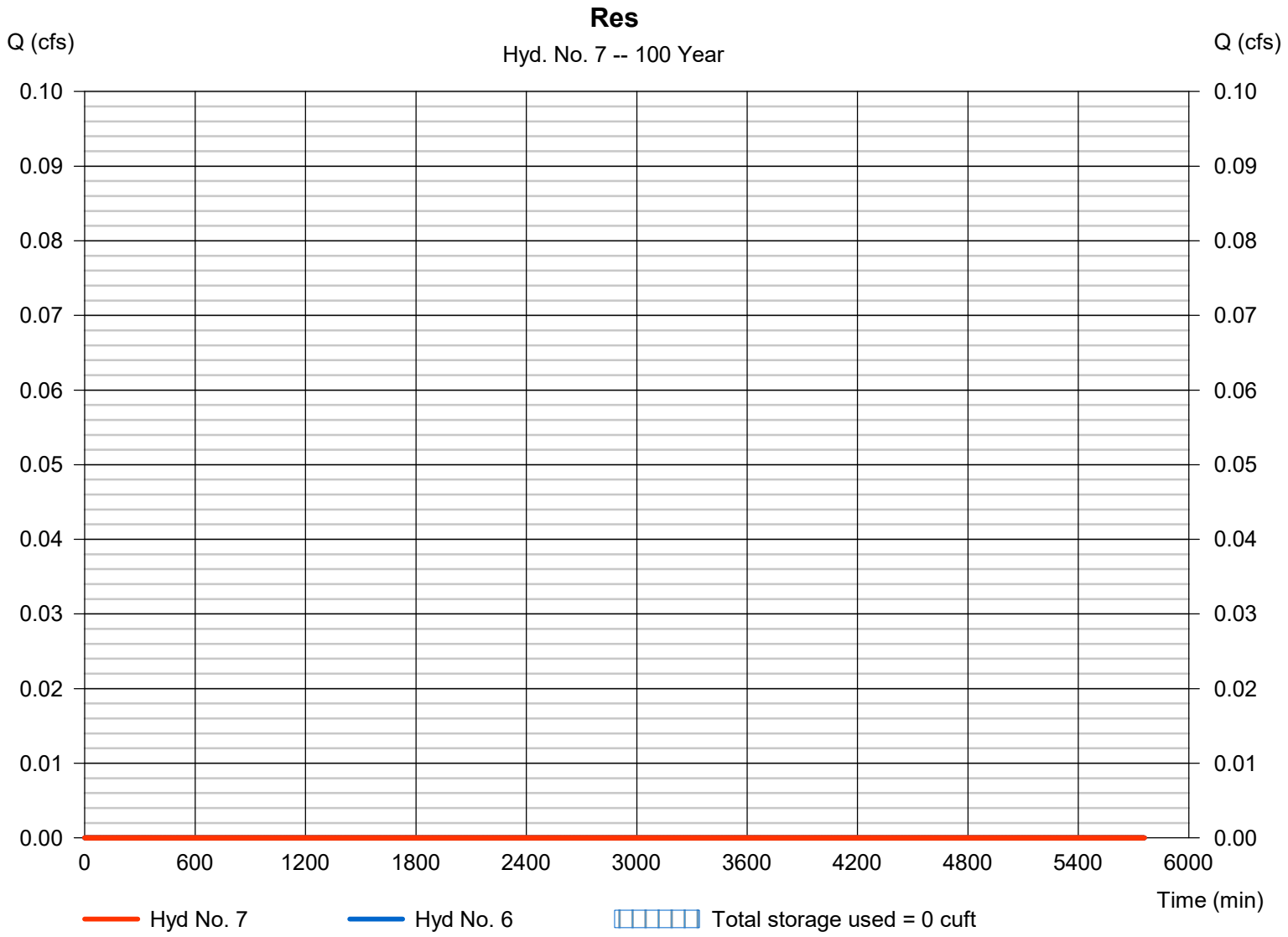
Hydrograph Report

Hyd. No. 7

Res

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	6 - Post 2 Total	Max. Elevation	=	689.00 ft
Reservoir name	=	Underground Retention	Max. Storage	=	0 cuft

Storage Indication method used.



