# STORMWATER
# CALCULATIONS FOR

# Project Mustang

**Joe Frank Porter Road**
**Mt. Pleasant, Maury County, TN**
**Gresham Smith Project #50114.00**

**Tax Map 126, Parcel 041.01**

**August 28, 2025**


Matthew McLaren

Digitally signed by Matthew McLaren
DN: E=matt.mclaren@greshamsmith.com, CN=Matthew McLaren, O=Gresham Smith, L=Nashville, S=Tennessee, C=US
Date: 2025.08.28 15:05:54-04'00'

Gresham Smith

**SUITE 1400**

**222 SECOND AVE. SOUTH NASHVILLE, TN 37201**

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# CONTENTS

# PROJECT NARRATIVE

Project Description

The 36.9 acre proposed site is located west of Joe Frank Porter Road, just north of State Route 43 Lawrenceburg Highway in northeast Mt. Pleasant, Tennessee.

Property improvements include parking, stormwater infrastructure, and one driveway connecting to the existing Joe Frank Porter Road cul-de-sac.

Soil Conditions

The USDA Web Soil Survey data for this property shows:

| Map unit symbol | Map unit name | Rating | Acres in AOI | Percent of AOI |
|---|---|---|---|---|
| Ae | Armour silt loam, eroded gently sloping phase | B | 0.3 | 0.7% |
| Bk | Braxton silty clay loam, eroded sloping phase | C | 0.0 | 0.1% |
| Bm | Burgin silt loam, phosphatic phase (Eagleville) | D | 1.8 | 5.0% |
| Df | Donerail silt loam, gently sloping phase | C | 2.1 | 5.7% |
| Dg | Dunning silty clay loam, phosphatic phase | C/D | 0.2 | 0.5% |
| Ga | Godwin silt loam | C/D | 16.3 | 44.0% |
| Hr | Huntington silt loam, local alluvium phosphatic phase | B | 0.1 | 0.2% |
| Mb | Maury silt loam, eroded gently sloping phase | A | 16.2 | 43.8% |
| **Totals for Area of Interest** | | | **36.9** | **100.0%** |

Refer to Appendix B for existing soils information

Existing Stormwater Conditions

The site is currently undeveloped and consists of open land used for agriculture. Runoff drains across the parcel from northeast to southwest, across the site into an unnamed tributary of Big Bigby Creek, TN06040003019, which is designated as impaired by nutrients. Two natural outfalls occur on the site and these will be analyzed in both the pre- and post- conditions.

Proposed Stormwater Conditions

All stormwater runoff will drain in a similar pattern as the existing site, from northeast to southwest. The two natural locations of stormwater discharge in the existing condition will be analyzed in the proposed condition. These discharge locations will be the Point of Interests (POI) AB and C.

POI AB:
On the developed portion of the site, POI AB, the stormwater will be collected via a combination of overland flow and underground pipe networks to either one of two riprap-lined ditches and/or a dry detention pond. A small portion of impervious area (0.74 acres) will directly flow into the detention pond without first entering a riprap-lined ditch. Stormwater that does not enter the storm network will bypass the detention pond and flow overland to the POI AB site outfall.

POI C:
For the undeveloped area at the south of the site, no changes will be made to the existing overland flow path to the POI C outfall. The area of drainage to this point of interest has been reduced from the pre- to the post- condition.

Refer to Appendix B for Existing and Proposed Hydrologic Plan Exhibits.

# Stormwater Quantity

Storm Sewer System
The majority of all onsite water will be conveyed via a combination of surface runoff and the proposed storm network throughout the site. All disturbed areas of increased impervious runoff will be diverted to a dry detention pond before slow-release to the POI AB outfall.

The drainage area for each inlet and storm sewer calculations are provided in Appendix D.

Stormwater Detention
Stormwater detention for the proposed development has been provided through the use of the TR-55 method to meet the pre vs. post water quantity requirements, per the City of Mt. Pleasant. The calculations provided herein take into account all future parking and building expansion impervious areas shown on Site Plan. Stormwater over the disturbed portion of the site will be retained for a minimum of 24 hours in a dry detention basin before slow-releasing to the site outfall. The dry detention basin will also improve water quality by the provision for sediment and other pollutants to settle out over time, see Water Quality design.

The Detention Calculations are provided in Appendix D.

| POI AB<br>*Pre vs. Post Discharge Flow Rates (cfs)* | | | | | | |
|---|---|---|---|---|---|---|
| | **2-YR** | **5-YR** | **10-YR** | **25-YR** | **50-YR** | **100-YR** |
| **PRE** | 34.07 | 46.13 | 55.81 | 69.25 | 79.96 | 91.13 |
| **POST** | 18.76 | 22.60 | 25.47 | 29.36 | 32.38 | 35.46 |

| POI C<br>*Pre vs. Post Discharge Flow Rates (cfs)* | | | | | | |
|---|---|---|---|---|---|---|
| | **2-YR** | **5-YR** | **10-YR** | **25-YR** | **50-YR** | **100-YR** |
| **PRE** | 46.91 | 64.61 | 78.98 | 99.24 | 115.50 | 132.53 |
| **POST** | 16.89 | 22.34 | 26.67 | 32.63 | 37.37 | 42.29 |

# Stormwater Quality

The City of Mt. Pleasant does not currently have water quality requirements for permitting but an effort was made to ensure that sediment transport to receiving waters would be minimal.

POI AB

The majority of surface drainage will be diverted through one of two riprap-lined ditches before being collected and detained in a dry detention basin. Stormwater routed through the pond will travel slowly over an elongated basin route before it discharges to POI AB. A trash rack will be located at the headwall of the basin outlet pipe to further deter negative impacts to receiving streams. There is a small area of impervious paving (0.74 acres) that will go directly to the dry detention basin without first entering a ditch.

POI C

The pre-construction drainage pattern for Watershed C (WS C) will continue undisturbed to POI C.

# Erosion and Sediment Control

Ditches A & B:

Both ditches will be lined with Turf Reinforcement Mat (TRM) SC250 to diminish shear stress along the channel bottom and discourage sediment transport. The North American Green Erosion Control Materials Design Software (ECMDS) was used for the analysis of the channel lining and the Known Q was entered via watershed analysis using the Hydraflow Hydrograph Extension for Autodesk Civil 3D.

Ditch A

In order to analyze the channel lining for Ditch A, the Hydraflow Hydrograph Extension for Autodesk Civil 3D was utilized for Watershed 4 – POST WS A and the 10-year storm event. Ditch A conveys three (3) watersheds that enter at different points along the ditch, however, a conservative approach was taken to analyze the ditch as though all flows entered at the same point and were conveyed simultaneously. This ensures that Ditch A will not overflow and that flows entering the ditch will not produce any deleterious erosive effects along the length of the conveyance. The soil composition on site is primarily Silt Loam and Silty Clay Loam; for the analysis of the TRM lining, Silt Loam (SM), Loam (MH) and Clay Loam (CL) were all analyzed to ensure that the channel was stable.

Soils Report is provided in Appendix B. Channel Lining Analysis for Ditch A is provided in Appendix D.

Ditch B

In order to analyze the channel lining for Ditch B, the Hydraflow Hydrograph Extension for Autodesk Civil 3D was utilized for watershed 10 – POST WS B and the 10-year storm event. Ditch B conveys two (2) watersheds that enter at different points along the ditch, however, a conservative approach was taken to analyze the ditch as though all flows entered at the same point and were conveyed simultaneously. This ensures that Ditch B will not overflow and that flows entering the ditch will not produce any deleterious erosive effects along the length of the conveyance. The soil composition on site is primarily Silt Loam and Silty Clay Loam; for the analysis of the TRM lining, Silt Loam (SM), Loam (MH) and Clay Loam (CL) were all analyzed to ensure that the channel was stable.

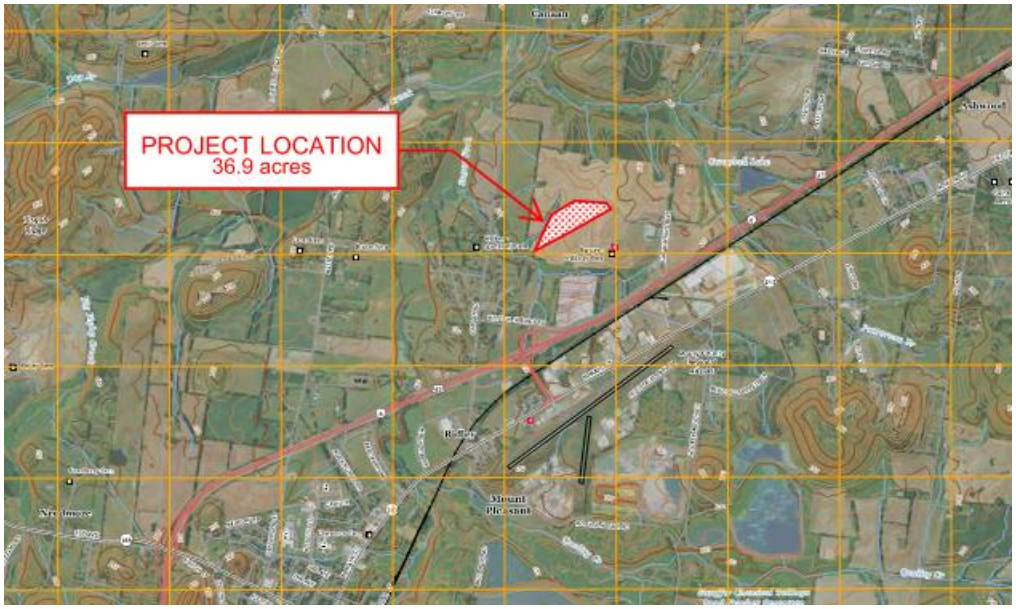
Soils Report is provided in Appendix B. Channel Lining Analysis for Ditch B is provided in Appendix D.

For temporary and permanent construction measures, as well as sediment basin calculations, refer to the Stormwater Prevention Plan (SWPPP) for erosion control plan and details in Appendix D.

# Offsite Drainage

The proposed site is downhill of agricultural land to the north that will contribute 12.21 acres of stormwater run-on. Due to the shape of the site, as well as the layout requirements of the building and vehicular circulation, it was difficult to bypass the entirety of the offsite drainage to the natural outfall of the site. Instead, approximately 12.05 acres of undeveloped offsite drainage will be accepted into the Stormwater Control Measures (SCMs) and treated within the detention pond before ultimately reaching the site outfall(s).

# APPENDIX A: VICINITY MAP




VICINITY MAP
NOT TO SCALE

Mt. Pleasant, Tennessee

# APPENDIX B: DRAINAGE MAP EXHIBITS

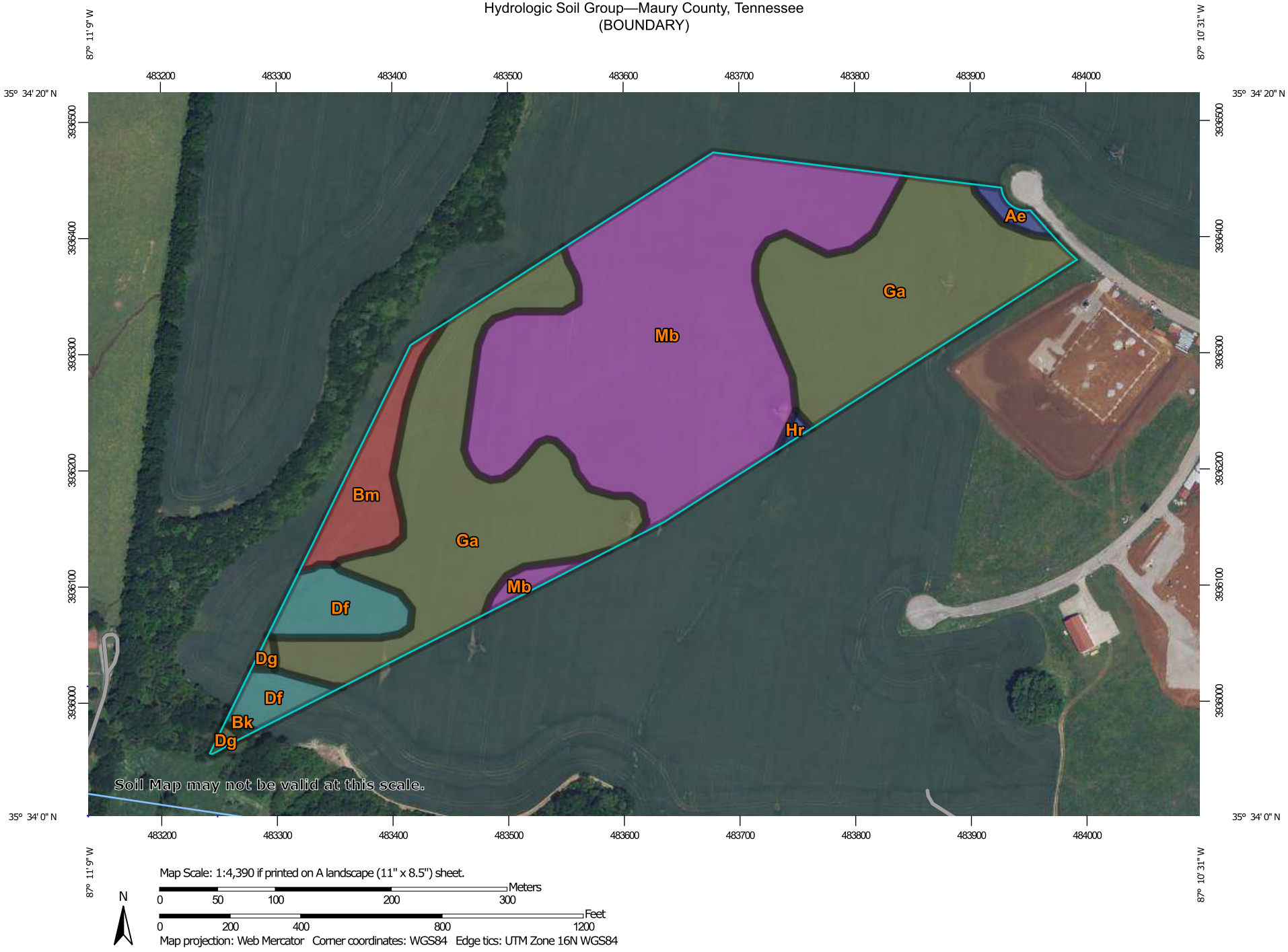
Soils Report

Existing Conditions Drainage Exhibit

Proposed Development Drainage Exhibit

NOAA Rainfall Data

Hydrologic Soil Group—Maury County, Tennessee
(BOUNDARY)



## MAP LEGEND

**Area of Interest (AOI)**

Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

A
A/D
B
B/D
C
C/D
D
Not rated or not available

**Soil Rating Lines**

A
A/D
B
B/D
C
C/D
D
Not rated or not available

**Soil Rating Points**

A
A/D
B
B/D
C
C/D
D
Not rated or not available

**Water Features**

Streams and Canals

**Transportation**

Rails
Interstate Highways
US Routes
Major Roads
Local Roads

**Background**

Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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

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: Maury County, Tennessee
Survey Area Data: Version 19, Sep 12, 2024

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

Date(s) aerial images were photographed: Mar 20, 2021—Jun 14, 2021

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.

# Hydrologic Soil Group

| Map unit symbol | Map unit name | Rating | Acres in AOI | Percent of AOI |
|---|---|---|---|---|
| Ae | Armour silt loam, eroded gently sloping phase | B | 0.3 | 0.7% |
| Bk | Braxton silty clay loam, eroded sloping phase | C | 0.0 | 0.1% |
| Bm | Burgin silt loam, phosphatic phase (Eagleville) | D | 1.8 | 5.0% |
| Df | Donerail silt loam, gently sloping phase | C | 2.1 | 5.7% |
| Dg | Dunning silty clay loam, phosphatic phase | C/D | 0.2 | 0.5% |
| Ga | Godwin silt loam | C/D | 16.3 | 44.0% |
| Hr | Huntington silt loam, local alluvium phosphatic phase | B | 0.1 | 0.2% |
| Mb | Maury silt loam, eroded gently sloping phase | A | 16.2 | 43.8% |
| **Totals for Area of Interest** | | | **36.9** | **100.0%** |

## Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

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

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

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

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

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

## Rating Options

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff: None Specified*

*Tie-break Rule:* Higher

PRE-WATERSHED A
19.04 ACRES
HSG A = 8.63 AC CN = 72
HSG C = 1.45 AC CN = 88
HSG C/D = 7.16 AC CN = 91
HSG D = 1.80 CN = 91
CN = 82
Tc = 32.8 min

PRE-OFFSITE WATERSHED
12.41 ACRES
HSG A = 10.71 AC CN = 72
HSG B = 0.62 AC CN = 81
HSG C/D = 0.71 AC CN = 91
IMP = 0.17 AC CN = 98
CN = 74
Tc = 27 min

PRE-WATERSHED B
17.89 ACRES
HSG A = 7.59 AC CN = 72
HSG B = 0.39 AC CN = 81
HSG C = 0.83 AC CN = 88
HSG C/D = 9.08 AC CN = 91
CN = 83
Tc = 34.6 min

OUTFALL POI AB
DRAINAGE AREA - 19.04 AC
LAT: 35.5681
LONG: -87.1844
RECEIVING WATERS:
TN06040003019

OUTFALL POI C
DRAINAGE AREA - 17.89 AC
LAT: 35.5671
LONG: -87.1849
RECEIVING WATERS:
TN06040003019

N58° 19' 24"E 1019.02'
N26° 57' 50"E 1288.70'
S63° 47' 43"W 836.67'
S63° 35' 04"W 548.98'
S58° 23' 51"W 352.55'
S58° 20' 27"W 485.14'
S58° 21' 53"W 515.00'
S82° 21' 50"E 823.21'

FUTURE RIGHT-OF-WAY

100' GRANT OF TRANSMISSION LINE EASEMENT BOOK 207, PAGE 323 & BOOK 307, PAGE 325

50' GAS LINE RIGHT-OF-WAY BOOK 285, PAGE 285 & BOOK 609 R.O.M.C., TN

100 YEAR FLOODPLAIN (ZONE A)

NO EASEMENT DOCUMENT FOUND

NORTH

100' 0 100' 200'
GRAPHIC SCALE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Suite 1400
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DCi

# PROJECT MUSTANG

7th District of Maury County, Mount Pleasant, Tennessee
Being a portion of Tax Map 126 Parcel 041.01

Developer: DCi

Revision

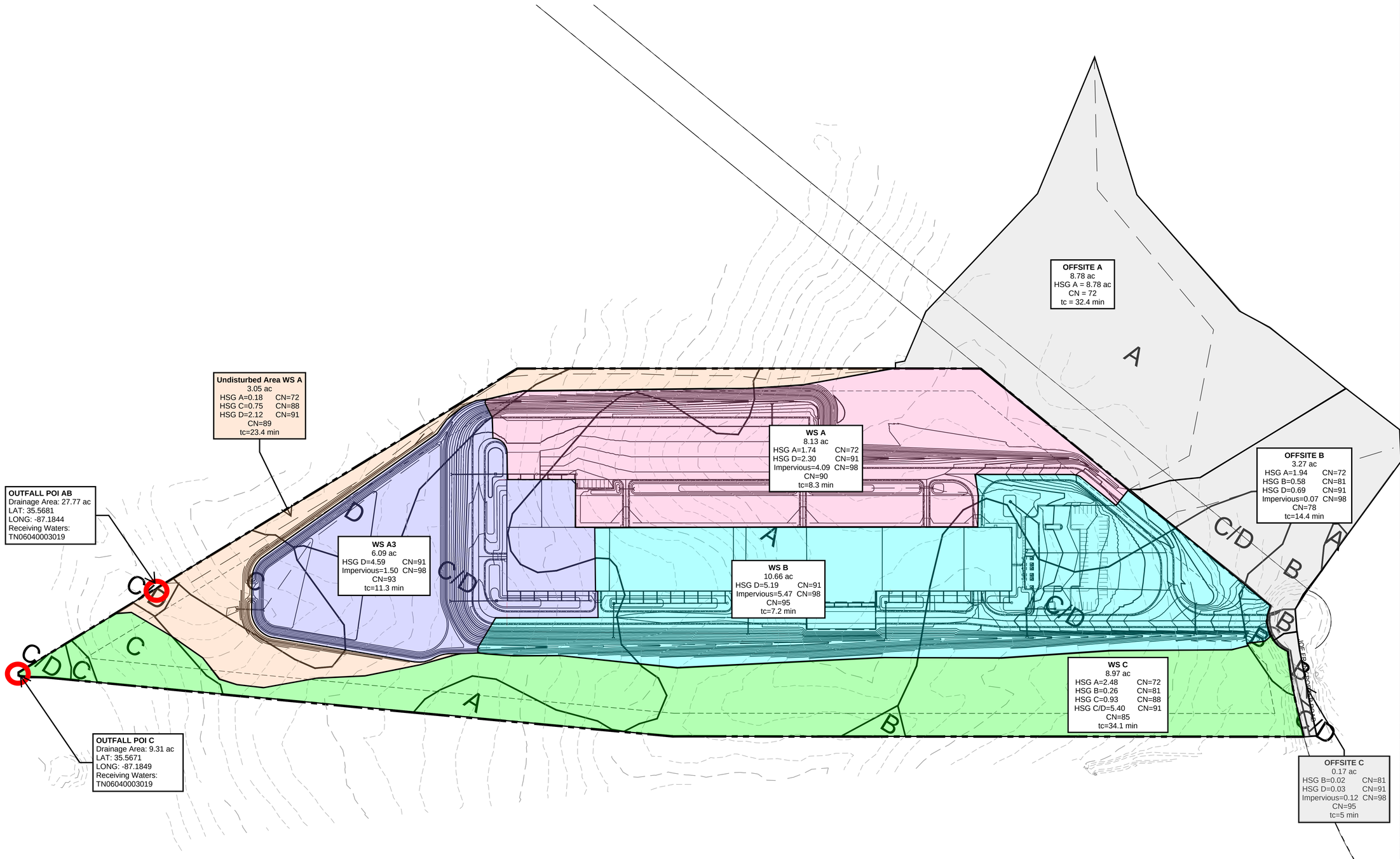
| No. | Date | Description |
|---|---|---|
| | | |

## EXISTING HYDROLOGIC PLAN

50114.00
06/10/2025

This Line Is 3 Inches When Printed Full Size

C:\Users\rockhiv\DCIACCDocs\Gresham Smith\50114.00 Project Mustang R25\Project Files\C3DSheets\Archive\50114.00_EXISTING DRAINAGE.dwg - Valerie Rockhill - 6/24/2025 12:58:20 PM




| | |
|---|---|
| WS A | 8.13 |
| WS B | 10.66 |
| WS C | 8.97 |
| WS A3 | 6.09 |
| UNDSTD WS A | 3.05 |
| | 36.90 ac |

NORTH

X' 0 X' X'
GRAPHIC SCALE


Gresham Smith
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Suite 1400
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DCi

