

STORMWATER POLLUTION PREVENTION PLAN

FOR

RDM WAREHOUSES – 230 NEELYTOWN RD

Neelytown Road

**TOWN OF HAMPTONBURGH
ORANGE COUNTY, NEW YORK**

PREPARED BY
**ENGINEERING
& SURVEYING
PROPERTIES**
*Achieving Successful Results
with Innovative Designs*
71 Clinton Street
Montgomery, NY 12549

**JANUARY 2019
REVISED DECEMBER 2020**

This page is left intentionally blank

TABLE OF CONTENTS

SECTION	PAGE
APPENDIX 1: FIGURES	2
1.0 INTRODUCTION	3
1.1 PURPOSE	3
1.2 SCOPE	3
2.0 PROJECT DESCRIPTION	3
3.0 TOPOGRAPHY AND SOILS	4
4.0 METHODOLOGY	4
5.0 STORMWATER MANAGEMENT PLANNING	5
5.1 INITIAL SITE PLANNING	5
5.1.1 EXISTING CONDITIONS	6
5.1.2 PROPOSED CONDITIONS	7
5.2 WATER QUALITY VOLUME	8
5.3 RUNOFF REDUCTION VOLUME	9
5.4 APPLICATION OF STANDARD SMP'S FOR THE REVISED WQ _v	13
5.5 VOLUME AND PEAK RATE CONTROL	13
5.5.1 CHANNEL PROTECTION VOLUME	14
5.5.2 PEAK RATE CONTROL	15
5.6 SOIL RESTORATION	16
6.0 EROSION AND SEDIMENT CONTROL MEASURES	18
7.0 LONG TERM MAINTENANCE OF WATER QUALITY FEATURES	23
8.0 SUMMARY OF FINDINGS AND CONCLUSIONS	25

This page is left intentionally blank

TABLES

TABLE 1: EXISTING DRAINAGE AREA CHARACTERISTICS	7
TABLE 2: PROPOSED DRAINAGE AREA CHARACTERISTICS.....	8
TABLE 3: REQUIRED WATER QUALITY VOLUMES.....	8
TABLE 4: SPECIFIC REDUCTION FACTOR (S)*	12
TABLE 5: RUNOFF REDUCTION VOLUMES & REVISED WQV.....	13
TABLE 6: WQV PROVIDED IN STANDARD SMP'S.....	13
TABLE 7: CALCULATED CHANNEL PROTECTION VOLUMES (CPV).....	15
TABLE 8: CPV EXTENDED DETENTION TIMES.....	15
TABLE 9: SUMMARY OF RESULTS AT THE DESIGN POINTS.....	16
TABLE 10: SOIL RESTORATION REQUIREMENTS	17

APPENDICES

APPENDIX 1: FIGURES
APPENDIX 2: RAINFALL DATA
APPENDIX 3: CURVE NUMBER CALCULATIONS
APPENDIX 4: TIME OF CONCENTRATION CALCULATIONS
APPENDIX 5: WATER QUALITY VOLUME CALCULATIONS, RUNOFF REDUCTION VOLUME CALCULATIONS & SEDIMENT BASIN CALCULATIONS
APPENDIX 6: HYDROGRAPH SUMMARIES & DIAGRAMS
APPENDIX 7: 1 – YEAR DESIGN STORM HYDROGRAPHS
APPENDIX 8: 10 – YEAR DESIGN STORM HYDROGRAPHS
APPENDIX 9: 100 – YEAR DESIGN STORM HYDROGRAPHS
APPENDIX 10: RESERVOIR REPORTS
APPENDIX 11: INFILTRATION SOIL TESTING RESULTS & LOCATION
APPENDIX 12: CONSTRUCTION SITE INSPECTION FORM, NOTICE OF INTENT & MS4 ACCEPTANCE [DRAFT FORMS]
APPENDIX 13: CONSTRUCTION WASTE MANAGEMENT & SPILL PREVENTION PLANS
APPENDIX 14: LARGE SCALE WATERSHED MAPS

This page is left intentionally blank

1.0 INTRODUCTION

Engineering & Surveying Properties, PC (EP) prepared this report summarizing the potential stormwater impact of the proposed development of the property, known as RDM Warehouses – 230 Neelytown Road, on downstream properties and receiving waters.

1.1 PURPOSE

The purpose of the Stormwater Pollution Prevention Plan (SWPPP) is to:

- a. Maintain existing drainage patterns as much as possible and continue the conveyance of upland watershed runoff;
- b. Mitigate increases in stormwater runoff resulting from the proposed development without adversely affecting downstream conditions;
- c. Mitigate potential stormwater impacts, and prevent soil erosion and sedimentation resulting from stormwater runoff.

1.2 SCOPE

The scope of the SWPPP for RDM Warehouses – 230 Neelytown Road described herein is as follows:

- a) Describe and estimate existing stormwater runoff conditions;
- b) Describe and estimate proposed stormwater runoff conditions;
- c) Describe and evaluate stormwater management facilities planned as part of the proposed development.

2.0 PROJECT DESCRIPTION

The RDM Warehouses – 230 Neelytown Road project site is 77.95± acres in size and is located on the eastern side of Neelytown Road in the Town of Hamptonburgh, Orange County, New York. The project encompasses Town of Hamptonburgh tax lot Section 1 Block 1 Lot 6. A site location map is included as Figure 1 in Appendix 1.

As proposed, the RDM Warehouses – 230 Neelytown Road project involves the construction of an 100,000 square foot warehouse and a 245,000 square foot warehouse. Access to the site will be via a private road constructed to Town of Hamptonburgh town road standards. Associated parking areas and infrastructure will be built to serve the proposed project. Multiple stormwater management facilities will be constructed within the project to mitigate any stormwater runoff quality and quantity increases. The proposed project site is bounded by farmland to the north, east & west. The southern

portion of the property the parcel is split by a railroad owned by the Middletown & NJ Railroad LLC.

The project site is an irregular shaped area of land which contains generally gentle slopes. The existing site cover consists of mostly wooded areas, some farmland areas, some gravel impervious cover, some lawn area and an existing farm residence.

3.0 TOPOGRAPHY AND SOILS

The existing topography in the RDM Warehouses – 230 Neelytown Road project area is mostly flat across the site, ranging from approximately 452 feet above mean sea level (AMSL) to 362 feet AMSL. The majority of the slopes (67%) on the project site are gently sloped (0%-10%), and moderate sloped areas (10%-15%) consist of approximately 16% of the site. The area of significant slope (15%-25%) on site represents 11% of the site area, with the remaining portion of the site (6%) consisting of severe slopes (>25%). The majority of the significant and severe slopes generally exist in the eastern portion of the project site.

Soils information for the RDM Warehouses – 230 Neelytown Road project area was assembled from data provided by the U.S. Department of Agriculture Soil Conservation Service printed in the Soil Survey of Orange County identifies the presence of Alden (AC), Allard (AdB), Erie (ErA), Fredon (Fd), Halsey (Ha), Hoosic (HoB & HoC), Mardin (MdB), Otisville and Hoosic (OVE), and Pittsfield (PtB & PtC) soil complexes within the areas of the proposed project site. These soils are considered to be a part of the “A, B & D” hydrologic soils group. A soils map and soil descriptions are included as Figure 2.

4.0 METHODOLOGY

The methodology utilized for this analysis is based upon the U.S.D.A. Soil Conservation Service’s Technical Release No. 20 and Technical Release No. 55, as utilized by the software entitled Hydrology Studio.

Hydrology Studio is a Microsoft Windows based program for analyzing the hydrology and hydraulics of stormwater runoff. It utilizes the latest techniques to predict the stormwater flows from any given storm event.

Hydrology Studio has the capability of computing hydrographs (representing discharge rates characteristic of specific watershed conditions, precipitation and geologic factors),

combining hydrographs, and routing flows through pipes, streams and ponds. A drainage model can consist of four different components - subareas, combinations, reaches and reservoirs.

A subarea consists of a relatively homogeneous area of land, which produces a volume and rate of runoff unique to that watershed. A subarea combination is the hydrologic addition of two subareas in order to determine the peak runoff at a design point. A reach is a channelized conveyance structure which routes the runoff from one point to another. A reservoir consists of a natural or man-made impoundment which temporarily stores stormwater runoff and that empties in a manner determined by various hydraulic structures located at its outlet.

The SWPPP for the RDM Warehouses – 230 Neelytown Road was based upon the New York State Stormwater Management Design Manual (NYSSMDM) published by the New York State Department of Environmental Conservation (NYSDEC) issued on January 2015. Criteria set forth by this manual, requires analysis and determination of the required Water Quality Volume (WQv), to provide extended detention of the 1-year storm event for Stream Channel Protection (Cpv), to control the peak discharge of the 10-year storm event also known as Overbank Flood Protection Criteria (Qp), and to control the peak discharge and safely pass the 100-year storm event otherwise known as Extreme Flood Control Criteria (Qf).

The SWPPP for RDM Warehouses – 230 Neelytown Road was developed utilizing the “five-step” process for Stormwater Site Planning and Practice Selection. The five steps consist of site planning, determination of the water quality treatment volume, runoff reduction volumes applied through the use of “green technologies”, application of standard stormwater management practices (SMP’s) for remaining water quality volumes, and application of volume and peak rate control methods as required. Each of the five “steps” is further discussed in detail within this report.

5.0 STORMWATER MANAGEMENT PLANNING

5.1 INITIAL SITE PLANNING

Development of the proposed site plan within the “site planning” process was an iterative process with different conceptual layouts developed for the project site.

The current proposed plan was developed after careful consideration of many

planning techniques and potential environmental impacts. The proposed site plan was devised to protect and preserve natural features, maintain natural drainage patterns, and avoid to the greatest extent practical, the disturbance of erodible soils. The proposed design of the site through grading and stormwater infrastructure along with quality and quantity treatment facilities maintains the existing contributory drainage areas to the greatest extent practical while still achieving the development goals. The natural features such as regulated wetlands, water courses, and steep slopes have been avoided to the greatest extent practical while still achieving the development goals. The avoidance of steep slopes to the extent possible in conjunction with the design and implementation of erosion & sediment control measures eliminates the potential impact to any erodible soils. The site plan with proposed watershed boundaries is included as Figure 3 in Appendix 1.

The hydrologic and hydraulic analysis was performed by delineating the tributary watershed to the design point and then dividing these tributary areas into relatively homogeneous subareas. The separation of the watershed into subareas was dictated by watershed conditions, methods of collection, conveyance and points of discharge. Watershed characteristics for each subarea were then assessed from topographical maps, soil surveys, site investigations and land use maps.

5.1.1 EXISTING CONDITIONS

The existing watershed within the site and areas contributory to the site's discharge location were divided into two (2) distinct drainage areas with two (2) separate design points. A design point represents the point at which stormwater, generated within a watershed, will exit the project site via either sheet flow along a linear boundary or as a point discharge. The existing property is bisected by a ridge just south of the NYSDEC Wetland GO-13. This ridge defines the two distinct drainage areas. The southern drainage area (Design Point "A") is the larger area and has a distinct design point where the majority of the property drains to a centralized stream (Beaverdam Brook [NYSDEC Class "A"]) which traverses the site from North to South and exits the site through an existing culvert beneath the

adjacent railroad bed. The northern drainage area (Design Point “B”) collects runoff and discharges from the site to the east through an existing culvert beneath the existing farm driveway. Figure 3 in Appendix 1 identifies the subareas and their corresponding design points. The characteristics of each of the existing subareas of this watershed are detailed within Table 1 below.

The sub-areas were delineated and a contributory area, a curve number (CN) and time of concentration (Tc) was determined for each sub-area. Calculations for the CN's and Tc's are included in Appendices 3 and 4, respectively. It should be noted that the total contributory area includes off-site areas where appropriate and therefore, the total drainage area size differs from the project development area.

TABLE 1: EXISTING DRAINAGE AREA CHARACTERISTICS

DRAINAGE AREA DESIGNATION	DRAINAGE AREA SIZE (Ac.)	CN	Tc (min)
EX – A	102.47	64	63.60
EX – B	26.67	82	41.40
TOTAL	129.14		

The watershed responses to the 1-, 10- and 100-year 24-hour storm events were computed and evaluated at the two (2) design points. The peak rates of runoff at each design point are presented in Table 9. Stormwater computations are attached at the end of this report in Appendices 7, 8 and 9.

5.1.2 PROPOSED CONDITIONS

For the proposed conditions analysis, the two existing watersheds were broken into a post-development network consisting of eight (8) subareas and four (4) stormwater facilities while maintaining the same two Design Points. The subareas under the proposed development are identified in Figure 4. The characteristics of each proposed subarea are detailed in Table 2 below. It is noted that the total contributory area to each design

point includes off-site areas and therefore, the total drainage area size differs from the project development area.

TABLE 2: PROPOSED DRAINAGE AREA CHARACTERISTICS

DRAINAGE AREA DESIGNATION	DRAINAGE AREA SIZE (Ac.)	CN	Tc (min)
PR – A1	39.49	75	52.80
PR – A2A	4.28	92	6.60
PR – A2B	2.99	82	5.40
PR – A3	0.85	91	6.60
PR – A4	55.78	65	58.20
PR – B1	24.00	80	41.40
PR – B2	1.41	86	4.20
PR – B3	0.34	65	9.00
TOTAL	129.14		

5.2 WATER QUALITY VOLUME

The second step of the stormwater site planning process is determination of the required water quality treatment volume (WQ_v). WQ_v is calculated using the 90% Rule as defined by NYSDEC Stormwater Management Design Manual. The 90% Rule is defined as:

$$WQ_v = [(P)(R_v)(A)] / 12$$

Where: P is the 90% Rainfall Event Number
 R_v is equal to 0.05 + 0.009*I
 I is the Impervious Cover in percent
 A is the subarea total acreage

The WQ_v was calculated for both watersheds encompassing the entire project site and off-site areas. The results of the WQ_v calculations are included in Table 3 below.

TABLE 3: REQUIRED WATER QUALITY VOLUMES

WQ_v (Ac-ft)
2.565

5.3 RUNOFF REDUCTION VOLUME

Step three of the stormwater site planning process is the incorporation of “green infrastructure technologies” and standard SMP’s with runoff reduction volume (RR_v) capacity. The intended result of RR_v, is to treat 100% of the WQ_v and replicate pre-development hydrology, however if unattainable, provide the minimum RR_v required and provide additional treatment for the remaining WQ_v. Each of the following green technologies and standard SMP’s with RR_v capacity were analyzed for implementation along with an explanation of how they are used or unable to be used on this project. The location of the green technologies used are shown on Figure 5.

Green Technologies

- Conservation of Natural Areas
 - There is a significant portion of the total property being that will remain as open space, however due to the fact that the majority of the contributory area to the open space will already be routed through and treated by another stormwater practice prior to reaching the open space area, conservation of natural areas will not be utilized on this project.
- Sheet flow to Riparian Buffers / Filter Areas
 - As all areas suitable for a riparian buffer and filter areas have been accounted for in other green technologies, the implementation for this practice is not proposed.
- Vegetated Open Swales
 - The proposed plan incorporates the use of curbed roadway and parking areas to direct and collect stormwater runoff and therefore vegetative swales were not utilized.
- Tree Planting / Tree Box
 - The site design proposes a landscaping plan however this landscaping will be utilized for aesthetic purposes only and will not be designed to incorporate stormwater quality treatment.

- Disconnection of Rooftop runoff
 - Due to a lack of filter strips or grassed areas uphill of the stormwater conveyance paths, the rooftop runoff from the proposed buildings will be directed towards catch basins.
- Stream Daylighting
 - There are no culverted/piped streams on-site therefore this technology is not applicable to this project.
- Rain Gardens
 - Due to the fact that most of the tributary drainage areas consist of areas greater than 1,000 sq.ft., rain gardens could not be utilized as a green technology on this project.
- Green Roof
 - As all the areas of the proposed development, including all new rooftop areas, have been accounted for in other green technologies, the implementation of this practice is not proposed.
- Stormwater Planters
 - Stormwater planters are suitable for small runoff areas such as rooftops or plaza and courtyards. Stormwater planters work very well within urban redevelopment projects with appropriate soils. This project is utilizing other technologies for treatment of rooftop runoff; therefore, the green technology of stormwater planters was not implemented.
- Rain Tanks/Cistern
 - Rain Tanks and cisterns are well-suited to treat runoff from small rooftop areas. Due to the expansive building footprints proposed, the implementation of rain tanks/cisterns is not proposed.
- Porous Pavement
 - Porous pavement was not considered as areas eligible for porous pavement have already been considered under a different runoff reduction practice.
- Soil Restoration

- Soil restoration measures must be applied to all areas of disturbance that will be re-established as non-impervious cover to recover the original properties and porosity of the soil to the greatest extent practical. Soil restoration techniques and requirements are discussed further in Section 5.6 of this report.

Standard SMP's with RR_v Capacity

- Infiltration Practice
 - Extensive on-site soil testing was completed including deep test pits and standard infiltration percolation testing in accordance with the standards set forth in NYSDEC's NYSSMDM Appendix D. The results indicated that there are suitable soil conditions present and the utilization of infiltration systems are proposed as stormwater management facilities. Infiltration tests, test pit information and a location map for basins A2 and B3 can be found in Appendix 11. Rates for infiltration basin B3 were ranged from 0.5 in/hr to 14.2 in/hr, whereas infiltration basin A2 ranged from 4 to 24 in/hr. The fastest and slowest infiltration rate for each facility was omitted and an average of the remaining infiltration rates was use for each facility. Basin B3 was analyzed with an average infiltration rate of 1.83 in/hr and basin A2 was analyzed with an average infiltration rate of 20.92 in/hr. Testpits were performed in each basin to determine depth to bedrock and/or groundwater. One of the basins B3 testpits resulted in groundwater at a depth of 5'-6". This test pit was performed at an existing elevation of ±371.0. Therefore, the bottom of the infiltration facility was design with a bottom of 369.0 to maintain the required 3-foot separation to groundwater. The testpits for basin A2 resulted in depths to bedrock of 2.5 feet and 4 feet. These testpits were performed at a surface election of ±360.0. The basin design was revised to away from the testpit with rock at a depth of 2.5 feet and the bottom has been designed at an elevation of 359.0 to maintain the required 3-foot separation to bedrock.
- Bio-Retention Practice

- A bio-retention facility was not implemented on this site due to RR_v credit limitations set forth by the NYSDEC manual relative to on-site soils. The use of other filtering practices such as infiltration basins are being utilized.
- Dry Swale (Open Channel Practice)
 - Dry swales were not utilized for this project as all areas of proposed development have been accounted in other green technologies.

The RR_v for each of the green technologies used has been calculated for the point of analysis. The total RR_v was calculated and compared to the WQ_v for the design point. The minimum RR_v is based upon the hydrological soil group (HSG) classification within the watershed and is defined a Specific Reduction Factor (S). The reduction factors for each HSG are shown below in Table 4.

TABLE 4: SPECIFIC REDUCTION FACTOR (S)*

HSG	S
A	0.55
B	0.40
C	0.30
D	0.20

* Watersheds with multiple HSG's shall utilize a weighted average

RR_{v MIN} was calculated for each watershed in accordance with the following formula:

$$RR_{v \text{ MIN}} = [(P)(0.95)(S)(I)] / 12$$

The total calculated RR_v provided is compared to the RR_{v MIN} to ensure that the green technologies proposed are providing the minimum reduction of the WQ_v as required. The RR_{v MIN} and the total RR_v provided along with the revised WQ_v are shown below in Table 5. The revised WQ_v is calculated using the 90% rule as noted in Section 5.2 above, however, the contributory area and impervious area are reduced through the application of green technologies that have been utilized. The calculations for the required and adjusted water quality volumes along with the runoff reduction volumes calculations are shown in Appendix 5.

TABLE 5: RUNOFF REDUCTION VOLUMES & REVISED WQ_v

RR_v MIN	Total RR_v (Provided)	Revised WQ_v
0.643	0.643	1.850

5.4 APPLICATION OF STANDARD SMP'S FOR THE REVISED WQ_v

The RR_v does reduce the required WQ_v treatment for the watershed however, it does not completely eliminate the need to provide treatment through standard stormwater management practices. Continuing with the stormwater site planning process, step four is to ensure treatment for the remaining WQ_v is provided. The WQ_v provided within each proposed stormwater management practice as shown below in Table 6.

TABLE 6: WQ_v PROVIDED IN STANDARD SMP'S

SMP	WQ_v Provided (Ac-ft)
Forebay A1	1.985
Extended Detention Permanent Pool A1	4.775
Forebay A2-A	0.459
Forebay A2-B	0.287
Forebay A3	0.118
Pocket Pond Permanent Pool A3	0.179
Forebay B3	0.126
TOTAL:	7.929

5.5 VOLUME AND PEAK RATE CONTROL

The fifth and final step of the stormwater site planning process is to apply volume and peak rate control as necessary through the use of standard stormwater management practices. In preparing the SWPPP, it was determined that on-site stormwater facilities including a pocket pond, infiltration basins, and a wet extended detention pond will be necessary to mitigate the potential increase in peak stormwater runoff rates from the proposed site improvements.

The following NYSDEC stormwater design criteria are achieved:

- The stormwater pond is not located within jurisdictional waters.

- A forebay has been provided for each inflow point.
- Outlet protection has been provided at the pond outfall for discharges to daylight through rip-rap flow dispersion.
- Pond forebays are created by an earthen berm.
- The forebays are designed to contain a minimum of 50% of the WQ_v .
- Access to the stormwater ponds for maintenance has been provided.
- A fixed sediment marker shall be installed in each forebay and permanent sediment basin to measure sediment deposition through time.
- Pond side slopes are designed at 4:1 or a safety bench is provided.
- A detailed landscaping plan for each facility has been incorporated into the design.
- A non-clogging low flow orifice has been incorporated into the design.
- The outlet structure will be located within the embankment for maintenance access and safety.
- A pond drain will be installed to drain the permanent pool to the greatest extent practical in an emergency. Should the permanent pool be unable to be completely drained, a portable pump will be required to drain the remaining water.
- An adjustable gate valve shall be installed on the pond drain within the outlet structure.

5.5.1 CHANNEL PROTECTION VOLUME

The required volume control consists of Channel Protection Volume (Cp_v) which is designed to protect downstream channels from erosion. The Cp_v is achieved through providing extended detention of the 1-year storm event for any volume not previously reduced through runoff reduction volume reduction (RR_v), for a period of 24 hours. The calculated 1 year storm event runoff volume along with the required Cp_v volume provided are shown in Table 7. If the timeframe of 24 hours cannot be met with a resulting

extended detention, then the facility shall utilize a 3" extended detention orifice which will be a 3" diameter reverse pipe. The C_{pv} detention time is shown in Table 8 below and the calculated results are shown in Appendix 9.

TABLE 7: CALCULATED CHANNEL PROTECTION VOLUMES (C_{PV})

BASIN	1-Yr Runoff Volume (Ac-ft)	RR_v Provided (Ac-ft)	C_{p_v} Required (Ac-ft)	C_{p_v} Provided (Ac-ft)
A1	1.100	0.000	1.100	9.307
A3	0.123	0.000	0.123	0.271

TABLE 8: C_{PV} EXTENDED DETENTION TIMES

FACILITY	C_{p_v} ED Time (hrs)
A1	24.73
A3	13.30*

* Facilities with extended detention times less than 24 hours will utilize a minimum 3" orifice as required

5.5.2 PEAK RATE CONTROL

The peak discharge rate is controlled utilizing the storage volume available in the stormwater pond and controlling discharge through an overflow weir. The watershed responses to the 1-, 10- and 100-year - 24-hour storm events were computed and evaluated at the aforementioned design points. The peak rates of runoff realized at the design points are presented in Table 9 below. Stormwater computations are attached as Appendices 7, 8 and 9. The total peak runoff rates at the design point for the existing condition as well as the final proposed condition have been calculated and listed below in Table 9. The peak runoff rates have been reduced in the proposed conditions during the 1-, 10- and 100-year design storms for all drainage areas on site.

TABLE 9: SUMMARY OF RESULTS AT THE DESIGN POINTS

Criteria		Design Point A	Design Point B
1 – YEAR (Cpv)	Existing (cfs)	9.32	16.39
	Proposed (cfs)	6.048	13.04
	Reduction (cfs)	-3.272	-3.35
	Reduction (%)	-35.11%	-20.44%
Pe	Existing (cfs)	60.88	43.61
	Proposed (cfs)	37.67	38.21
	Reduction (cfs)	-23.21	-5.40
	Reduction (%)	-38.12%	-12.38%
100 – YEAR (Qf)	Existing (cfs)	190.9	93.93
	Proposed (cfs)	154.0	84.69
	Reduction (cfs)	-40.5	-9.24
	Reduction (%)	-21.22%	-9.84%

Since the runoff rates have been decreased in the post-development condition, there will be no adverse impact to the downstream receiving waters. Therefore, the SWPPP designed for the RDM Warehouses - 230 Neelytown Road will accomplish the intent of its design.

5.6 SOIL RESTORATION

Soil restoration is intended to recover the original properties and porosity of the soil to the greatest extent practicable. Soil restoration measures shall be applied to any disturbed area within the project prior to establishment of permanent vegetation and installation of landscaping. Any proposed impervious areas do not require soil restoration measures. Soil restoration measures such as tilling allows for compacted soil to gather oxygen and create temporary and even permanent air voids and when combined with the incorporation of organic material, greatly improves the soils characteristics to temporarily store water and subsequent runoff reduction through infiltration and evapotranspiration.

Various soil disturbance activities related to construction of land development within various soil types and the associated minimum required soil restoration techniques are shown in Table 10.

TABLE 10: SOIL RESTORATION REQUIREMENTS

Type of Soil Disturbance	Soil Restoration Requirement		Comments / Examples
No Soil Disturbance	Restoration not permitted		Preservation of Natural Features
Minimal Soil Disturbance	Restoration not required		Clearing and Grubbing
Areas where topsoil is stripped only – NO change in grade.	HSG A & B	HSG C & D	Protect Areas from any ongoing construction activities.
	Apply 6" of topsoil	Aerate* and apply 6" of topsoil	
Areas of cut or fill	HSG A & B	HSG C & D	
	Aerate* and apply 6" of topsoil	Apply full Soil Restoration*	
Heavy traffic areas on site (especially in a zone 5'-25' around buildings, but not within the 5' perimeter around the foundation walls)	Apply full Soil Restoration** (de-compaction and compost enhancement)		
Areas where Runoff Reduction and/or Infiltration Practices are applied.	Restoration not required, but maybe applied to enhance the reduction specified for appropriate practices		Keep construction equipment from crossings these areas. To protect newly installed practice from any ongoing construction activities construct a single-phase operation fence area.
Redevelopment projects	Soil restoration is required on redevelopment projects in areas where existing impervious area will be converted to pervious area		

* Aeration includes the use of machines such as tractor-drawn implements with coulters making a narrow slit in the soil, a roller with many spikes making indentations in the soil, or prongs which function like a mini-subsoiler.

** Per "Deep Ripping and De-compaction Guidelines", NYSDEC 2008

6.0 EROSION AND SEDIMENT CONTROL MEASURES

Soil erosion and sediment control measures have been detailed on the plans and outlined herein. The following are general measures that should be implemented:

- a. Damage to surface waters resulting from erosion and sedimentation shall be minimized by stabilizing disturbed areas and by removing sediment from construction site discharge.
- b. Following the completion of construction activities in any portion of the site, permanent vegetation shall be re-established on all exposed soils within 14 days. Also, in areas where construction will temporarily cease for 21 days or more, the site shall be stabilized within 7 days of the last construction activity. After completion of final rough grading, topsoil shall be spread to a depth of 6 inches or more and tested for nutrient and soil composition. The topsoil shall be amended as necessary to encourage successful growth of proposed vegetation.
- c. Site preparation activities shall be planned to minimize the area and duration of soil disturbance. The project is proposed to be built in phases limiting the amount of disturbance at any one time, however; it has been determined that there will be an extensive amount of earthwork required (i.e. cuts and fills greater than 10'), resulting in the necessity of greater than five acres to be disturbed at any one time. The proposed plan for buildings greater than 5 acres in size alone results in the movement of large amounts of material within a single phase to be stockpiled and/or spread and compacted in another phase or phases for use as fill material in a subsequent phase(s).

The phasing plan developed includes the following phases and areas. Phase 1 shall consist of construction of the private roadway, associated stormwater facilities (a2 & b3), and the wetland mitigation area. The roadway construction shall consist of earthwork cuts and fills as necessary to establish subgrade. All subsurface stormwater infrastructure shall be installed per the plan design to the stormwater management facilities. Care shall be taken to ensure that the infiltration basin is not cut to final grade during construction and shall only be cut to final grade upon stabilization of the roadway and all roadway

embankments. The wetland mitigation area shall be constructed in accordance with the NYSDEC approved mitigation plans.

Phase 2 shall consist of lot 1 construction which includes the 100,000 sf building, associated parking and loading areas, individual subsurface septic system, the water service line from the drilled well and required stormwater facilities (a3). Phase 2 shall be completed in two sub phases. Phase 2-1 will consist of the watermain being stubbed from the well site around the NYSDEC wetland and the construction of stormwater facilities a3-1, a3-2 & a3-3. Care shall be taken to ensure that the infiltration basin is not cut to final grade during construction and shall only be cut to final grade upon stabilization of the building, roadway, parking and loading areas for lot 1.

Phase 3 shall consist of lot 2 construction which includes the 245,000 sf building, associated parking and loading areas, individual subsurface septic system, the water service line from the drilled well and required stormwater facilities (a1). Phase 3 shall be completed in four sub phases. Phase 3-1 will consist of the construction of stormwater facility a1. Phase 3-2 will consist of the lot 2 access driveway up to the employee parking area. Phase 3-3 will consist of the construction of the 245,000 sf building along with associate parking and loading areas. Phase 3-4 will consist of construction of the individual subsurface septic system.

In an attempt to balance the site with regards to earth movement, there will be a need to have greater than 5 acres disturbed at any one time during phase 2 and phase 3 due to the size of the buildings and the required cuts & fills. Earth will be moved from lot 1 and stockpiled on lot 2 for future use in the development of lot 2. Phase 3 which consists of the construction of the 245,000 sf building (which is self is > 5ac.) Will require an area larger than 5 acres to be disturbed to accomplish the large amounts of cuts and fills. (additional stormwater management measures and are detailed on sheet c-304) below are the additional requirements for sites with greater than 5 acres of disturbance at any one time:

- the required site inspections by the qualified inspector shall occur two (2) times every seven (7) days with a minimum of two (2) full days between inspections.
- in areas where disturbance has temporarily or permanently ceased, stabilization shall be implemented within seven (7) days from the ceasing of soil disturbance activity.

As many of the phases will require disturbance of the same area in multiple phases, the total disturbance of all the phases will be greater than the actual disturbance. As construction progresses within each phase, disturbed areas will be stabilized and in an attempt to achieve continuity of construction and maximize efficiency of earthwork, utilities, paving, etc., there are several areas that will be disturbed in multiple phases and have been accounted for in the overall disturbance area of each phase. The total area of disturbance is ± 33.34 ac. But as noted previously each phase may contain overlapping areas.

The maximum disturbance area in each of the construction phasing areas are as follows:

Phase 1 - ± 4.529 ac.
Phase 2 - ± 8.954 ac.
 Phase 2A: ± 2.544
 Phase 2B: ± 6.034
Phase 3 - ± 20.773 ac.
 Phase 3A: ± 5.643
 Phase 3B: ± 1.090
 Phase 3C: ± 15.406
 Phase 3D: ± 0.344

The plans approved for construction contains a detailed “Erosion Control Plan(s)” which depicts the limits of grading along with the required earth cut and fill locations (including stockpile (topsoil and excess material) locations if necessary). In addition, site specific phased erosion control measures required are shown on the approved plans for construction. In accordance with the NYSDEC GP-0-20-001 permit, a waiver shall be requested of and applied for to the MS4 to have an earth disturbance greater than the five-acre threshold.

Permanent traffic corridors shall be established and “routes of convenience” shall be avoided. Off-site sediment tracking shall be minimized through regularly scheduled sweeping and good housekeeping of construction vehicles.

- d. Additional measures shall be implemented for any site work occurring during the “winter months period” which generally consists of November 15th through April 1st. The additional measures shall be in accordance with the Standards and Specifications for Winter Stabilization as detailed in the New York State Standards and Specifications for Erosion Control, latest edition, as published by the New York State Department of Environmental Conservation.
- e. To provide additional protection from debris, suspended solids and potential oils and greases from surface runoff, catch basin inserts model FloGard +Plus as manufactured by Oldcastle Infrastructure shall be installed at all catch basins within the proposed development to collect potential contaminants during stormwater runoff and prevent these contaminants from discharging into downstream waterbodies. The FloGard +Plus is capable of removing up to 80% of total suspended solids (TSS), 70% of oils and grease, and 40% of total phosphorus (TP). The FloGard +Plus inlet filter utilizes a “Fossil Rock” absorbent pouches that will all collect polycyclic aromatic hydrocarbons (PAH) from any inadvertent oil spill and/or leak. The Fossil Rock absorbent pouches utilize a rubberizer to transform any potential hydrocarbons into a rubber like solid that will not be discharged from the inlet filter. Regular maintenance of the inserts shall be performed in accordance with the Manufacturer’s recommendations to ensure the proper function of the water quality measure.
- f. The proposed roadways, access drives, parking and loading areas are all proposed to be curbed, therefore any salt or other de-icing agent utilized will be collected through the stormwater infrastructure system and not be discharge directly on to any pervious or neighboring property. The common use and maintenance agreement between the two lot owners will require that a contract with a private snow removal company be agreed upon for plowing the roadway and any common access drives, parking and/or loading areas during winter

months. Salt or other de-icing agents will only be utilized as necessary and will be brought to the site by the contractor as needed but will not be permitted to be stored on-site. Stormwater from roadways and parking areas will flow into stormwater facilities for treatment prior to discharge offsite.

- g. A qualified professional shall inspect and log the erosion and sediment control measures once every seven days once earth disturbance has commenced and continue until the site has achieved final stabilization in accordance with the requirements. During times of possible inactivity (i.e. winter months), upon the site being temporarily stabilized, the professional shall perform inspections monthly. The professional shall make recommendations to the operator on how to maintain the integrity and function of all temporary erosion control measures throughout the duration of the development process. Any deficiencies in the measures shall be corrected as soon as possible by the operator.
- h. An up to date Construction Site Log Book which includes this SWPPP for RDM Warehouses - 230 Neelytown Road shall be maintained on site at all times during construction. The Construction Site Log Book shall include at a minimum the following items:
 - SPDES General Permit for Stormwater Discharges (Permit No. GP- 0-20-001)
 - A copy of the Final (or updated if revised) SWPPP
 - A copy of the Final (or updated if revised) Site Plans
 - A copy of the Notice of Intent (NOI)
 - A copy of the MS4 Signoff (if applicable)
 - A copy of the 5 acre waiver from the MS4 (if applicable)
 - A copy of the Acknowledgement of the NOI from the NYSDEC
 - Owner & Contractor Certifications
 - Copies of all erosion & sediment control inspections

In particular, the following measures will be implemented:

- a. Pre-Construction Installation: Prior to any disturbance on site, silt fence shall be installed in accordance with the approved plans in the area of the first phase. Prior to commencement of any subsequent phase, silt fence shall be installed in the proper phase in accordance with the approved plans. Siltation barriers

shall be maintained in good condition and reinforced, extended, repaired or replaced as necessary.

- b. In no case shall erodible materials be stockpiled within 25 feet of any ditch, stream or other surface water body.
- c. Permanent vegetative cover: Immediately following the completion of construction activity in any portion of the site, permanent vegetation shall be established on all exposed soils by properly seeding at a coverage rate as noted on the approved plans and covered with straw. Water shall be applied to newly seeded areas as needed until grass cover is well established.
- d. Washouts shall be immediately repaired, reseeded and protected from further erosion. All accumulated sediment shall be removed and contained in appropriate spoil areas. To effectively control wind erosion, water shall be applied to all exposed soils as necessary

7.0 LONG TERM MAINTENANCE OF WATER QUALITY FEATURES

Upon completion of the project, the ownership and maintenance of the stormwater facilities shall be a combination of private individual and joint ownership and maintenance responsibilities. Stormwater Facilities B2 and A3 are designed to handle and treat runoff from the proposed private roadway and therefore shall be maintained jointly by the owners of Lots 1 and 2. Stormwater Facilities B2 and A3 are located within the proposed private road right of way or within an easement granting the joint entity the ability to access and maintain the facility. Stormwater Facility A2 is located on Lot 1 and Lot 2 and will be shared maintenance between the two lot owners through an agreement and through easements. Stormwater Facility A1 will be owned and maintained by the Owner of Lot 2. The responsible entity shall be responsible to ensure that the facilities operate and function as designed through proper maintenance as follows.

- a. Regular inspection and maintenance of the proposed facilities is required to ensure its long-term water quality and quantity reduction functions. Maintenance requirements for the pond and bio-retention area are as follows:

- i. The forebay of each facility shall have accumulated sediment removed every five to six years or when the accumulation level has reached 50% of the forebay capacity. The 50% level will be measured and indicated by the permanent sediment marker installed in the forebay and permanent sediment basin.
 - ii. All catch basins and outlet structures shall be inspected annually for debris and operability. Any deficiencies shall be repaired or removed immediately.
 - iii. All catch basin inserts shall be maintained in accordance with the manufacturer's suggestions but no less than the following
 - 1. Inspected for debris (and removed in accumulation is evident)
 - a. At least three times per year (i.e. 1 once every 4 months)
 - b. Prior to the first snowfall and after all snow melt has occurred.
 - c. After significant rain fall events.
 - iv. The side slopes of all facilities shall be mowed at a minimum of twice a year.
 - v. Catch basins shall be vacuum cleaned once every three years or if determined necessary upon visual inspection.
 - vi. The facilities and conveyance components shall be inspected every 6 months and after every rainfall event of 1" or more. The inspection should focus on sedimentation and erosion or damage to the facility. Sediment must be removed every five years or when it accumulates to a depth of 6 inches. Trash and debris shall be removed from the facility as necessary. In addition, mulching shall be replaced at a minimum of every three years or at such time that the filter media becomes exposed.
- b. Additional maintenance measures during the "winter months" time frame of November 15th through April 1st including but not limited to the following:
- i. Bi-weekly inspection of winter stabilization methods and repair and/replace as necessary to ensure proper function.

- ii. All exposed soils that are in areas with no proposed disturbance within 3 days shall be stabilized through establishing vegetation if possible, others covered with straw, mulch, rock and/or a rolled erosion control product.
- c. A removeable trash rack to be provided on permanent outlet structure tops.
- d. The property owners shall retain the services of a licensed professional engineer on a yearly basis to perform an inspection of all stormwater facilities. The inspection shall include a written report of the findings of the current operation of the stormwater facilities and any items in need of repair and/or maintenance. The requirement of this annual inspection shall be included in the common maintenance agreement and a copy of the annual inspection report shall be provided to the Town of Hamptonburgh Building Department and Town Engineer.

8.0 SUMMARY OF FINDINGS AND CONCLUSIONS

This SWPPP is designed in accordance with criteria set forth in the New York State Stormwater Management Design Manual. Post-development peak discharge rates will be reduced below pre-development peak discharge rates, or their impacts are minimized. Sediment and erosion control measures are designed to minimize erosion loss and downstream sediment deposits.

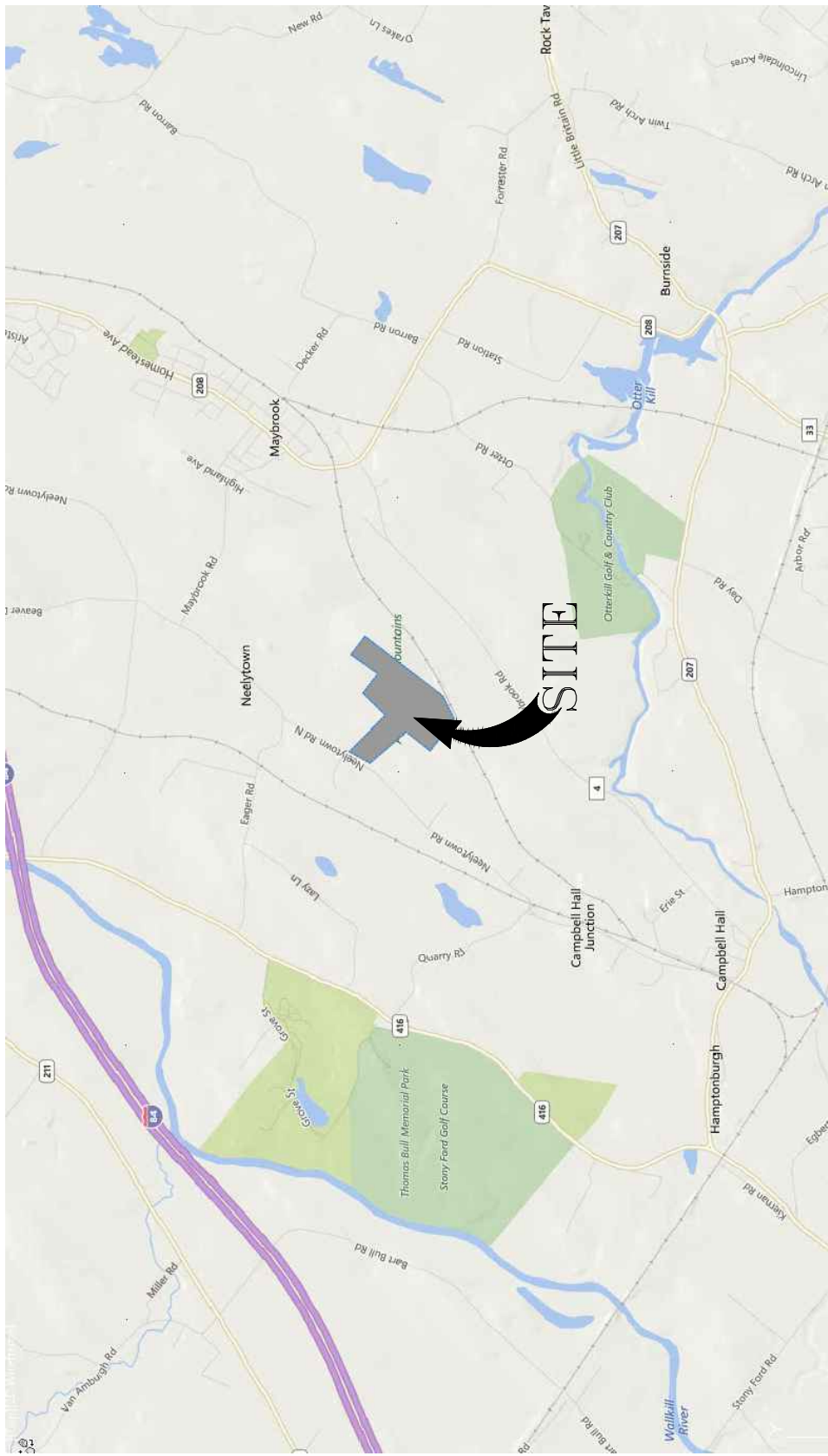
This SWPPP has been prepared by a professional engineer and is conformance with all the requirements set forth by the NYSDEC GP-0-20-001 and is eligible for coverage under GP-0-20-001 five days after filing the Notice of Intent.


This page is left intentionally blank

APPENDIX 1

FIGURES

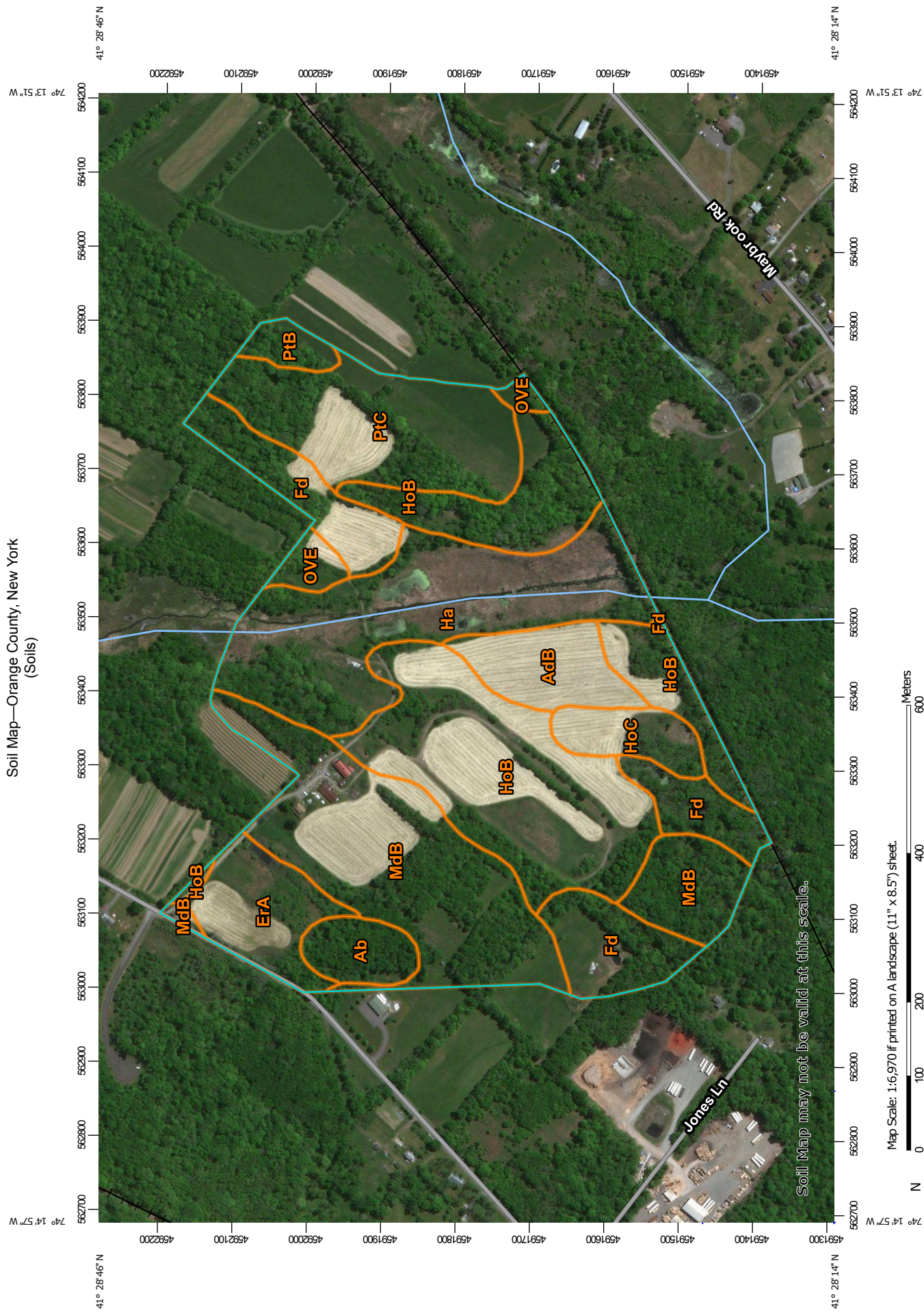
This page is left intentionally blank



SITE LOCATION MAP	RDM WAREHOUSES 230 NEELYTOWN ROAD TOWN OF HAMPTONBURGH ORANGE COUNTY, NEW YORK		DATE: 01/23/19 REV AUG '19	JOB #	1284.02		71 CLINTON STREET MONTGOMERY, NY 12549 Ph: (845) 457-7727 Fx: (845) 457-1899
			SCALE: NTS	SHEET #	F-1		

This page is left intentionally blank

Soil Map—Orange County, New York (Soils)



**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Orange County, New York
Survey Area Data: Version 19, Sep 3, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 7, 2013—Feb 26, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ab	Alden silt loam	2.9	2.4%
AdB	Allard silt loam, 3 to 8 percent slopes	5.1	4.2%
ErA	Erie gravelly silt loam, 0 to 3 percent slopes	6.1	5.0%
Fd	Fredon loam	13.1	10.8%
Ha	Halsey silt loam	19.9	16.4%
HoB	Hoosic gravelly sandy loam, 3 to 8 percent slopes	30.0	24.7%
HoC	Hoosic gravelly sandy loam, 8 to 15 percent slopes	3.3	2.7%
MdB	Mardin gravelly silt loam, 3 to 8 percent slopes	24.1	19.9%
OVE	Otisville and Hoosic soils, steep	1.8	1.5%
PtB	Pittsfield gravelly loam, 3 to 8 percent slopes	1.5	1.3%
PtC	Pittsfield gravelly loam, 8 to 15 percent slopes	13.4	11.0%
Totals for Area of Interest		121.3	100.0%

Orange County, New York

Ab—Alden silt loam

Map Unit Setting

National map unit symbol: 9vtc

Elevation: 300 to 1,500 feet

Mean annual precipitation: 42 to 52 inches

Mean annual air temperature: 46 to 52 degrees F

Frost-free period: 135 to 215 days

Farmland classification: Not prime farmland

Map Unit Composition

Alden and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alden

Setting

Landform: Depressions

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: A silty mantle of local deposition overlying loamy till

Typical profile

H1 - 0 to 9 inches: silt loam

H2 - 9 to 36 inches: silt loam

H3 - 36 to 60 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Very poorly drained

Capacity of the most limiting layer to transmit water (Ksat):

Moderately low to moderately high (0.06 to 0.57 in/hr)

Depth to water table: About 0 inches

Frequency of flooding: None

Frequency of ponding: Frequent

Calcium carbonate, maximum in profile: 1 percent

Available water storage in profile: High (about 9.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 5w

Hydrologic Soil Group: C/D

Hydric soil rating: Yes

Minor Components

Canandaigua

Percent of map unit: 5 percent

Landform: Depressions

Hydric soil rating: Yes

Erie

Percent of map unit: 5 percent

Landform: Depressions

Hydric soil rating: No

Wayland

Percent of map unit: 5 percent

Landform: Flood plains

Hydric soil rating: Yes

Carlisle

Percent of map unit: 5 percent

Landform: Swamps, marshes

Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Orange County, New York

Survey Area Data: Version 19, Sep 3, 2018

Orange County, New York

AdB—Allard silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9vtg

Mean annual precipitation: 42 to 52 inches

Mean annual air temperature: 46 to 52 degrees F

Frost-free period: 135 to 215 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Allard and similar soils: 75 percent

Minor components: 25 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Allard

Setting

Landform: Terraces, alluvial fans, outwash plains

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Tread

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Silty eolian, glaciolacustrine, or old alluvial deposits over sandy and gravelly glaciofluvial deposits

Typical profile

H1 - 0 to 9 inches: silt loam

H2 - 9 to 35 inches: silt loam

H3 - 35 to 60 inches: stratified coarse sand

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat):

Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: B

Hydric soil rating: No

Minor Components

Hoosic

Percent of map unit: 5 percent

Hydric soil rating: No

Chenango

Percent of map unit: 5 percent

Hydric soil rating: No

Oakville

Percent of map unit: 5 percent

Hydric soil rating: No

Scio

Percent of map unit: 5 percent

Hydric soil rating: No

Unadilla

Percent of map unit: 5 percent

Hydric soil rating: No

Data Source Information

Soil Survey Area: Orange County, New York

Survey Area Data: Version 19, Sep 3, 2018

Orange County, New York

ErA—Erie gravelly silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 9vv8

Mean annual precipitation: 42 to 52 inches

Mean annual air temperature: 46 to 52 degrees F

Frost-free period: 135 to 215 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Erie and similar soils: 75 percent

Minor components: 25 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Erie

Setting

Landform: Drumlinoid ridges, hills, till plains

Landform position (two-dimensional): Footslope, summit

Landform position (three-dimensional): Base slope

Down-slope shape: Concave

Across-slope shape: Linear

Parent material: Loamy till derived from siltstone, sandstone, shale, and limestone

Typical profile

H1 - 0 to 10 inches: gravelly silt loam

H2 - 10 to 18 inches: channery silt loam

H3 - 18 to 56 inches: channery silt loam

H4 - 56 to 70 inches: channery silt loam

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: 10 to 21 inches to fragipan

Natural drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat):

Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 6 to 18 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 15 percent

Available water storage in profile: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: D

Hydric soil rating: No

Minor Components

Bath

Percent of map unit: 5 percent

Hydric soil rating: No

Alden

Percent of map unit: 5 percent

Landform: Depressions

Hydric soil rating: Yes

Swartswood

Percent of map unit: 5 percent

Landform: Depressions

Hydric soil rating: No

Mardin

Percent of map unit: 5 percent

Hydric soil rating: No

Wurtsboro

Percent of map unit: 5 percent

Hydric soil rating: No

Data Source Information

Soil Survey Area: Orange County, New York

Survey Area Data: Version 19, Sep 3, 2018

Orange County, New York

Fd—Fredon loam

Map Unit Setting

National map unit symbol: 9vvd

Elevation: 250 to 1,200 feet

Mean annual precipitation: 42 to 52 inches

Mean annual air temperature: 46 to 52 degrees F

Frost-free period: 135 to 215 days

Farmland classification: Prime farmland if drained

Map Unit Composition

Fredon, poorly drained, and similar soils: 50 percent

Fredon, somewhat poorly drained, and similar soils: 25 percent

Minor components: 25 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fredon, Poorly Drained

Setting

Landform: Valley trains, terraces

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Tread

Down-slope shape: Concave

Across-slope shape: Linear

Parent material: Loamy over sandy and gravelly glaciofluvial deposits

Typical profile

H1 - 0 to 6 inches: loam

H2 - 6 to 24 inches: very fine sandy loam

H3 - 24 to 60 inches: stratified gravelly sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat):

Moderately high to high (0.20 to 1.98 in/hr)

Depth to water table: About 0 to 12 inches

Frequency of flooding: Occasional

Frequency of ponding: None

Calcium carbonate, maximum in profile: 15 percent

Available water storage in profile: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: B/D

Hydric soil rating: Yes

Description of Fredon, Somewhat Poorly Drained

Setting

Landform: Valley trains, terraces

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Tread

Down-slope shape: Concave

Across-slope shape: Linear

Parent material: Loamy over sandy and gravelly glaciofluvial deposits

Typical profile

H1 - 0 to 6 inches: loam

H2 - 6 to 24 inches: very fine sandy loam

H3 - 24 to 60 inches: stratified gravelly sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat):

Moderately high to high (0.20 to 1.98 in/hr)

Depth to water table: About 6 to 18 inches

Frequency of flooding: Occasional

Frequency of ponding: None

Calcium carbonate, maximum in profile: 15 percent

Available water storage in profile: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: B/D

Hydric soil rating: No

Minor Components

Castile

Percent of map unit: 5 percent

Hydric soil rating: No

Chenango

Percent of map unit: 5 percent

Hydric soil rating: No

Halsey

Percent of map unit: 5 percent

Landform: Depressions

Hydric soil rating: Yes

Raynham

Percent of map unit: 5 percent

Hydric soil rating: No

Hoosic

Percent of map unit: 5 percent

Hydric soil rating: No

Data Source Information

Soil Survey Area: Orange County, New York
Survey Area Data: Version 19, Sep 3, 2018

Orange County, New York

Ha—Halsey silt loam

Map Unit Setting

National map unit symbol: 9vvf

Mean annual precipitation: 42 to 52 inches

Mean annual air temperature: 46 to 52 degrees F

Frost-free period: 135 to 215 days

Farmland classification: Not prime farmland

Map Unit Composition

Halsey and similar soils: 75 percent

Minor components: 25 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Halsey

Setting

Landform: Depressions

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Tread

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits

Typical profile

H1 - 0 to 6 inches: silt loam

H2 - 6 to 22 inches: silt loam

H3 - 22 to 60 inches: stratified very gravelly sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Very poorly drained

Capacity of the most limiting layer to transmit water (Ksat):

Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: About 0 to 6 inches

Frequency of flooding: None

Frequency of ponding: Frequent

Calcium carbonate, maximum in profile: 15 percent

Available water storage in profile: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 5w

Hydrologic Soil Group: B/D

Hydric soil rating: Yes

Minor Components

Fredon

Percent of map unit: 10 percent

Hydric soil rating: No

Chenango

Percent of map unit: 5 percent

Hydric soil rating: No

Riverhead

Percent of map unit: 5 percent

Hydric soil rating: No

Tioga

Percent of map unit: 5 percent

Hydric soil rating: No

Data Source Information

Soil Survey Area: Orange County, New York

Survey Area Data: Version 19, Sep 3, 2018

Orange County, New York

HoB—Hoosic gravelly sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9vvl

Elevation: 100 to 1,100 feet

Mean annual precipitation: 42 to 52 inches

Mean annual air temperature: 46 to 52 degrees F

Frost-free period: 135 to 215 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Hoosic and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hoosic

Setting

Landform: Deltas, outwash plains, terraces

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Tread

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Sandy and gravelly glaciofluvial deposits

Typical profile

H1 - 0 to 6 inches: gravelly sandy loam

H2 - 6 to 28 inches: very gravelly sandy loam

H3 - 28 to 60 inches: very gravelly sand

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Somewhat excessively drained

Capacity of the most limiting layer to transmit water (Ksat): High to very high (1.98 to 19.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3s

Hydrologic Soil Group: A

Hydric soil rating: No

Minor Components

Castile

Percent of map unit: 5 percent

Hydric soil rating: No

Chenango

Percent of map unit: 5 percent

Hydric soil rating: No

Oakville

Percent of map unit: 5 percent

Hydric soil rating: No

Fredon

Percent of map unit: 5 percent

Hydric soil rating: No

Data Source Information

Soil Survey Area: Orange County, New York

Survey Area Data: Version 19, Sep 3, 2018

Orange County, New York

HoC—Hoosic gravelly sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9vvm

Elevation: 100 to 1,100 feet

Mean annual precipitation: 42 to 52 inches

Mean annual air temperature: 46 to 52 degrees F

Frost-free period: 135 to 215 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Hoosic and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hoosic

Setting

Landform: Terraces, deltas, outwash plains

Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Tread

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Sandy and gravelly glaciofluvial deposits

Typical profile

H1 - 0 to 5 inches: gravelly sandy loam

H2 - 5 to 25 inches: very gravelly sandy loam

H3 - 25 to 60 inches: very gravelly sand

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Somewhat excessively drained

Capacity of the most limiting layer to transmit water (Ksat): High to very high (1.98 to 19.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: A

Hydric soil rating: No

Minor Components

Castile

Percent of map unit: 5 percent

Hydric soil rating: No

Chenango

Percent of map unit: 5 percent

Hydric soil rating: No

Oakville

Percent of map unit: 5 percent

Hydric soil rating: No

Fredon

Percent of map unit: 5 percent

Hydric soil rating: No

Data Source Information

Soil Survey Area: Orange County, New York

Survey Area Data: Version 19, Sep 3, 2018

Orange County, New York

MdB—Mardin gravelly silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2v30j

Elevation: 330 to 2,460 feet

Mean annual precipitation: 31 to 70 inches

Mean annual air temperature: 39 to 52 degrees F

Frost-free period: 105 to 180 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Mardin and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mardin

Setting

Landform: Mountains, hills

Landform position (two-dimensional): Summit, shoulder

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Loamy till

Typical profile

Ap - 0 to 8 inches: gravelly silt loam

Bw - 8 to 15 inches: gravelly silt loam

E - 15 to 20 inches: gravelly silt loam

Bx - 20 to 72 inches: gravelly silt loam

Properties and qualities

Slope: 3 to 8 percent

Percent of area covered with surface fragments: 0.0 percent

Depth to restrictive feature: 14 to 26 inches to fragipan

Natural drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)

Depth to water table: About 13 to 24 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: D

Hydric soil rating: No

Minor Components

Bath

Percent of map unit: 5 percent

Landform: Hills, mountains

Landform position (two-dimensional): Backslope, shoulder

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: No

Volusia

Percent of map unit: 5 percent

Landform: Hills, mountains

Landform position (two-dimensional): Footslope, summit

Landform position (three-dimensional): Base slope, interfluve, side slope

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: No

Lordstown

Percent of map unit: 5 percent

Landform: Hills, mountains

Landform position (two-dimensional): Summit, shoulder

Landform position (three-dimensional): Mountaintop, interfluve, crest

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Data Source Information

Soil Survey Area: Orange County, New York

Survey Area Data: Version 19, Sep 3, 2018

Orange County, New York

OVE—Otisville and Hoosic soils, steep

Map Unit Setting

National map unit symbol: 9vw4

Elevation: 100 to 1,100 feet

Mean annual precipitation: 42 to 52 inches

Mean annual air temperature: 46 to 52 degrees F

Frost-free period: 135 to 215 days

Farmland classification: Not prime farmland

Map Unit Composition

Otisville and similar soils: 40 percent

Hoosic and similar soils: 40 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Otisville

Setting

Landform: Deltas, outwash plains, terraces

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Riser

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Sandy and gravelly glaciofluvial deposits

Typical profile

H1 - 0 to 4 inches: gravelly sandy loam

H2 - 4 to 20 inches: gravelly loamy sand

H3 - 20 to 60 inches: very gravelly sand

Properties and qualities

Slope: 25 to 35 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Excessively drained

Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: A

Hydric soil rating: No

Description of Hoosic

Setting

Landform: Deltas, outwash plains, terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy and gravelly glaciofluvial deposits

Typical profile

H1 - 0 to 4 inches: gravelly sandy loam
H2 - 4 to 22 inches: very gravelly sandy loam
H3 - 22 to 60 inches: very gravelly sand

Properties and qualities

Slope: 25 to 35 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (1.98 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Barbour

Percent of map unit: 5 percent
Hydric soil rating: No

Chenango

Percent of map unit: 5 percent
Hydric soil rating: No

Oakville

Percent of map unit: 5 percent
Hydric soil rating: No

Suncook

Percent of map unit: 5 percent

Hydric soil rating: No

Data Source Information

Soil Survey Area: Orange County, New York
Survey Area Data: Version 19, Sep 3, 2018

Orange County, New York

PtB—Pittsfield gravelly loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9vw8

Elevation: 0 to 1,000 feet

Mean annual precipitation: 42 to 52 inches

Mean annual air temperature: 46 to 52 degrees F

Frost-free period: 135 to 215 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Pittsfield and similar soils: 75 percent

Minor components: 25 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pittsfield

Setting

Landform: Drumlinoid ridges, hills, till plains

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Crest

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Calcareous loamy till

Typical profile

H1 - 0 to 10 inches: gravelly loam

H2 - 10 to 34 inches: gravelly loam

H3 - 34 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat):

Moderately high to high (0.57 to 5.95 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 15 percent

Available water storage in profile: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: B

Hydric soil rating: No

Minor Components

Bath

Percent of map unit: 5 percent

Hydric soil rating: No

Charlton

Percent of map unit: 5 percent

Hydric soil rating: No

Hollis

Percent of map unit: 5 percent

Hydric soil rating: No

Mardin

Percent of map unit: 5 percent

Hydric soil rating: No

Paxton

Percent of map unit: 5 percent

Hydric soil rating: No

Data Source Information

Soil Survey Area: Orange County, New York

Survey Area Data: Version 19, Sep 3, 2018

Orange County, New York

PtC—Pittsfield gravelly loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9vw9

Elevation: 0 to 1,000 feet

Mean annual precipitation: 42 to 52 inches

Mean annual air temperature: 46 to 52 degrees F

Frost-free period: 135 to 215 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Pittsfield and similar soils: 75 percent

Minor components: 25 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pittsfield

Setting

Landform: Till plains, drumlinoid ridges, hills

Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Crest

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Calcareous loamy till

Typical profile

H1 - 0 to 9 inches: gravelly loam

H2 - 9 to 31 inches: gravelly loam

H3 - 31 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat):

Moderately high to high (0.57 to 5.95 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 15 percent

Available water storage in profile: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: B