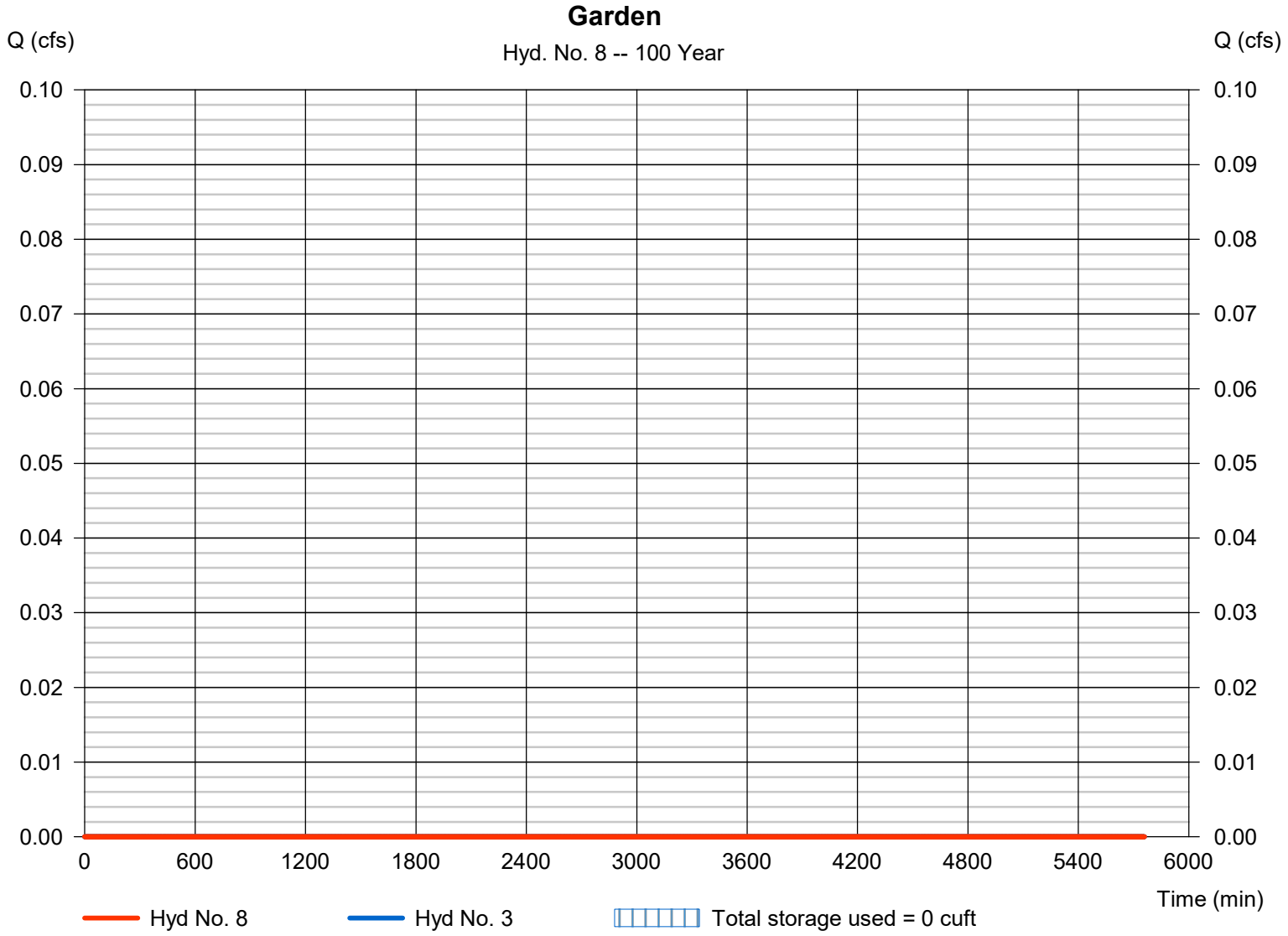
Hydrograph Report

Hyd. No. 8

Garden

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	3 - Post 3	Max. Elevation	=	700.00 ft
Reservoir name	=	Garden	Max. Storage	=	0 cuft

Storage Indication method used. Outflow includes exfiltration.



Hydraflow Table of Contents

Post Hydro.gpw

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

DEQ Virginia Runoff Reduction Method Re-Development Compliance Spreadsheet - Version 3.0

○ 2011 BMP Standards and Specifications ⊙ 2013 Draft BMP Standards and Specifications

CLEAR ALL (Ctrl+Shift+R)

data input cells | constant values | calculation cells | final results

Project Name: Crozet Elementary School

Date:

Linear Development Project? No

Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area *(acres)* → 1.27

Check:

BMP Design Specifications List: 2013 Draft Stds & Specs

Maximum reduction required: 20%

Linear project? No

The site's net increase in impervious cover (acres) is: 0.46

Land cover areas entered correctly? ✓

Post-Development TP Load Reduction for Site (lb/yr): 1.53

Total disturbed area entered? ✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed forest/open space					0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed		0.94			0.94
Impervious Cover (acres)		1.56			1.56
					2.50

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land					0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed		0.48			0.48
Impervious Cover (acres)		2.02			2.02
Area Check	OK.	OK.	OK.	OK.	2.50

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

LAND COVER SUMMARY -- PRE-REDEVELOPMENT

Land Cover Summary-Pre		
Pre-ReDevelopment	**Listed**	**Adjusted[1]**
Forest/Open Space Cover (acres)	0.00	0.00
Weighted Rv(forest)	0.00	0.00
% Forest	0%	0%
Managed Turf Cover (acres)	0.94	0.48
Weighted Rv(turf)	0.20	0.20
% Managed Turf	38%	24%
Impervious Cover (acres)	1.56	1.56
Rv(impervious)	0.95	0.95
% Impervious	62%	76%
Total Site Area (acres)	**2.50**	**2.04**
Site Rv	**0.67**	**0.77**

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary-Post (Final)	
Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.00
Weighted Rv(forest)	0.00
% Forest	0%
Managed Turf Cover (acres)	0.48
Weighted Rv (turf)	0.20
% Managed Turf	19%
Impervious Cover (acres)	2.02
Rv(impervious)	0.95
% Impervious	81%
Final Site Area (acres)	**2.50**
Final Post Dev Site Rv	**0.81**

Land Cover Summary-Post	
Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.00
Weighted Rv(forest)	0.00
% Forest	0%
Managed Turf Cover (acres)	0.48
Weighted Rv (turf)	0.20
% Managed Turf	24%
ReDev. Impervious Cover (acres)	1.56
Rv(impervious)	0.95
% Impervious	76%
Total ReDev. Site Area (acres)	**2.04**
ReDev Site Rv	**0.77**

Land Cover Summary-Post	
Post-Development New Impervious	
New Impervious Cover (acres)	0.46
Rv(impervious)	0.95

Treatment Volume and Nutrient Load

Pre-ReDevelopment Treatment Volume (acre-ft)	0.1392	0.1315
Pre-ReDevelopment Treatment Volume (cubic feet)	6,062	5,728
Pre-ReDevelopment TP Load (lb/yr)	**3.81**	**3.60**
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	1.52	1.76
Baseline TP Load (lb/yr) (0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		*0.84*

Treatment Volume and Nutrient Load

Final Post-Development Treatment Volume (acre-ft)	0.1679	
Final Post-Development Treatment Volume (cubic feet)	7,314	
Final Post-Development TP Load (lb/yr)	**4.60**	
Final Post-Development TP Load per acre (lb/acre/yr)	1.84	