# PROJECT MUSTANG

7th District of Maury County, Mount Pleasant, Tennessee
Being a portion of Tax Map 126 Parcel 041.01

Developer: DCi

THIS PLAN HAS BEEN SIGNED, SEALED, AND DATED DIGITALLY

Revision

| No. | Date | Description |
|---|---|---|
| | | |

PROPOSED DRAINAGE MAP

50114.00
07/08/2025

This Line Is 3 Inches When Printed Full Size

**NOAA Atlas 14, Volume 2, Version 3**
**Location name: Mount Pleasant, Tennessee, USA***
**Latitude: 35.5717°, Longitude: -87.1786°**
**Elevation: 635 ft****
* source: ESRI Maps
** source: USGS

**POINT PRECIPITATION FREQUENCY ESTIMATES**

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

## PF tabular

**PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]**

| Duration | Average recurrence interval (years) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 5 | 10 | 25 | 50 | 100 | 200 | 500 | 1000 |
| 5-min | **0.409** (0.377-0.448) | **0.483** (0.445-0.528) | **0.564** (0.519-0.618) | **0.632** (0.580-0.690) | **0.724** (0.659-0.790) | **0.795** (0.719-0.866) | **0.869** (0.781-0.948) | **0.946** (0.843-1.03) | **1.05** (0.923-1.15) | **1.14** (0.986-1.24) |
| 10-min | **0.653** (0.602-0.715) | **0.772** (0.711-0.845) | **0.904** (0.831-0.990) | **1.01** (0.927-1.10) | **1.15** (1.05-1.26) | **1.27** (1.15-1.38) | **1.38** (1.24-1.51) | **1.50** (1.34-1.64) | **1.66** (1.46-1.82) | **1.79** (1.55-1.96) |
| 15-min | **0.817** (0.752-0.894) | **0.971** (0.894-1.06) | **1.14** (1.05-1.25) | **1.28** (1.17-1.40) | **1.46** (1.33-1.60) | **1.60** (1.45-1.75) | **1.75** (1.57-1.90) | **1.89** (1.68-2.06) | **2.09** (1.84-2.29) | **2.25** (1.95-2.46) |
| 30-min | **1.12** (1.03-1.22) | **1.34** (1.24-1.47) | **1.62** (1.49-1.78) | **1.85** (1.70-2.02) | **2.16** (1.97-2.36) | **2.42** (2.18-2.63) | **2.68** (2.40-2.92) | **2.95** (2.62-3.21) | **3.33** (2.92-3.64) | **3.64** (3.16-3.98) |
| 60-min | **1.40** (1.29-1.53) | **1.68** (1.55-1.84) | **2.08** (1.92-2.28) | **2.41** (2.21-2.64) | **2.88** (2.62-3.15) | **3.27** (2.96-3.56) | **3.68** (3.31-4.02) | **4.13** (3.68-4.50) | **4.78** (4.19-5.22) | **5.31** (4.61-5.81) |
| 2-hr | **1.61** (1.48-1.78) | **1.94** (1.77-2.13) | **2.40** (2.19-2.63) | **2.78** (2.53-3.05) | **3.33** (3.00-3.64) | **3.79** (3.40-4.15) | **4.28** (3.81-4.69) | **4.82** (4.25-5.28) | **5.60** (4.86-6.14) | **6.25** (5.37-6.87) |
| 3-hr | **1.75** (1.61-1.92) | **2.10** (1.93-2.31) | **2.58** (2.37-2.83) | **2.99** (2.73-3.28) | **3.57** (3.24-3.91) | **4.06** (3.66-4.45) | **4.59** (4.10-5.02) | **5.15** (4.56-5.64) | **5.97** (5.22-6.54) | **6.65** (5.74-7.29) |
| 6-hr | **2.18** (2.00-2.39) | **2.59** (2.38-2.85) | **3.16** (2.91-3.47) | **3.65** (3.34-4.00) | **4.34** (3.94-4.74) | **4.92** (4.44-5.37) | **5.53** (4.95-6.03) | **6.19** (5.50-6.76) | **7.14** (6.27-7.81) | **7.92** (6.88-8.68) |
| 12-hr | **2.64** (2.43-2.90) | **3.15** (2.90-3.46) | **3.84** (3.53-4.21) | **4.42** (4.04-4.83) | **5.22** (4.75-5.71) | **5.90** (5.34-6.44) | **6.61** (5.93-7.21) | **7.36** (6.57-8.05) | **8.43** (7.44-9.23) | **9.31** (8.13-10.2) |
| 24-hr | **3.26** (3.02-3.52) | **3.89** (3.61-4.21) | **4.74** (4.40-5.14) | **5.41** (5.01-5.85) | **6.33** (5.84-6.84) | **7.06** (6.50-7.62) | **7.82** (7.17-8.42) | **8.58** (7.85-9.25) | **9.63** (8.75-10.4) | **10.5** (9.46-11.3) |
| 2-day | **3.85** (3.56-4.18) | **4.61** (4.26-5.01) | **5.62** (5.19-6.10) | **6.42** (5.92-6.96) | **7.50** (6.91-8.14) | **8.37** (7.68-9.06) | **9.26** (8.46-10.0) | **10.2** (9.26-11.0) | **11.4** (10.3-12.3) | **12.4** (11.1-13.4) |
| 3-day | **4.12** (3.82-4.44) | **4.92** (4.57-5.32) | **5.98** (5.55-6.46) | **6.80** (6.30-7.34) | **7.90** (7.31-8.52) | **8.77** (8.09-9.45) | **9.64** (8.87-10.4) | **10.5** (9.65-11.3) | **11.7** (10.7-12.6) | **12.6** (11.5-13.6) |
| 4-day | **4.38** (4.08-4.70) | **5.23** (4.88-5.62) | **6.34** (5.90-6.81) | **7.18** (6.69-7.72) | **8.30** (7.71-8.90) | **9.17** (8.50-9.84) | **10.0** (9.27-10.8) | **10.9** (10.0-11.7) | **12.0** (11.0-12.9) | **12.9** (11.8-13.9) |
| 7-day | **5.16** (4.84-5.49) | **6.15** (5.78-6.55) | **7.38** (6.93-7.86) | **8.32** (7.81-8.86) | **9.56** (8.96-10.2) | **10.5** (9.82-11.2) | **11.4** (10.7-12.2) | **12.3** (11.5-13.1) | **13.5** (12.5-14.4) | **14.4** (13.3-15.4) |
| 10-day | **5.87** (5.52-6.23) | **6.97** (6.56-7.40) | **8.30** (7.80-8.80) | **9.32** (8.76-9.88) | **10.6** (10.0-11.3) | **11.7** (10.9-12.4) | **12.7** (11.9-13.4) | **13.7** (12.8-14.5) | **15.0** (13.9-15.9) | **16.0** (14.8-16.9) |
| 20-day | **8.06** (7.62-8.51) | **9.51** (9.00-10.0) | **11.1** (10.5-11.7) | **12.2** (11.5-12.9) | **13.6** (12.9-14.4) | **14.7** (13.8-15.5) | **15.7** (14.8-16.5) | **16.6** (15.6-17.5) | **17.7** (16.6-18.7) | **18.5** (17.3-19.6) |
| 30-day | **9.92** (9.41-10.4) | **11.7** (11.1-12.3) | **13.4** (12.7-14.1) | **14.6** (13.9-15.4) | **16.2** (15.3-17.0) | **17.3** (16.3-18.1) | **18.3** (17.3-19.2) | **19.2** (18.1-20.2) | **20.3** (19.2-21.4) | **21.1** (19.9-22.3) |
| 45-day | **12.5** (11.9-13.1) | **14.6** (13.9-15.3) | **16.6** (15.8-17.4) | **18.0** (17.1-18.9) | **19.8** (18.8-20.8) | **21.1** (20.0-22.1) | **22.2** (21.1-23.3) | **23.3** (22.0-24.4) | **24.5** (23.2-25.8) | **25.4** (24.0-26.7) |
| 60-day | **14.9** (14.2-15.7) | **17.5** (16.6-18.4) | **19.8** (18.8-20.8) | **21.4** (20.4-22.6) | **23.4** (22.2-24.7) | **24.8** (23.6-26.1) | **26.1** (24.7-27.5) | **27.3** (25.8-28.7) | **28.6** (27.0-30.1) | **29.5** (27.8-31.1) |

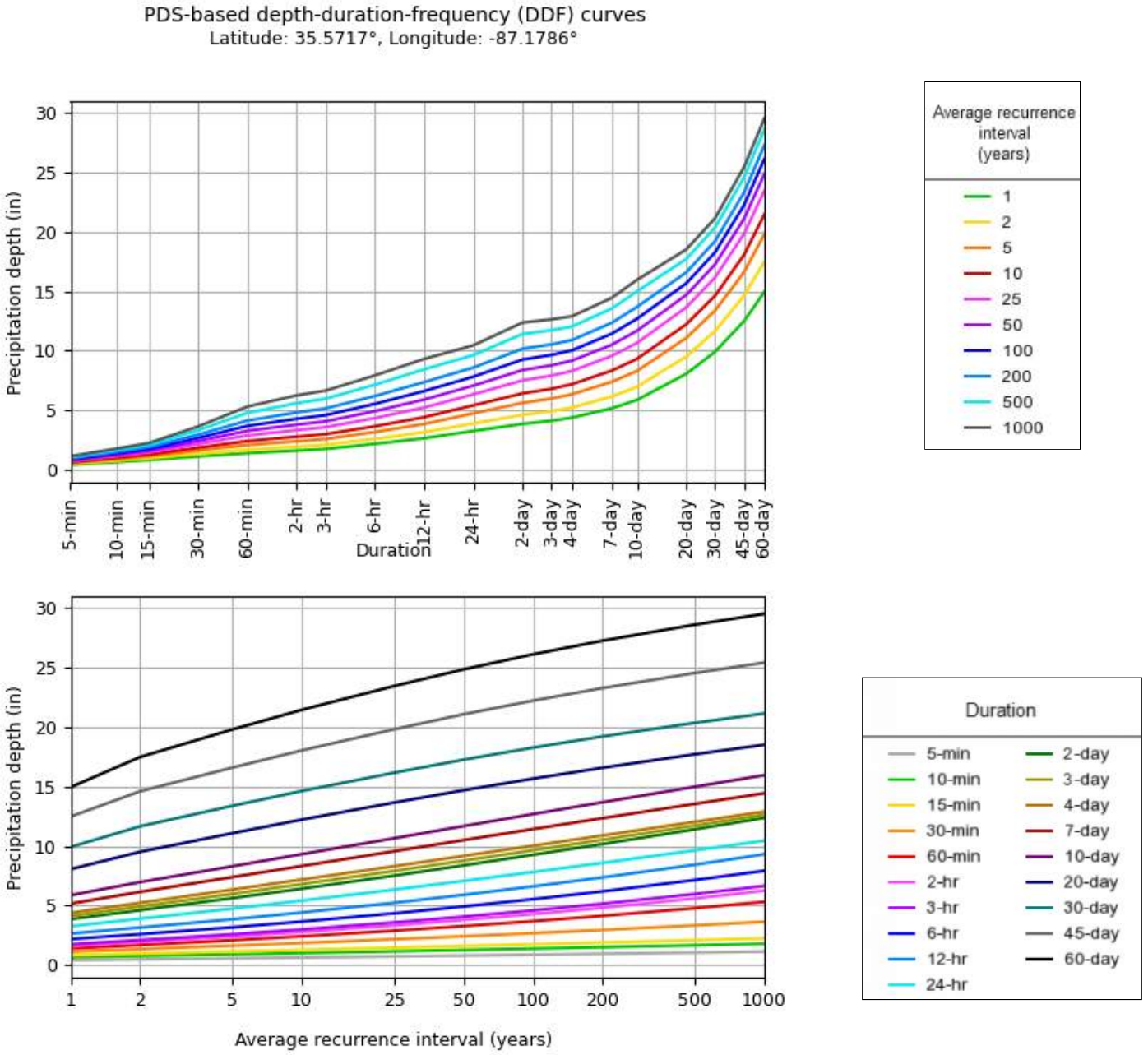
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

## PF graphical



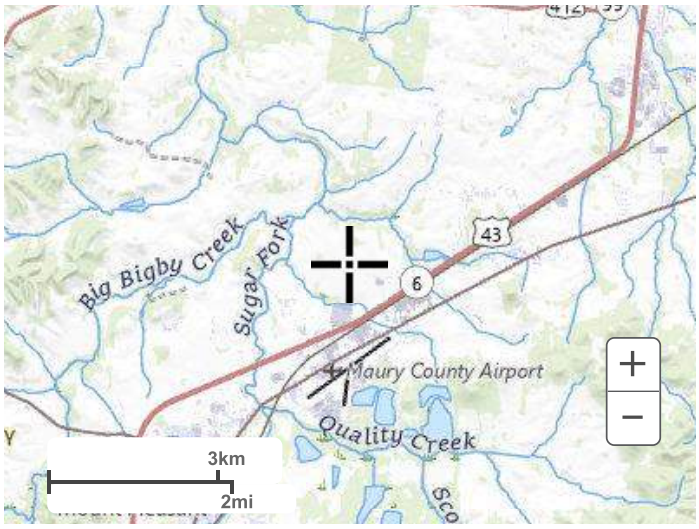

NOAA Atlas 14, Volume 2, Version 3

Created (GMT): Mon May 19 20:51:40 2025

Back to Top

## Maps & aerials

**Small scale terrain**




**Large scale terrain**


**Large scale map**


**Large scale aerial**


Back to Top

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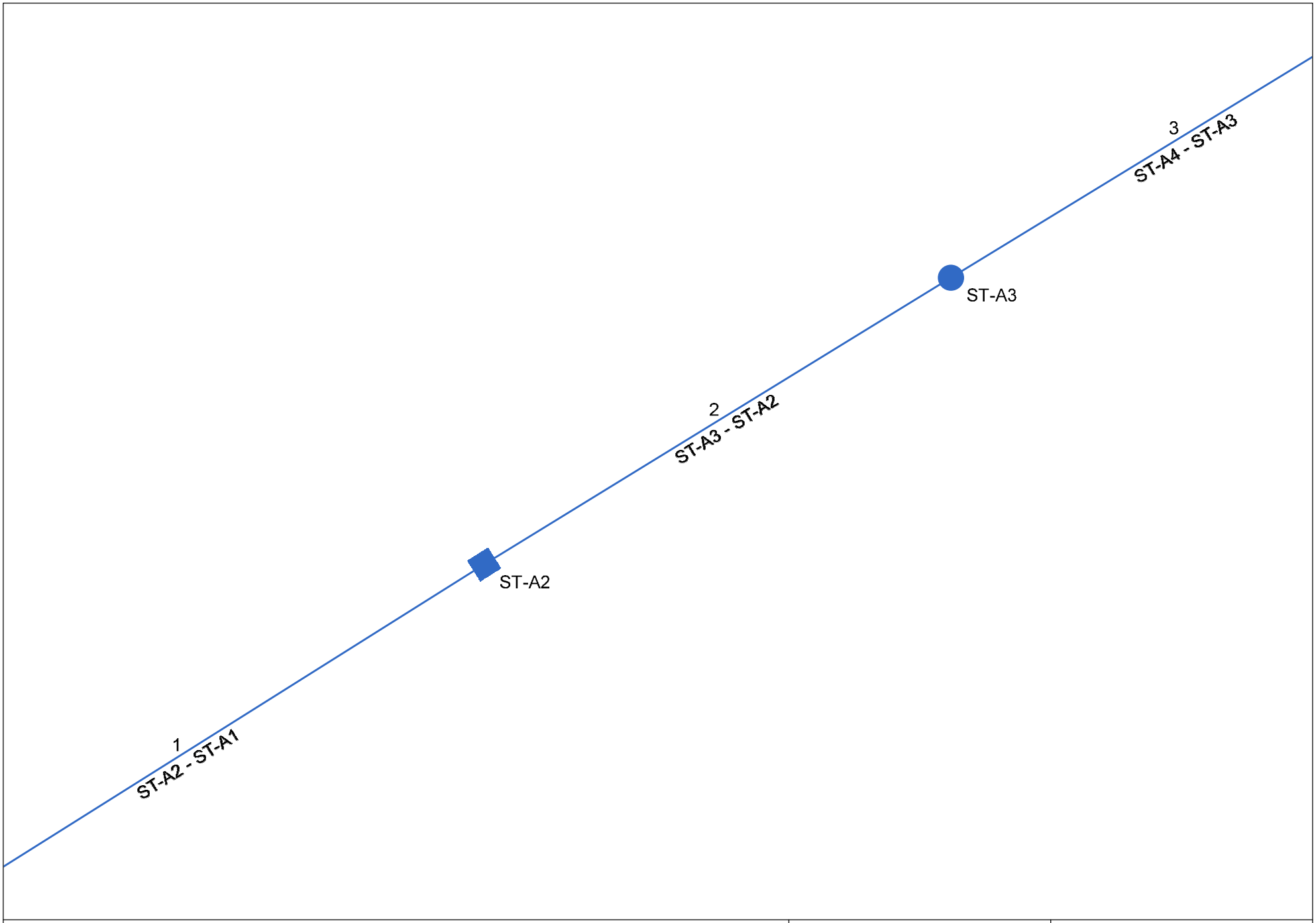
US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

# APPENDIX C: STORM SEWERS

STORM SEWER ANALYSIS REPORT – 10 YEAR

# Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan




| | | |
|---|---|---|
| Project File: New.stm | Number of lines: 3 | Date: 8/28/2025 |

# Storm Sewer Inventory Report

| Line No. | Alignment | | | | Flow Data | | | | Physical Data | | | | | | | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dnstr Line No. | Line Length (ft) | Defl angle (deg) | Junc Type | Known Q (cfs) | Drng Area (ac) | Runoff Coeff (C) | Inlet Time (min) | Invert El Dn (ft) | Line Slope (%) | Invert El Up (ft) | Line Size (in) | Line Shape | N Value (n) | J-Loss Coeff (K) | Inlet/ Rim El (ft) | |
| 1 | End | 119.003 | -32.267 | DrGrt | 0.00 | 0.36 | 0.65 | 0.0 | 611.00 | 5.85 | 617.96 | 15 | Cir | 0.012 | 0.50 | 625.00 | ST-A2 - ST-A1 |
| 2 | 1 | 90.456 | 0.614 | MH | 0.00 | 0.18 | 0.95 | 5.0 | 618.03 | 1.67 | 619.54 | 12 | Cir | 0.012 | 0.15 | 626.76 | ST-A3 - ST-A2 |
| 3 | 2 | 87.394 | 0.134 | MH | 0.00 | 0.18 | 0.95 | 5.0 | 619.54 | 2.36 | 621.60 | 12 | Cir | 0.012 | 1.00 | 629.34 | ST-A4 - ST-A3 |

Project File: New.stm | Number of lines: 3 | Date: 8/28/2025

# Storm Sewer Summary Report



| Line No. | Line ID | Flow rate (cfs) | Line Size (in) | Line shape | Line length (ft) | Invert EL Dn (ft) | Invert EL Up (ft) | Line Slope (%) | HGL Down (ft) | HGL Up (ft) | Minor loss (ft) | HGL Junct (ft) | Dns Line No. | Junction Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ST-A2 - ST-A1 | 4.11 | 15 | Cir | 119.003 | 611.00 | 617.96 | 5.849 | 611.82 | 618.78 | 0.18 | 618.78 | End | DropGrate |
| 2 | ST-A3 - ST-A2 | 2.49 | 12 | Cir | 90.456 | 618.03 | 619.54 | 1.669 | 618.78 | 620.22 | n/a | 620.22 j | 1 | Manhole |
| 3 | ST-A4 - ST-A3 | 1.30 | 12 | Cir | 87.394 | 619.54 | 621.60 | 2.357 | 620.22 | 622.08 | n/a | 622.08 j | 2 | Manhole |

Project File: New.stm

Number of lines: 3

Run Date: 8/28/2025

NOTES: Return period = 10 Yrs. ; j - Line contains hyd. jump.