Hydric soil rating: No

Minor Components

Bath

Percent of map unit: 5 percent

Hydric soil rating: No

Charlton

Percent of map unit: 5 percent

Hydric soil rating: No

Hollis

Percent of map unit: 5 percent

Hydric soil rating: No

Mardin

Percent of map unit: 5 percent

Hydric soil rating: No

Paxton

Percent of map unit: 5 percent

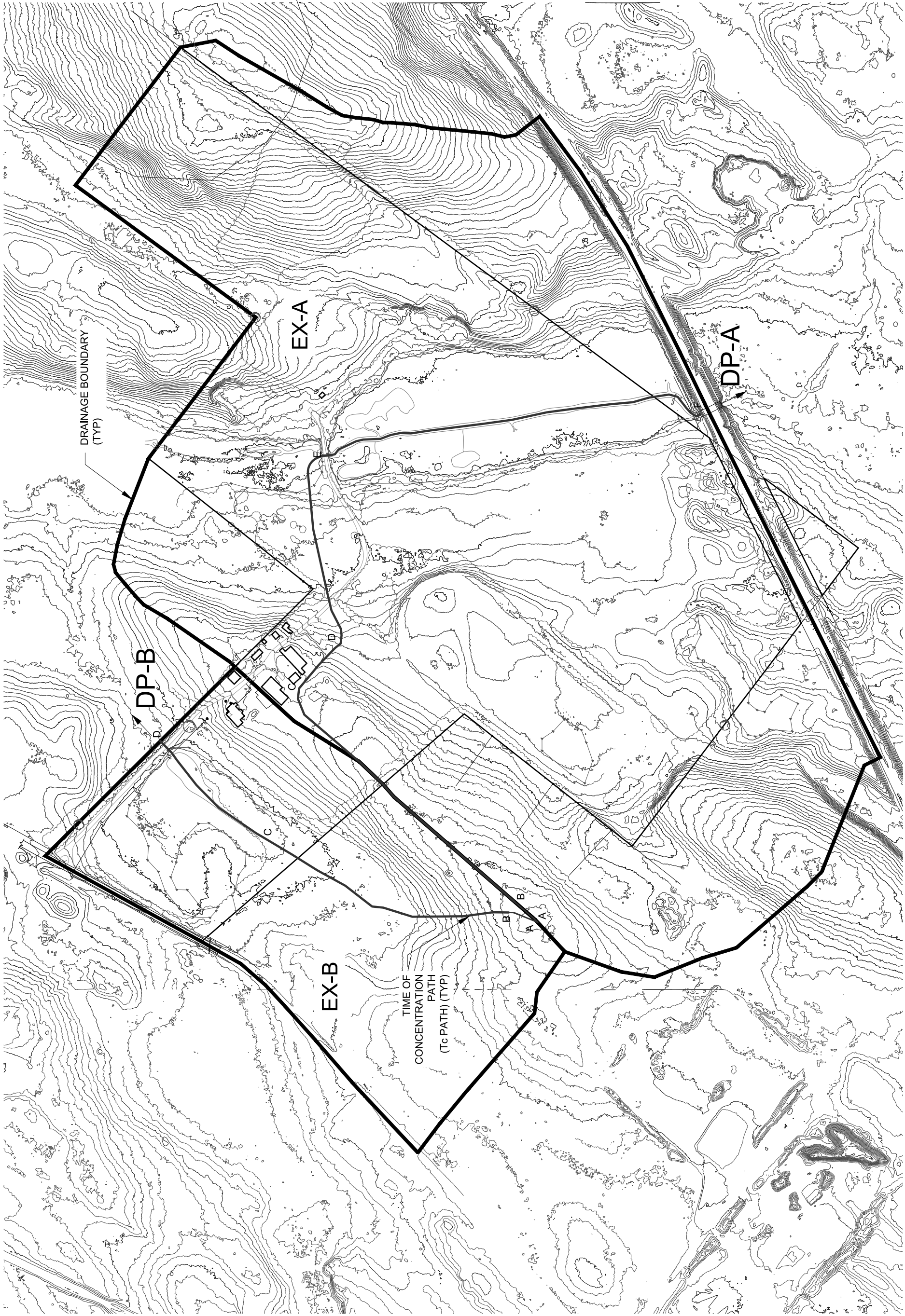
Hydric soil rating: No

Data Source Information

Soil Survey Area: Orange County, New York

Survey Area Data: Version 19, Sep 3, 2018

This page is left intentionally blank



EXISTING CONDITIONS

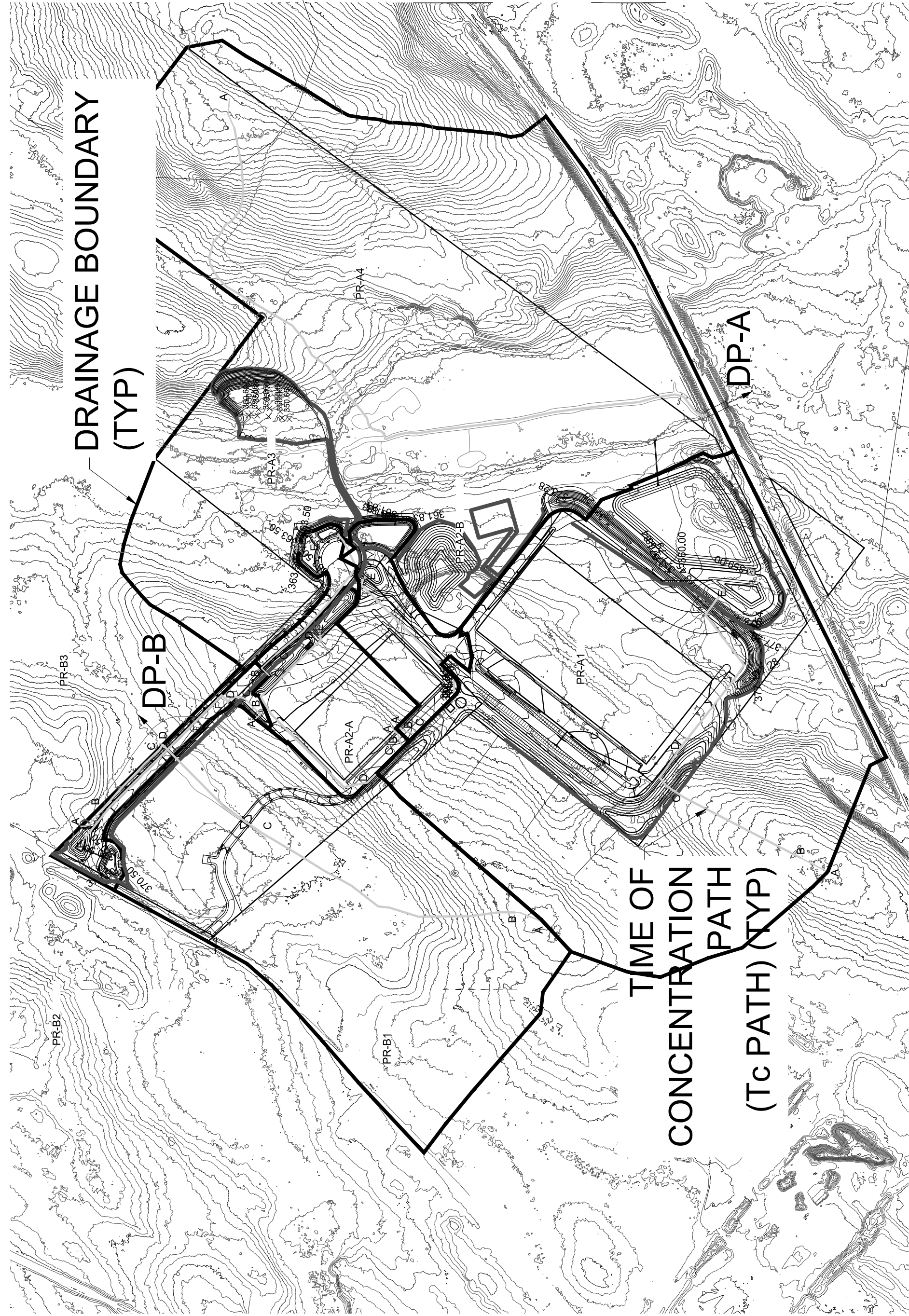
RDM WAREHOUSES
230 NEELYTOWN ROAD
TOWN OF HAMPTONBURGH
ORANGE COUNTY, NEW YORK

DATE: 01/23/19
REV AUG '19
SCALE: 1" = 300'

JOB # 1284.02
SHEET # F-3

ENGINEERING & SURVEYING
PROPERTIES
Achieving Successful Results
With Innovative Designs
71 CLINTON STREET
MONTGOMERY, NY 12549
Ph: (845) 457-7727
Fx: (845) 457-1899

THIS PAGE WAS INTENTIONALLY LEFT BLANK



PROPOSED CONDITIONS

RDM WAREHOUSES
230 NEELYTOWN ROAD
TOWN OF HAMPTONBURGH
ORANGE COUNTY, NEW YORK

DATE: 01/23/19
REV SEPT '20
SCALE: 1" = 300'

JOB # 1284.02
SHEET # F-4

ENGINEERING & SURVEYING
71 CLINTON STREET
MONTGOMERY, NY 12549
Ph: (845) 457-7727
Fx: (845) 457-1899
Achieving Successful Results
with Innovative Designs

THIS PAGE WAS INTENTIONALLY LEFT BLANK



GREEN INFRASTRUCTURE

RDM WAREHOUSES
230 NEELYTOWN ROAD
TOWN OF HAMPTONBURGH
ORANGE COUNTY, NEW YORK

DATE: 01/23/19
REV AUG '19
SCALE: 1" = 300'

JOB # 1284.02
SHEET # F-5

ENGINEERING & SURVEYING
Achieving Successful Results
with Innovative Designs
71 CLINTON STREET
MONTGOMERY, NY 12549
Ph: (845) 457-7727
Fx: (845) 457-1899

THIS PAGE WAS INTENTIONALLY LEFT BLANK

APPENDIX 2

RAINFALL DATA

This page is left intentionally blank

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	New York
Location	
Longitude	74.242 degrees West
Latitude	41.477 degrees North
Elevation	0 feet
Date/Time	Wed, 09 Jan 2019 10:25:17 -0500

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.33	0.50	0.62	0.81	1.02	1.26	1yr	0.88	1.18	1.44	1.77	2.15	2.61	3.03	1yr	2.31	2.91	3.37	4.02	4.66	1yr
2yr	0.39	0.60	0.74	0.98	1.23	1.53	2yr	1.06	1.43	1.76	2.15	2.62	3.17	3.61	2yr	2.81	3.48	3.98	4.69	5.33	2yr
5yr	0.46	0.71	0.89	1.19	1.53	1.92	5yr	1.32	1.77	2.20	2.70	3.28	3.97	4.57	5yr	3.51	4.39	5.02	5.78	6.55	5yr
10yr	0.51	0.80	1.02	1.38	1.79	2.27	10yr	1.55	2.07	2.62	3.22	3.90	4.70	5.46	10yr	4.16	5.25	5.98	6.77	7.65	10yr
25yr	0.60	0.95	1.21	1.67	2.23	2.85	25yr	1.92	2.56	3.30	4.06	4.92	5.90	6.91	25yr	5.22	6.65	7.56	8.35	9.40	25yr
50yr	0.68	1.08	1.39	1.95	2.62	3.38	50yr	2.26	3.01	3.92	4.83	5.85	7.00	8.27	50yr	6.19	7.96	9.02	9.80	10.99	50yr
100yr	0.77	1.24	1.60	2.27	3.10	4.02	100yr	2.67	3.54	4.67	5.76	6.96	8.31	9.90	100yr	7.36	9.52	10.78	11.50	12.87	100yr
200yr	0.87	1.42	1.84	2.64	3.65	4.77	200yr	3.15	4.17	5.56	6.86	8.29	9.88	11.86	200yr	8.75	11.41	12.88	13.51	15.08	200yr
500yr	1.04	1.72	2.24	3.25	4.56	5.99	500yr	3.94	5.18	7.00	8.65	10.45	12.43	15.07	500yr	11.00	14.49	16.33	16.73	18.61	500yr

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.29	0.45	0.55	0.74	0.91	1.09	1yr	0.79	1.06	1.23	1.56	1.99	2.23	2.50	1yr	1.98	2.41	2.96	3.64	3.99	1yr
2yr	0.37	0.58	0.71	0.96	1.19	1.42	2yr	1.03	1.39	1.61	2.06	2.57	3.06	3.49	2yr	2.71	3.35	3.85	4.53	5.17	2yr
5yr	0.42	0.65	0.80	1.10	1.40	1.65	5yr	1.21	1.61	1.87	2.40	3.01	3.62	4.16	5yr	3.20	4.00	4.59	5.28	6.03	5yr
10yr	0.46	0.71	0.88	1.23	1.59	1.85	10yr	1.37	1.81	2.09	2.69	3.38	4.11	4.76	10yr	3.64	4.58	5.26	5.93	6.77	10yr
25yr	0.53	0.80	1.00	1.42	1.87	2.12	25yr	1.62	2.08	2.43	3.13	3.93	4.85	5.68	25yr	4.29	5.46	6.27	6.92	7.93	25yr
50yr	0.58	0.88	1.10	1.58	2.13	2.37	50yr	1.84	2.32	2.72	3.52	4.42	5.49	6.52	50yr	4.86	6.27	7.21	7.80	8.97	50yr
100yr	0.65	0.98	1.22	1.77	2.43	2.65	100yr	2.09	2.59	3.05	3.96	4.97	6.22	7.49	100yr	5.50	7.20	8.28	8.89	10.17	100yr
200yr	0.72	1.09	1.38	2.00	2.79	2.95	200yr	2.40	2.89	3.42	4.49	5.61	7.02	8.63	200yr	6.21	8.30	9.55	10.09	11.55	200yr
500yr	0.85	1.26	1.62	2.36	3.35	3.42	500yr	2.89	3.35	3.99	5.30	6.61	8.23	10.43	500yr	7.29	10.03	11.56	11.96	13.74	500yr

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.35	0.55	0.67	0.90	1.11	1.34	1yr	0.95	1.31	1.54	1.94	2.40	2.87	3.31	1yr	2.54	3.19	3.64	4.29	4.95	1yr
2yr	0.40	0.62	0.77	1.04	1.28	1.54	2yr	1.11	1.50	1.75	2.23	2.78	3.32	3.78	2yr	2.94	3.63	4.18	4.92	5.59	2yr
5yr	0.50	0.77	0.95	1.31	1.66	1.97	5yr	1.44	1.93	2.25	2.88	3.60	4.34	4.95	5yr	3.85	4.76	5.48	6.36	7.09	5yr
10yr	0.59	0.91	1.12	1.57	2.03	2.42	10yr	1.75	2.37	2.74	3.53	4.41	5.36	6.10	10yr	4.74	5.87	6.74	7.72	8.57	10yr
25yr	0.74	1.13	1.40	2.00	2.64	3.18	25yr	2.27	3.11	3.61	4.69	5.76	7.05	8.03	25yr	6.24	7.72	8.89	10.03	10.96	25yr
50yr	0.88	1.34	1.67	2.40	3.23	3.79	50yr	2.78	3.71	4.43	5.76	7.03	8.69	9.91	50yr	7.69	9.53	10.98	12.21	13.21	50yr
100yr	1.05	1.58	1.98	2.86	3.93	4.64	100yr	3.39	4.53	5.43	7.07	8.61	10.75	12.23	100yr	9.51	11.76	13.52	14.91	15.91	100yr
200yr	1.25	1.87	2.37	3.44	4.79	5.67	200yr	4.14	5.54	6.67	8.70	10.54	13.29	15.10	200yr	11.76	14.52	16.69	18.16	19.16	200yr
500yr	1.58	2.35	3.02	4.39	6.24	7.39	500yr	5.38	7.22	8.75	11.44	13.76	17.64	19.91	500yr	15.62	19.15	22.03	23.56	24.49	500yr

This page is left intentionally blank

APPENDIX 3

CURVE NUMBER

CALCULATIONS

This page is left intentionally blank



CURVE NUMBER (CN) WORKSHEET

WO. NO.	DATE	REVISED	SHEET	OF
1284.02	01/23/19	N/A	1	10

PROJECT TITLE
RDM Warehouses - 230 Neelytown Road

LOCATION
Town of Hamptonburgh

CALCULATED BY
ZS

APPROVED BY
JS

REF DRAWING(S)

1. Runoff curve number (CN)

Existing

Proposed

Subarea: **EX-A**

Soil Name & Hydrologic Group	Cover Description (cover type, treatment & conditions)	CN	Area (acres)	Product of CN x Area
A	Brush - Fair	35	5.54	193.90
A	Woods - Fair	43	16.84	724.29
A	Grassland - Fair	49	15.09	739.28
A	Gravel	76	0.11	7.98
B	Brush - Fair	56	2.69	150.36
B	Woods - Fair	65	10.76	699.40
B	Grassland - Fair	69	13.15	907.14
B	Gravel	89	0.02	1.87
D	Brush - Fair	77	13.29	1,023.41
D	Woods - Fair	82	19.03	1,560.13
D	Grassland - Fair	84	5.55	465.95
D	Gravel	91	0.21	19.20
D	Impervious	98	0.21	20.09
TOTAL =			102.47	6512.9997

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{6512.9997}{102.4693}$$

$$\text{CN (weighted)} = 63.560 \quad \text{Use CN} = \mathbf{64}$$

2. Runoff

$$S = 5.63$$

Frequency yr
Rainfall, P in
Runoff, Q in

Storm #1	Storm #2	Storm #3

(Use P and CN with table 2-1, fig 2-1, or eqns. 2-3 and 2-4)

CURVE NUMBER (CN) WORKSHEET

WO. NO.
1284.02

DATE
01/23/19

REVISED
N/A

SHEET
2

OF
10

PROJECT TITLE

RDM Warehouses - 230 Neelytown Road

CALCULATED BY
ZS

APPROVED BY
JS

LOCATION

Town of Hamptonburgh

REF DRAWING(S)

1. Runoff curve number (CN)

Existing

Proposed

Subarea:

EX-B

Soil Name & Hydrologic Group	Cover Description (cover type, treatment & conditions)	CN	Area (acres)	Product of CN x Area
A	Brush - Fair	35	0.07	2.38
A	Grassland - Fair	49	0.22	10.68
A	Woods - Fair	43	0.21	8.82
A	Gravel	76	0.11	7.98
D	Brush - Fair	77	3.31	254.72
D	Grassland - Fair	84	10.18	854.87
D	Woods - Fair	82	11.18	916.47
D	Gravel	76	0.18	13.83
D	Paved	98	1.22	119.66
		TOTAL =	26.66	2189.396439

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{2189.3964}{26.660408}$$

CN (weighted) = 82.122 Use CN= **82**

2. Runoff

S = 2.20

Frequency	yr
Rainfall, P	in
Runoff, Q	in

<i>Storm #1</i>	<i>Storm #2</i>	<i>Storm #3</i>

(Use P and CN with table 2-1, fig 2-1, or eqns. 2-3 and 2-4)



CURVE NUMBER (CN) WORKSHEET

WO. NO.	DATE	REVISED	SHEET	OF
1284.02	01/23/19	N/A	3	10

PROJECT TITLE
RDM Warehouses - 230 Neelytown Road

LOCATION
Town of Hamptonburgh

CALCULATED BY
ZS

APPROVED BY
JS

REF DRAWING(S)

1. Runoff curve number (CN)

Existing ☒ Proposed ☐ Subarea: **PR-A1**

Soil Name & Hydrologic Group	Cover Description (cover type, treatment & conditions)	CN	Area (acres)	Product of CN x Area
A	Grassland - Fair Condition	49	0.471	23.08
A	Woods - Fair Condition	43	5.167	222.18
A	Lawn - Good Condition	39	4.816	187.82
A	Brush - Fair Condition	35	0.258	9.03
D	Grassland - Fair Condition	84	2.580	216.72
D	Woods - Fair Condition	82	13.134	1,076.99
D	Lawn - Good Condition	80	0.538	43.04
B	Lawn - Good Condition	80	2.115	169.20
	Impervious	98	10.410	1,020.18
TOTAL =			39.49	2968.242

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{2968.242}{39.489}$$

$$\text{CN (weighted)} = 75.166 \quad \text{Use CN} = \mathbf{75}$$

2. Runoff

$$S = 3.33$$

Frequency yr
Rainfall, P in
Runoff, Q in

Storm #1	Storm #2	Storm #3

(Use P and CN with table 2-1, fig 2-1, or eqns. 2-3 and 2-4)



CURVE NUMBER (CN) WORKSHEET

WO. NO. 1284.02	DATE 01/23/19	REVISED N/A	SHEET 4	OF 10
---------------------------	-------------------------	-----------------------	-------------------	-----------------

PROJECT TITLE
RDM Warehouses - 230 Neelytown Road

LOCATION
Town of Hamptonburgh

CALCULATED BY
ZS

APPROVED BY
JS

REF DRAWING(S)

1. Runoff curve number (CN)

Existing ☐ Proposed ☒ Subarea: **PR-A2-A**

Soil Name & Hydrologic Group	Cover Description (cover type, treatment & conditions)	CN	Area (acres)	Product of CN x Area
	Impervious	98	3.506	343.59
A	Lawn - Good Condition	39	0.235	9.17
D	Lawn - Good Condition	80	0.537	42.96
TOTAL =			4.28	395.713

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{395.713}{4.278}$$

$$\text{CN (weighted)} = 92.500 \quad \text{Use CN} = \mathbf{92}$$

2. Runoff

$$S = 0.87$$

Frequency yr
Rainfall, P in
Runoff, Q in

Storm #1	Storm #2	Storm #3

(Use P and CN with table 2-1, fig 2-1, or eqns. 2-3 and 2-4)



CURVE NUMBER (CN) WORKSHEET

WO. NO. 1284.02	DATE 01/23/19	REVISED N/A	SHEET 5	OF 10
---------------------------	-------------------------	-----------------------	-------------------	-----------------

PROJECT TITLE
RDM Warehouses - 230 Neelytown Road

LOCATION
Town of Hamptonburgh

CALCULATED BY
ZS

APPROVED BY
JS

REF DRAWING(S)

1. Runoff curve number (CN)

Existing ☒ Proposed ☐ Subarea: **PR-A2-B**

Soil Name & Hydrologic Group	Cover Description (cover type, treatment & conditions)	CN	Area (acres)	Product of CN x Area
	Impervious	98	2.037	199.63
A	Lawn - Good Condition	39	0.779	30.38
D	Lawn - Good Condition	80	0.174	13.92
TOTAL =			2.99	243.927

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{243.927}{2.99}$$

$$\text{CN (weighted)} = 81.581 \quad \text{Use CN} = \mathbf{82}$$

2. Runoff

$$S = 2.20$$

Frequency yr
Rainfall, P in
Runoff, Q in

Storm #1	Storm #2	Storm #3

(Use P and CN with table 2-1, fig 2-1, or eqns. 2-3 and 2-4)



CURVE NUMBER (CN) WORKSHEET

WO. NO. 1284.02	DATE 01/23/19	REVISED N/A	SHEET 6	OF 10
---------------------------	-------------------------	-----------------------	-------------------	-----------------

PROJECT TITLE
RDM Warehouses - 230 Neelytown Road

LOCATION
Town of Hamptonburgh

CALCULATED BY
ZS

APPROVED BY
JS

REF DRAWING(S)

1. Runoff curve number (CN)

Existing ☒ Proposed ☐ Subarea: **PR-A3**

Soil Name & Hydrologic Group	Cover Description (cover type, treatment & conditions)	CN	Area (acres)	Product of CN x Area
	Impervious	98	0.54	52.63
D	Lawn - Good Condition	80	0.31	24.64
TOTAL =			0.85	77.266

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{77.266}{0.845}$$

$$\text{CN (weighted)} = 91.439 \quad \text{Use CN} = \mathbf{91}$$

2. Runoff

S = 0.99

Frequency yr
Rainfall, P in
Runoff, Q in

Storm #1	Storm #2	Storm #3

(Use P and CN with table 2-1, fig 2-1, or eqns. 2-3 and 2-4)



CURVE NUMBER (CN) WORKSHEET

WO. NO.	DATE	REVISED	SHEET	OF
1284.02	01/23/19	N/A	7	10

PROJECT TITLE
RDM Warehouses - 230 Neelytown Road

LOCATION
Town of Hamptonburgh

CALCULATED BY
ZS

APPROVED BY
JS

REF DRAWING(S)

1. Runoff curve number (CN)

Existing ☒ Proposed ☐ Subarea: **PR-A4**

Soil Name & Hydrologic Group	Cover Description (cover type, treatment & conditions)	CN	Area (acres)	Product of CN x Area
A	Grassland - Fair Condition	49	4.135	202.62
A	Woods - Fair Condition	43	6.856	294.81
A	Brush - Fair Condition	35	1.918	67.13
A	Lawn - Good Condition	39	0.617	24.06
B	Grassland - Fair Condition	69	9.821	677.65
B	Woods - Fair Condition	65	10.886	707.59
B	Brush - Fair Condition	56	2.598	145.49
B	Lawn - Good Condition	61	0.338	20.62
D	Grassland - Fair Condition	84	0.868	72.91
D	Woods - Fair Condition	82	6.414	525.95
D	Brush - Fair Condition	77	10.614	817.28
D	Lawn - Good Condition	84	0.719	60.40
TOTAL =			55.78	3616.495

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{3616.495}{55.784}$$

CN (weighted) = 64.830 Use CN= **65**

2. Runoff

S = 5.38

Frequency yr
Rainfall, P in
Runoff, Q in

Storm #1	Storm #2	Storm #3

(Use P and CN with table 2-1, fig 2-1, or eqns. 2-3 and 2-4)

CURVE NUMBER (CN) WORKSHEET

WO. NO.
1284.02

DATE
01/23/19

REVISED
N/A

SHEET
8

OF
10

PROJECT TITLE

RDM Warehouses - 230 Neelytown Road

CALCULATED BY
ZS

APPROVED BY
JS

LOCATION

Town of Hamptonburgh

REF DRAWING(S)

1. Runoff curve number (CN)

Existing

Proposed

Subarea:

PR-B1

Soil Name & Hydrologic Group	Cover Description (cover type, treatment & conditions)	CN	Area (acres)	Product of CN x Area
A	Lawn - Good	39	0.11	4.21
A	Grassland - Fair	49	0.02	0.98
D	Lawn - Good	80	0.64	51.20
D	Grassland - Fair	84	5.91	496.52
D	Brush - Fair	77	5.48	422.11
D	Woods - Fair	79	10.81	853.75
	Impervious	98	1.04	101.53
		TOTAL =	24.00	1930.311

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{1930.311}{24.004}$$

CN (weighted) = 80.416 Use CN= **80**

2. Runoff

S = 2.50

Frequency	yr
Rainfall, P	in
Runoff, Q	in

<i>Storm #1</i>	<i>Storm #2</i>	<i>Storm #3</i>

(Use P and CN with table 2-1, fig 2-1, or eqns. 2-3 and 2-4)



CURVE NUMBER (CN) WORKSHEET

WO. NO. 1284.02	DATE 01/23/19	REVISED N/A	SHEET 9	OF 10
---------------------------	-------------------------	-----------------------	-------------------	-----------------

PROJECT TITLE
RDM Warehouses - 230 Neelytown Road

LOCATION
Town of Hamptonburgh

CALCULATED BY
ZS

APPROVED BY
JS

REF DRAWING(S)

1. Runoff curve number (CN)

Existing ☒ Proposed ☐ Subarea: **PR-B2**

Soil Name & Hydrologic Group	Cover Description (cover type, treatment & conditions)	CN	Area (acres)	Product of CN x Area
A	Lawn - Good	39	0.16	6.32
D	Lawn - Good	80	0.43	34.64
	Impervious	98	0.82	79.87
TOTAL =			1.41	120.828

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{120.828}{1.41}$$

$$\text{CN (weighted)} = 85.694 \quad \text{Use CN} = \mathbf{86}$$

2. Runoff

$$S = 1.63$$

Frequency yr
Rainfall, P in
Runoff, Q in

Storm #1	Storm #2	Storm #3

(Use P and CN with table 2-1, fig 2-1, or eqns. 2-3 and 2-4)



CURVE NUMBER (CN) WORKSHEET

WO. NO. 1284.02	DATE 01/23/19	REVISED N/A	SHEET 10	OF 10
---------------------------	-------------------------	-----------------------	--------------------	-----------------

PROJECT TITLE
RDM Warehouses - 230 Neelytown Road

LOCATION
Town of Hamptonburgh

CALCULATED BY
ZS

APPROVED BY
JS

REF DRAWING(S)

1. Runoff curve number (CN)

Existing ☒ Proposed ☐ Subarea: **PR-B3**

Soil Name & Hydrologic Group	Cover Description (cover type, treatment & conditions)	CN	Area (acres)	Product of CN x Area
A	Lawn - Good	39	0.12	4.84
D	Lawn - Good	80	0.21	17.12
TOTAL =			0.34	21.956

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{21.956}{0.338}$$

CN (weighted) = 64.959 Use CN= **65**

2. Runoff

S = 5.38

Frequency yr
Rainfall, P in
Runoff, Q in

Storm #1	Storm #2	Storm #3

(Use P and CN with table 2-1, fig 2-1, or eqns. 2-3 and 2-4)

APPENDIX 4

TIME OF CONCENTRATION

CALCULATIONS

This page is left intentionally blank

TIME OF CONCENTRATION (T_c) WORKSHEET

WO. NO. 1284.02	DATE 01/22/19	REVISED	SHEET 1	OF 10
---------------------------	-------------------------	---------	-------------------	-----------------

PROJECT TITLE RDM Warehouses - 230 Neelytown Road		LOCATION Town of Hamptonburgh	
CALCULATED BY ZS	APPROVED BY JS	REF DRAWING(S)	

Existing
 Proposed
 Area: **EX-A**

1. Sheet Flow

Surface Description (table 3-1)
 Manning's roughness coeff., 'n' (table 3-1)
 Flow length, L (total L ≤ 300 ft)
 Two-year 24-hour rainfall, P₂
 Land Slope, s

$$T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$$

Segment
ID

A-B				
Woods: D				
0.80				
100				
3.50				
0.018				
0.629				0.629

2. Shallow Concentrated Flow

Surface description (paved or unpaved)
 Flow length, L
 Watercourse slope, s
 Average velocity, V (figure 3-1)

$$T_t = \frac{L}{3600 V}$$

Segment
ID

B-C	C-D	D-E		
Unpaved	Paved	Unpaved		
1,001.5	323.1	620.6		
0.020	0.038	0.038		
2.276	3.976	3.145		
0.122	0.023	0.055		0.200

3. Channel Flow

Cross sectional flow area, a
 Wetted perimeter, p_w
 Hydraulic radius, r = a/p_w
 Channel slope, s
 Manning's roughness coefficient, n

$$V = \frac{1.49 r^{2/3} s^{1/2}}{n}$$

Flow Length, L

$$T_t = \frac{L}{3600 V}$$

Segment
ID

E-F				
8.00				
6.47				
1.24				
0.001				
0.035				
1.551				
1,294.2				
0.232				0.232

Total T_c For Watershed or Subarea (Add Steps 6, 11, and 19) hr =

1.06

min =

63.60

TIME OF CONCENTRATION (T_c) WORKSHEET

WO. NO. 1284.02	DATE 01/22/19	REVISED	SHEET 2	OF 10
---------------------------	-------------------------	---------	-------------------	-----------------

PROJECT TITLE RDM Warehouses - 230 Neelytown Road	LOCATION Town of Hamptonburgh
CALCULATED BY ZS	APPROVED BY JS
REF DRAWING(S)	

☒ Existing
 ☐ Proposed
 Area: **EX-B**

1. Sheet Flow

Surface Description (table 3-1)
 Manning's roughness coeff., 'n' (table 3-1)
 Flow length, L (total L ≤ 300 ft)
 Two-year 24-hour rainfall, P₂
 Land Slope, s

$$T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$$

Segment
ID

A-B					
Woods: D					
0.80					
100					
3.50					
0.020					
0.596					0.596

2. Shallow Concentrated Flow

Surface description (paved or unpaved)
 Flow length, L
 Watercourse slope, s
 Average velocity, V (figure 3-1)

$$T_t = \frac{L}{3600 V}$$

Segment
ID

B-C					
Unpaved					
874.3					
0.040					
3.238					
0.075					0.075

3. Channel Flow

Cross sectional flow area, a
 Wetted perimeter, p_w
 Hydraulic radius, r = a/p_w
 Channel slope, s
 Manning's roughness coefficient, n

$$V = \frac{1.49 r^{2/3} s^{1/2}}{n}$$

Flow Length, L

$$T_t = \frac{L}{3600 V}$$

Segment
ID

C-D					
8.00					
6.47					
1.24					
0.026					
0.035					
7.908					
451.2					
0.016					0.016

Total T_c For Watershed or Subarea (Add Steps 6, 11, and 19) hr =

0.69

min =

41.40

TIME OF CONCENTRATION (T_c) WORKSHEET

WO. NO. 1284.02	DATE 01/22/19	REVISED SEPT '20	SHEET 3	OF 10
---------------------------	-------------------------	----------------------------	-------------------	-----------------

PROJECT TITLE RDM Warehouses - 230 Neelytown Road	LOCATION Town of Hamptonburgh
CALCULATED BY ZS	APPROVED BY JS
REF DRAWING(S)	

Existing Proposed Area: **PR-A1**

1. Sheet Flow

Surface Description (table 3-1)
Manning's roughness coeff., 'n' (table 3-1)
Flow length, L (total L ≤ 300 ft)
Two-year 24-hour rainfall, P₂
Land Slope, s

$$T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$$

Segment
ID

A-B				
Woods: D				
0.80				
100				
3.50				
0.010				
0.786				0.786

2. Shallow Concentrated Flow

Surface description (paved or unpaved)
Flow length, L
Watercourse slope, s
Average velocity, V (figure 3-1)

$$T_t = \frac{L}{3600 V}$$

Segment
ID

B-C	C-D			
Unpaved	Unpaved			
434	242			
0.041	0.074			
3.286	4.400			
0.037	0.015			0.052

3. Channel Flow

Cross sectional flow area, a
Wetted perimeter, p_w
Hydraulic radius, r = a/p_w
Channel slope, s
Manning's roughness coefficient, n

$$V = \frac{1.49 r^{2/3} s^{1/2}}{n}$$

Flow Length, L

$$T_t = \frac{L}{3600 V}$$

Segment
ID

D-E				
1.23				
3.92				
0.31				
0.010				
0.012				
5.724				
581.0				
0.028				0.028

Total T_c For Watershed or Subarea (Add Steps 6, 11, and 19) hr =

0.87

min =

52.20

TIME OF CONCENTRATION (T_c) WORKSHEET

WO. NO. 1284.02	DATE 01/22/19	REVISED	SHEET 4	OF 10
---------------------------	-------------------------	---------	-------------------	-----------------

PROJECT TITLE RDM Warehouses - 230 Neelytown Road	LOCATION Town of Hamptonburgh
CALCULATED BY ZS	APPROVED BY JS
REF DRAWING(S)	

Existing Proposed Area: PR-A2-A

1. Sheet Flow

Surface Description (table 3-1)
Manning's roughness coeff., 'n' (table 3-1)
Flow length, L (total L ≤ 300 ft)
Two-year 24-hour rainfall, P₂
Land Slope, s

$$T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$$

Segment
ID

A-B	B-C			
Grass: D	Paved			
0.24	0.01			
9	91			
3.50	3.50			
0.020	0.020			
0.033	0.018			0.051

2. Shallow Concentrated Flow

Surface description (paved or unpaved)
Flow length, L
Watercourse slope, s
Average velocity, V (figure 3-1)

$$T_t = \frac{L}{3600 V}$$

Segment
ID

C-D				
Paved				
139.4				
0.020				
2.875				
0.013				0.013

3. Channel Flow

Cross sectional flow area, a
Wetted perimeter, p_w
Hydraulic radius, r = a/p_w
Channel slope, s
Manning's roughness coefficient, n

$$V = \frac{1.49 r^{2/3} s^{1/2}}{n}$$

Flow Length, L

$$T_t = \frac{L}{3600 V}$$

Segment
ID

D-E				
4.00				
6.00				
0.67				
0.023				
0.035				
4.927				
761.2				
0.043				0.043

Total T_c For Watershed or Subarea (Add Steps 6, 11, and 19) hr =

0.11

min =

6.60

TIME OF CONCENTRATION (T_c) WORKSHEET

WO. NO. 1284.02	DATE 01/22/19	REVISED	SHEET 5	OF 10
---------------------------	-------------------------	---------	-------------------	-----------------

PROJECT TITLE RDM Warehouses - 230 Neelytown Road		LOCATION Town of Hamptonburgh		
CALCULATED BY ZS	APPROVED BY JS	REF DRAWING(S)		

Existing Proposed Area: **PR-A2-B**

1. Sheet Flow

Surface Description (table 3-1)
Manning's roughness coeff., 'n' (table 3-1)
Flow length, L (total L ≤ 300 ft)
Two-year 24-hour rainfall, P₂
Land Slope, s

$$T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$$

Segment
ID

A-B	B-C			
Grass: D	Paved			
0.24	0.01			
9	91			
3.50	3.50			
0.020	0.020			
0.033	0.018			0.051

2. Shallow Concentrated Flow

Surface description (paved or unpaved)
Flow length, L
Watercourse slope, s
Average velocity, V (figure 3-1)

$$T_t = \frac{L}{3600 V}$$

Segment
ID

C-D				
Paved				
136.7				
0.020				
2.875				
0.013				0.013

3. Channel Flow

Cross sectional flow area, a
Wetted perimeter, p_w
Hydraulic radius, r = a/p_w
Channel slope, s
Manning's roughness coefficient, n

$$V = \frac{1.49 r^{2/3} s^{1/2}}{n}$$

Flow Length, L

$$T_t = \frac{L}{3600 V}$$

Segment
ID

D-E				
4.00				
6.00				
0.67				
0.023				
0.035				
4.927				
510.3				
0.029				0.029

Total T_c For Watershed or Subarea (Add Steps 6, 11, and 19) hr =

0.09

min =

5.40

TIME OF CONCENTRATION (T_c) WORKSHEET

WO. NO. 1284.02	DATE 01/22/19	REVISED	SHEET 6	OF 10
---------------------------	-------------------------	---------	-------------------	-----------------

PROJECT TITLE RDM Warehouses - 230 Neelytown Road		LOCATION Town of Hamptonburgh		
CALCULATED BY ZS	APPROVED BY JS	REF DRAWING(S)		

Existing Proposed Area: **PR-A3**

1. Sheet Flow

Surface Description (table 3-1)
Manning's roughness coeff., 'n' (table 3-1)
Flow length, L (total L ≤ 300 ft)
Two-year 24-hour rainfall, P₂
Land Slope, s

$$T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$$

Segment
ID

A-B	B-C			
Grass: D	Paved			
0.24	0.01			
35	65			
3.50	3.50			
0.170	0.020			
0.042	0.014			0.055

2. Shallow Concentrated Flow

Surface description (paved or unpaved)
Flow length, L
Watercourse slope, s
Average velocity, V (figure 3-1)

$$T_t = \frac{L}{3600 V}$$

Segment
ID

C-D				
Paved				
119.6				
0.020				
2.875				
0.012				0.012

3. Channel Flow

Cross sectional flow area, a
Wetted perimeter, p_w
Hydraulic radius, r = a/p_w
Channel slope, s
Manning's roughness coefficient, n

$$V = \frac{1.49 r^{2/3} s^{1/2}}{n}$$

Flow Length, L

$$T_t = \frac{L}{3600 V}$$

Segment
ID

D-E				
4.00				
6.00				
0.67				
0.020				
0.035				
4.595				
388.2				
0.023				0.023

Total T_c For Watershed or Subarea (Add Steps 6, 11, and 19) hr =

0.09

min =

5.40

TIME OF CONCENTRATION (T_c) WORKSHEET

WO. NO. 1284.02	DATE 01/22/19	REVISED	SHEET 7	OF 10
---------------------------	-------------------------	---------	-------------------	-----------------

PROJECT TITLE RDM Warehouses - 230 Neelytown Road	LOCATION Town of Hamptonburgh
CALCULATED BY ZS	APPROVED BY JS
REF DRAWING(S)	

Existing Proposed Area: **PR-A4**

1. Sheet Flow

Surface Description (table 3-1)
Manning's roughness coeff., 'n' (table 3-1)
Flow length, L (total L ≤ 300 ft)
Two-year 24-hour rainfall, P₂
Land Slope, s

$$T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$$

Segment
ID

A-B					
Woods: D					
0.80					
100					
3.50					
0.015					
0.668					0.668

2. Shallow Concentrated Flow

Surface description (paved or unpaved)
Flow length, L
Watercourse slope, s
Average velocity, V (figure 3-1)

$$T_t = \frac{L}{3600 V}$$

Segment
ID

B-C					
Unpaved					
1,301.4					
0.074					
4.392					
0.082					0.082

3. Channel Flow

Cross sectional flow area, a
Wetted perimeter, p_w
Hydraulic radius, r = a/p_w
Channel slope, s
Manning's roughness coefficient, n

$$V = \frac{1.49 r^{2/3} s^{1/2}}{n}$$

Flow Length, L

$$T_t = \frac{L}{3600 V}$$

Segment
ID

C-D					
8.00					
6.47					
1.24					
0.001					
0.035					
1.551					
1,198.6					
0.215					0.215

Total T_c For Watershed or Subarea (Add Steps 6, 11, and 19) hr =

0.97

min =

58.20

TIME OF CONCENTRATION (T_c) WORKSHEET

WO. NO. 1284.02	DATE 01/22/19	REVISED	SHEET 8	OF EX-A!K4
---------------------------	-------------------------	---------	-------------------	----------------------

PROJECT TITLE RDM Warehouses - 230 Neelytown Road	LOCATION Town of Hamptonburgh
CALCULATED BY ZS	APPROVED BY JS
REF DRAWING(S)	

Existing Proposed Area: **PR-B1**

1. Sheet Flow

Surface Description (table 3-1)
Manning's roughness coeff., 'n' (table 3-1)
Flow length, L (total L ≤ 300 ft)
Two-year 24-hour rainfall, P₂
Land Slope, s

$$T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$$

Segment
ID

A-B					
Woods: D					
0.80					
100					
3.50					
0.020					
0.596					0.596

2. Shallow Concentrated Flow

Surface description (paved or unpaved)
Flow length, L
Watercourse slope, s
Average velocity, V (figure 3-1)

$$T_t = \frac{L}{3600 V}$$

Segment
ID

B-C					
Unpaved					
874.3					
0.040					
3.238					
0.075					0.075

3. Channel Flow

Cross sectional flow area, a
Wetted perimeter, p_w
Hydraulic radius, r = a/p_w
Channel slope, s
Manning's roughness coefficient, n

$$V = \frac{1.49 r^{2/3} s^{1/2}}{n}$$

Flow Length, L

$$T_t = \frac{L}{3600 V}$$

Segment
ID

C-D					
8.00					
6.47					
1.24					
0.026					
0.035					
7.908					
452.3					
0.016					0.016

Total T_c For Watershed or Subarea (Add Steps 6, 11, and 19) hr =

0.69

min =

41.40

TIME OF CONCENTRATION (T_c) WORKSHEET

WO. NO. 1284.02	DATE 01/22/19	REVISED	SHEET 9	OF 10
---------------------------	-------------------------	---------	-------------------	-----------------

PROJECT TITLE RDM Warehouses - 230 Neelytown Road	LOCATION Town of Hamptonburgh
CALCULATED BY ZS	APPROVED BY JS
REF DRAWING(S)	

Existing Proposed Area: **PR-B2**

1. Sheet Flow

Surface Description (table 3-1)
Manning's roughness coeff., 'n' (table 3-1)
Flow length, L (total L ≤ 300 ft)
Two-year 24-hour rainfall, P₂
Land Slope, s

$$T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$$

Segment
ID

A-B	B-C			
Grass: S	Paved			
0.15	0.01			
20	80			
3.50	3.50			
0.400	0.020			
0.013	0.016			0.029

2. Shallow Concentrated Flow

Surface description (paved or unpaved)
Flow length, L
Watercourse slope, s
Average velocity, V (figure 3-1)

$$T_t = \frac{L}{3600 V}$$

Segment
ID

C-D				
Unpaved				
50.0				
0.020				
2.282				
0.006				0.006

3. Channel Flow

Cross sectional flow area, a
Wetted perimeter, p_w
Hydraulic radius, r = a/p_w
Channel slope, s
Manning's roughness coefficient, n

$$V = \frac{1.49 r^{2/3} s^{1/2}}{n}$$

Flow Length, L

$$T_t = \frac{L}{3600 V}$$

Segment
ID

D-E				
4.91				
3.93				
1.25				
0.010				
0.035				
4.941				
670.3				
0.038				0.038

Total T_c For Watershed or Subarea (Add Steps 6, 11, and 19) hr =

0.07

min =

4.20

TIME OF CONCENTRATION (T_c) WORKSHEET

WO. NO. 1284.02	DATE 01/22/19	REVISED	SHEET 10	OF 10
---------------------------	-------------------------	---------	--------------------	-----------------

PROJECT TITLE RDM Warehouses - 230 Neelytown Road	LOCATION Town of Hamptonburgh
CALCULATED BY ZS	APPROVED BY JS
REF DRAWING(S)	

Existing Proposed Area: **PR-B3**

1. Sheet Flow

Surface Description (table 3-1)
Manning's roughness coeff., 'n' (table 3-1)
Flow length, L (total L ≤ 300 ft)
Two-year 24-hour rainfall, P₂
Land Slope, s

$$T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$$

Segment
ID

A-B					
Grass: S					
0.15					
100	ft				
3.50	in				
0.040	ft/ft				
0.118	hr				0.118

2. Shallow Concentrated Flow

Surface description (paved or unpaved)
Flow length, L
Watercourse slope, s
Average velocity, V (figure 3-1)

$$T_t = \frac{L}{3600 V}$$

Segment
ID

B-C					
Unpaved					
280.3	ft				
0.025	ft/ft				
2.546	ft/s				
0.031	hr				0.031

3. Channel Flow

Cross sectional flow area, a
Wetted perimeter, p_w
Hydraulic radius, r = a/p_w
Channel slope, s
Manning's roughness coefficient, n

$$V = \frac{1.49 r^{2/3} s^{1/2}}{n}$$

Flow Length, L

$$T_t = \frac{L}{3600 V}$$

Segment
ID

	ft ²				
	ft				
	ft				
	ft/ft				
	ft/s				
	ft				
	hr				

Total T_c For Watershed or Subarea (Add Steps 6, 11, and 19) hr =

0.15

min =

9.00

APPENDIX 5

WATER QUALITY VOLUME &

RUNOFF REDUCTION

VOLUME CALCULATIONS

This page is left intentionally blank

WATER QUALITY VOLUME (WQ_v) CALCULATION SHEET

WO. NO. 1284.02	DATE 01/23/19	REVISED N/A	SHEET 1	OF 3
---------------------------	-------------------------	-----------------------	-------------------	----------------

PROJECT TITLE RDM Warehouses - 230 Neelytown Road	LOCATION Town of Hamptonburgh
CALCULATED BY ZS	APPROVED BY JS
SITE Stormwater Management Design Point Designation	

$$WQ_v = (P * R_v * A) / (12)$$

Drainage Area			90% Rainfall Event # (P)	Total Drainage Area (A)	Total Impervious Area (I)	R _v (0.05 + 0.009*I%)	WQ _v Required (Ac-ft)	WQ _v Required (ft ³)
SITE			1.40	129.14	17.25	0.170	2.565	111,731.4
HSG	Area (Ac.)	%	S	Minimum RR _v = (P * 0.95 * S * I) / (12)				
A	35.06	27%	0.55	P = 1.40				
B	26.64	21%	0.40	S = 0.34				
C	0.00	0%	0.30	I = 17.25				
D	67.44	52%	0.20	RR _v MIN	0.643	Ac-ft		

Green Technology	Implemented ?		Drainage Area Reduction	Contributing Drainage Area Reduction	Total Drainage Area Reduction	Total Impervious Area Reduction
	Yes	No				

Area Reduction Practices						
Conservation of Natural Areas	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	-	-
Sheet Flow to Riparian Buffers or Filter Strips	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	-	-
Tree Planting / Tree Box	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	-	-

Subtotals					0.00	0.00
Revised WQ _v after Area Deductions	P	A	I	R _v	WQ _v	RR _v AREA
	1.40	129.14	17.25	0.170	2.565	0.000

Disconnection of Rooftop Runoff	Impervious Area Reduction:			0.00	Acres	
Revised WQ _v after Impervious Disconnect	P	A	I	R _v	WQ _v	RR _v IMP
	1.40	129.14	17.25	0.170	2.565	0.000

Source Control WQ _v Treatment Practices	Yes	No	WQ _v	RR _v SC*	(A) Reduction	(I) Reduction
Vegetated Open Swales	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	-	-
Rain Garden	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	-	-
Green Roof	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	-	-
Stormwater Planters	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	-	-
Rain Tanks / Cisterns	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	-	-
Porous Pavement	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	-	-

Standard SMP's with RR _v Capacity						
Infiltration	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0.715	0.643	8.73	6.32
Bio-Retention	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	-	-
Dry Swale (Open Channel)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	-	-

Subtotals			0.715	0.643	8.73	6.32
Is The Total RR _v (RR _v AREA + RR _v IMP + RR _v SC)	0.643	≥ RR _v MIN ?		0.643	YES	
WQ _v Required by Standard Practices	P	A	I	R _v	WQ _v (Ac-ft)	WQ _v (ft ³)
	1.40	120.41	10.93	0.132	1.850	80,584.0

* For Source Control (if used) RR_v calculations see attached Green Technology RR_v Calculation Sheets

RUNOFF REDUCTION VOLUME (RRv) CALCULATION SHEET

WO. NO. 1284.02	DATE 01/23/19	REVISED N/A	SHEET 2	OF 3
---------------------------	-------------------------	-----------------------	-------------------	----------------

PROJECT TITLE RDM Warehouses - 230 Neelytown Road		LOCATION Town of Hamptonburgh
CALCULATED BY ZS	APPROVED BY JS	Stormwater Management Design Point Designation SITE

INFILTRATION PRACTICES

Requirement Checks

Yes

No

Notes:

Infiltration rate (k) $\geq 0.5"/_{hr}$



Pretreatment provided



Design Complies with Required
Elements of Practice



Infiltration designed to exfiltrate through
bottom of practice only?



Drainage Area (Ac.)	7.32	
Impervious Area (Ac.)	5.51	
Rainfall Event # (P)	1.40	
Rv	0.728	
WQv REQ'D	0.621	
A _t (ft ²)		Surface area of infiltration trench
d _t (ft)		depth of trench
n	0.400	porosity
V _t (ft ³)		Design Volume of Trench (WQ _v Provided)
V _t > WQv REQ'D		
A _b (ft ²)	6,300.0	Surface area of infiltration basin
D _b (ft)	4.333	depth of basin
V _b (ft ³)	27,297.9	Design Volume of basin (WQ _v Provided)
V _b (ac-ft)	0.627	Design Volume of basin (WQ _v Provided)
V _t > WQv REQ'D	YES	
RRv	0.559	

Calculations for Infiltration Basin A2

RUNOFF REDUCTION VOLUME (RRv) CALCULATION SHEET

WO. NO. 1284.02	DATE 01/23/19	REVISED N/A	SHEET 3	OF 3
---------------------------	-------------------------	-----------------------	-------------------	----------------

PROJECT TITLE RDM Warehouses - 230 Neelytown Road		LOCATION Town of Hamptonburgh
CALCULATED BY ZS	APPROVED BY JS	Stormwater Management Design Point Designation SITE

INFILTRATION PRACTICES

Requirement Checks

Yes

No

Notes:

Infiltration rate (k) $\geq 0.5"/_{hr}$



Pretreatment provided



Design Complies with Required
Elements of Practice



Infiltration designed to exfiltrate through
bottom of practice only?



Drainage Area (Ac.)	1.41	
Impervious Area (Ac.)	0.81	
Rainfall Event # (P)	1.40	
Rv	0.570	
WQv REQ'D	0.094	
A _t (ft ²)		Surface area of infiltration trench
d _t (ft)		depth of trench
n	0.400	porosity
V _t (ft ³)		Design Volume of Trench (WQ _v Provided)
V _t > WQv REQ'D		
A _b (ft ²)	1,767.0	Surface area of infiltration basin
D _b (ft)	4.500	depth of basin
V _b (ft ³)	7,951.5	Design Volume of basin (WQ _v Provided)
V _b (ac-ft)	0.183	Design Volume of basin (WQ _v Provided)
V _t > WQv REQ'D	YES	
RRv	0.084	

Calculations for Infiltration Basin B3

This page is left intentionally blank

APPENDIX 6

HYDROGRAPH

SUMMARIES & DIAGRAMS

This page is left intentionally blank

Basin Model

Hydrology Studio v 3.0.0.4

Project Name:

01-22-2019

EX-A



EX-B



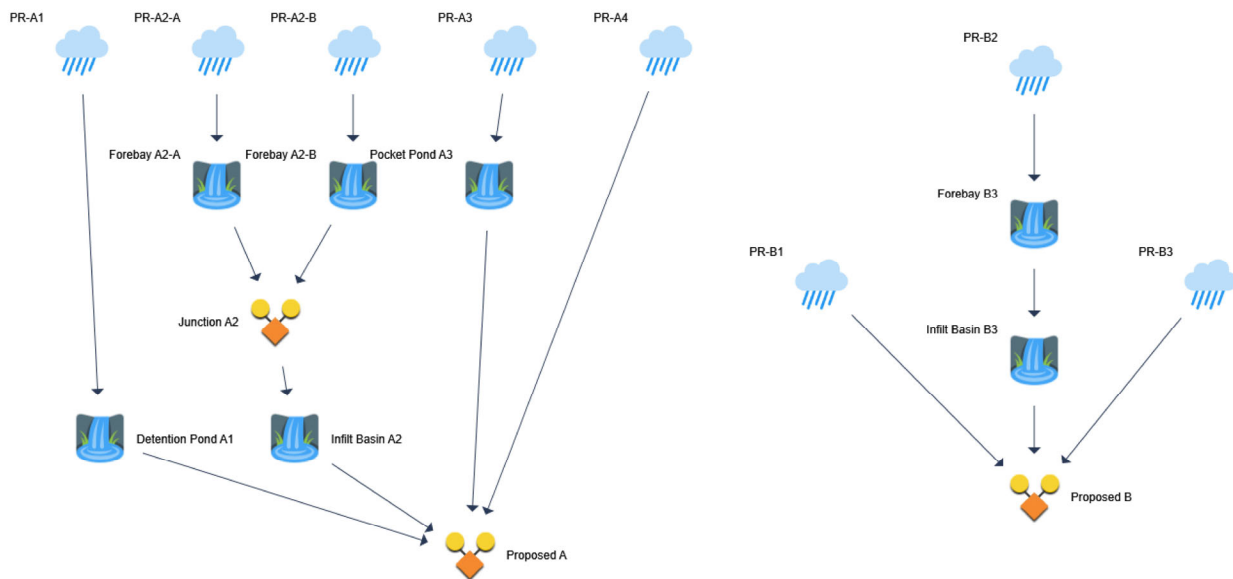
This page is left intentionally blank

Basin Model

Hydrology Studio v 3.0.0.12

Project Name:

08-20-2019



This page is left intentionally blank

Hydrograph by Return Period

Project Name:

Hydrology Studio v 3.0.0.4

01-22-2019

[illegible]

This page is left intentionally blank

Hydrograph by Return Period

Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

[illegible]

This page is left intentionally blank

APPENDIX 7

1-YEAR DESIGN STORM

HYDROGRAPHS

This page is left intentionally blank

Hydrograph Report

Project Name:

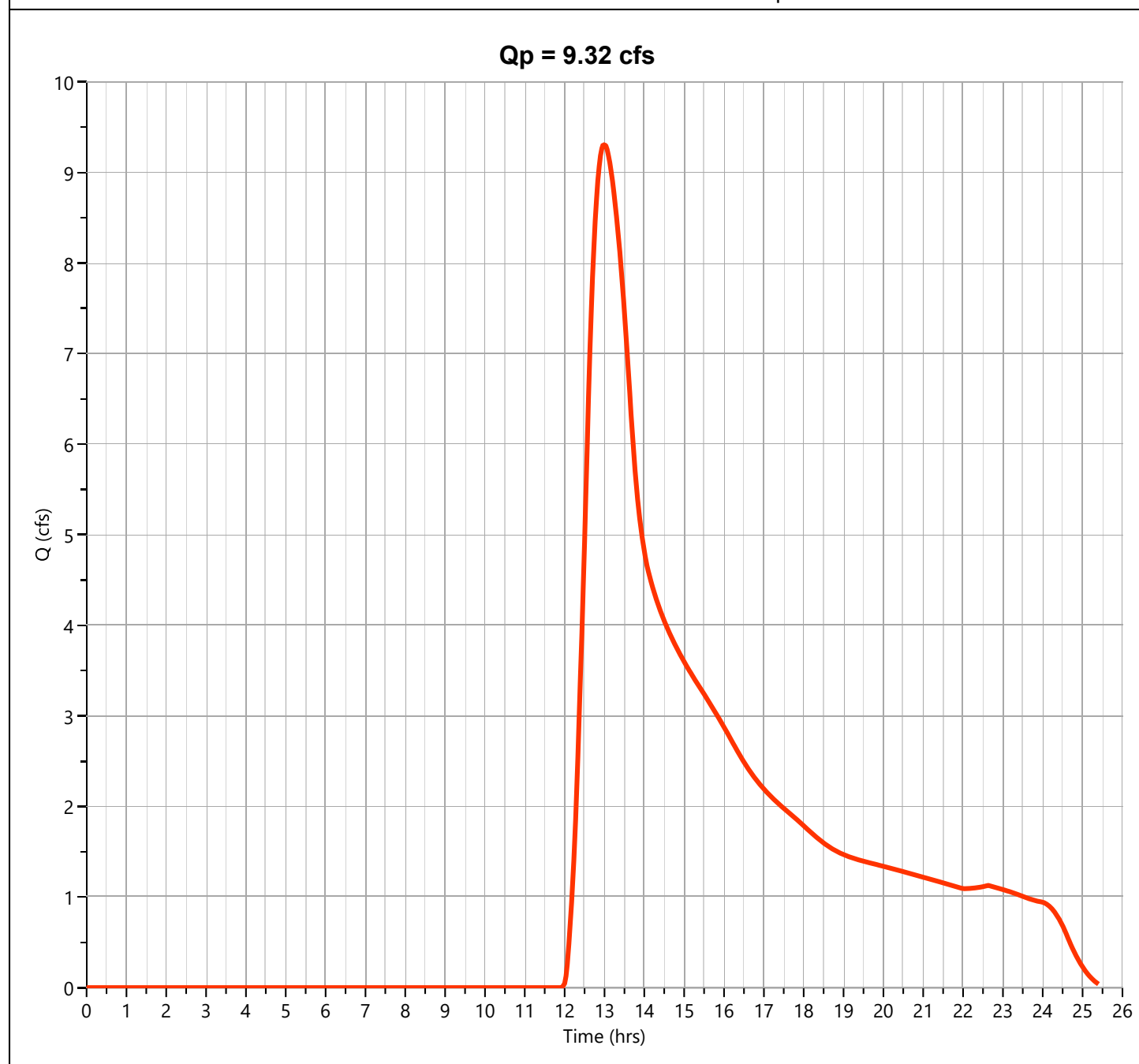
Hydrology Studio v 3.0.0.4

01-22-2019

EX-A

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 9.318 cfs
Storm Frequency	= 1-yr	Time to Peak	= 13.00 hrs
Time Interval	= 2 min	Runoff Volume	= 116,117 cuft
Drainage Area	= 102.47 ac	Curve Number	= 64
Tc Method	= User	Time of Conc. (Tc)	= 63.6 min
Total Rainfall	= 2.6100 in	Design Storm	= Type III
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

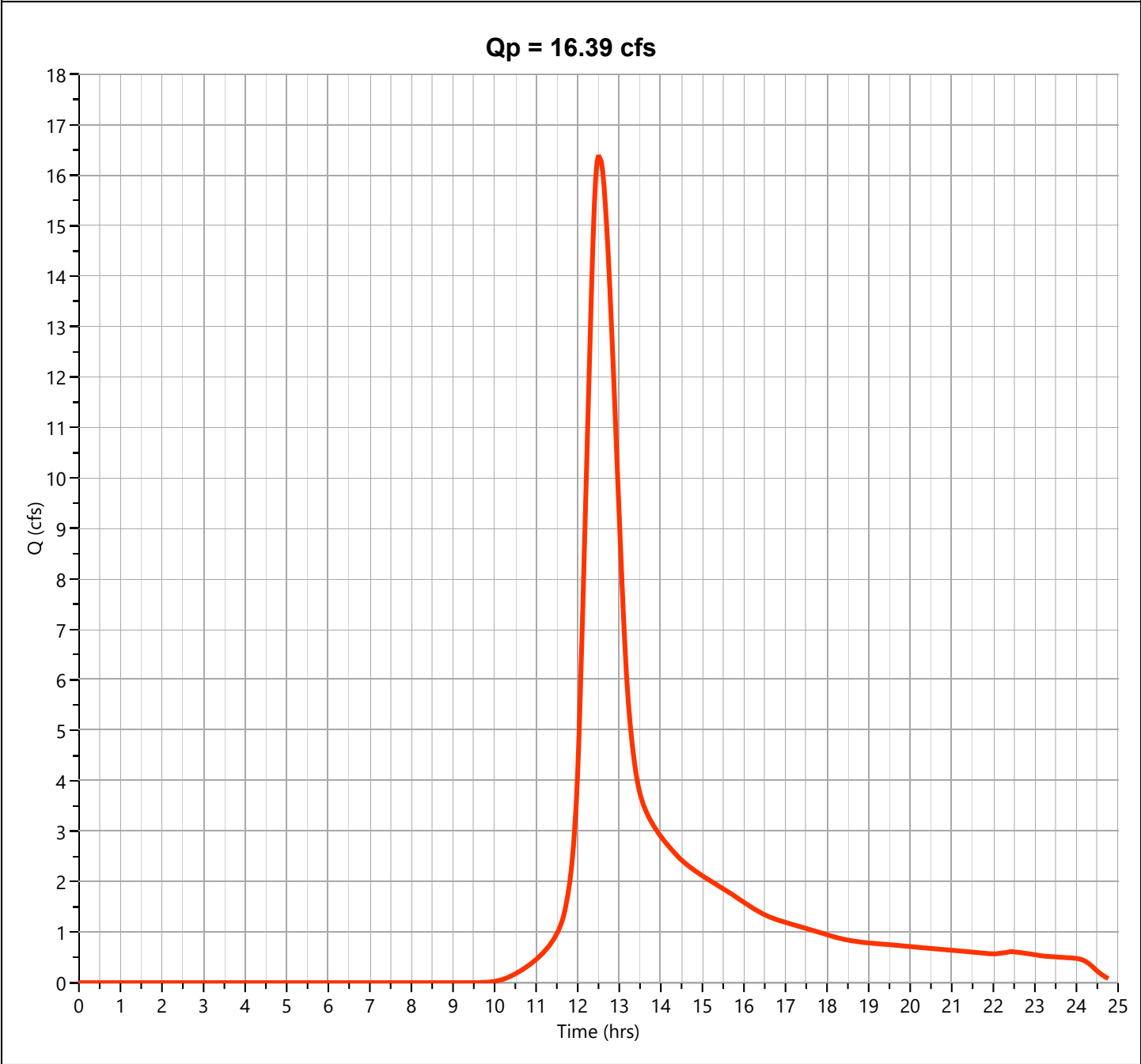
Hydrology Studio v 3.0.0.4

01-22-2019

EX-B

Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 16.39 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.50 hrs
Time Interval	= 2 min	Runoff Volume	= 105,512 cuft
Drainage Area	= 26.67 ac	Curve Number	= 82
Tc Method	= User	Time of Conc. (Tc)	= 41.4 min
Total Rainfall	= 2.6100 in	Design Storm	= Type III
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

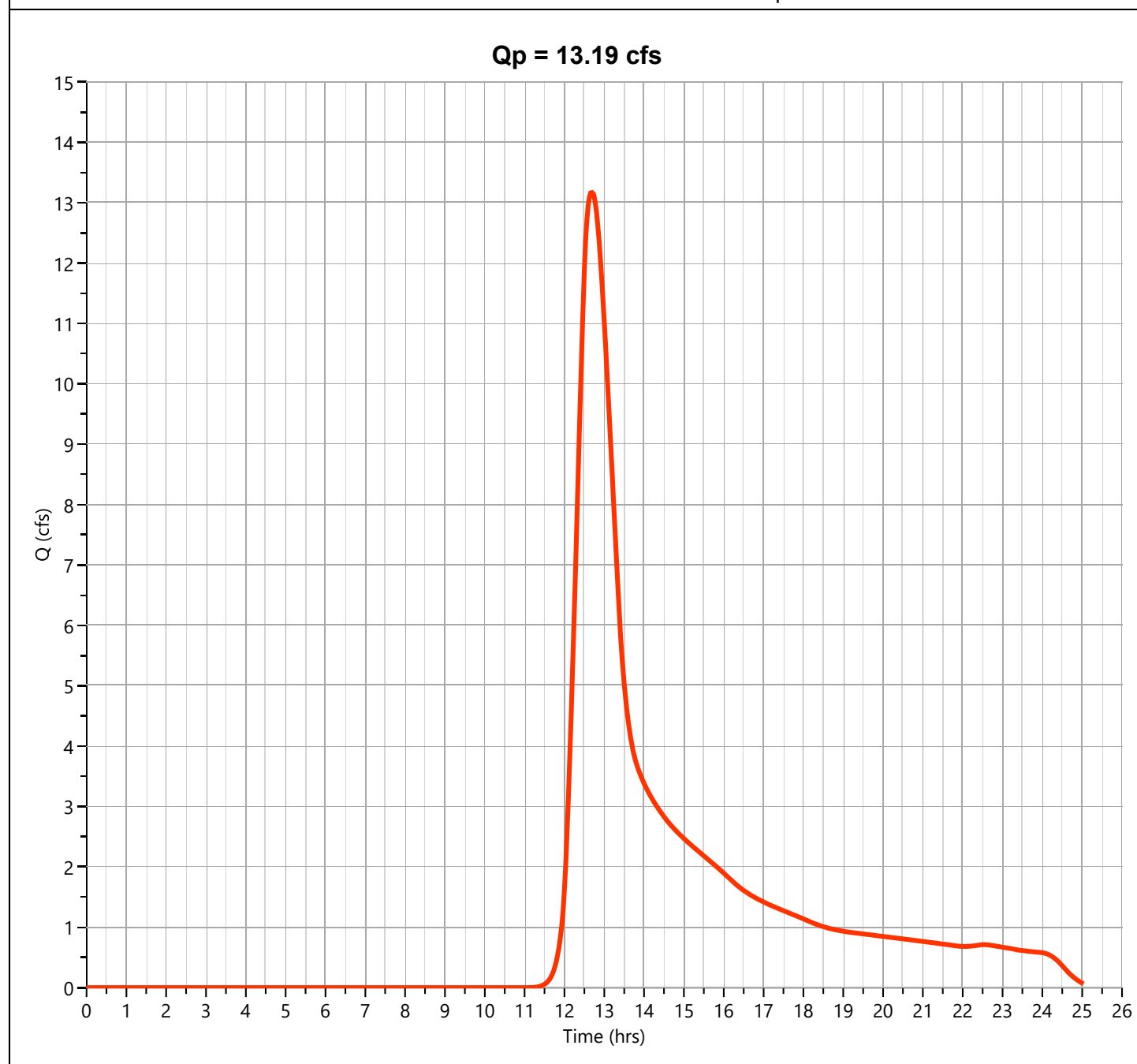
Hydrology Studio v 1.0.0.0

09-09-2020

PR-A1

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 13.19 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.70 hrs
Time Interval	= 2 min	Runoff Volume	= 103,397 cuft
Drainage Area	= 39.49 ac	Curve Number	= 75
Tc Method	= User	Time of Conc. (Tc)	= 52.2 min
Total Rainfall	= 2.61 in	Design Storm	= Type III
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