Post-ReDevelopment Treatment Volume (acre-ft)	0.1315	
Post-ReDevelopment Treatment Volume (cubic feet)	5,728	
Post-ReDevelopment Load (TP) (lb/yr)*	**3.60**	
Post-ReDevelopment TP Load per acre (lb/acre/yr)	1.76	
Max. Reduction Required (Below Pre-ReDevelopment Load)	**20%**	
TP Load Reduction Required for Redeveloped Area (lb/yr)	**0.72**	

Post-Development Treatment Volume (acre-ft)	0.0364
Post-Development Treatment Volume (cubic feet)	1,586
Post-Development TP Load (lb/yr)	**1.00**
TP Load Reduction Required for New Impervious Area (lb/yr)	**0.81**

[1] *Adjusted Land Cover Summary:*
Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column I shows load reduction requriement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) **1.53**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	27.25	Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	32.88

Drainage Area A

Drainage Area A Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals	Land Cover Rv
Forest/Open Space (acres)					0.00	0.00
Managed Turf (acres)		0.16			0.16	0.20
Impervious Cover (acres)		1.17			1.17	0.95
				Total	1.33	

CLEAR BMP AREAS

Total Phosphorus Available for Removal in D.A. A (lb/yr)	2.61
Post Development Treatment Volume in D.A. A (ft^3)	4,151

Stormwater Best Management Practices (RR = Runoff Reduction)

--Select from dropdown lists--

Practice	Runoff Reduction Credit (%)	Managed Turf Credit Area (acres)	Impervious Cover Credit Area (acres)	Volume from Upstream Practice (ft^3)	Runoff Reduction (ft^3)	Remaining Runoff Volume (ft^3)	Total BMP Treatment Volume (ft^3)	Phosphorus Removal Efficiency (%)	Phosphorus Load from Upstream Practices (lb)	Untreated Phosphorus Load to Practice (lb)	Phosphorus Removed By Practice (lb)	Remaining Phosphorus Load (lb)	Downstream Practice to be Employed
1. Vegetated Roof (RR)													
1.a. Vegetated Roof #1 (Spec #5)	45				0	0	0	0		0.00	0.00	0.00	
1.b. Vegetated Roof #2 (Spec #5)	60				0	0	0	0		0.00	0.00	0.00	
2. Rooftop Disconnection (RR)													
2.a. Simple Disconnection to A/B Soils (Spec #1)	50			0	0	0	0	0	0.00	0.00	0.00	0.00	
2.b. Simple Disconnection to C/D Soils (Spec #1)	25			0	0	0	0	0	0.00	0.00	0.00	0.00	
2.c. To Soil Amended Filter Path as per specifications (existing C/D soils) (Spec #4)	50			0	0	0	0	0	0.00	0.00	0.00	0.00	
2.d. To Dry Well or French Drain #1, Micro-Infiltration #1 (Spec #8)	50			0	0	0	0	25	0.00	0.00	0.00	0.00	
2.e. To Dry Well or French Drain #2, Micro-Infiltration #2 (Spec #8)	90			0	0	0	0	25	0.00	0.00	0.00	0.00	
2.f. To Rain Garden #1, Micro-Bioretention #1 (Spec #9)	40			0	0	0	0	25	0.00	0.00	0.00	0.00	
2.g. To Rain Garden #2, Micro-Bioretention #2 (Spec #9)	80			0	0	0	0	50	0.00	0.00	0.00	0.00	
2.h. To Rainwater Harvesting (Spec #6)	0			0	0	0	0	0	0.00	0.00	0.00	0.00	
2.i. To Stormwater Planter, Urban Bioretention (Spec #9, Appendix A)	40			0	0	0	0	25	0.00	0.00	0.00	0.00	
3. Permeable Pavement (RR)													
3.a. Permeable Pavement #1 (Spec #7)	45			0	0	0	0	25	0.00	0.00	0.00	0.00	
3.b. Permeable Pavement #2 (Spec #7)	75				0	0	0	25		0.00	0.00	0.00	
4. Grass Channel (RR)													
4.a. Grass Channel A/B Soils (Spec #3)	20			0	0	0	0	15	0.00	0.00	0.00	0.00	
4.b. Grass Channel C/D Soils (Spec #3)	10			0	0	0	0	15	0.00	0.00	0.00	0.00	
4.c. Grass Channel with Compost Amended Soils as per specs (see Spec #4)	20			0	0	0	0	15	0.00	0.00	0.00	0.00	
5. Dry Swale (RR)													
5.a. Dry Swale #1 (Spec #10)	40			0	0	0	0	20	0.00	0.00	0.00	0.00	
5.b. Dry Swale #2 (Spec #10)	60			0	0	0	0	40	0.00	0.00	0.00	0.00	
6. Bioretention (RR)													
6.a. Bioretention #1 or Micro-Bioretention #1 or Urban Bioretention (Spec #9)	40			0	0	0	0	25	0.00	0.00	0.00	0.00	
6.b. Bioretention #2 or Micro-Bioretention #2 (Spec #9)	80			0	0	0	0	50	0.00	0.00	0.00	0.00	
7. Infiltration (RR)													
7.a. Infiltration #1 (Spec #8)	50			0	0	0	0	25	0.00	0.00	0.00	0.00	
7.b. Infiltration #2 (Spec #8)	90			0	0	0	0	25	0.00	0.00	0.00	0.00	
8. Extended Detention Pond (RR)													