# MyReport



| Line No. | Area Dn (sqft) | Area Up (sqft) | Byp Ln No | Coeff C1 (C) | Coeff C2 (C) | Coeff C3 (C) | Capac Full (cfs) | Crit Depth (ft) | Cross Sl, Sw (ft/ft) | Cross Sl, Sx (ft/ft) | Curb Len (ft) | Defl Ang (Deg) | Depth Dn (ft) | Depth Up (ft) | DnStm Ln No | Drng Area (ac) | Easting X (ft) | EGL Dn (ft) | EGL Up (ft) | Energy Loss (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.85 | 0.85 | Sag | 0.35 | 0.50 | 0.95 | 16.92 | 0.82 | 0.020 | 0.020 | .... | -32.267 | 0.82 | 0.82** | Outfall | 0.36 | 1616767.90 | 612.18 | 619.14 | 0.000 |
| 2 | 0.56 | 0.56 | 1 | 0.35 | 0.50 | 0.95 | 4.98 | 0.68 | .... | .... | .... | 0.614 | 0.75 | 0.68** | 1 | 0.18 | 1616844.90 | 619.08 | 620.52 | 0.000 |
| 3 | 0.37 | 0.37 | 2 | 0.35 | 0.50 | 0.95 | 5.92 | 0.48 | .... | .... | .... | 0.134 | 0.68 | 0.48** | 2 | 0.18 | 1616919.40 | 620.40 | 622.27 | 0.000 |

Project File: New.stm | Number of lines: 3 | Date: 8/28/2025

NOTES: ** Critical depth

# MyReport



| Flow Rate (cfs) | Sf Ave (ft/ft) | Sf Dn (ft/ft) | Grate Area (sqft) | Grate Len (ft) | Grate Width (ft) | Gnd/Rim El Dn (ft) | Gnd/Rim El Up (ft) | Gutter Depth (ft) | Gutter Slope (ft/ft) | Gutter Spread (ft) | Gutter Width (ft) | HGL Dn (ft) | HGL Up (ft) | HGL Jnct (ft) | HGL Jmp Dn (ft) | HGL Jmp Up (ft) | Incr CxA | Incr Q (cfs) | Inlet Depth (ft) | Inlet Eff (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.11 | 0.000 | 0.000 | 5.06 | 2.53 | 2.00 | 613.00 | 625.00 | 0.21 | Sag | 22.86 | 2.00 | 611.82 | 618.78 | 618.78 | .... | .... | 0.23 | 0.00 | 0.21 | 100 |
| 2.49 | 0.000 | 0.000 | .... | .... | .... | 625.00 | 626.76 | .... | .... | .... | .... | 618.78 | 620.22 j | 620.22 | 618.86 | 618.79 | 0.17 | 1.30 | .... | .... |
| 1.30 | 0.000 | 0.000 | .... | .... | .... | 626.76 | 629.34 | .... | .... | .... | .... | 620.22 | 622.08 j | 622.08 | 620.23 | 620.15 | 0.17 | 1.30 | .... | .... |

Project File: New.stm | Number of lines: 3 | Date: 8/28/2025

NOTES: ** Critical depth

# MyReport

| Inlet ID | Inlet Loc | (ft) | Inlet Time (min) | i Sys (in/hr) | i Inlet (in/hr) | Invert Dn (ft) | Invert Up (ft) | Jump Loc (ft) | Jump Len (ft) | Vel Hd Jmp Dn (ft) | Vel Hd Jmp Up (ft) | J-Loss Coeff | Junct Type | Known Q (cfs) | Cost RCP | Cost CMP | Cost PVC | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-A2 | Sag | | 0.0 | 7.13 | 0.00 | 611.00 | 617.96 | .... | .... | 0.00 | 0.00 | 0.50 z | Dp-Grate | 0.00 | 4,185 | 3,767 | 3,557 | |
| ST-A3 | Sag | | 5.0 | 7.28 | 7.57 | 618.03 | 619.54 | 9.05 | 3.38 | 0.30 | 0.49 | 0.15 z | MH | 0.00 | 3,280 | 2,952 | 2,788 | |
| ST-A4 | Sag | | 5.0 | 7.57 | 7.57 | 619.54 | 621.60 | 8.74 | 2.40 | 0.19 | 0.43 | 1.00 z | MH | 0.00 | 3,175 | 2,858 | 2,699 | |

Project File: New.stm | Number of lines: 3 | Date: 8/28/2025

NOTES: Intensity = 73.40 / (Inlet time + 12.20) ^ 0.80 -- Return period = 10 Yrs. ; ** Critical depth

# MyReport



| Line ID | Line Length (ft) | Line Size (in) | Line Slope (%) | Line Type | Local Depr (in) | n-val Gutter | n-val Pipe | Minor Loss (ft) | Northing Y (ft) | Pipe Travel (min) | Q Byp (cfs) | Q Capt (cfs) | Q Carry (cfs) | Line Rise (in) | Runoff Coeff (C) | Line Span (in) | Area A1 (ac) | Area A2 (ac) | Area A3 (ac) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-A2 - ST-A1 | 119.003 | 15 | 5.85 | Cir | .... | .... | 0.012 | 0.18 | 452173.60 | 0.58 | 0.00 | 2.59 | 2.59 | 15 | 0.65 | 15 | 0.18 | 0.00 | 0.18 |
| ST-A3 - ST-A2 | 90.456 | 12 | 1.67 | Cir | .... | .... | 0.012 | n/a | 452221.07 | 0.47 | .... | .... | .... | 12 | 0.95 | 12 | 0.00 | 0.00 | 0.18 |
| ST-A4 - ST-A3 | 87.394 | 12 | 2.36 | Cir | .... | .... | 0.012 | n/a | 452266.76 | 0.88 | .... | .... | .... | 12 | 0.95 | 12 | 0.00 | 0.00 | 0.18 |

Project File: New.stm | Number of lines: 3 | Date: 8/28/2025

NOTES: ** Critical depth

# MyReport

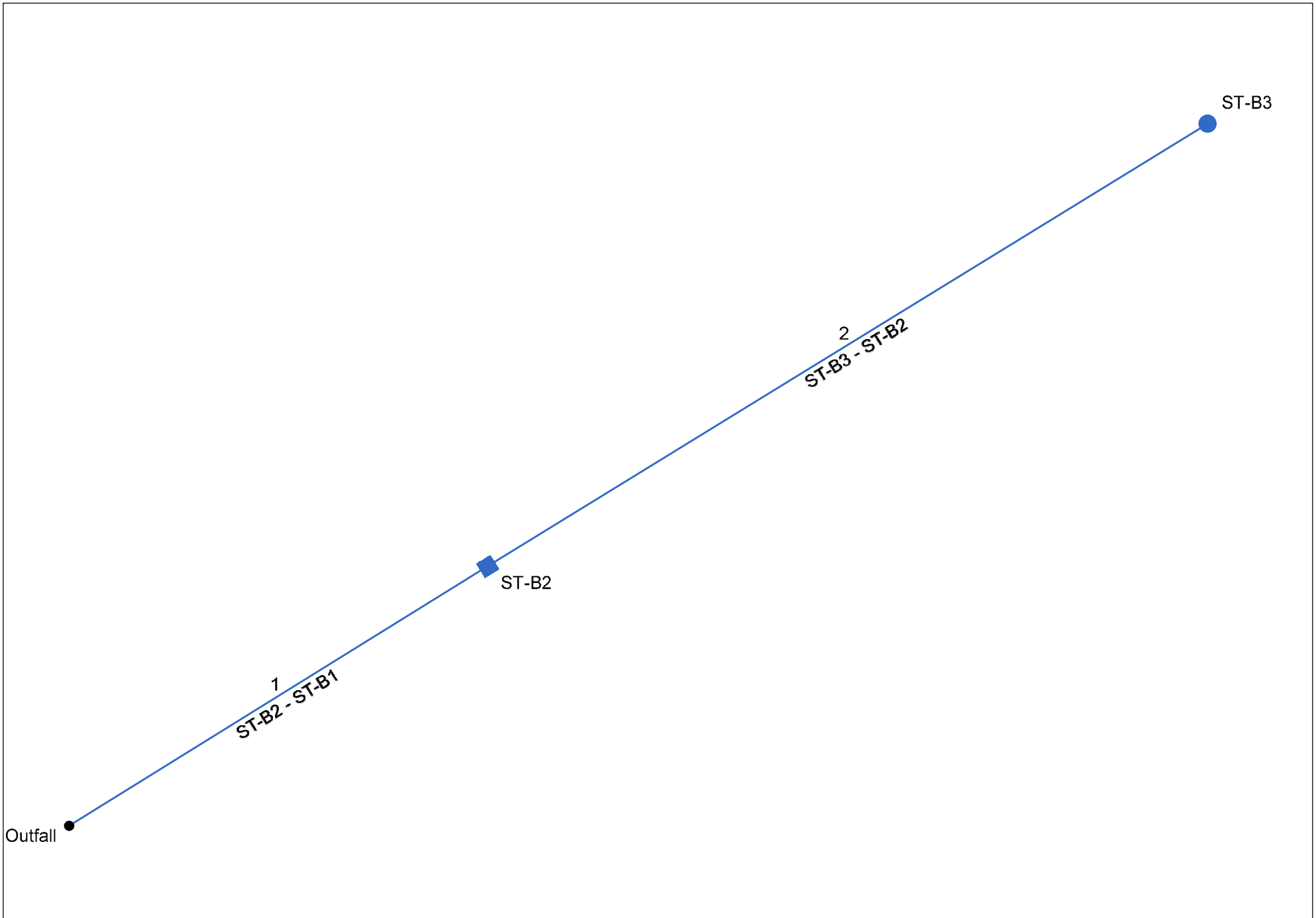


| Tc (min) | Throat Ht (in) | Total Area (ac) | Total CxA | Total Runoff (cfs) | Vel Ave (ft/s) | Vel Dn (ft/s) | Vel Hd Dn (ft) | Vel Hd Up (ft) | Vel Up (ft/s) | Cover Dn (ft) | Cover Up (ft) | Storage (cft) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6.4 | .... | 0.72 | 0.58 | 4.11 | 4.82 | 4.82 | 0.36 | 0.36 | 4.82 | 0.75 | 5.79 | 101.50 | |
| 5.9 | .... | 0.36 | 0.34 | 2.49 | 4.18 | 3.94 | 0.30 | 0.30 | 4.41 | 5.97 | 6.22 | 54.12 | |
| 5.0 | .... | 0.18 | 0.17 | 1.30 | 2.88 | 2.30 | 0.19 | 0.19 | 3.47 | 6.22 | 6.74 | 41.05 | |

Project File: New.stm | Number of lines: 3 | Date: 8/28/2025

NOTES: ** Critical depth

# Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan




| | | |
|---|---|---|
| Project File: New.stm | Number of lines: 2 | Date: 8/7/2025 |

# Storm Sewer Inventory Report

| Line No. | Alignment | | | | Flow Data | | | | Physical Data | | | | | | | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dnstr Line No. | Line Length (ft) | Defl angle (deg) | Junc Type | Known Q (cfs) | Drng Area (ac) | Runoff Coeff (C) | Inlet Time (min) | Invert El Dn (ft) | Line Slope (%) | Invert El Up (ft) | Line Size (in) | Line Shape | N Value (n) | J-Loss Coeff (K) | Inlet/ Rim El (ft) | |
| 1 | End | 120.512 | -31.955 | DrGrt | 0.00 | 0.45 | 0.55 | 5.0 | 611.00 | 8.30 | 621.00 | 15 | Cir | 0.012 | 0.50 | 627.00 | ST-B2 - ST-B1 |
| 2 | 1 | 207.150 | 0.257 | MH | 0.00 | 0.63 | 0.95 | 5.0 | 621.00 | 1.93 | 625.00 | 12 | Cir | 0.012 | 1.00 | 628.83 | ST-B3 - ST-B2 |

Project File: New.stm | Number of lines: 2 | Date: 8/7/2025

# Storm Sewer Summary Report



| Line No. | Line ID | Flow rate (cfs) | Line Size (in) | Line shape | Line length (ft) | Invert EL Dn (ft) | Invert EL Up (ft) | Line Slope (%) | HGL Down (ft) | HGL Up (ft) | Minor loss (ft) | HGL Junct (ft) | Dns Line No. | Junction Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ST-B2 - ST-B1 | 6.24 | 15 | Cir | 120.512 | 611.00 | 621.00 | 8.298 | 612.01 | 622.01 | n/a | 622.01 | End | DropGrate |
| 2 | ST-B3 - ST-B2 | 4.53 | 12 | Cir | 207.150 | 621.00 | 625.00 | 1.931 | 622.01 | 625.89 | n/a | 625.89 j | 1 | Manhole |

Project File: New.stm | Number of lines: 2 | Run Date: 8/7/2025

NOTES: Return period = 10 Yrs. ; j - Line contains hyd. jump.

# MyReport



| Line No. | Area Dn (sqft) | Area Up (sqft) | Byp Ln No | Coeff C1 (C) | Coeff C2 (C) | Coeff C3 (C) | Capac Full (cfs) | Crit Depth (ft) | Cross Sl, Sw (ft/ft) | Cross Sl, Sx (ft/ft) | Curb Len (ft) | Defl Ang (Deg) | Depth Dn (ft) | Depth Up (ft) | DnStm Ln No | Drng Area (ac) | Easting X (ft) | EGL Dn (ft) | EGL Up (ft) | Energy Loss (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.06 | 1.06 | Sag | 0.35 | 0.50 | 0.95 | 20.15 | 1.01 | 0.050 | 0.020 | .... | -31.955 | 1.01 | 1.01** | Outfall | 0.45 | 1616916.40 | 612.55 | 622.55 | 0.000 |
| 2 | 0.74 | 0.74 | 1 | 0.35 | 0.50 | 0.95 | 5.36 | 0.89 | .... | .... | .... | 0.257 | 1.00 | 0.89** | 1 | 0.63 | 1617092.65 | 622.53 | 626.48 | 2.705 |

Project File: New.stm | Number of lines: 2 | Date: 8/7/2025

NOTES: ** Critical depth

# MyReport

| Flow Rate (cfs) | Sf Ave (ft/ft) | Sf Dn (ft/ft) | Grate Area (sqft) | Grate Len (ft) | Grate Width (ft) | Gnd/Rim El Dn (ft) | Gnd/Rim El Up (ft) | Gutter Depth (ft) | Gutter Slope (ft/ft) | Gutter Spread (ft) | Gutter Width (ft) | HGL Dn (ft) | HGL Up (ft) | HGL Jnct (ft) | HGL Jmp Dn (ft) | HGL Jmp Up (ft) | Incr CxA | Incr Q (cfs) | Inlet Depth (ft) | Inlet Eff (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6.24 | 0.000 | 0.000 | 5.06 | 2.53 | 2.00 | 612.78 | 627.00 | 0.38 | Sag | 40.16 | 2.00 | 612.01 | 622.01 | 622.01 | .... | .... | 0.25 | 1.87 | 0.38 | 100 |
| 4.53 | 1.306 | 1.381 | .... | .... | .... | 627.00 | 628.83 | .... | .... | .... | .... | 622.01 | 625.89 j | 625.89 | 622.29 | 622.22 | 0.60 | 4.53 | .... | .... |

Project File: New.stm | Number of lines: 2 | Date: 8/7/2025

NOTES: ** Critical depth

# MyReport



| Inlet ID | Inlet Loc | (ft) | Inlet Time (min) | i Sys (in/hr) | i Inlet (in/hr) | Invert Dn (ft) | Invert Up (ft) | Jump Loc (ft) | Jump Len (ft) | Vel Hd Jmp Dn (ft) | Vel Hd Jmp Up (ft) | J-Loss Coeff | Junct Type | Known Q (cfs) | Cost RCP | Cost CMP | Cost PVC | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-B2 | Sag | | 5.0 | 7.37 | 7.57 | 611.00 | 621.00 | .... | .... | 0.00 | 0.00 | 0.50 z | Dp-Grate | 0.00 | 4,023 | 3,620 | 3,419 | ST-B2 - ST-B1 |
| ST-B3 | Sag | | 5.0 | 7.57 | 7.57 | 621.00 | 625.00 | 20.72 | 4.44 | 0.59 | 0.83 | 1.00 z | MH | 0.00 | 6,277 | 5,649 | 5,335 | ST-B3 - ST-B2 |

Project File: New.stm | Number of lines: 2 | Date: 8/7/2025

NOTES: Intensity = 73.40 / (Inlet time + 12.20) ^ 0.80 -- Return period = 10 Yrs. ; ** Critical depth

# MyReport



| Line Length (ft) | Line Size (in) | Line Slope (%) | Line Type | Local Depr (in) | n-val Gutter | n-val Pipe | Minor Loss (ft) | Northing Y (ft) | Pipe Travel (min) | Q Byp (cfs) | Q Capt (cfs) | Q Carry (cfs) | Line Rise (in) | Runoff Coeff (C) | Line Span (in) | Area A1 (ac) | Area A2 (ac) | Area A3 (ac) | Tc (min) | Throat Ht (in) | Total Area (ac) | Total CxA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 120.512 | 15 | 8.30 | Cir | .... | .... | 0.012 | n/a | 451937.67 | 0.41 | 0.00 | 6.41 | 4.53 | 15 | 0.55 | 15 | 0.30 | 0.00 | 0.15 | 5.6 | .... | 1.08 | 0.85 |
| 207.150 | 12 | 1.93 | Cir | .... | .... | 0.012 | n/a | 452046.51 | 0.60 | .... | .... | .... | 12 | 0.95 | 12 | 0.00 | 0.00 | 0.63 | 5.0 | .... | 0.63 | 0.60 |

Project File: New.stm | Number of lines: 2 | Date: 8/7/2025

NOTES: ** Critical depth

# MyReport

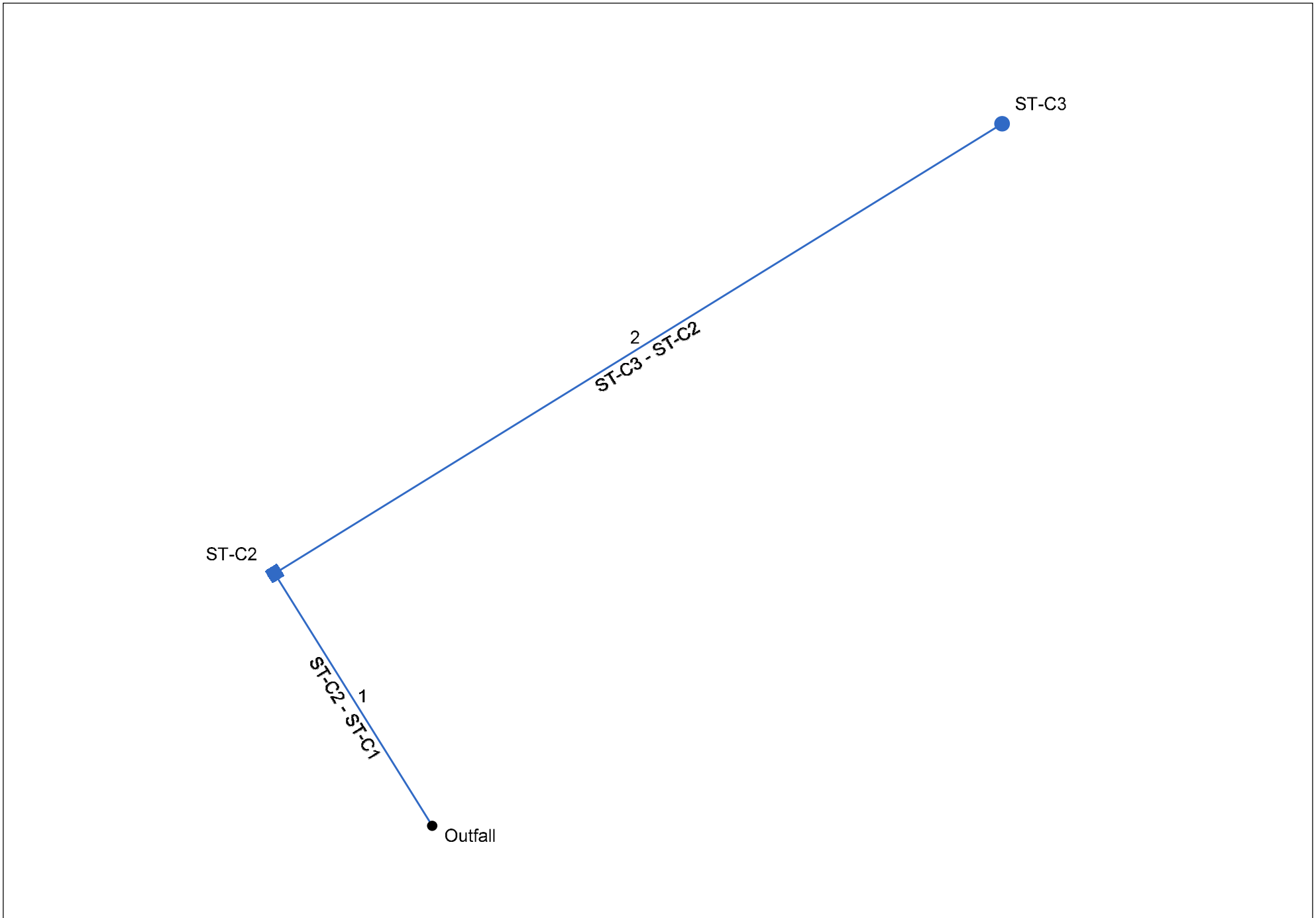


| Total Runoff (cfs) | Vel Ave (ft/s) | Vel Dn (ft/s) | Vel Hd Dn (ft) | Vel Hd Up (ft) | Vel Up (ft/s) | Cover Dn (ft) | Cover Up (ft) | Storage (cft) | |
|---|---|---|---|---|---|---|---|---|---|
| 6.24 | 5.88 | 5.88 | 0.54 | 0.54 | 5.88 | 0.53 | 4.75 | 127.70 | |
| 4.53 | 5.96 | 5.77 | 0.52 | 0.59 | 6.15 | 5.00 | 2.83 | 158.86 | |

Project File: New.stm | Number of lines: 2 | Date: 8/7/2025

NOTES: ** Critical depth

# Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan




| | | |
|---|---|---|
| Project File: New.stm | Number of lines: 2 | Date: 8/7/2025 |

# Storm Sewer Inventory Report

| Line No. | Alignment | | | | Flow Data | | | | Physical Data | | | | | | | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dnstr Line No. | Line Length (ft) | Defl angle (deg) | Junc Type | Known Q (cfs) | Drng Area (ac) | Runoff Coeff (C) | Inlet Time (min) | Invert El Dn (ft) | Line Slope (%) | Invert El Up (ft) | Line Size (in) | Line Shape | N Value (n) | J-Loss Coeff (K) | Inlet/ Rim El (ft) | |
| 1 | End | 87.053 | -121.899 | DrGrt | 0.00 | 0.50 | 0.61 | 5.0 | 617.00 | 4.59 | 621.00 | 15 | Cir | 0.012 | 1.50 | 627.00 | ST-C2 - ST-C1 |
| 2 | 1 | 249.817 | 90.069 | MH | 0.00 | 0.88 | 0.95 | 5.0 | 621.00 | 1.20 | 624.00 | 15 | Cir | 0.012 | 1.00 | 628.67 | ST-C3 - ST-C2 |

Project File: New.stm | Number of lines: 2 | Date: 8/7/2025

# Storm Sewer Summary Report



| Line No. | Line ID | Flow rate (cfs) | Line Size (in) | Line shape | Line length (ft) | Invert EL Dn (ft) | Invert EL Up (ft) | Line Slope (%) | HGL Down (ft) | HGL Up (ft) | Minor loss (ft) | HGL Junct (ft) | Dns Line No. | Junction Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ST-C2 - ST-C1 | 8.33 | 15 | Cir | 87.053 | 617.00 | 621.00 | 4.595 | 618.13 | 622.13 | n/a | 622.13 | End | DropGrate |
| 2 | ST-C3 - ST-C2 | 6.33 | 15 | Cir | 249.817 | 621.00 | 624.00 | 1.201 | 622.13 | 625.01 | n/a | 625.01 j | 1 | Manhole |

Project File: New.stm | Number of lines: 2 | Run Date: 8/7/2025

NOTES: Return period = 10 Yrs. ; j - Line contains hyd. jump.