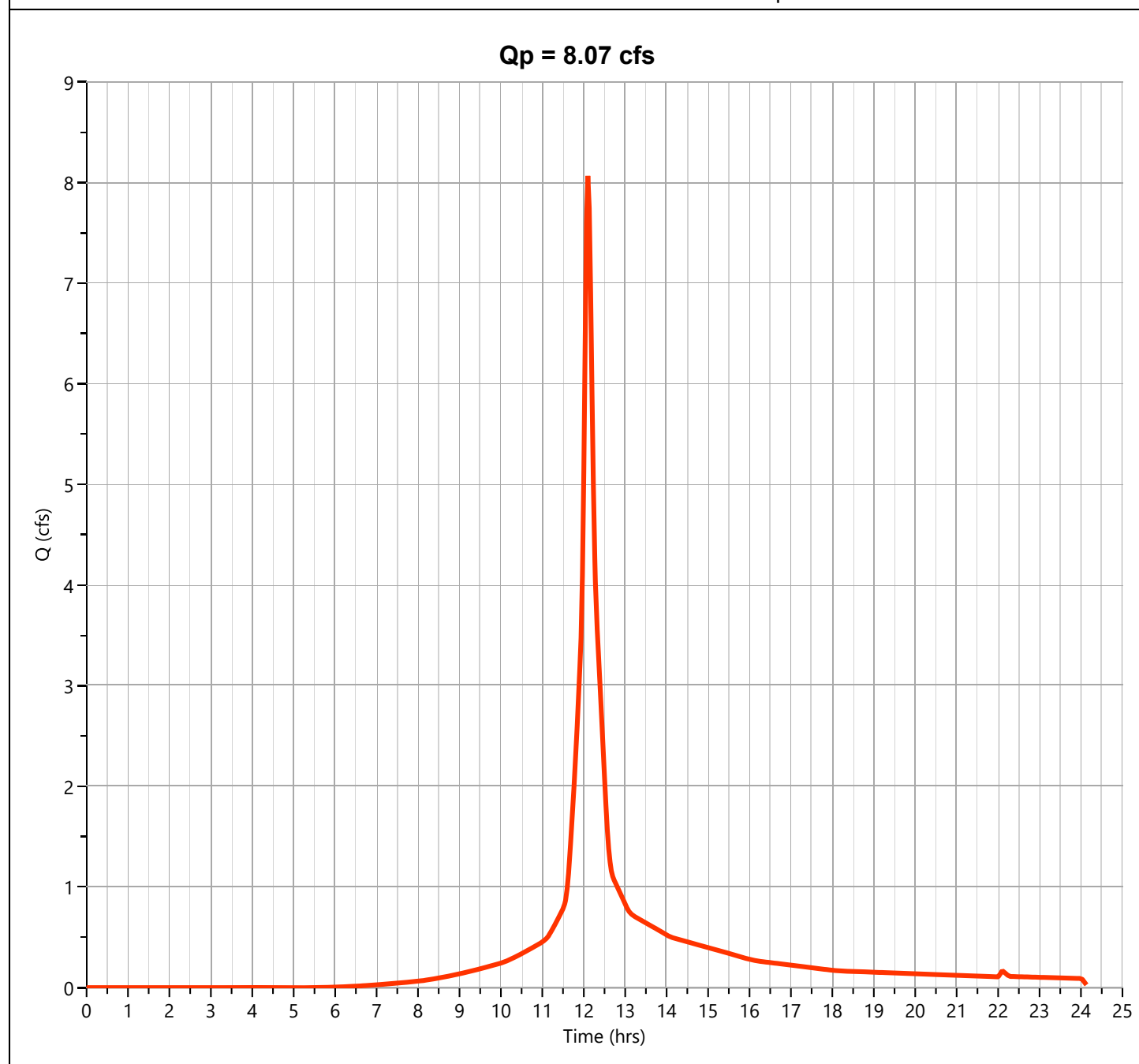
Hydrology Studio v 1.0.0.0

09-09-2020

PR-A2-A

Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 8.067 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.10 hrs
Time Interval	= 2 min	Runoff Volume	= 27,879 cuft
Drainage Area	= 4.278 ac	Curve Number	= 92
Tc Method	= User	Time of Conc. (Tc)	= 6.6 min
Total Rainfall	= 2.61 in	Design Storm	= Type III
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

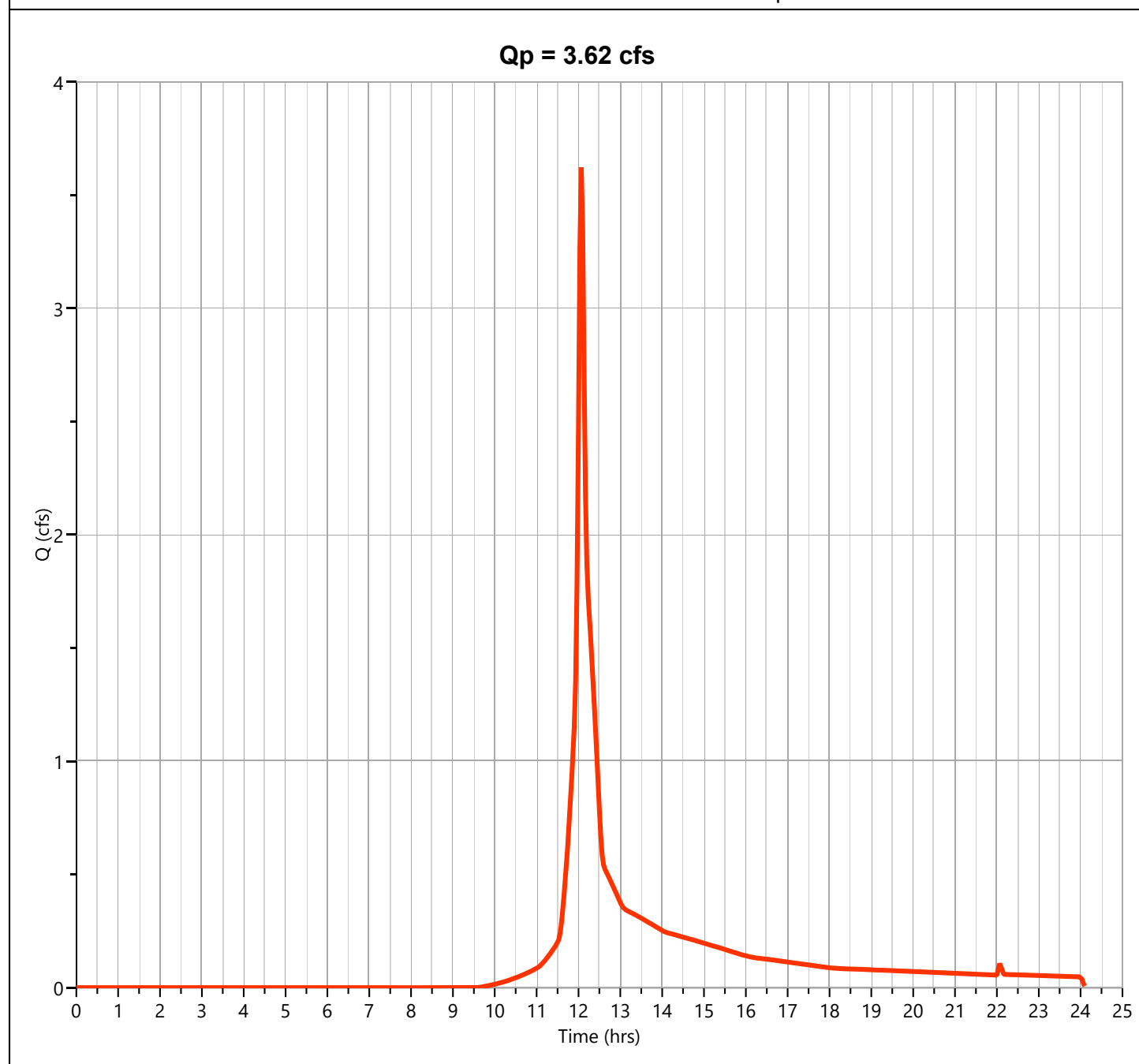
Hydrology Studio v 1.0.0.0

09-09-2020

PR-A2-B

Hyd. No. 3

Hydrograph Type	= NRCS Runoff	Peak Flow	= 3.622 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.07 hrs
Time Interval	= 2 min	Runoff Volume	= 10,984 cuft
Drainage Area	= 2.99 ac	Curve Number	= 82
Tc Method	= User	Time of Conc. (Tc)	= 5.4 min
Total Rainfall	= 2.61 in	Design Storm	= Type III
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

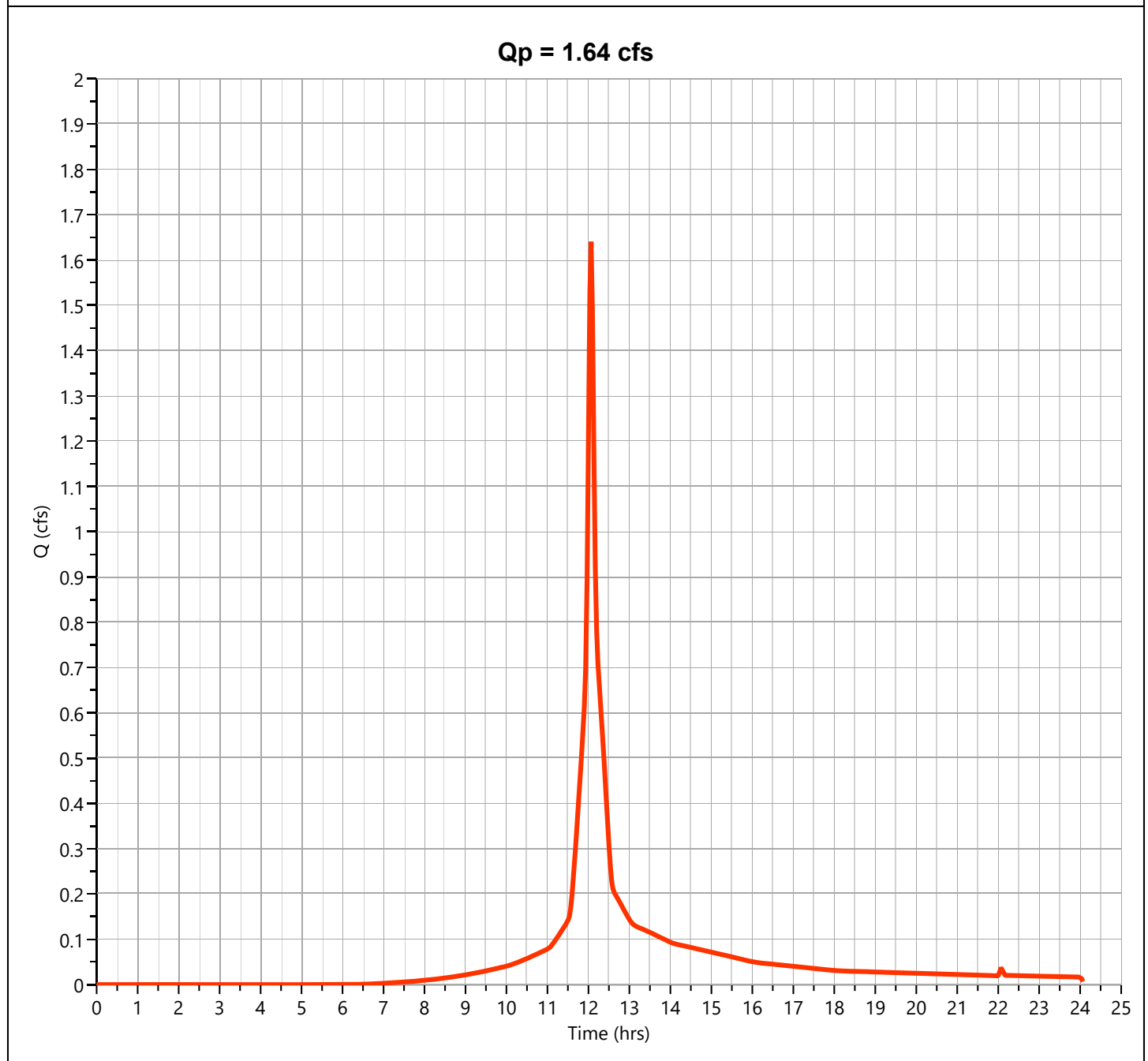
Hydrology Studio v 1.0.0.0

09-09-2020

PR-A3

Hyd. No. 4

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.640 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.07 hrs
Time Interval	= 2 min	Runoff Volume	= 4,949 cuft
Drainage Area	= 0.85 ac	Curve Number	= 91
Tc Method	= User	Time of Conc. (Tc)	= 5.4 min
Total Rainfall	= 2.61 in	Design Storm	= Type III
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

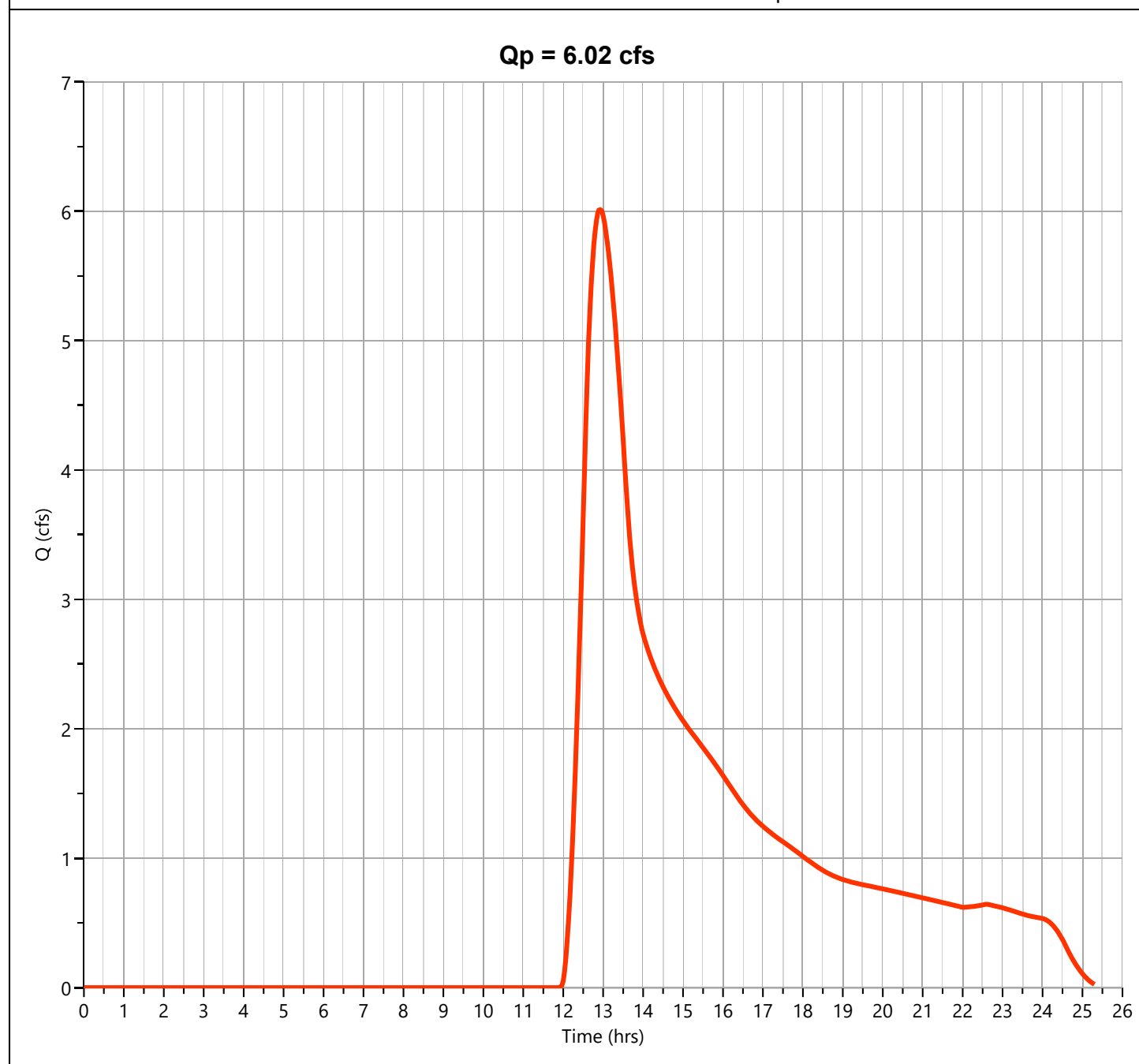
Hydrology Studio v 1.0.0.0

09-09-2020

PR-A4

Hyd. No. 5

Hydrograph Type	= NRCS Runoff	Peak Flow	= 6.022 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.93 hrs
Time Interval	= 2 min	Runoff Volume	= 68,791 cuft
Drainage Area	= 55.78 ac	Curve Number	= 65
Tc Method	= User	Time of Conc. (Tc)	= 58.2 min
Total Rainfall	= 2.61 in	Design Storm	= Type III
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

Detention Pond A1

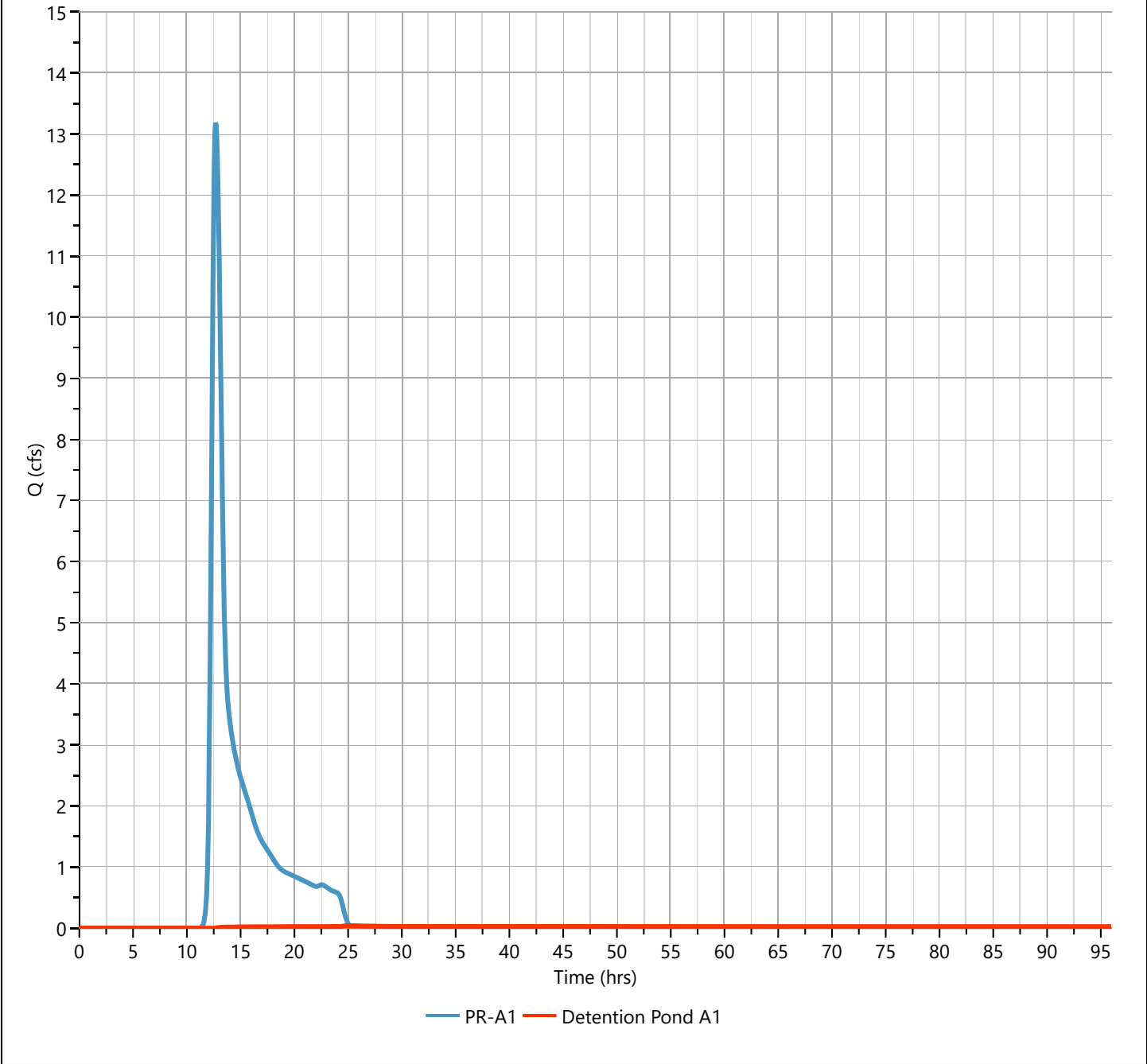
Hyd. No. 6

Hydrograph Type	= Pond Route	Peak Flow	= 0.040 cfs
Storm Frequency	= 1-yr	Time to Peak	= 25.10 hrs
Time Interval	= 2 min	Hydrograph Volume	= 7,548 cuft
Inflow Hydrograph	= 1 - PR-A1	Max. Elevation	= 356.00 ft
Pond Name	= Detention Pond A1	Max. Storage	= 372,036 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 39.33 hrs

Qp = 0.04 cfs



Hydrograph Report

Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

Forebay A2-A

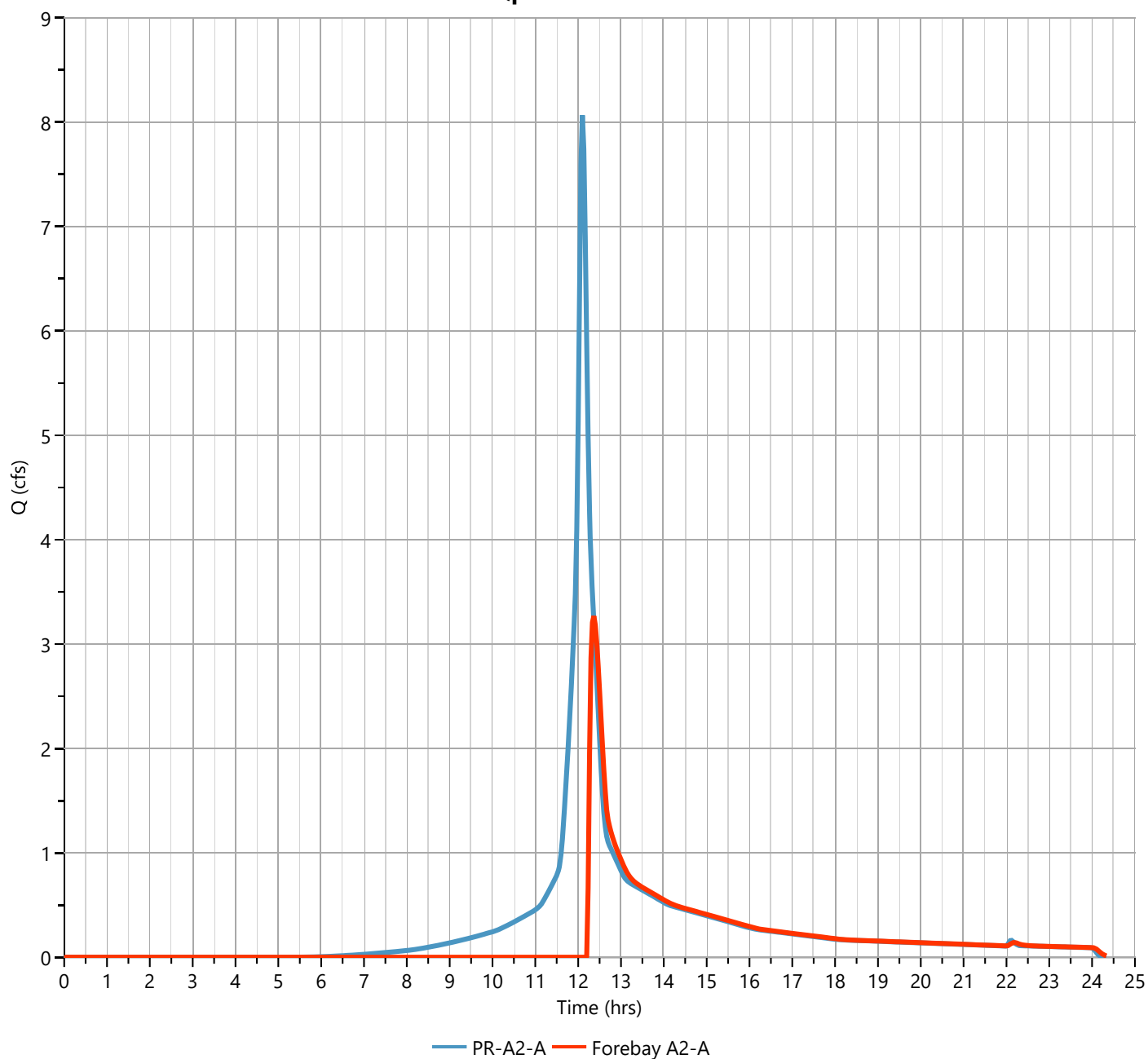
Hyd. No. 7

Hydrograph Type	= Pond Route	Peak Flow	= 3.269 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.37 hrs
Time Interval	= 2 min	Hydrograph Volume	= 15,104 cuft
Inflow Hydrograph	= 2 - PR-A2-A	Max. Elevation	= 366.68 ft
Pond Name	= Forebay A2-A	Max. Storage	= 13,711 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 1.74 hrs

Qp = 3.27 cfs



Hydrograph Report

Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

Forebay A2-B

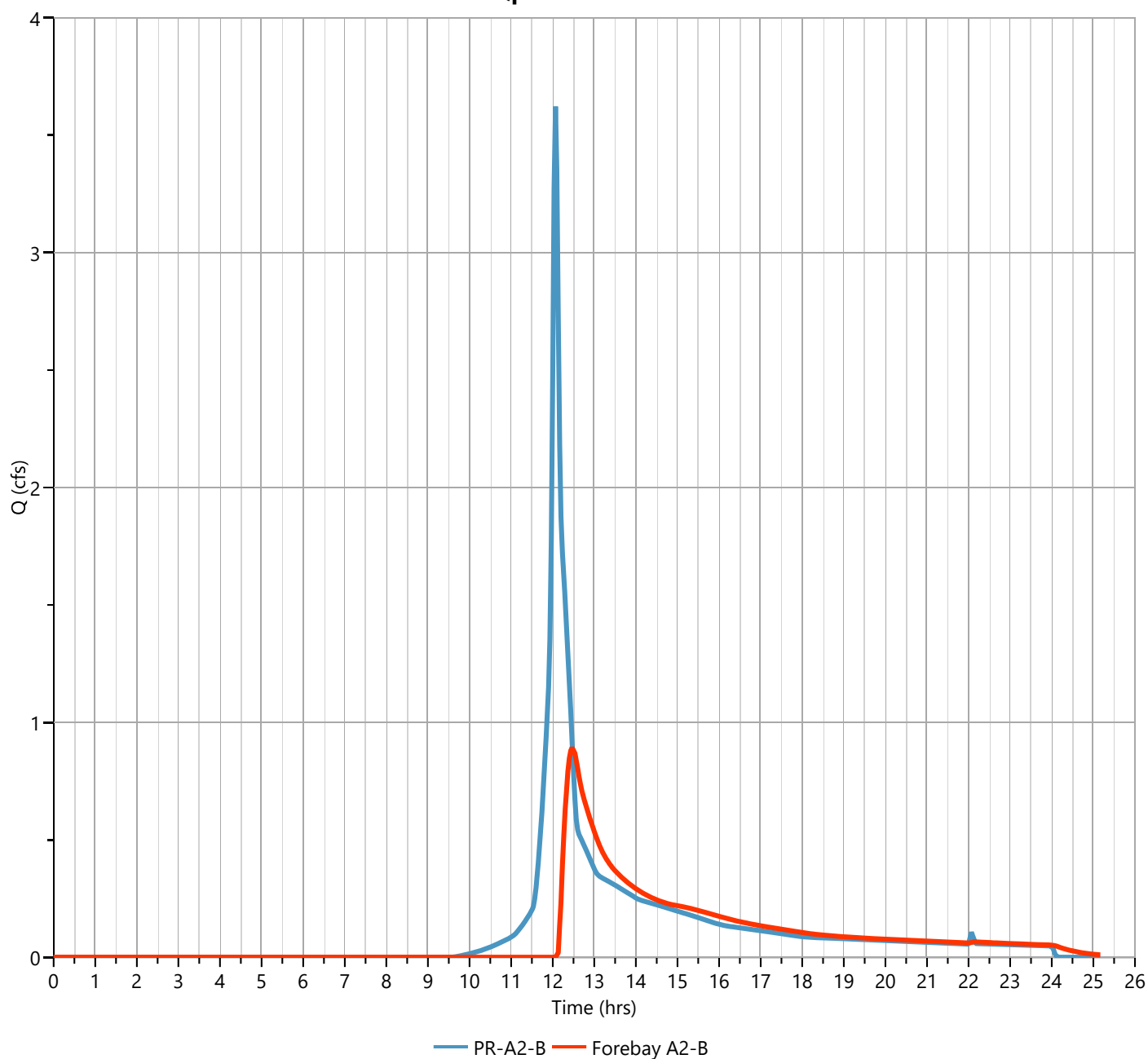
Hyd. No. 8

Hydrograph Type	= Pond Route	Peak Flow	= 0.892 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.47 hrs
Time Interval	= 2 min	Hydrograph Volume	= 7,661 cuft
Inflow Hydrograph	= 3 - PR-A2-B	Max. Elevation	= 360.46 ft
Pond Name	= Forebay A2-B	Max. Storage	= 4,572 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 1.52 hrs

Qp = 0.89 cfs



Hydrograph Report

Project Name:

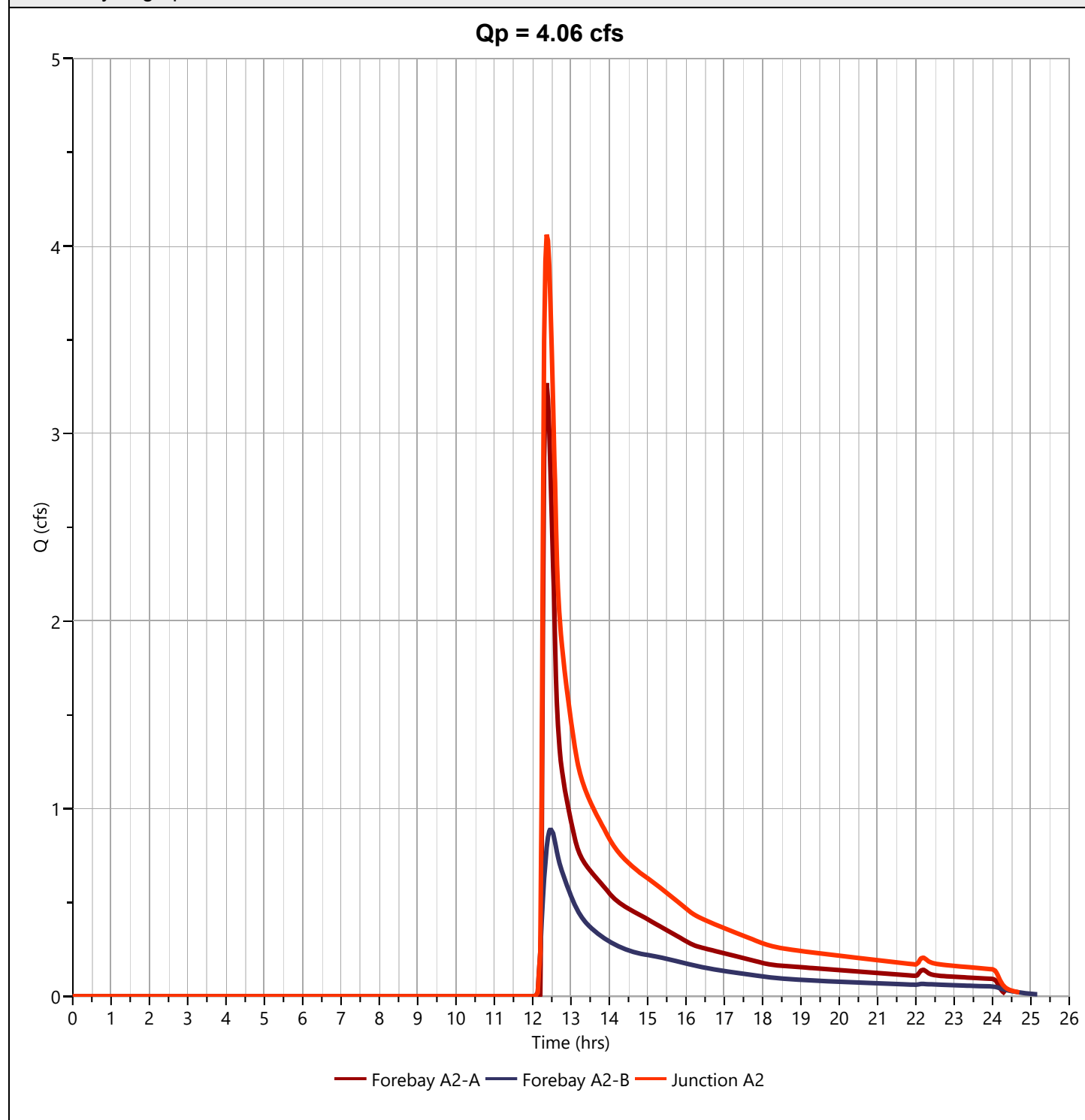
Hydrology Studio v 1.0.0.0

09-09-2020

Junction A2

Hyd. No. 9

Hydrograph Type	= Junction	Peak Flow	= 4.061 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.37 hrs
Time Interval	= 2 min	Hydrograph Volume	= 22,764 cuft
Inflow Hydrographs	= 7, 8	Total Contrib. Area	= 0.0 ac



Hydrograph Report

Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

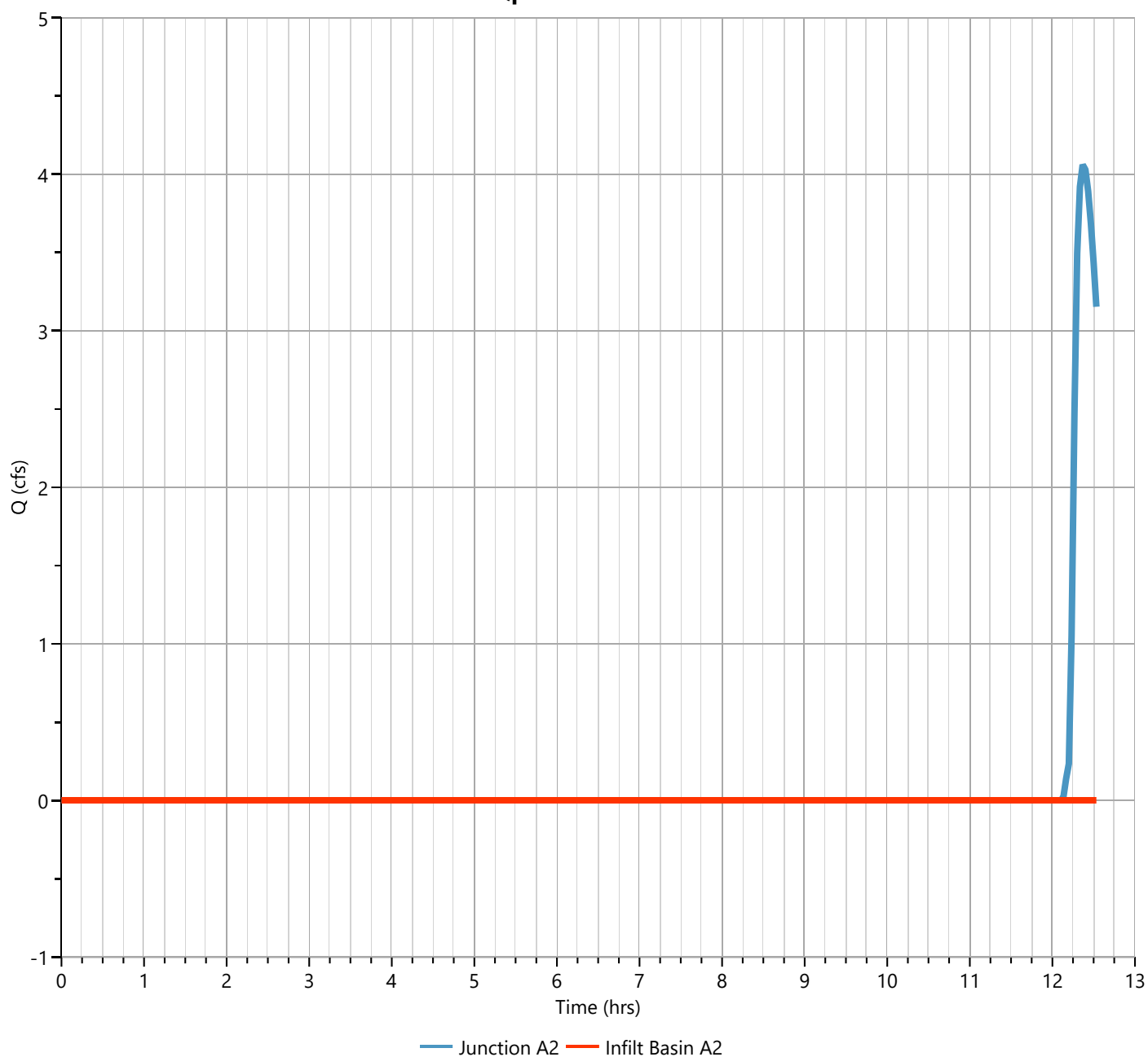
Infil Basin A2

Hyd. No. 10

Hydrograph Type	= Pond Route	Peak Flow	= 0.000 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.50 hrs
Time Interval	= 2 min	Hydrograph Volume	= 0.000 cuft
Inflow Hydrograph	= 9 - Junction A2	Max. Elevation	= 359.08 ft
Pond Name	= Infiltration A2	Max. Storage	= 831 cuft

Pond Routing by Storage Indication Method

Qp = 0.00 cfs



Hydrograph Report

Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

Pocket Pond A3

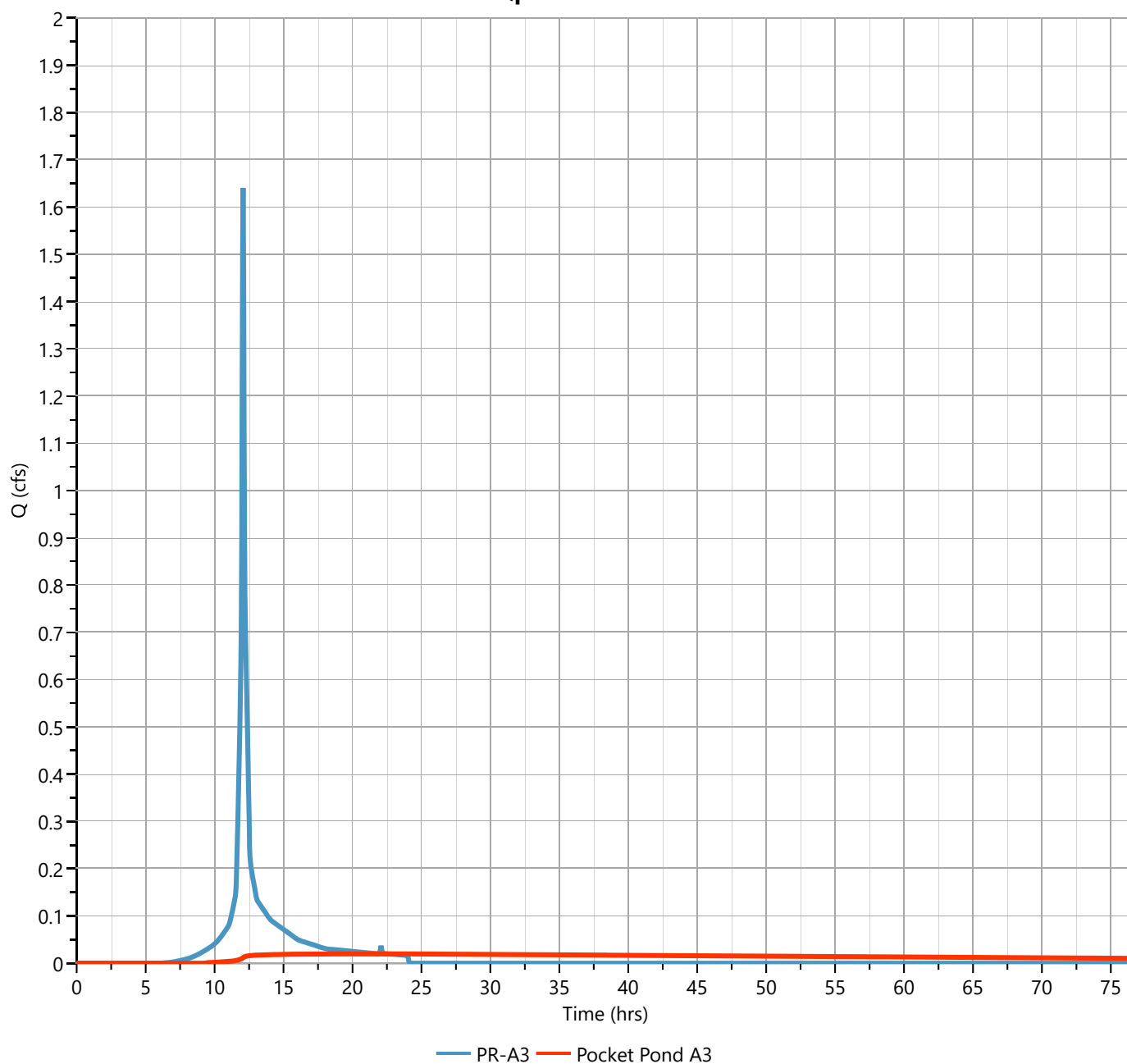
Hyd. No. 11

Hydrograph Type	= Pond Route	Peak Flow	= 0.020 cfs
Storm Frequency	= 1-yr	Time to Peak	= 22.50 hrs
Time Interval	= 2 min	Hydrograph Volume	= 4,223 cuft
Inflow Hydrograph	= 4 - PR-A3	Max. Elevation	= 362.60 ft
Pond Name	= Pocket Pond A3	Max. Storage	= 14,921 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 33.25 hrs

Qp = 0.02 cfs



Hydrograph Report

Project Name:

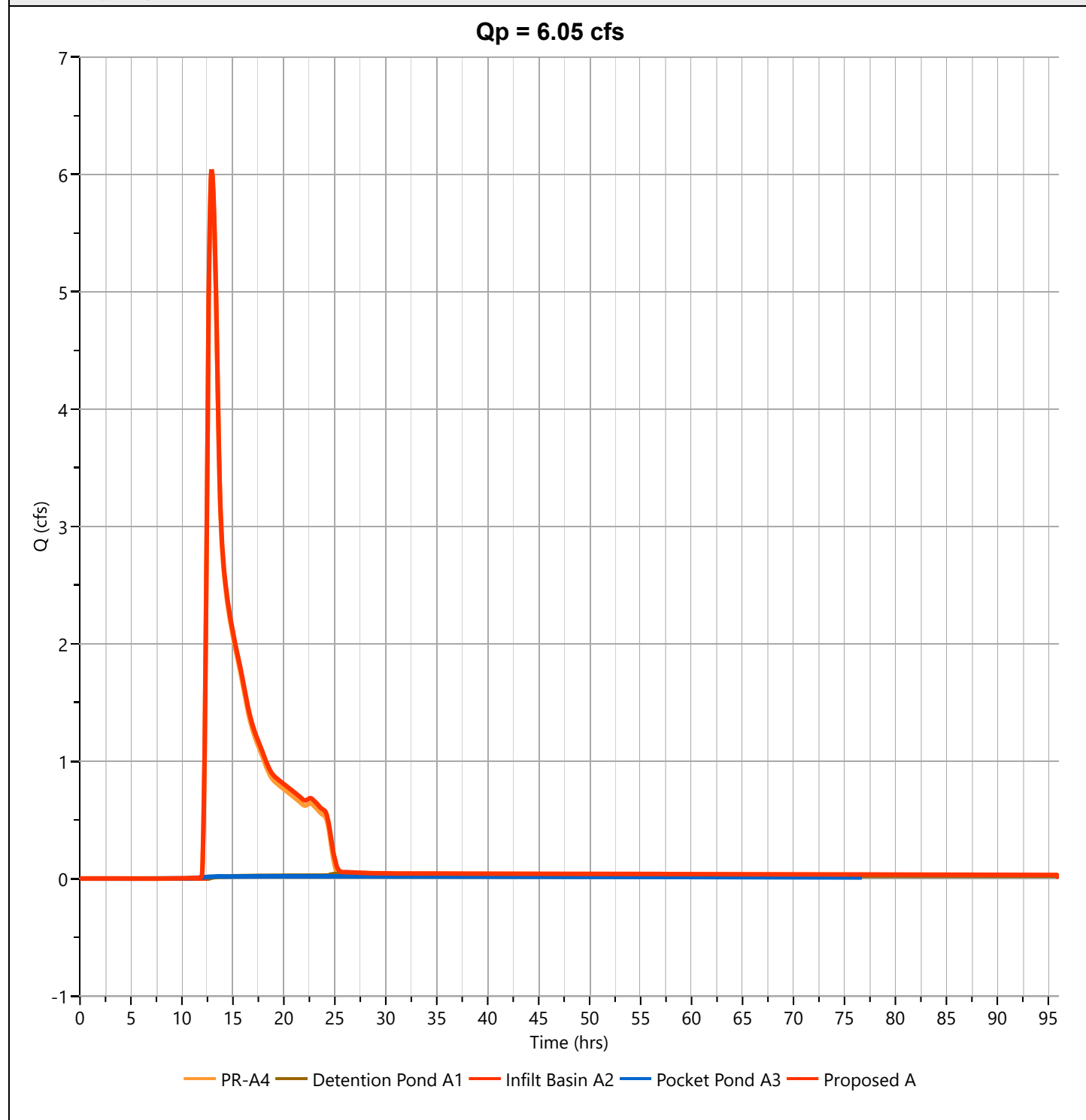
Hydrology Studio v 1.0.0.0

09-09-2020

Proposed A

Hyd. No. 12

Hydrograph Type	= Junction	Peak Flow	= 6.048 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.93 hrs
Time Interval	= 2 min	Hydrograph Volume	= 80,562 cuft
Inflow Hydrographs	= 5, 6, 10, 11	Total Contrib. Area	= 55.78 ac



Hydrograph Report

Project Name:

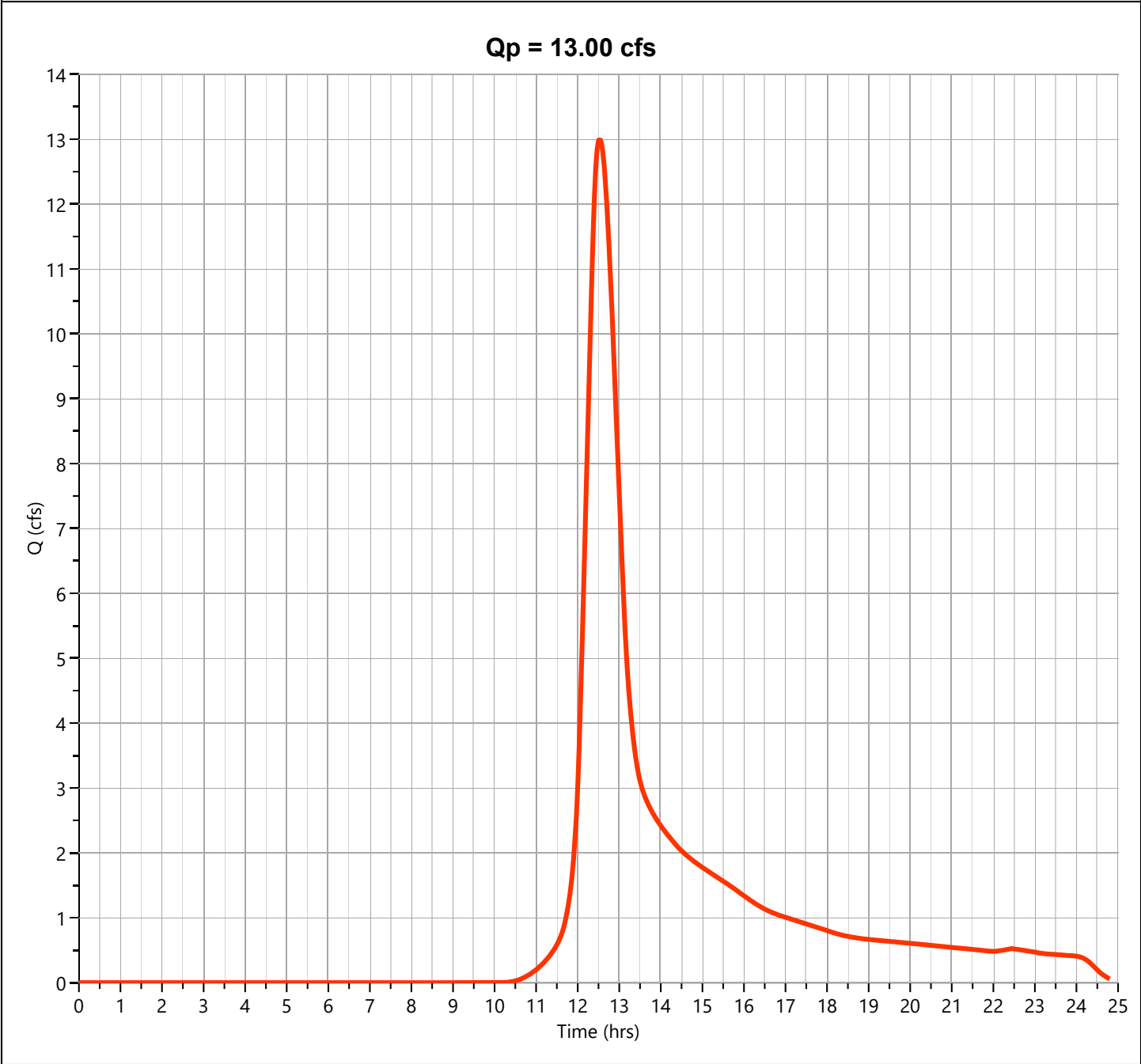
Hydrology Studio v 1.0.0.0

09-09-2020

PR-B1

Hyd. No. 13

Hydrograph Type	= NRCS Runoff	Peak Flow	= 13.00 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.53 hrs
Time Interval	= 2 min	Runoff Volume	= 84,945 cuft
Drainage Area	= 24.0 ac	Curve Number	= 80
Tc Method	= User	Time of Conc. (Tc)	= 41.4 min
Total Rainfall	= 2.61 in	Design Storm	= Type III
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

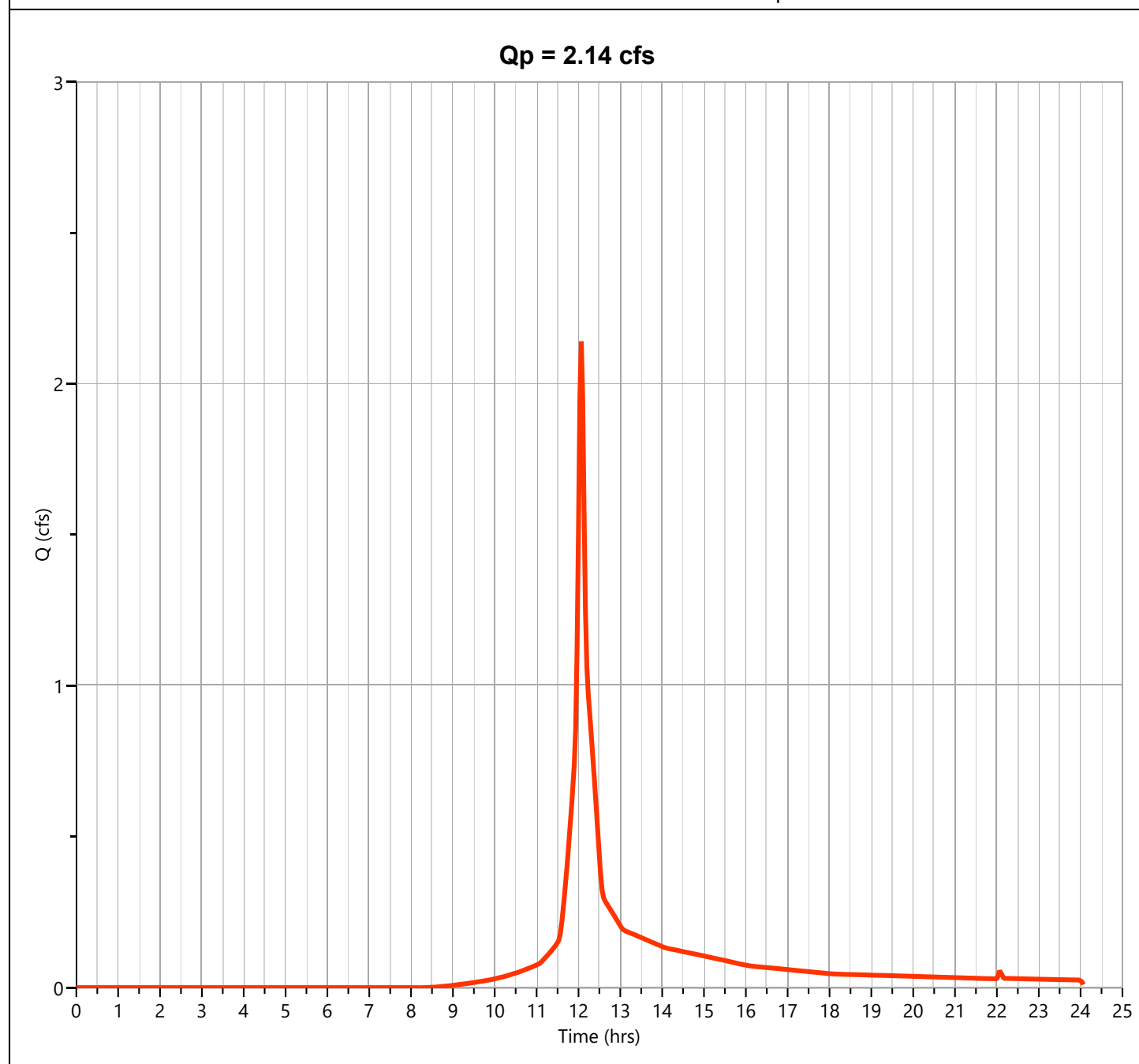
Hydrology Studio v 1.0.0.0

09-09-2020

PR-B2

Hyd. No. 14

Hydrograph Type	= NRCS Runoff	Peak Flow	= 2.141 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.07 hrs
Time Interval	= 2 min	Runoff Volume	= 6,400 cuft
Drainage Area	= 1.41 ac	Curve Number	= 86
Tc Method	= User	Time of Conc. (Tc)	= 4.2 min
Total Rainfall	= 2.61 in	Design Storm	= Type III
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

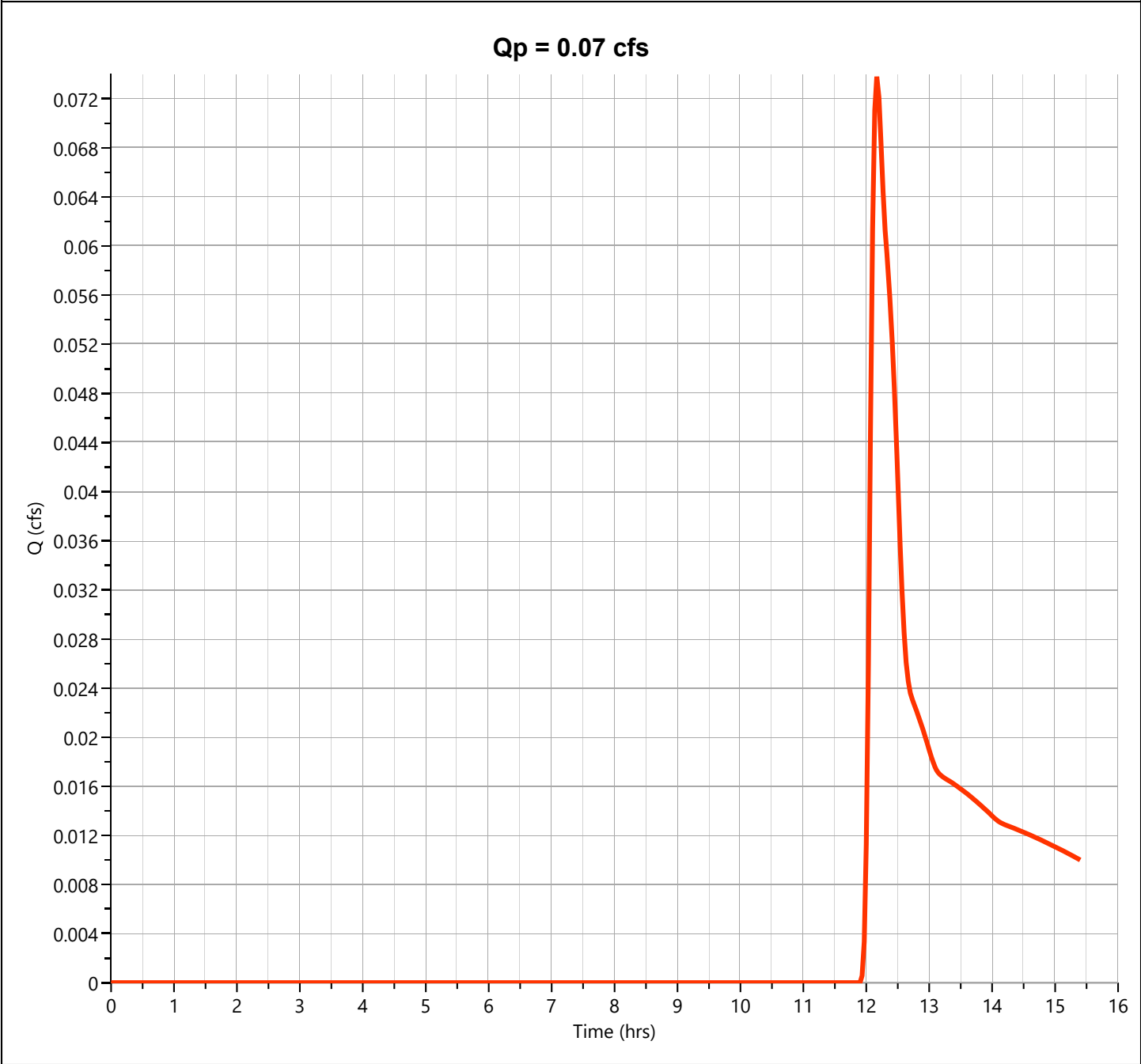
Hydrology Studio v 1.0.0.0

09-09-2020

PR-B3

Hyd. No. 15

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.074 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 419 cuft
Drainage Area	= 0.34 ac	Curve Number	= 65
Tc Method	= User	Time of Conc. (Tc)	= 9.0 min
Total Rainfall	= 2.61 in	Design Storm	= Type III
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

Forebay B3

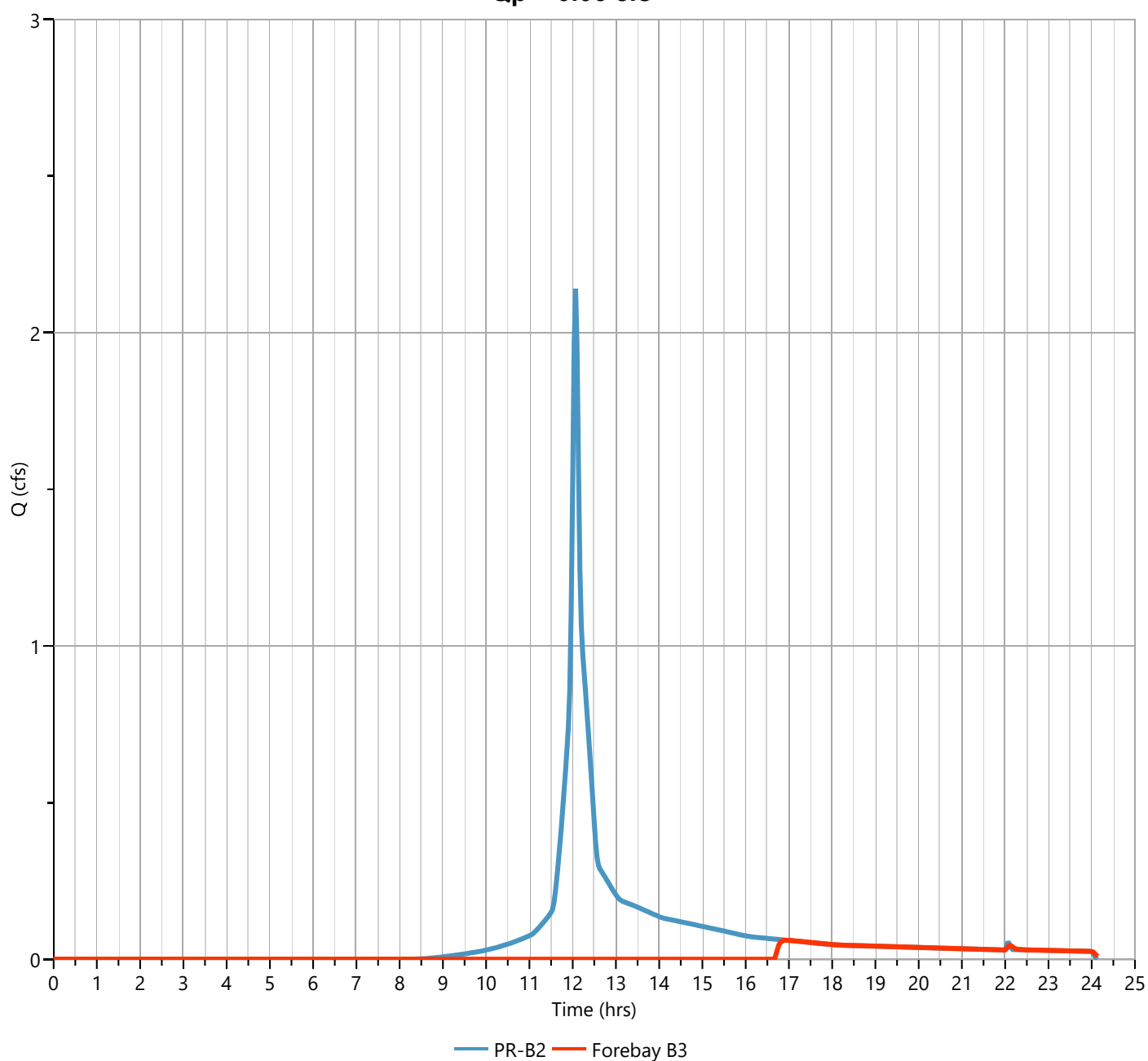
Hyd. No. 16

Hydrograph Type	= Pond Route	Peak Flow	= 0.060 cfs
Storm Frequency	= 1-yr	Time to Peak	= 16.93 hrs
Time Interval	= 2 min	Hydrograph Volume	= 1,005 cuft
Inflow Hydrograph	= 14 - PR-B2	Max. Elevation	= 373.00 ft
Pond Name	= Forebay B	Max. Storage	= 5,408 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 6.09 hrs

Qp = 0.06 cfs



Hydrograph Report

Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

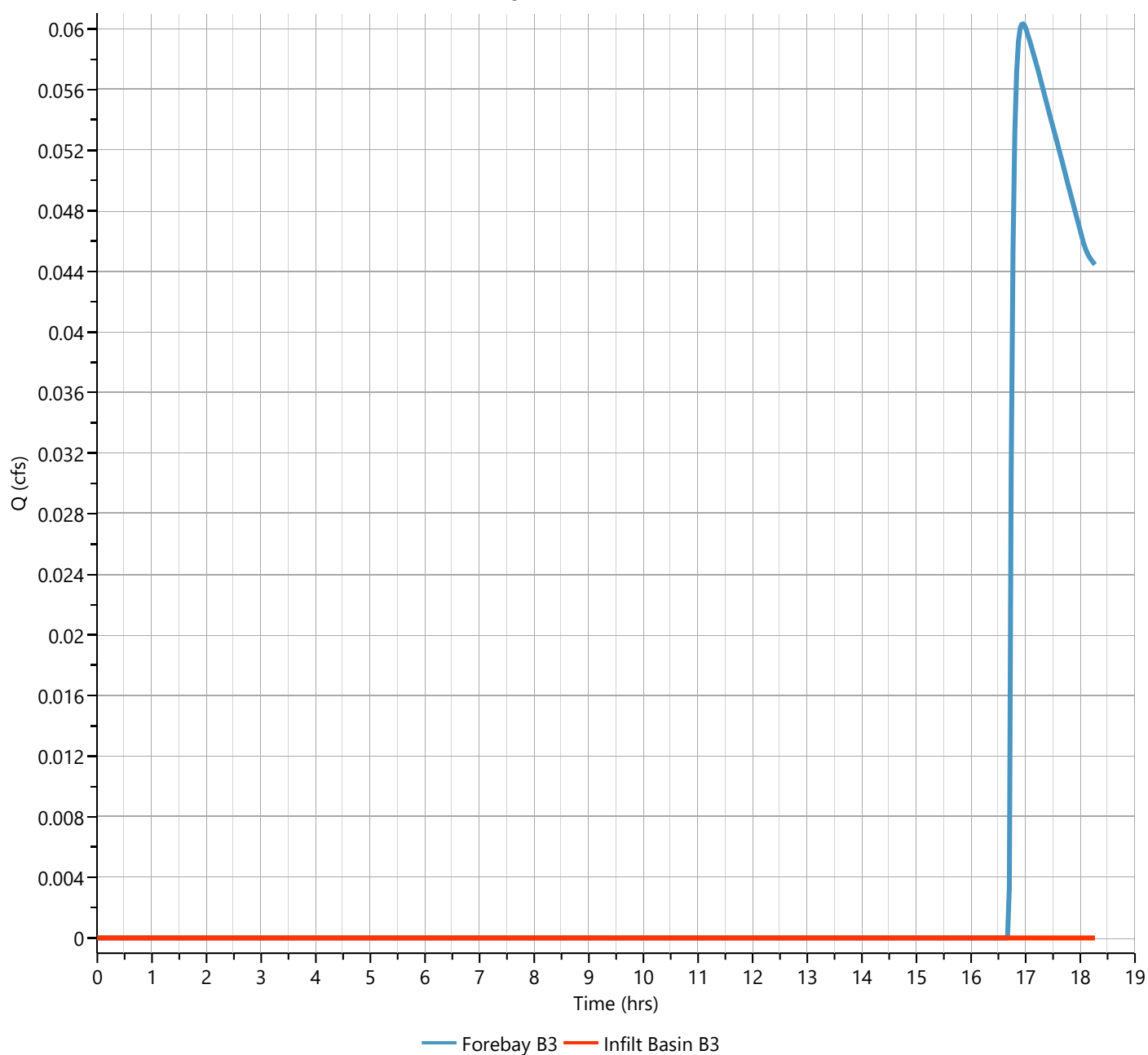
Infiltration Basin B3

Hyd. No. 17

Hydrograph Type	= Pond Route	Peak Flow	= 0.000 cfs
Storm Frequency	= 1-yr	Time to Peak	= 18.23 hrs
Time Interval	= 2 min	Hydrograph Volume	= 0.000 cuft
Inflow Hydrograph	= 16 - Forebay B3	Max. Elevation	= 369.20 ft
Pond Name	= Pond B	Max. Storage	= 359 cuft