Practice	Nitrogen Removal Efficiency (%)	Nitrogen Load from Upstream Practices (lbs)	Untreated Nitrogen Load to Practice (lbs)	Nitrogen Removed By Practice (lbs)	Remaining Nitrogen Load (lbs)
1. Vegetated Roof (RR)					
1.a. Vegetated Roof #1 (Spec #5)	0		0.00	0.00	0.00
1.b. Vegetated Roof #2 (Spec #5)	0		0.00	0.00	0.00
2. Rooftop Disconnection (RR)					
2.a. Simple Disconnection to A/B Soils (Spec #1)	0	0.00	0.00	0.00	0.00
2.b. Simple Disconnection to C/D Soils (Spec #1)	0	0.00	0.00	0.00	0.00
2.c. To Soil Amended Filter Path as per specifications (existing C/D soils) (Spec #4)	0	0.00	0.00	0.00	0.00
2.d. To Dry Well or French Drain #1, Micro-Infiltration #1 (Spec #8)	15	0.00	0.00	0.00	0.00
2.e. To Dry Well or French Drain #2, Micro-Infiltration #2 (Spec #8)	15	0.00	0.00	0.00	0.00
2.f. To Rain Garden #1, Micro-Bioretention #1 (Spec #9)	40	0.00	0.00	0.00	0.00
2.g. To Rain Garden #2, Micro-Bioretention #2 (Spec #9)	60	0.00	0.00	0.00	0.00
2.h. To Rainwater Harvesting (Spec #6)	0	0.00	0.00	0.00	0.00
2.i. To Stormwater Planter, Urban Bioretention (Spec #9, Appendix A)	40	0.00	0.00	0.00	0.00
3. Permeable Pavement (RR)					
3.a. Permeable Pavement #1 (Spec #7)	25	0.00	0.00	0.00	0.00
3.b. Permeable Pavement #2 (Spec #7)	25		0.00	0.00	0.00
4. Grass Channel (RR)					
4.a. Grass Channel A/B Soils (Spec #3)	20	0.00	0.00	0.00	0.00
4.b. Grass Channel C/D Soils (Spec #3)	20	0.00	0.00	0.00	0.00
4.c. Grass Channel with Compost Amended Soils as per specs (see Spec #4)	20	0.00	0.00	0.00	0.00
5. Dry Swale (RR)					
5.a. Dry Swale #1 (Spec #10)	25	0.00	0.00	0.00	0.00
5.b. Dry Swale #2 (Spec #10)	35	0.00	0.00	0.00	0.00
6. Bioretention (RR)					
6.a. Bioretention #1 or Micro-Bioretention #1 or Urban Bioretention (Spec #9)	40	0.00	0.00	0.00	0.00
6.b. Bioretention #2 or Micro-Bioretention #2 (Spec #9)	60	0.00	0.00	0.00	0.00
7. Infiltration (RR)					
7.a. Infiltration #1 (Spec #8)	15	0.00	0.00	0.00	0.00
7.b. Infiltration #2 (Spec #8)	15	0.00	0.00	0.00	0.00
8. Extended Detention Pond (RR)					

8.a. ED #1 (Spec #15)	0			0	0	0	0	15	0.00	0.00	0.00	0.00		10	0.00	0.00	0.00	0.00
8.b. ED #2 (Spec #15)	15			0	0	0	0	15	0.00	0.00	0.00	0.00		10	0.00	0.00	0.00	0.00
9. Sheetflow to Filter/Open Space (RR)														**9. Sheetflow to Filter/Open Space (RR)**				
9.a. Sheetflow to Conservation Area, A/B Soils (Spec #2)	75			0	0	0	0	0	0.00	0.00	0.00	0.00		0	0.00	0.00	0.00	0.00
9.b. Sheetflow to Conservation Area, C/D Soils (Spec #2)	50			0	0	0	0	0	0.00	0.00	0.00	0.00		0	0.00	0.00	0.00	0.00
9.c. Sheetflow to Vegetated Filter Strip, A Soils or Compost Amended B/C/D Soils (Spec #2 & #4)	50			0	0	0	0	0	0.00	0.00	0.00	0.00		0	0.00	0.00	0.00	0.00

TOTAL IMPERVIOUS COVER TREATED (ac)	0.00	AREA CHECK: OK.
TOTAL MANAGED TURF AREA TREATED (ac)	0.00	AREA CHECK: OK.
TOTAL RUNOFF REDUCTION IN D.A. A (ft^3)	0	
TOTAL PHOSPHORUS AVAILABLE FOR REMOVAL IN D.A. A (lb/yr)	2.61	
TOTAL PHOSPHORUS REMOVED WITH RUNOFF REDUCTION PRACTICES IN D.A. A (lb/yr)	0.00	
TOTAL PHOSPHORUS REMAINING AFTER APPLYING RUNOFF REDUCTION PRACTICES IN D.A. A (lb/yr)	2.61	

SEE WATER QUALITY COMPLIANCE TAB FOR SITE COMPLIANCE CALCULATIONS

TOTAL RUNOFF REDUCTION IN D.A. A (ft^3)	0
NITROGEN REMOVED WITH RUNOFF REDUCTION PRACTICES IN D.A. A (lb/yr)	0.00

SEE WATER QUALITY COMPLIANCE TAB FOR SITE CALCULATIONS (Information Only)