# MyReport



| Line No. | Area Dn (sqft) | Area Up (sqft) | Byp Ln No | Coeff C1 (C) | Coeff C2 (C) | Coeff C3 (C) | Capac Full (cfs) | Crit Depth (ft) | Cross Sl, Sw (ft/ft) | Cross Sl, Sx (ft/ft) | Curb Len (ft) | Defl Ang (Deg) | Depth Dn (ft) | Depth Up (ft) | DnStm Ln No | Drng Area (ac) | Easting X (ft) | EGL Dn (ft) | EGL Up (ft) | Energy Loss (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.17 | 1.17 | Sag | 0.35 | 0.50 | 0.95 | 15.00 | 1.13 | 0.050 | 0.020 | .... | -121.899 | 1.13 | 1.13** | Outfall | 0.50 | 1617138.53 | 618.92 | 622.92 | 0.000 |
| 2 | 1.07 | 1.07 | 1 | 0.35 | 0.50 | 0.95 | 7.67 | 1.01 | .... | .... | .... | 90.069 | 1.13 | 1.01** | 1 | 0.88 | 1617350.78 | 622.68 | 625.56 | 0.000 |

Project File: New.stm | Number of lines: 2 | Date: 8/7/2025

NOTES: ** Critical depth

# MyReport



| Flow Rate (cfs) | Sf Ave (ft/ft) | Sf Dn (ft/ft) | Grate Area (sqft) | Grate Len (ft) | Grate Width (ft) | Gnd/Rim El Dn (ft) | Gnd/Rim El Up (ft) | Gutter Depth (ft) | Gutter Slope (ft/ft) | Gutter Spread (ft) | Gutter Width (ft) | HGL Dn (ft) | HGL Up (ft) | HGL Jnct (ft) | HGL Jmp Dn (ft) | HGL Jmp Up (ft) | Incr CxA | Incr Q (cfs) | Inlet Depth (ft) | Inlet Eff (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8.33 | 0.000 | 0.000 | 5.06 | 2.53 | 2.00 | 619.78 | 627.00 | 0.47 | Sag | 48.58 | 2.00 | 618.13 | 622.13 | 622.13 | .... | .... | 0.31 | 2.31 | 0.47 | 100 |
| 6.33 | 0.000 | 0.000 | .... | .... | .... | 627.00 | 628.67 | .... | .... | .... | .... | 622.13 | 625.01 j | 625.01 | 622.31 | 622.24 | 0.84 | 6.33 | .... | .... |

Project File: New.stm | Number of lines: 2 | Date: 8/7/2025

NOTES: ** Critical depth

# MyReport



| Inlet ID | Inlet Loc | (ft) | Inlet Time (min) | i Sys (in/hr) | i Inlet (in/hr) | Invert Dn (ft) | Invert Up (ft) | Jump Loc (ft) | Jump Len (ft) | Vel Hd Jmp Dn (ft) | Vel Hd Jmp Up (ft) | J-Loss Coeff | Junct Type | Known Q (cfs) | Cost RCP | Cost CMP | Cost PVC | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-C2 | Sag | | 5.0 | 7.30 | 7.57 | 617.00 | 621.00 | .... | .... | 0.00 | 0.00 | 1.50 z | Dp-Grate | 0.00 | 3,003 | 2,702 | 2,552 | ST-C2 - ST-C1 |
| ST-C3 | Sag | | 5.0 | 7.57 | 7.57 | 621.00 | 624.00 | 24.98 | 5.07 | 0.55 | 0.74 | 1.00 z | MH | 0.00 | 8,853 | 7,967 | 7,525 | ST-C3 - ST-C2 |

Project File: New.stm | Number of lines: 2 | Date: 8/7/2025

NOTES: Intensity = 73.40 / (Inlet time + 12.20) ^ 0.80 -- Return period = 10 Yrs. ; ** Critical depth

# MyReport



| Line Length (ft) | Line Size (in) | Line Slope (%) | Line Type | Local Depr (in) | n-val Gutter | n-val Pipe | Minor Loss (ft) | Northing Y (ft) | Pipe Travel (min) | Q Byp (cfs) | Q Capt (cfs) | Q Carry (cfs) | Line Rise (in) | Runoff Coeff (C) | Line Span (in) | Area A1 (ac) | Area A2 (ac) | Area A3 (ac) | Tc (min) | Throat Ht (in) | Total Area (ac) | Total CxA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 87.053 | 15 | 4.59 | Cir | .... | .... | 0.012 | n/a | 452067.88 | 0.22 | 0.00 | 8.64 | 6.33 | 15 | 0.61 | 15 | 0.28 | 0.00 | 0.22 | 5.8 | .... | 1.38 | 1.14 |
| 249.817 | 15 | 1.20 | Cir | .... | .... | 0.012 | n/a | 452199.64 | 0.81 | .... | .... | .... | 15 | 0.95 | 15 | 0.00 | 0.00 | 0.88 | 5.0 | .... | 0.88 | 0.84 |

Project File: New.stm | Number of lines: 2 | Date: 8/7/2025

NOTES: ** Critical depth

# MyReport

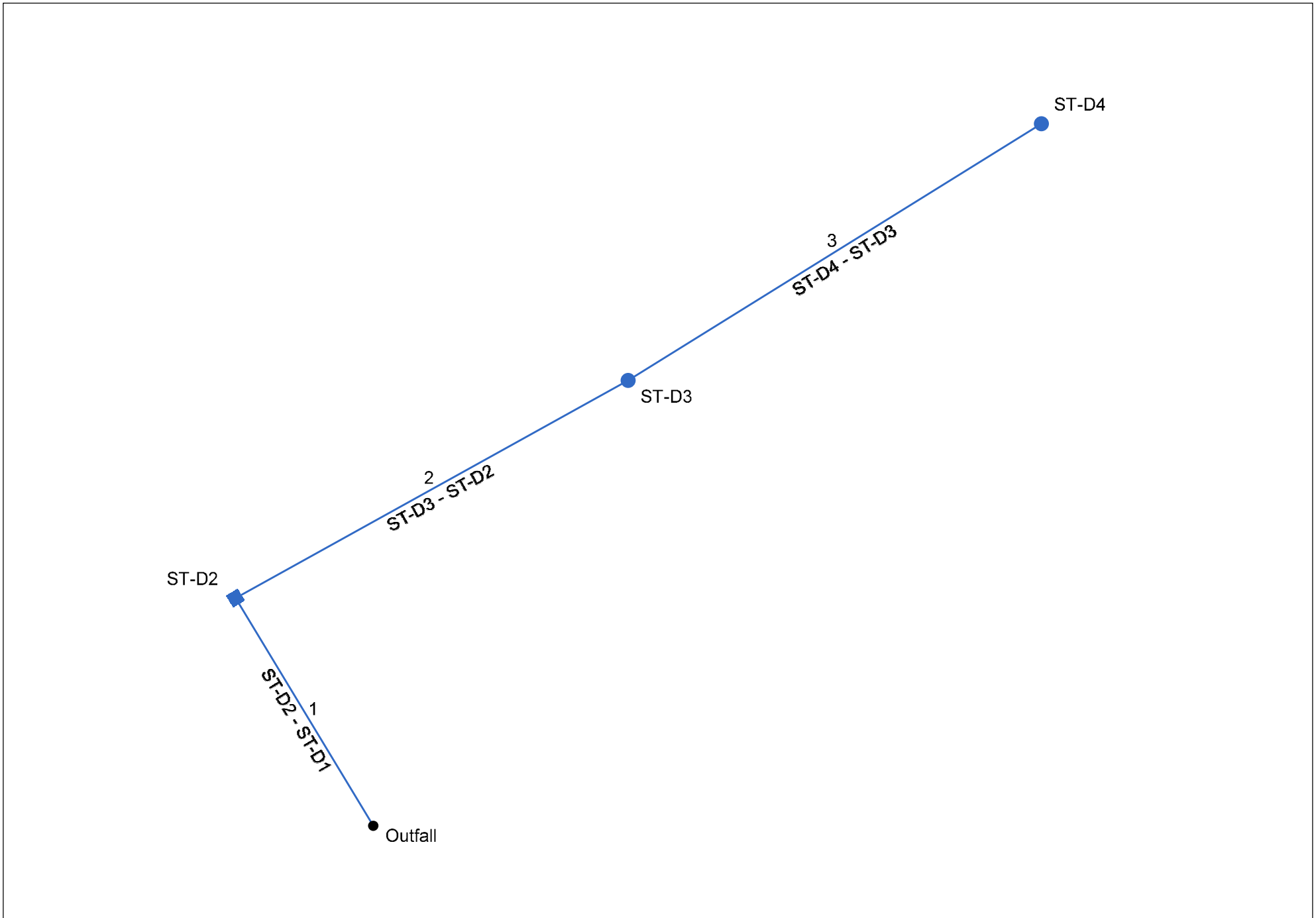


| Total Runoff (cfs) | Vel Ave (ft/s) | Vel Dn (ft/s) | Vel Hd Dn (ft) | Vel Hd Up (ft) | Vel Up (ft/s) | Cover Dn (ft) | Cover Up (ft) | Storage (cft) |
|---|---|---|---|---|---|---|---|---|
| 8.33 | 7.14 | 7.14 | 0.79 | 0.79 | 7.14 | 1.53 | 4.75 | 101.54 |
| 6.33 | 5.68 | 5.43 | 0.55 | 0.55 | 5.94 | 4.75 | 3.42 | 279.49 |

Project File: New.stm | Number of lines: 2 | Date: 8/7/2025

NOTES: ** Critical depth

# Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan




| Project File: New.stm | Number of lines: 3 | Date: 8/7/2025 |
|---|---|---|

# Storm Sewer Inventory Report

| Line No. | Alignment | | | | Flow Data | | | | Physical Data | | | | | | | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dnstr Line No. | Line Length (ft) | Defl angle (deg) | Junc Type | Known Q (cfs) | Drng Area (ac) | Runoff Coeff (C) | Inlet Time (min) | Invert El Dn (ft) | Line Slope (%) | Invert El Up (ft) | Line Size (in) | Line Shape | N Value (n) | J-Loss Coeff (K) | Inlet/ Rim El (ft) | |
| 1 | End | 81.446 | -121.043 | DrGrt | 0.00 | 0.30 | 0.65 | 5.0 | 619.00 | 3.68 | 622.00 | 18 | Cir | 0.012 | 1.50 | 628.00 | ST-D2 - ST-D1 |
| 2 | 1 | 137.097 | 91.907 | MH | 0.00 | 0.43 | 0.95 | 5.0 | 622.00 | 0.73 | 623.00 | 18 | Cir | 0.012 | 0.15 | 629.35 | ST-D3 - ST-D2 |
| 3 | 2 | 148.658 | -2.824 | MH | 0.00 | 0.62 | 0.95 | 5.0 | 623.00 | 0.67 | 624.00 | 15 | Cir | 0.012 | 1.00 | 629.15 | ST-D4 - ST-D3 |

Project File: New.stm | Number of lines: 3 | Date: 8/7/2025

# Storm Sewer Summary Report



| Line No. | Line ID | Flow rate (cfs) | Line Size (in) | Line shape | Line length (ft) | Invert EL Dn (ft) | Invert EL Up (ft) | Line Slope (%) | HGL Down (ft) | HGL Up (ft) | Minor loss (ft) | HGL Junct (ft) | Dns Line No. | Junction Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ST-D2 - ST-D1 | 8.55 | 18 | Cir | 81.446 | 619.00 | 622.00 | 3.683 | 620.13 | 623.13 | n/a | 623.13 | End | DropGrate |
| 2 | ST-D3 - ST-D2 | 7.33 | 18 | Cir | 137.097 | 622.00 | 623.00 | 0.729 | 623.13 | 624.05 | n/a | 624.05 j | 1 | Manhole |
| 3 | ST-D4 - ST-D3 | 4.46 | 15 | Cir | 148.658 | 623.00 | 624.00 | 0.673 | 624.05 | 624.86 | n/a | 624.86 j | 2 | Manhole |

Project File: New.stm | Number of lines: 3 | Run Date: 8/7/2025

NOTES: Return period = 10 Yrs. ; j - Line contains hyd. jump.

# MyReport



| Line No. | Area Dn (sqft) | Area Up (sqft) | Byp Ln No | Coeff C1 (C) | Coeff C2 (C) | Coeff C3 (C) | Capac Full (cfs) | Crit Depth (ft) | Cross Sl, Sw (ft/ft) | Cross Sl, Sx (ft/ft) | Curb Len (ft) | Defl Ang (Deg) | Depth Dn (ft) | Depth Up (ft) | DnStm Ln No | Drng Area (ac) | Easting X (ft) | EGL Dn (ft) | EGL Up (ft) | Energy Loss (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.43 | 1.43 | Sag | 0.35 | 0.50 | 0.95 | 21.83 | 1.13 | 0.050 | 0.020 | .... | -121.043 | 1.13 | 1.13** | Outfall | 0.30 | 1617391.90 | 620.69 | 623.69 | 0.000 |
| 2 | 1.32 | 1.32 | 1 | 0.35 | 0.50 | 0.95 | 9.72 | 1.05 | .... | .... | .... | 91.907 | 1.13 | 1.05** | 1 | 0.43 | 1617511.65 | 623.61 | 624.53 | 0.000 |
| 3 | 0.89 | 0.89 | 2 | 0.35 | 0.50 | 0.95 | 5.74 | 0.86 | .... | .... | .... | -2.824 | 1.05 | 0.86** | 2 | 0.62 | 1617637.78 | 624.43 | 625.24 | 0.000 |

Project File: New.stm | Number of lines: 3 | Date: 8/7/2025

NOTES: ** Critical depth

# MyReport

| Flow Rate (cfs) | Sf Ave (ft/ft) | Sf Dn (ft/ft) | Grate Area (sqft) | Grate Len (ft) | Grate Width (ft) | Gnd/Rim El Dn (ft) | Gnd/Rim El Up (ft) | Gutter Depth (ft) | Gutter Slope (ft/ft) | Gutter Spread (ft) | Gutter Width (ft) | HGL Dn (ft) | HGL Up (ft) | HGL Jnct (ft) | HGL Jmp Dn (ft) | HGL Jmp Up (ft) | Incr CxA | Incr Q (cfs) | Inlet Depth (ft) | Inlet Eff (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8.55 | 0.000 | 0.000 | 5.06 | 2.53 | 2.00 | 621.03 | 628.00 | 0.48 | Sag | 49.98 | 2.00 | 620.13 | 623.13 | 623.13 | .... | .... | 0.20 | 1.48 | 0.48 | 100 |
| 7.33 | 0.000 | 0.000 | .... | .... | .... | 628.00 | 629.35 | .... | .... | .... | .... | 623.13 | 624.05 j | 624.05 | 623.15 | 623.12 | 0.41 | 3.09 | .... | .... |
| 4.46 | 0.000 | 0.000 | .... | .... | .... | 629.35 | 629.15 | .... | .... | .... | .... | 624.05 | 624.86 j | 624.86 | 624.66 | 624.66 | 0.59 | 4.46 | .... | .... |

Project File: New.stm | Number of lines: 3 | Date: 8/7/2025

NOTES: ** Critical depth

# MyReport

| Inlet ID | Inlet Loc | (ft) | Inlet Time (min) | i Sys (in/hr) | i Inlet (in/hr) | Invert Dn (ft) | Invert Up (ft) | Jump Loc (ft) | Jump Len (ft) | Vel Hd Jmp Dn (ft) | Vel Hd Jmp Up (ft) | J-Loss Coeff | Junct Type | Known Q (cfs) | Cost RCP | Cost CMP | Cost PVC | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-D2 | Sag | | 5.0 | 7.17 | 7.57 | 619.00 | 622.00 | .... | .... | 0.00 | 0.00 | 1.50 z | Dp-Grate | 0.00 | 3,040 | 2,736 | 2,584 | ST-D2 - ST-D1 |
| ST-D3 | Sag | | 5.0 | 7.34 | 7.57 | 622.00 | 623.00 | 13.71 | 5.25 | 0.48 | 0.56 | 0.15 z | MH | 0.00 | 6,295 | 5,666 | 5,351 | ST-D3 - ST-D2 |
| ST-D4 | Sag | | 5.0 | 7.57 | 7.57 | 623.00 | 624.00 | 118.93 | 4.29 | 0.38 | 0.41 | 1.00 z | MH | 0.00 | 5,533 | 4,979 | 4,703 | ST-D4 - ST-D3 |

Project File: New.stm | Number of lines: 3 | Date: 8/7/2025

NOTES: Intensity = 73.40 / (Inlet time + 12.20) ^ 0.80 -- Return period = 10 Yrs. ; ** Critical depth

# MyReport



| Line Length (ft) | Line Size (in) | Line Slope (%) | Line Type | Local Depr (in) | n-val Gutter | n-val Pipe | Minor Loss (ft) | Northing Y (ft) | Pipe Travel (min) | Q Byp (cfs) | Q Capt (cfs) | Q Carry (cfs) | Line Rise (in) | Runoff Coeff (C) | Line Span (in) | Area A1 (ac) | Area A2 (ac) | Area A3 (ac) | Tc (min) | Throat Ht (in) | Total Area (ac) | Total CxA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 81.446 | 18 | 3.68 | Cir | .... | .... | 0.012 | n/a | 452221.39 | 0.28 | 0.00 | 9.03 | 7.56 | 18 | 0.65 | 18 | 0.15 | 0.00 | 0.15 | 6.2 | .... | 1.35 | 1.19 |
| 137.097 | 18 | 0.73 | Cir | .... | .... | 0.012 | n/a | 452288.14 | 0.55 | .... | .... | .... | 18 | 0.95 | 18 | 0.00 | 0.00 | 0.43 | 5.7 | .... | 1.05 | 1.00 |
| 148.658 | 15 | 0.67 | Cir | .... | .... | 0.012 | n/a | 452366.82 | 0.68 | .... | .... | .... | 15 | 0.95 | 15 | 0.00 | 0.00 | 0.62 | 5.0 | .... | 0.62 | 0.59 |

Project File: New.stm | Number of lines: 3 | Date: 8/7/2025

NOTES: ** Critical depth

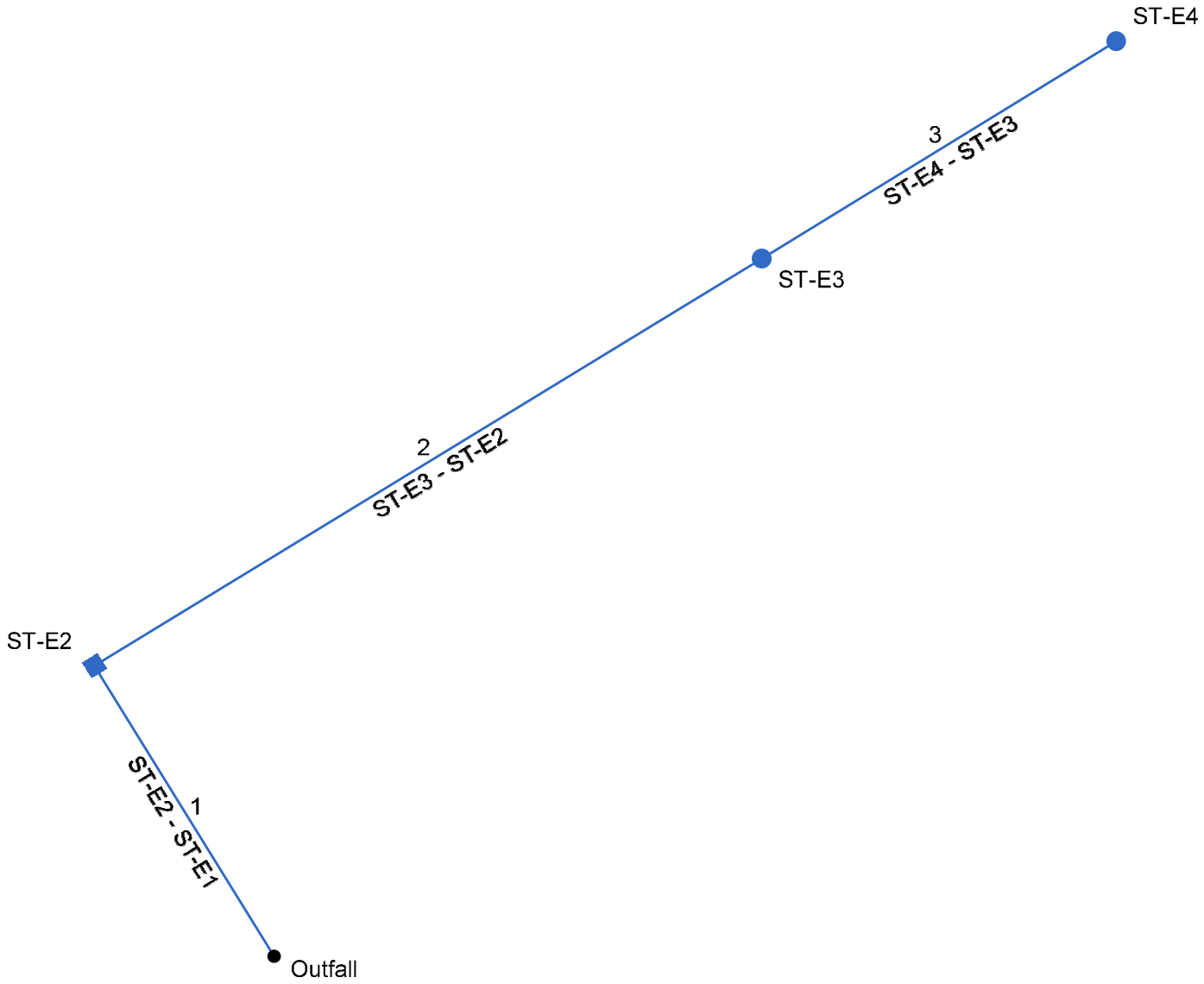
# MyReport

| Total Runoff (cfs) | Vel Ave (ft/s) | Vel Dn (ft/s) | Vel Hd Dn (ft) | Vel Hd Up (ft) | Vel Up (ft/s) | Cover Dn (ft) | Cover Up (ft) | Storage (cft) |
|---|---|---|---|---|---|---|---|---|
| 8.55 | 5.98 | 5.98 | 0.56 | 0.56 | 5.98 | 0.53 | 4.50 | 116.43 |
| 7.33 | 5.34 | 5.12 | 0.48 | 0.48 | 5.56 | 4.50 | 4.85 | 188.39 |
| 4.46 | 4.53 | 4.06 | 0.39 | 0.39 | 4.99 | 5.10 | 3.90 | 148.68 |

Project File: New.stm | Number of lines: 3 | Date: 8/7/2025

NOTES: ** Critical depth

# Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan




| Project File: New.stm | Number of lines: 3 | Date: 8/7/2025 |
|---|---|---|

# Storm Sewer Inventory Report



| Line No. | Alignment | | | | Flow Data | | | | Physical Data | | | | | | | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dnstr Line No. | Line Length (ft) | Defl angle (deg) | Junc Type | Known Q (cfs) | Drng Area (ac) | Runoff Coeff (C) | Inlet Time (min) | Invert El Dn (ft) | Line Slope (%) | Invert El Up (ft) | Line Size (in) | Line Shape | N Value (n) | J-Loss Coeff (K) | Inlet/ Rim El (ft) | |
| 1 | End | 79.131 | -121.631 | DrGrt | 0.00 | 0.30 | 0.53 | 5.0 | 621.00 | 1.26 | 622.00 | 18 | Cir | 0.012 | 1.50 | 628.00 | ST-E2 - ST-E1 |
| 2 | 1 | 180.741 | 90.142 | MH | 0.00 | 0.58 | 0.95 | 5.0 | 622.00 | 1.11 | 624.00 | 15 | Cir | 0.012 | 0.15 | 628.97 | ST-E3 - ST-E2 |
| 3 | 2 | 96.148 | -0.130 | MH | 0.00 | 0.34 | 0.95 | 5.0 | 624.00 | 1.04 | 625.00 | 12 | Cir | 0.012 | 1.00 | 628.00 | ST-E4 - ST-E3 |

Project File: New.stm | Number of lines: 3 | Date: 8/7/2025

# Storm Sewer Summary Report



| Line No. | Line ID | Flow rate (cfs) | Line Size (in) | Line shape | Line length (ft) | Invert EL Dn (ft) | Invert EL Up (ft) | Line Slope (%) | HGL Down (ft) | HGL Up (ft) | Minor loss (ft) | HGL Junct (ft) | Dns Line No. | Junction Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ST-E2 - ST-E1 | 7.45 | 18 | Cir | 79.131 | 621.00 | 622.00 | 1.264 | 622.06 | 623.06 | n/a | 623.06 | End | DropGrate |
| 2 | ST-E3 - ST-E2 | 6.47 | 15 | Cir | 180.741 | 622.00 | 624.00 | 1.107 | 623.06 | 625.02 | n/a | 625.02 j | 1 | Manhole |
| 3 | ST-E4 - ST-E3 | 2.45 | 12 | Cir | 96.148 | 624.00 | 625.00 | 1.040 | 625.02 | 625.67 | n/a | 625.67 j | 2 | Manhole |

Project File: New.stm | Number of lines: 3 | Run Date: 8/7/2025

NOTES: Return period = 10 Yrs. ; j - Line contains hyd. jump.