Pond Routing by Storage Indication Method

Qp = 0.00 cfs



Hydrograph Report

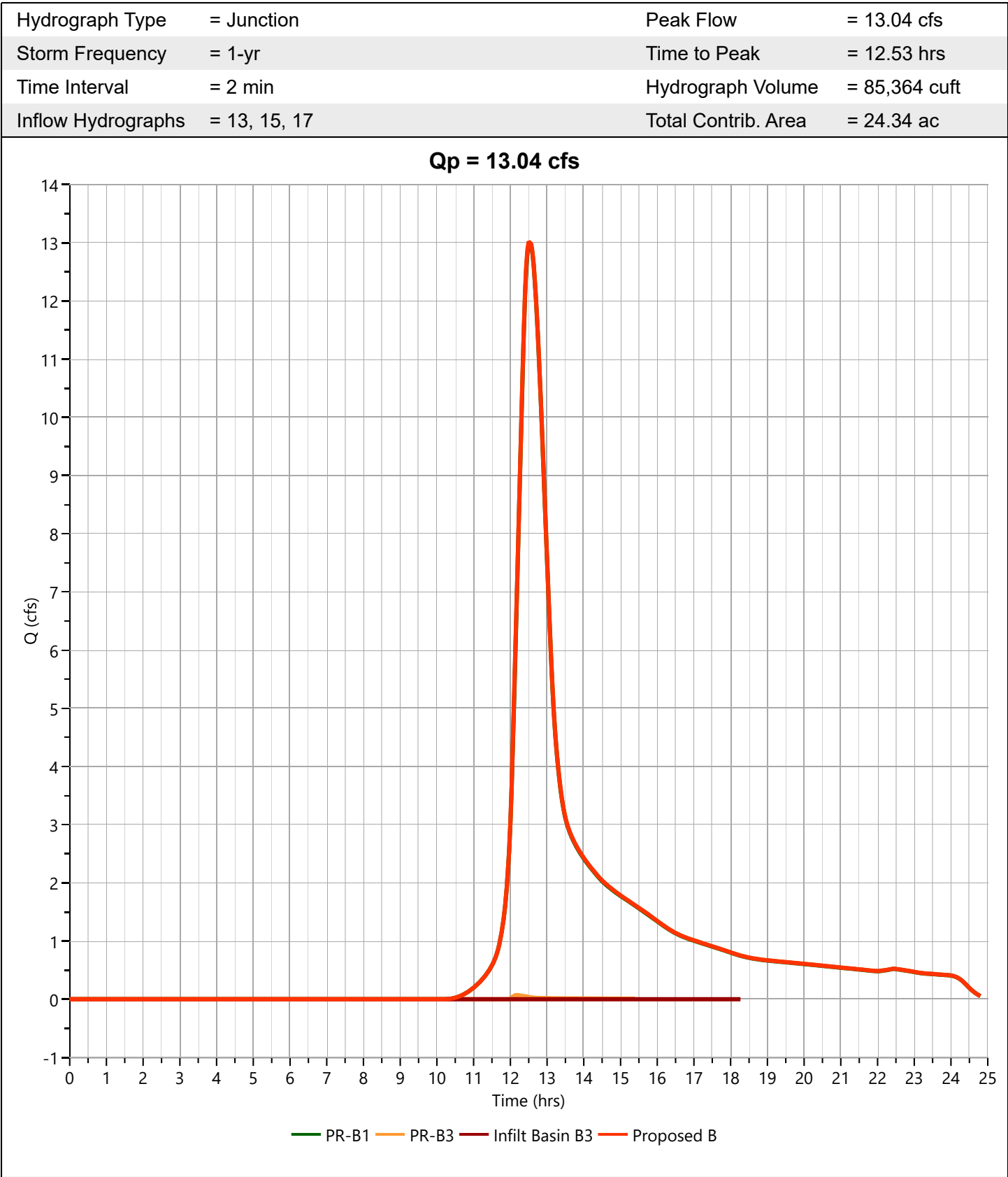
Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

Proposed B

Hyd. No. 18



APPENDIX 8

10-YEAR DESIGN STORM

HYDROGRAPHS

This page is left intentionally blank

Hydrograph Report

Project Name:

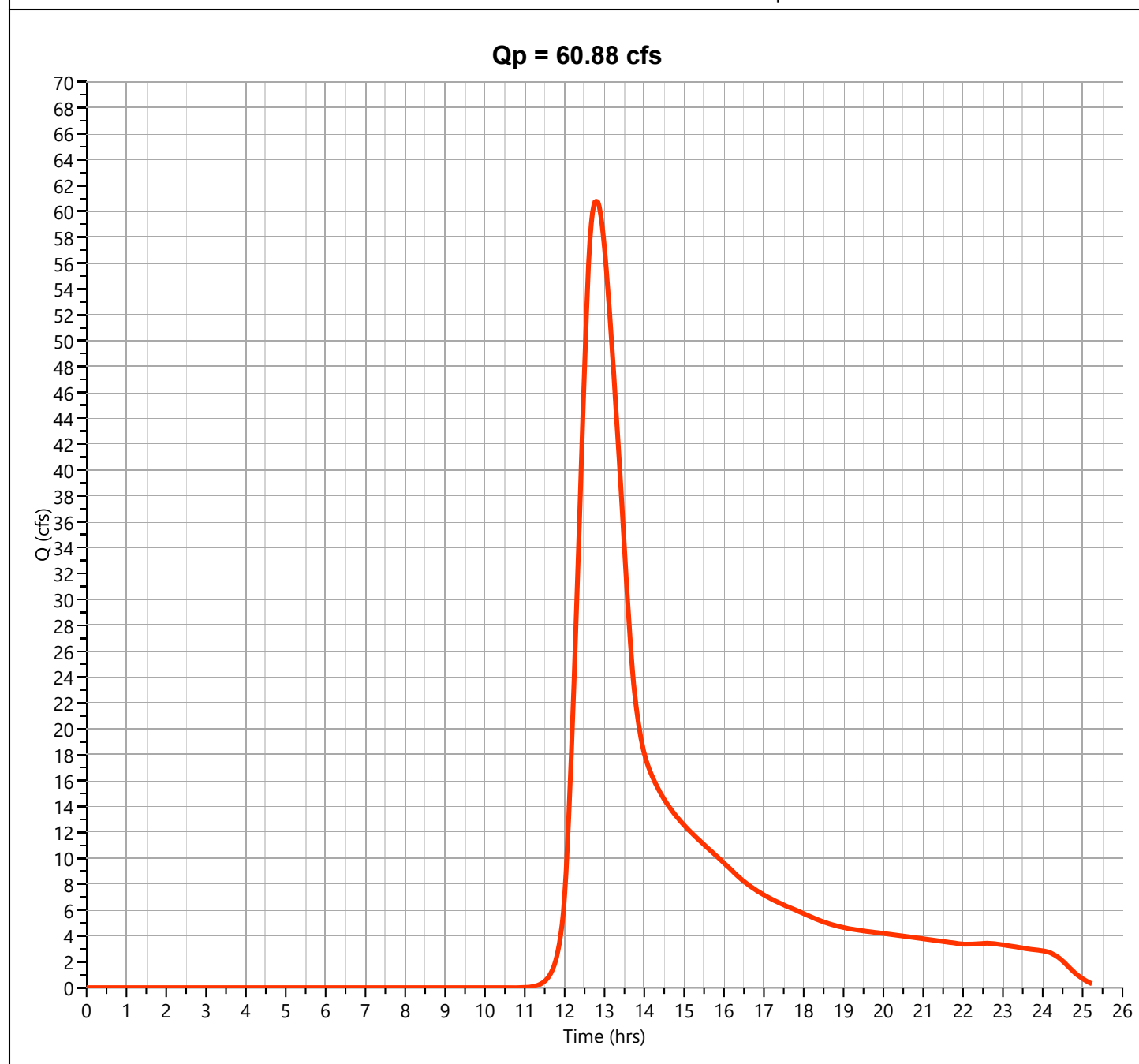
Hydrology Studio v 3.0.0.4

01-22-2019

EX-A

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 60.88 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.80 hrs
Time Interval	= 2 min	Runoff Volume	= 520,132 cuft
Drainage Area	= 102.47 ac	Curve Number	= 64
Tc Method	= User	Time of Conc. (Tc)	= 63.6 min
Total Rainfall	= 4.7000 in	Design Storm	= Type III
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

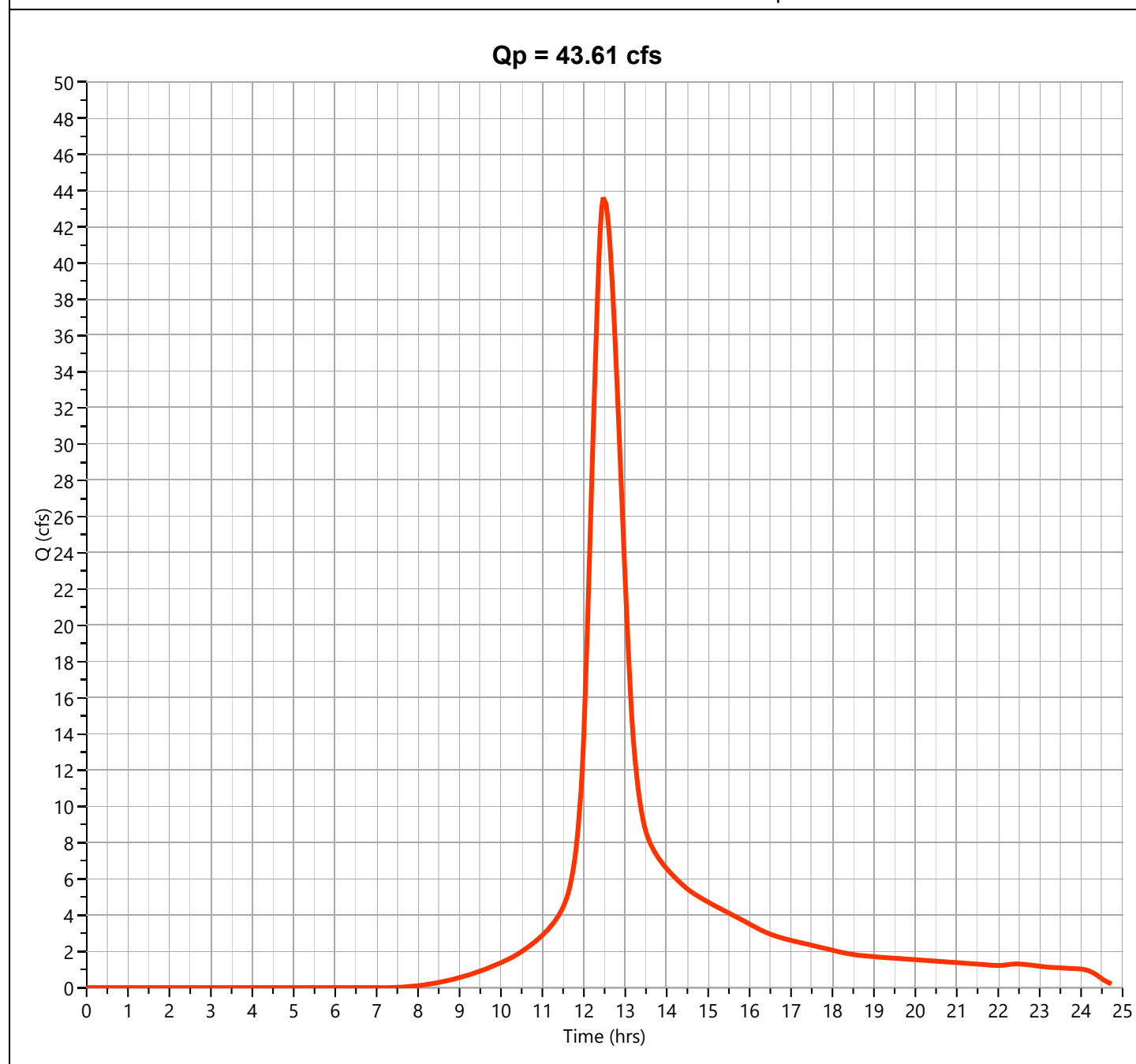
Hydrology Studio v 3.0.0.4

01-22-2019

EX-B

Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 43.61 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.47 hrs
Time Interval	= 2 min	Runoff Volume	= 274,874 cuft
Drainage Area	= 26.67 ac	Curve Number	= 82
Tc Method	= User	Time of Conc. (Tc)	= 41.4 min
Total Rainfall	= 4.7000 in	Design Storm	= Type III
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

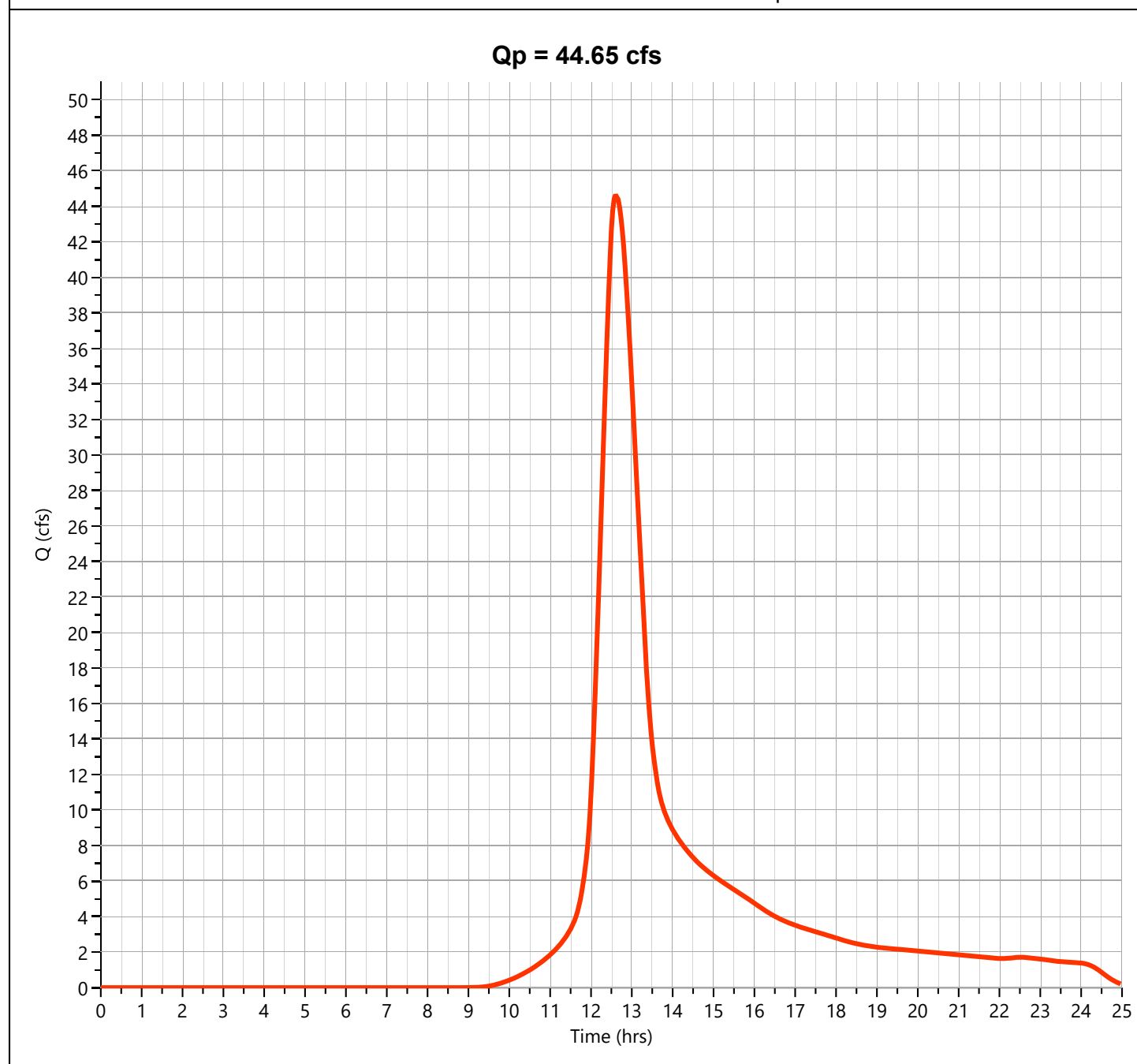
Hydrology Studio v 1.0.0.0

09-09-2020

PR-A1

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 44.65 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.60 hrs
Time Interval	= 2 min	Runoff Volume	= 319,029 cuft
Drainage Area	= 39.49 ac	Curve Number	= 75
Tc Method	= User	Time of Conc. (Tc)	= 52.2 min
Total Rainfall	= 4.70 in	Design Storm	= Type III
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

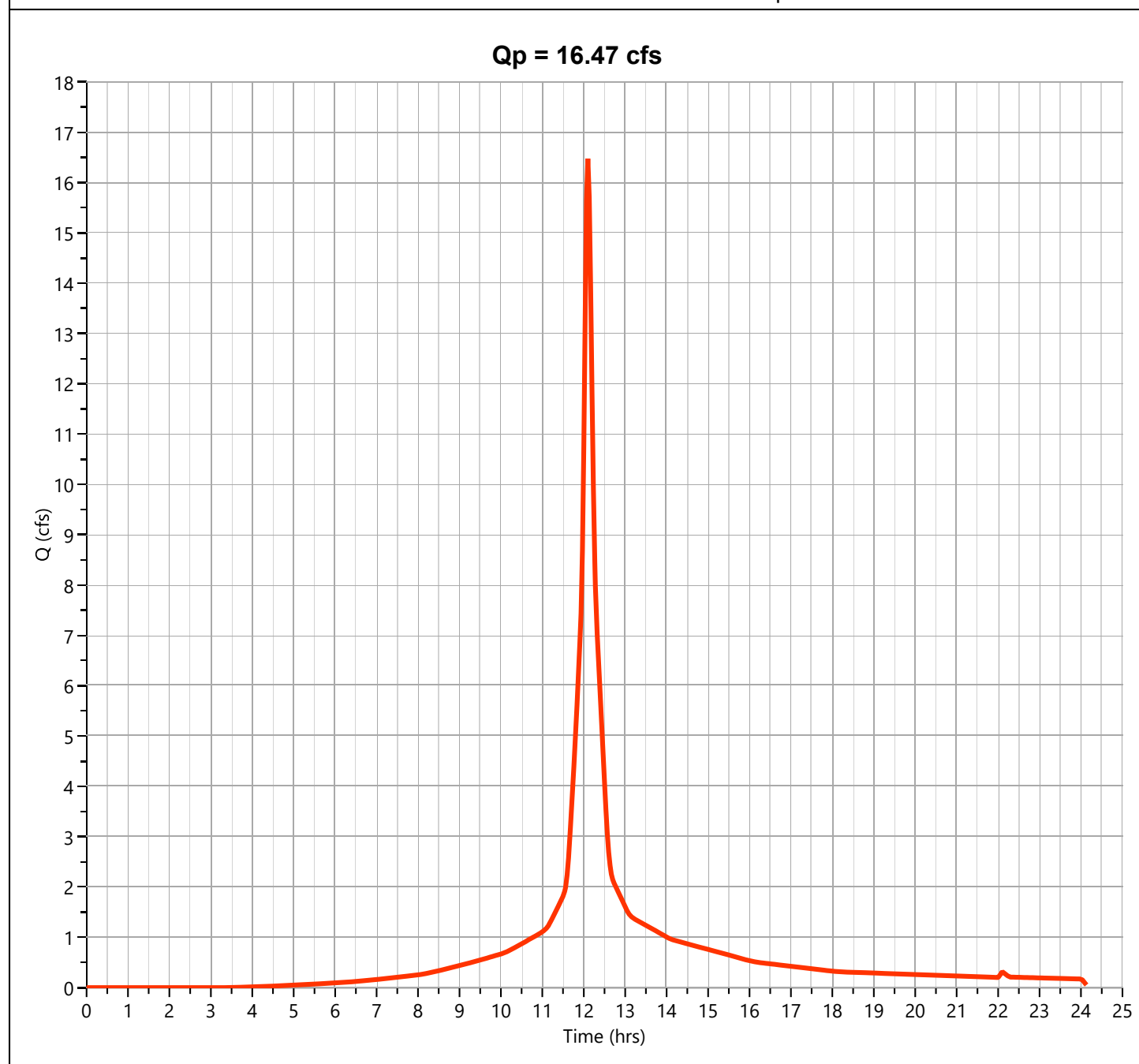
Hydrology Studio v 1.0.0.0

09-09-2020

PR-A2-A

Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 16.47 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.10 hrs
Time Interval	= 2 min	Runoff Volume	= 58,959 cuft
Drainage Area	= 4.278 ac	Curve Number	= 92
Tc Method	= User	Time of Conc. (Tc)	= 6.6 min
Total Rainfall	= 4.70 in	Design Storm	= Type III
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

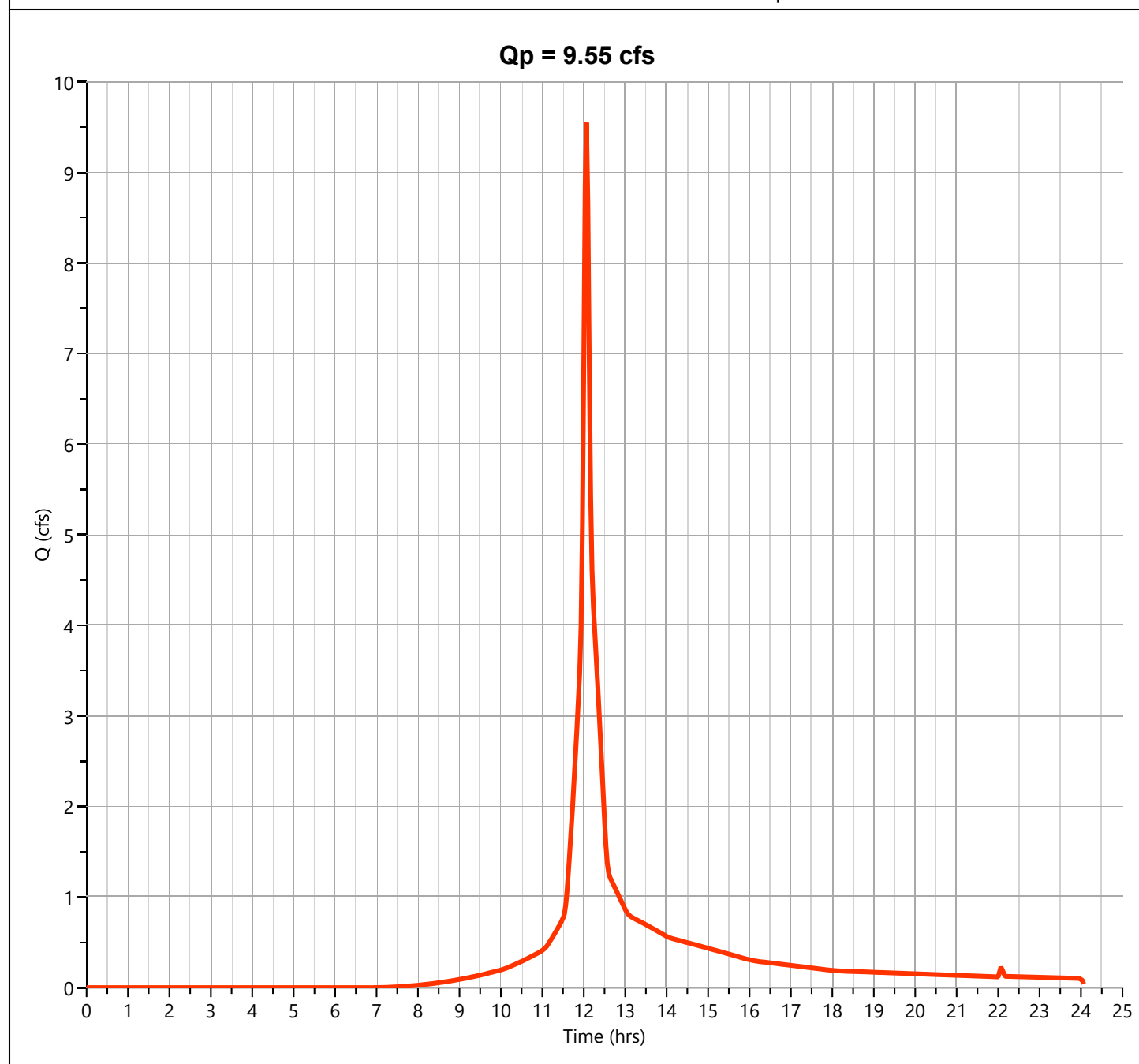
Hydrology Studio v 1.0.0.0

09-09-2020

PR-A2-B

Hyd. No. 3

Hydrograph Type	= NRCS Runoff	Peak Flow	= 9.552 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.07 hrs
Time Interval	= 2 min	Runoff Volume	= 28,615 cuft
Drainage Area	= 2.99 ac	Curve Number	= 82
Tc Method	= User	Time of Conc. (Tc)	= 5.4 min
Total Rainfall	= 4.70 in	Design Storm	= Type III
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

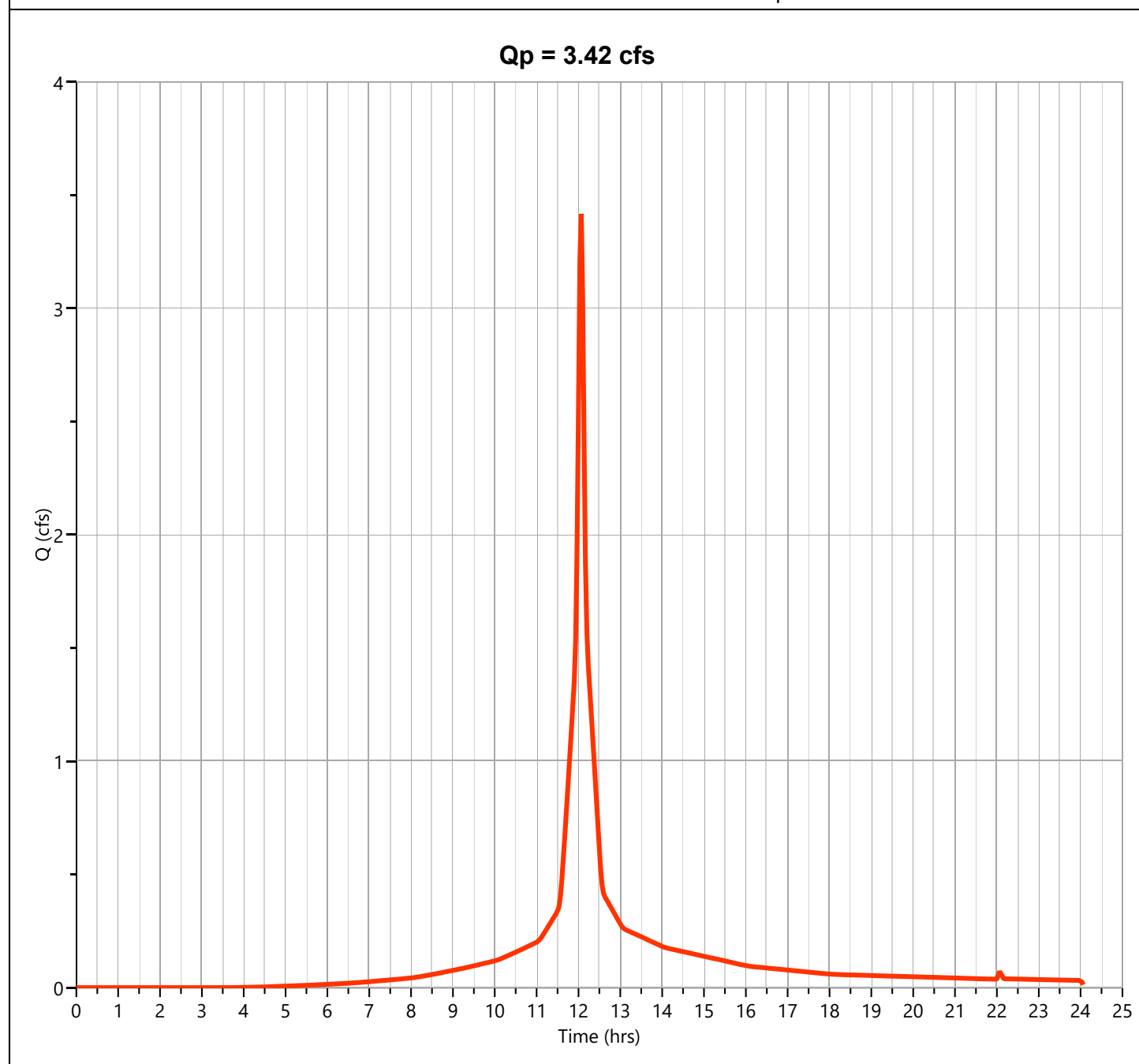
Hydrology Studio v 1.0.0.0

09-09-2020

PR-A3

Hyd. No. 4

Hydrograph Type	= NRCS Runoff	Peak Flow	= 3.417 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.07 hrs
Time Interval	= 2 min	Runoff Volume	= 10,678 cuft
Drainage Area	= 0.85 ac	Curve Number	= 91
Tc Method	= User	Time of Conc. (Tc)	= 5.4 min
Total Rainfall	= 4.70 in	Design Storm	= Type III
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

Hydrology Studio v 1.0.0.0

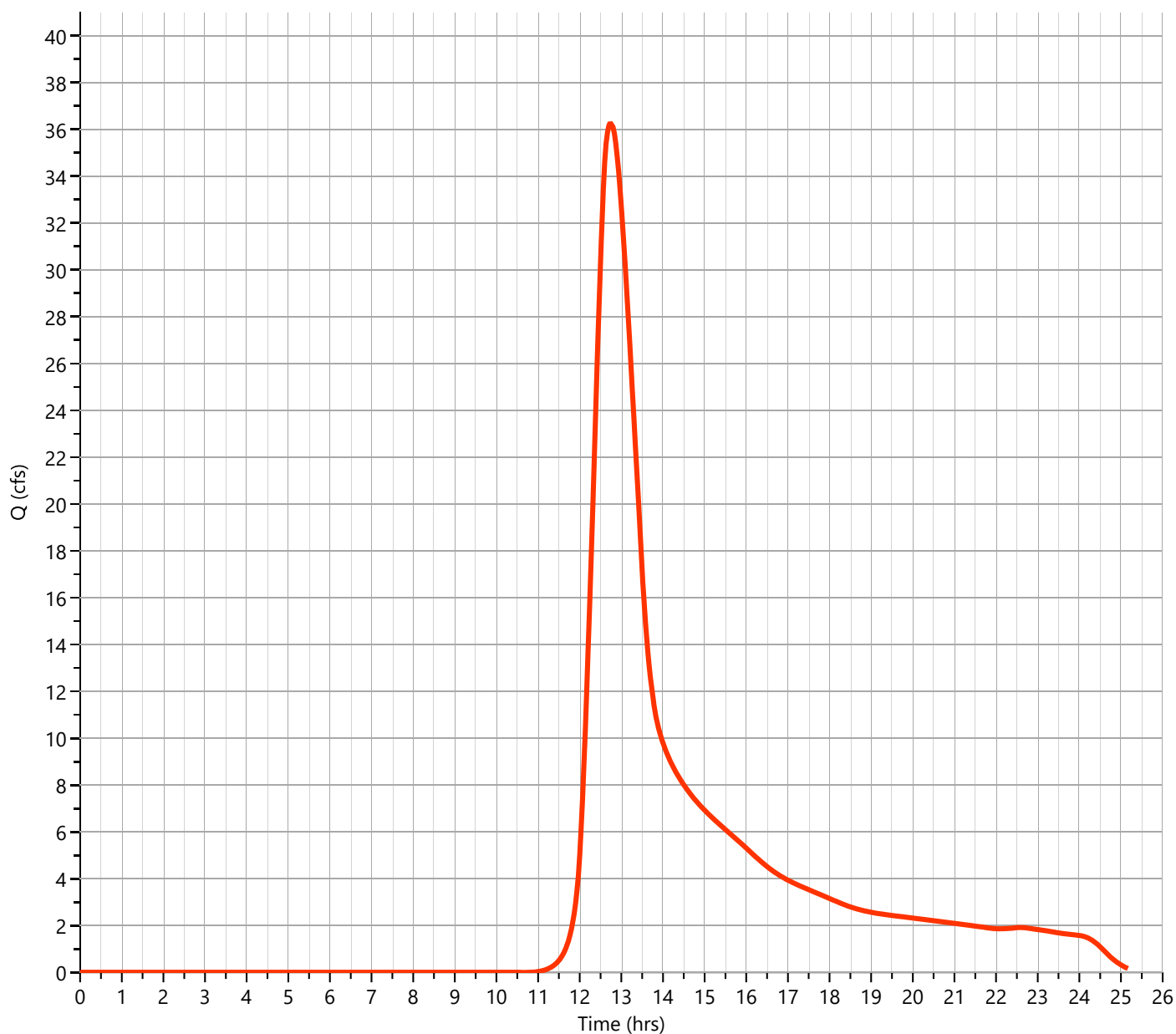
09-09-2020

PR-A4

Hyd. No. 5

Hydrograph Type	= NRCS Runoff	Peak Flow	= 36.29 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.73 hrs
Time Interval	= 2 min	Runoff Volume	= 295,071 cuft
Drainage Area	= 55.78 ac	Curve Number	= 65
Tc Method	= User	Time of Conc. (Tc)	= 58.2 min
Total Rainfall	= 4.70 in	Design Storm	= Type III
Storm Duration	= 24 hrs	Shape Factor	= 484

Qp = 36.29 cfs



Hydrograph Report

Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

Detention Pond A1

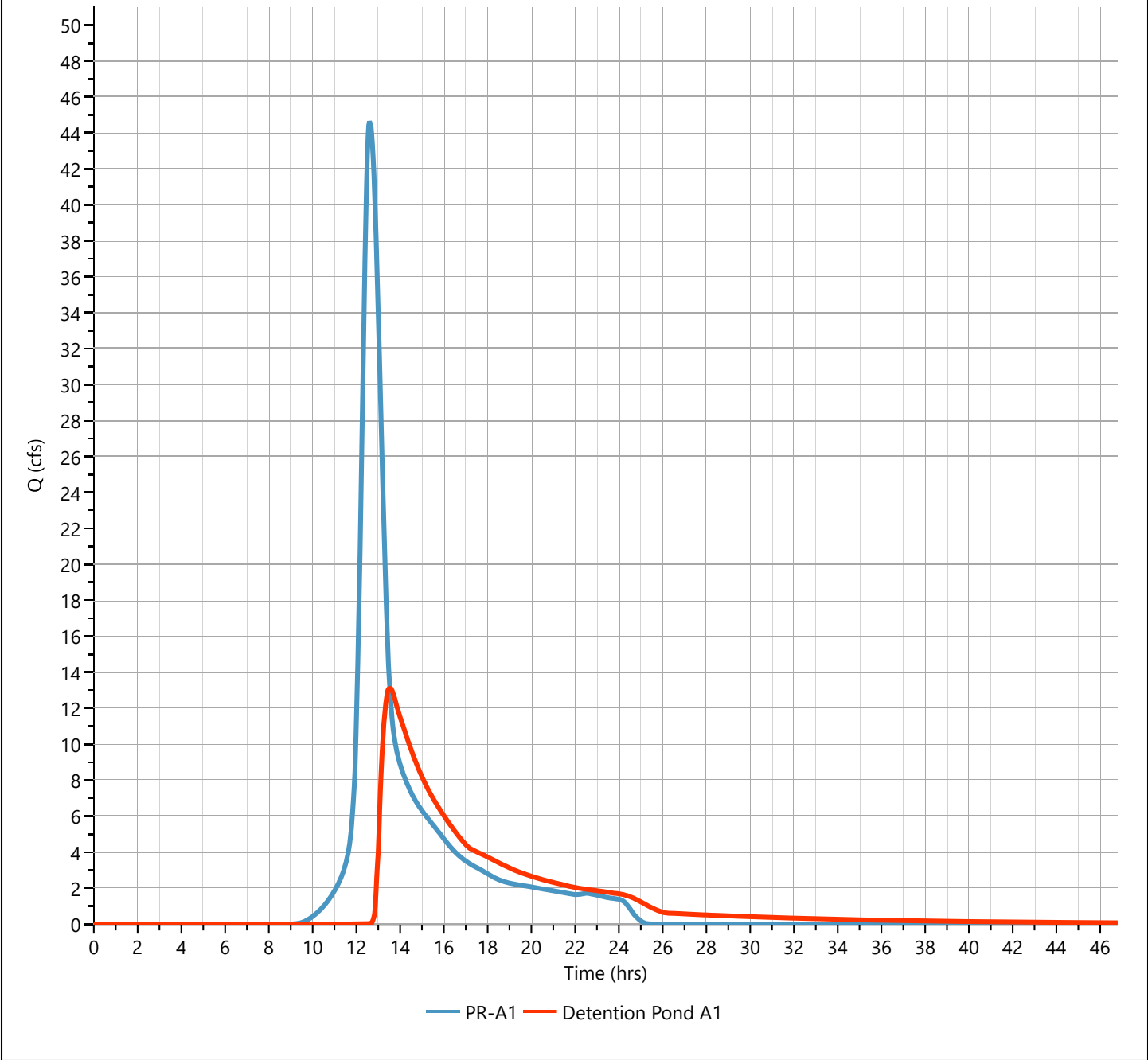
Hyd. No. 6

Hydrograph Type	= Pond Route	Peak Flow	= 13.15 cfs
Storm Frequency	= 10-yr	Time to Peak	= 13.53 hrs
Time Interval	= 2 min	Hydrograph Volume	= 220,829 cuft
Inflow Hydrograph	= 1 - PR-A1	Max. Elevation	= 356.62 ft
Pond Name	= Detention Pond A1	Max. Storage	= 433,000 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 3.51 hrs

Qp = 13.15 cfs



Hydrograph Report

Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

Forebay A2-A

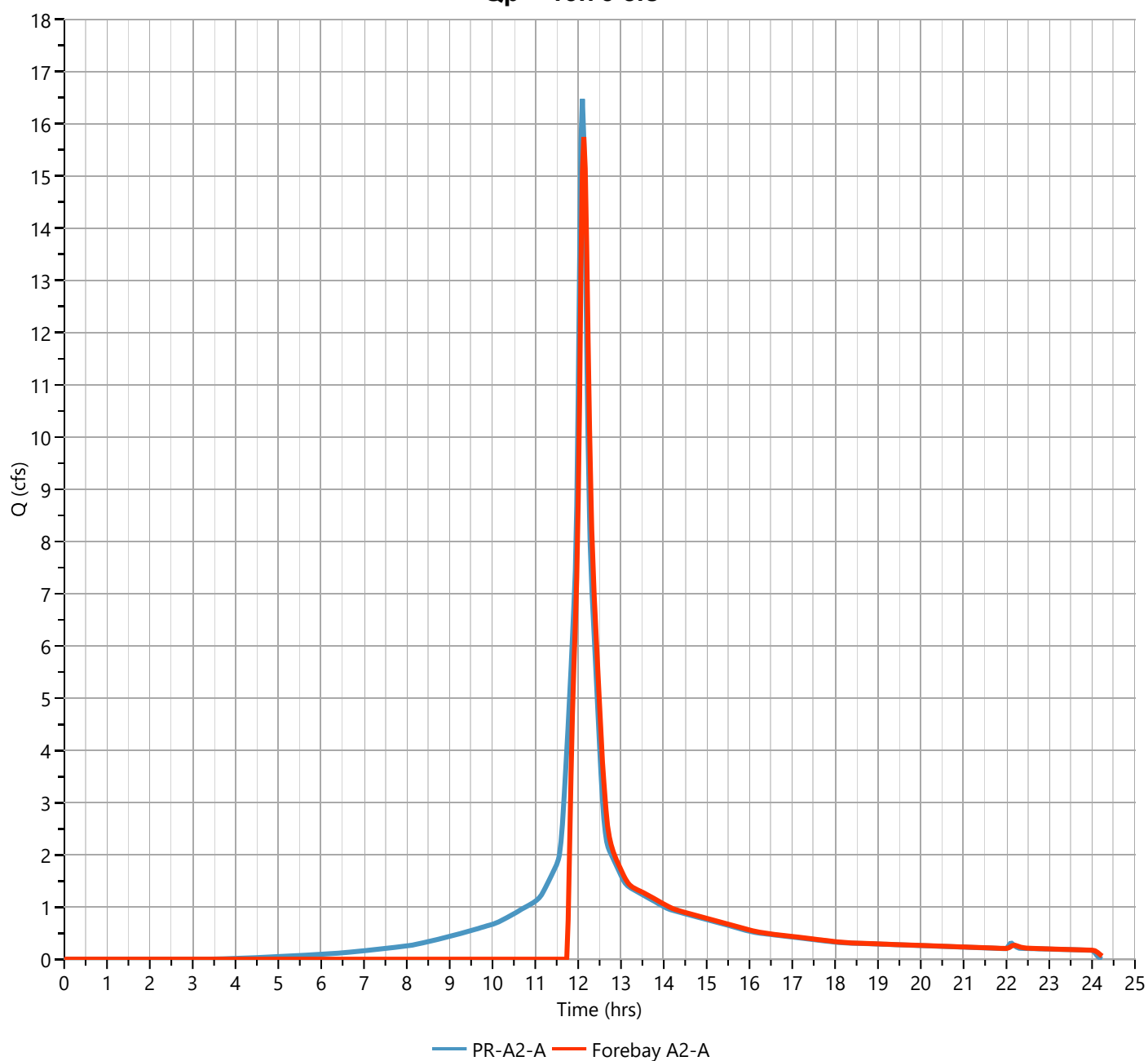
Hyd. No. 7

Hydrograph Type	= Pond Route	Peak Flow	= 15.75 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.13 hrs
Time Interval	= 2 min	Hydrograph Volume	= 46,184 cuft
Inflow Hydrograph	= 2 - PR-A2-A	Max. Elevation	= 367.01 ft
Pond Name	= Forebay A2-A	Max. Storage	= 15,489 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 54 min

Qp = 15.75 cfs



Hydrograph Report

Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

Forebay A2-B

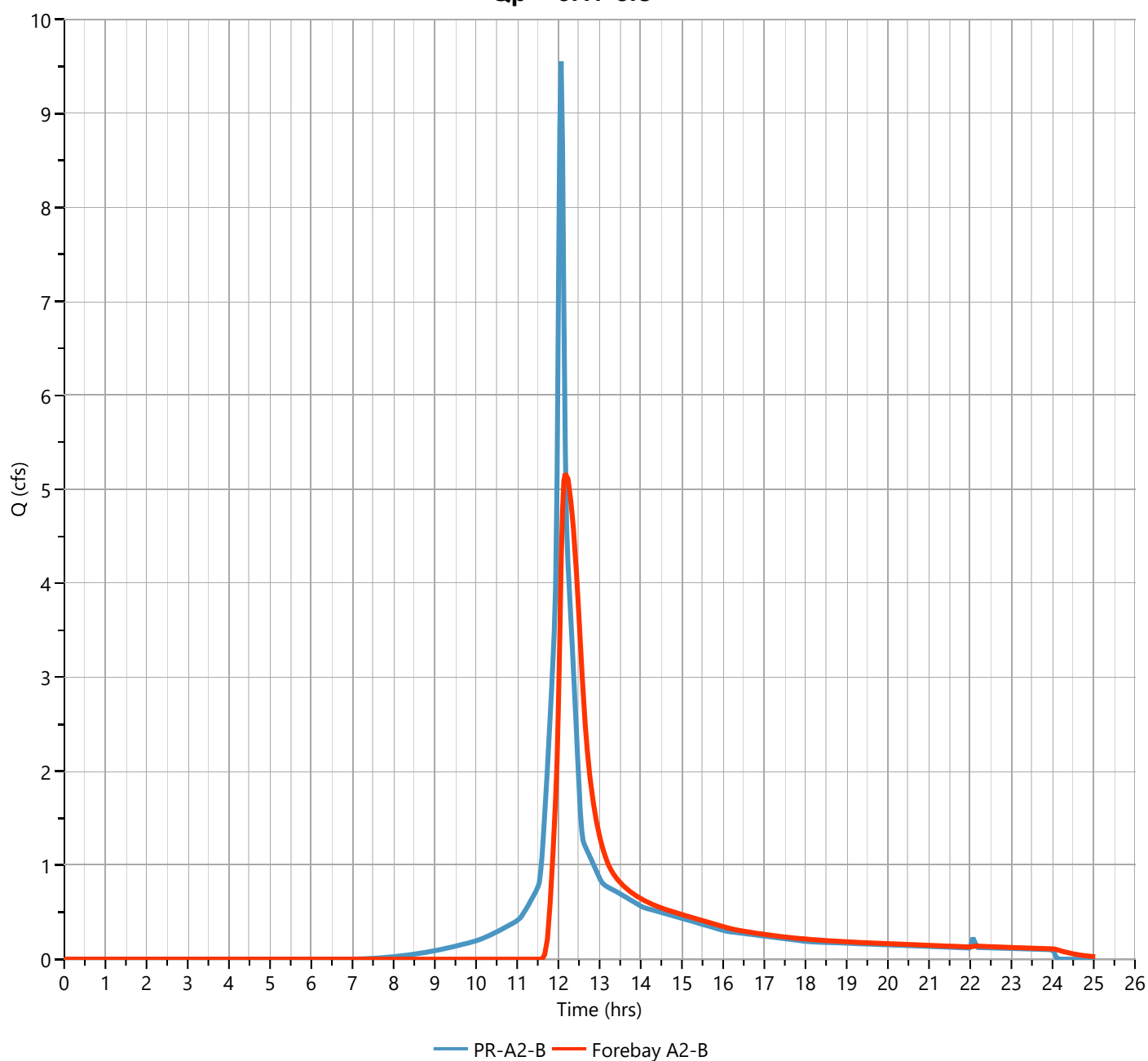
Hyd. No. 8

Hydrograph Type	= Pond Route	Peak Flow	= 5.167 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Hydrograph Volume	= 25,292 cuft
Inflow Hydrograph	= 3 - PR-A2-B	Max. Elevation	= 361.83 ft
Pond Name	= Forebay A2-B	Max. Storage	= 8,281 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 45 min

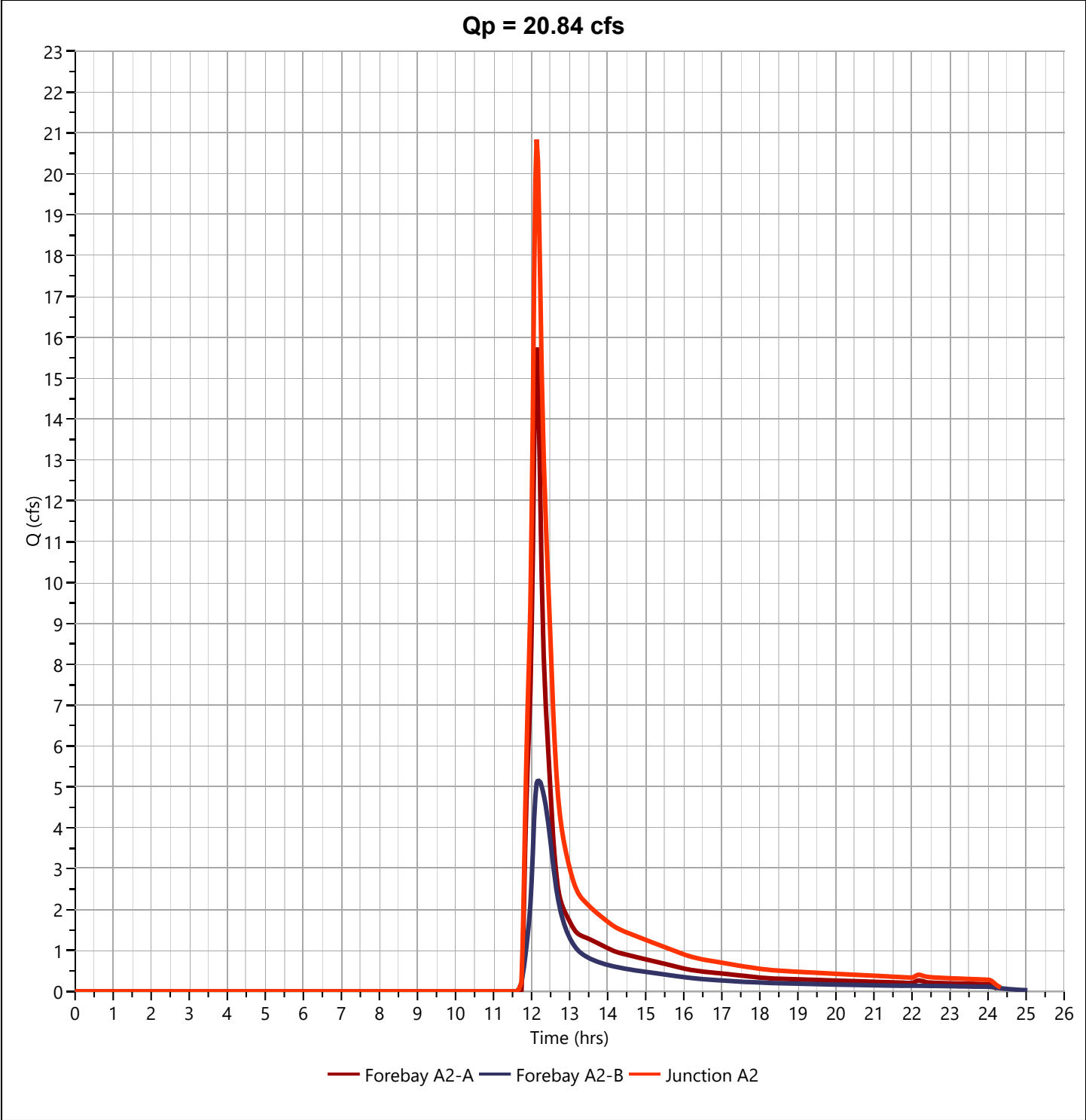
Qp = 5.17 cfs



Junction A2

Hyd. No. 9

Hydrograph Type	= Junction	Peak Flow	= 20.84 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.13 hrs
Time Interval	= 2 min	Hydrograph Volume	= 71,475 cuft
Inflow Hydrographs	= 7, 8	Total Contrib. Area	= 0.0 ac



Hydrograph Report

Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

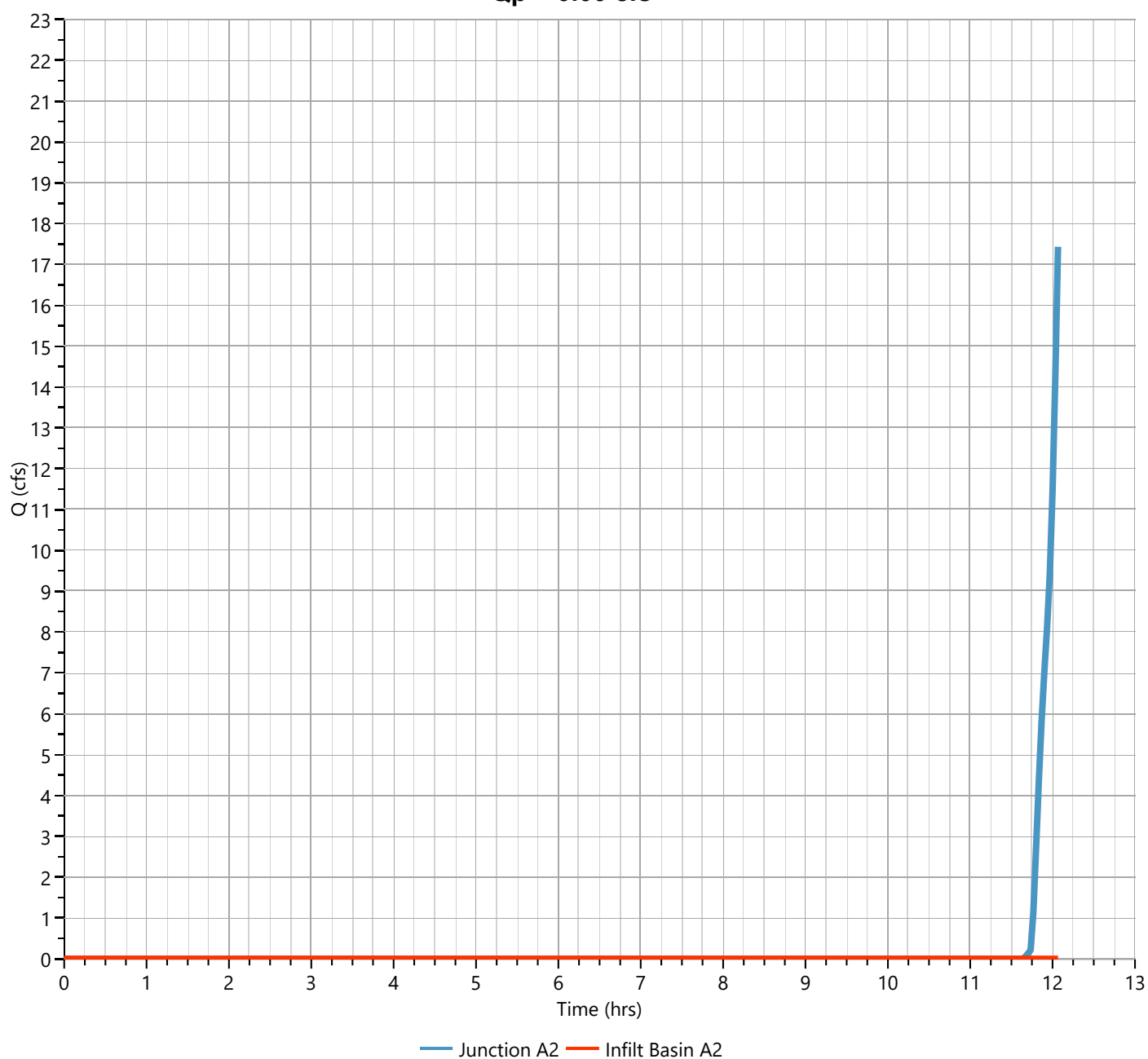
Infilt Basin A2

Hyd. No. 10

Hydrograph Type	= Pond Route	Peak Flow	= 0.000 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.03 hrs
Time Interval	= 2 min	Hydrograph Volume	= 0.001 cuft
Inflow Hydrograph	= 9 - Junction A2	Max. Elevation	= 360.78 ft
Pond Name	= Infiltration A2	Max. Storage	= 19,617 cuft

Pond Routing by Storage Indication Method

Qp = 0.00 cfs



Hydrograph Report

Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

Pocket Pond A3

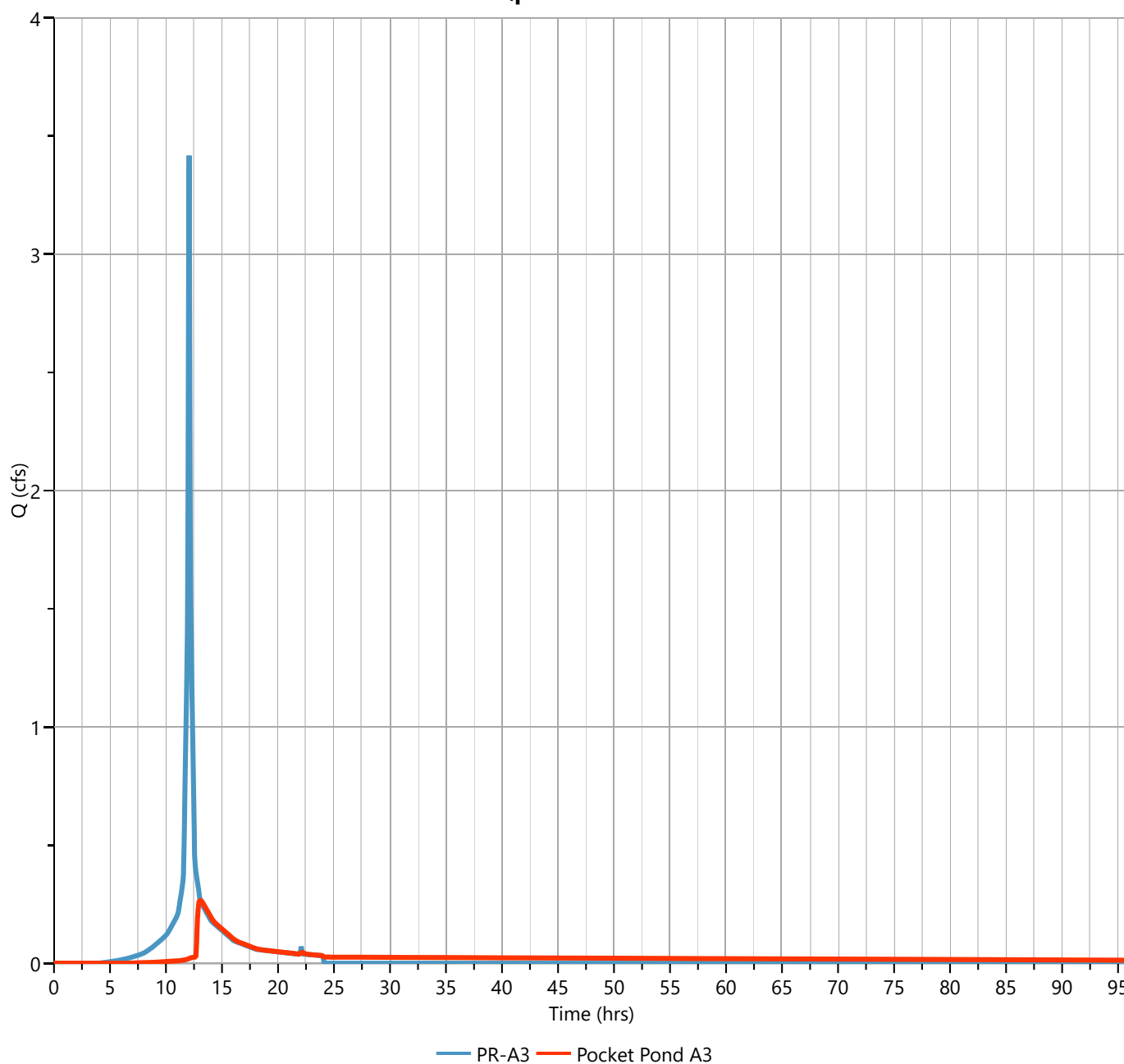
Hyd. No. 11

Hydrograph Type	= Pond Route	Peak Flow	= 0.270 cfs
Storm Frequency	= 10-yr	Time to Peak	= 13.03 hrs
Time Interval	= 2 min	Hydrograph Volume	= 8,799 cuft
Inflow Hydrograph	= 4 - PR-A3	Max. Elevation	= 363.02 ft
Pond Name	= Pocket Pond A3	Max. Storage	= 17,795 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 25.55 hrs

Qp = 0.27 cfs



Hydrograph Report

Project Name:

Hydrology Studio v 1.0.0.0

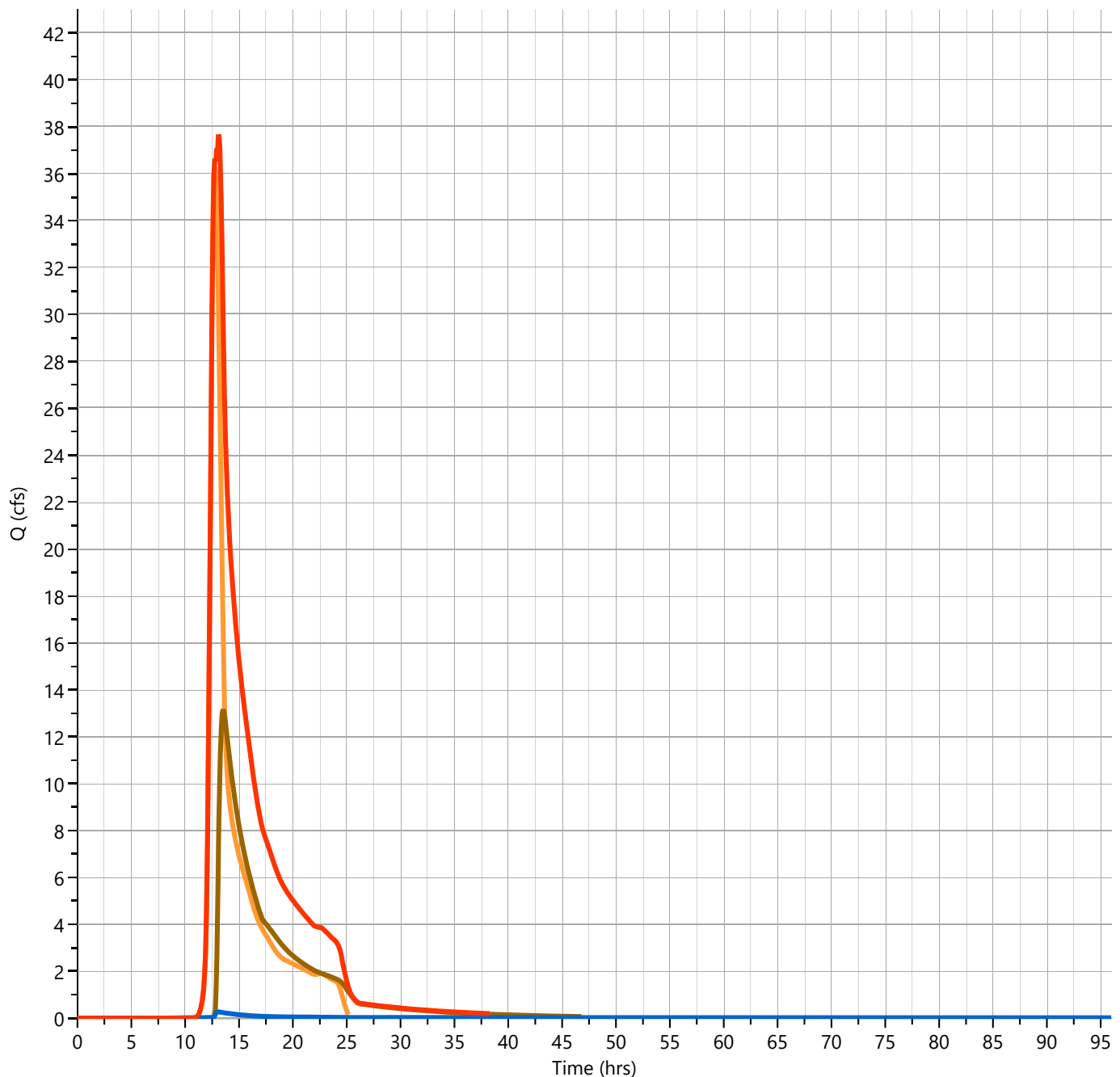
09-09-2020

Proposed A

Hyd. No. 12

Hydrograph Type	= Junction	Peak Flow	= 37.67 cfs
Storm Frequency	= 10-yr	Time to Peak	= 13.10 hrs
Time Interval	= 2 min	Hydrograph Volume	= 524,700 cuft
Inflow Hydrographs	= 5, 6, 10, 11	Total Contrib. Area	= 55.78 ac

Qp = 37.67 cfs



PR-A4 Detention Pond A1 Infiltration Basin A2 Pocket Pond A3 Proposed A

Hydrograph Report

Project Name:

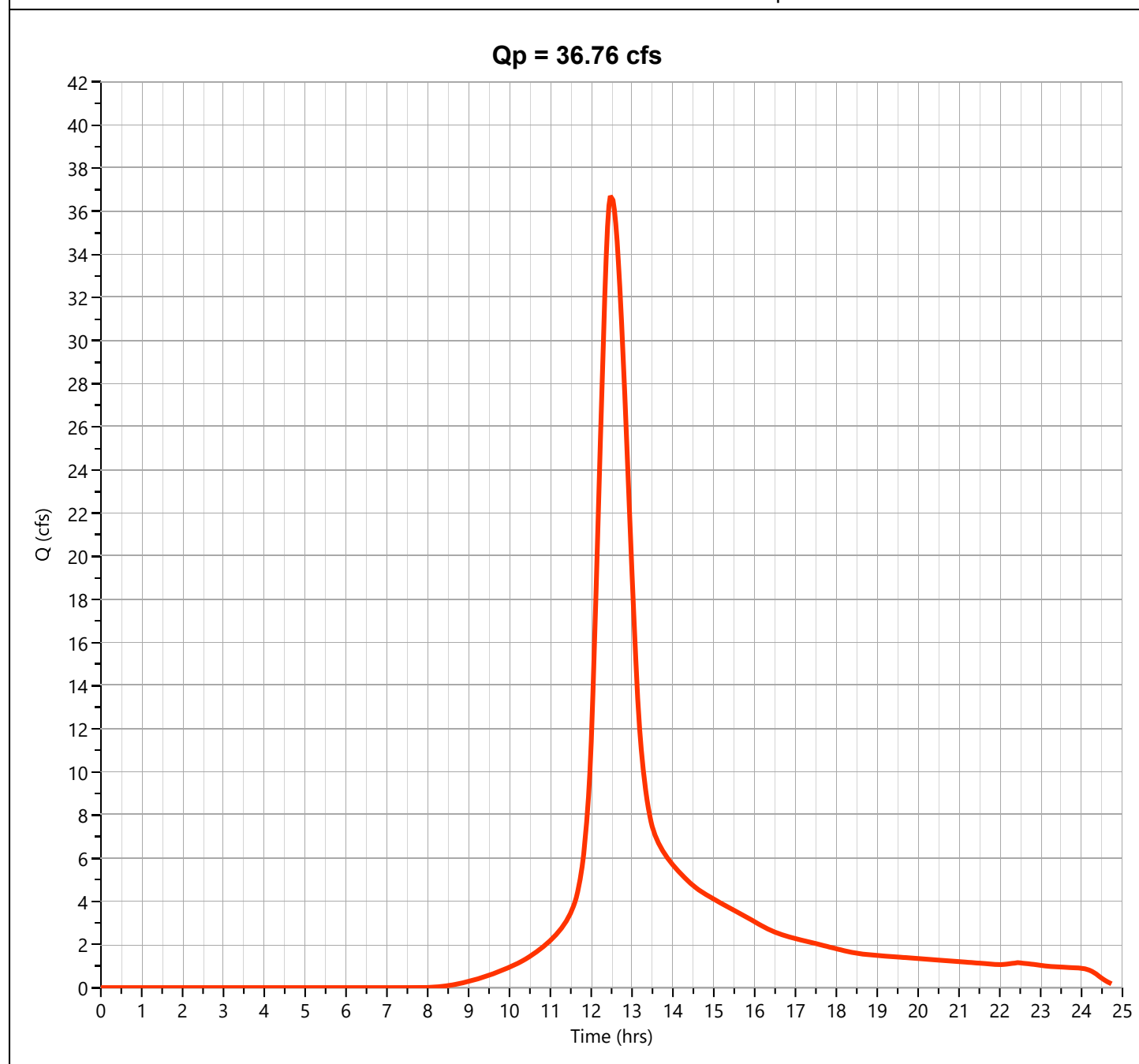
Hydrology Studio v 1.0.0.0

09-09-2020

PR-B1

Hyd. No. 13

Hydrograph Type	= NRCS Runoff	Peak Flow	= 36.76 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.50 hrs
Time Interval	= 2 min	Runoff Volume	= 231,578 cuft
Drainage Area	= 24.0 ac	Curve Number	= 80
Tc Method	= User	Time of Conc. (Tc)	= 41.4 min
Total Rainfall	= 4.70 in	Design Storm	= Type III
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