10. Wet Swale (no RR)														**10. Wet Swale (Coastal Plain) (no RR)**				
10.a. Wet Swale #1 (Spec #11)	0			0	0	0	0	20	0.00	0.00	0.00	0.00		25	0.00	0.00	0.00	0.00
10.b. Wet Swale #2 (Spec #11)	0			0	0	0	0	40	0.00	0.00	0.00	0.00		35	0.00	0.00	0.00	0.00
11. Filtering Practices (no RR)														**11. Filtering Practices (no RR)**				
11.a.Filtering Practice #1 (Spec #12)	0			0	0	0	0	60	0.00	0.00	0.00	0.00		30	0.00	0.00	0.00	0.00
11.b. Filtering Practice #2 (Spec #12)	0			0	0	0	0	65	0.00	0.00	0.00	0.00		45	0.00	0.00	0.00	0.00
12. Constructed Wetland (no RR)														**12. Constructed Wetland (no RR)**				
12.a.Constructed Wetland #1 (Spec #13)	0			0	0	0	0	50	0.00	0.00	0.00	0.00		25	0.00	0.00	0.00	0.00
12.b. Constructed Wetland #2 (Spec #13)	0			0	0	0	0	75	0.00	0.00	0.00	0.00		55	0.00	0.00	0.00	0.00
13. Wet Ponds (no RR)														**13. Wet Ponds (no RR)**				
13.a. Wet Pond #1 (Spec #14)	0			0	0	0	0	50	0.00	0.00	0.00	0.00		30	0.00	0.00	0.00	0.00
13.b. Wet Pond #1 (Coastal Plain) (Spec #14)	0			0	0	0	0	45	0.00	0.00	0.00	0.00		20	0.00	0.00	0.00	0.00
13.c. Wet Pond #2 (Spec #14)	0			0	0	0	0	75	0.00	0.00	0.00	0.00		40	0.00	0.00	0.00	0.00
13.d. Wet Pond #2 (Coastal Plain) (Spec #14)	0			0	0	0	0	65	0.00	0.00	0.00	0.00		30	0.00	0.00	0.00	0.00
14. Manufactured Treatment Devices (no RR)														**14. Manufactured BMP (no RR)**				
14.a. Manufactured Treatment Device-Hydrodynamic	0			0	0	0	0	20	0.00	0.00	0.00	0.00		0	0.00	0.00	0.00	0.00
14.b. Manufactured Treatment Device-Filtering	0			0	0	0	0	20	0.00	0.00	0.00	0.00		0	0.00	0.00	0.00	0.00
14.c. Manufactured Treatment Device-Generic	0			0	0	0	0	20	0.00	0.00	0.00	0.00		0	0.00	0.00	0.00	0.00

TOTAL IMPERVIOUS COVER TREATED (ac)	0.00	AREA CHECK: OK.
TOTAL MANAGED TURF AREA TREATED (ac)	0.00	AREA CHECK: OK.
TOTAL PHOSPHORUS REMOVAL REQUIRED ON SITE (lb/yr)	1.53	
TOTAL PHOSPHORUS AVAILABLE FOR REMOVAL IN D.A. A (lb/yr)	2.61	
TOTAL PHOSPHORUS REMOVED WITHOUT RUNOFF REDUCTION PRACTICES IN D.A. A (lb/yr)	0.00	
TOTAL PHOSPHORUS REMOVED WITH RUNOFF REDUCTION PRACTICES IN D.A. A (lb/yr)	0.00	

TOTAL PHOSPHORUS LOAD REDUCTION ACHIEVED IN D.A. A (lb/yr)	0.00
TOTAL PHOSPHORUS REMAINING AFTER APPLYING BMP LOAD REDUCTIONS IN D.A. A (lb/yr)	2.61

SEE WATER QUALITY COMPLIANCE TAB FOR SITE COMPLIANCE CALCULATIONS

NITROGEN REMOVED WITH RUNOFF REDUCTION PRACTICES IN D.A. A (lb/yr)	0.00
NITROGEN REMOVED WITHOUT RUNOFF REDUCTION PRACTICES IN D.A. A (lb/yr)	0.00
TOTAL NITROGEN REMOVED IN D.A. A (lb/yr)	0.00

Runoff Volume and Curve Number Calculations

Enter design storm rainfall depths (in):

1-year storm	2-year storm	10-year storm
3.07	3.71	5.58

Use NOAA Atlas 14 (http://hdsc.nws.noaa.gov/hdsc/pfds/)

***Notes (see below):**

[1] The curve numbers and runoff volumes computed in this spreadsheet for each drainage area are limited in their applicability for determining and demonstrating compliance with water quantity requirements. See VRRM User's Guide and Documentation for additional information.

[2] Runoff Volume (RV) for pre- and post-development drainage areas must be in volumetric units (e.g., acre-feet or cubic feet) when using the Energy Balance Equation. Runoff measured in watershed-inches and shown in the spreadsheet as RV(watershed-inch) can only be used in the Energy Balance Equation when the pre- and post-development drainage areas are equal. Otherwise RV(watershed-inch) must be multiplied by the drainage area.

[3] Adjusted CNs are based on runoff reduction volumes as calculated in D.A. tabs. An alternative CN adjustment calculation for Vegetated Roofs is included in BMP specification No. 5.

Drainage Area Curve Numbers and Runoff Depths*

Curve numbers (CN, CNadj) and runoff depths ($RV_{Developed}$) are computed with and without reduction practices.

Drainage Area A		A Soils	B Soils	C Soils	D Soils
Forest/Open Space -- undisturbed, protected forest/open space or reforested land	Area (acres)	0.00	0.00	0.00	0.00
	CN	30	55	70	77
Managed Turf -- disturbed, graded for yards or other turf to be mowed/managed	Area (acres)	0.00	0.16	0.00	0.00
	CN	39	61	74	80
Impervious Cover	Area (acres)	0.00	1.17	0.00	0.00
	CN	98	98	98	98
					$CN_{(D.A.\ A)}$
					94
		1-year storm	2-year storm	10-year storm	
$RV_{Developed}$ *(watershed-inch)* with no Runoff Reduction*		2.42	3.04	4.88	
$RV_{Developed}$ *(watershed-inch)* with Runoff Reduction*		2.42	3.04	4.88	
Adjusted CN*		94	94	94	

Total Area (acres):	1.33
Runoff Reduction Volume (ft^3):	0

**See Notes above*

Drainage Area B		A Soils	B Soils	C Soils	D Soils
Forest/Open Space -- undisturbed, protected forest/open space or reforested land	Area (acres)	0.00	0.00	0.00	0.00
	CN	30	55	70	77
Managed Turf -- disturbed, graded for yards or other turf to be mowed/managed	Area (acres)	0.00	0.40	0.00	0.00
	CN	39	61	74	80
Impervious Cover	Area (acres)	0.00	0.75	0.00	0.00
	CN	98	98	98	98
					$CN_{(D.A.\ B)}$
					85
		1-year storm	2-year storm	10-year storm	
$RV_{Developed}$ *(watershed-inch)* with no Runoff Reduction*		1.65	2.20	3.91	
$RV_{Developed}$ *(watershed-inch)* with Runoff Reduction*		1.65	2.20	3.91	
Adjusted CN*		85	85	85	