# MyReport



| Line No. | Area Dn (sqft) | Area Up (sqft) | Byp Ln No | Coeff C1 (C) | Coeff C2 (C) | Coeff C3 (C) | Capac Full (cfs) | Crit Depth (ft) | Cross Sl, Sw (ft/ft) | Cross Sl, Sx (ft/ft) | Curb Len (ft) | Defl Ang (Deg) | Depth Dn (ft) | Depth Up (ft) | DnStm Ln No | Drng Area (ac) | Easting X (ft) | EGL Dn (ft) | EGL Up (ft) | Energy Loss (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.33 | 1.33 | Sag | 0.35 | 0.50 | 0.95 | 12.79 | 1.06 | 0.050 | 0.020 | .... | -121.631 | 1.06 | 1.06** | Outfall | 0.30 | 1617646.53 | 622.54 | 623.54 | 0.000 |
| 2 | 1.08 | 1.08 | 1 | 0.35 | 0.50 | 0.95 | 7.36 | 1.02 | .... | .... | .... | 90.142 | 1.06 | 1.02** | 1 | 0.58 | 1617800.65 | 623.62 | 625.59 | 0.000 |
| 3 | 0.56 | 0.56 | 2 | 0.35 | 0.50 | 0.95 | 3.93 | 0.67 | .... | .... | .... | -0.130 | 1.00 | 0.67** | 2 | 0.34 | 1617882.53 | 625.17 | 625.97 | 0.505 |

Project File: New.stm | Number of lines: 3 | Date: 8/7/2025

NOTES: ** Critical depth

# MyReport

| Flow Rate (cfs) | Sf Ave (ft/ft) | Sf Dn (ft/ft) | Grate Area (sqft) | Grate Len (ft) | Grate Width (ft) | Gnd/Rim El Dn (ft) | Gnd/Rim El Up (ft) | Gutter Depth (ft) | Gutter Slope (ft/ft) | Gutter Spread (ft) | Gutter Width (ft) | HGL Dn (ft) | HGL Up (ft) | HGL Jnct (ft) | HGL Jmp Dn (ft) | HGL Jmp Up (ft) | Incr CxA | Incr Q (cfs) | Inlet Depth (ft) | Inlet Eff (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7.45 | 0.000 | 0.000 | 5.06 | 2.53 | 2.00 | 623.60 | 628.00 | 0.44 | Sag | 45.59 | 2.00 | 622.06 | 623.06 | 623.06 | .... | .... | 0.16 | 1.20 | 0.44 | 100 |
| 6.47 | 0.000 | 0.000 | .... | .... | .... | 628.00 | 628.97 | .... | .... | .... | .... | 623.06 | 625.02 j | 625.02 | 623.23 | 623.18 | 0.55 | 4.17 | .... | .... |
| 2.45 | 0.525 | 0.402 | .... | .... | .... | 628.97 | 628.00 | .... | .... | .... | .... | 625.02 | 625.67 j | 625.67 | 625.07 | 624.82 | 0.32 | 2.45 | .... | .... |

Project File: New.stm | Number of lines: 3 | Date: 8/7/2025

NOTES: ** Critical depth

# MyReport

| Inlet ID | Inlet Loc | (ft) | Inlet Time (min) | i Sys (in/hr) | i Inlet (in/hr) | Invert Dn (ft) | Invert Up (ft) | Jump Loc (ft) | Jump Len (ft) | Vel Hd Jmp Dn (ft) | Vel Hd Jmp Up (ft) | J-Loss Coeff | Junct Type | Known Q (cfs) | Cost RCP | Cost CMP | Cost PVC | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-E2 | Sag | | 5.0 | 7.21 | 7.57 | 621.00 | 622.00 | .... | .... | 0.00 | 0.00 | 1.50 z | Dp-Grate | 0.00 | 3,020 | 2,718 | 2,567 | ST-E2 - ST-E1 |
| ST-E3 | Sag | | 5.0 | 7.40 | 7.57 | 622.00 | 624.00 | 18.07 | 5.13 | 0.56 | 0.69 | 0.15 z | MH | 0.00 | 6,438 | 5,794 | 5,472 | ST-E3 - ST-E2 |
| ST-E4 | Sag | | 5.0 | 7.57 | 7.57 | 624.00 | 625.00 | 19.23 | 4.34 | 0.18 | 0.43 | 1.00 z | MH | 0.00 | 2,882 | 2,594 | 2,450 | ST-E4 - ST-E3 |

Project File: New.stm | Number of lines: 3 | Date: 8/7/2025

NOTES: Intensity = 73.40 / (Inlet time + 12.20) ^ 0.80 -- Return period = 10 Yrs. ; ** Critical depth

# MyReport



| Line Length (ft) | Line Size (in) | Line Slope (%) | Line Type | Local Depr (in) | n-val Gutter | n-val Pipe | Minor Loss (ft) | Northing Y (ft) | Pipe Travel (min) | Q Byp (cfs) | Q Capt (cfs) | Q Carry (cfs) | Line Rise (in) | Runoff Coeff (C) | Line Span (in) | Area A1 (ac) | Area A2 (ac) | Area A3 (ac) | Tc (min) | Throat Ht (in) | Total Area (ac) | Total CxA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 79.131 | 18 | 1.26 | Cir | .... | .... | 0.012 | n/a | 452383.95 | 0.32 | 0.00 | 7.82 | 6.62 | 18 | 0.53 | 18 | 0.21 | 0.00 | 0.09 | 6.1 | .... | 1.22 | 1.03 |
| 180.741 | 15 | 1.11 | Cir | .... | .... | 0.012 | n/a | 452478.35 | 0.57 | .... | .... | .... | 15 | 0.95 | 15 | 0.00 | 0.00 | 0.58 | 5.5 | .... | 0.92 | 0.87 |
| 96.148 | 12 | 1.04 | Cir | .... | .... | 0.012 | n/a | 452528.76 | 0.51 | .... | .... | .... | 12 | 0.95 | 12 | 0.00 | 0.00 | 0.34 | 5.0 | .... | 0.34 | 0.32 |

Project File: New.stm | Number of lines: 3 | Date: 8/7/2025

NOTES: ** Critical depth

# MyReport

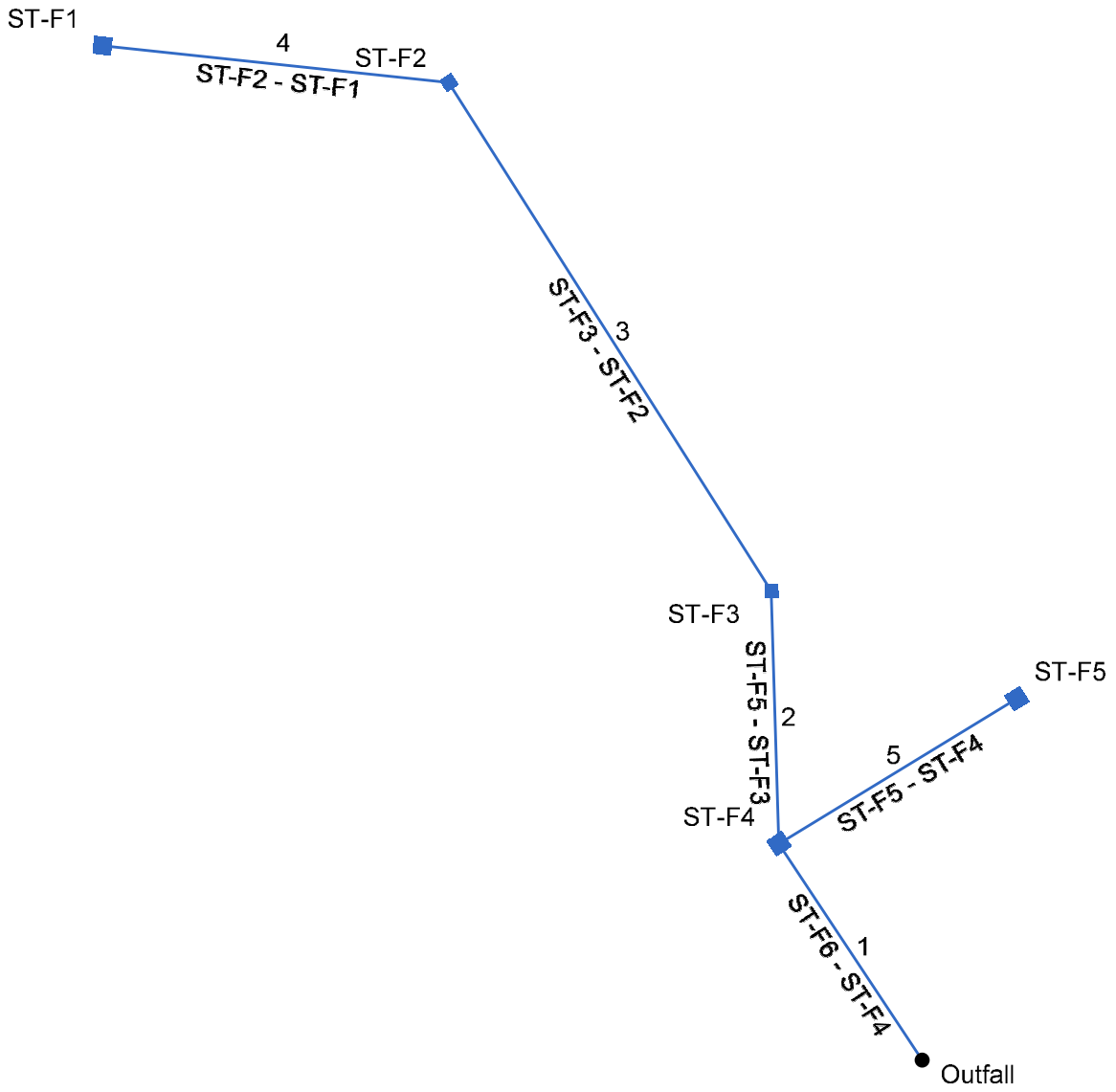


| Total Runoff (cfs) | Vel Ave (ft/s) | Vel Dn (ft/s) | Vel Hd Dn (ft) | Vel Hd Up (ft) | Vel Up (ft/s) | Cover Dn (ft) | Cover Up (ft) | Storage (cft) |
|---|---|---|---|---|---|---|---|---|
| 7.45 | 5.60 | 5.60 | 0.49 | 0.49 | 5.60 | 1.10 | 4.50 | 105.26 |
| 6.47 | 5.93 | 5.84 | 0.56 | 0.56 | 6.01 | 4.75 | 3.72 | 197.24 |
| 2.45 | 3.75 | 3.12 | 0.15 | 0.30 | 4.38 | 3.97 | 2.00 | 66.98 |

Project File: New.stm | Number of lines: 3 | Date: 8/7/2025

NOTES: ** Critical depth

# Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan




| Project File: New.stm | Number of lines: 5 | Date: 8/7/2025 |
|---|---|---|

# Storm Sewer Inventory Report



| Line No. | Alignment | | | | Flow Data | | | | Physical Data | | | | | | | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dnstr Line No. | Line Length (ft) | Defl angle (deg) | Junc Type | Known Q (cfs) | Drng Area (ac) | Runoff Coeff (C) | Inlet Time (min) | Invert El Dn (ft) | Line Slope (%) | Invert El Up (ft) | Line Size (in) | Line Shape | N Value (n) | J-Loss Coeff (K) | Inlet/ Rim El (ft) | |
| 1 | End | 59.180 | -123.455 | DrGrt | 0.00 | 0.23 | 0.56 | 5.0 | 624.00 | 0.52 | 624.31 | 24 | Cir | 0.012 | 1.50 | 628.00 | ST-F6 - ST-F4 |
| 2 | 1 | 57.777 | 31.719 | DrGrt | 0.00 | 0.63 | 0.70 | 5.0 | 624.31 | 0.50 | 624.60 | 21 | Cir | 0.012 | 0.84 | 628.20 | ST-F5 - ST-F3 |
| 3 | 2 | 137.271 | -30.514 | DrGrt | 0.00 | 0.61 | 0.74 | 5.0 | 624.60 | 0.51 | 625.30 | 18 | Cir | 0.012 | 1.23 | 628.50 | ST-F3 - ST-F2 |
| 4 | 3 | 79.073 | -51.647 | DrGrt | 0.00 | 0.60 | 0.49 | 5.0 | 625.30 | 0.51 | 625.70 | 15 | Cir | 0.012 | 1.00 | 628.00 | ST-F2 - ST-F1 |
| 5 | 1 | 63.350 | 91.929 | Curb | 0.00 | 0.45 | 0.72 | 5.0 | 624.31 | 1.88 | 625.50 | 15 | Cir | 0.012 | 1.00 | 630.19 | ST-F5 - ST-F4 |

Project File: New.stm | Number of lines: 5 | Date: 8/7/2025

# Storm Sewer Summary Report



| Line No. | Line ID | Flow rate (cfs) | Line Size (in) | Line shape | Line length (ft) | Invert EL Dn (ft) | Invert EL Up (ft) | Line Slope (%) | HGL Down (ft) | HGL Up (ft) | Minor loss (ft) | HGL Junct (ft) | Dns Line No. | Junction Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ST-F6 - ST-F4 | 11.50 | 24 | Cir | 59.180 | 624.00 | 624.31 | 0.524 | 625.22 | 625.53 | n/a | 625.53 | End | DropGrate |
| 2 | ST-F5 - ST-F3 | 8.42 | 21 | Cir | 57.777 | 624.31 | 624.60 | 0.502 | 625.53 | 625.68 | n/a | 625.68 | 1 | DropGrate |
| 3 | ST-F3 - ST-F2 | 5.46 | 18 | Cir | 137.271 | 624.60 | 625.30 | 0.510 | 625.68 | 626.20 | n/a | 626.20 j | 2 | DropGrate |
| 4 | ST-F2 - ST-F1 | 2.23 | 15 | Cir | 79.073 | 625.30 | 625.70 | 0.506 | 626.20 | 626.30 | n/a | 626.30 j | 3 | DropGrate |
| 5 | ST-F5 - ST-F4 | 2.45 | 15 | Cir | 63.350 | 624.31 | 625.50 | 1.878 | 625.53 | 626.13 | n/a | 626.13 j | 1 | Curb-Horiz |

Project File: New.stm | Number of lines: 5 | Run Date: 8/7/2025

NOTES: Return period = 10 Yrs. ; j - Line contains hyd. jump.

# MyReport



| Line No. | Area Dn (sqft) | Area Up (sqft) | Byp Ln No | Coeff C1 (C) | Coeff C2 (C) | Coeff C3 (C) | Capac Full (cfs) | Crit Depth (ft) | Cross Sl, Sw (ft/ft) | Cross Sl, Sx (ft/ft) | Curb Len (ft) | Defl Ang (Deg) | Depth Dn (ft) | Depth Up (ft) | DnStm Ln No | Drng Area (ac) | Easting X (ft) | EGL Dn (ft) | EGL Up (ft) | Energy Loss (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.00 | 2.00 | Sag | 0.35 | 0.50 | 0.95 | 17.73 | 1.22 | 0.050 | 0.020 | .... | -123.455 | 1.22 | 1.22** | Outfall | 0.23 | 1617916.90 | 625.73 | 626.04 | 0.000 |
| 2 | 1.55 | 1.55 | 1 | 0.35 | 0.50 | 0.95 | 12.16 | 1.08 | 0.050 | 0.020 | .... | 31.719 | 1.22 | 1.08** | 1 | 0.63 | 1617915.15 | 625.98 | 626.13 | 0.000 |
| 3 | 1.11 | 1.11 | 2 | 0.35 | 0.50 | 0.95 | 8.12 | 0.90 | 0.050 | 0.020 | .... | -30.514 | 1.08 | 0.90** | 2 | 0.61 | 1617841.90 | 625.93 | 626.58 | 0.562 |
| 4 | 0.58 | 0.58 | 3 | 0.35 | 0.50 | 0.95 | 4.98 | 0.60 | 0.020 | 0.020 | .... | -51.647 | 0.90 | 0.60** | 3 | 0.60 | 1617763.28 | 626.43 | 626.53 | 0.000 |
| 5 | 0.62 | 0.62 | 1 | 0.35 | 0.50 | 0.95 | 9.59 | 0.63 | 0.050 | 0.020 | 4.25 | 91.929 | 1.22 | 0.63** | 1 | 0.45 | 1617970.90 | 625.77 | 626.37 | 0.000 |

Project File: New.stm | Number of lines: 5 | Date: 8/7/2025

NOTES: ** Critical depth

# MyReport

| Flow Rate (cfs) | Sf Ave (ft/ft) | Sf Dn (ft/ft) | Grate Area (sqft) | Grate Len (ft) | Grate Width (ft) | Gnd/Rim El Dn (ft) | Gnd/Rim El Up (ft) | Gutter Depth (ft) | Gutter Slope (ft/ft) | Gutter Spread (ft) | Gutter Width (ft) | HGL Dn (ft) | HGL Up (ft) | HGL Jnct (ft) | HGL Jmp Dn (ft) | HGL Jmp Up (ft) | Incr CxA | Incr Q (cfs) | Inlet Depth (ft) | Inlet Eff (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11.50 | 0.000 | 0.000 | 5.06 | 2.53 | 2.00 | 626.81 | 628.00 | 0.11 | Sag | 12.87 | 2.00 | 625.22 | 625.53 | 625.53 | .... | .... | 0.13 | 0.98 | 0.11 | 100 |
| 8.42 | 0.000 | 0.000 | 5.06 | 2.53 | 2.00 | 628.00 | 628.20 | 0.25 | Sag | 26.71 | 2.00 | 625.53 | 625.68 | 625.68 | .... | .... | 0.44 | 3.34 | 0.25 | 100 |
| 5.46 | 0.409 | 0.308 | 5.06 | 2.53 | 2.00 | 628.20 | 628.50 | 0.25 | Sag | 27.10 | 2.00 | 625.68 | 626.20 j | 626.20 | 625.71 | 625.66 | 0.45 | 3.42 | 0.25 | 100 |
| 2.23 | 0.000 | 0.000 | 5.06 | 2.53 | 2.00 | 628.50 | 628.00 | 0.19 | Sag | 20.85 | 2.00 | 626.20 | 626.30 j | 626.30 | 626.22 | 626.18 | 0.29 | 2.23 | 0.19 | 100 |
| 2.45 | 0.000 | 0.000 | .... | .... | .... | 628.00 | 630.19 | 0.32 | Sag | 13.21 | 2.00 | 625.53 | 626.13 j | 626.13 | 625.51 | 625.07 | 0.32 | 2.45 | 0.32 | 100 |

Project File: New.stm | Number of lines: 5 | Date: 8/7/2025

NOTES: ** Critical depth

# MyReport

| Inlet ID | Inlet Loc | (ft) | Inlet Time (min) | i Sys (in/hr) | i Inlet (in/hr) | Invert Dn (ft) | Invert Up (ft) | Jump Loc (ft) | Jump Len (ft) | Vel Hd Jmp Dn (ft) | Vel Hd Jmp Up (ft) | J-Loss Coeff | Junct Type | Known Q (cfs) | Cost RCP | Cost CMP | Cost PVC | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-F4 | Sag | | 5.0 | 7.02 | 7.57 | 624.00 | 624.31 | .... | .... | 0.00 | 0.00 | 1.50 z | Dp-Grate | 0.00 | 2,224 | 2,002 | 1,890 | ST-F6 - ST-F4 |
| ST-F3 | Sag | | 5.0 | 7.10 | 7.57 | 624.31 | 624.60 | .... | .... | 0.00 | 0.00 | 0.84 z | Dp-Grate | 0.00 | 2,055 | 1,850 | 1,747 | ST-F5 - ST-F3 |
| ST-F2 | Sag | | 5.0 | 7.33 | 7.57 | 624.60 | 625.30 | 27.45 | 4.83 | 0.32 | 0.38 | 1.23 z | Dp-Grate | 0.00 | 4,484 | 4,036 | 3,811 | ST-F3 - ST-F2 |
| ST-F1 | Sag | | 5.0 | 7.57 | 7.57 | 625.30 | 625.70 | 55.35 | 3.18 | 0.20 | 0.24 | 1.00 z | Dp-Grate | 0.00 | 2,470 | 2,223 | 2,100 | ST-F2 - ST-F1 |
| ST-F5 | Sag | | 5.0 | 7.57 | 7.57 | 624.31 | 625.50 | 12.67 | 4.83 | 0.09 | 0.65 | 1.00 z | Curb | 0.00 | 2,228 | 2,005 | 1,893 | ST-F5 - ST-F4 |

Project File: New.stm | Number of lines: 5 | Date: 8/7/2025

NOTES: Intensity = 73.40 / (Inlet time + 12.20) ^ 0.80 -- Return period = 10 Yrs. ; ** Critical depth

# MyReport



| Line Length (ft) | Line Size (in) | Line Slope (%) | Line Type | Local Depr (in) | n-val Gutter | n-val Pipe | Minor Loss (ft) | Northing Y (ft) | Pipe Travel (min) | Q Byp (cfs) | Q Capt (cfs) | Q Carry (cfs) | Line Rise (in) | Runoff Coeff (C) | Line Span (in) | Area A1 (ac) | Area A2 (ac) | Area A3 (ac) | Tc (min) | Throat Ht (in) | Total Area (ac) | Total CxA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 59.180 | 24 | 0.52 | Cir | .... | .... | 0.012 | n/a | 452534.07 | 0.27 | 0.00 | 0.98 | 0.00 | 24 | 0.56 | 24 | 0.15 | 0.00 | 0.08 | 6.7 | .... | 2.52 | 1.64 |
| 57.777 | 21 | 0.50 | Cir | .... | .... | 0.012 | n/a | 452591.82 | 0.27 | 0.00 | 3.34 | 0.00 | 21 | 0.70 | 21 | 0.26 | 0.00 | 0.37 | 6.5 | .... | 1.84 | 1.19 |
| 137.271 | 18 | 0.51 | Cir | .... | .... | 0.012 | n/a | 452707.92 | 0.73 | 0.00 | 3.42 | 0.00 | 18 | 0.74 | 18 | 0.21 | 0.00 | 0.40 | 5.7 | .... | 1.21 | 0.75 |
| 79.073 | 15 | 0.51 | Cir | .... | .... | 0.012 | n/a | 452716.32 | 0.73 | 0.00 | 2.23 | 0.00 | 15 | 0.49 | 15 | 0.46 | 0.00 | 0.14 | 5.0 | .... | 0.60 | 0.29 |
| 63.350 | 15 | 1.88 | Cir | 0.0 | .... | 0.012 | n/a | 452567.20 | 0.53 | 0.00 | 2.45 | 0.00 | 15 | 0.72 | 15 | 0.17 | 0.00 | 0.28 | 5.0 | 4.0 | 0.45 | 0.32 |