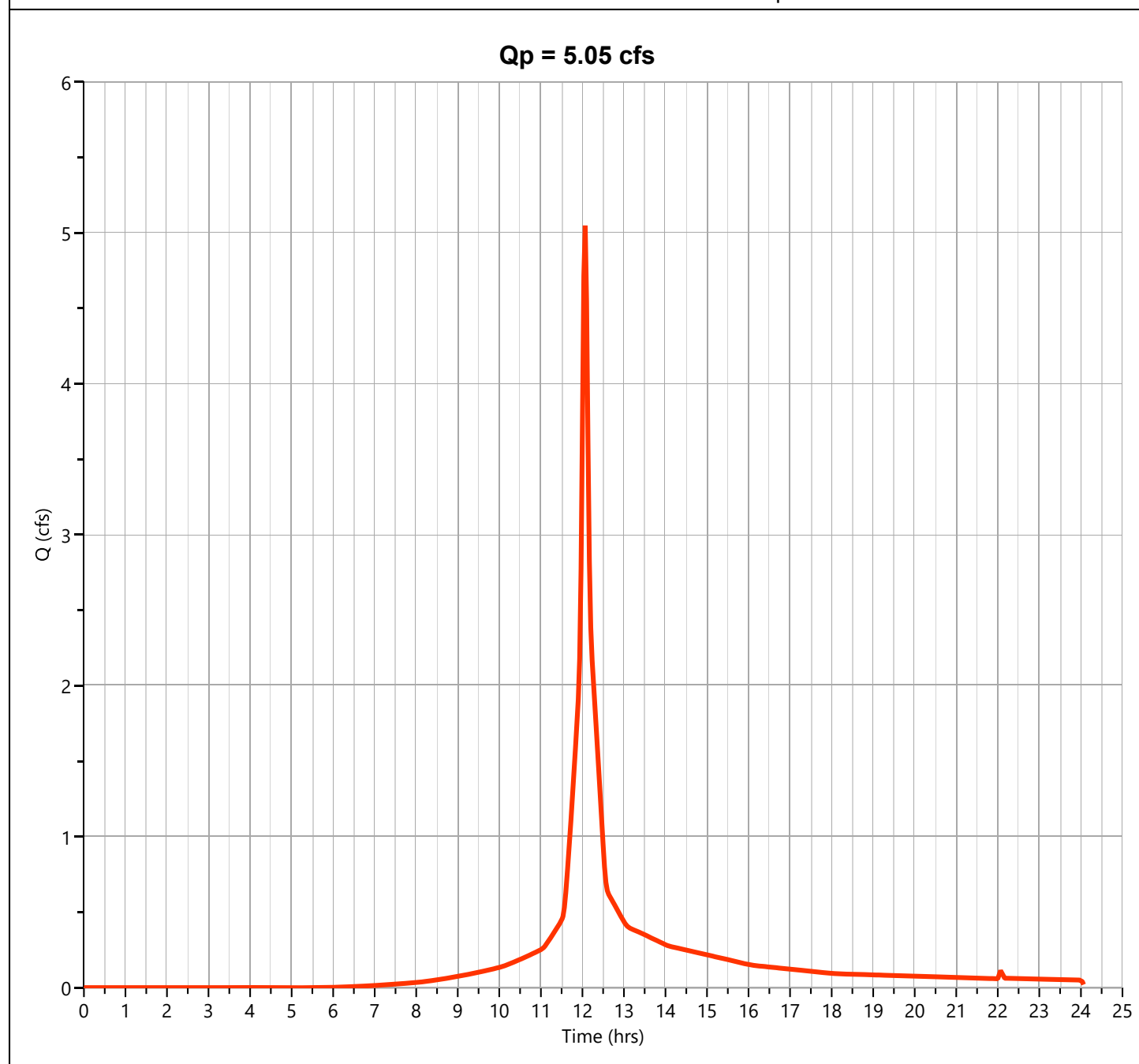
Hydrology Studio v 1.0.0.0

09-09-2020

PR-B2

Hyd. No. 14

Hydrograph Type	= NRCS Runoff	Peak Flow	= 5.048 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.07 hrs
Time Interval	= 2 min	Runoff Volume	= 15,297 cuft
Drainage Area	= 1.41 ac	Curve Number	= 86
Tc Method	= User	Time of Conc. (Tc)	= 4.2 min
Total Rainfall	= 4.70 in	Design Storm	= Type III
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

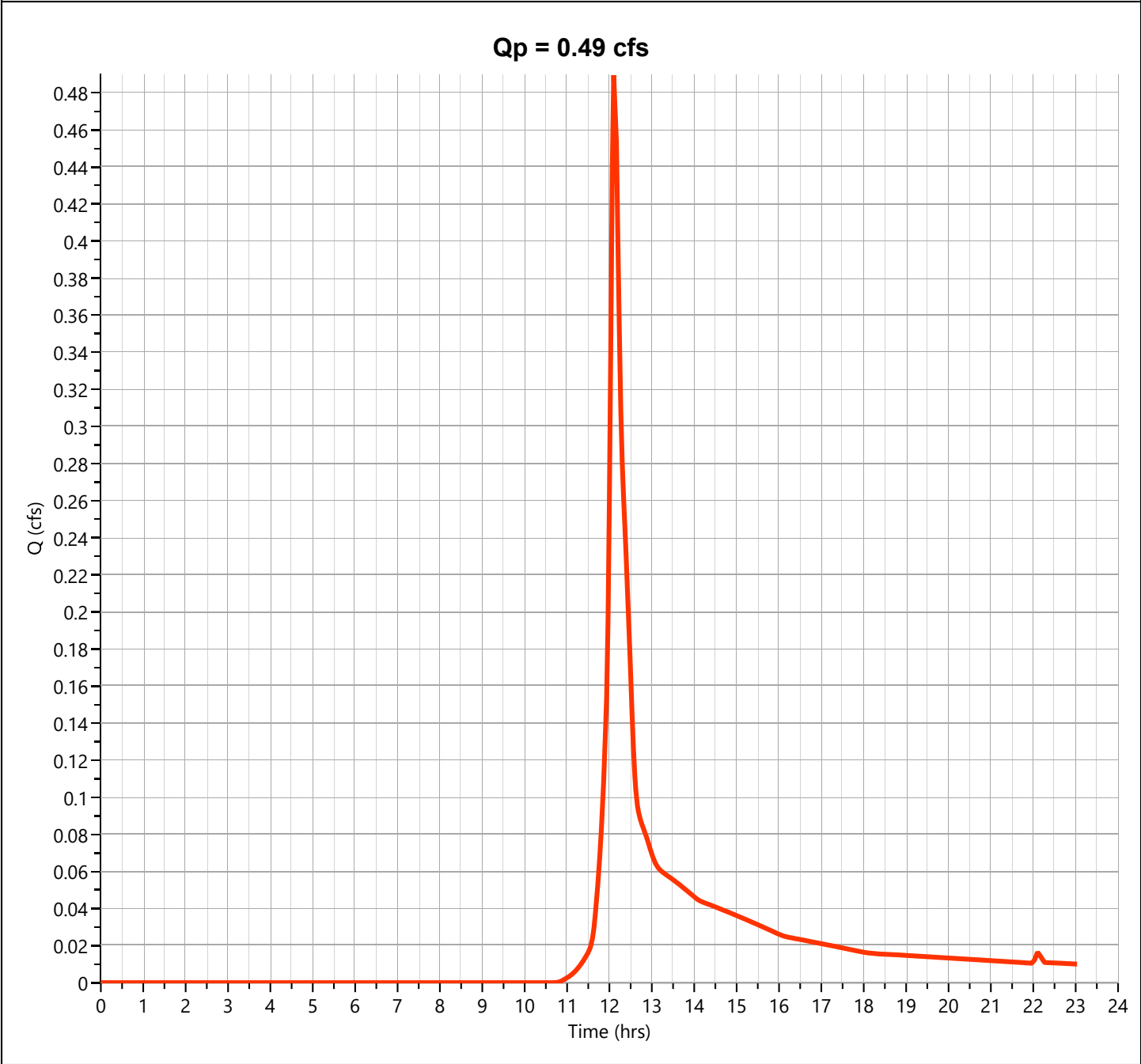
Hydrology Studio v 1.0.0.0

09-09-2020

PR-B3

Hyd. No. 15

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.489 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.10 hrs
Time Interval	= 2 min	Runoff Volume	= 1,799 cuft
Drainage Area	= 0.34 ac	Curve Number	= 65
Tc Method	= User	Time of Conc. (Tc)	= 9.0 min
Total Rainfall	= 4.70 in	Design Storm	= Type III
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

Forebay B3

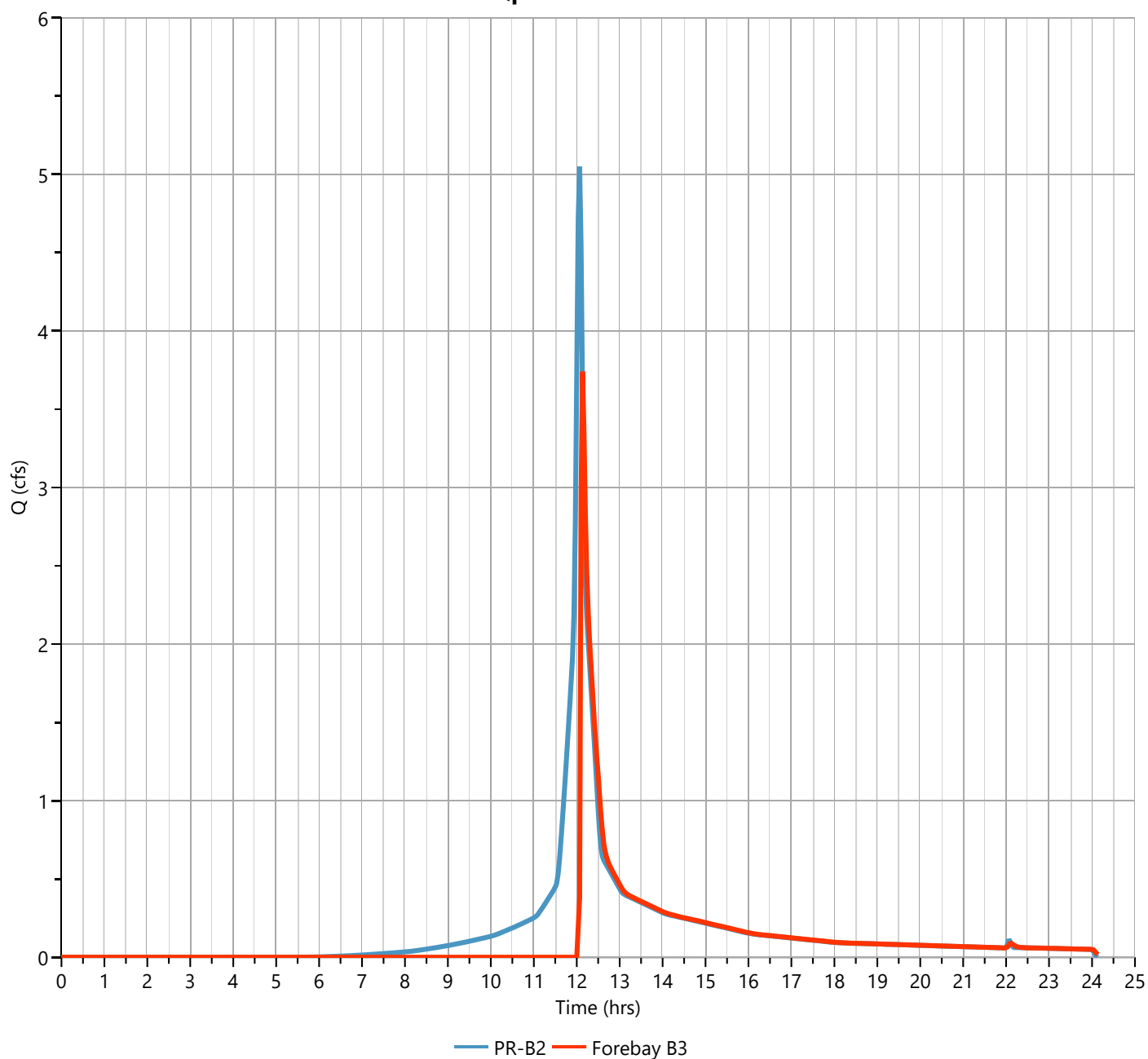
Hyd. No. 16

Hydrograph Type	= Pond Route	Peak Flow	= 3.740 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.13 hrs
Time Interval	= 2 min	Hydrograph Volume	= 9,902 cuft
Inflow Hydrograph	= 14 - PR-B2	Max. Elevation	= 373.20 ft
Pond Name	= Forebay B	Max. Storage	= 5,937 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 1.23 hrs

Qp = 3.74 cfs



Hydrograph Report

Project Name:

Hydrology Studio v 1.0.0.0

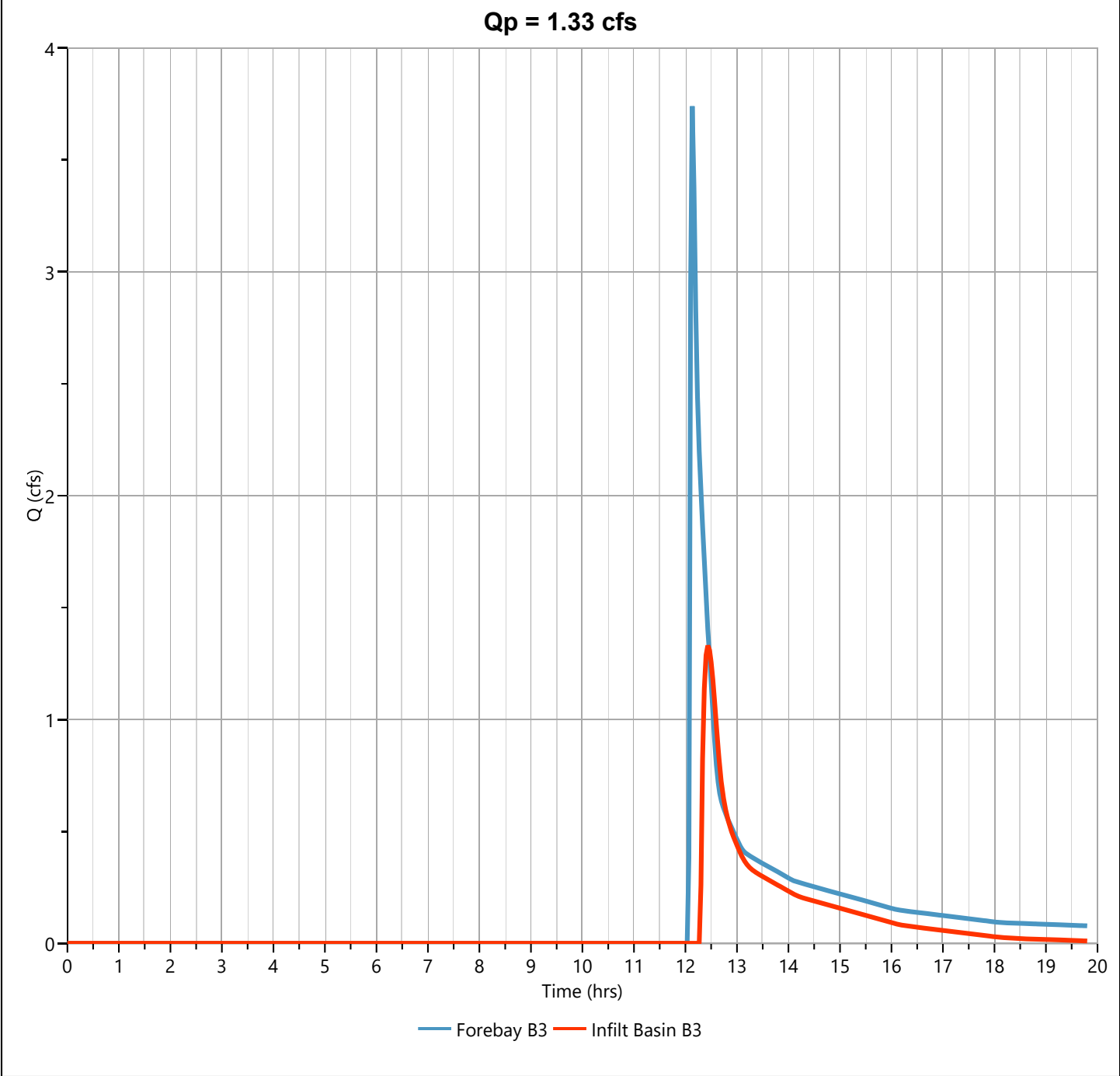
09-09-2020

Infiltration Basin B3

Hyd. No. 17

Hydrograph Type	= Pond Route	Peak Flow	= 1.330 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.43 hrs
Time Interval	= 2 min	Hydrograph Volume	= 4,893 cuft
Inflow Hydrograph	= 16 - Forebay B3	Max. Elevation	= 370.41 ft
Pond Name	= Pond B	Max. Storage	= 2,515 cuft

Pond Routing by Storage Indication Method



Hydrograph Report

Project Name:

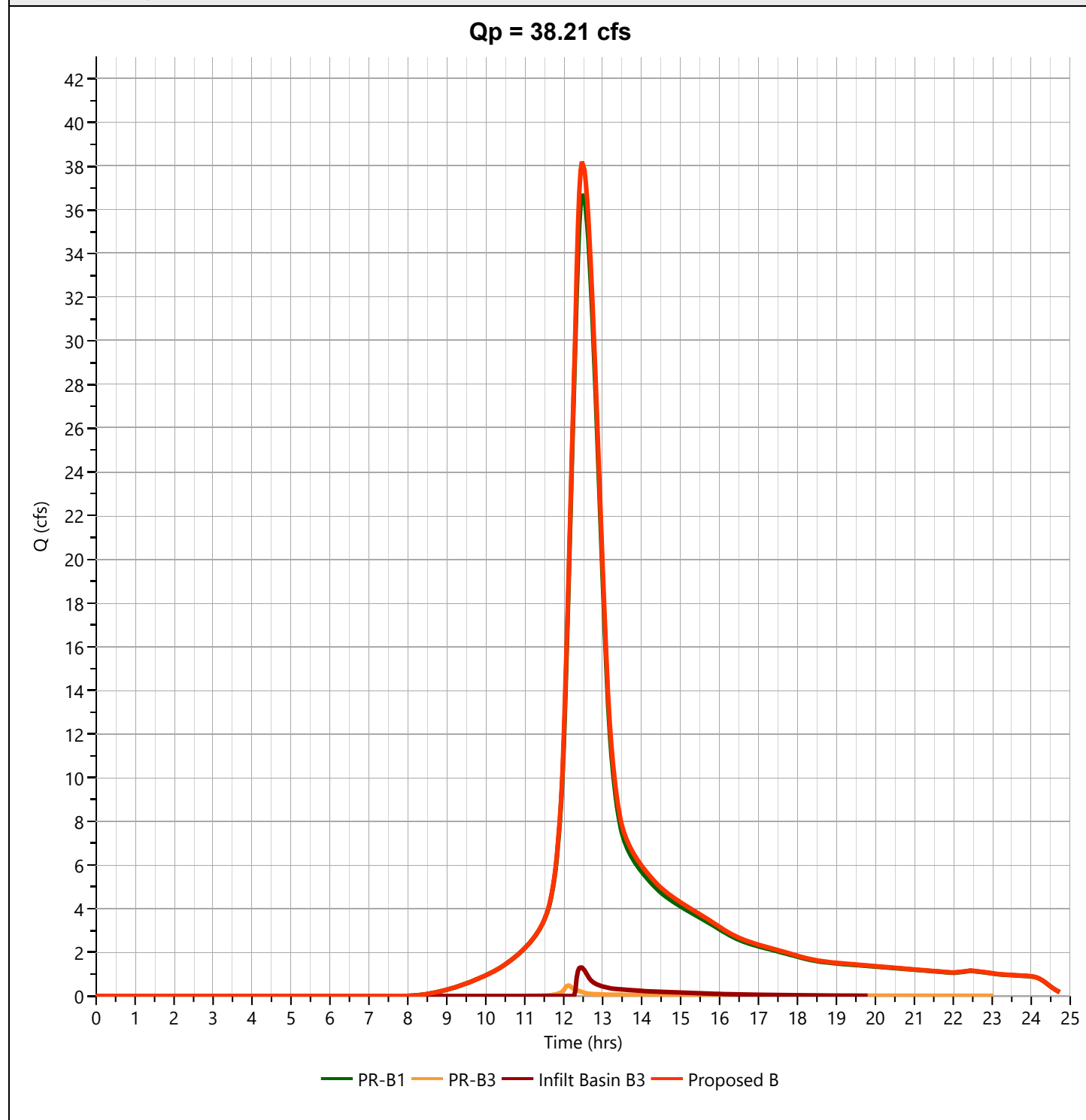
Hydrology Studio v 1.0.0.0

09-09-2020

Proposed B

Hyd. No. 18

Hydrograph Type	= Junction	Peak Flow	= 38.21 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.47 hrs
Time Interval	= 2 min	Hydrograph Volume	= 238,269 cuft
Inflow Hydrographs	= 13, 15, 17	Total Contrib. Area	= 24.34 ac



APPENDIX 9

100-YEAR DESIGN STORM

HYDROGRAPHS

This page is left intentionally blank

Hydrograph Report

Project Name:

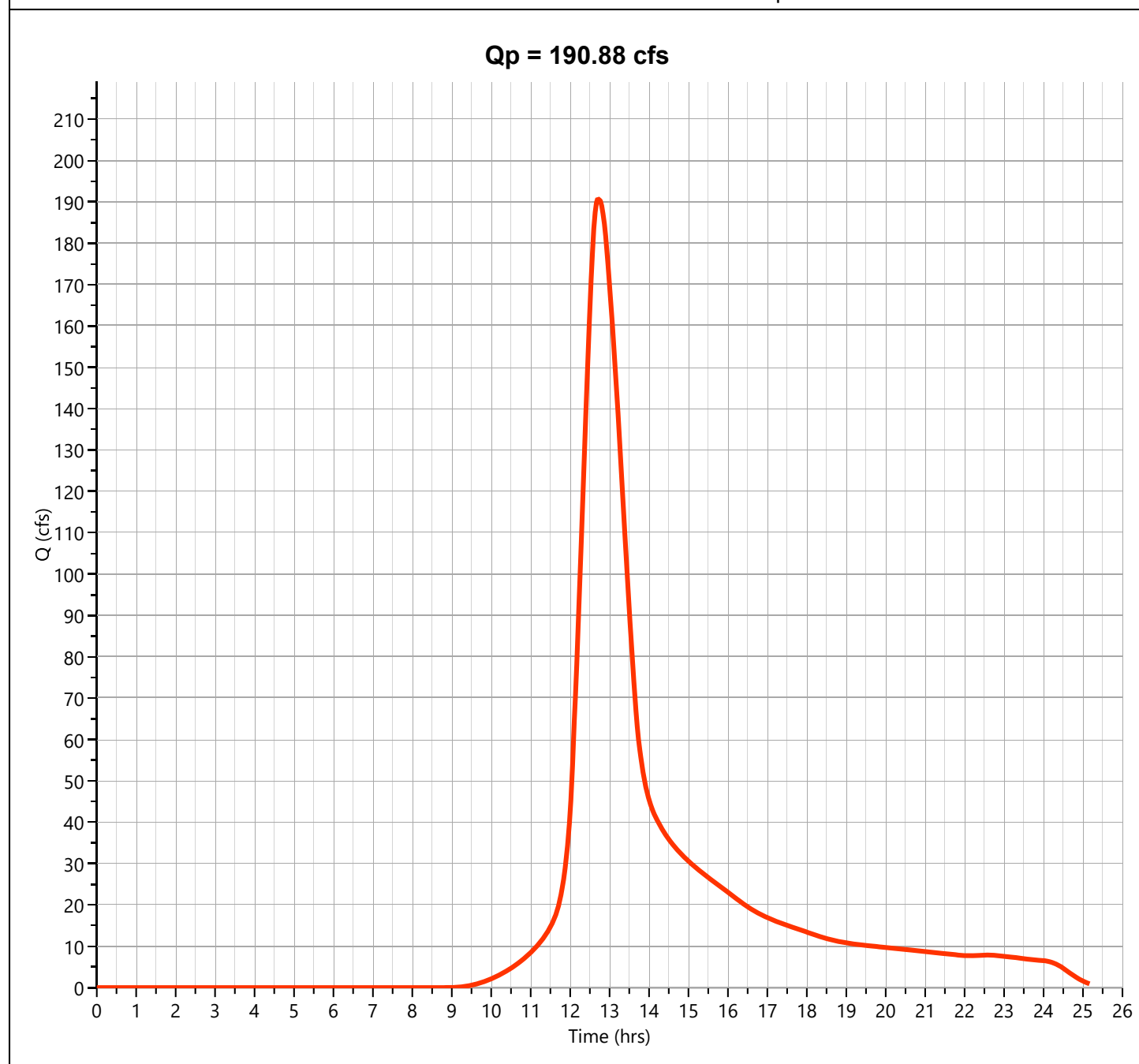
Hydrology Studio v 3.0.0.4

01-22-2019

EX-A

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 190.9 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.73 hrs
Time Interval	= 2 min	Runoff Volume	= 1,508,883 cuft
Drainage Area	= 102.47 ac	Curve Number	= 64
Tc Method	= User	Time of Conc. (Tc)	= 63.6 min
Total Rainfall	= 8.3100 in	Design Storm	= Type III
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

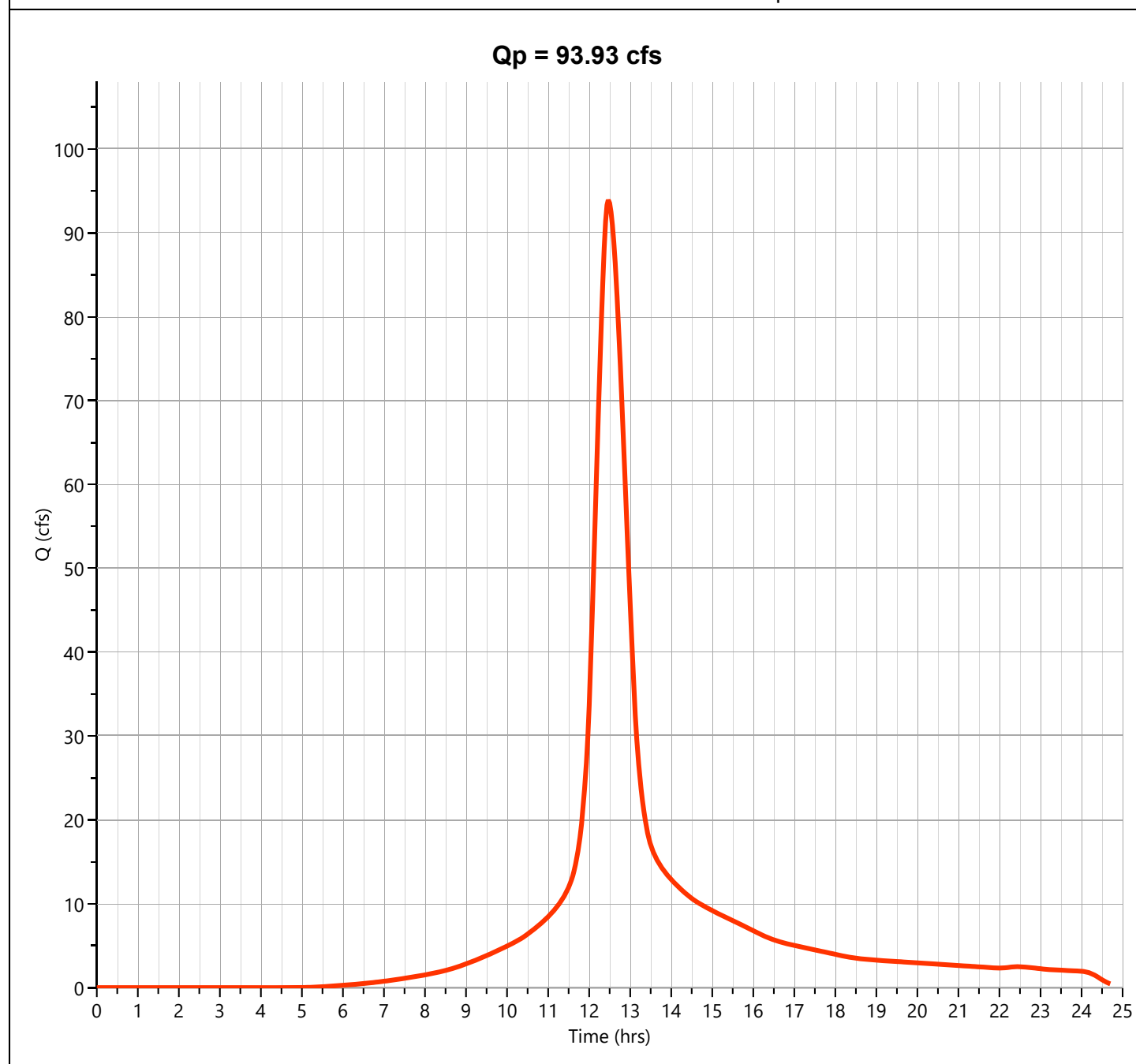
Hydrology Studio v 3.0.0.4

01-22-2019

EX-B

Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 93.93 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.47 hrs
Time Interval	= 2 min	Runoff Volume	= 601,563 cuft
Drainage Area	= 26.67 ac	Curve Number	= 82
Tc Method	= User	Time of Conc. (Tc)	= 41.4 min
Total Rainfall	= 8.3100 in	Design Storm	= Type III
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

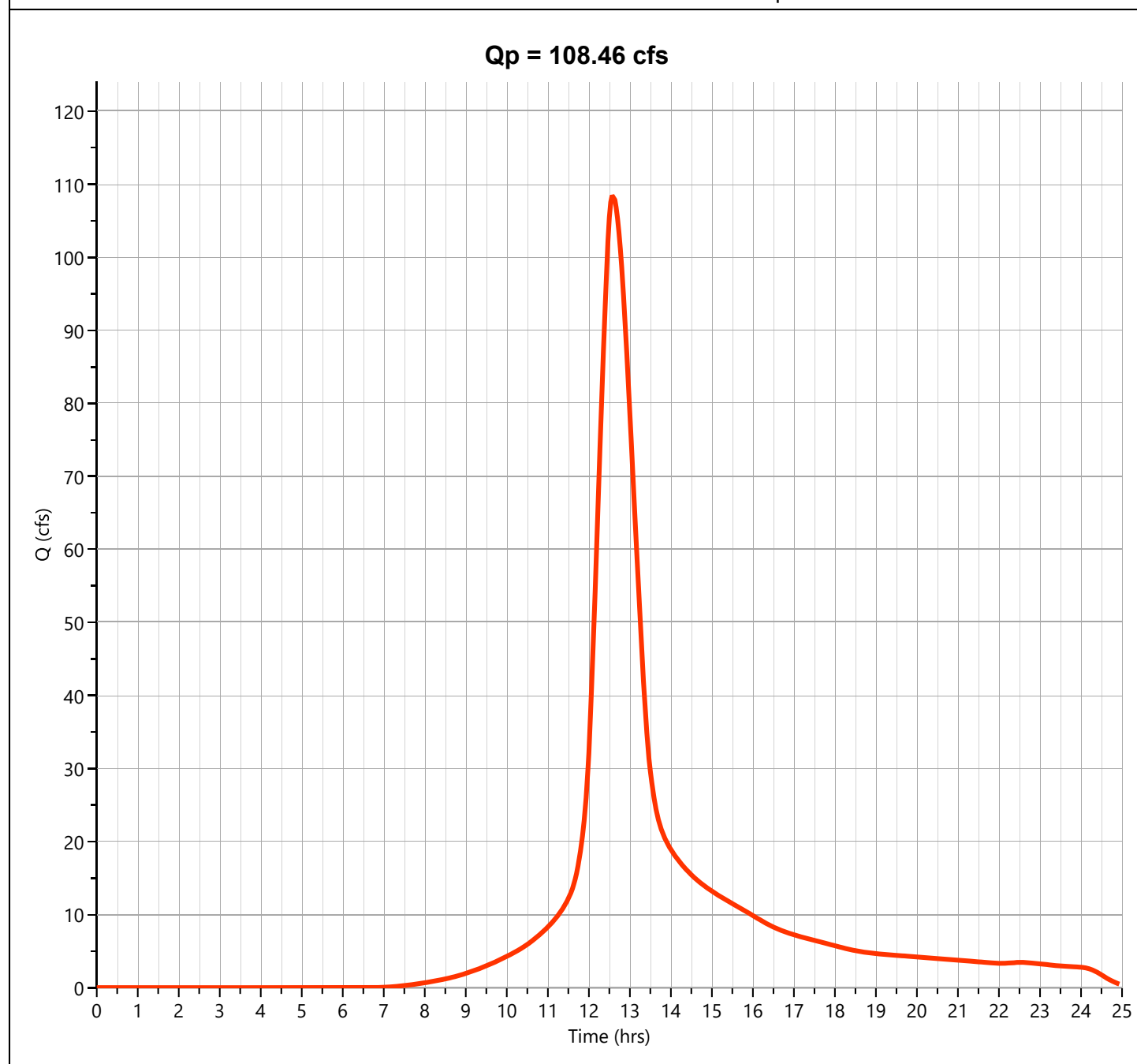
Hydrology Studio v 1.0.0.0

09-09-2020

PR-A1

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 108.5 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.60 hrs
Time Interval	= 2 min	Runoff Volume	= 768,898 cuft
Drainage Area	= 39.49 ac	Curve Number	= 75
Tc Method	= User	Time of Conc. (Tc)	= 52.2 min
Total Rainfall	= 8.31 in	Design Storm	= Type III
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

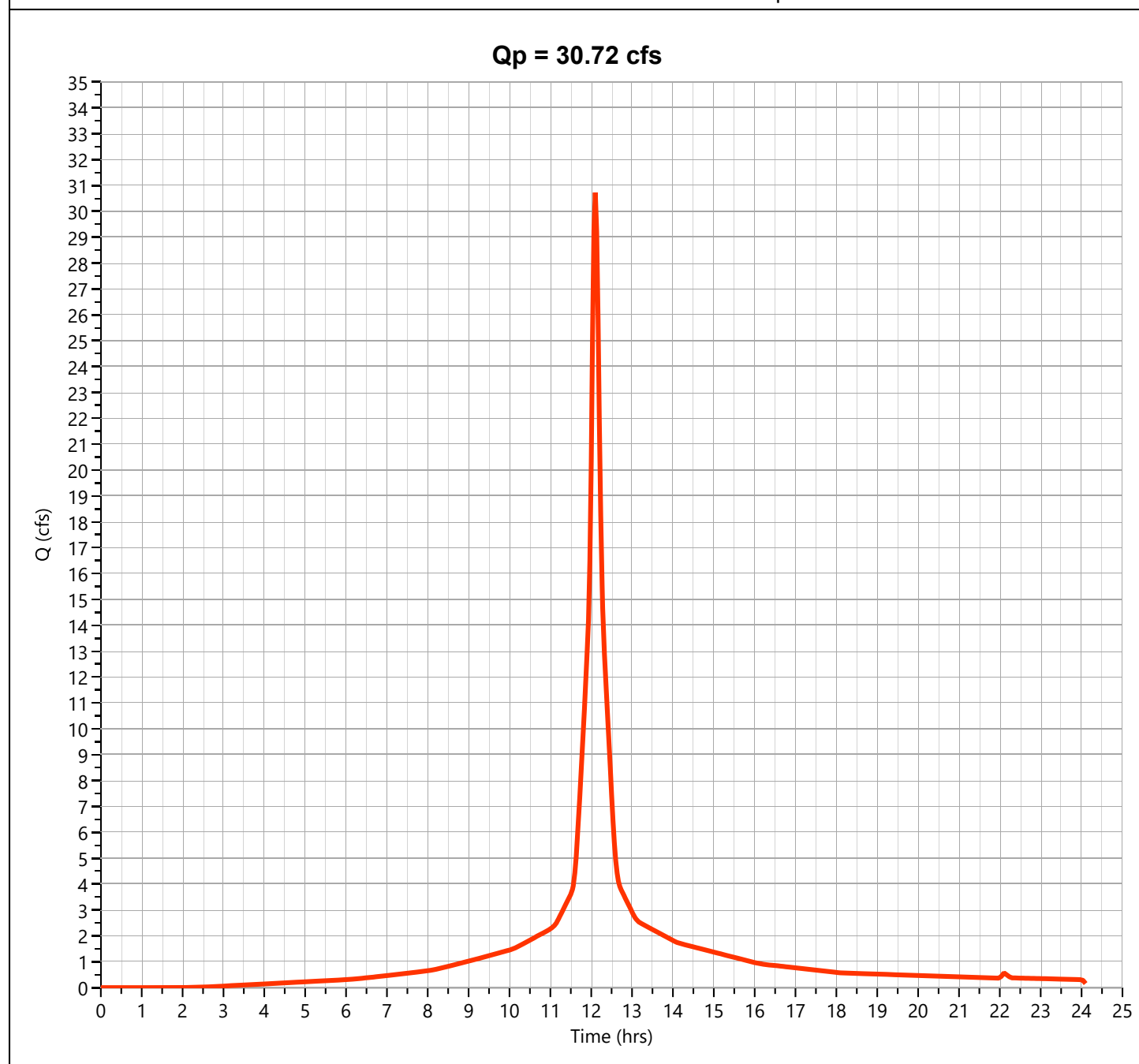
Hydrology Studio v 1.0.0.0

09-09-2020

PR-A2-A

Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 30.72 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.10 hrs
Time Interval	= 2 min	Runoff Volume	= 114,147 cuft
Drainage Area	= 4.278 ac	Curve Number	= 92
Tc Method	= User	Time of Conc. (Tc)	= 6.6 min
Total Rainfall	= 8.31 in	Design Storm	= Type III
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

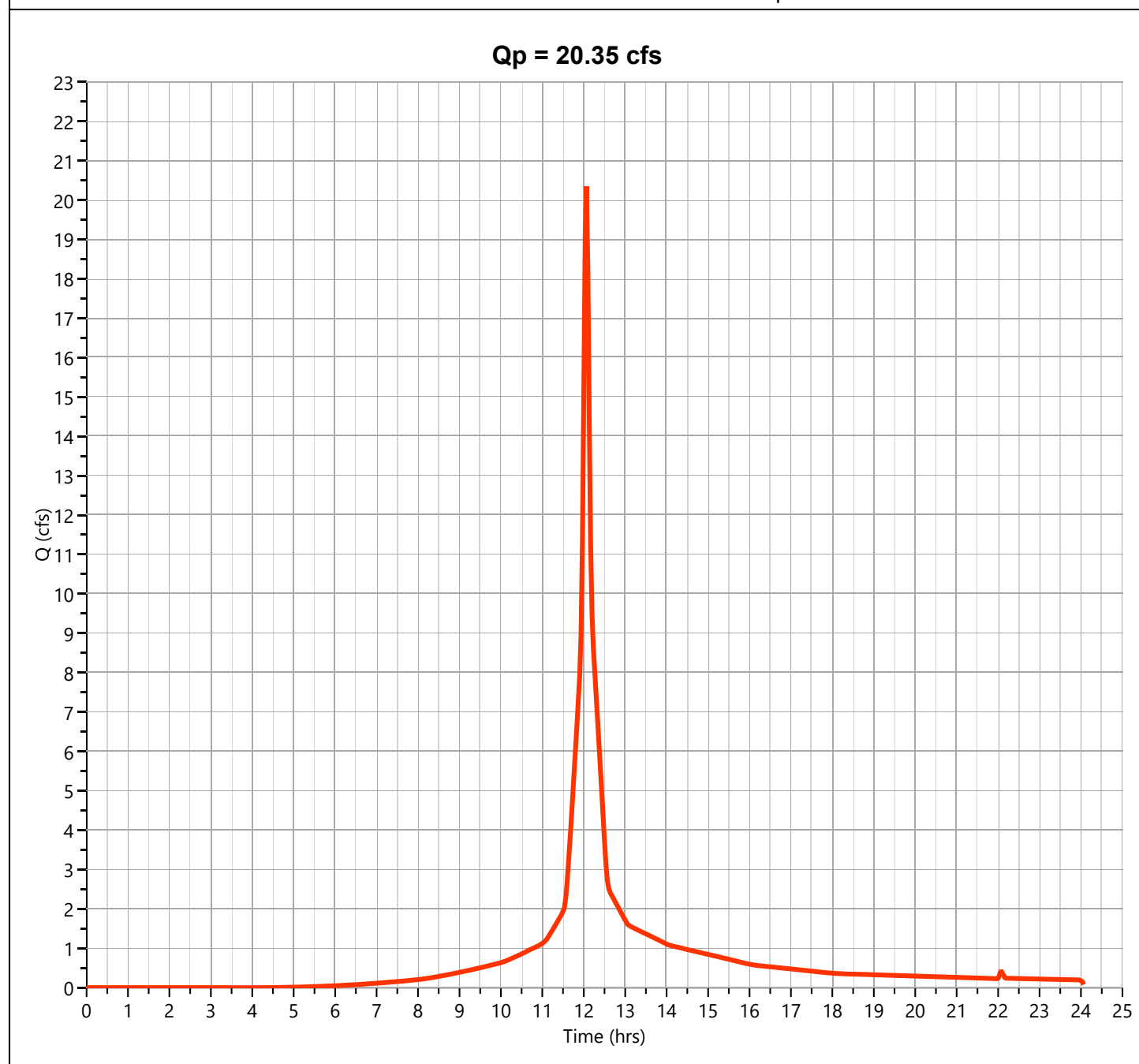
Hydrology Studio v 1.0.0.0

09-09-2020

PR-A2-B

Hyd. No. 3

Hydrograph Type	= NRCS Runoff	Peak Flow	= 20.35 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.07 hrs
Time Interval	= 2 min	Runoff Volume	= 62,625 cuft
Drainage Area	= 2.99 ac	Curve Number	= 82
Tc Method	= User	Time of Conc. (Tc)	= 5.4 min
Total Rainfall	= 8.31 in	Design Storm	= Type III
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

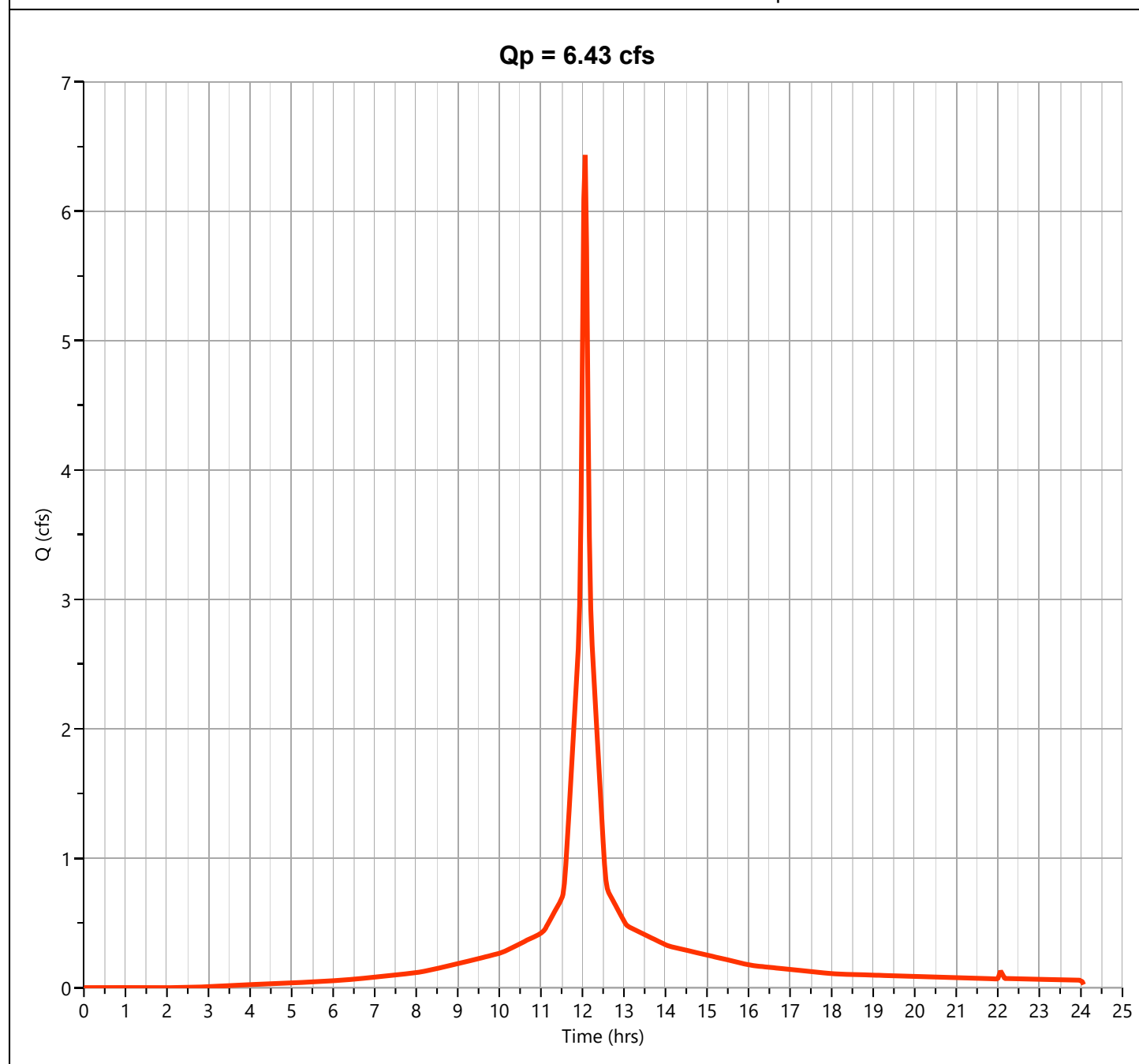
Hydrology Studio v 1.0.0.0

09-09-2020

PR-A3

Hyd. No. 4

Hydrograph Type	= NRCS Runoff	Peak Flow	= 6.435 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.07 hrs
Time Interval	= 2 min	Runoff Volume	= 20,916 cuft
Drainage Area	= 0.85 ac	Curve Number	= 91
Tc Method	= User	Time of Conc. (Tc)	= 5.4 min
Total Rainfall	= 8.31 in	Design Storm	= Type III
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

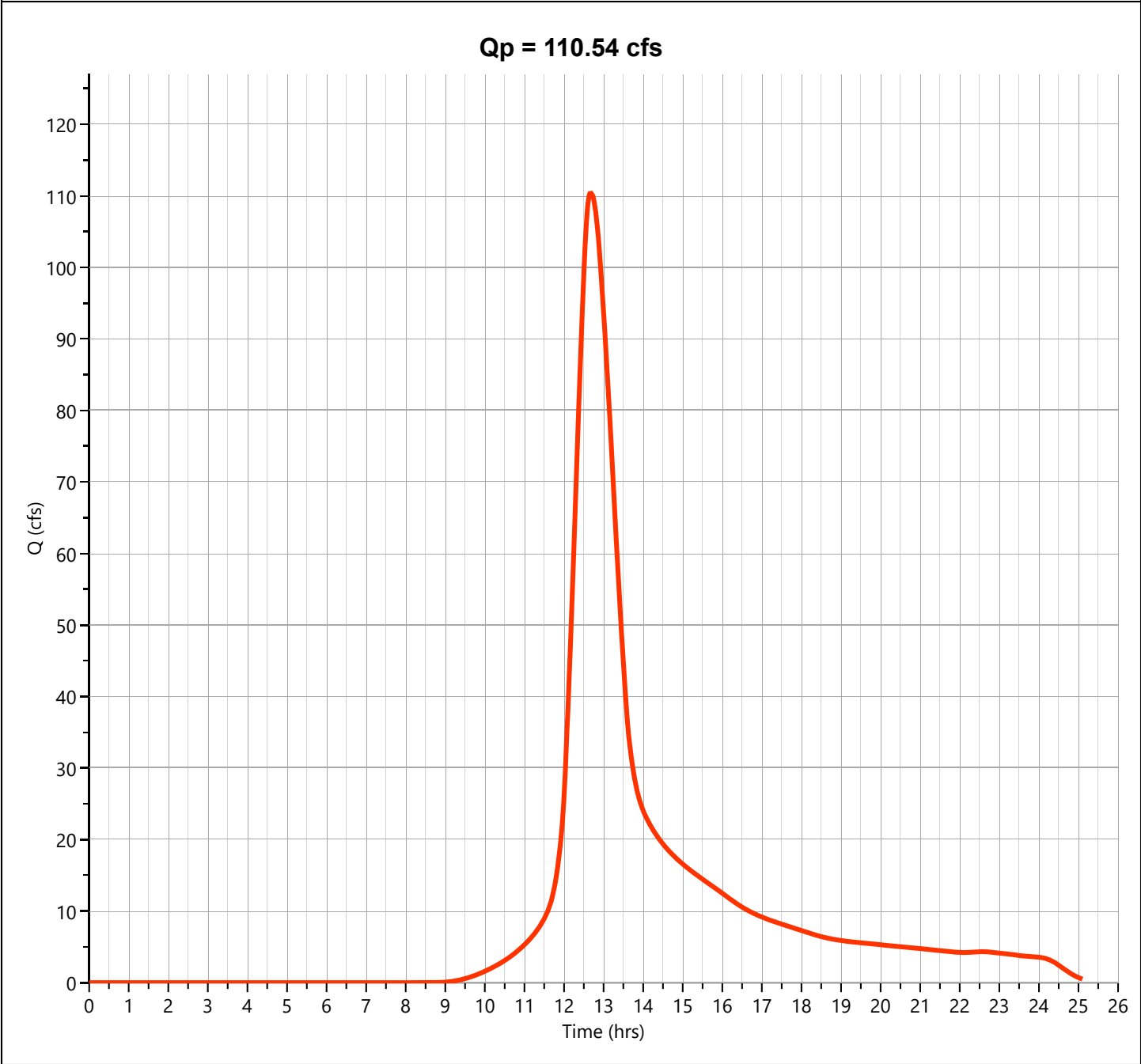
Hydrology Studio v 1.0.0.0

09-09-2020

PR-A4

Hyd. No. 5

Hydrograph Type	= NRCS Runoff	Peak Flow	= 110.5 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.67 hrs
Time Interval	= 2 min	Runoff Volume	= 839,559 cuft
Drainage Area	= 55.78 ac	Curve Number	= 65
Tc Method	= User	Time of Conc. (Tc)	= 58.2 min
Total Rainfall	= 8.31 in	Design Storm	= Type III
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

Detention Pond A1

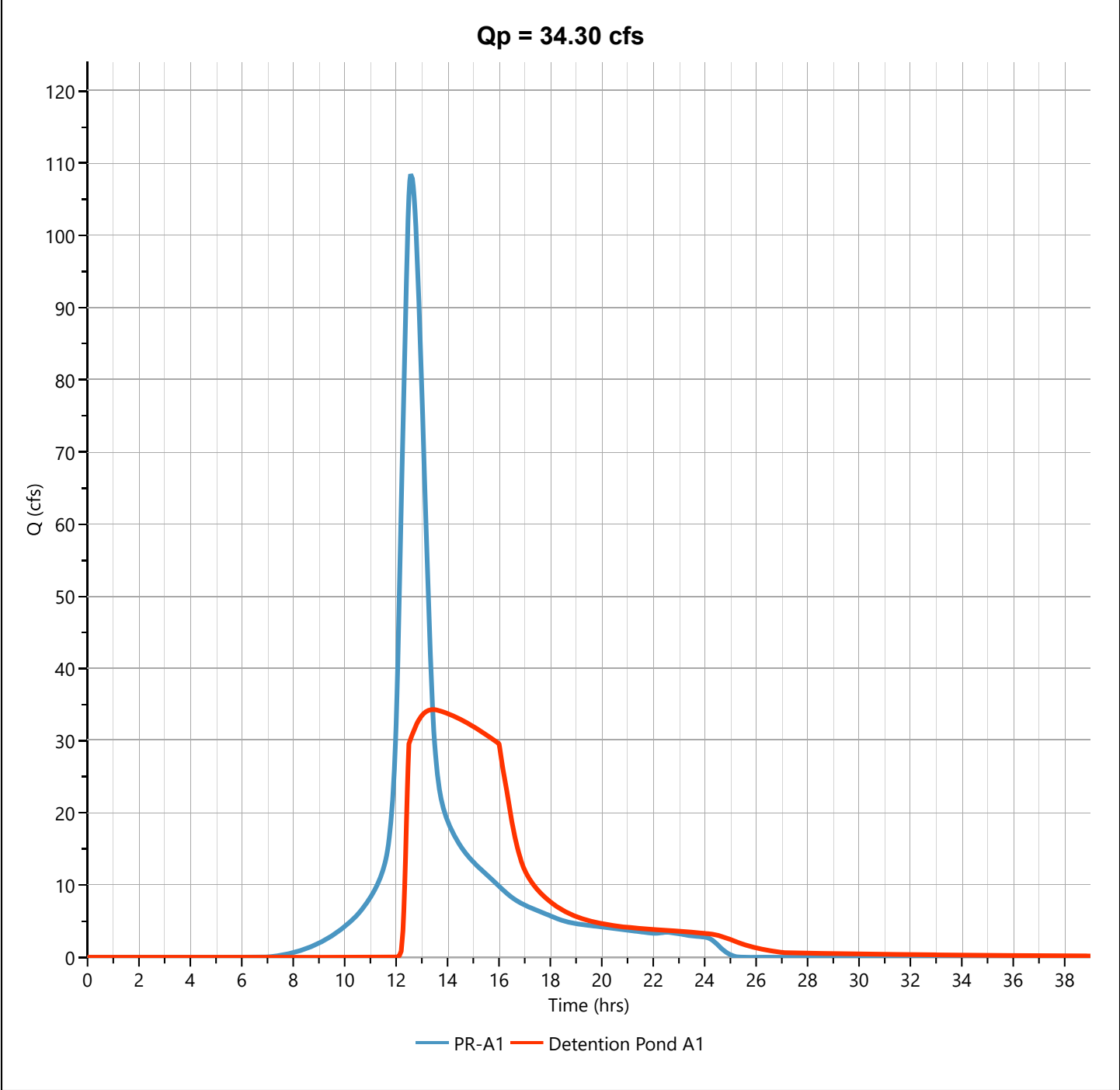
Hyd. No. 6

Hydrograph Type	= Pond Route	Peak Flow	= 34.30 cfs
Storm Frequency	= 100-yr	Time to Peak	= 13.43 hrs
Time Interval	= 2 min	Hydrograph Volume	= 670,599 cuft
Inflow Hydrograph	= 1 - PR-A1	Max. Elevation	= 358.48 ft
Pond Name	= Detention Pond A1	Max. Storage	= 623,855 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 2.03 hrs

Qp = 34.30 cfs



Hydrograph Report

Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

Forebay A2-A

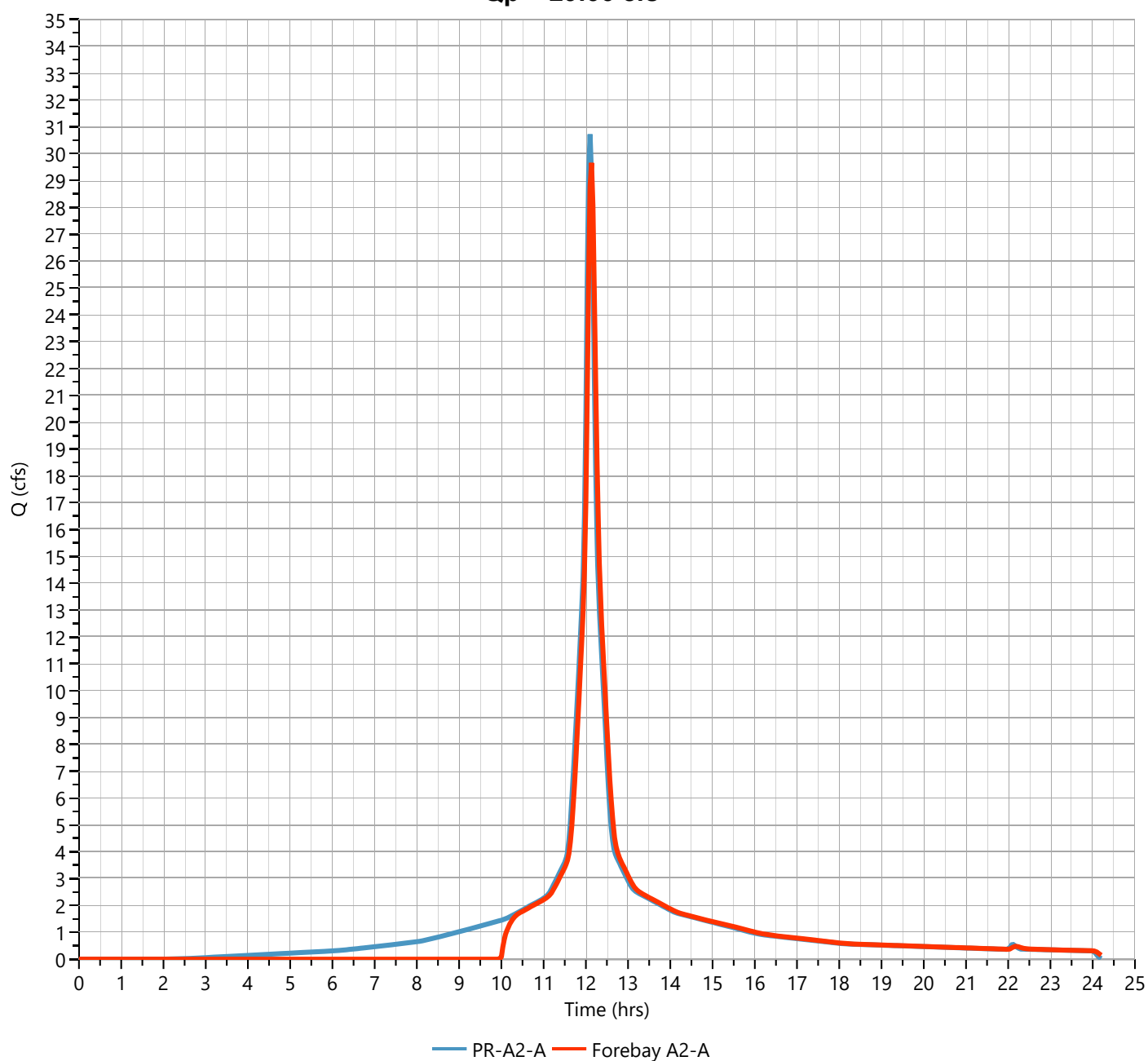
Hyd. No. 7

Hydrograph Type	= Pond Route	Peak Flow	= 29.66 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.13 hrs
Time Interval	= 2 min	Hydrograph Volume	= 101,372 cuft
Inflow Hydrograph	= 2 - PR-A2-A	Max. Elevation	= 367.29 ft
Pond Name	= Forebay A2-A	Max. Storage	= 17,031 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 41 min

Qp = 29.66 cfs



Hydrograph Report

Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

Forebay A2-B

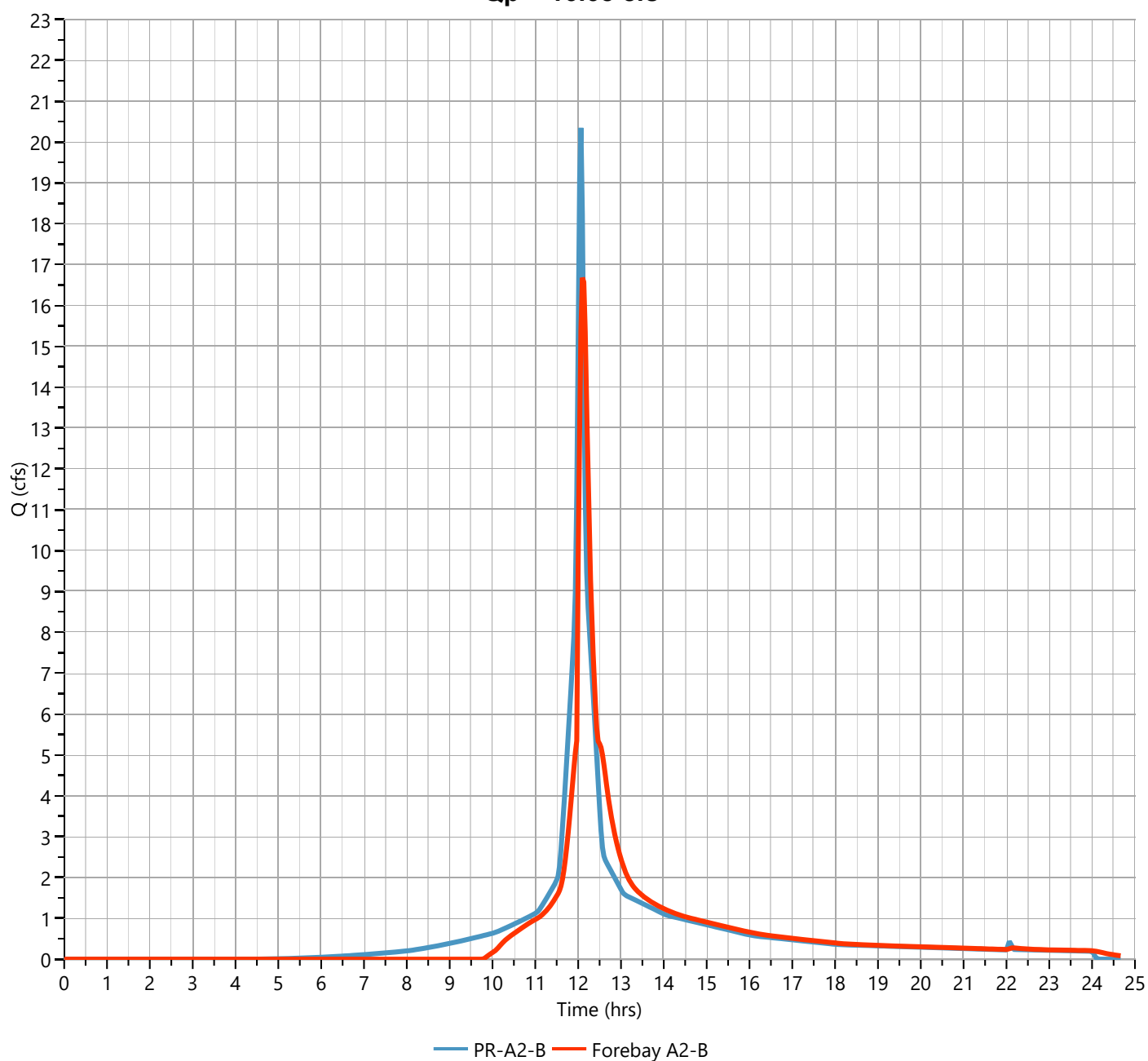
Hyd. No. 8

Hydrograph Type	= Pond Route	Peak Flow	= 16.68 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.10 hrs
Time Interval	= 2 min	Hydrograph Volume	= 59,301 cuft
Inflow Hydrograph	= 3 - PR-A2-B	Max. Elevation	= 362.68 ft
Pond Name	= Forebay A2-B	Max. Storage	= 11,149 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 34 min