Total Area (acres):	1.15
Runoff Reduction Volume (ft^3):	0

**See Notes above*

Drainage Area C		A Soils	B Soils	C Soils	D Soils
Forest/Open Space -- undisturbed, protected forest/open space or reforested land	Area (acres)	0.00	0.00	0.00	0.00
	CN	30	55	70	77
Managed Turf -- disturbed, graded for yards or other turf to be mowed/managed	Area (acres)	0.00	0.00	0.00	0.00
	CN	39	61	74	80
Impervious Cover	Area (acres)	0.00	0.00	0.00	0.00
	CN	98	98	98	98
					$CN_{(D.A.\ C)}$
					0
		1-year storm	2-year storm	10-year storm	
$RV_{Developed}$ *(watershed-inch)* with no Runoff Reduction*		0.00	0.00	0.00	
$RV_{Developed}$ *(watershed-inch)* with Runoff Reduction*		0.00	0.00	0.00	
Adjusted CN*		0	0	0	

Total Area (acres):	0.00
Runoff Reduction Volume (ft^3):	0

**See Notes above*

Drainage Area D		A Soils	B Soils	C Soils	D Soils
Forest/Open Space -- undisturbed, protected forest/open space or reforested land	Area (acres)	0.00	0.00	0.00	0.00
	CN	30	55	70	77
Managed Turf -- disturbed, graded for yards or other turf to be mowed/managed	Area (acres)	0.00	0.00	0.00	0.00
	CN	39	61	74	80
Impervious Cover	Area (acres)	0.00	0.00	0.00	0.00
	CN	98	98	98	98
					$CN_{(D.A.\ D)}$
					0
		1-year storm	2-year storm	10-year storm	
$RV_{Developed}$ *(watershed-inch)* with no Runoff Reduction*		0.00	0.00	0.00	
$RV_{Developed}$ *(watershed-inch)* with Runoff Reduction*		0.00	0.00	0.00	
Adjusted CN*		0	0	0	

Total Area (acres):	0.00
Runoff Reduction Volume (ft^3):	0

**See Notes above*

Drainage Area E		A Soils	B Soils	C Soils	D Soils
Forest/Open Space -- undisturbed, protected forest/open space or reforested land	Area (acres)	0.00	0.00	0.00	0.00
	CN	30	55	70	77
Managed Turf -- disturbed, graded for yards or other turf to be mowed/managed	Area (acres)	0.00	0.00	0.00	0.00
	CN	39	61	74	80
Impervious Cover	Area (acres)	0.00	0.00	0.00	0.00
	CN	98	98	98	98
					$CN_{(D.A.\ E)}$
					0
		1-year storm	2-year storm	10-year storm	
$RV_{Developed}$ *(watershed-inch)* with no Runoff Reduction*		0.00	0.00	0.00	
$RV_{Developed}$ *(watershed-inch)* with Runoff Reduction*		0.00	0.00	0.00	
Adjusted CN*		0	0	0	

Total Area (acres):	0.00
Runoff Reduction Volume (ft^3):	0

**See Notes above*

Inlet Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, May 3 2023

<Name>

Combination Inlet

Location	= Sag
Curb Length (ft)	= 4.00
Throat Height (in)	= 6.00
Grate Area (sqft)	= 2.45
Grate Width (ft)	= 1.00
Grate Length (ft)	= 2.45

Gutter

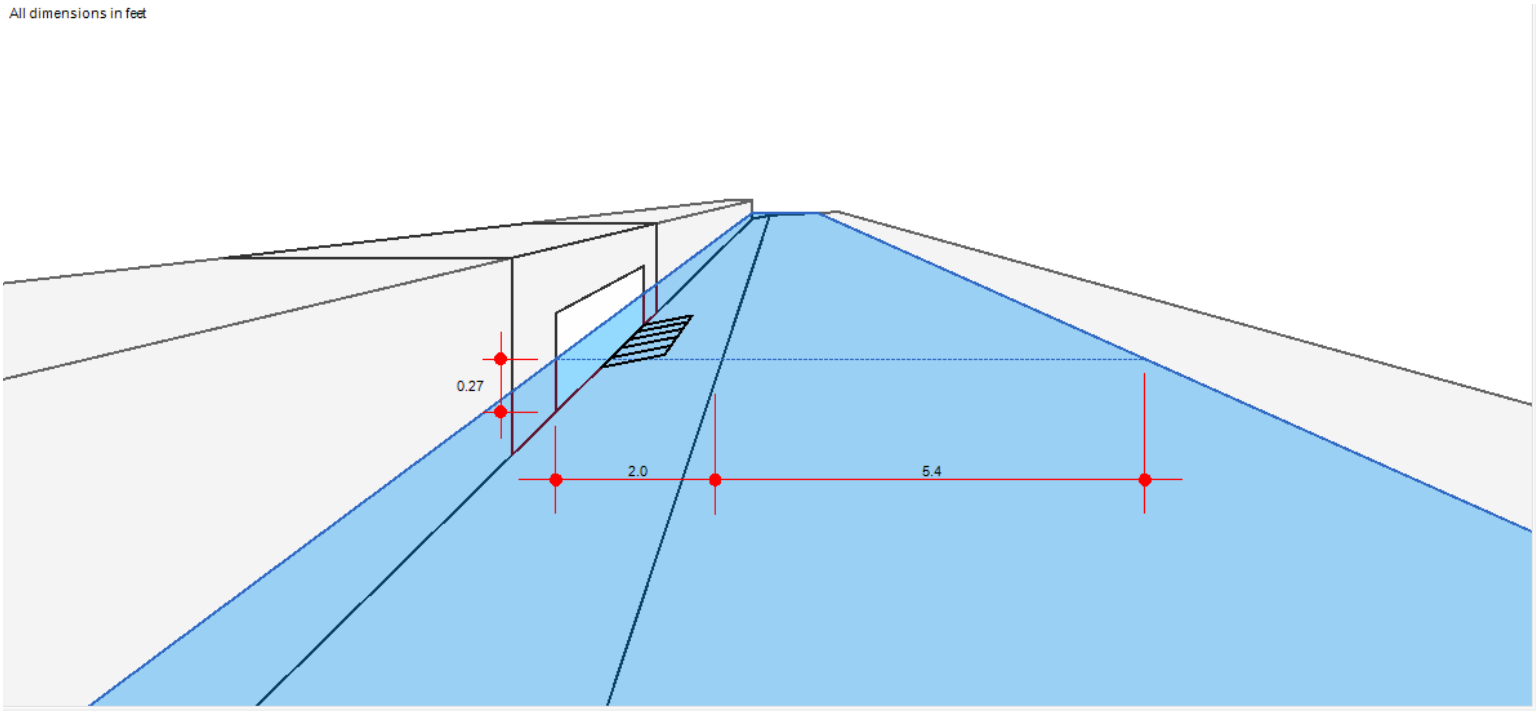
Slope, Sw (ft/ft)	= 0.080
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= -0-
Gutter Width (ft)	= 2.00
Gutter Slope (%)	= -0-
Gutter n-value	= -0-