Project File: New.stm | Number of lines: 5 | Date: 8/7/2025

NOTES: ** Critical depth

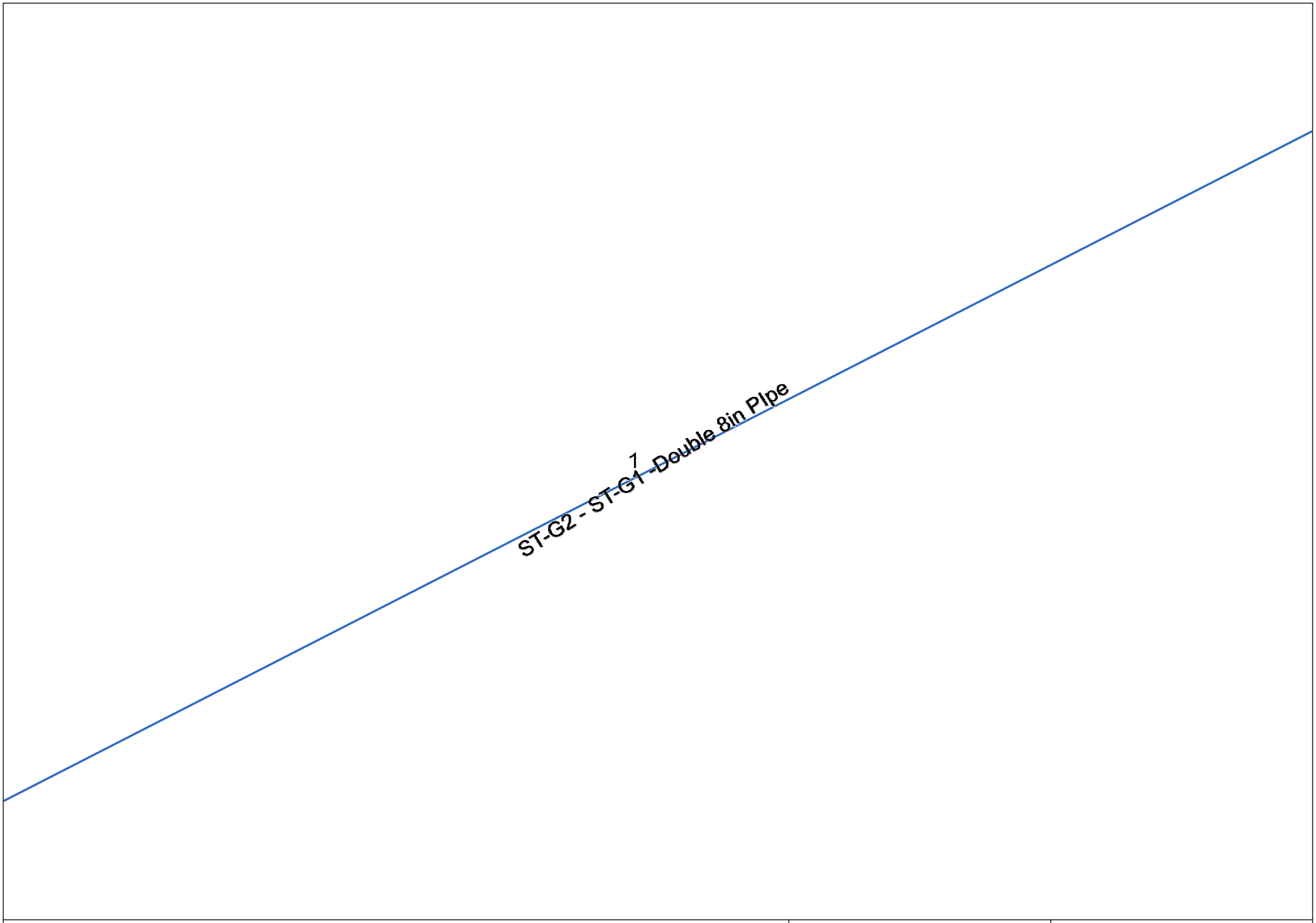
# MyReport

| Total Runoff (cfs) | Vel Ave (ft/s) | Vel Dn (ft/s) | Vel Hd Dn (ft) | Vel Hd Up (ft) | Vel Up (ft/s) | Cover Dn (ft) | Cover Up (ft) | Storage (cft) |
|---|---|---|---|---|---|---|---|---|
| 11.50 | 5.75 | 5.75 | 0.51 | 0.51 | 5.75 | 0.81 | 1.69 | 118.37 |
| 8.42 | 5.07 | 4.72 | 0.46 | 0.46 | 5.42 | 1.94 | 1.85 | 96.46 |
| 5.46 | 4.48 | 4.02 | 0.25 | 0.38 | 4.93 | 2.10 | 1.70 | 169.43 |
| 2.23 | 3.11 | 2.35 | 0.23 | 0.23 | 3.86 | 1.95 | 1.05 | 60.45 |
| 2.45 | 3.00 | 2.01 | 0.25 | 0.25 | 3.99 | 2.44 | 3.44 | 60.32 |

Project File: New.stm | Number of lines: 5 | Date: 8/7/2025

NOTES: ** Critical depth

# Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan




| | | |
|---|---|---|
| Project File: G-Double.stm | Number of lines: 1 | Date: 8/11/2025 |

# Storm Sewer Inventory Report



| Line No. | Alignment | | | | Flow Data | | | | Physical Data | | | | | | | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dnstr Line No. | Line Length (ft) | Defl angle (deg) | Junc Type | Known Q (cfs) | Drng Area (ac) | Runoff Coeff (C) | Inlet Time (min) | Invert El Dn (ft) | Line Slope (%) | Invert El Up (ft) | Line Size (in) | Line Shape | N Value (n) | J-Loss Coeff (K) | Inlet/ Rim El (ft) | |
| 1 | End | 22.456 | 147.792 | Hdwl | 0.00 | 0.27 | 0.86 | 5.0 | 626.50 | 1.78 | 626.90 | 8 | Cir(2b) | 0.012 | 1.00 | 628.09 | ST-G2 - ST-G1 -Dou |

Project File: G-Double.stm | Number of lines: 1 | Date: 8/11/2025

# Storm Sewer Summary Report



| Line No. | Line ID | Flow rate (cfs) | Line Size (in) | Line shape | Line length (ft) | Invert EL Dn (ft) | Invert EL Up (ft) | Line Slope (%) | HGL Down (ft) | HGL Up (ft) | Minor loss (ft) | HGL Junct (ft) | Dns Line No. | Junction Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ST-G2 - ST-G1 -Double 8in PIpe | 1.76 | 8 | Cir(2b) | 22.456 | 626.50 | 626.90 | 1.781 | 626.87 | 627.27 | n/a | 627.27 | End | OpenHeadwall |

Project File: G-Double.stm | Number of lines: 1 | Run Date: 8/11/2025

NOTES: Return period = 10 Yrs.

# MyReport



| Line No. | Area Dn (sqft) | Area Up (sqft) | Byp Ln No | Coeff C1 (C) | Coeff C2 (C) | Coeff C3 (C) | Capac Full (cfs) | Crit Depth (ft) | Cross Sl, Sw (ft/ft) | Cross Sl, Sx (ft/ft) | Curb Len (ft) | Defl Ang (Deg) | Depth Dn (ft) | Depth Up (ft) | DnStm Ln No | Drng Area (ac) | Easting X (ft) | EGL Dn (ft) | EGL Up (ft) | Energy Loss (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.40 | 0.40 | n/a | 0.35 | 0.50 | 0.95 | 3.49 | 0.37 | .... | .... | .... | 147.792 | 0.37 | 0.37** | Outfall | 0.27 | 1617019.78 | 627.17 | 627.57 | 0.000 |

Project File: G-Double.stm | Number of lines: 1 | Date: 8/11/2025

NOTES: ** Critical depth

# MyReport

| Flow Rate (cfs) | Sf Ave (ft/ft) | Sf Dn (ft/ft) | Grate Area (sqft) | Grate Len (ft) | Grate Width (ft) | Gnd/Rim El Dn (ft) | Gnd/Rim El Up (ft) | Gutter Depth (ft) | Gutter Slope (ft/ft) | Gutter Spread (ft) | Gutter Width (ft) | HGL Dn (ft) | HGL Up (ft) | HGL Jnct (ft) | HGL Jmp Dn (ft) | HGL Jmp Up (ft) | Incr CxA | Incr Q (cfs) | Inlet Depth (ft) | Inlet Eff (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.76 | 0.000 | 0.000 | .... | .... | .... | 627.69 | 628.09 | .... | .... | .... | .... | 626.87 | 627.27 | 627.27 | .... | .... | 0.23 | 1.76 | .... | 100 |

Project File: G-Double.stm | Number of lines: 1 | Date: 8/11/2025

NOTES: ** Critical depth

# MyReport

| Inlet ID | Inlet Loc | (ft) | Inlet Time (min) | i Sys (in/hr) | i Inlet (in/hr) | Invert Dn (ft) | Invert Up (ft) | Jump Loc (ft) | Jump Len (ft) | Vel Hd Jmp Dn (ft) | Vel Hd Jmp Up (ft) | J-Loss Coeff | Junct Type | Known Q (cfs) | Cost RCP | Cost CMP | Cost PVC | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-G1 | Sag | | 5.0 | 7.57 | 7.57 | 626.50 | 626.90 | .... | .... | 0.00 | 0.00 | 1.00 z | Hdwall | 0.00 | 0 | 0 | 0 | |

Project File: G-Double.stm | Number of lines: 1 | Date: 8/11/2025

NOTES: Intensity = 73.40 / (Inlet time + 12.20) ^ 0.80 -- Return period = 10 Yrs. ; ** Critical depth

# MyReport



| Line ID | Line Length (ft) | Line Size (in) | Line Slope (%) | Line Type | Local Depr (in) | n-val Gutter | n-val Pipe | Minor Loss (ft) | Northing Y (ft) | Pipe Travel (min) | Q Byp (cfs) | Q Capt (cfs) | Q Carry (cfs) | Line Rise (in) | Runoff Coeff (C) | Line Span (in) | Area A1 (ac) | Area A2 (ac) | Area A3 (ac) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-G2 - ST-G1 -Double 8in PIpe | 22.456 | 8(2b) | 1.78 | Cir | .... | .... | 0.012 | n/a | 452290.64 | 0.15 | 0.00 | 1.76 | 0.00 | 8 | 0.86 | 8 | 0.04 | 0.00 | 0.23 |

Project File: G-Double.stm | Number of lines: 1 | Date: 8/11/2025

NOTES: ** Critical depth

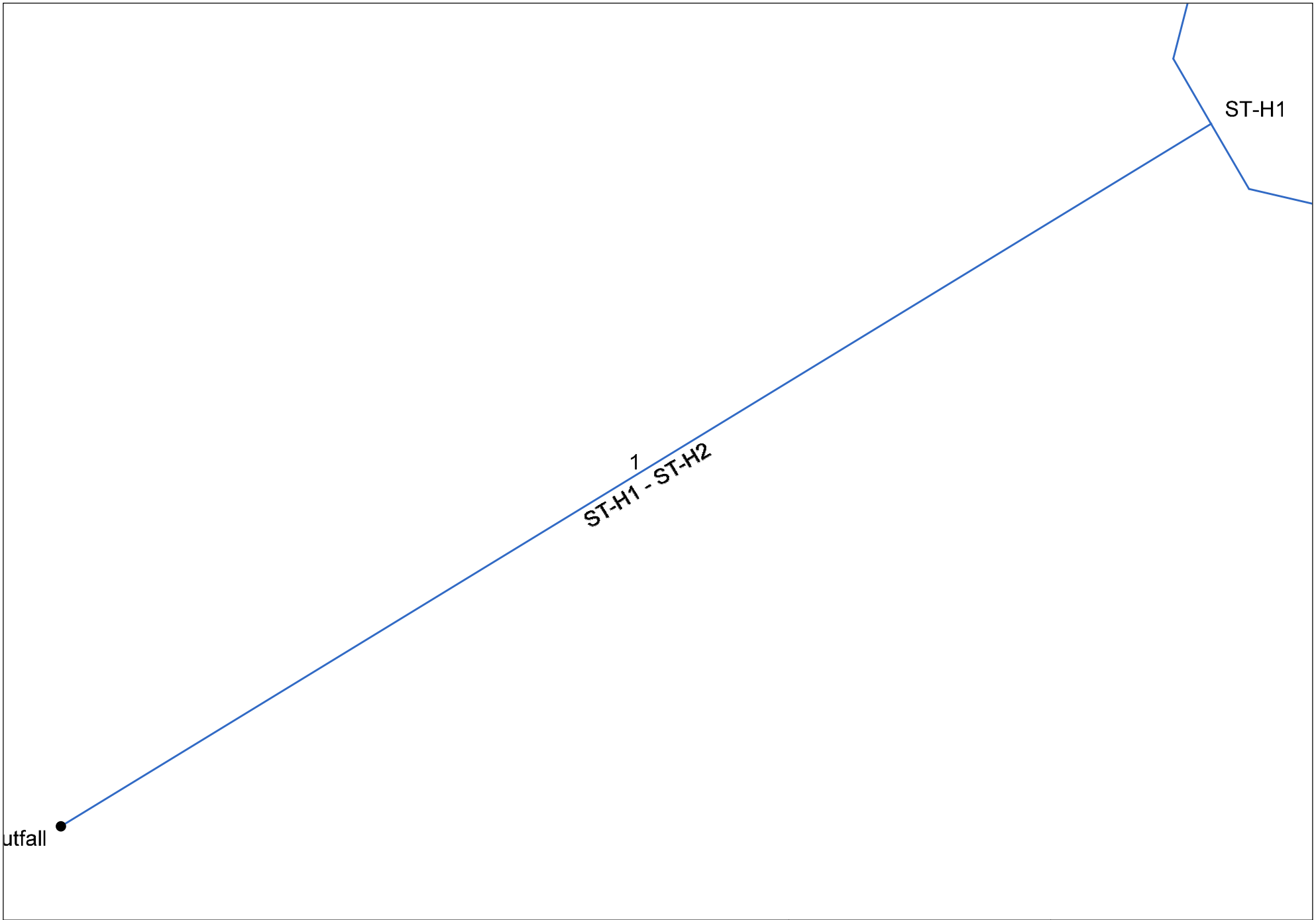
# MyReport

| Tc (min) | Throat Ht (in) | Total Area (ac) | Total CxA | Total Runoff (cfs) | Vel Ave (ft/s) | Vel Dn (ft/s) | Vel Hd Dn (ft) | Vel Hd Up (ft) | Vel Up (ft/s) | Cover Dn (ft) | Cover Up (ft) | Storage (cft) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5.0 | .... | 0.27 | 0.23 | 1.76 | 4.41 | 4.41 | 0.30 | 0.30 | 4.41 | 0.52 | 0.52 | 8.96 | |

Project File: G-Double.stm | Number of lines: 1 | Date: 8/11/2025

NOTES: ** Critical depth

# Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan




| | | |
|---|---|---|
| Project File: H.stm | Number of lines: 1 | Date: 8/11/2025 |

# Storm Sewer Inventory Report

| Line No. | Alignment | | | | Flow Data | | | | Physical Data | | | | | | | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dnstr Line No. | Line Length (ft) | Defl angle (deg) | Junc Type | Known Q (cfs) | Drng Area (ac) | Runoff Coeff (C) | Inlet Time (min) | Invert El Dn (ft) | Line Slope (%) | Invert El Up (ft) | Line Size (in) | Line Shape | N Value (n) | J-Loss Coeff (K) | Inlet/ Rim El (ft) | |
| 1 | End | 35.598 | -31.430 | Hdwl | 1.89 | 0.66 | 0.78 | 5.0 | 623.97 | 0.55 | 624.17 | 18 | Cir | 0.012 | 1.00 | 626.73 | ST-H1 - ST-H2 |

Project File: H.stm | Number of lines: 1 | Date: 8/11/2025

# Storm Sewer Summary Report



| Line No. | Line ID | Flow rate (cfs) | Line Size (in) | Line shape | Line length (ft) | Invert EL Dn (ft) | Invert EL Up (ft) | Line Slope (%) | HGL Down (ft) | HGL Up (ft) | Minor loss (ft) | HGL Junct (ft) | Dns Line No. | Junction Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ST-H1 - ST-H2 | 5.79 | 18 | Cir | 35.598 | 623.97 | 624.17 | 0.553 | 625.77* | 625.86* | 0.17 | 626.03 | End | OpenHeadwall |

Project File: H.stm | Number of lines: 1 | Run Date: 8/11/2025

NOTES: Return period = 10 Yrs. ; *Surcharged (HGL above crown).

# MyReport



| Line No. | Area Dn (sqft) | Area Up (sqft) | Byp Ln No | Coeff C1 (C) | Coeff C2 (C) | Coeff C3 (C) | Capac Full (cfs) | Crit Depth (ft) | Cross Sl, Sw (ft/ft) | Cross Sl, Sx (ft/ft) | Curb Len (ft) | Defl Ang (Deg) | Depth Dn (ft) | Depth Up (ft) | DnStm Ln No | Drng Area (ac) | Easting X (ft) | EGL Dn (ft) | EGL Up (ft) | Energy Loss (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.77 | 1.77 | n/a | 0.35 | 0.50 | 0.95 | 8.46 | 0.93 | .... | .... | .... | -31.430 | 1.50 | 1.50 | Outfall | 0.66 | 1617373.40 | 625.94 | 626.03 | 0.092 |

Project File: H.stm | Number of lines: 1 | Date: 8/11/2025

NOTES: ** Critical depth

# MyReport



| Flow Rate (cfs) | Sf Ave (ft/ft) | Sf Dn (ft/ft) | Grate Area (sqft) | Grate Len (ft) | Grate Width (ft) | Gnd/Rim El Dn (ft) | Gnd/Rim El Up (ft) | Gutter Depth (ft) | Gutter Slope (ft/ft) | Gutter Spread (ft) | Gutter Width (ft) | HGL Dn (ft) | HGL Up (ft) | HGL Jnct (ft) | HGL Jmp Dn (ft) | HGL Jmp Up (ft) | Incr CxA | Incr Q (cfs) | Inlet Depth (ft) | Inlet Eff (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5.79 | 0.259 | 0.259 | .... | .... | .... | 626.53 | 626.73 | .... | .... | .... | .... | 625.77 | 625.86 | 626.03 | .... | .... | 0.51 | 5.79 | .... | 100 |

Project File: H.stm | Number of lines: 1 | Date: 8/11/2025

NOTES: ** Critical depth

# MyReport

| Inlet ID | Inlet Loc | (ft) | Inlet Time (min) | i Sys (in/hr) | i Inlet (in/hr) | Invert Dn (ft) | Invert Up (ft) | Jump Loc (ft) | Jump Len (ft) | Vel Hd Jmp Dn (ft) | Vel Hd Jmp Up (ft) | J-Loss Coeff | Junct Type | Known Q (cfs) | Cost RCP | Cost CMP | Cost PVC | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-H1 | Sag | | 5.0 | 7.57 | 7.57 | 623.97 | 624.17 | .... | .... | 0.00 | 0.00 | 1.00 | Hdwall | 1.89 | 1,136 | 1,022 | 966 | |

Project File: H.stm | Number of lines: 1 | Date: 8/11/2025

NOTES: Intensity = 73.40 / (Inlet time + 12.20) ^ 0.80 -- Return period = 10 Yrs. ; ** Critical depth

# MyReport



| Line ID | Line Length (ft) | Line Size (in) | Line Slope (%) | Line Type | Local Depr (in) | n-val Gutter | n-val Pipe | Minor Loss (ft) | Northing Y (ft) | Pipe Travel (min) | Q Byp (cfs) | Q Capt (cfs) | Q Carry (cfs) | Line Rise (in) | Runoff Coeff (C) | Line Span (in) | Area A1 (ac) | Area A2 (ac) | Area A3 (ac) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-H1 - ST-H2 | 35.598 | 18 | 0.55 | Cir | .... | .... | 0.012 | 0.17 | 452510.89 | 0.18 | 0.00 | 5.79 | 0.00 | 18 | 0.78 | 18 | 0.19 | 0.00 | 0.47 |

Project File: H.stm | Number of lines: 1 | Date: 8/11/2025

NOTES: ** Critical depth

# MyReport

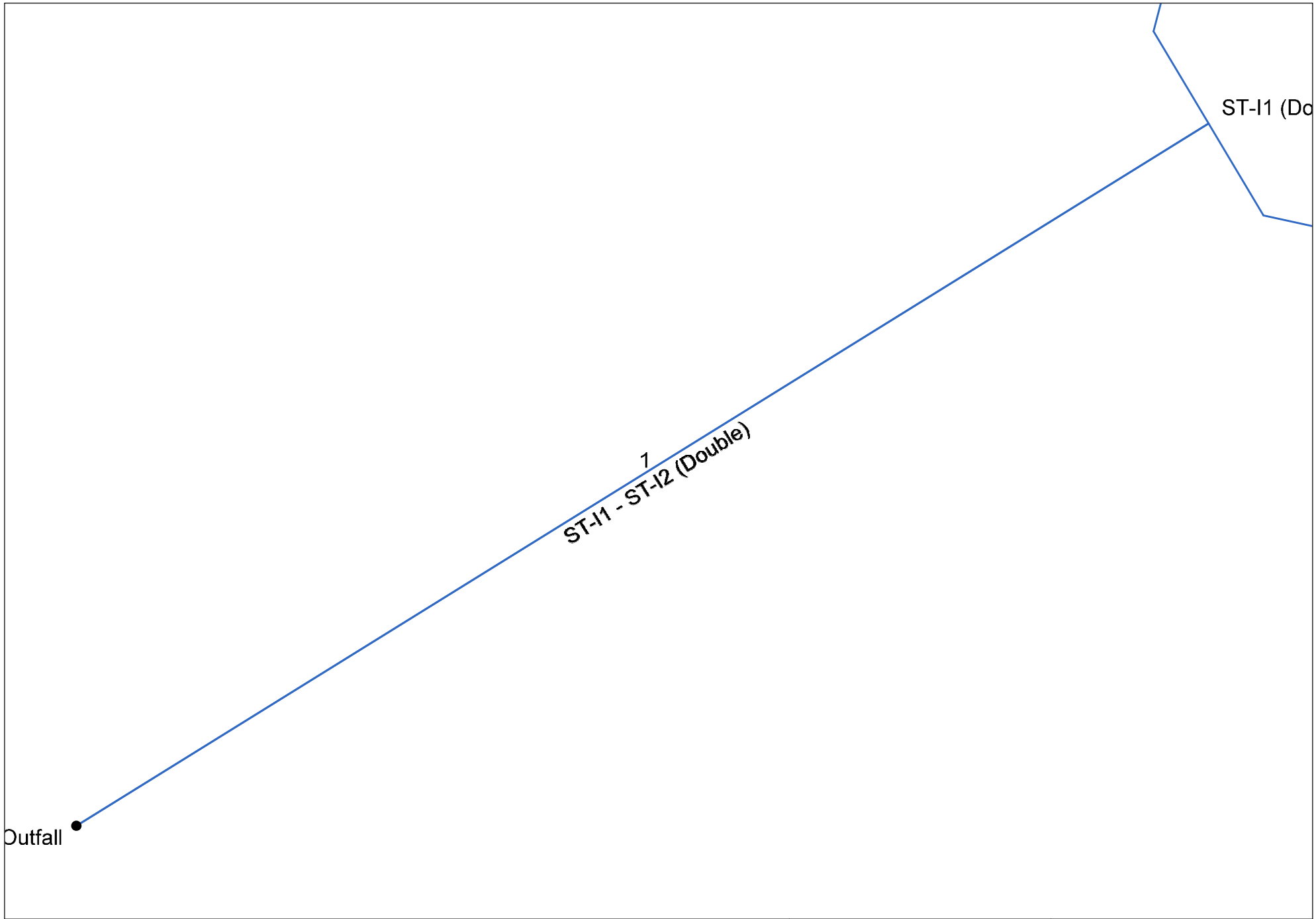


| Tc (min) | Throat Ht (in) | Total Area (ac) | Total CxA | Total Runoff (cfs) | Vel Ave (ft/s) | Vel Dn (ft/s) | Vel Hd Dn (ft) | Vel Hd Up (ft) | Vel Up (ft/s) | Cover Dn (ft) | Cover Up (ft) | Storage (cft) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5.0 | .... | 0.66 | 0.51 | 3.90 | 3.28 | 3.28 | 0.17 | 0.17 | 3.28 | 1.06 | 1.06 | 62.89 | |

| | | |
|---|---|---|
| Project File: H.stm | Number of lines: 1 | Date: 8/11/2025 |