Qp = 16.68 cfs



Hydrograph Report

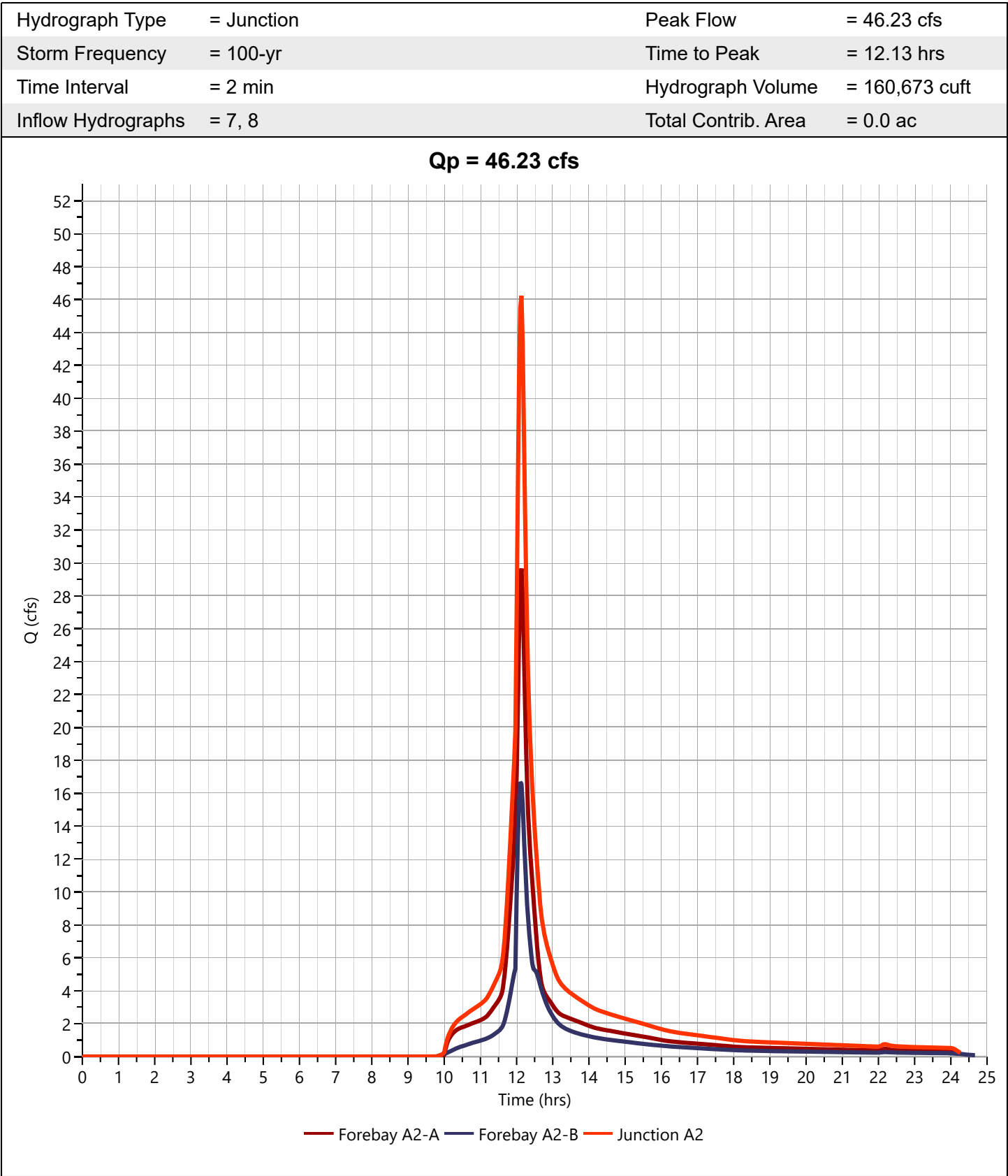
Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

Junction A2

Hyd. No. 9



Hydrograph Report

Project Name:

Hydrology Studio v 1.0.0.0

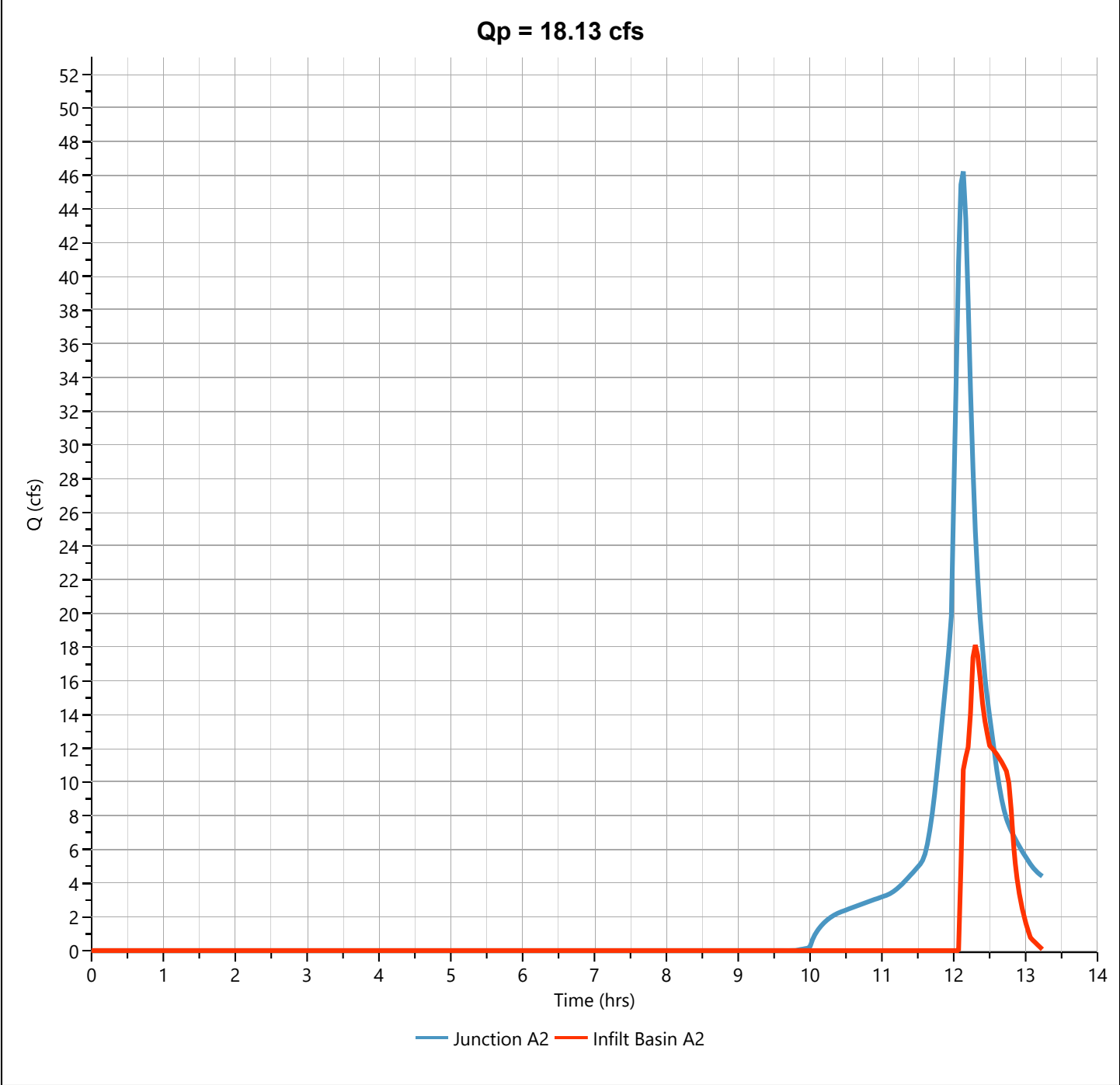
09-09-2020

Infilt Basin A2

Hyd. No. 10

Hydrograph Type	= Pond Route	Peak Flow	= 18.13 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.30 hrs
Time Interval	= 2 min	Hydrograph Volume	= 35,885 cuft
Inflow Hydrograph	= 9 - Junction A2	Max. Elevation	= 361.99 ft
Pond Name	= Infiltration A2	Max. Storage	= 36,045 cuft

Pond Routing by Storage Indication Method



Hydrograph Report

Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

Pocket Pond A3

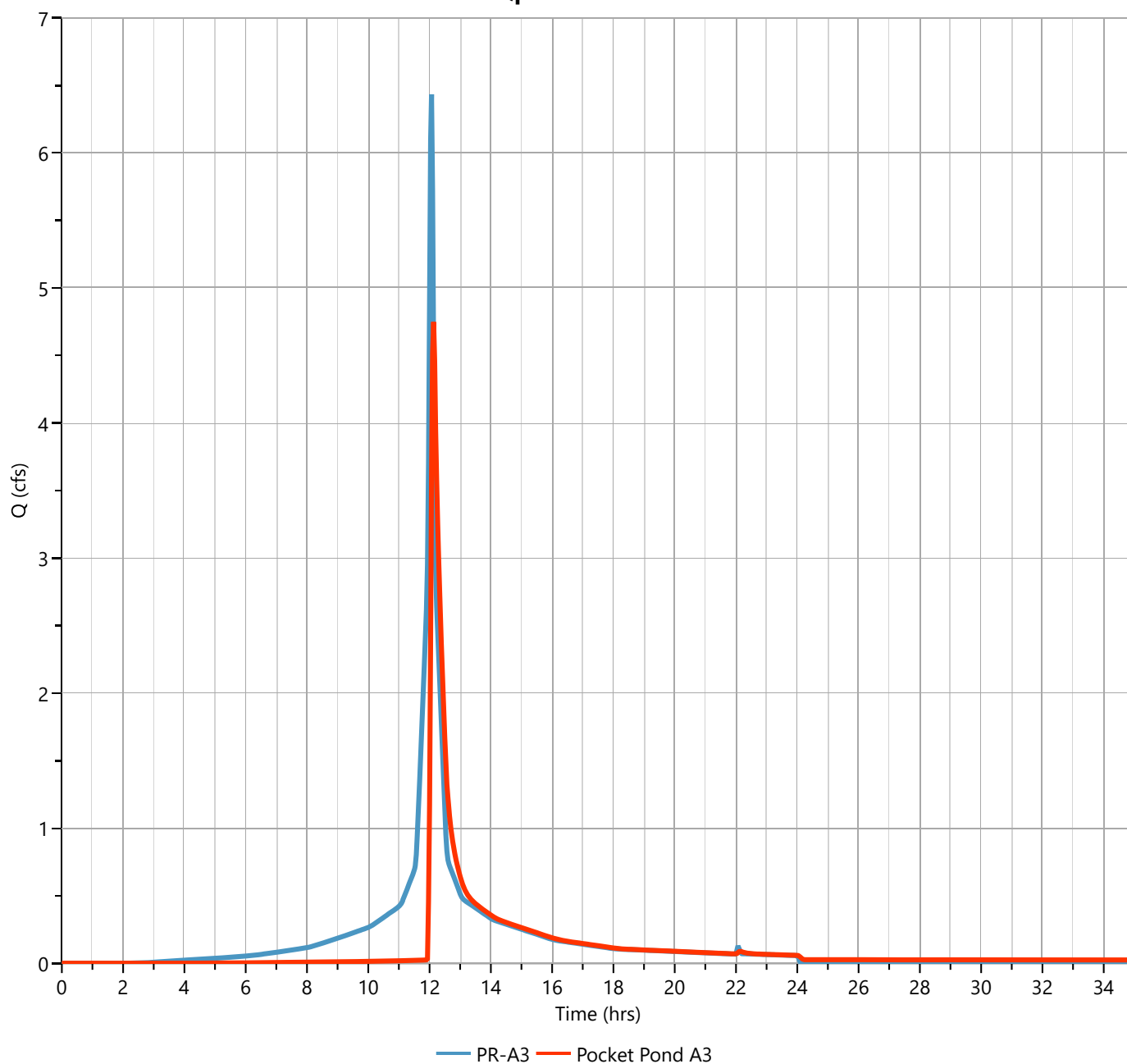
Hyd. No. 11

Hydrograph Type	= Pond Route	Peak Flow	= 4.748 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.13 hrs
Time Interval	= 2 min	Hydrograph Volume	= 19,033 cuft
Inflow Hydrograph	= 4 - PR-A3	Max. Elevation	= 363.23 ft
Pond Name	= Pocket Pond A3	Max. Storage	= 19,460 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 1.46 hrs

Qp = 4.75 cfs



Hydrograph Report

Project Name:

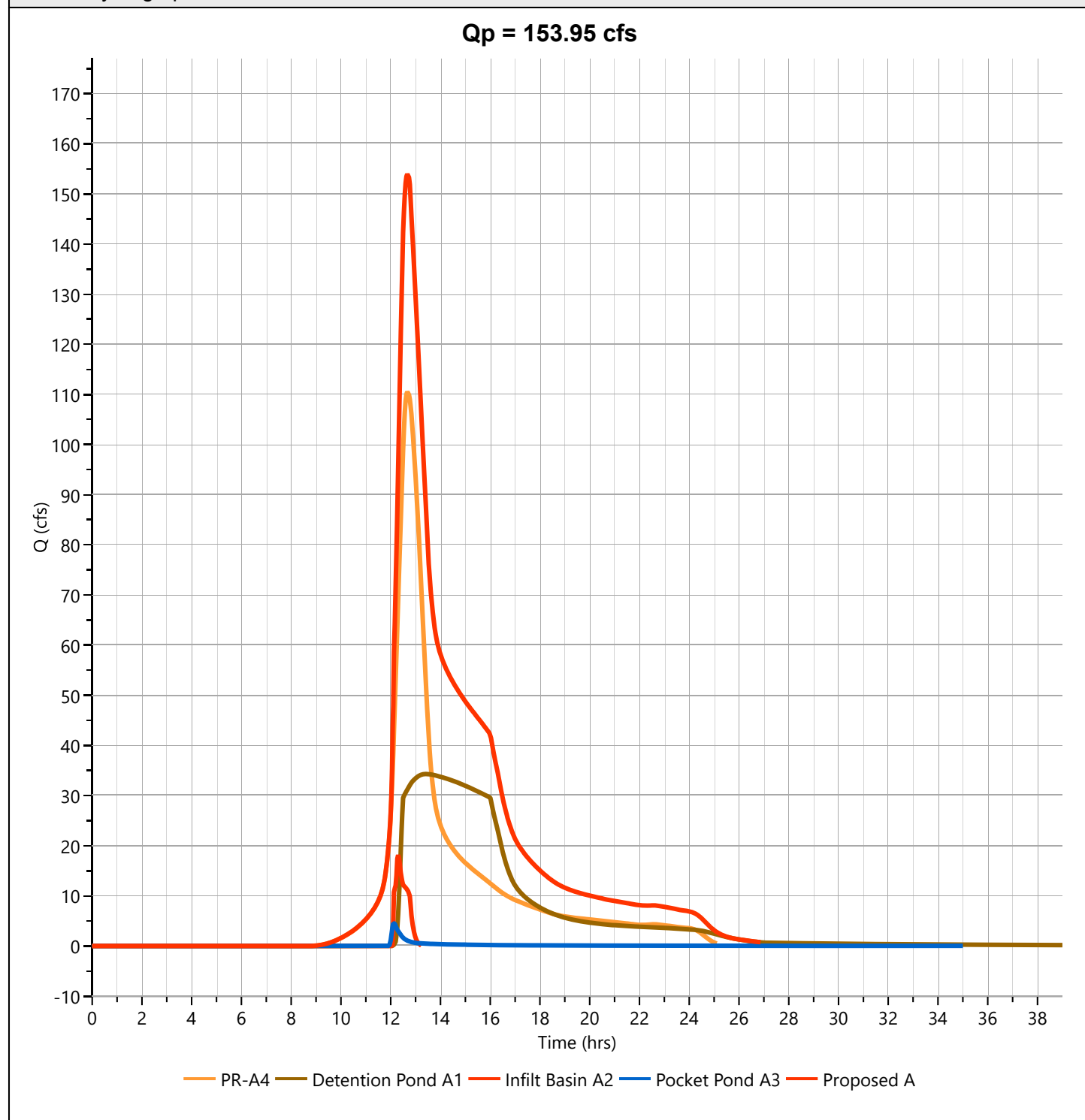
Hydrology Studio v 1.0.0.0

09-09-2020

Proposed A

Hyd. No. 12

Hydrograph Type	= Junction	Peak Flow	= 154.0 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.67 hrs
Time Interval	= 2 min	Hydrograph Volume	= 1,565,082 cuft
Inflow Hydrographs	= 5, 6, 10, 11	Total Contrib. Area	= 55.78 ac



Hydrograph Report

Project Name:

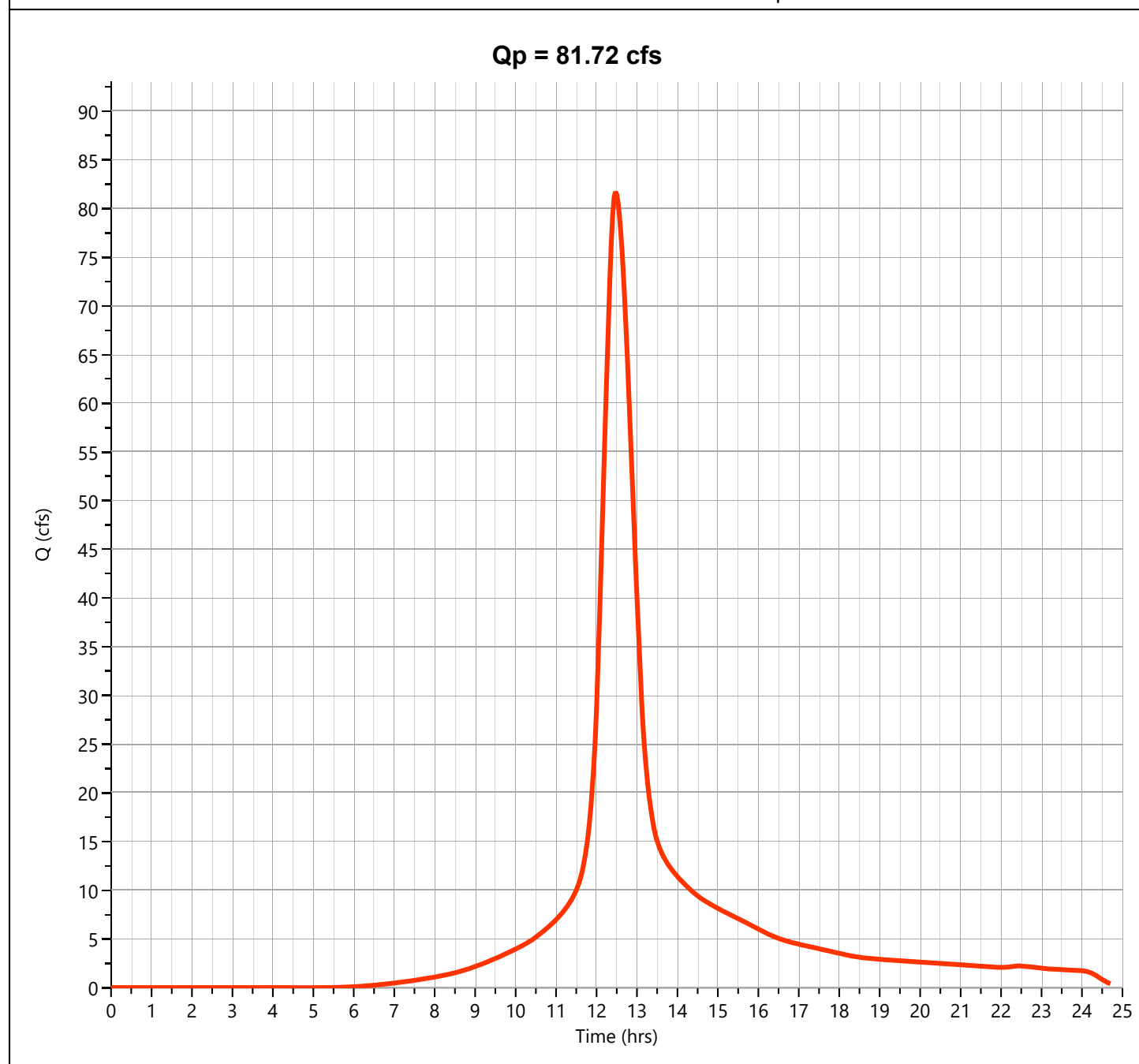
Hydrology Studio v 1.0.0.0

09-09-2020

PR-B1

Hyd. No. 13

Hydrograph Type	= NRCS Runoff	Peak Flow	= 81.72 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.47 hrs
Time Interval	= 2 min	Runoff Volume	= 520,376 cuft
Drainage Area	= 24.0 ac	Curve Number	= 80
Tc Method	= User	Time of Conc. (Tc)	= 41.4 min
Total Rainfall	= 8.31 in	Design Storm	= Type III
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

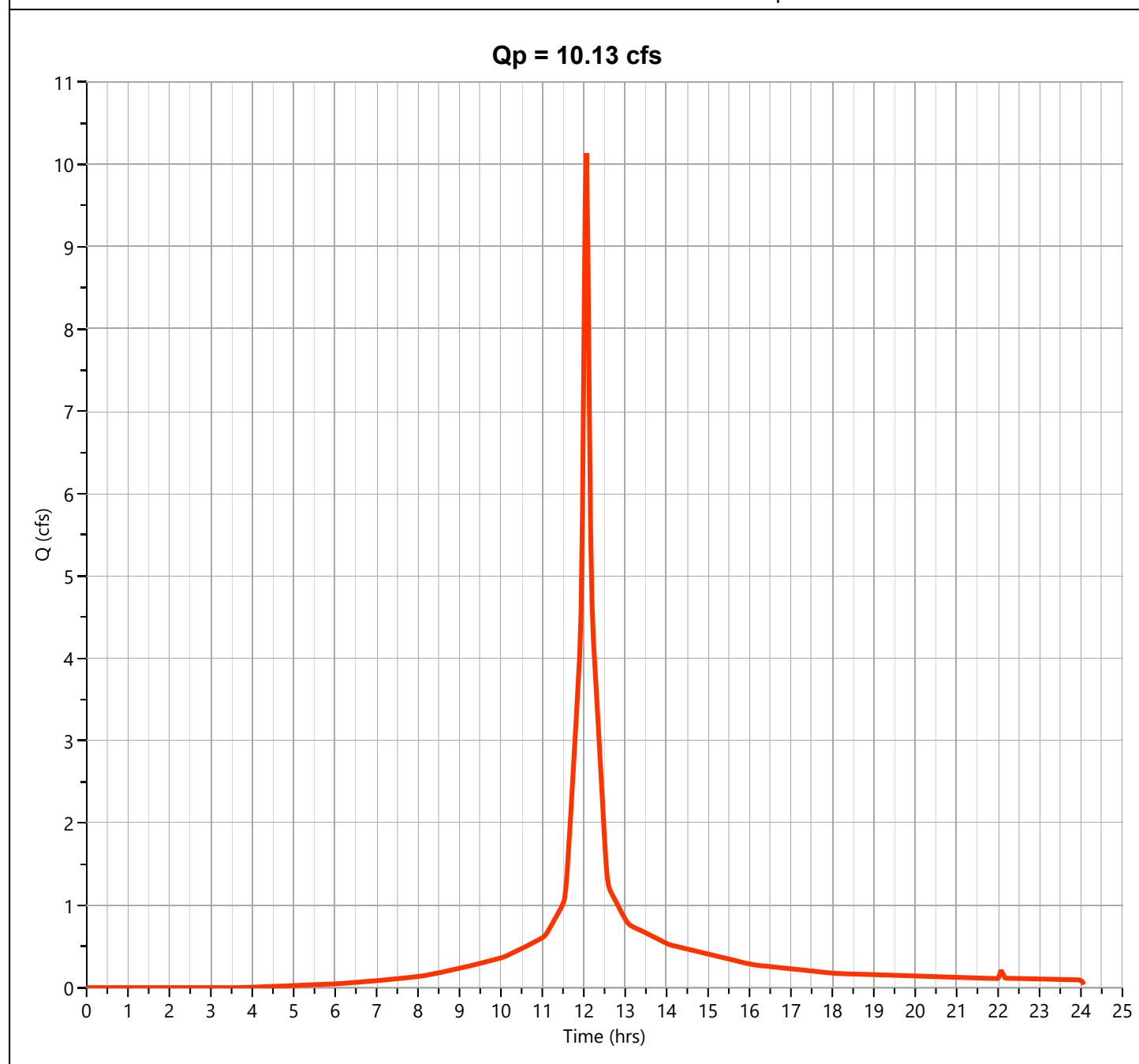
Hydrology Studio v 1.0.0.0

09-09-2020

PR-B2

Hyd. No. 14

Hydrograph Type	= NRCS Runoff	Peak Flow	= 10.13 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.07 hrs
Time Interval	= 2 min	Runoff Volume	= 31,824 cuft
Drainage Area	= 1.41 ac	Curve Number	= 86
Tc Method	= User	Time of Conc. (Tc)	= 4.2 min
Total Rainfall	= 8.31 in	Design Storm	= Type III
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

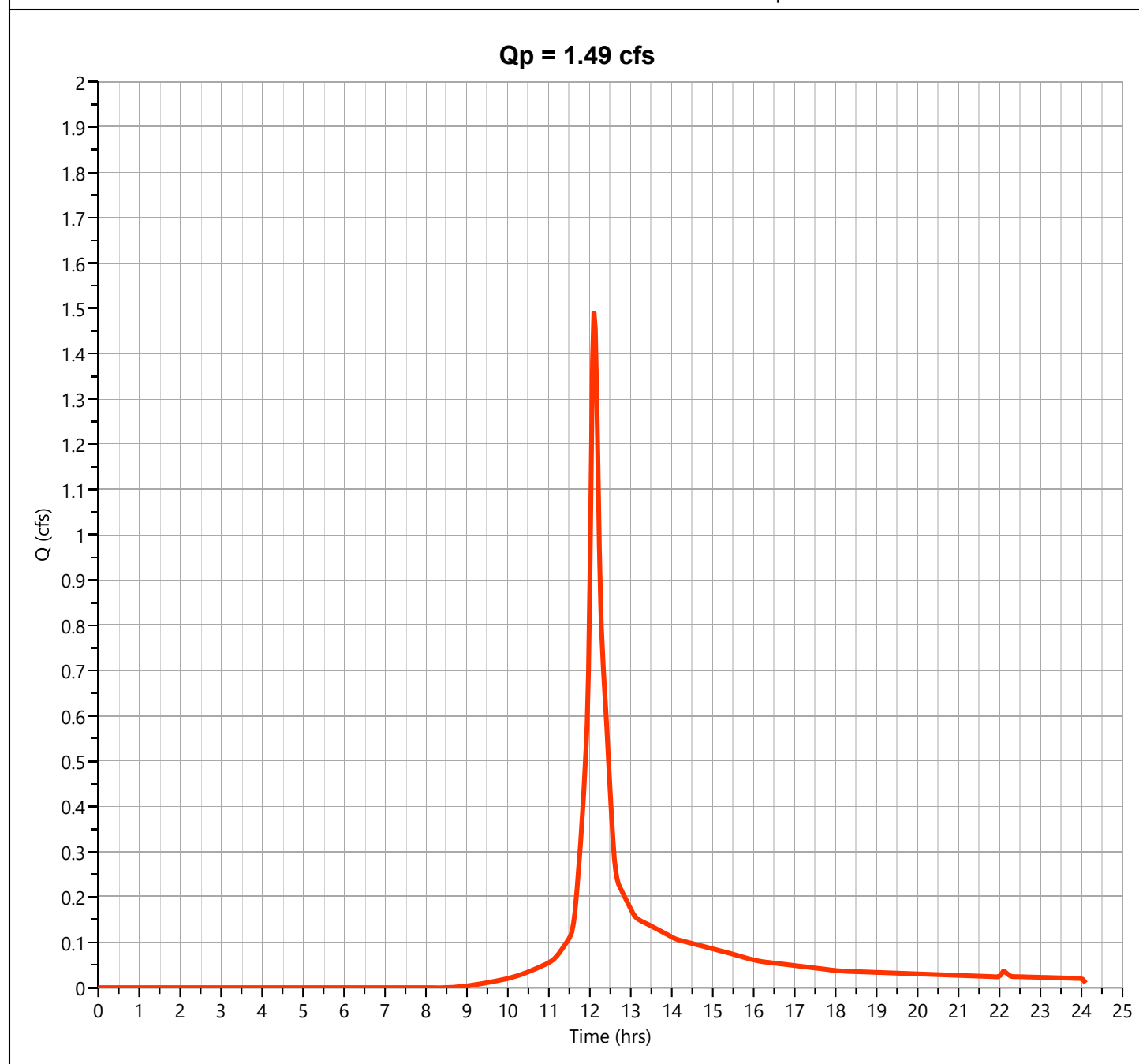
Hydrology Studio v 1.0.0.0

09-09-2020

PR-B3

Hyd. No. 15

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.494 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.10 hrs
Time Interval	= 2 min	Runoff Volume	= 5,117 cuft
Drainage Area	= 0.34 ac	Curve Number	= 65
Tc Method	= User	Time of Conc. (Tc)	= 9.0 min
Total Rainfall	= 8.31 in	Design Storm	= Type III
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

Forebay B3

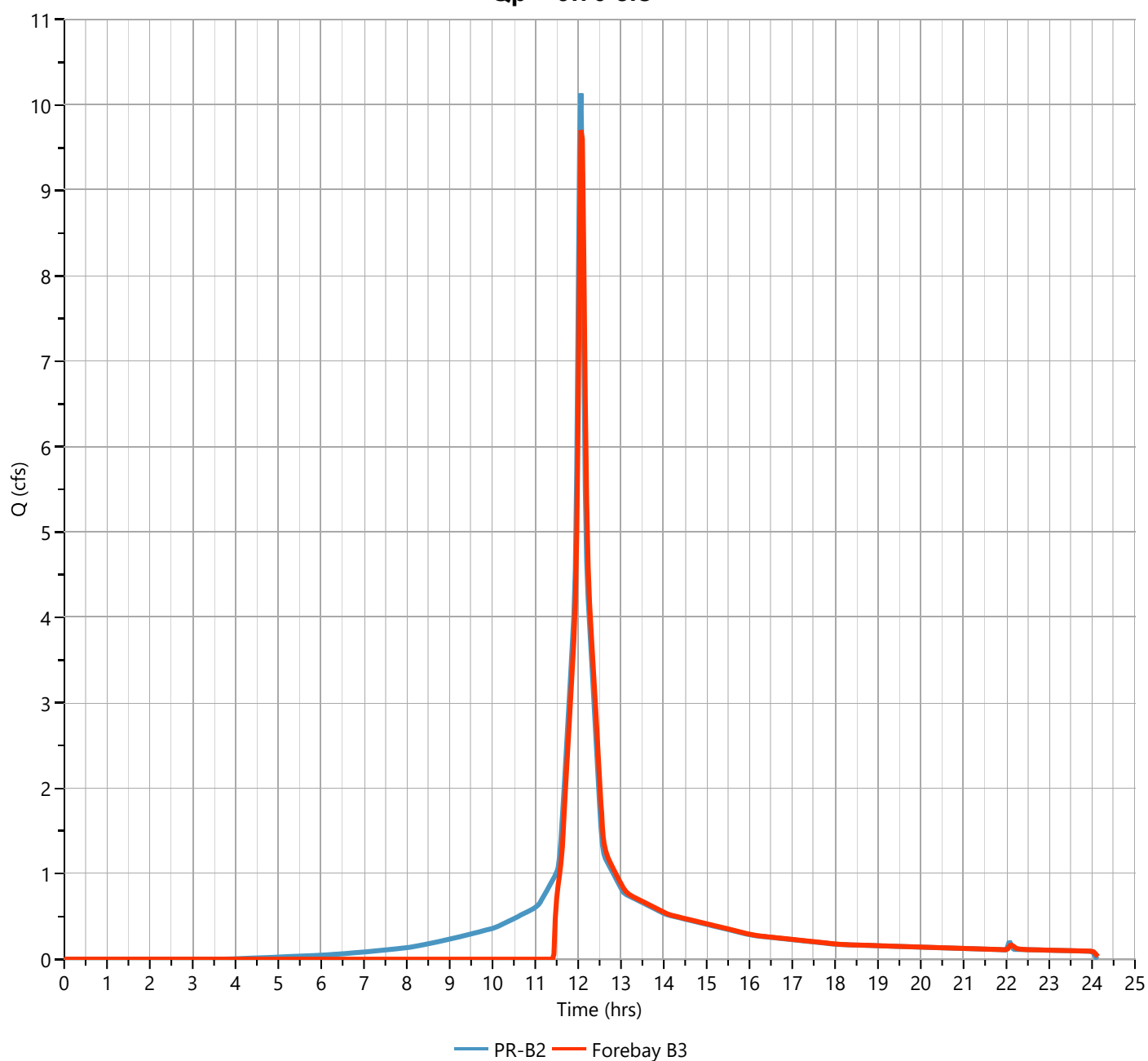
Hyd. No. 16

Hydrograph Type	= Pond Route	Peak Flow	= 9.704 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.07 hrs
Time Interval	= 2 min	Hydrograph Volume	= 26,428 cuft
Inflow Hydrograph	= 14 - PR-B2	Max. Elevation	= 373.38 ft
Pond Name	= Forebay B	Max. Storage	= 6,417 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 46 min

Qp = 9.70 cfs



Hydrograph Report

Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

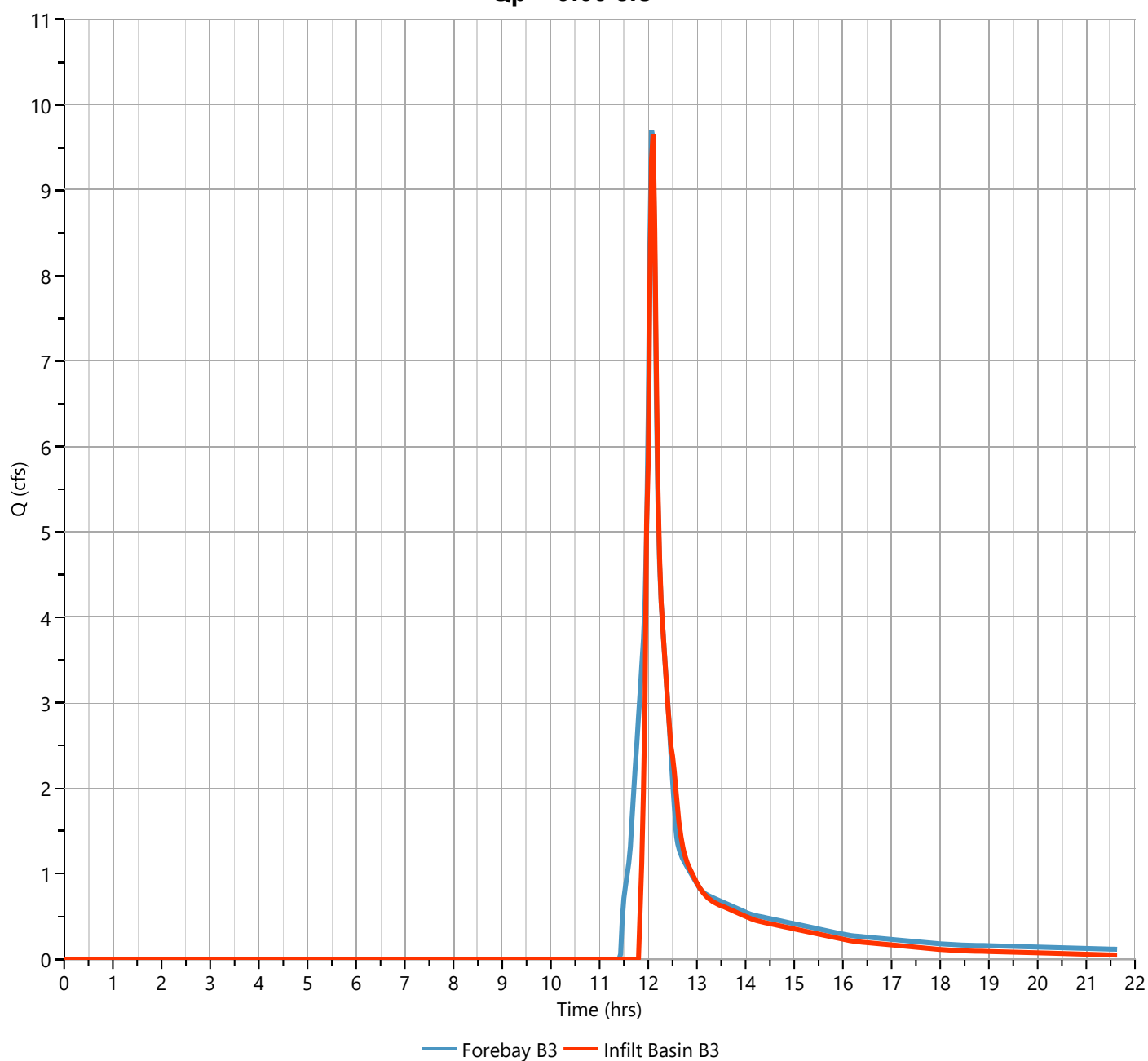
Infil Basin B3

Hyd. No. 17

Hydrograph Type	= Pond Route	Peak Flow	= 9.661 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.10 hrs
Time Interval	= 2 min	Hydrograph Volume	= 21,163 cuft
Inflow Hydrograph	= 16 - Forebay B3	Max. Elevation	= 370.71 ft
Pond Name	= Pond B	Max. Storage	= 3,045 cuft

Pond Routing by Storage Indication Method

Qp = 9.66 cfs



Hydrograph Report

Project Name:

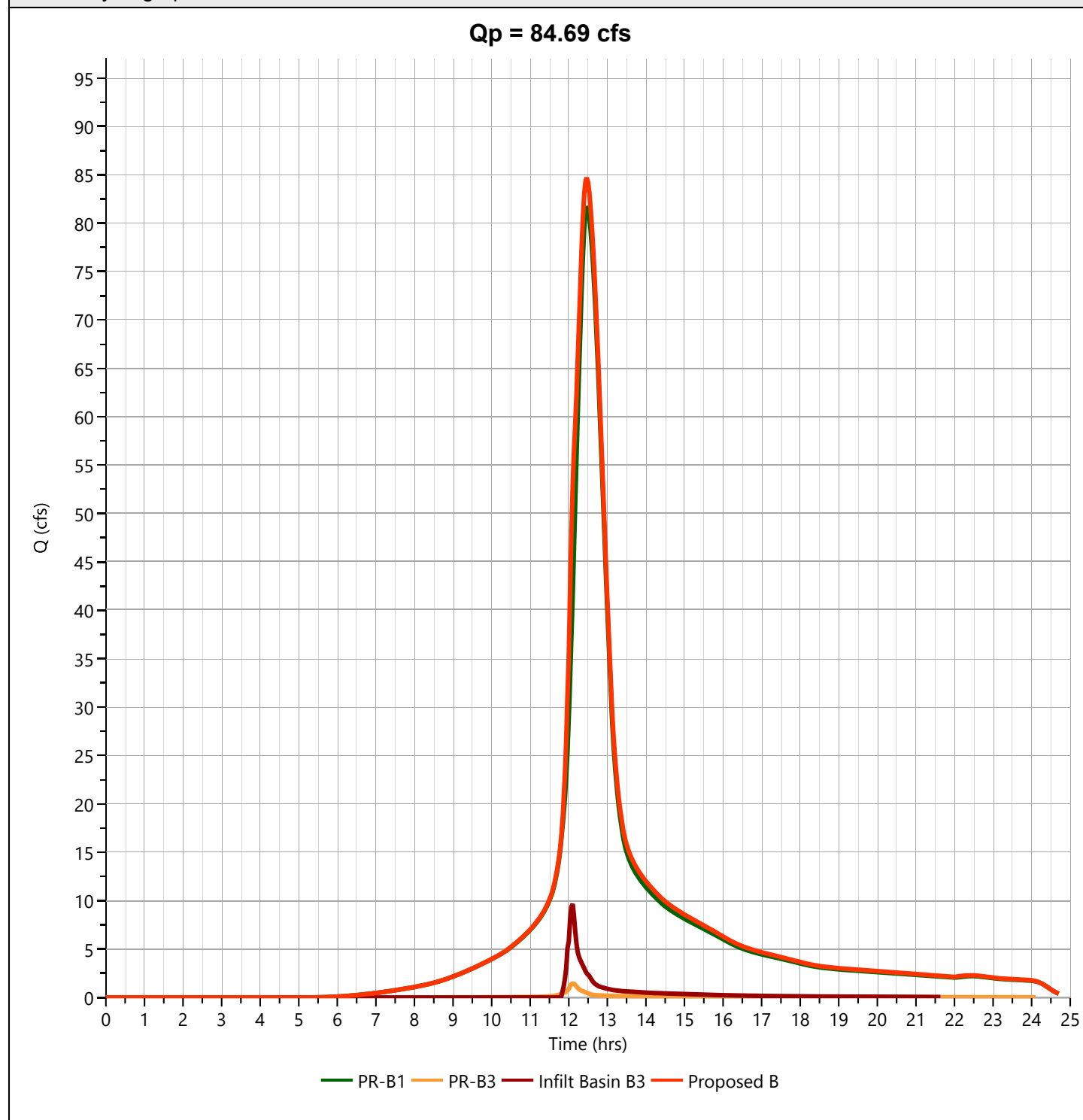
Hydrology Studio v 1.0.0.0

09-09-2020

Proposed B

Hyd. No. 18

Hydrograph Type	= Junction	Peak Flow	= 84.69 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.47 hrs
Time Interval	= 2 min	Hydrograph Volume	= 546,657 cuft
Inflow Hydrographs	= 13, 15, 17	Total Contrib. Area	= 24.34 ac



APPENDIX 10

RESERVOIR REPORTS

This page is left intentionally blank



WQv Provided in SMP

WO. NO.	DATE	REVISED	SHEET	OF
1284.02	JAN '19	SEPT '20	1	7

PROJECT TITLE
RDM Warehouses - 230 Neelytown Road

LOCATION
Town of Hamptonburgh

CALCULATED BY
ZS

APPROVED BY
JS

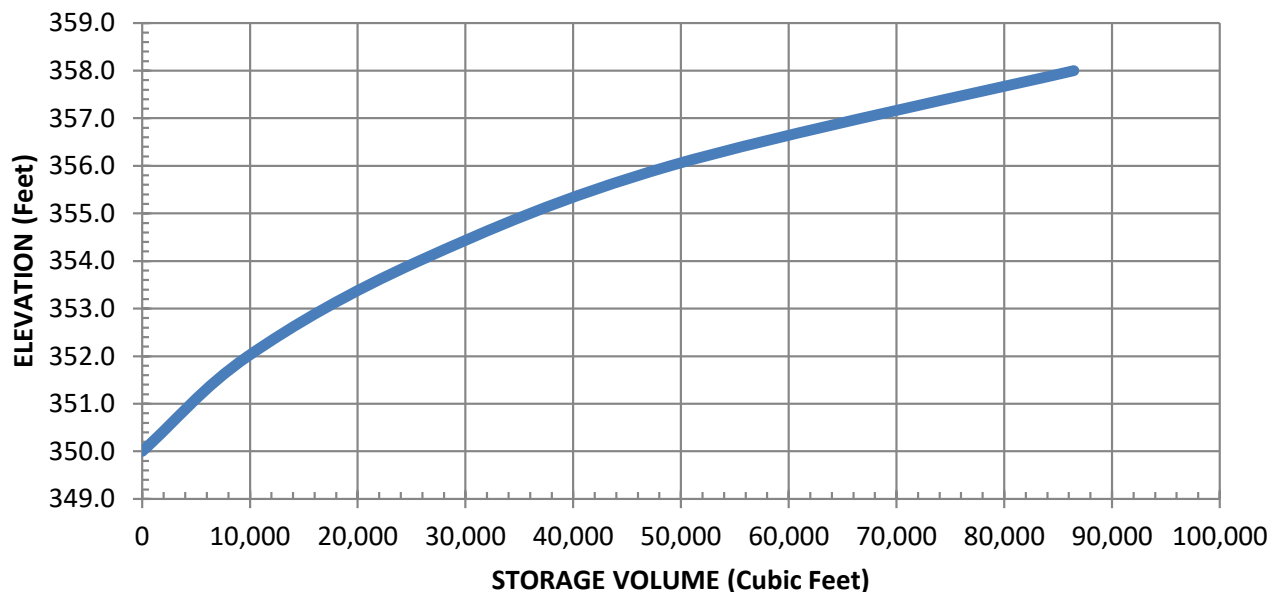
REF DRAWING(S)

Basin **Forebay A1**

WQv provided: 1.985 ac-ft

Water Surface Elevation (Feet)	Surface Area (Square Feet)	Average Area (Square Feet)	Difference in Elevation (Feet)	Incremental Storage (Cubic Feet)	Total Storage Volume (Cubic Feet)
350.0	3,575.0	--	--	--	0.0
352.0	6,243.0	4,909.0	2.0	9,818.0	9,818.0
354.0	9,623.0	7,933.0	2.0	15,866.0	25,684.0
356.0	13,709.0	11,666.0	2.0	23,332.0	49,016.0
358.0	23,733.0	18,721.0	2.0	37,442.0	86,458.0

Stage Storage Curve





WQv Provided in SMP

WO. NO.	DATE	REVISED	SHEET	OF
1284.02	JAN '19		2	7

PROJECT TITLE
RDM Warehouses - 230 Neelytown Road

LOCATION
Town of Hamptonburgh

CALCULATED BY
ZS

APPROVED BY
JS

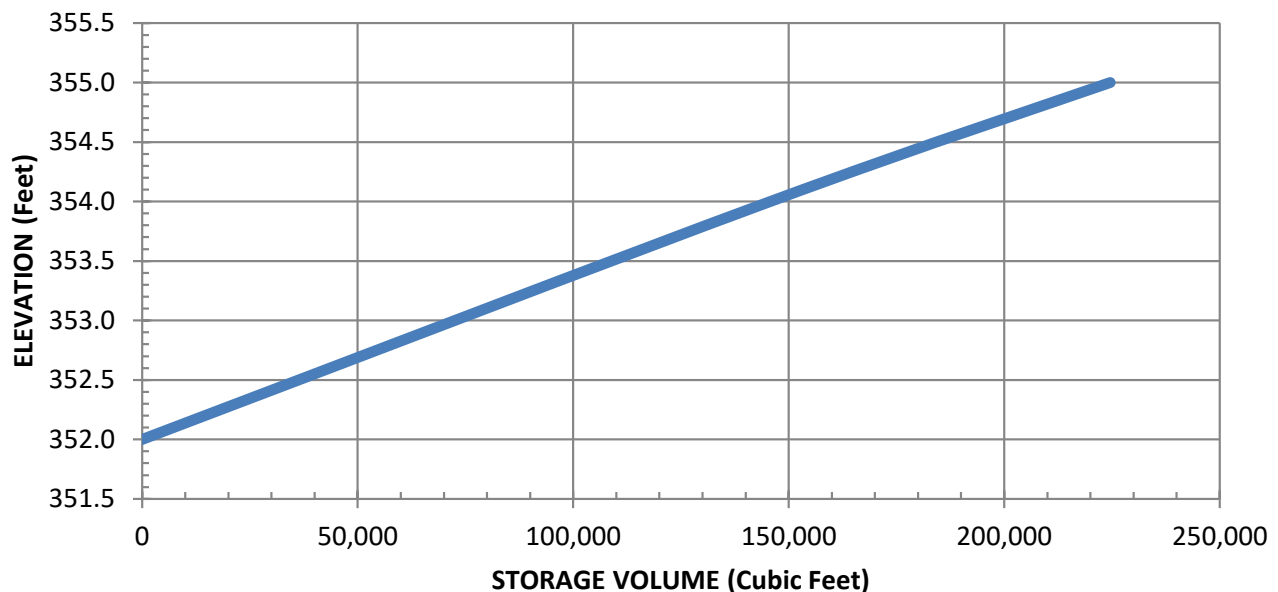
REF DRAWING(S)

Basin **A1 Basin**

WQv provided: 5.156 ac-ft

Water Surface Elevation (Feet)	Surface Area (Square Feet)	Average Area (Square Feet)	Difference in Elevation (Feet)	Incremental Storage (Cubic Feet)	Total Storage Volume (Cubic Feet)
352.0	68,531.0	--	--	--	0.0
354.0	77,193.0	72,862.0	2.0	145,724.0	145,724.0
355.0	80,538.0	78,865.5	1.0	78,865.5	224,589.5

Stage Storage Curve





WQv Provided in SMP

WO. NO.	DATE	REVISED	SHEET	OF
1284.02	JAN '19		3	7

PROJECT TITLE
RDM Warehouses - 230 Neelytown Road

LOCATION
Town of Hamptonburgh

CALCULATED BY
ZS

APPROVED BY
JS

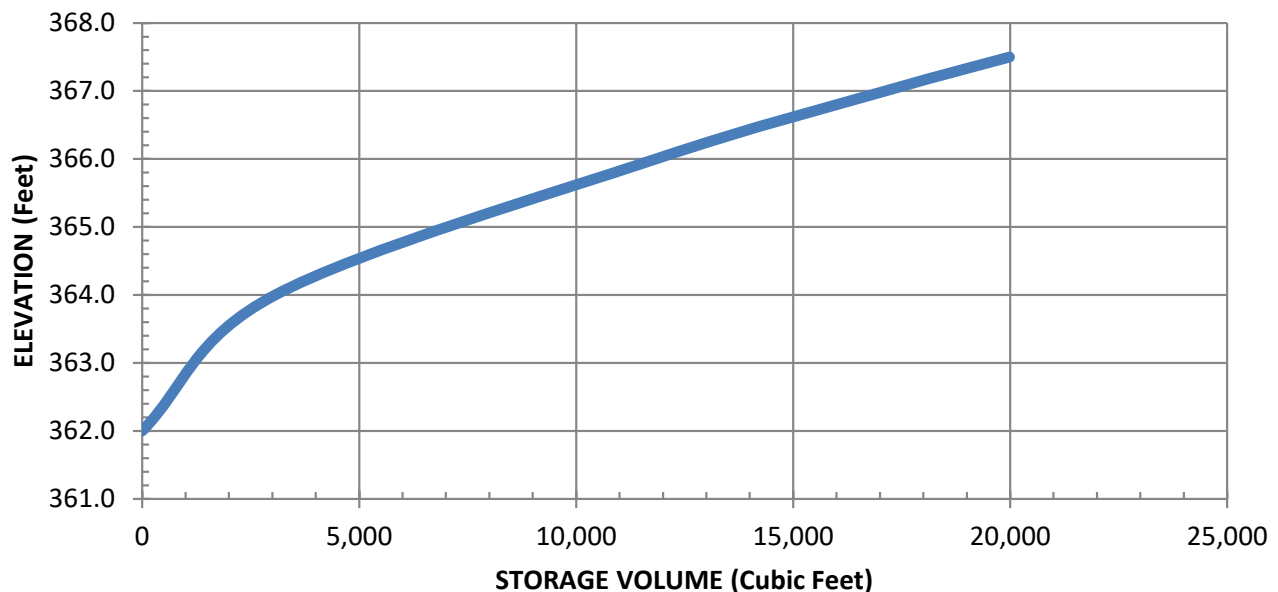
REF DRAWING(S)

Basin **Forebay A2A**

WQv provided: 0.459 ac-ft

Water Surface Elevation (Feet)	Surface Area (Square Feet)	Average Area (Square Feet)	Difference in Elevation (Feet)	Incremental Storage (Cubic Feet)	Total Storage Volume (Cubic Feet)
362.0	806.0	--	--	--	0.0
364.0	2,259.0	1,532.5	2.0	3,065.0	3,065.0
366.0	5,124.0	4,384.0	2.0	8,768.0	11,833.0
367.0	5,450.0	5,287.0	1.0	5,287.0	17,120.0
367.5	6,009.0	5,729.5	0.5	2,864.8	19,984.8

Stage Storage Curve





WQv Provided in SMP

WO. NO.	DATE	REVISED	SHEET	OF
1284.02	JAN '19		4	7

PROJECT TITLE
RDM Warehouses - 230 Neelytown Road

LOCATION
Town of Hamptonburgh

CALCULATED BY
ZS

APPROVED BY
JS

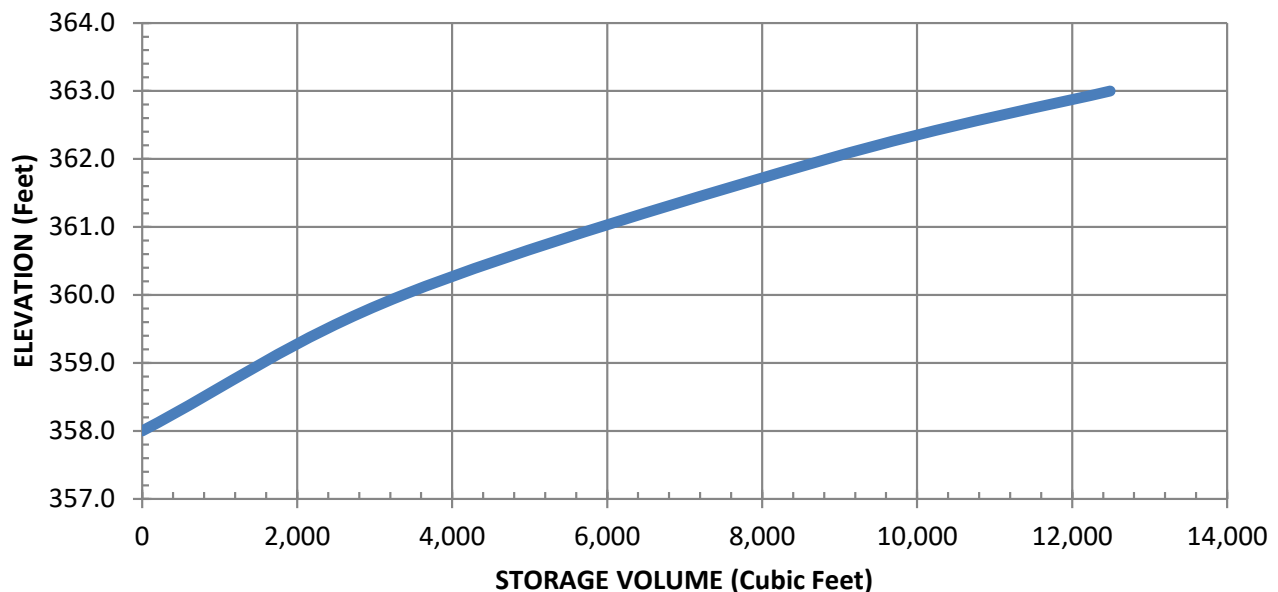
REF DRAWING(S)

Basin **Forebay A2B**

WQv provided: 0.287 ac-ft

Water Surface Elevation (Feet)	Surface Area (Square Feet)	Average Area (Square Feet)	Difference in Elevation (Feet)	Incremental Storage (Cubic Feet)	Total Storage Volume (Cubic Feet)
358.0	1,213.0	--	--	--	0.0
360.0	2,153.0	1,683.0	2.0	3,366.0	3,366.0
362.0	3,319.0	2,736.0	2.0	5,472.0	8,838.0
363.0	3,986.0	3,652.5	1.0	3,652.5	12,490.5

Stage Storage Curve





WQv Provided in SMP

WO. NO.	DATE	REVISED	SHEET	OF
1284.02	JAN '19		5	7

PROJECT TITLE
RDM Warehouses - 230 Neelytown Road

LOCATION
Town of Hamptonburgh

CALCULATED BY
ZS

APPROVED BY
JS

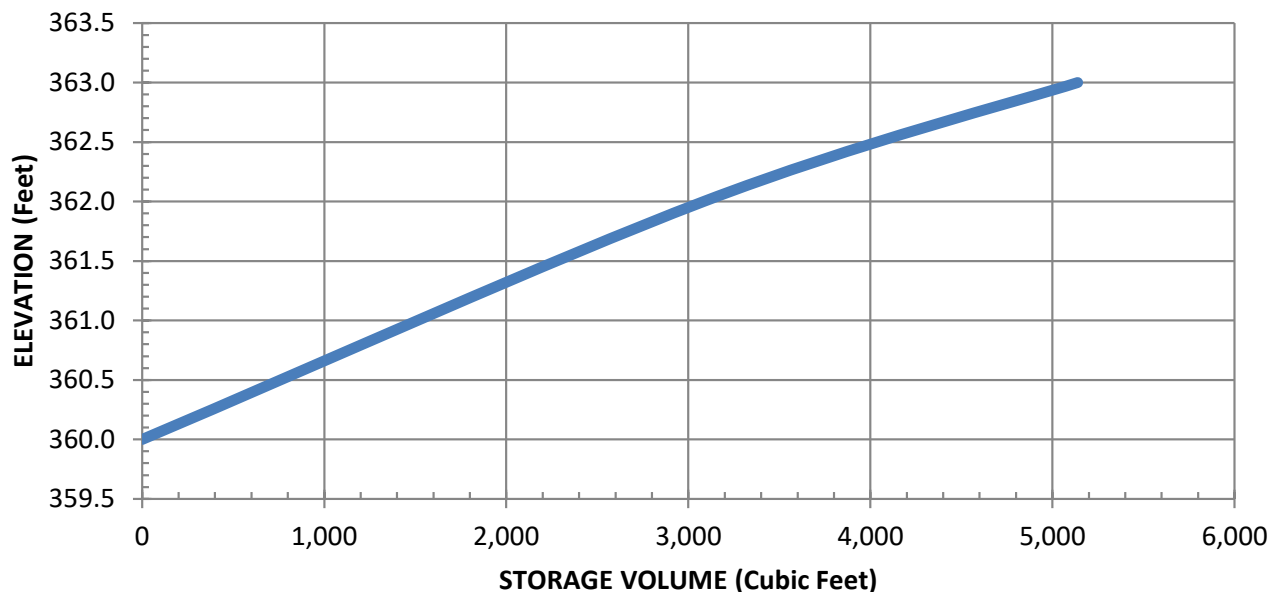
REF DRAWING(S)

Basin **Forebay A3**

WQv provided: 0.118 ac-ft

Water Surface Elevation (Feet)	Surface Area (Square Feet)	Average Area (Square Feet)	Difference in Elevation (Feet)	Incremental Storage (Cubic Feet)	Total Storage Volume (Cubic Feet)
360.0	1,213.0	--	--	--	0.0
362.0	1,871.0	1,542.0	2.0	3,084.0	3,084.0
363.0	2,238.0	2,054.5	1.0	2,054.5	5,138.5

Stage Storage Curve





WQv Provided in SMP

WO. NO.	DATE	REVISED	SHEET	OF
1284.02	JAN '19		6	7

PROJECT TITLE
RDM Warehouses - 230 Neelytown Road

LOCATION
Town of Hamptonburgh

CALCULATED BY
ZS

APPROVED BY
JS

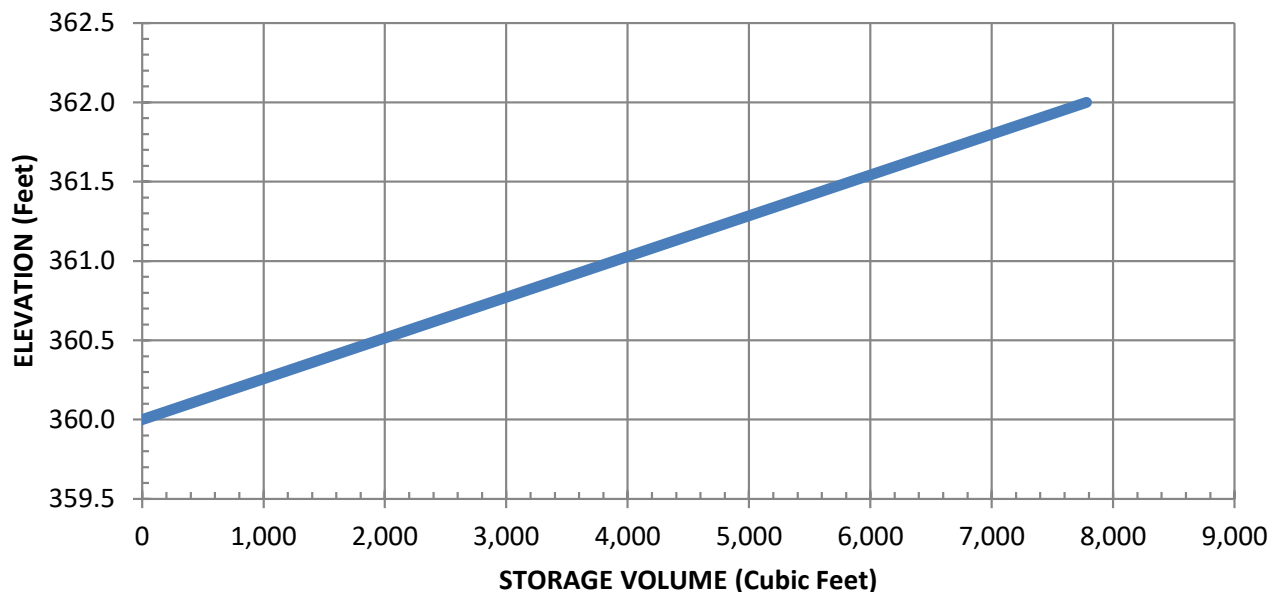
REF DRAWING(S)

Basin **Basin A3**

WQv provided: 0.179 ac-ft

Water Surface Elevation (Feet)	Surface Area (Square Feet)	Average Area (Square Feet)	Difference in Elevation (Feet)	Incremental Storage (Cubic Feet)	Total Storage Volume (Cubic Feet)
360.0	3,303.0	--	--	--	0.0
362.0	4,478.0	3,890.5	2.0	7,781.0	7,781.0

Stage Storage Curve





WQv Provided in SMP

WO. NO.	DATE	REVISED	SHEET	OF
1284.02	JAN '19		7	7

PROJECT TITLE
RDM Warehouses - 230 Neelytown Road

LOCATION
Town of Hamptonburgh

CALCULATED BY
ZS

APPROVED BY
JS

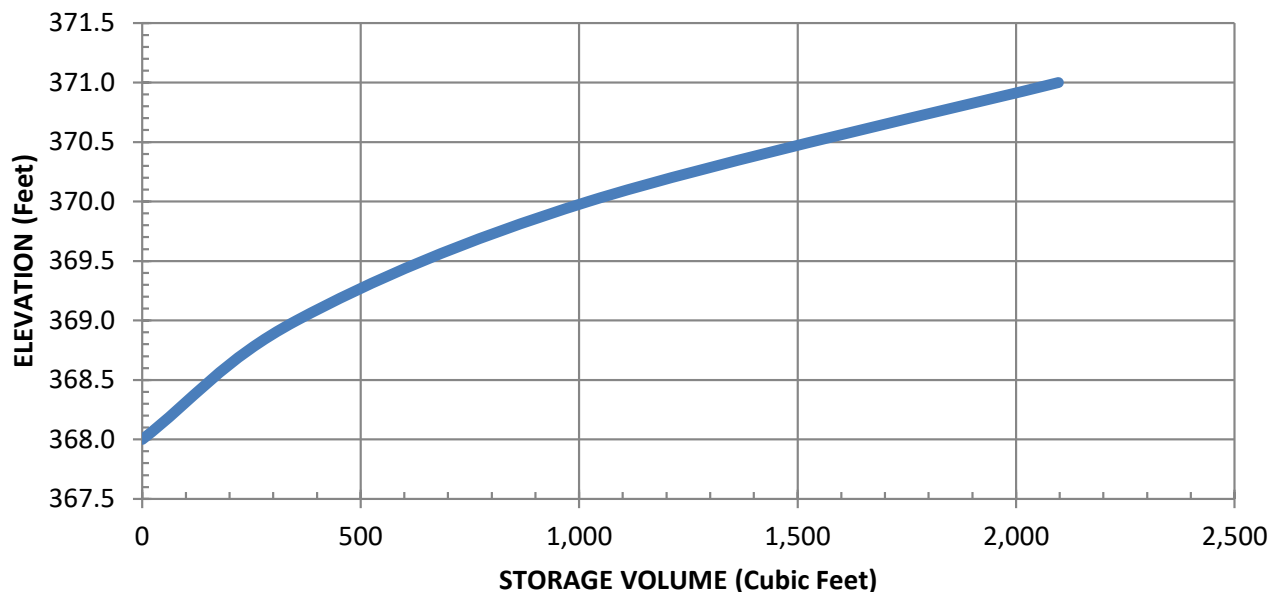
REF DRAWING(S)

Basin **Forebay B3**

WQv provided: 0.048 ac-ft

Water Surface Elevation (Feet)	Surface Area (Square Feet)	Average Area (Square Feet)	Difference in Elevation (Feet)	Incremental Storage (Cubic Feet)	Total Storage Volume (Cubic Feet)
368.0	219.0	--	--	--	0.0
369.0	488.0	353.5	1.0	353.5	353.5
370.0	847.0	667.5	1.0	667.5	1,021.0
371.0	1,305.0	1,076.0	1.0	1,076.0	2,097.0

Stage Storage Curve



This page is left intentionally blank

Pond Report

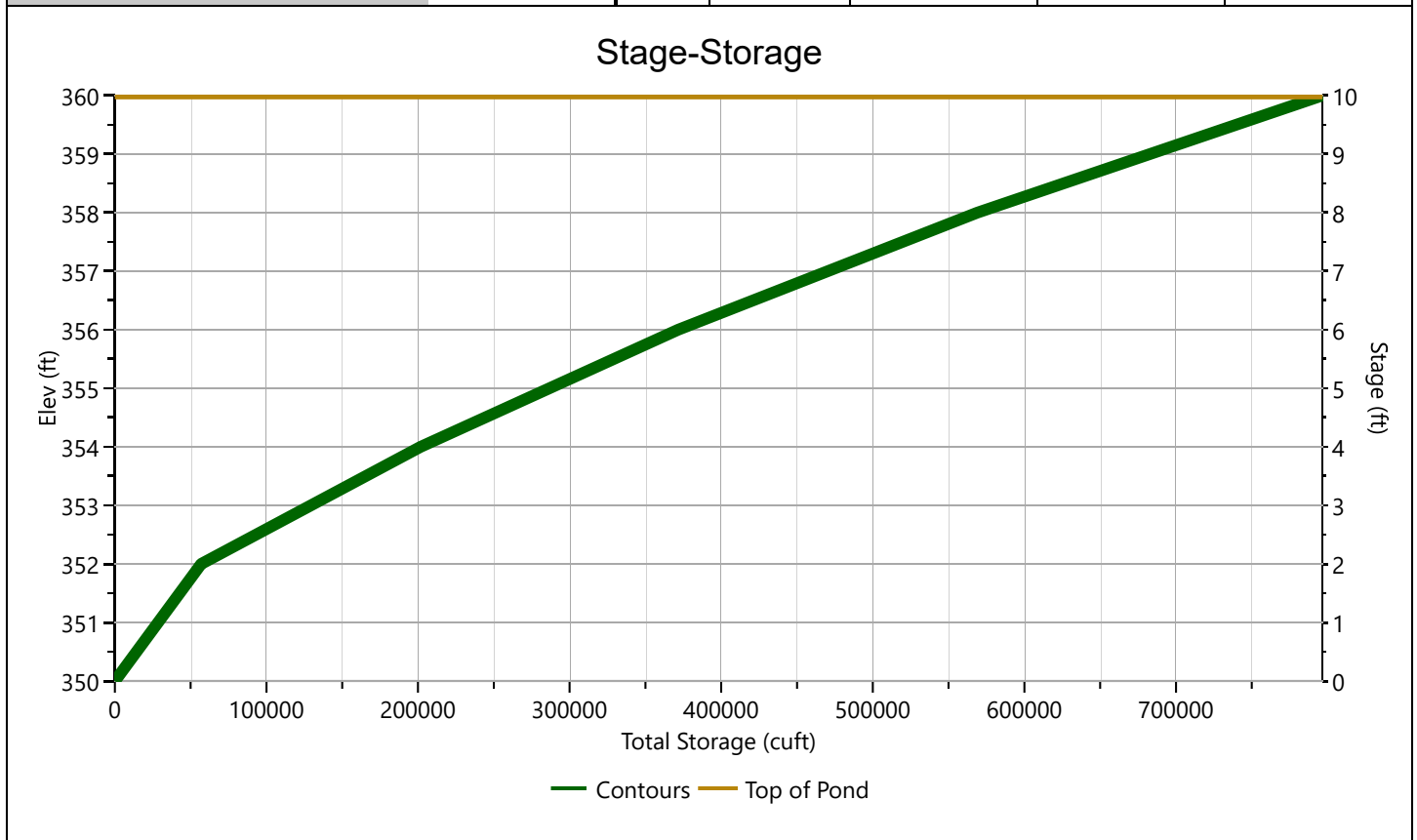
Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

Detention Pond A1

Stage-Storage

[illegible]

Pond Report

Project Name:

Hydrology Studio v 1.0.0.0

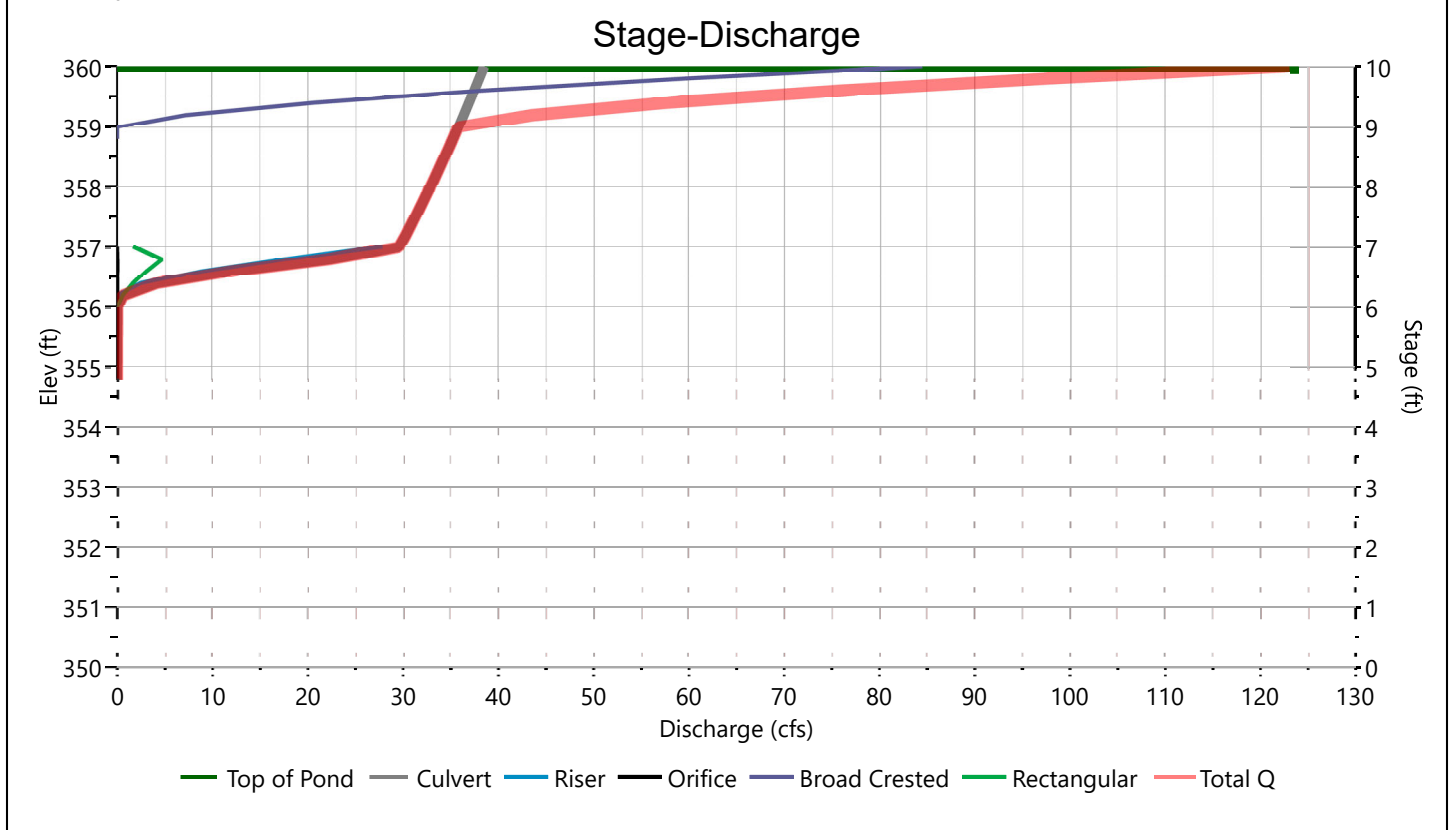
09-09-2020

Detention Pond A1

Stage-Discharge

Culvert / Orifices	Culvert	Orifices			Orifice Plate
		1*	2	3	
Rise, in	24	1			Orifice Dia, in
Span, in	24	1			No. Orifices
No. Barrels	1	1			Invert Elevation, ft
Invert Elevation, ft	352.00	355.00			Height, ft
Orifice Coefficient, Co	0.60	0.60			Orifice Coefficient, Co
Length, ft	133				
Barrel Slope, %	1				
N-Value, n	0.013				
Weirs	Riser*	Weirs			Ancillary
		1	2*	3	
Shape / Type	Box	Broad Crested	Rectangular		Exfiltration, in/hr
Crest Elevation, ft	356.25	359	356		
Crest Length, ft	13	24	2		
Angle, deg		26.6 (2:1)			
Weir Coefficient, Cw	3.3	3.3	3.3		

*Routes through Culvert.