Calculations

Compute by:	Known Q
Q (cfs)	= 1.76

Highlighted

Q Total (cfs)	= 1.76
Q Capt (cfs)	= 1.76
Q Bypass (cfs)	= -0-
Depth at Inlet (in)	= 3.21
Efficiency (%)	= 100
Gutter Spread (ft)	= 7.40
Gutter Vel (ft/s)	= -0-
Bypass Spread (ft)	= -0-
Bypass Depth (in)	= -0-



Inlet Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, May 3 2023

<Name>

Combination Inlet

Location	= Sag
Curb Length (ft)	= 4.00
Throat Height (in)	= 6.00
Grate Area (sqft)	= 2.45
Grate Width (ft)	= 1.00
Grate Length (ft)	= 2.45

Gutter

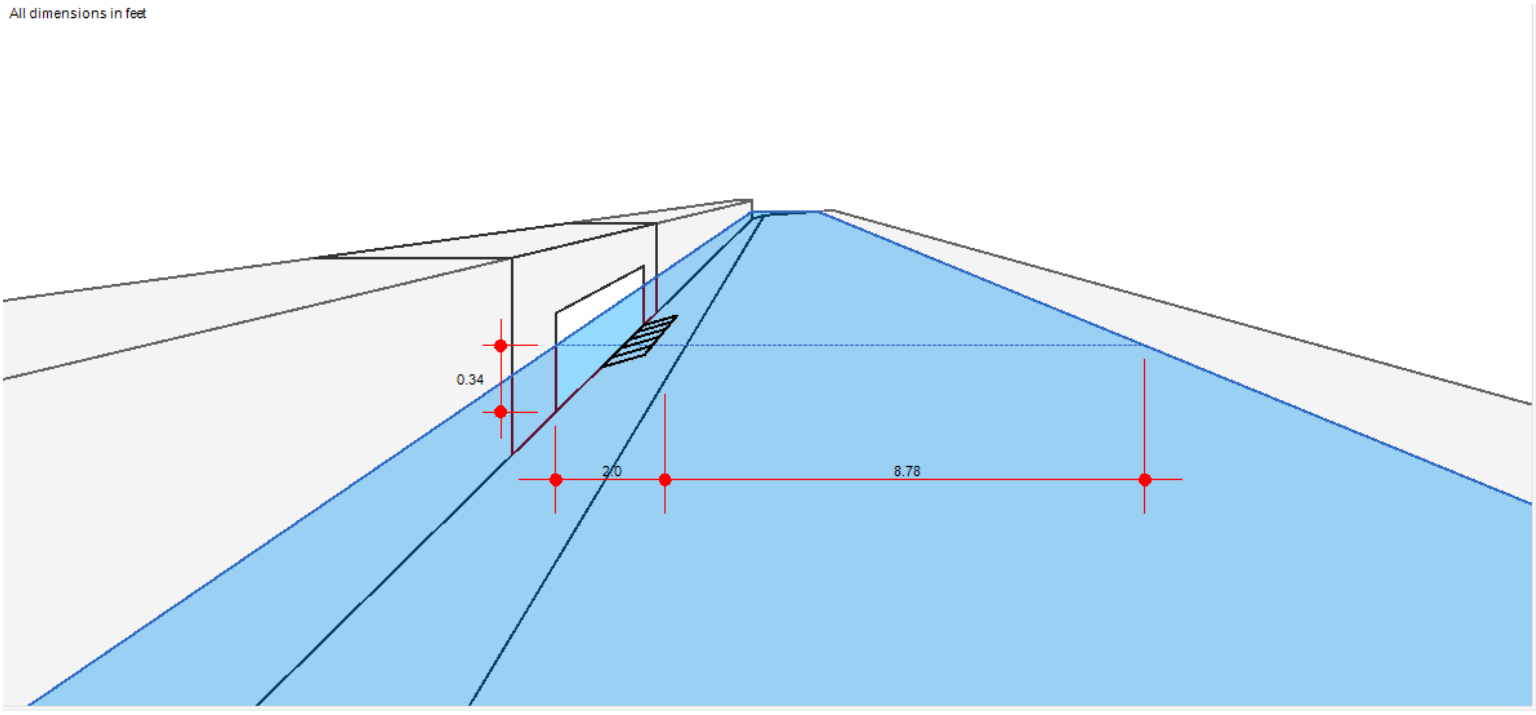
Slope, Sw (ft/ft)	= 0.080
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= -0-
Gutter Width (ft)	= 2.00
Gutter Slope (%)	= -0-
Gutter n-value	= -0-