NOTES: ** Critical depth

# Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan




| | | |
|---|---|---|
| Project File: New.stm | Number of lines: 1 | Date: 8/7/2025 |

# Storm Sewer Inventory Report

| Line No. | Alignment | | | | Flow Data | | | | Physical Data | | | | | | | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dnstr Line No. | Line Length (ft) | Defl angle (deg) | Junc Type | Known Q (cfs) | Drng Area (ac) | Runoff Coeff (C) | Inlet Time (min) | Invert El Dn (ft) | Line Slope (%) | Invert El Up (ft) | Line Size (in) | Line Shape | N Value (n) | J-Loss Coeff (K) | Inlet/ Rim El (ft) | |
| 1 | End | 24.314 | -31.974 | Hdwl | 0.00 | 0.30 | 0.83 | 5.0 | 626.90 | 0.41 | 627.00 | 8 | Cir(2b) | 0.012 | 1.00 | 628.24 | ST-I1 - ST-I2 (Dou |

Project File: New.stm | Number of lines: 1 | Date: 8/7/2025

# Storm Sewer Summary Report



| Line No. | Line ID | Flow rate (cfs) | Line Size (in) | Line shape | Line length (ft) | Invert EL Dn (ft) | Invert EL Up (ft) | Line Slope (%) | HGL Down (ft) | HGL Up (ft) | Minor loss (ft) | HGL Junct (ft) | Dns Line No. | Junction Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ST-I1 - ST-I2 (Double) | 1.89 | 8 | Cir(2b) | 24.314 | 626.90 | 627.00 | 0.411 | 627.28 | 627.67 | 0.11 | 627.78 | End | OpenHeadwall |

Project File: New.stm | Number of lines: 1 | Run Date: 8/7/2025

NOTES: Return period = 10 Yrs.

# MyReport



| Line No. | Area Dn (sqft) | Area Up (sqft) | Byp Ln No | Coeff C1 (C) | Coeff C2 (C) | Coeff C3 (C) | Capac Full (cfs) | Crit Depth (ft) | Cross Sl, Sw (ft/ft) | Cross Sl, Sx (ft/ft) | Curb Len (ft) | Defl Ang (Deg) | Depth Dn (ft) | Depth Up (ft) | DnStm Ln No | Drng Area (ac) | Easting X (ft) | EGL Dn (ft) | EGL Up (ft) | Energy Loss (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.42 | 0.70 | n/a | 0.35 | 0.50 | 0.95 | 1.68 | 0.38 | .... | .... | .... | -31.974 | 0.38 | 0.67 | Outfall | 0.30 | 1617600.40 | 627.60 | 627.78 | 0.219 |

Project File: New.stm | Number of lines: 1 | Date: 8/7/2025

NOTES: ** Critical depth

# MyReport

| Flow Rate (cfs) | Sf Ave (ft/ft) | Sf Dn (ft/ft) | Grate Area (sqft) | Grate Len (ft) | Grate Width (ft) | Gnd/Rim El Dn (ft) | Gnd/Rim El Up (ft) | Gutter Depth (ft) | Gutter Slope (ft/ft) | Gutter Spread (ft) | Gutter Width (ft) | HGL Dn (ft) | HGL Up (ft) | HGL Jnct (ft) | HGL Jmp Dn (ft) | HGL Jmp Up (ft) | Incr CxA | Incr Q (cfs) | Inlet Depth (ft) | Inlet Eff (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.89 | 0.902 | 1.301 | .... | .... | .... | 628.09 | 628.24 | .... | .... | .... | .... | 627.28 | 627.67 | 627.78 | .... | .... | 0.25 | 1.89 | .... | 100 |

Project File: New.stm | Number of lines: 1 | Date: 8/7/2025

NOTES: ** Critical depth

# MyReport

| Inlet ID | Inlet Loc | (ft) | Inlet Time (min) | i Sys (in/hr) | i Inlet (in/hr) | Invert Dn (ft) | Invert Up (ft) | Jump Loc (ft) | Jump Len (ft) | Vel Hd Jmp Dn (ft) | Vel Hd Jmp Up (ft) | J-Loss Coeff | Junct Type | Known Q (cfs) | Cost RCP | Cost CMP | Cost PVC | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-I1 (Double) | Sag | | 5.0 | 7.57 | 7.57 | 626.90 | 627.00 | .... | .... | 0.00 | 0.00 | 1.00 | Hdwall | 0.00 | 0 | 0 | 0 | |

Project File: New.stm | Number of lines: 1 | Date: 8/7/2025

NOTES: Intensity = 73.40 / (Inlet time + 12.20) ^ 0.80 -- Return period = 10 Yrs. ; ** Critical depth

# MyReport



| Line ID | Line Length (ft) | Line Size (in) | Line Slope (%) | Line Type | Local Depr (in) | n-val Gutter | n-val Pipe | Minor Loss (ft) | Northing Y (ft) | Pipe Travel (min) | Q Byp (cfs) | Q Capt (cfs) | Q Carry (cfs) | Line Rise (in) | Runoff Coeff (C) | Line Span (in) | Area A1 (ac) | Area A2 (ac) | Area A3 (ac) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-I1 - ST-I2 (Double) | 24.314 | 8(2b) | 0.41 | Cir | .... | .... | 0.012 | 0.11 | 452651.32 | 0.15 | 0.00 | 1.89 | 0.00 | 8 | 0.83 | 8 | 0.06 | 0.00 | 0.24 | |

Project File: New.stm | Number of lines: 1 | Date: 8/7/2025

NOTES: ** Critical depth

# MyReport

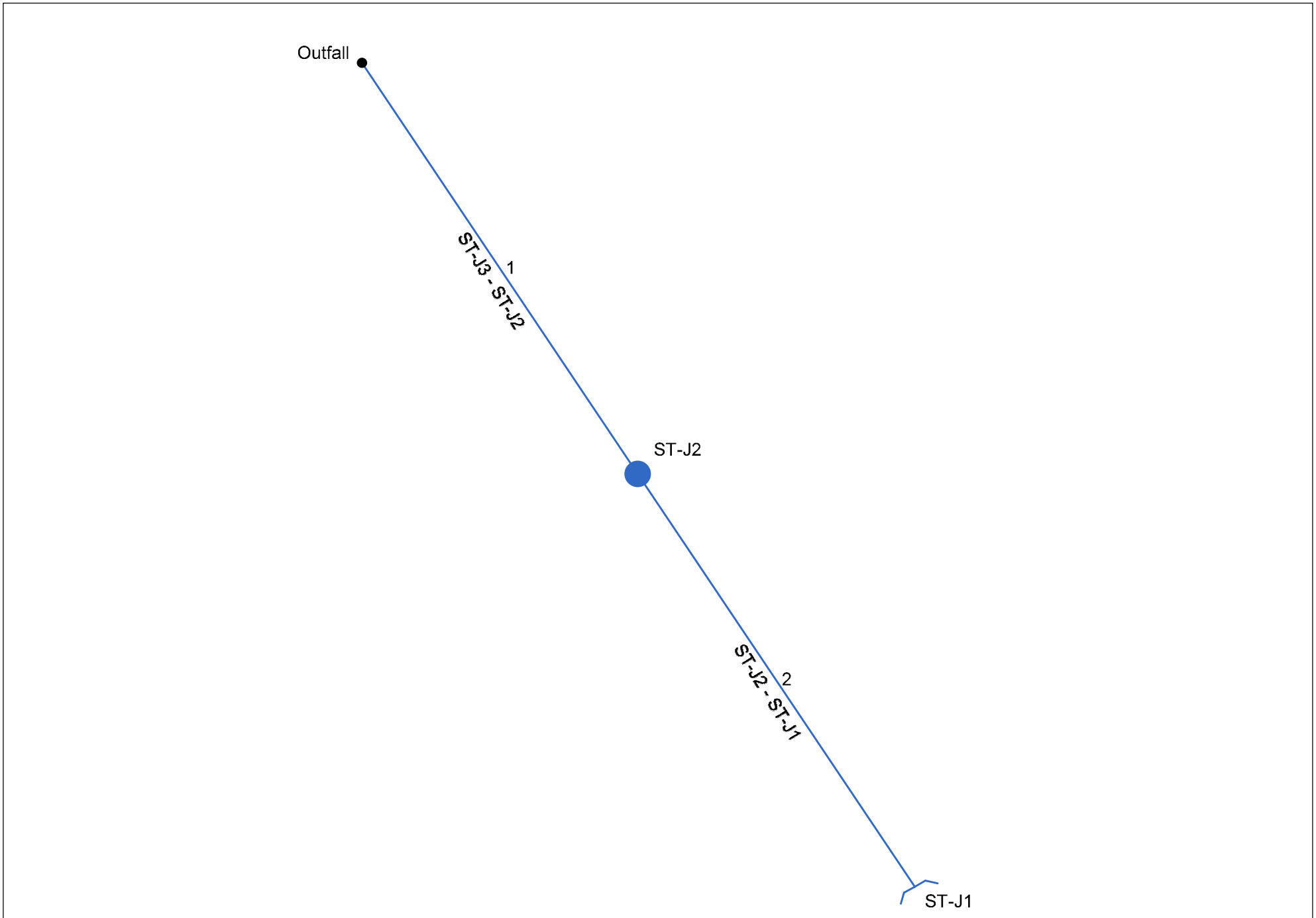


| Tc (min) | Throat Ht (in) | Total Area (ac) | Total CxA | Total Runoff (cfs) | Vel Ave (ft/s) | Vel Dn (ft/s) | Vel Hd Dn (ft) | Vel Hd Up (ft) | Vel Up (ft/s) | Cover Dn (ft) | Cover Up (ft) | Storage (cft) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5.0 | .... | 0.30 | 0.25 | 1.89 | 3.61 | 4.52 | 0.32 | 0.11 | 2.70 | 0.52 | 0.57 | 14.08 | |

| | | |
|---|---|---|
| Project File: New.stm | Number of lines: 1 | Date: 8/7/2025 |

NOTES: ** Critical depth

# Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan




| | | |
|---|---|---|
| Project File: J.stm | Number of lines: 2 | Date: 8/11/2025 |

# Storm Sewer Inventory Report

| Line No. | Alignment | | | | Flow Data | | | | Physical Data | | | | | | | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dnstr Line No. | Line Length (ft) | Defl angle (deg) | Junc Type | Known Q (cfs) | Drng Area (ac) | Runoff Coeff (C) | Inlet Time (min) | Invert El Dn (ft) | Line Slope (%) | Invert El Up (ft) | Line Size (in) | Line Shape | N Value (n) | J-Loss Coeff (K) | Inlet/ Rim El (ft) | |
| 1 | End | 85.225 | 58.326 | MH | 0.00 | 0.00 | 0.00 | 0.0 | 621.00 | 1.08 | 621.92 | 24 | Cir | 0.012 | 0.15 | 626.30 | ST-J3 - ST-J2 |
| 2 | 1 | 85.623 | -0.033 | Hdwl | 7.55 | 0.94 | 0.78 | 5.0 | 621.92 | 1.00 | 622.78 | 24 | Cir | 0.012 | 1.00 | 626.31 | ST-J2 - ST-J1 |

Project File: J.stm | Number of lines: 2 | Date: 8/11/2025

# Storm Sewer Summary Report



| Line No. | Line ID | Flow rate (cfs) | Line Size (in) | Line shape | Line length (ft) | Invert EL Dn (ft) | Invert EL Up (ft) | Line Slope (%) | HGL Down (ft) | HGL Up (ft) | Minor loss (ft) | HGL Junct (ft) | Dns Line No. | Junction Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ST-J3 - ST-J2 | 13.02 | 24 | Cir | 85.225 | 621.00 | 621.92 | 1.079 | 622.30 | 623.22 | 0.08 | 623.22 | End | Manhole |
| 2 | ST-J2 - ST-J1 | 13.10 | 24 | Cir | 85.623 | 621.92 | 622.78 | 1.004 | 623.22 | 624.08 | n/a | 624.08 | 1 | OpenHeadwall |

Project File: J.stm | Number of lines: 2 | Run Date: 8/11/2025

NOTES: Return period = 10 Yrs.

# MyReport



| Line No. | Area Dn (sqft) | Area Up (sqft) | Byp Ln No | Coeff C1 (C) | Coeff C2 (C) | Coeff C3 (C) | Capac Full (cfs) | Crit Depth (ft) | Cross Sl, Sw (ft/ft) | Cross Sl, Sx (ft/ft) | Curb Len (ft) | Defl Ang (Deg) | Depth Dn (ft) | Depth Up (ft) | DnStm Ln No | Drng Area (ac) | Easting X (ft) | EGL Dn (ft) | EGL Up (ft) | Energy Loss (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.16 | 2.16 | n/a | 0.35 | 0.50 | 0.95 | 25.46 | 1.30 | .... | .... | .... | 58.326 | 1.30 | 1.30** | Outfall | 0.00 | 1617253.15 | 622.86 | 623.78 | 0.000 |
| 2 | 2.16 | 2.16 | 1 | 0.35 | 0.50 | 0.95 | 24.56 | 1.30 | .... | .... | .... | -0.033 | 1.30 | 1.30** | 1 | 0.94 | 1617298.15 | 623.79 | 624.65 | 0.000 |

Project File: J.stm | Number of lines: 2 | Date: 8/11/2025

NOTES: ** Critical depth

# MyReport



| Flow Rate (cfs) | Sf Ave (ft/ft) | Sf Dn (ft/ft) | Grate Area (sqft) | Grate Len (ft) | Grate Width (ft) | Gnd/Rim El Dn (ft) | Gnd/Rim El Up (ft) | Gutter Depth (ft) | Gutter Slope (ft/ft) | Gutter Spread (ft) | Gutter Width (ft) | HGL Dn (ft) | HGL Up (ft) | HGL Jnct (ft) | HGL Jmp Dn (ft) | HGL Jmp Up (ft) | Incr CxA | Incr Q (cfs) | Inlet Depth (ft) | Inlet Eff (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 13.02 | 0.000 | 0.000 | .... | .... | .... | 623.81 | 626.30 | .... | .... | .... | .... | 622.30 | 623.22 | 623.22 | .... | .... | 0.00 | 0.00 | .... | .... |
| 13.10 | 0.000 | 0.000 | .... | .... | .... | 626.30 | 626.31 | .... | .... | .... | .... | 623.22 | 624.08 | 624.08 | .... | .... | 0.73 | 13.10 | .... | 100 |

Project File: J.stm | Number of lines: 2 | Date: 8/11/2025

NOTES: ** Critical depth

# MyReport

| Inlet ID | Inlet Loc | (ft) | Inlet Time (min) | i Sys (in/hr) | i Inlet (in/hr) | Invert Dn (ft) | Invert Up (ft) | Jump Loc (ft) | Jump Len (ft) | Vel Hd Jmp Dn (ft) | Vel Hd Jmp Up (ft) | J-Loss Coeff | Junct Type | Known Q (cfs) | Cost RCP | Cost CMP | Cost PVC | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-J2 | Sag | | 0.0 | 7.46 | 0.00 | 621.00 | 621.92 | .... | .... | 0.00 | 0.00 | 0.15 z | MH | 0.00 | 3,344 | 3,010 | 2,842 | |
| ST-J1 | Sag | | 5.0 | 7.57 | 7.57 | 621.92 | 622.78 | .... | .... | 0.00 | 0.00 | 1.00 z | Hdwall | 7.55 | 3,382 | 3,044 | 2,875 | |

| Project File: J.stm | Number of lines: 2 | Date: 8/11/2025 |
|---|---|---|

NOTES: Intensity = 73.40 / (Inlet time + 12.20) ^ 0.80 -- Return period = 10 Yrs. ; ** Critical depth

# MyReport



| Line ID | Line Length (ft) | Line Size (in) | Line Slope (%) | Line Type | Local Depr (in) | n-val Gutter | n-val Pipe | Minor Loss (ft) | Northing Y (ft) | Pipe Travel (min) | Q Byp (cfs) | Q Capt (cfs) | Q Carry (cfs) | Line Rise (in) | Runoff Coeff (C) | Line Span (in) | Area A1 (ac) | Area A2 (ac) | Area A3 (ac) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-J3 - ST-J2 | 85.225 | 24 | 1.08 | Cir | .... | .... | 0.012 | 0.08 | 452545.32 | 0.34 | .... | .... | .... | 24 | 0.00 | 24 | 0.00 | 0.00 | 0.00 |
| ST-J2 - ST-J1 | 85.623 | 24 | 1.00 | Cir | .... | .... | 0.012 | n/a | 452472.48 | 0.34 | 0.00 | 13.10 | 0.00 | 24 | 0.78 | 24 | 0.27 | 0.00 | 0.67 |

Project File: J.stm | Number of lines: 2 | Date: 8/11/2025

NOTES: ** Critical depth

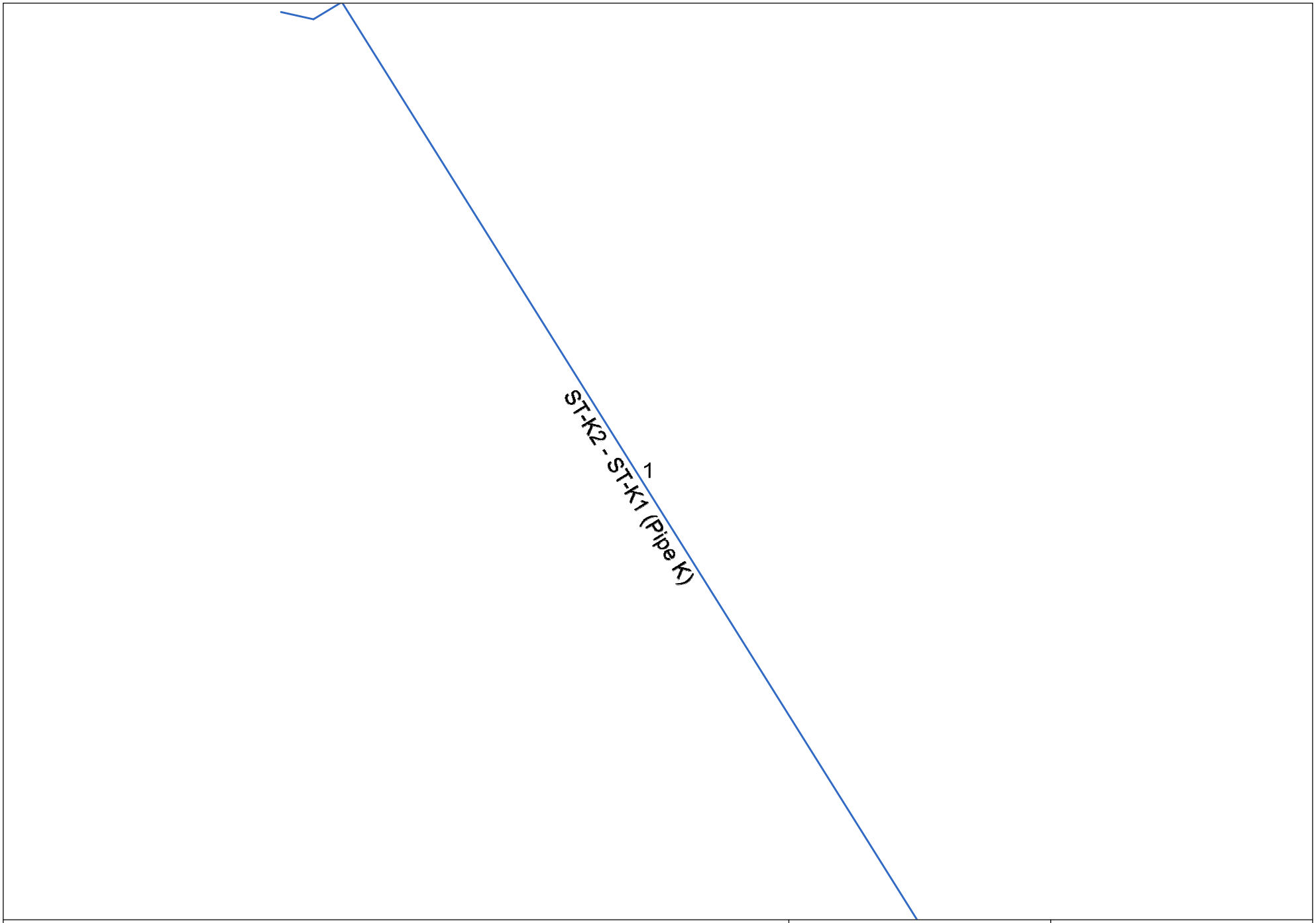
# MyReport

| Tc (min) | Throat Ht (in) | Total Area (ac) | Total CxA | Total Runoff (cfs) | Vel Ave (ft/s) | Vel Dn (ft/s) | Vel Hd Dn (ft) | Vel Hd Up (ft) | Vel Up (ft/s) | Cover Dn (ft) | Cover Up (ft) | Storage (cft) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5.3 | .... | 0.94 | 0.73 | 5.47 | 6.04 | 6.04 | 0.57 | 0.57 | 6.04 | 0.81 | 2.38 | 183.75 | |
| 5.0 | .... | 0.94 | 0.73 | 5.55 | 6.07 | 6.08 | 0.57 | 0.57 | 6.05 | 2.38 | 1.53 | 184.97 | |

Project File: J.stm | Number of lines: 2 | Date: 8/11/2025

NOTES: ** Critical depth

# Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan




| | | |
|---|---|---|
| Project File: New.stm | Number of lines: 1 | Date: 8/28/2025 |

# Storm Sewer Inventory Report

| Line No. | Alignment | | | | Flow Data | | | | Physical Data | | | | | | | | Line ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dnstr Line No. | Line Length (ft) | Defl angle (deg) | Junc Type | Known Q (cfs) | Drng Area (ac) | Runoff Coeff (C) | Inlet Time (min) | Invert El Dn (ft) | Line Slope (%) | Invert El Up (ft) | Line Size (in) | Line Shape | N Value (n) | J-Loss Coeff (K) | Inlet/ Rim El (ft) | |
| 1 | End | 68.953 | -121.961 | Hdwl | 15.06 | 0.59 | 0.35 | 5.0 | 632.85 | 2.03 | 634.25 | 24 | Cir | 0.012 | 1.00 | 637.83 | ST-K2 - ST-K1 (Pip |

Project File: New.stm | Number of lines: 1 | Date: 8/28/2025

# Storm Sewer Summary Report



| Line No. | Line ID | Flow rate (cfs) | Line Size (in) | Line shape | Line length (ft) | Invert EL Dn (ft) | Invert EL Up (ft) | Line Slope (%) | HGL Down (ft) | HGL Up (ft) | Minor loss (ft) | HGL Junct (ft) | Dns Line No. | Junction Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ST-K2 - ST-K1 (Pipe K) | 16.62 | 24 | Cir | 68.953 | 632.85 | 634.25 | 2.030 | 634.32 | 635.72 | 0.70 | 635.72 | End | OpenHeadwall |

Project File: New.stm | Number of lines: 1 | Run Date: 8/28/2025

NOTES: Return period = 10 Yrs.