Pond Report

Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

Detention Pond A1

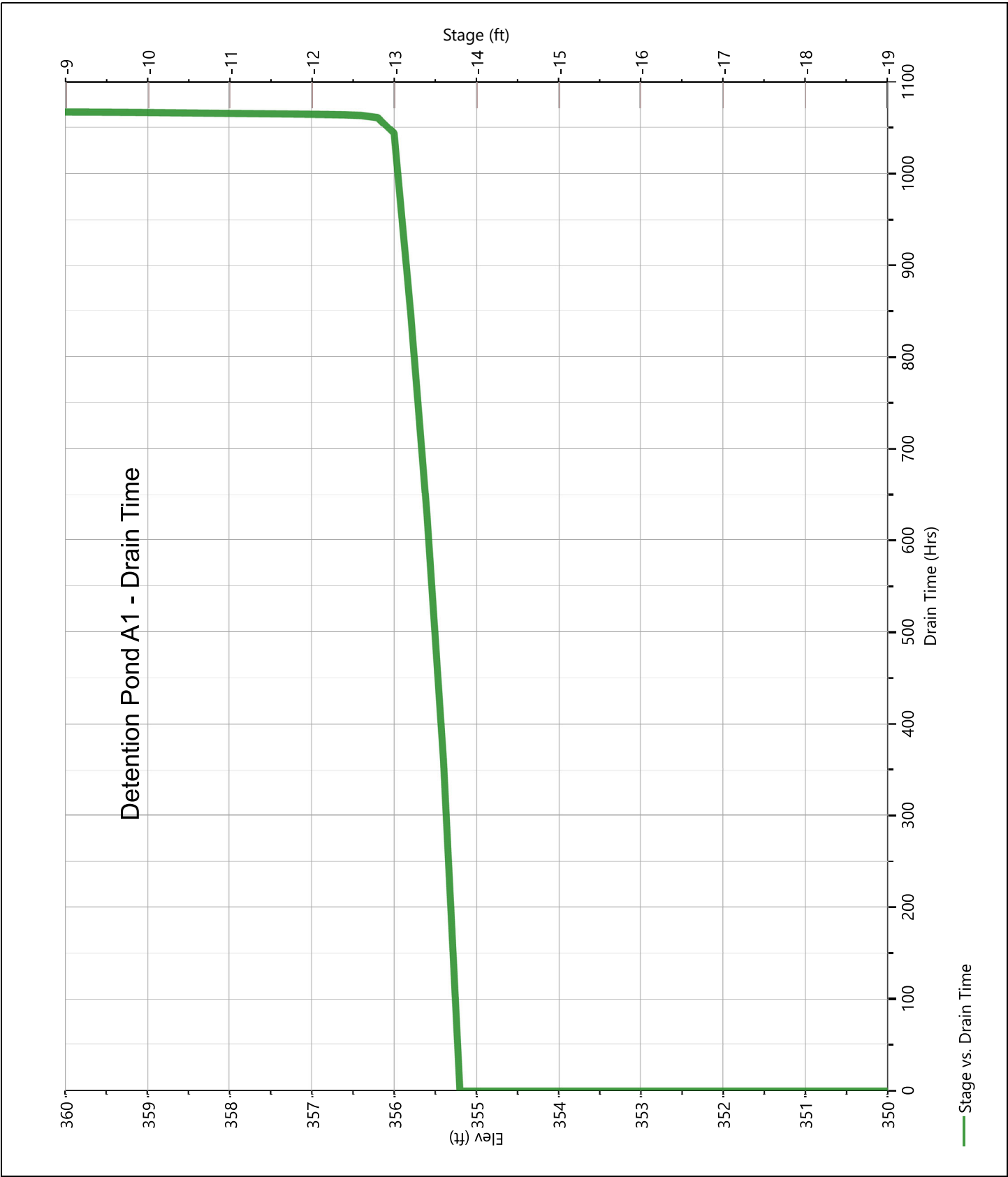
Stage-Storage-Discharge Summary

[illegible]

Suffix key: ic = inlet control, oc = outlet control, s = submerged weir

Detention Pond A1

Pond Drawdown



Pond Report

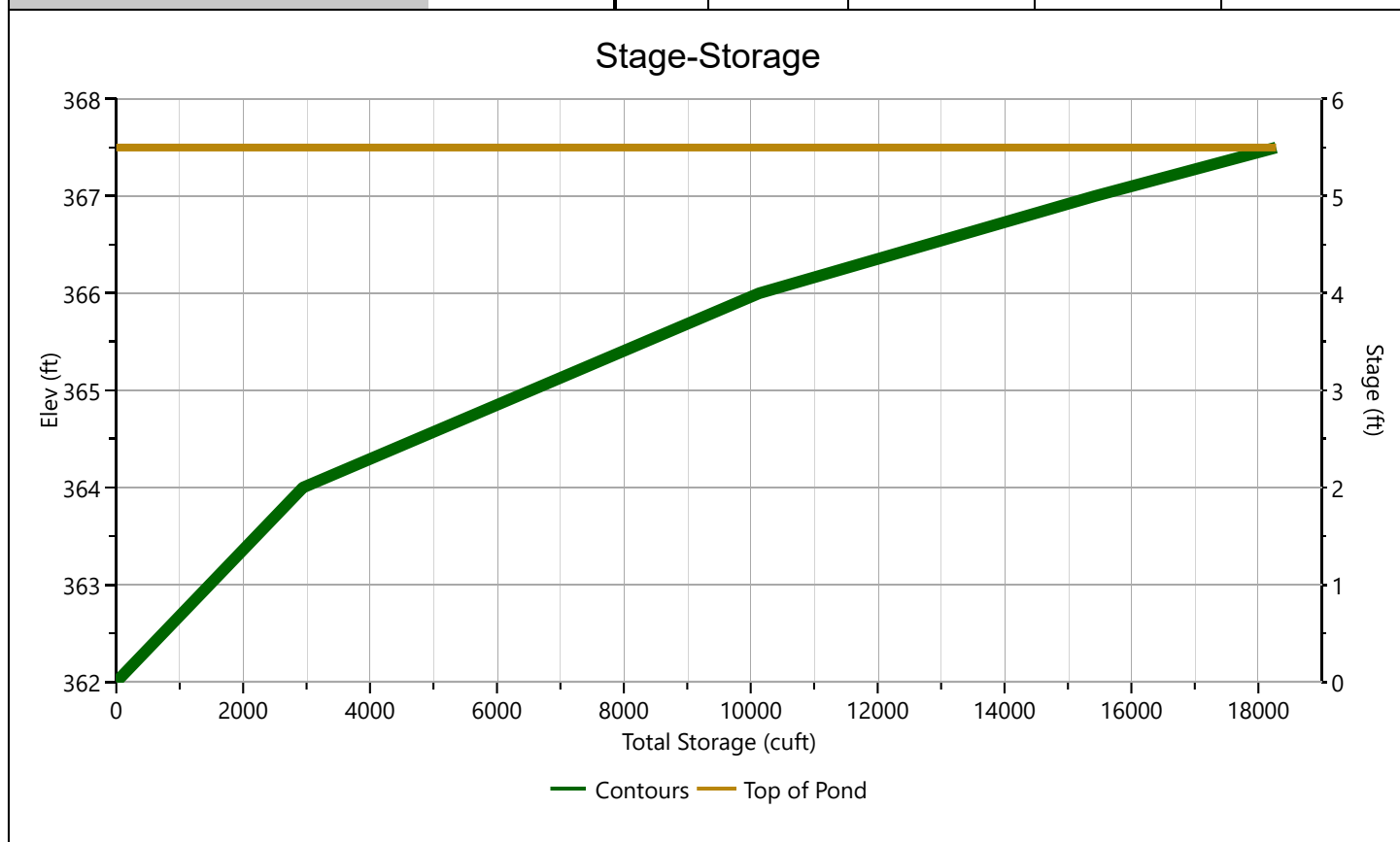
Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

Forebay A2-A

Stage-Storage

[illegible]

Pond Report

Project Name:

Hydrology Studio v 1.0.0.0

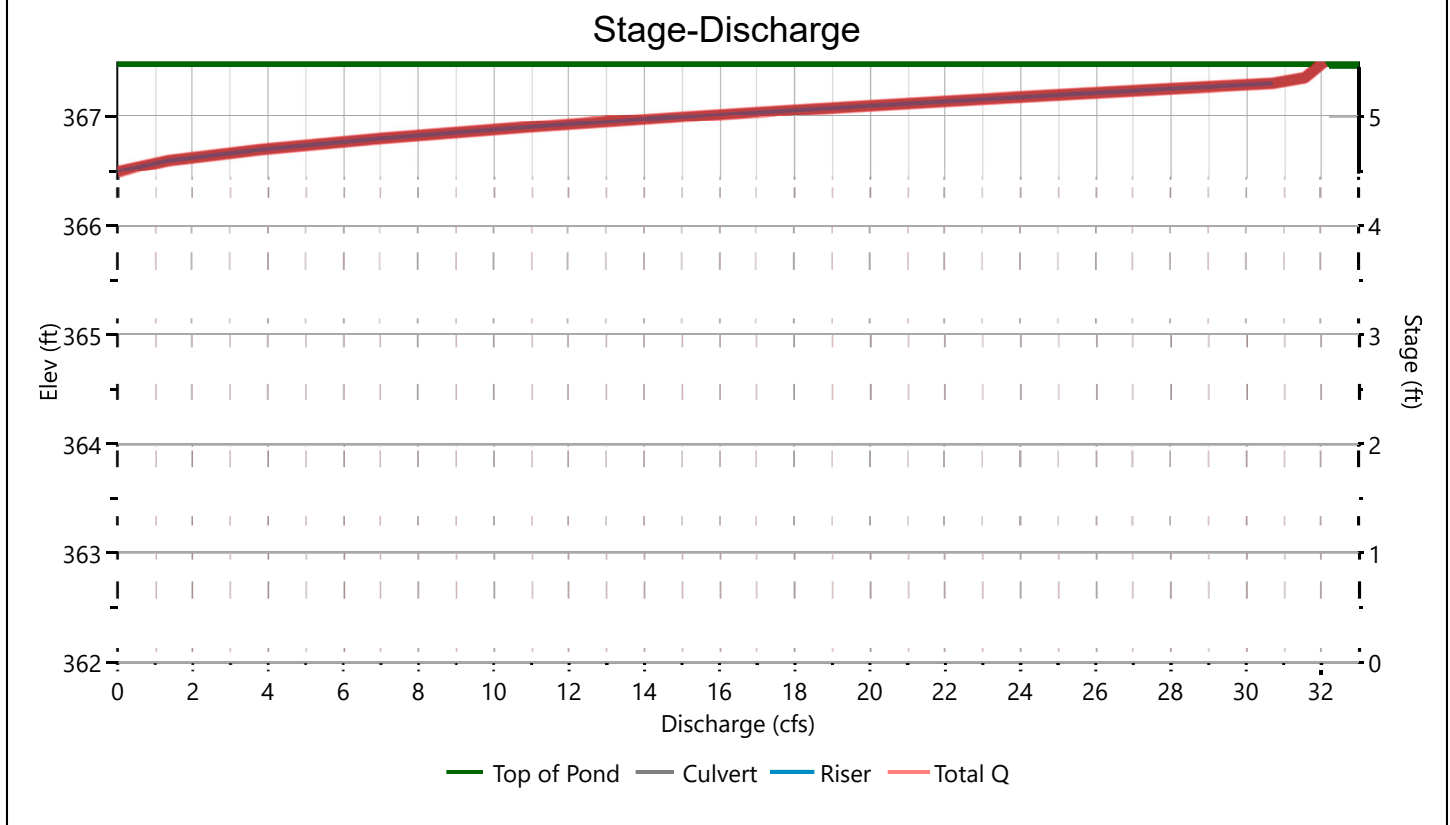
09-09-2020

Forebay A2-A

Stage-Discharge

Culvert / Orifices	Culvert	Orifices			Orifice Plate
		1	2	3	
Rise, in	24				Orifice Dia, in
Span, in	24				No. Orifices
No. Barrels	1				Invert Elevation, ft
Invert Elevation, ft	362.00				Height, ft
Orifice Coefficient, Co	0.60				Orifice Coefficient, Co
Length, ft	114				
Barrel Slope, %	1.82				
N-Value, n	0.013				
Weirs	Riser*	Weirs			Ancillary
		1	2	3	
Shape / Type	Box				Exfiltration, in/hr
Crest Elevation, ft	366.5				
Crest Length, ft	13				
Angle, deg					
Weir Coefficient, Cw	3.3				

*Routes through Culvert.



Pond Report

Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

Forebay A2-A

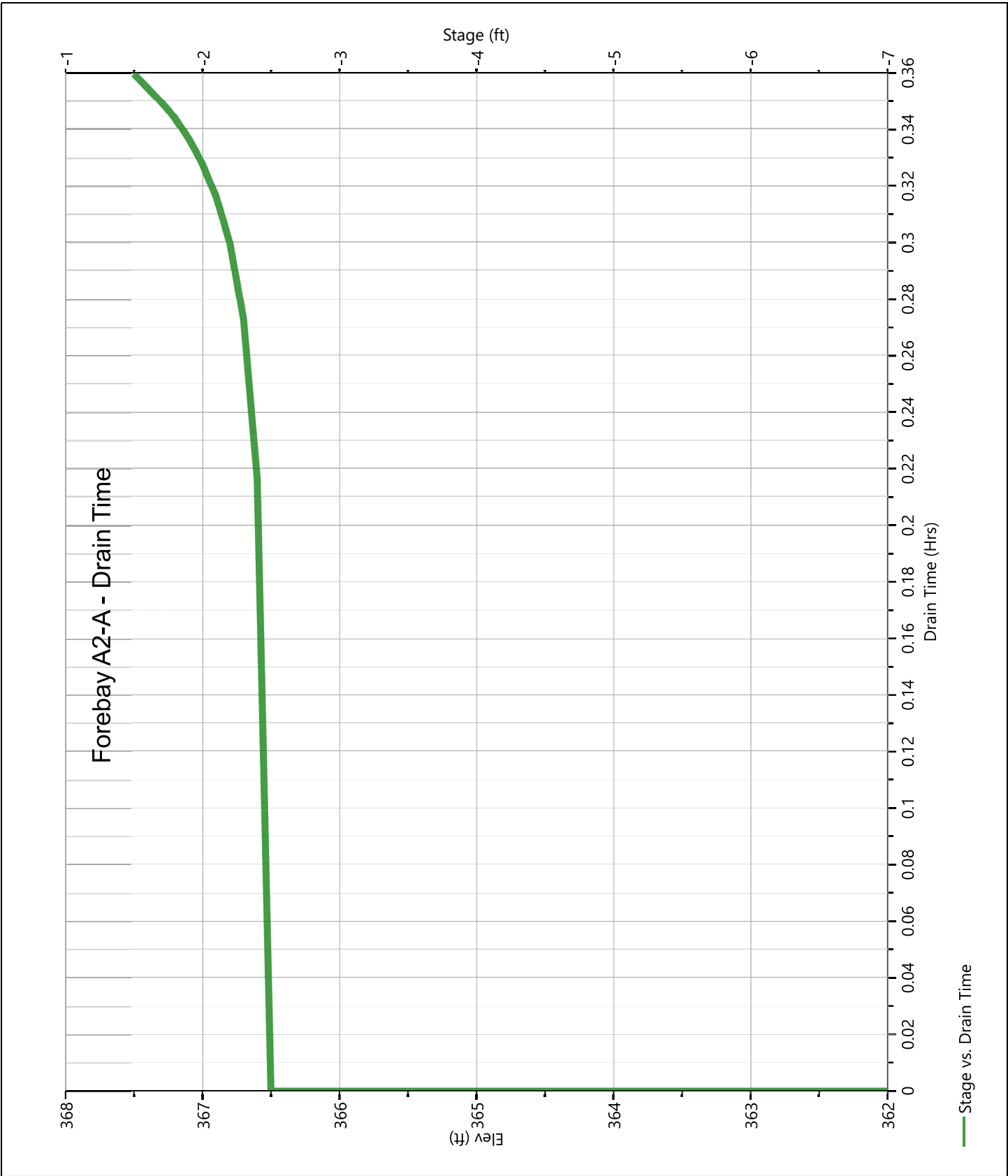
Stage-Storage-Discharge Summary

[illegible]

Suffix key: ic = inlet control, oc = outlet control, s = submerged weir

Forebay A2-A

Pond Drawdown



Pond Report

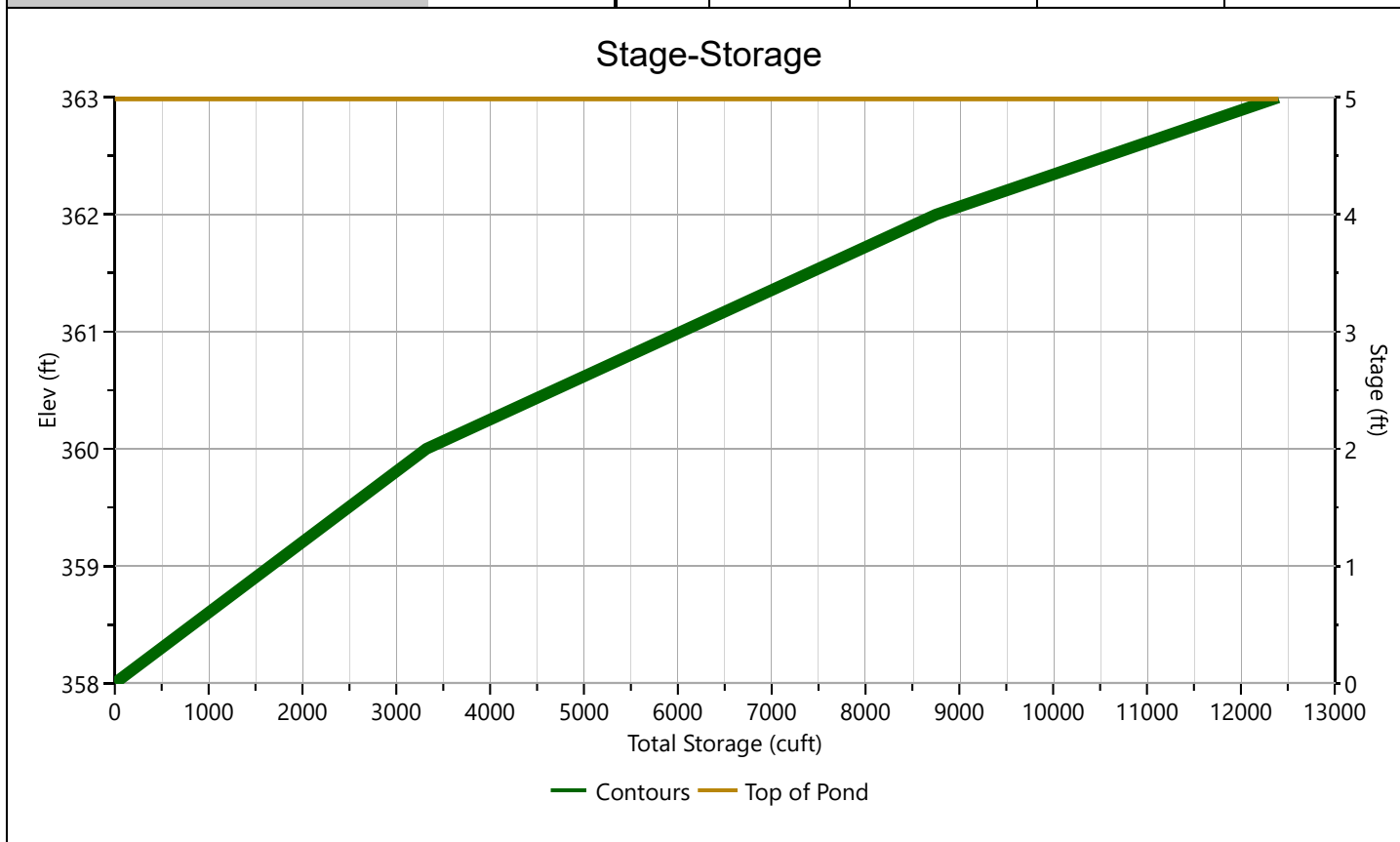
Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

Forebay A2-B

Stage-Storage

[illegible]

Pond Report

Project Name:

Hydrology Studio v 1.0.0.0

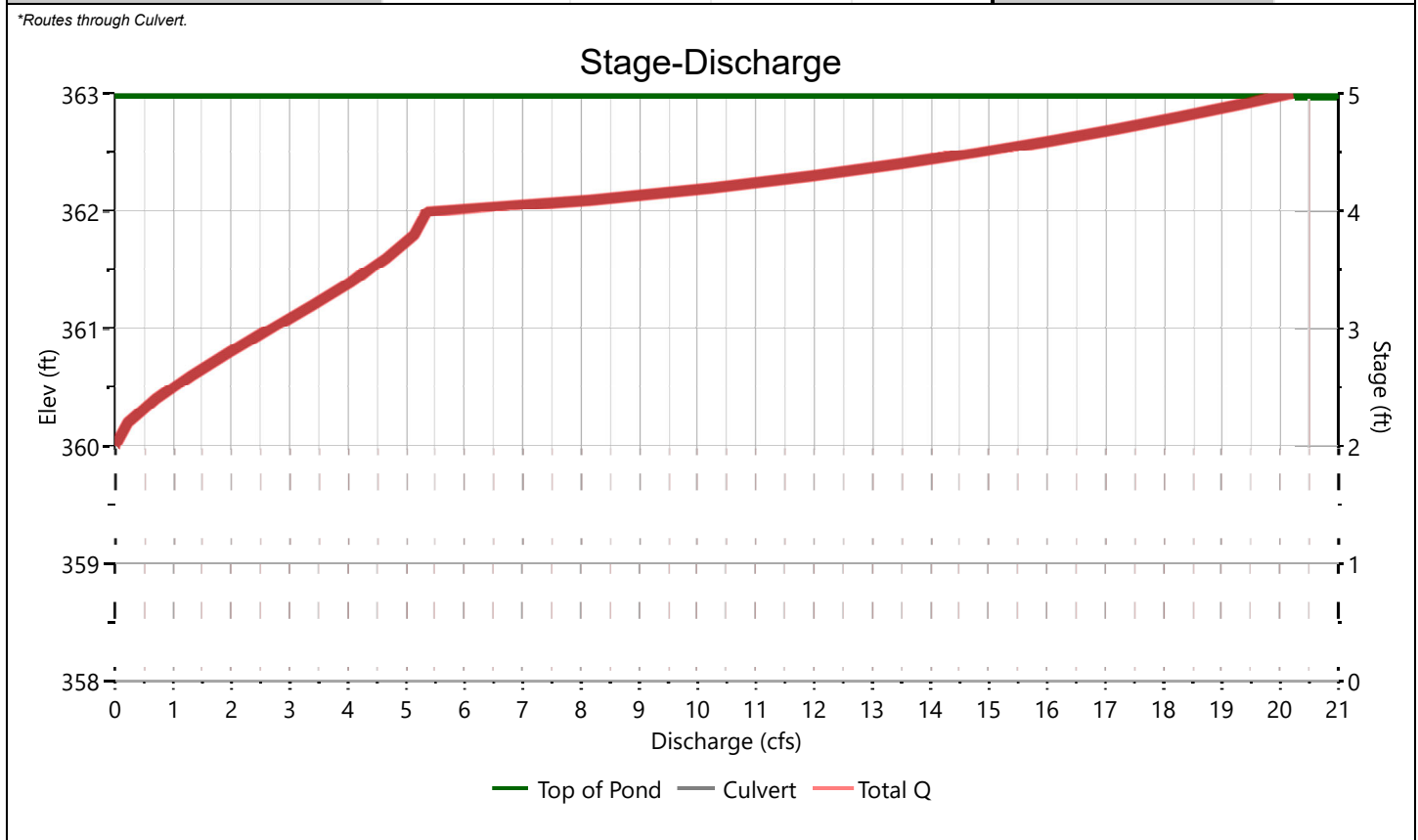
09-09-2020

Forebay A2-B

Stage-Discharge

Culvert / Orifices	Culvert	Orifices			Perforated Riser
		1	2	3	
Rise, in	24				Hole Diameter, in
Span, in	24				No. holes
No. Barrels	1				Invert Elevation, ft
Invert Elevation, ft	360.00				Height, ft
Orifice Coefficient, Co	0.60				Orifice Coefficient, Co
Length, ft	14				
Barrel Slope, %	.54				
N-Value, n	0.013				
Weirs	Riser*	Weirs			Ancillary
		1	2	3	
Shape / Type	Box				Exfiltration, in/hr
Crest Elevation, ft					
Crest Length, ft					
Angle, deg					
Weir Coefficient, Cw					

*Routes through Culvert.



Pond Report

Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

Forebay A2-B

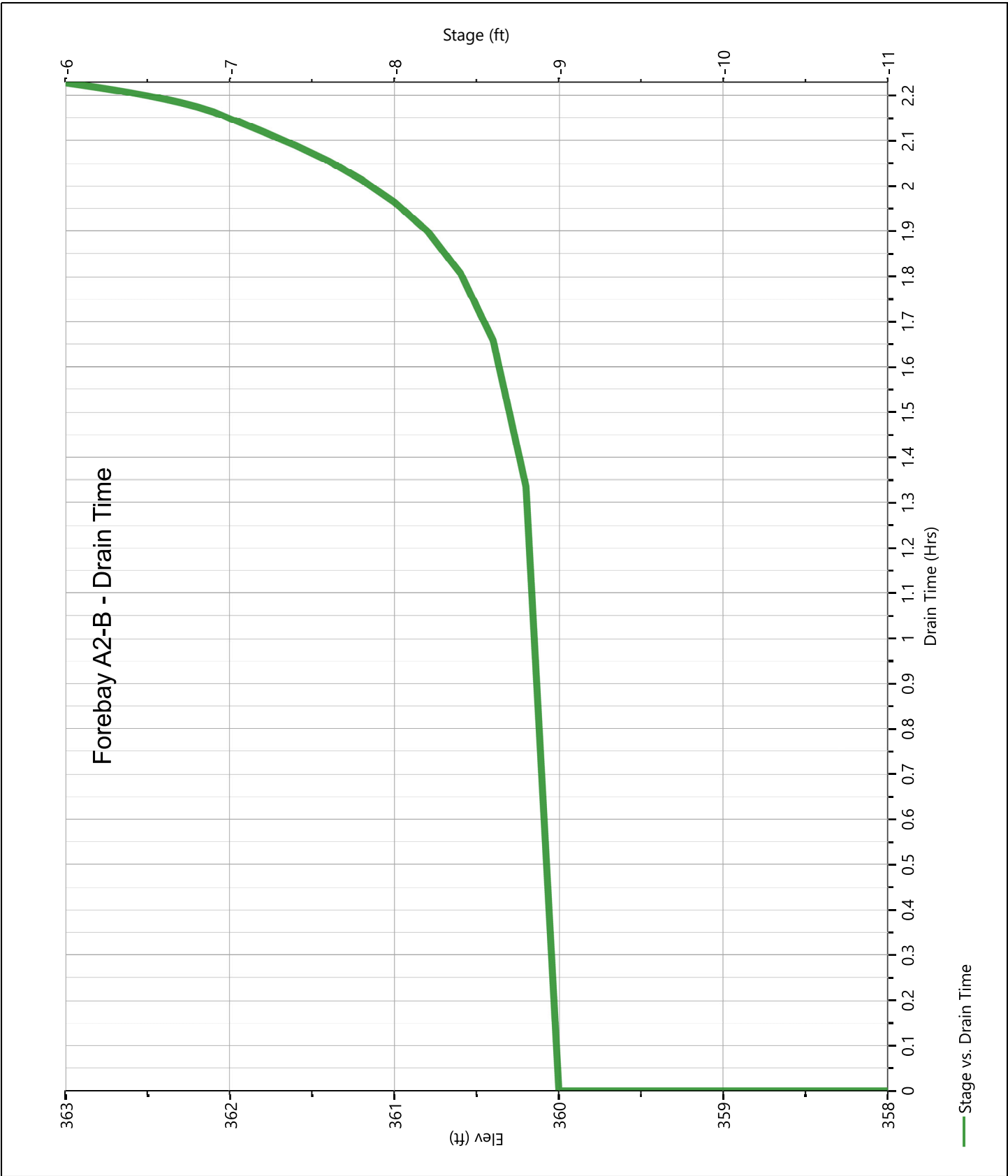
Stage-Storage-Discharge Summary

[illegible]

Suffix key: ic = inlet control, oc = outlet control, s = submerged weir

Forebay A2-B

Pond Drawdown



Pond Report

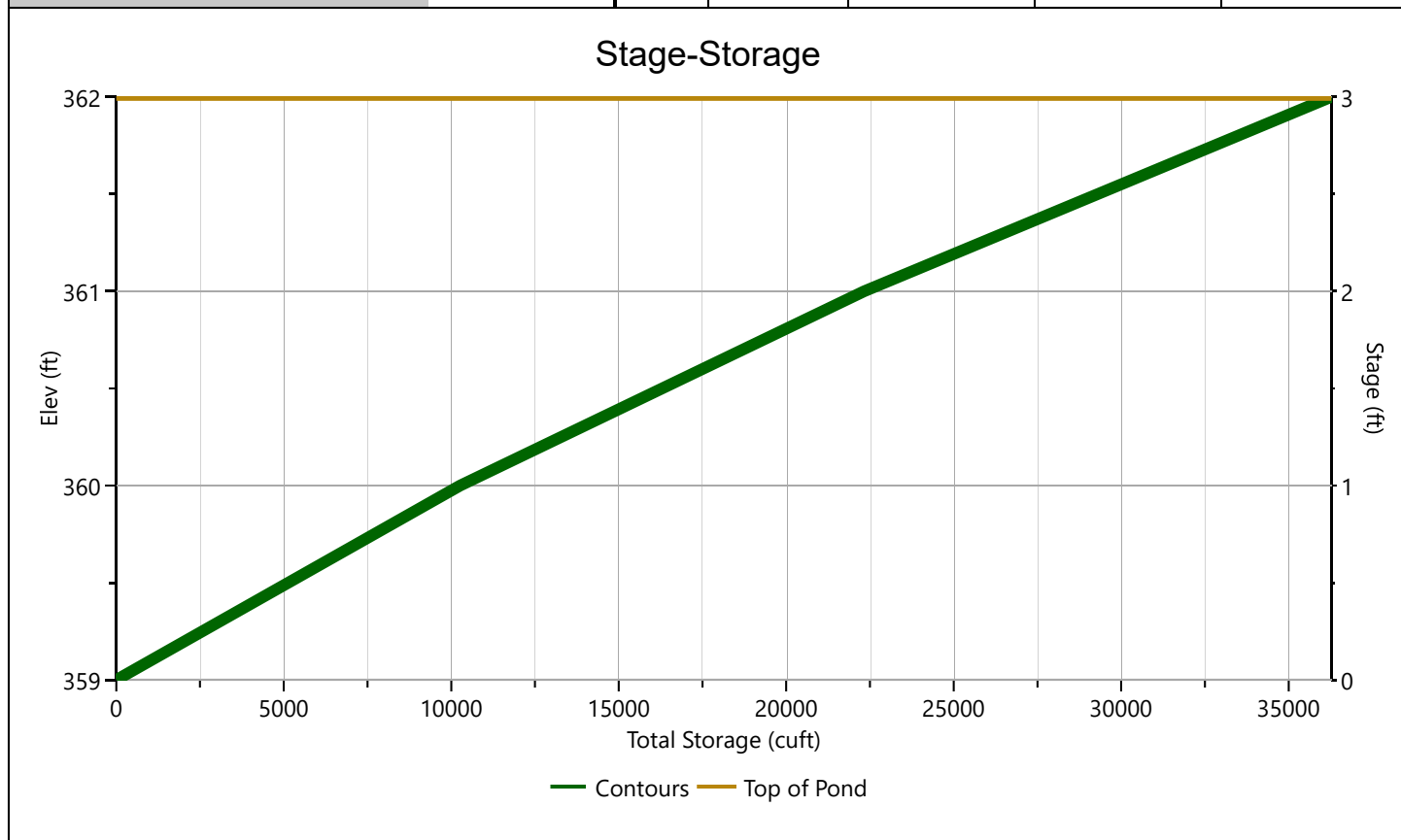
Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

Infiltration A2

Stage-Storage

[illegible]

Pond Report

Project Name:

Hydrology Studio v 1.0.0.0

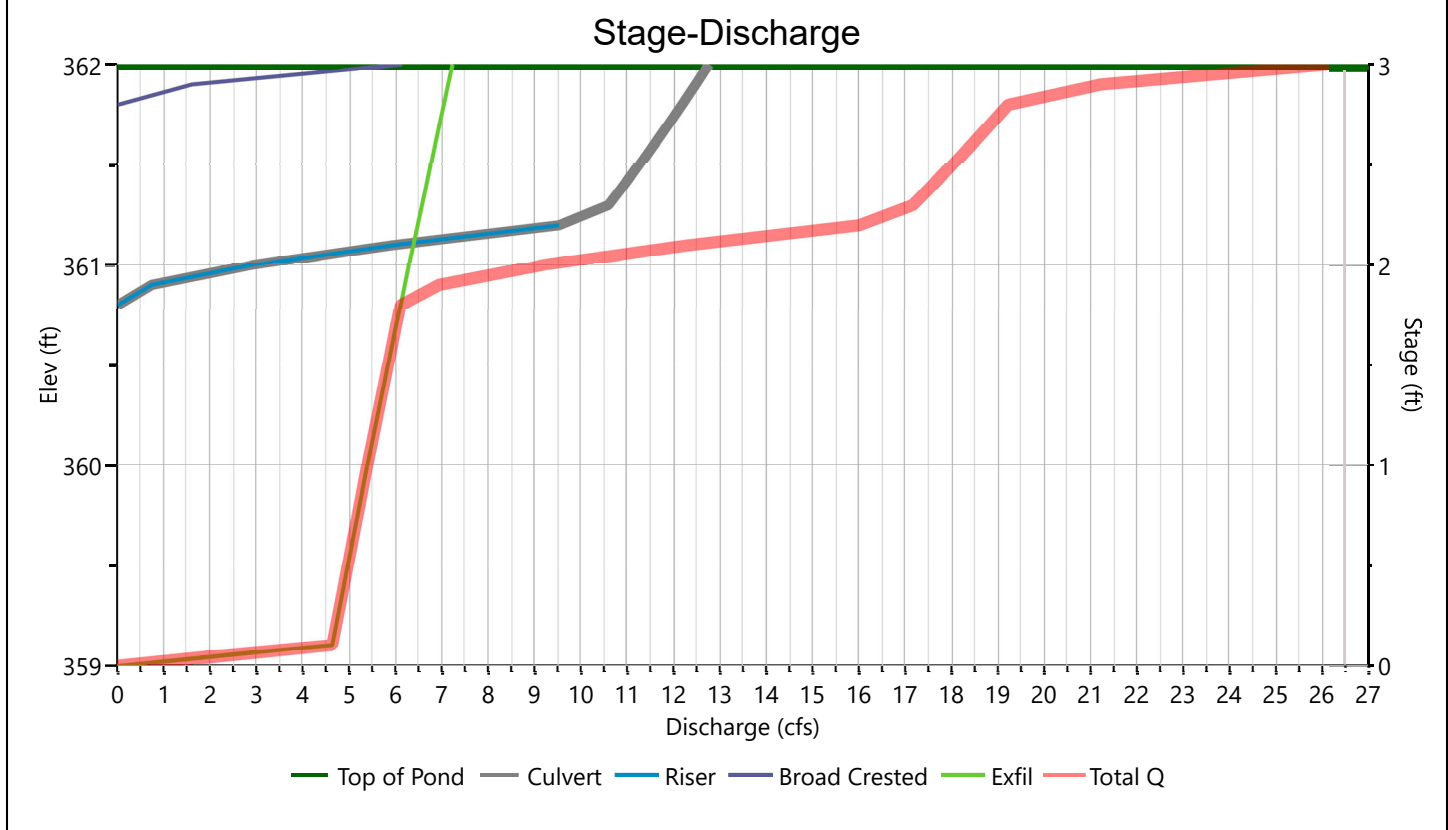
09-09-2020

Infiltration A2

Stage-Discharge

Culvert / Orifices	Culvert	Orifices			Orifice Plate	
		1	2	3		
Rise, in	18				Orifice Dia, in	
Span, in	18				No. Orifices	
No. Barrels	1				Invert Elevation, ft	
Invert Elevation, ft	359.00				Height, ft	
Orifice Coefficient, Co	0.60				Orifice Coefficient, Co	
Length, ft	20					
Barrel Slope, %	2.5					
N-Value, n	0.013					
Weirs	Riser*	Weirs			Ancillary	
		1	2	3		
Shape / Type	Box	Broad Crested			Exfiltration, in/hr	20.92**
Crest Elevation, ft	360.83	361.83				
Crest Length, ft	13	26				
Angle, deg		14 (4:1)				
Weir Coefficient, Cw	3.3	3.3				

*Routes through Culvert. **Exfiltration extracted from outflow hydrograph. Rate applied to contours.



Pond Report

Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

Infiltration A2

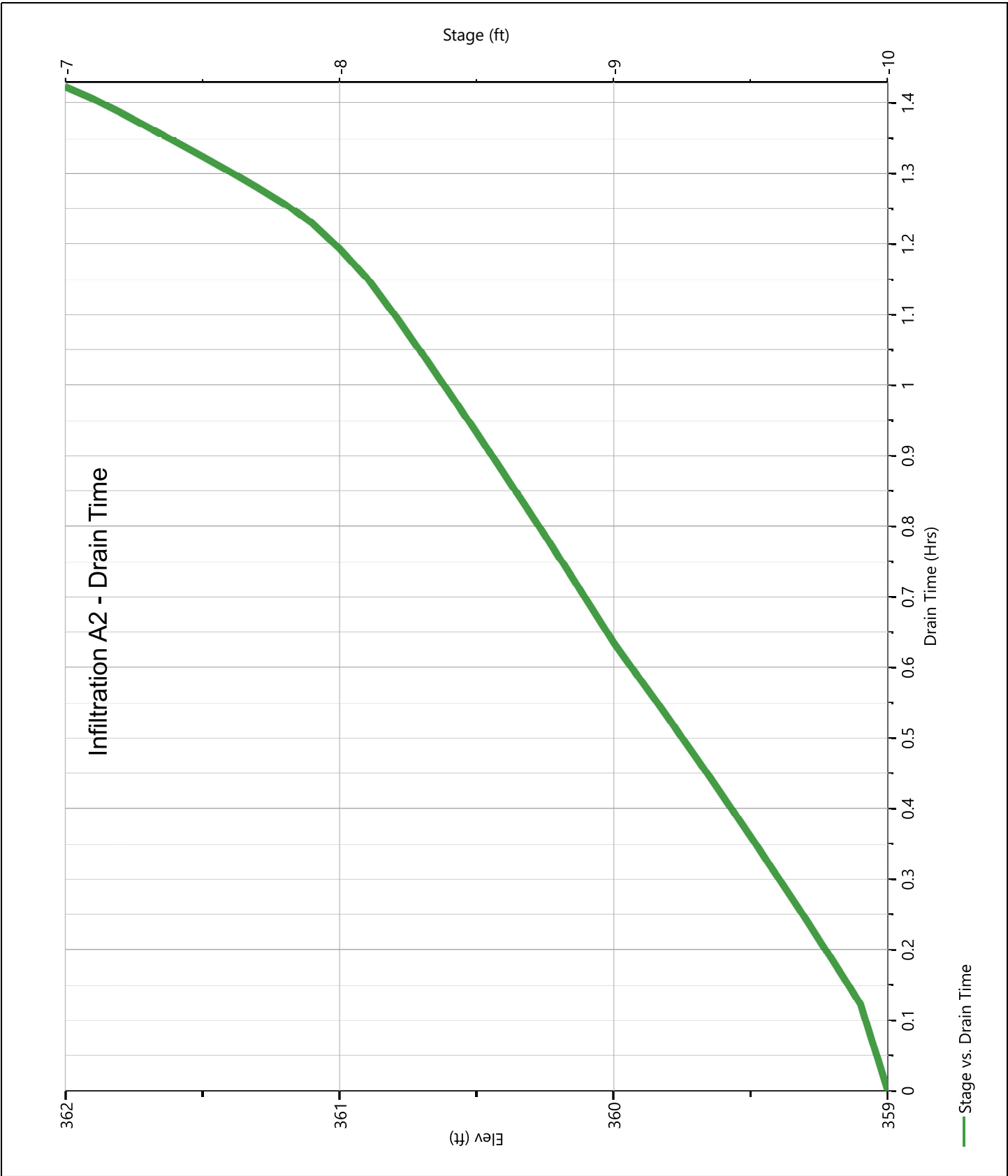
Stage-Storage-Discharge Summary

[illegible]

Suffix key: ic = inlet control, oc = outlet control, s = submerged weir

Infiltration A2

Pond Drawdown



Pond Report

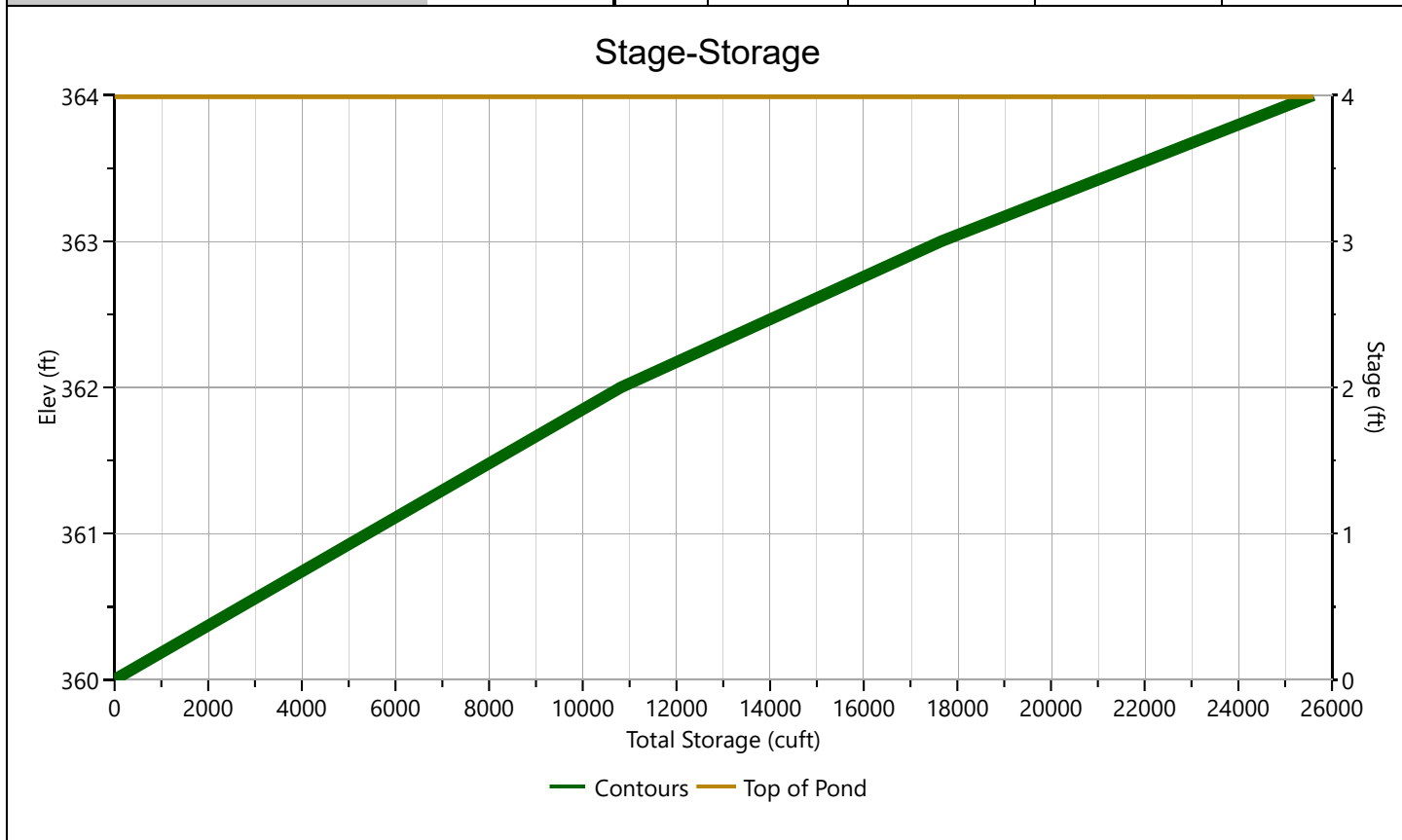
Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

Pocket Pond A3

Stage-Storage

[illegible]

Pond Report

Project Name:

Hydrology Studio v 1.0.0.0

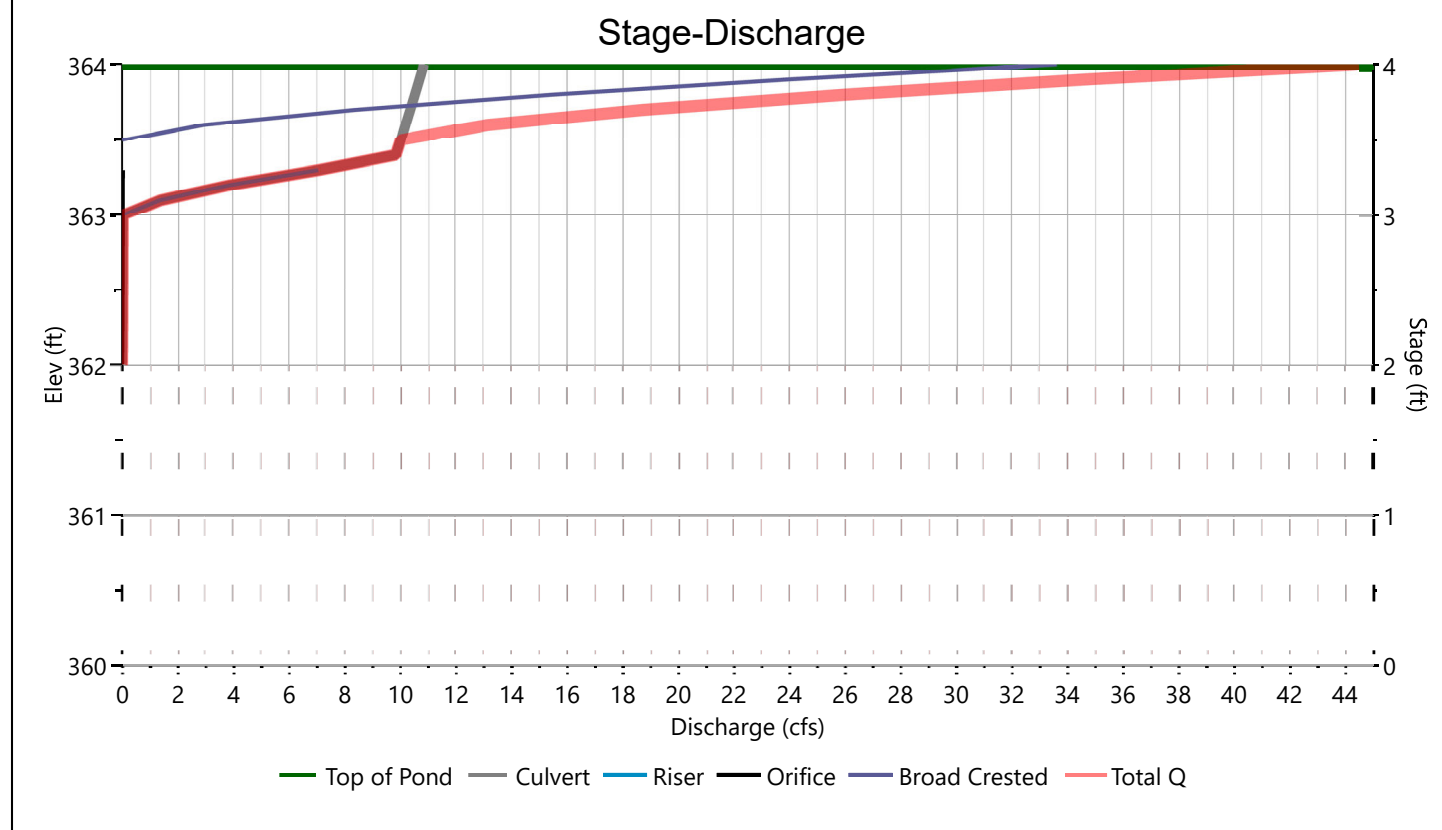
09-09-2020

Pocket Pond A3

Stage-Discharge

Culvert / Orifices	Culvert	Orifices			Orifice Plate
		1*	2	3	
Rise, in	15	1			Orifice Dia, in
Span, in	15	1			No. Orifices
No. Barrels	1	1			Invert Elevation, ft
Invert Elevation, ft	360.00	362.00			Height, ft
Orifice Coefficient, Co	0.60	0.60			Orifice Coefficient, Co
Length, ft	52				
Barrel Slope, %	6.25				
N-Value, n	0.013				
Weirs	Riser*	Weirs			Ancillary
		1	2	3	
Shape / Type	Box	Broad Crested			Exfiltration, in/hr
Crest Elevation, ft	363	363.5			
Crest Length, ft	13	28			
Angle, deg		26.6 (2:1)			
Weir Coefficient, Cw	3.3	3.3			

*Routes through Culvert.



Pond Report

Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

Pocket Pond A3

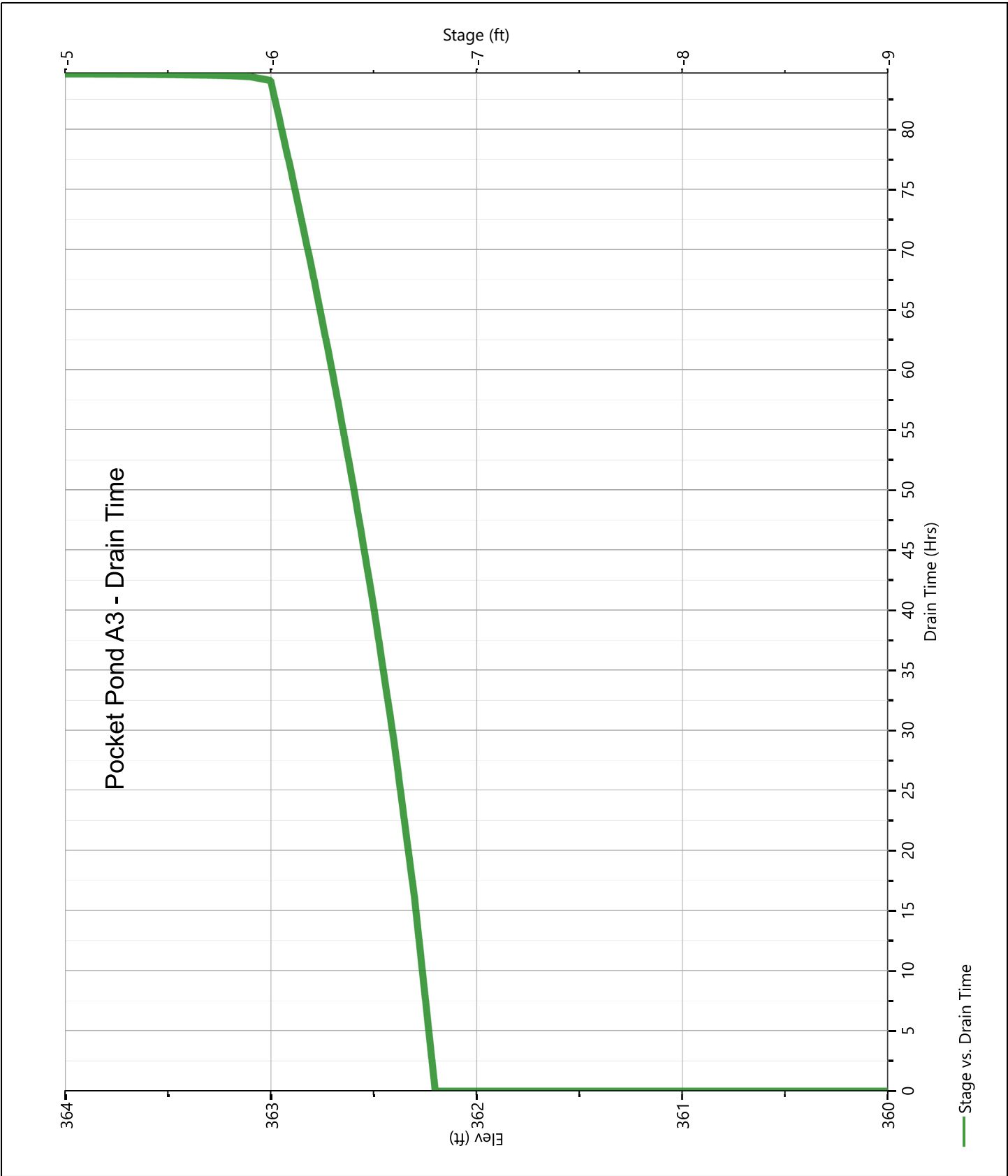
Stage-Storage-Discharge Summary

[illegible]

Suffix key: ic = inlet control, oc = outlet control, s = submerged weir

Pocket Pond A3

Pond Drawdown



Pond Report

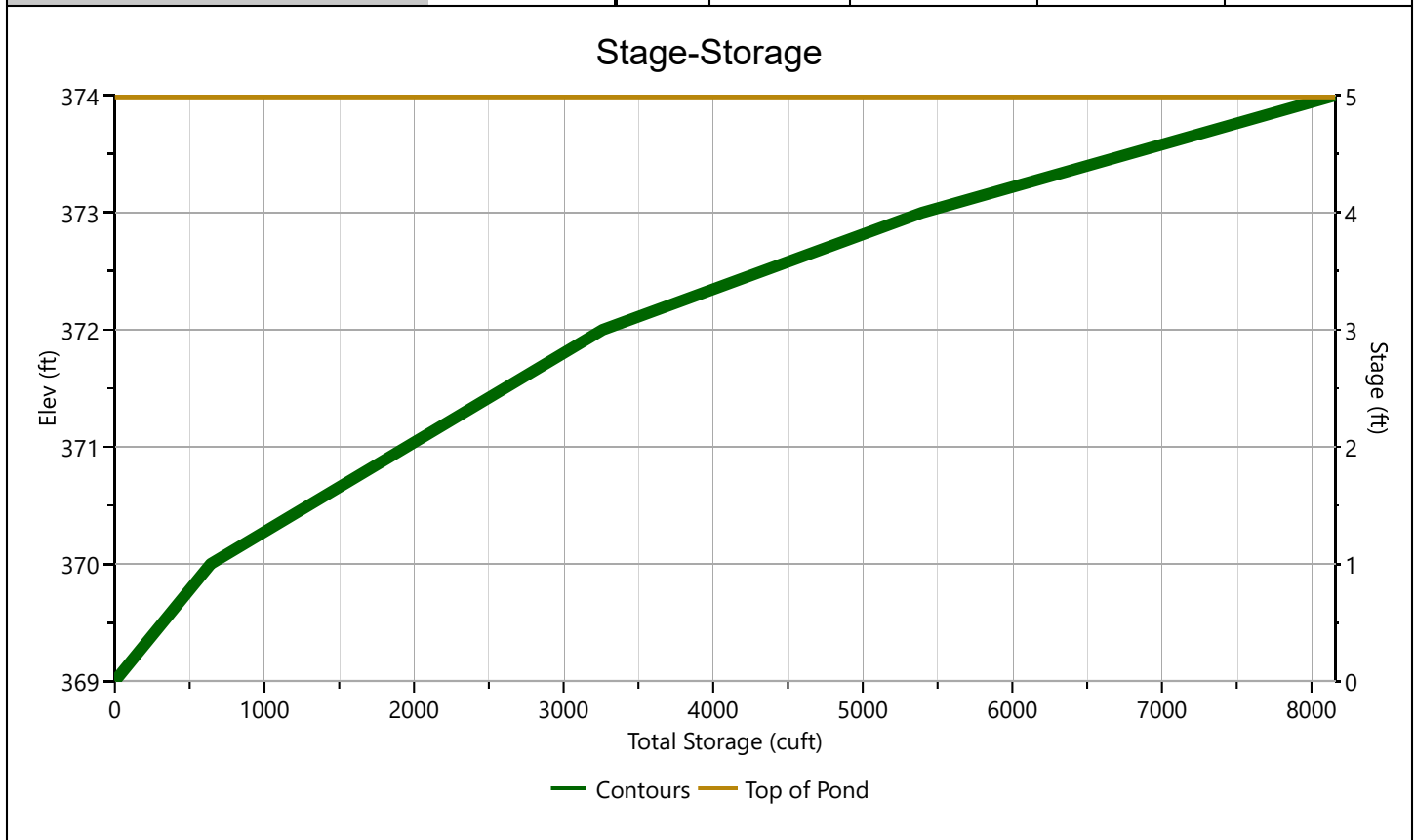
Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

Forebay B

Stage-Storage

[illegible]

Pond Report

Project Name:

Hydrology Studio v 1.0.0.0

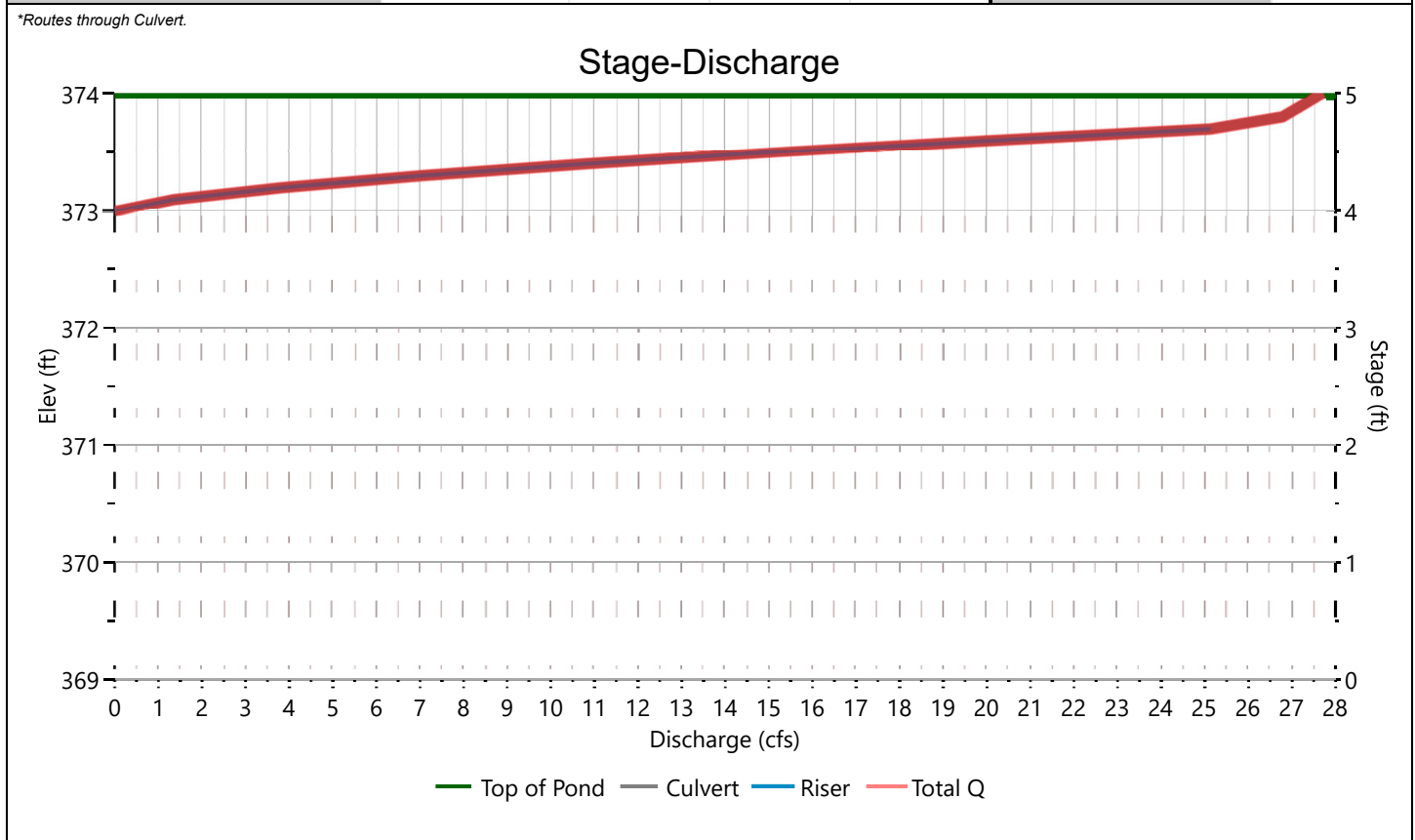
09-09-2020

Forebay B

Stage-Discharge

Culvert / Orifices	Culvert	Orifices			Orifice Plate
		1	2	3	
Rise, in	24				Orifice Dia, in
Span, in	24				No. Orifices
No. Barrels	1				Invert Elevation, ft
Invert Elevation, ft	369.39				Height, ft
Orifice Coefficient, Co	0.60				Orifice Coefficient, Co
Length, ft	81				
Barrel Slope, %	.5				
N-Value, n	0.013				
Weirs	Riser*	Weirs			Ancillary
		1	2	3	
Shape / Type	Box				Exfiltration, in/hr
Crest Elevation, ft	373				
Crest Length, ft	13				
Angle, deg					
Weir Coefficient, Cw	3.3				

*Routes through Culvert.