Calculations

Compute by:	Known Q
Q (cfs)	= 2.91

Highlighted

Q Total (cfs)	= 2.91
Q Capt (cfs)	= 2.91
Q Bypass (cfs)	= -0-
Depth at Inlet (in)	= 4.03
Efficiency (%)	= 100
Gutter Spread (ft)	= 10.78
Gutter Vel (ft/s)	= -0-
Bypass Spread (ft)	= -0-
Bypass Depth (in)	= -0-



Inlet Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, May 3 2023

<Name>

Combination Inlet

Location	= Sag
Curb Length (ft)	= 4.00
Throat Height (in)	= 6.00
Grate Area (sqft)	= 2.45
Grate Width (ft)	= 1.00
Grate Length (ft)	= 2.45

Gutter

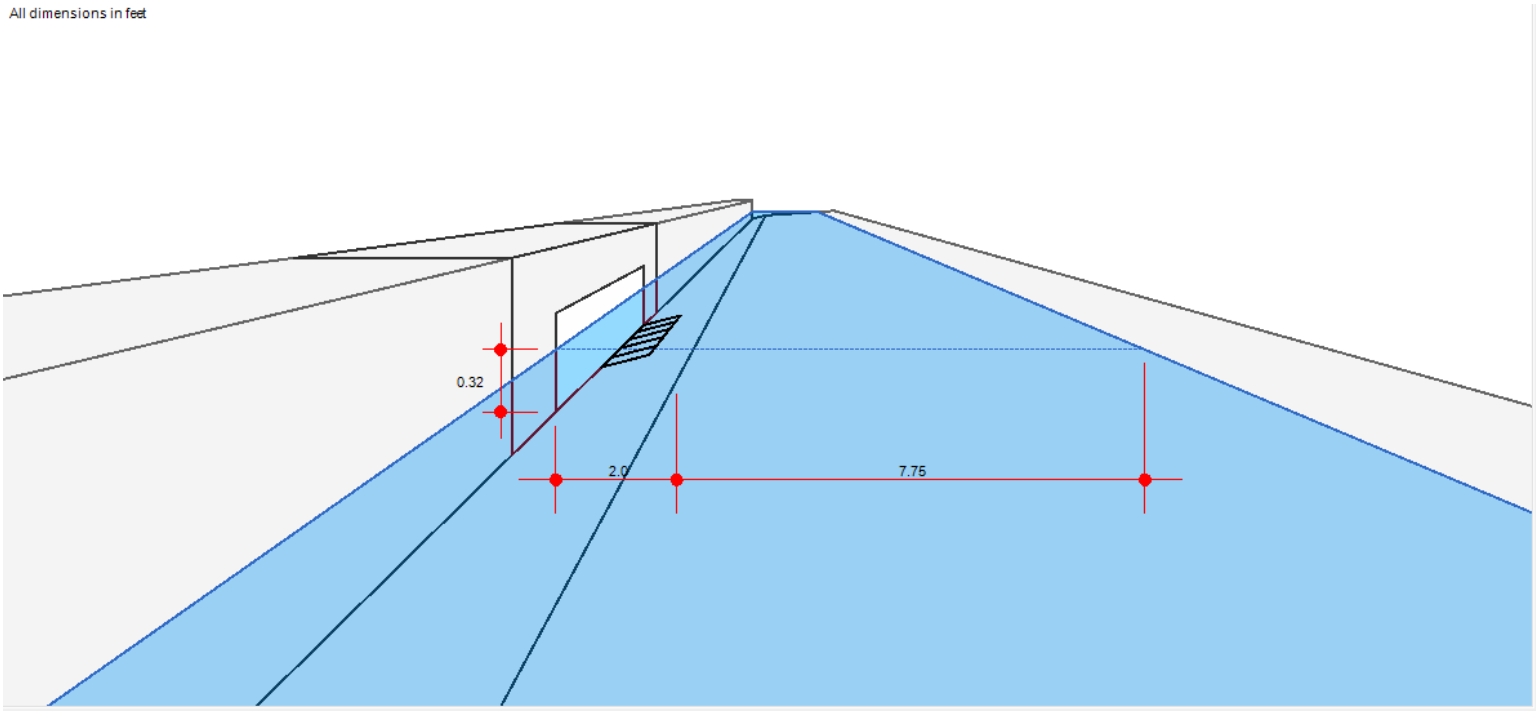
Slope, Sw (ft/ft)	= 0.080
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= -0-
Gutter Width (ft)	= 2.00
Gutter Slope (%)	= -0-
Gutter n-value	= -0-

Calculations

Compute by:	Known Q
Q (cfs)	= 2.54

Highlighted

Q Total (cfs)	= 2.54
Q Capt (cfs)	= 2.54
Q Bypass (cfs)	= -0-
Depth at Inlet (in)	= 3.78
Efficiency (%)	= 100
Gutter Spread (ft)	= 9.75
Gutter Vel (ft/s)	= -0-
Bypass Spread (ft)	= -0-
Bypass Depth (in)	= -0-



Inlet Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, May 3 2023

<Name>

Combination Inlet

Location	= Sag
Curb Length (ft)	= 4.00
Throat Height (in)	= 6.00
Grate Area (sqft)	= 2.45
Grate Width (ft)	= 1.00
Grate Length (ft)	= 2.45

Gutter

Slope, Sw (ft/ft)	= 0.080
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= -0-
Gutter Width (ft)	= 2.00
Gutter Slope (%)	= -0-
Gutter n-value	= -0-

Calculations

Compute by:	Known Q
Q (cfs)	= 4.95

Highlighted

Q Total (cfs)	= 4.95
Q Capt (cfs)	= 4.95
Q Bypass (cfs)	= -0-
Depth at Inlet (in)	= 5.24
Efficiency (%)	= 100
Gutter Spread (ft)	= 15.82
Gutter Vel (ft/s)	= -0-
Bypass Spread (ft)	= -0-
Bypass Depth (in)	= -0-