Project Name:

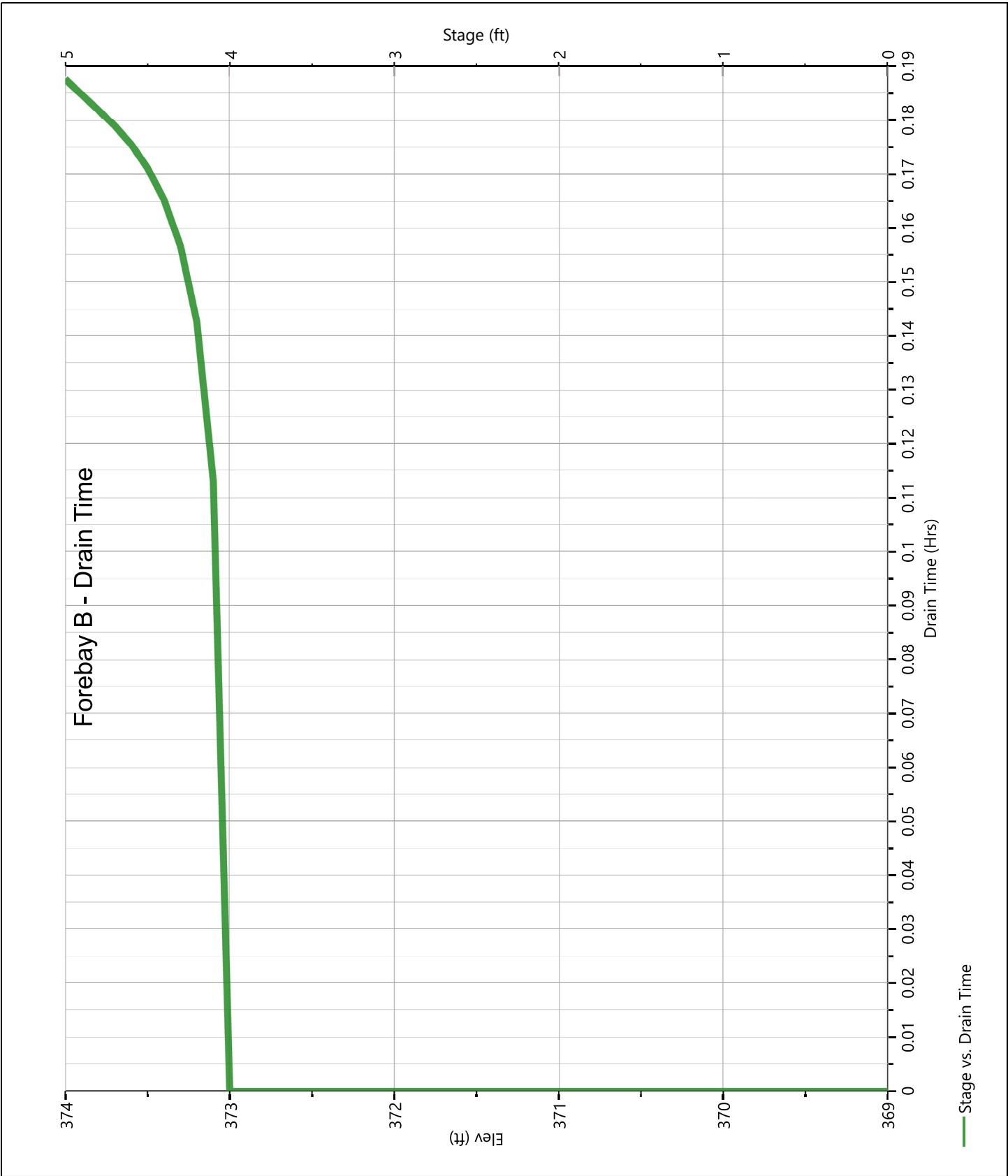
09-09-2020

Stage-Storage-Discharge Summary

Suffix key: ic = inlet control, oc = outlet control, s = submerged weir

Forebay B

Pond Drawdown



Pond Report

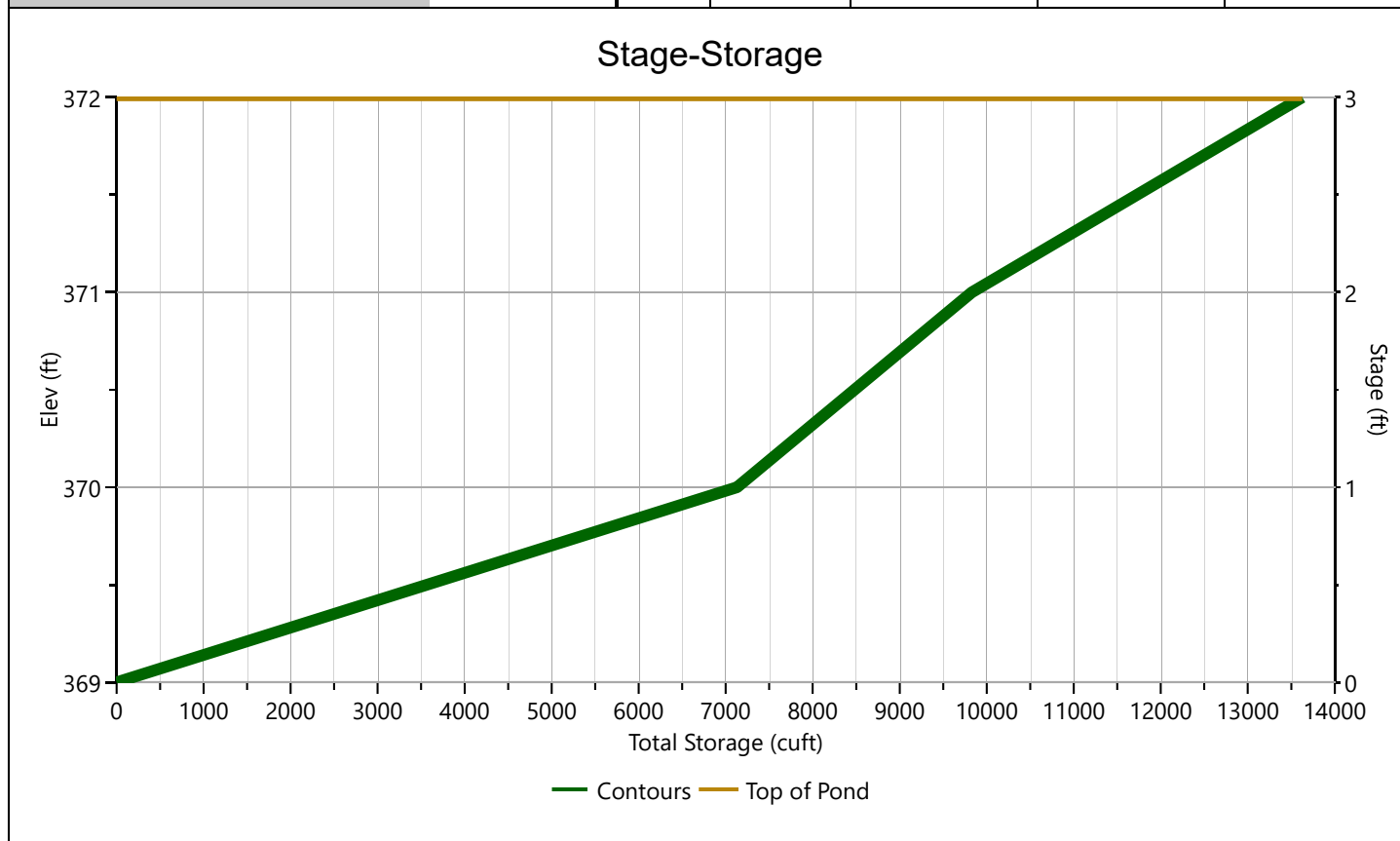
Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

Pond B

Stage-Storage

[illegible]

Pond Report

Project Name:

Hydrology Studio v 1.0.0.0

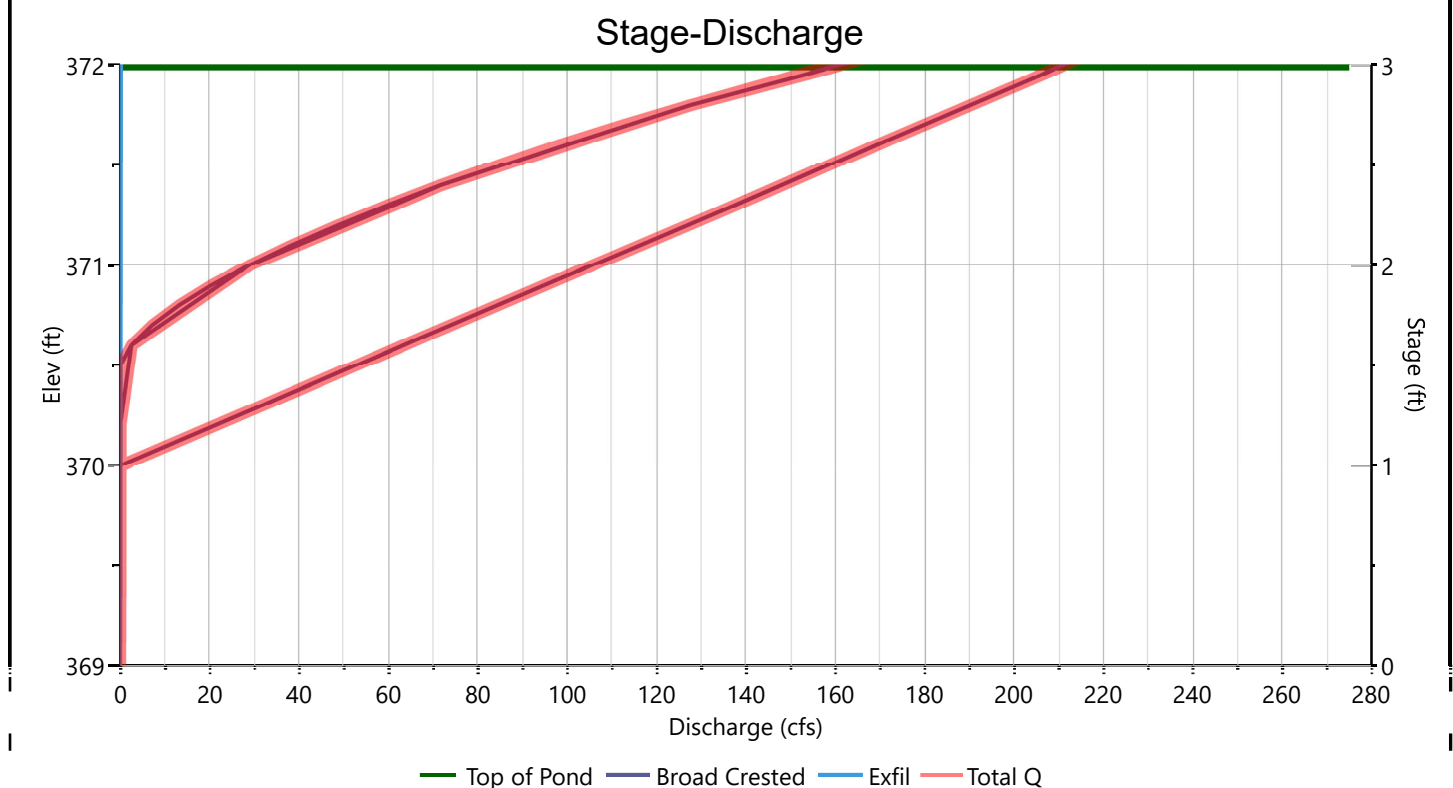
09-09-2020

Pond B

Stage-Discharge

Culvert / Orifices	Culvert	Orifices			Perforated Riser
		1	2	3	
Rise, in					Hole Diameter, in
Span, in					No. holes
No. Barrels					Invert Elevation, ft
Invert Elevation, ft					Height, ft
Orifice Coefficient, Co					Orifice Coefficient, Co
Length, ft					
Barrel Slope, %					
N-Value, n	0.000				
Weirs	Riser*	Weirs			Ancillary
		1	2	3	
Shape / Type		Broad Crested			Exfiltration, in/hr
Crest Elevation, ft		370.5			1.83**
Crest Length, ft		24			
Angle, deg		26.6 (2:1)			
Weir Coefficient, Cw		3.3			

*Routes through Culvert. **Exfiltration extracted from outflow hydrograph. Rate applied to contours.



Pond Report

Project Name:

Hydrology Studio v 1.0.0.0

09-09-2020

Pond B

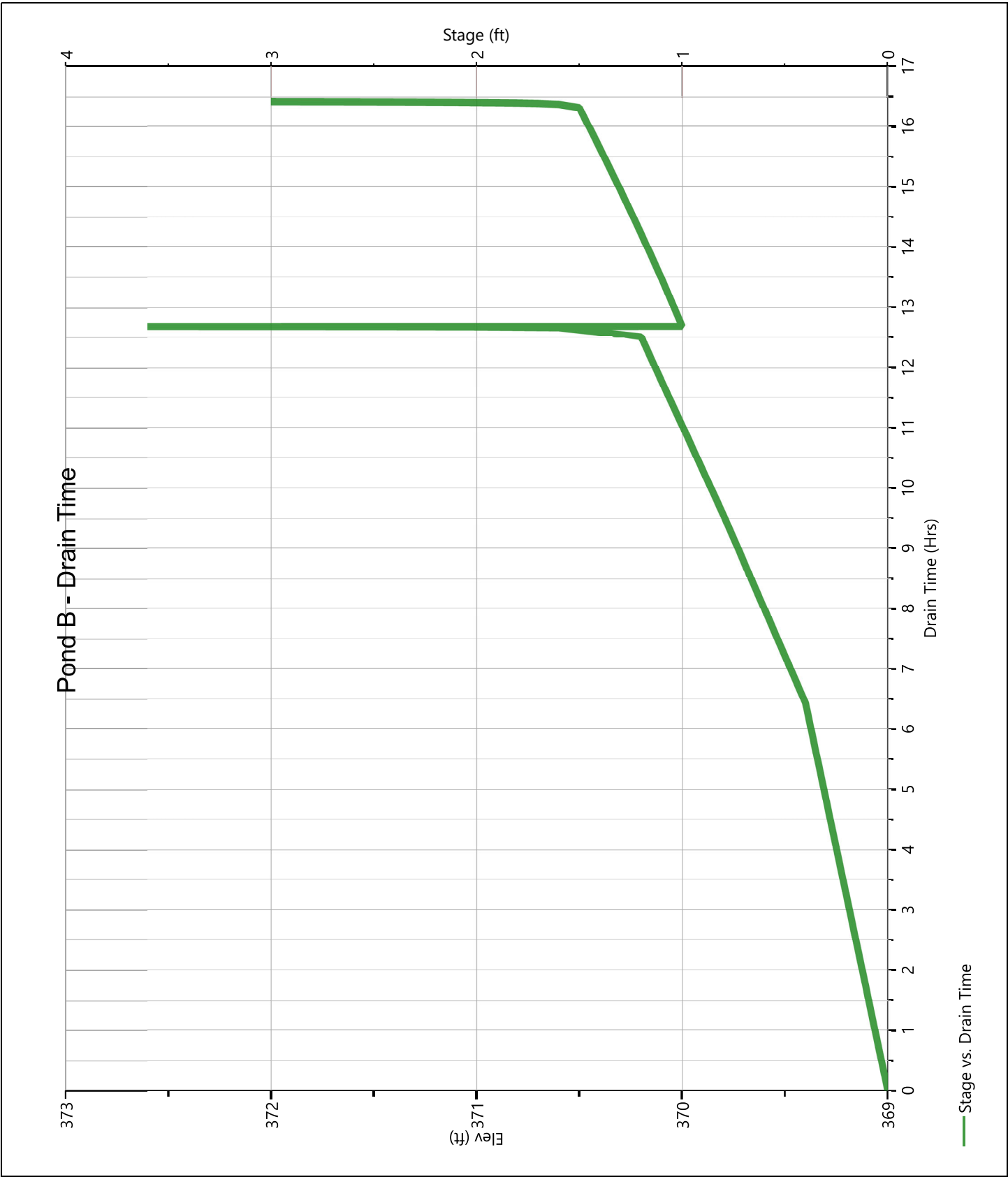
Stage-Storage-Discharge Summary

[illegible]

Suffix key: ic = inlet control, oc = outlet control, s = submerged weir

Pond B

Pond Drawdown



Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc.

Monday, Aug 19 2019

Circular Culvert

Invert Elev Dn (ft) = 365.69
Pipe Length (ft) = 51.00
Slope (%) = 1.18
Invert Elev Up (ft) = 366.29
Rise (in) = 24.0
Shape = Circular
Span (in) = 24.0
No. Barrels = 2
n-Value = 0.012
Culvert Type = Circular Culvert
Culvert Entrance = Smooth tapered inlet throat
Coeff. K,M,c,Y,k = 0.534, 0.555, 0.0196, 0.9, 0.2

Embankment

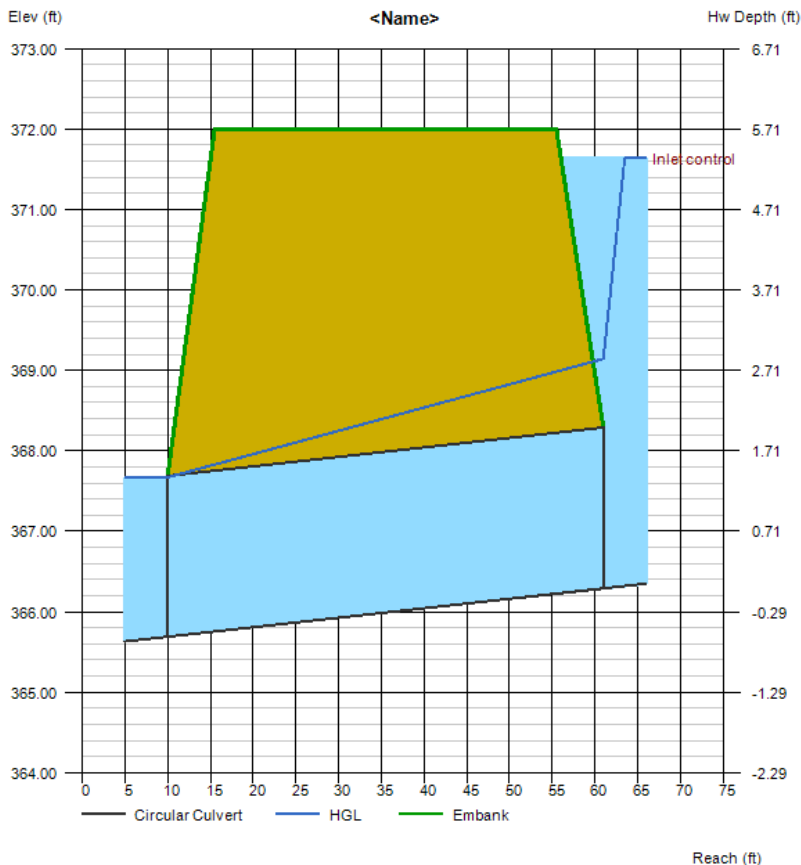
Top Elevation (ft) = 372.00
Top Width (ft) = 40.00
Crest Width (ft) = 12.00

Calculations

Qmin (cfs) = 0.00
Qmax (cfs) = 90.00
Tailwater Elev (ft) = (dc+D)/2

Highlighted

Qtotal (cfs) = 84.70
Qpipe (cfs) = 84.70
Qovertop (cfs) = 0.00
Veloc Dn (ft/s) = 13.50
Veloc Up (ft/s) = 13.48
HGL Dn (ft) = 367.67
HGL Up (ft) = 369.14
Hw Elev (ft) = 371.64
Hw/D (ft) = 2.67
Flow Regime = Inlet Control



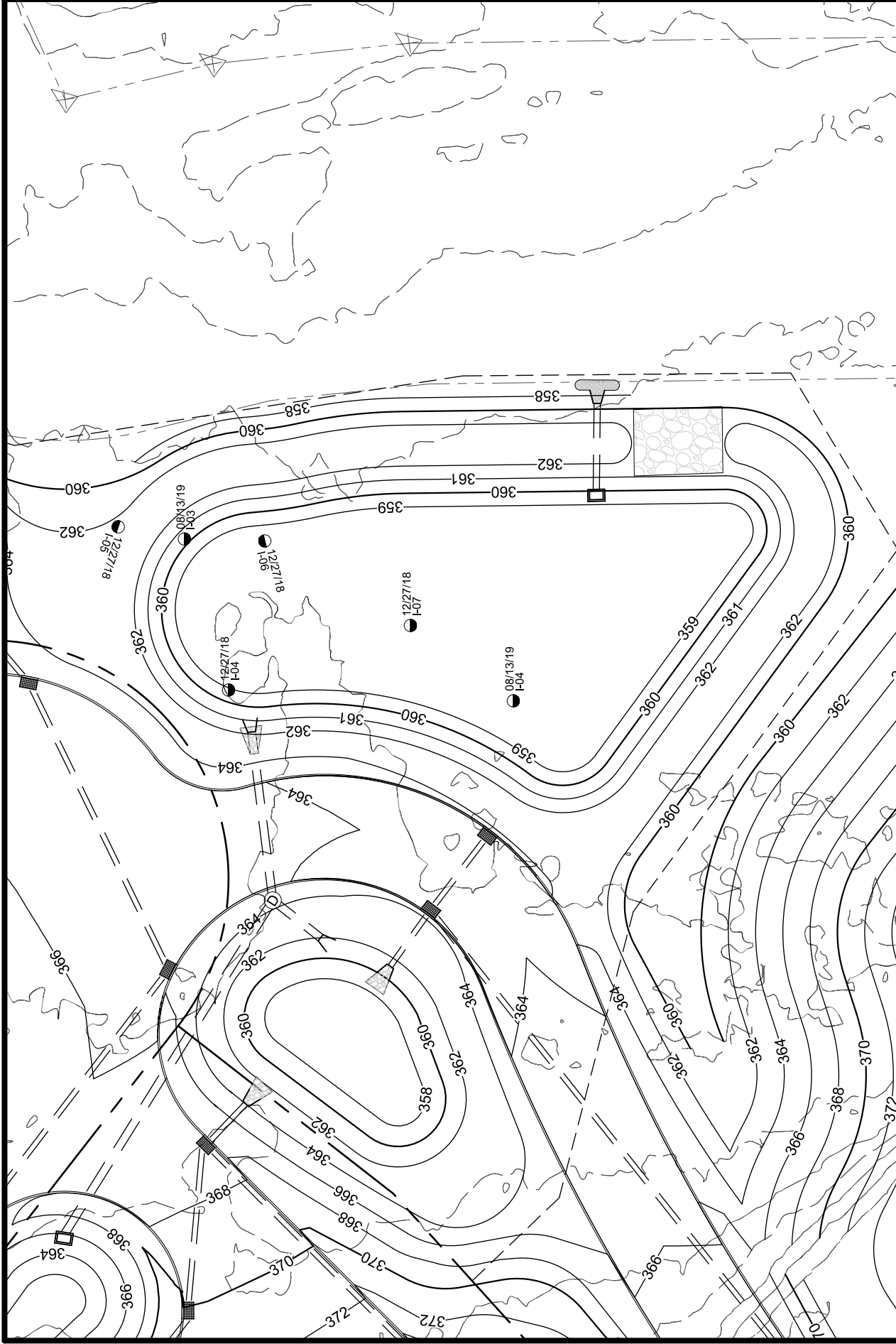
This page is left intentionally blank

APPENDIX 11

INFILTRATION SOIL TESTING

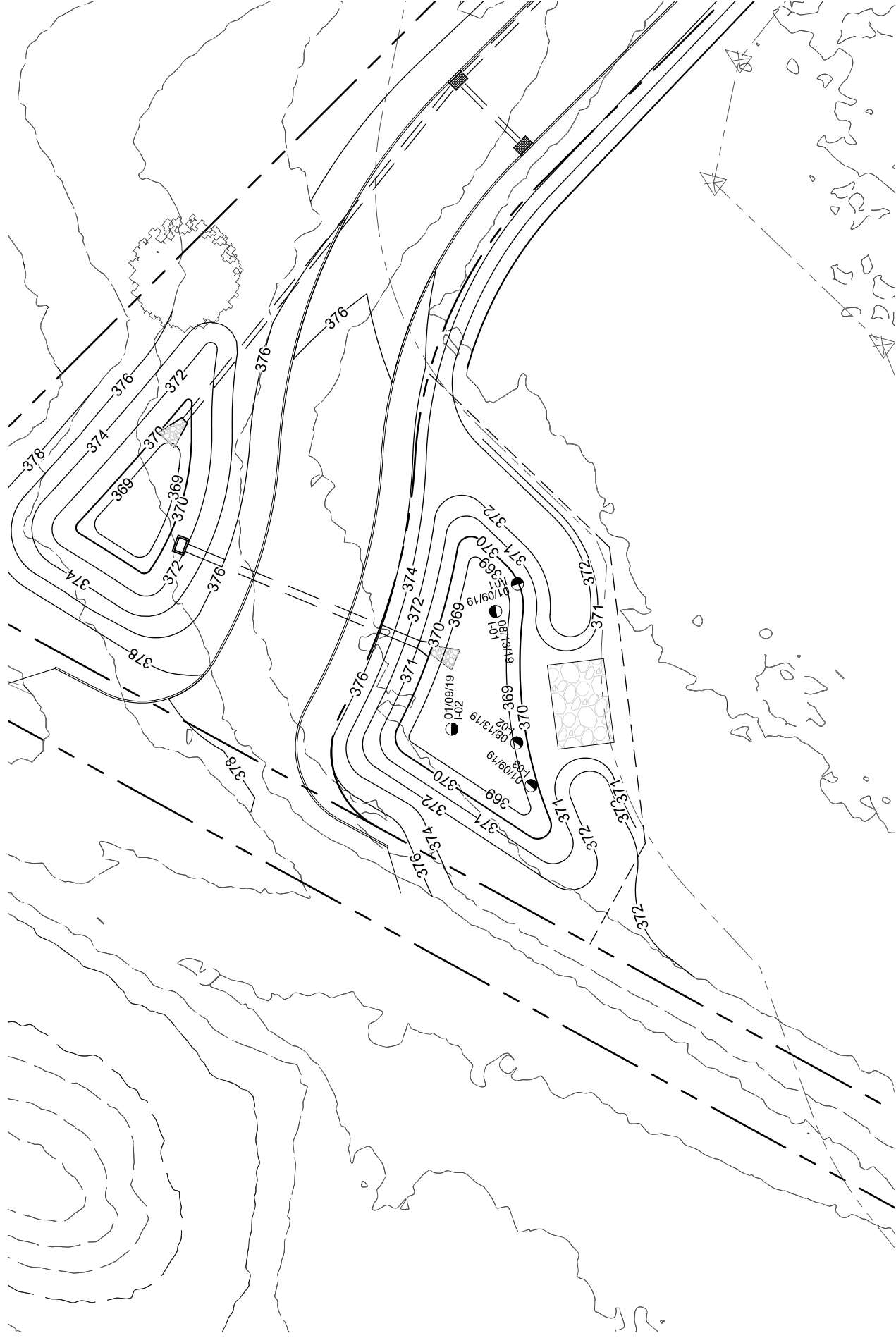
RESULTS & LOCATION

This page is left intentionally blank



INFILTRATION TEST LOCATIONS (INFILTRATION BASIN A2)	RDM WAREHOUSES 230 NEELYTOWN ROAD TOWN OF HAMPTONBURGH ORANGE COUNTY, NEW YORK		DATE: 01/23/19 REV AUG '19 SCALE: 1" = 40'	JOB # 1284.02 SHEET # F-6	 <p>71 CLINTON STREET MONTGOMERY, NY 12549 Ph: (845) 457-7727 Fx: (845) 457-1899</p> <p>©COPYRIGHT 2019 ENGINEERING & SURVEYING PROPERTIES, PC</p>

This page is left intentionally blank



INFILTRATION TEST LOCATIONS
(INFILTRATION BASIN B3)

RDM WAREHOUSES
230 NEELYTOWN ROAD
TOWN OF HAMPTONBURGH
ORANGE COUNTY, NEW YORK

DATE: 01/23/19
REV AUG '19
SCALE: 1" = 40'

JOB # 1284.02
SHEET # F-7

ENGINEERING & SURVEYING
F-1 PROPERTIES
Achieving Successful Results
with Innovative Designs

71 CLINTON STREET
MONTGOMERY, NY 12549
Ph: (845) 457-7727
Fx: (845) 457-1899

This page is left intentionally blank

INFILTRATION TEST RESULTS

WO. NO. 1284.02	DATE 01/09/19	REVISED Aug '19	SHEET 1	OF 2
---------------------------	-------------------------	---------------------------	-------------------	----------------

PROJECT TITLE
RDM WAREHOUSES - 230 NEELYTOWN ROAD

LOCATION
TOWN OF HAMTONBURGH

CALCULATED BY
ZS

APPROVED BY
JS

REF DRAWING(S)
INFILTRATION BASIN B3

Test Hole Number	Test Hole Depth	Test Hole Diameter	Time	Infiltration Test Runs (Water drop in inches over One Hour)				Average Drop
1	24	8	Start:	10:01 AM	11:03 AM	12:10 PM	1:15 AM	0.5
			Finish:	11:01 AM	12:03 PM	1:10 AM	2:15 AM	
			Drop:	0.50	0.50	0.50	0.50	

Comments: _____

2	24	8	Start:	9:50 AM	10:59 AM	12:05 PM	1:10 PM	0.5
			Finish:	10:50 AM	11:59 AM	1:05 PM	2:10 AM	
			Drop:	0.50	0.50	0.50	0.50	

Comments: _____

3	24	8	Start:	10:20 AM	11:25 AM	12:29 PM	1:32 AM	0.5
			Finish:	11:20 AM	12:25 PM	1:29 AM	2:32 AM	
			Drop:	0.50	0.50	0.50	0.50	

Comments: _____

			Start:					
			Finish:					
			Drop:					

Comments: _____

1 08/13/19	24	8	Start:	8:38 AM	9:38 AM	10:38 AM		14.2
			Finish:	9:38 AM	10:38 AM	11:38 AM		
			Drop:	16.00	13.25	13.25		

Comments: _____

2 8/13/19	24	8	Start:	8:39 AM	9:40 AM	10:40 AM		4.5
			Finish:	9:39 AM	10:40 AM	11:40 AM		
			Drop:	6.00	4.50	3.00		

Comments: _____

			Start:					
			Finish:					
			Drop:					

Comments: _____

			Start:					
			Finish:					
			Drop:					

Comments: _____

INFILTRATION TEST RESULTS

WO. NO. 1284.02	DATE 01/09/19	REVISED Aug '19	SHEET 2	OF 2
---------------------------	-------------------------	---------------------------	-------------------	----------------

PROJECT TITLE
RDM WAREHOUSES - 230 NEELYTOWN ROAD

LOCATION
TOWN OF HAMTONBURGH

CALCULATED BY
ZS

APPROVED BY
JS

REF DRAWING(S)
INFILTRATION BASIN A2

Test Hole Number	Test Hole Depth	Test Hole Diameter	Time	Infiltration Test Runs (Water drop in inches over One Hour)				Average Drop
4	24	8	Start:	9:49 AM	11:03 AM	12:05PM	1:07 PM	8.0
			Finish:	10:49 AM	12:03 PM	1:05 PM	2:07 PM	
			Drop:	8.00	8.00	8.00	8.00	

Comments: _____

5	24	8	Start:	9:57 AM	11:05 AM	12:05 PM	1:10 PM	4.0
			Finish:	10:57 AM	12:05 PM	1:05 PM	2:10 AM	
			Drop:	4.00	4.00	4.00	4.00	

Comments: _____

6	24	8	Start:	10:17 AM	11:19 AM	12:21 PM	1:22 PM	24.0
			Finish:	11:17 AM	12:19 PM	1:21 PM	2:22 PM	
			Drop:	24.00	24.00	24.00	24.00	

Comments: _____

7	24	8	Start:	1:20 PM	1:45 PM	2:25 PM	3:25 PM	24.0
			Finish:	1:45 PM	2:23 PM	3:20 PM	4:25 PM	
			Drop:	24.00	24.00	24.00	24.00	

Comments: _____

			Start:					
			Finish:					
			Drop:					

Comments: _____

3 08/13/19	24	8	Start:	9:45 AM	10:47 AM	11:48 AM		19.75
			Finish:	10:45 AM	11:47 AM	12:48 PM		
			Drop:	20.25	19.50	19.50		

Comments: _____

4 8/13/19	24	8	Start:	9:51 AM	10:51 AM	11:51 AM		19.0
			Finish:	10:51 AM	11:51 AM	12:51 PM		
			Drop:	20.50	19.00	17.50		

10:51

			Start:					
			Finish:					
			Drop:					

Comments: _____

DEEP TEST PIT SOIL RESULTS

WO. NO. 1284.02	DATE 1-10-19	REVISED	SHEET 1	OF 2
--------------------	-----------------	---------	------------	---------

PROJECT TITLE 230 Neelytown Rd

LOCATION
230 Neelytown Rd

CALCULATED BY JMH

APPROVED BY

REF DRAWING(S)

Deep Test #	Depth	Soil Description
1	0 to 9" 9" to 4' 4' to 5'6"	top soil tan silty loam gravelly sandy loam water @ 5'6", no rock
2	0 to 9" 9" to 30" 30" to 6'	top soil tan silty loam sandy clay silty loam no water no mottling no rock
3	0 to 9" 9" to 30"	top soil silty loam with ripable shale no water no mottling rock @ 30"
4	0 to 9" 9" to 3' 3' to 4'	top soil tan silty loam tan silty loam w/ ripable shale no water no mottling rock @ 4'

Comments:

DEEP TEST PIT SOIL RESULTS

WO. NO. 1284.02	DATE 01/10/19	REVISED	SHEET 2	OF 2
--------------------	------------------	---------	------------	---------

PROJECT TITLE 230 Neelytown Rd

LOCATION 230 Neelytown Rd

CALCULATED BY JMH

APPROVED BY

REF DRAWING(S)

Deep Test #	Depth	Soil Description
new sds area 2 test 3 01/10/19	0 to 12" 12" to 44" 44" to 5' 5' to 8'	top soil tan silty loam black sandy gravel w/ cobbles water @ 84" no rock no mottling
new sds area 2 test 4 01/10/19	0 to 12" 12" to 36" 36" to 68" 38" to 8'	top soil tan silty loam brown silty sandy clay loam tan gravelly loam w/ cobble water @ 6' no rock no mottling
sds area 1 test 1 01/10/19	0 to 4" 4" to 36" 36" to 60" 60 to 96"	top soil tan silty sandy gravelly loam brown gravelly loam tan silty sandy clay loam water @ 68" no rock no mottling
sds area 1 test 2 01/10/19	0 to 10" 10" to 44' 44" 68' 68" 96'	top soil tan silty sandy loam brown gravelly silty loam w/ cobble tan silty gravelly clay loam w/ mottling water @ 68" no rock
sds area 1 test 3 01/10/19	0 to 4" 4" to 20" 20" to 56" 56" to 96	top soil tan silty loam brown silty sandy clay loam w/ cobbles brown silty clay gravelly loam water @ 78" no rock no mottling
sds area 1 test 4 01/10/19	0 to 6" 6" to 22" 22" to 7' 7' to 8'	top soil tan silty loam brown silty sandy gravelly clay loam brown silty sandy gravelly loam w/ cobble water 2 72" no rock no water

Comments:

APPENDIX 12

CONSTRUCTION SITE


INSPECTION FORM,

NOTICE OF INTENT,

AND MS4 ACCEPTANCE

This page is left intentionally blank

SWPPP INSPECTION REPORT

 <p>ENGINEERING & SURVEYING PROPERTIES Achieving Successful Results with Innovative Designs</p>	W.O. No.:	Date:	Greater than 5 Ac. Of Disturbance? <input type="checkbox"/> Waiver? <input type="checkbox"/>	Page Of
	Project Name:		Weather Conditions: <input type="checkbox"/> Dry <input type="checkbox"/> Rain <input type="checkbox"/> Snow	
			Soil Conditions: <input type="checkbox"/> Dry <input type="checkbox"/> Wet <input type="checkbox"/> Saturated	
	Location:		Arrival Time :	
Departing Time:				
Owner:	Phone:		Documents on-site?	
Contractor:	Phone:		Weekly Inspections:	NOI:

1. Description of current activities onsite and phase of construction (attach sketch showing areas of stabilization, current work, and photo locations):

2. Description of the condition of the runoff at all points of discharge from the construction site (including onsite conveyance systems):

3. Description of the condition of all natural surface water bodies located within, or immediately adjacent to the construction site:

4. Identify all erosion and sediment control practices that require repair and/or maintenance:

5. Identify all erosion and sediment control practices that were not installed properly or are not functioning as designed:

6. Identify current status of construction for all post-construction stormwater management practices:

7. Corrective action(s) required to erosion and sediment control measures and post-construction stormwater management practices:

Was the owner and contractor(s) notified of the deficiencies and repairs needed within one (1) business day? ☐ Yes ☐ No

Qualified Inspector

Signature

Notice: ☐ GP-02-01 ☐ GP-08-001 ☐ GP-10-001

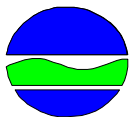
This inspection was performed solely for the purpose of determining compliance with NYSDEC SPDES General Permit:

Name and Title

Signature

This page is left intentionally blank

NOTICE OF INTENT



New York State Department of Environmental Conservation

Division of Water

625 Broadway, 4th Floor

Albany, New York 12233-3505

NYR [] [] [] [] []
(for DEC use only)

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

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

- IMPORTANT -

RETURN THIS FORM TO THE ADDRESS ABOVE

OWNER/OPERATOR MUST SIGN FORM

Owner/Operator Information

Owner/Operator (Company Name/Private Owner Name/Municipality Name)

[illegible]

Owner/Operator Contact Person Last Name (NOT CONSULTANT)

[illegible]

Owner/Operator Contact Person First Name

[illegible]

Owner/Operator Mailing Address

[illegible]

City

[illegible]

State

--	--

Zip

--	--	--	--	--	--	--	--	--

Phone (Owner/Operator)

			-				-			
--	--	--	---	--	--	--	---	--	--	--

Fax (Owner/Operator)

			-				-			
--	--	--	---	--	--	--	---	--	--	--

Email (Owner/Operator)

[illegible][illegible]

FED TAX ID

		-							
--	--	---	--	--	--	--	--	--	--

(not required for individuals)

Project Site Information

Project/Site Name

[illegible]

Street Address (NOT P.O. BOX)

[illegible]

Side of Street

☐ North ☐ South ☐ East ☐ West

City/Town/Village (THAT ISSUES BUILDING PERMIT)

[illegible]

State

Zip

--	--

--	--	--	--	--

—

--	--	--	--

County

[illegible]DEC Region

--	--

Name of Nearest Cross Street

[illegible]

Distance to Nearest Cross Street (Feet)

--	--	--	--	--

Project In Relation to Cross Street

☐ North ☐ South ☐ East ☐ West

Tax Map Numbers

Section-Block-Parcel

[illegible]

Tax Map Numbers

[illegible]

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

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

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

X Coordinates (Easting)

--	--	--	--	--	--

Y Coordinates (Northing)

--	--	--	--	--	--	--

2. What is the nature of this construction project?

- New Construction

- Redevelopment with increase in impervious area

- Redevelopment with no increase in impervious area

SELECT ONLY ONE CHOICE FOR EACH

Number of Lots

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

[illegible][illegible]

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

**Future Impervious
Area Within
Disturbed Area**

--	--	--	--	--	--

--	--	--	--	--	--

--	--	--	--	--	--

--	--	--	--	--	--

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

A			%

B			%

C			%

D			%

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

Start Date

		/			/				
--	--	---	--	--	---	--	--	--	--

End Date

--	--	--	--	--

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

- [illegible]

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

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

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

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

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

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

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

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

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

[illegible]

SWPPP Preparer

[illegible]

Contact Name (Last, Space, First)

[illegible]

Mailing Address

[illegible]

City

[illegible]

State Zip

								-				
--	--	--	--	--	--	--	--	---	--	--	--	--

Phone

--	--	--	--

Fax

--	--	--	--

Email

[illegible][illegible]

SWPPP Preparer Certification

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

First Name

[illegible]

MI

--	--

Last Name

[illegible]

Signature

Date _____

--	--

/

--	--

/

--	--	--	--

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

☐ Yes ☐ No

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

Temporary Structural

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

Biotechnical

- Brush Matting
- Wattling

Other

[illegible]

Vegetative Measures

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

Permanent Structural

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

Post-construction Stormwater Management Practice (SMP) Requirements

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

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

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

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

- ☐ All disturbed areas will be restored in accordance with the Soil Restoration requirements in Table 5.3 of the Design Manual (see page 5-22).
- ☐ Compacted areas were considered as impervious cover when calculating the **WQv Required**, and the compacted areas were assigned a post-construction Hydrologic Soil Group (HSG) designation that is one level less permeable than existing conditions for the hydrology analysis.

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

Total WQv Required

. acre-feet

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

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

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

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

RR Techniques (Area Reduction)	Total Contributing Area (acres)	Total Contributing Impervious Area(acres)
○ Conservation of Natural Areas (RR-1) ...	<input type="text"/> <input type="text"/> <input type="text"/> . <input type="text"/> <input type="text"/> <input type="text"/>	and/or <input type="text"/> <input type="text"/> <input type="text"/> . <input type="text"/> <input type="text"/> <input type="text"/>
○ Sheetflow to Riparian Buffers/Filters Strips (RR-2)	<input type="text"/> <input type="text"/> <input type="text"/> . <input type="text"/> <input type="text"/> <input type="text"/>	and/or <input type="text"/> <input type="text"/> <input type="text"/> . <input type="text"/> <input type="text"/> <input type="text"/>
○ Tree Planting/Tree Pit (RR-3)	<input type="text"/> <input type="text"/> <input type="text"/> . <input type="text"/> <input type="text"/> <input type="text"/>	and/or <input type="text"/> <input type="text"/> <input type="text"/> . <input type="text"/> <input type="text"/> <input type="text"/>
○ Disconnection of Rooftop Runoff (RR-4) ..	<input type="text"/> <input type="text"/> <input type="text"/> . <input type="text"/> <input type="text"/> <input type="text"/>	and/or <input type="text"/> <input type="text"/> <input type="text"/> . <input type="text"/> <input type="text"/> <input type="text"/>
RR Techniques (Volume Reduction)		
○ Vegetated Swale (RR-5)	<input type="text"/> <input type="text"/> <input type="text"/>	. <input type="text"/> <input type="text"/> <input type="text"/>
○ Rain Garden (RR-6)	<input type="text"/> <input type="text"/> <input type="text"/>	. <input type="text"/> <input type="text"/> <input type="text"/>
○ Stormwater Planter (RR-7)	<input type="text"/> <input type="text"/> <input type="text"/>	. <input type="text"/> <input type="text"/> <input type="text"/>
○ Rain Barrel/Cistern (RR-8)	<input type="text"/> <input type="text"/> <input type="text"/>	. <input type="text"/> <input type="text"/> <input type="text"/>
○ Porous Pavement (RR-9)	<input type="text"/> <input type="text"/> <input type="text"/>	. <input type="text"/> <input type="text"/> <input type="text"/>
○ Green Roof (RR-10)	<input type="text"/> <input type="text"/> <input type="text"/>	. <input type="text"/> <input type="text"/> <input type="text"/>
Standard SMPs with RRv Capacity		
○ Infiltration Trench (I-1)	<input type="text"/> <input type="text"/> <input type="text"/>	. <input type="text"/> <input type="text"/> <input type="text"/>
○ Infiltration Basin (I-2)	<input type="text"/> <input type="text"/> <input type="text"/>	. <input type="text"/> <input type="text"/> <input type="text"/>
○ Dry Well (I-3)	<input type="text"/> <input type="text"/> <input type="text"/>	. <input type="text"/> <input type="text"/> <input type="text"/>
○ Underground Infiltration System (I-4)	<input type="text"/> <input type="text"/> <input type="text"/>	. <input type="text"/> <input type="text"/> <input type="text"/>
○ Bioretention (F-5)	<input type="text"/> <input type="text"/> <input type="text"/>	. <input type="text"/> <input type="text"/> <input type="text"/>
○ Dry Swale (O-1)	<input type="text"/> <input type="text"/> <input type="text"/>	. <input type="text"/> <input type="text"/> <input type="text"/>
Standard SMPs		
○ Micropool Extended Detention (P-1)	<input type="text"/> <input type="text"/> <input type="text"/>	. <input type="text"/> <input type="text"/> <input type="text"/>
○ Wet Pond (P-2)	<input type="text"/> <input type="text"/> <input type="text"/>	. <input type="text"/> <input type="text"/> <input type="text"/>
○ Wet Extended Detention (P-3)	<input type="text"/> <input type="text"/> <input type="text"/>	. <input type="text"/> <input type="text"/> <input type="text"/>
○ Multiple Pond System (P-4)	<input type="text"/> <input type="text"/> <input type="text"/>	. <input type="text"/> <input type="text"/> <input type="text"/>
○ Pocket Pond (P-5)	<input type="text"/> <input type="text"/> <input type="text"/>	. <input type="text"/> <input type="text"/> <input type="text"/>
○ Surface Sand Filter (F-1)	<input type="text"/> <input type="text"/> <input type="text"/>	. <input type="text"/> <input type="text"/> <input type="text"/>
○ Underground Sand Filter (F-2)	<input type="text"/> <input type="text"/> <input type="text"/>	. <input type="text"/> <input type="text"/> <input type="text"/>
○ Perimeter Sand Filter (F-3)	<input type="text"/> <input type="text"/> <input type="text"/>	. <input type="text"/> <input type="text"/> <input type="text"/>
○ Organic Filter (F-4)	<input type="text"/> <input type="text"/> <input type="text"/>	. <input type="text"/> <input type="text"/> <input type="text"/>
○ Shallow Wetland (W-1)	<input type="text"/> <input type="text"/> <input type="text"/>	. <input type="text"/> <input type="text"/> <input type="text"/>
○ Extended Detention Wetland (W-2)	<input type="text"/> <input type="text"/> <input type="text"/>	. <input type="text"/> <input type="text"/> <input type="text"/>
○ Pond/Wetland System (W-3)	<input type="text"/> <input type="text"/> <input type="text"/>	. <input type="text"/> <input type="text"/> <input type="text"/>
○ Pocket Wetland (W-4)	<input type="text"/> <input type="text"/> <input type="text"/>	. <input type="text"/> <input type="text"/> <input type="text"/>
○ Wet Swale (O-2)	<input type="text"/> <input type="text"/> <input type="text"/>	. <input type="text"/> <input type="text"/> <input type="text"/>

[illegible][illegible]

--	--	--

 ·

--	--	--

 acre-feet

--	--	--

 .

--	--	--

acre-feet

Page 10 of 14

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

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

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

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

WQv Provided

. acre-feet

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

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

.

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

If Yes, go to question 36.

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

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

CPv Required

. acre-feet

CPv Provided

. acre-feet

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

- ☐ Site discharges directly to tidal waters or a fifth order or larger stream.
- ☐ Reduction of the total CPv is achieved on site through runoff reduction techniques or infiltration systems.

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

Total Overbank Flood Control Criteria (Qp)

Pre-Development

. CFS

Post-development

. CFS

Total Extreme Flood Control Criteria (Qf)

Pre-Development

. CFS

Post-development

. CFS

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

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

- 37a. The need to meet the Qp and Qf criteria has been waived because:
- ☐ Site discharges directly to tidal waters or a fifth order or larger stream.
 - ☐ Downstream analysis reveals that the Qp and Qf controls are not required

38. Has a long term Operation and Maintenance Plan for the post-construction stormwater management practice(s) been developed? ☐ **Yes** ☐ **No**

38. Has a long term Operation and Maintenance Plan for the post-construction stormwater management practice(s) been developed? ☐ **Yes** ☐ **No**

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

[illegible]

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

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

○ Air Pollution Control

○ Coastal Erosion

☐ Hazardous Waste

○ Long Island Wells

○ Mined Land Reclamation

○ Solid Waste

○ Navigable Waters Protection / Article 15

○ Water Quality Certificate

○ Dam Safety

○ Water Supply

○ Freshwater Wetlands/Article 24

○ Tidal Wetlands

○ Wild, Scenic and Recreational Rivers

○ Stream Bed or Bank Protection / Article 15

○ Endangered or Threatened Species(Incidental Take Permit)

- Individual SPDES

○ SPDES Multi-Sector GP								
-------------------------	--	--	--	--	--	--	--	--

☐ Other

☐ None

41. Does this project require a US Army Corps of Engineers Wetland Permit? ☐ ☐ ☐ ☐ ☐ ☐

☐ Yes ☐ No

If Yes, Indicate Size of Impact.				
.				

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

☐ Yes ☐ No

43. Has the "MS4 SWPPP Acceptance" form been signed by the principal executive officer or ranking elected official and submitted along with this NOI?

☐ Yes ☐ No

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

Owner/Operator Certification	
<p>I have read or been advised of the permit conditions and believe that I understand them. I also understand that, under the terms of the permit, there may be reporting requirements. I hereby certify that this document and the corresponding documents were prepared under my direction or supervision. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further understand that coverage under the general permit will be identified in the acknowledgment that I will receive as a result of submitting this NOI and can be as long as sixty (60) business days as provided for in the general permit. I also understand that, by submitting this NOI, I am acknowledging that the SWPPP has been developed and will be implemented as the first element of construction, and agreeing to comply with all the terms and conditions of the general permit for which this NOI is being submitted.</p>	
Print First Name <div style="border: 1px solid black; height: 30px; width: 100%; position: relative;"> <div style="position: absolute; top: 0; left: 0; right: 0; bottom: 0; border: 1px solid black; display: flex; flex-wrap: wrap;"> <!-- 20 empty boxes for first name --> <!-- ... (omitting the 18 empty boxes for brevity) ... --> </div> </div>	MI <div style="border: 1px solid black; height: 30px; width: 100%; position: relative;"> <div style="position: absolute; top: 0; left: 0; right: 0; bottom: 0; border: 1px solid black; display: flex; flex-wrap: wrap;"> <!-- 2 empty boxes for MI --> </div> </div>
Print Last Name <div style="border: 1px solid black; height: 30px; width: 100%; position: relative;"> <div style="position: absolute; top: 0; left: 0; right: 0; bottom: 0; border: 1px solid black; display: flex; flex-wrap: wrap;"> <!-- 20 empty boxes for last name --> <!-- ... (omitting the 18 empty boxes for brevity) ... --> </div> </div>	
Owner/Operator Signature <div style="border: 1px solid black; height: 60px; width: 100%;"></div>	
<div style="display: flex; justify-content: flex-end; align-items: center;"> <div style="text-align: center; margin-right: 20px;"> Date <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center;"> </div> <div style="border: 1px solid black; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center;"> </div> <div style="margin: 0 5px;">/</div> <div style="border: 1px solid black; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center;"> </div> <div style="border: 1px solid black; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center;"> </div> <div style="margin: 0 5px;">/</div> <div style="border: 1px solid black; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center;"> </div> <div style="border: 1px solid black; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center;"> </div> </div> </div> </div>	



Department of
Environmental
Conservation

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

MS4 Stormwater Pollution Prevention Plan (SWPPP) Acceptance Form

for

Construction Activities Seeking Authorization Under SPDES General Permit

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

I. Project Owner/Operator Information

1. Owner/Operator Name:

2. Contact Person:

3. Street Address:

4. City/State/Zip:

II. Project Site Information

5. Project/Site Name:

6. Street Address:

7. City/State/Zip:

III. Stormwater Pollution Prevention Plan (SWPPP) Review and Acceptance Information

8. SWPPP Reviewed by:

9. Title/Position:

10. Date Final SWPPP Reviewed and Accepted:

IV. Regulated MS4 Information

11. Name of MS4:

12. MS4 SPDES Permit Identification Number: NYR20A _____

13. Contact Person:

14. Street Address:

15. City/State/Zip:

16. Telephone Number:

MS4 SWPPP Acceptance Form - continued

V. Certification Statement - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative

I hereby certify that the final Stormwater Pollution Prevention Plan (SWPPP) for the construction project identified in question 5 has been reviewed and meets the substantive requirements in the SPDES General Permit For Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4s). Note: The MS4, through the acceptance of the SWPPP, assumes no responsibility for the accuracy and adequacy of the design included in the SWPPP. In addition, review and acceptance of the SWPPP by the MS4 does not relieve the owner/operator or their SWPPP preparer of responsibility or liability for errors or omissions in the plan.

Printed Name:

Title/Position:

Signature:

Date:

VI. Additional Information

APPENDIX 13

CONSTRUCTION WASTE

MANAGEMENT & SPILL

PREVENTION PLANS

This page is left intentionally blank

CONSTRUCTION WASTE MANAGEMENT & SPILL PREVENTION PLAN

Early in the construction activities, land clearing materials will be collected and recycled either off site or re-used on site as erosion control materials. During early phase construction activities, cardboard, concrete, metal, wood and general trash collection dumpsters will be on site for collection and processing. As the project progresses, concrete dumpsters will be changed over to drywall collection, site clearing dumpsters will be changed over to finish material containers, etc. Typically, (4) open top containers will be on site for the duration of the project. General waste and cardboard/paper containers will be on site for the duration of the project. The contractor will be responsible for organizing and placing containers on site and timely removal/replacement when containers are filled to capacity. As necessary, the contractor will provide areas of collection or hoppers for subcontractors to utilize for intermediate storage of construction and demolition (CD) materials. All containers will be clearly identified with signage indicating stored materials.

Those CD materials generated on this project will be salvaged and re-processed as listed. The contractor will research available processing sources specific to the job site and make all trades aware of project qualifying CD recyclable materials as follows:

Brick: Materials will be stored on site and palletized by processor who will resell as product.

Cardboard: Materials will be separated on the jobsite and stored within dedicated on-site dumpster and delivered loose to processor. Processor will bale materials and deliver/resell to end market users.

Concrete: Scrap and loose materials will either be crushed on site and used for aggregate or stored within dedicated on-site dumpster and delivered to processor. Processor will reuse or resell materials as clean fill back or crush and use for aggregate.

Metals: Materials will be sorted and stored within dedicated on-site dumpster and delivered to processor. Processor will sell materials to metal recyclers (steel, aluminum, brass, copper, lead, stainless).

Stone and Granite: Materials will be collected on site in piles or containers and processor will palletize and haul materials. Processor will re-sell as product or crushed and use as aggregate.

Plastic, paper goods, and aluminum cans: Materials will be collected on job site within construction trailers, cantina areas, etc. and stored in on-site trailers. Materials will be hauled/recycled by processor.

Drywall: Waste materials will be sorted and collected in dedicated on-site containers or materials will be ground on site and used as an erosion control product. Hauled materials to processor will be processed as a soil amendment or used in alternate fuel mixture.

Wood or Lumber: Materials will be sorted and stored on-site within dedicated on-site containers and either resold as retail lumber by processor or ground and mixed with commercial land

clearing and/or approved materials for erosion control applications. Lumber will need to be clean, no paint or other wood treatment.

Land Clearing Debris: Woody materials (stumps, large limbs) will be ground on-site and used for soil erosion control products or hauled to processor to be ground as re-sold as erosion control products.

Roofing Shingles: Materials will be stored on site and processed as temporary road base, mixed into hot asphalt mix or used as alternate fuel blend or hauled offsite via appropriate methods to an authorized disposal/recycling facility.

Fuel Tanks: On site storage of fuel chemicals shall be equipped with a spill kit. The contractor must provide secondary containment for storing any hazardous chemicals on site.

Equipment storage: All equipment stored on site shall be inspected daily by the contractor for any oil or lubricant spills or leaks. Any leaks shall be repaired immediately. In addition all equipment must be closely inspected prior to working in the Town R.O.W.

Spill Response: The contractor shall clean all spills immediately and shall report all spills to the New York State Department of Environmental Conservation.
This Plan will be displayed in the construction jobsite trailer at all times.

APPENDIX 14

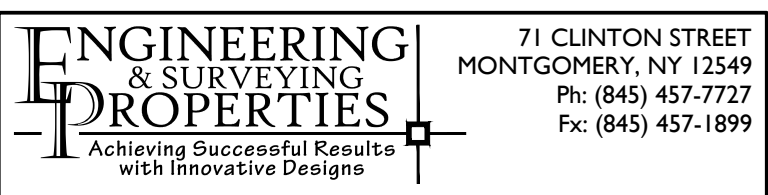
LARGE SCALE

WATERSHED MAPS

This page is left intentionally blank

DRAWING STATUS		ISSUE DATE:	
THIS SHEET IS PART OF THE PLAN SET ISSUED FOR		08/21/19	
SHEET NUMBER			
<input type="checkbox"/> PLANNING APPROVAL	N/A	OF	N/A
<input checked="" type="checkbox"/> CONCEALMENT BOARD APPROVAL	1	OF	2
<input type="checkbox"/> OGDH REALTY SUBDIVISION APPROVAL	N/A	OF	N/A
<input type="checkbox"/> OGDH WATERMAIN EXTENSION APPROVAL	N/A	OF	N/A
<input type="checkbox"/> NYSDEC APPROVAL	N/A	OF	N/A
<input type="checkbox"/> NYSDDOT APPROVAL	N/A	OF	N/A
<input type="checkbox"/> OTHER	N/A	OF	N/A
<input type="checkbox"/> FOR BID	N/A	OF	N/A
<input type="checkbox"/> FOR CONSTRUCTION	N/A	OF	N/A

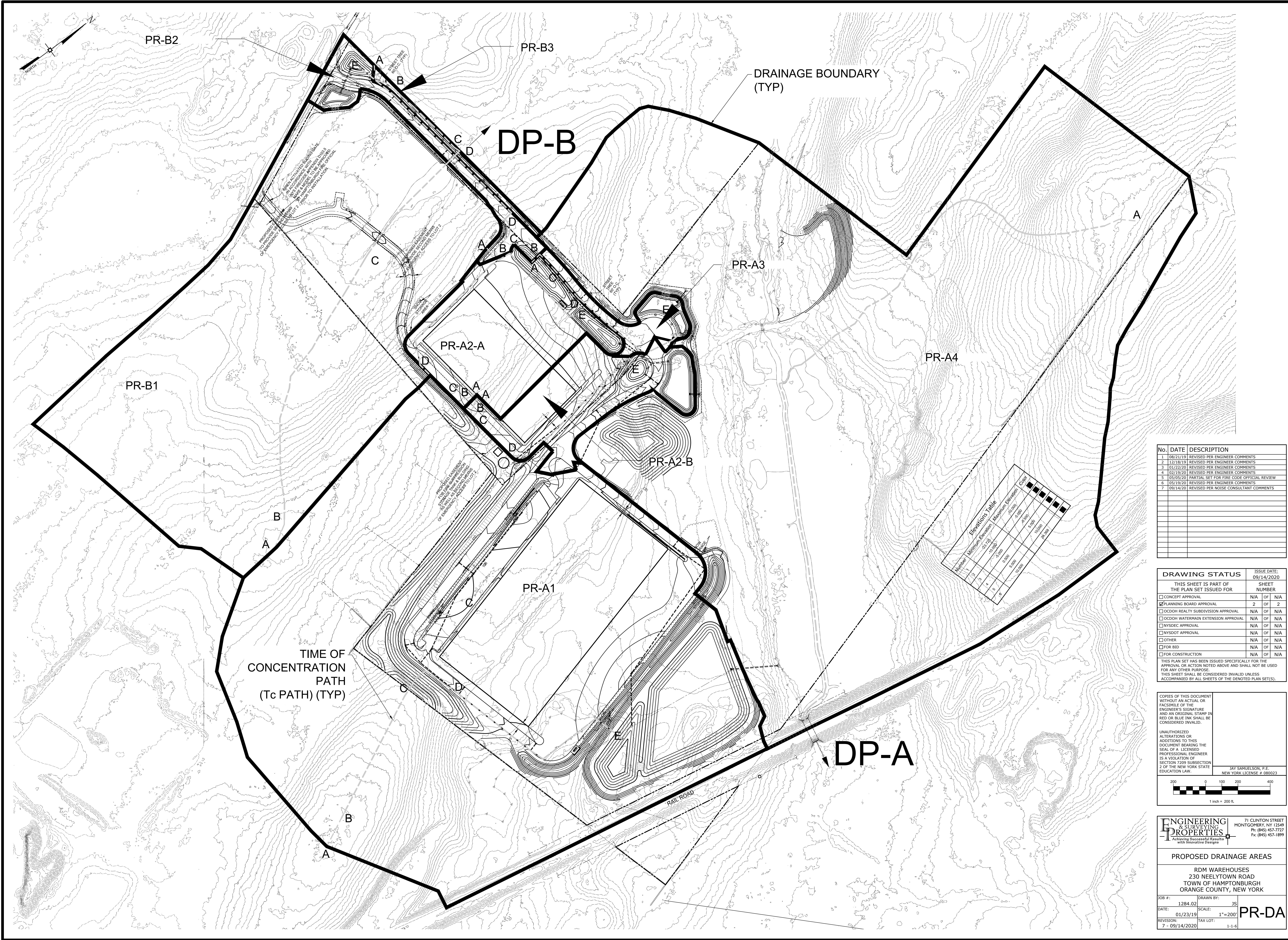
<p>COPIES OF THIS DOCUMENT WITHOUT AN ACTUAL OR FACSIMILE OF THE ENGINEER'S SIGNATURE AND AN ORIGINAL STAMP IN RED OR BLUE INK SHALL BE CONSIDERED INVALID.</p>	
<p>UNAUTHORIZED ALTERATIONS OR ADDITIONS TO THIS DOCUMENT BEARING THE SEAL OF A LICENSED PROFESSIONAL ENGINEER IS A VIOLATION OF SECTION 7209 SUBSECTION 2 OF THE NEW YORK STATE EDUCATION LAW.</p>	<p>JAY SAMUELSON, P.E. NEW YORK LICENSE # 080023</p>



RDM WAREHOUSES
230 NEELYTOWN ROAD
TOWN OF HAMPTONBURGH
ORANGE COUNTY, NEW YORK

JOB #:	1284.02	DRAWN BY:	JS	EX-DA
DATE:	01/23/19	SCALE:	1"=200'	
REVISION:	1 - 08/21/19	TAX LOT:	1-1-6	

©COPYRIGHT 2019 ENGINEERING & SURVEYING PROPERTIES, PC



No.	DATE	DESCRIPTION
1	08/21/19	REVISED PER ENGINEER COMMENTS
2	12/18/19	REVISED PER ENGINEER COMMENTS
3	02/22/20	REVISED PER ENGINEER COMMENTS
4	02/19/20	REVISED PER ENGINEER COMMENTS
5	05/05/20	PARTIAL SET FOR FIRE CODE OFFICIAL REVIEW
6	05/19/20	REVISED PER ENGINEER COMMENTS
7	09/14/20	REVISED PER NOISE CONSULTANT COMMENTS

Number	Minimum Elevation	Maximum Elevation	Cover
1	10.000	1.000	1.000
2	10.000	2.000	2.000
3	10.000	3.000	3.000
4	10.000	4.000	4.000
5	10.000	5.000	5.000
6	10.000	6.000	6.000

DRAWING STATUS		ISSUE DATE:
THIS SHEET IS PART OF THE PLAN SET ISSUED FOR		09/14/2020
SHEET NUMBER		
<input type="checkbox"/> CONCEPT APPROVAL	N/A OF N/A	
<input checked="" type="checkbox"/> PLANNING BOARD APPROVAL	2 OF 2	
<input type="checkbox"/> OGDH REALTY SUBDIVISION APPROVAL	N/A OF N/A	
<input type="checkbox"/> OGDH WATERMAIN EXTENSION APPROVAL	N/A OF N/A	
<input type="checkbox"/> NYSDEC APPROVAL	N/A OF N/A	
<input type="checkbox"/> NYSDOT APPROVAL	N/A OF N/A	
<input type="checkbox"/> OTHER	N/A OF N/A	
<input type="checkbox"/> FOR BID	N/A OF N/A	
<input type="checkbox"/> FOR CONSTRUCTION	N/A OF N/A	

THIS PLAN SET HAS BEEN ISSUED SPECIFICALLY FOR THE APPROVAL OR ACTION NOTED ABOVE AND SHALL NOT BE USED FOR ANY OTHER PURPOSE. THIS SHEET SHALL BE CONSIDERED INVALID UNLESS ACCOMPANIED BY ALL SHEETS OF THE DENOTED PLAN SET(S).

COPIES OF THIS DOCUMENT WITHOUT AN ACTUAL OR FACSIMILE OF THE ENGINEER'S SIGNATURE AND AN ORIGINAL STAMP IN RED OR BLUE INK SHALL BE CONSIDERED INVALID.

UNAUTHORIZED ALTERATIONS OR ADDITIONS TO THIS DOCUMENT BEARING THE SEAL OF A LICENSED PROFESSIONAL ENGINEER IS A VIOLATION OF SECTION 7209 SUBSECTION 2 OF THE NEW YORK STATE EDUCATION LAW.

JAY SAMUELSON, P.E.
NEW YORK LICENSE # 080023

200 0 100 200 400
1 inch = 200 ft.

ENGINEERING & SURVEYING PROPERTIES, INC.
Achieving Successful Results with Innovative Designs

71 CLINTON STREET
MONTGOMERY, NY 12549
Ph: (845) 457-7727
Fax: (845) 457-1899

PROPOSED DRAINAGE AREAS

RDM WAREHOUSES
230 NEELYTOWN ROAD
TOWN OF HAMPTONBURGH
ORANGE COUNTY, NEW YORK

JOB #: 1284.02
DATE: 01/23/19
REVISION: 7 - 09/14/2020

DRAWN BY: JS
SCALE: 1"=200'
TAX LOT: 1-1-6

PR-DA