# MyReport



| Line No. | Area Dn (sqft) | Area Up (sqft) | Byp Ln No | Coeff C1 (C) | Coeff C2 (C) | Coeff C3 (C) | Capac Full (cfs) | Crit Depth (ft) | Cross Sl, Sw (ft/ft) | Cross Sl, Sx (ft/ft) | Curb Len (ft) | Defl Ang (Deg) | Depth Dn (ft) | Depth Up (ft) | DnStm Ln No | Drng Area (ac) | Easting X (ft) | EGL Dn (ft) | EGL Up (ft) | Energy Loss (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.47 | 2.47 | n/a | 0.35 | 0.50 | 0.95 | 34.91 | 1.47 | .... | .... | .... | -121.961 | 1.47 | 1.47** | Outfall | 0.59 | 1618229.15 | 635.02 | 636.42 | 0.000 |

Project File: New.stm | Number of lines: 1 | Date: 8/28/2025

NOTES: ** Critical depth

# MyReport

| Flow Rate (cfs) | Sf Ave (ft/ft) | Sf Dn (ft/ft) | Grate Area (sqft) | Grate Len (ft) | Grate Width (ft) | Gnd/Rim El Dn (ft) | Gnd/Rim El Up (ft) | Gutter Depth (ft) | Gutter Slope (ft/ft) | Gutter Spread (ft) | Gutter Width (ft) | HGL Dn (ft) | HGL Up (ft) | HGL Jnct (ft) | HGL Jmp Dn (ft) | HGL Jmp Up (ft) | Incr CxA | Incr Q (cfs) | Inlet Depth (ft) | Inlet Eff (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16.62 | 0.000 | 0.000 | .... | .... | .... | 635.66 | 637.83 | .... | .... | .... | .... | 634.32 | 635.72 | 635.72 | .... | .... | 0.21 | 16.62 | .... | 100 |

Project File: New.stm | Number of lines: 1 | Date: 8/28/2025

NOTES: ** Critical depth

# MyReport

| Inlet ID | Inlet Loc | (ft) | Inlet Time (min) | i Sys (in/hr) | i Inlet (in/hr) | Invert Dn (ft) | Invert Up (ft) | Jump Loc (ft) | Jump Len (ft) | Vel Hd Jmp Dn (ft) | Vel Hd Jmp Up (ft) | J-Loss Coeff | Junct Type | Known Q (cfs) | Cost RCP | Cost CMP | Cost PVC | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-K2 | Sag | | 5.0 | 7.57 | 7.57 | 632.85 | 634.25 | .... | .... | 0.00 | 0.00 | 1.00 z | Hdwall | 15.06 | 2,466 | 2,219 | 2,096 | |

Project File: New.stm | Number of lines: 1 | Date: 8/28/2025

NOTES: Intensity = 73.40 / (Inlet time + 12.20) ^ 0.80 -- Return period = 10 Yrs. ; ** Critical depth

# MyReport



| Line ID | Line Length (ft) | Line Size (in) | Line Slope (%) | Line Type | Local Depr (in) | n-val Gutter | n-val Pipe | Minor Loss (ft) | Northing Y (ft) | Pipe Travel (min) | Q Byp (cfs) | Q Capt (cfs) | Q Carry (cfs) | Line Rise (in) | Runoff Coeff (C) | Line Span (in) | Area A1 (ac) | Area A2 (ac) | Area A3 (ac) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-K2 - ST-K1 (Pipe K) | 68.953 | 24 | 2.03 | Cir | .... | .... | 0.012 | 0.70 | 452736.10 | 0.22 | 0.00 | 16.62 | 0.00 | 24 | 0.35 | 24 | 0.59 | 0.00 | 0.00 |

Project File: New.stm | Number of lines: 1 | Date: 8/28/2025

NOTES: ** Critical depth

# MyReport



| Tc (min) | Throat Ht (in) | Total Area (ac) | Total CxA | Total Runoff (cfs) | Vel Ave (ft/s) | Vel Dn (ft/s) | Vel Hd Dn (ft) | Vel Hd Up (ft) | Vel Up (ft/s) | Cover Dn (ft) | Cover Up (ft) | Storage (cft) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5.0 | .... | 0.59 | 0.21 | 1.56 | 6.72 | 6.72 | 0.70 | 0.70 | 6.72 | 0.81 | 1.58 | 170.47 | |

| Project File: New.stm | Number of lines: 1 | Date: 8/28/2025 |
|---|---|---|

NOTES: ** Critical depth

# APPENDIX D: HYDROLOGIC CALCULATIONS

Hydraflow Watershed Analysis Report

Channel and Channel Lining Reports – 10 Year

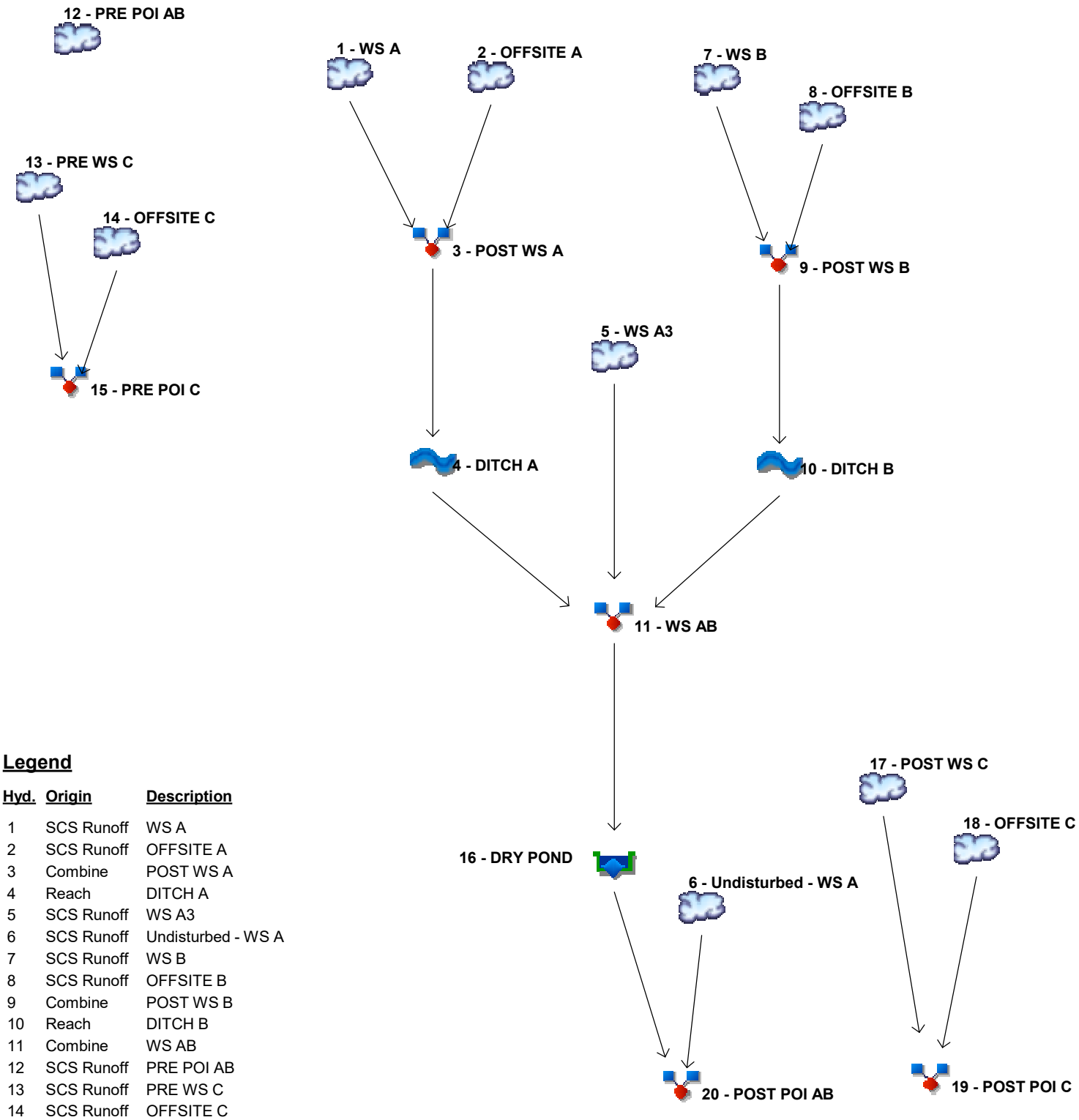
Sediment Basin Calculations

# Hydraflow Table of Contents

Mustang.gpw

# Watershed Model Schematic






## Legend

| Hyd. | Origin | Description |
|---|---|---|
| 1 | SCS Runoff | WS A |
| 2 | SCS Runoff | OFFSITE A |
| 3 | Combine | POST WS A |
| 4 | Reach | DITCH A |
| 5 | SCS Runoff | WS A3 |
| 6 | SCS Runoff | Undisturbed - WS A |
| 7 | SCS Runoff | WS B |
| 8 | SCS Runoff | OFFSITE B |
| 9 | Combine | POST WS B |
| 10 | Reach | DITCH B |
| 11 | Combine | WS AB |
| 12 | SCS Runoff | PRE POI AB |
| 13 | SCS Runoff | PRE WS C |
| 14 | SCS Runoff | OFFSITE C |
| 15 | Combine | PRE POI C |
| 16 | Reservoir | DRY POND |
| 17 | SCS Runoff | POST WS C |
| 18 | SCS Runoff | OFFSITE C |
| 19 | Combine | POST POI C |
| 20 | Combine | POST POI AB |

# Hydrograph Return Period Recap



| Hyd. No. | Hydrograph type (origin) | Inflow hyd(s) | Peak Outflow (cfs) | | | | | | | | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1-yr | 2-yr | 3-yr | 5-yr | 10-yr | 25-yr | 50-yr | 100-yr | |
| 1 | SCS Runoff | ------ | ------- | 35.20 | ------- | 44.72 | 52.19 | 62.40 | 70.46 | 78.82 | WS A |
| 2 | SCS Runoff | ------ | ------- | 9.833 | ------- | 14.60 | 18.58 | 24.26 | 28.92 | 33.88 | OFFSITE A |
| 3 | Combine | 1, 2 | ------- | 39.71 | ------- | 51.95 | 61.75 | 75.37 | 86.25 | 97.64 | POST WS A |
| 4 | Reach | 3 | ------- | 31.81 | ------- | 42.44 | 51.03 | 63.05 | 72.73 | 82.89 | DITCH A |
| 5 | SCS Runoff | ------ | ------- | 22.25 | ------- | 27.96 | 32.43 | 38.54 | 43.37 | 48.37 | WS A3 |
| 6 | SCS Runoff | ------ | ------- | 9.222 | ------- | 11.84 | 13.90 | 16.71 | 18.94 | 21.25 | Undisturbed - WS A |
| 7 | SCS Runoff | ------ | ------- | 51.56 | ------- | 63.72 | 73.25 | 86.29 | 96.60 | 107.31 | WS B |
| 8 | SCS Runoff | ------ | ------- | 7.418 | ------- | 10.32 | 12.68 | 15.98 | 18.62 | 21.39 | OFFSITE B |
| 9 | Combine | 7, 8 | ------- | 57.76 | ------- | 72.49 | 84.12 | 100.10 | 112.79 | 126.00 | POST WS B |
| 10 | Reach | 9 | ------- | 49.21 | ------- | 62.31 | 72.80 | 87.38 | 99.01 | 111.16 | DITCH B |
| 11 | Combine | 4, 5, 10 | ------- | 101.11 | ------- | 130.19 | 153.41 | 185.59 | 211.31 | 238.22 | WS AB |
| 12 | SCS Runoff | ------ | ------- | 34.07 | ------- | 46.13 | 55.81 | 69.25 | 79.96 | 91.13 | PRE POI AB |
| 13 | SCS Runoff | ------ | ------- | 31.02 | ------- | 41.67 | 50.20 | 61.99 | 71.39 | 81.17 | PRE WS C |
| 14 | SCS Runoff | ------ | ------- | 16.28 | ------- | 23.60 | 29.68 | 38.36 | 45.41 | 52.85 | OFFSITE C |
| 15 | Combine | 13, 14 | ------- | 46.91 | ------- | 64.61 | 78.98 | 99.24 | 115.50 | 132.53 | PRE POI C |
| 16 | Reservoir | 11 | ------- | 11.28 | ------- | 12.79 | 13.90 | 15.31 | 16.36 | 24.13 | DRY POND |
| 17 | SCS Runoff | ------ | ------- | 16.79 | ------- | 22.22 | 26.53 | 32.47 | 37.19 | 42.09 | POST WS C |
| 18 | SCS Runoff | ------ | ------- | 0.862 | ------- | 1.065 | 1.224 | 1.441 | 1.613 | 1.792 | OFFSITE C |
| 19 | Combine | 17, 18 | ------- | 16.89 | ------- | 22.34 | 26.67 | 32.63 | 37.37 | 42.29 | POST POI C |
| 20 | Combine | 6, 16, | ------- | 18.76 | ------- | 22.60 | 25.47 | 29.36 | 32.38 | 35.46 | POST POI AB |

# Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025

| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|
| 1 | SCS Runoff | 35.20 | 2 | 718 | 83,178 | ------ | ------ | ------ | WS A |
| 2 | SCS Runoff | 9.833 | 2 | 734 | 44,645 | ------ | ------ | ------ | OFFSITE A |
| 3 | Combine | 39.71 | 2 | 720 | 127,823 | 1, 2 | ------ | ------ | POST WS A |
| 4 | Reach | 31.81 | 2 | 724 | 127,819 | 3 | ------ | ------ | DITCH A |
| 5 | SCS Runoff | 22.25 | 2 | 720 | 60,085 | ------ | ------ | ------ | WS A3 |
| 6 | SCS Runoff | 9.222 | 2 | 726 | 32,159 | ------ | ------ | ------ | Undisturbed - WS A |
| 7 | SCS Runoff | 51.56 | 2 | 718 | 128,574 | ------ | ------ | ------ | WS B |
| 8 | SCS Runoff | 7.418 | 2 | 722 | 20,892 | ------ | ------ | ------ | OFFSITE B |
| 9 | Combine | 57.76 | 2 | 718 | 149,466 | 7, 8 | ------ | ------ | POST WS B |
| 10 | Reach | 49.21 | 2 | 724 | 149,463 | 9 | ------ | ------ | DITCH B |
| 11 | Combine | 101.11 | 2 | 722 | 337,368 | 4, 5, 10 | ------ | ------ | WS AB |
| 12 | SCS Runoff | 34.07 | 2 | 732 | 147,606 | ------ | ------ | ------ | PRE POI AB |
| 13 | SCS Runoff | 31.02 | 2 | 734 | 140,667 | ------ | ------ | ------ | PRE WS C |
| 14 | SCS Runoff | 16.28 | 2 | 732 | 67,195 | ------ | ------ | ------ | OFFSITE C |
| 15 | Combine | 46.91 | 2 | 734 | 207,862 | 13, 14 | ------ | ------ | PRE POI C |
| 16 | Reservoir | 11.28 | 2 | 772 | 337,366 | 11 | 611.32 | 153,693 | DRY POND |
| 17 | SCS Runoff | 16.79 | 2 | 734 | 76,047 | ------ | ------ | ------ | POST WS C |
| 18 | SCS Runoff | 0.862 | 2 | 716 | 1,922 | ------ | ------ | ------ | OFFSITE C |
| 19 | Combine | 16.89 | 2 | 734 | 77,970 | 17, 18 | ------ | ------ | POST POI C |
| 20 | Combine | 18.76 | 2 | 728 | 369,525 | 6, 16, | ------ | ------ | POST POI AB |

# Hydrograph Report

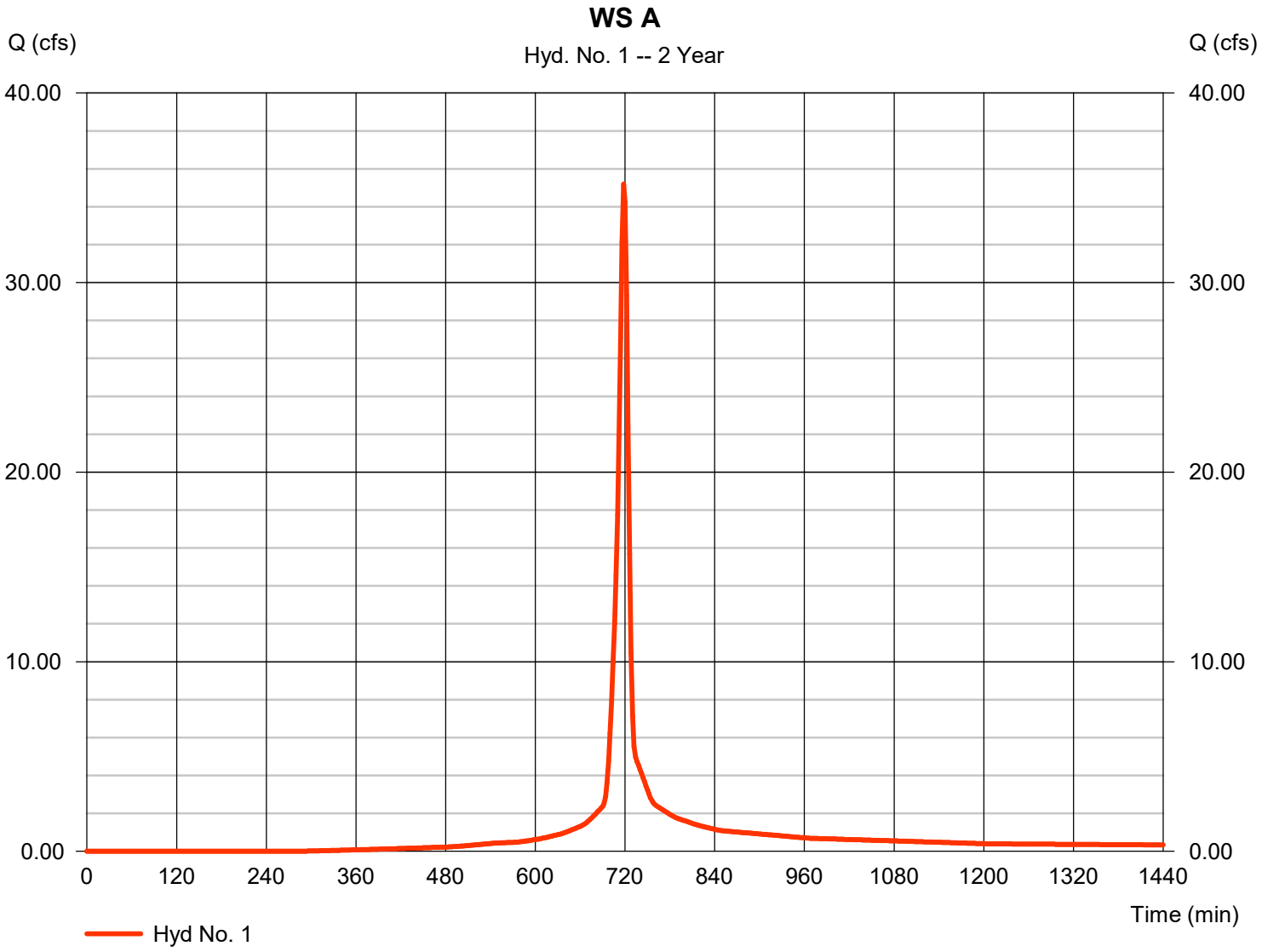


## Hyd. No. 1

WS A

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 35.20 cfs |
| Storm frequency | = | 2 yrs | Time to peak | = | 718 min |
| Time interval | = | 2 min | Hyd. volume | = | 83,178 cuft |
| Drainage area | = | 8.140 ac | Curve number | = | 90* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 8.30 min |
| Total precip. | = | 3.89 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(1.740 x 72) + (2.310 x 91) + (4.090 x 98)] / 8.140



# TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025

## Hyd. No. 1

WS A

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.035 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 71.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 3.89 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 0.50 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 3.67** | **+** | **0.00** | **+** | **0.00** | **=** | **3.67** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 88.00 | | 235.00 | | 46.00 | | |
| Watercourse slope (%) | = 2.27 | | 0.85 | | 0.50 | | |
| Surface description | = Unpaved | | Unpaved | | Unpaved | | |
| Average velocity (ft/s) | =2.43 | | 1.49 | | 1.14 | | |
| **Travel Time (min)** | **= 0.60** | **+** | **2.63** | **+** | **0.67** | **=** | **3.91** |
| **Channel Flow** | | | | | | | |
| X sectional flow area (sqft) | = 0.79 | | 3.14 | | 21.97 | | |
| Wetted perimeter (ft) | = 3.14 | | 6.28 | | 1.50 | | |
| Channel slope (%) | = 1.32 | | 2.25 | | 1.35 | | |
| Manning's n-value | = 0.011 | | 0.011 | | 0.035 | | |
| Velocity (ft/s) | =6.17 | | | | | | |
| | | | 12.77 | | | | |
| | | | | | 29.88 | | |
| Flow length (ft) | ({0})65.0 | | 178.0 | | 629.0 | | |
| **Travel Time (min)** | **= 0.18** | **+** | **0.23** | **+** | **0.35** | **=** | **0.76** |

**Total Travel Time, Tc ..... 8.30 min**

# Hydrograph Report

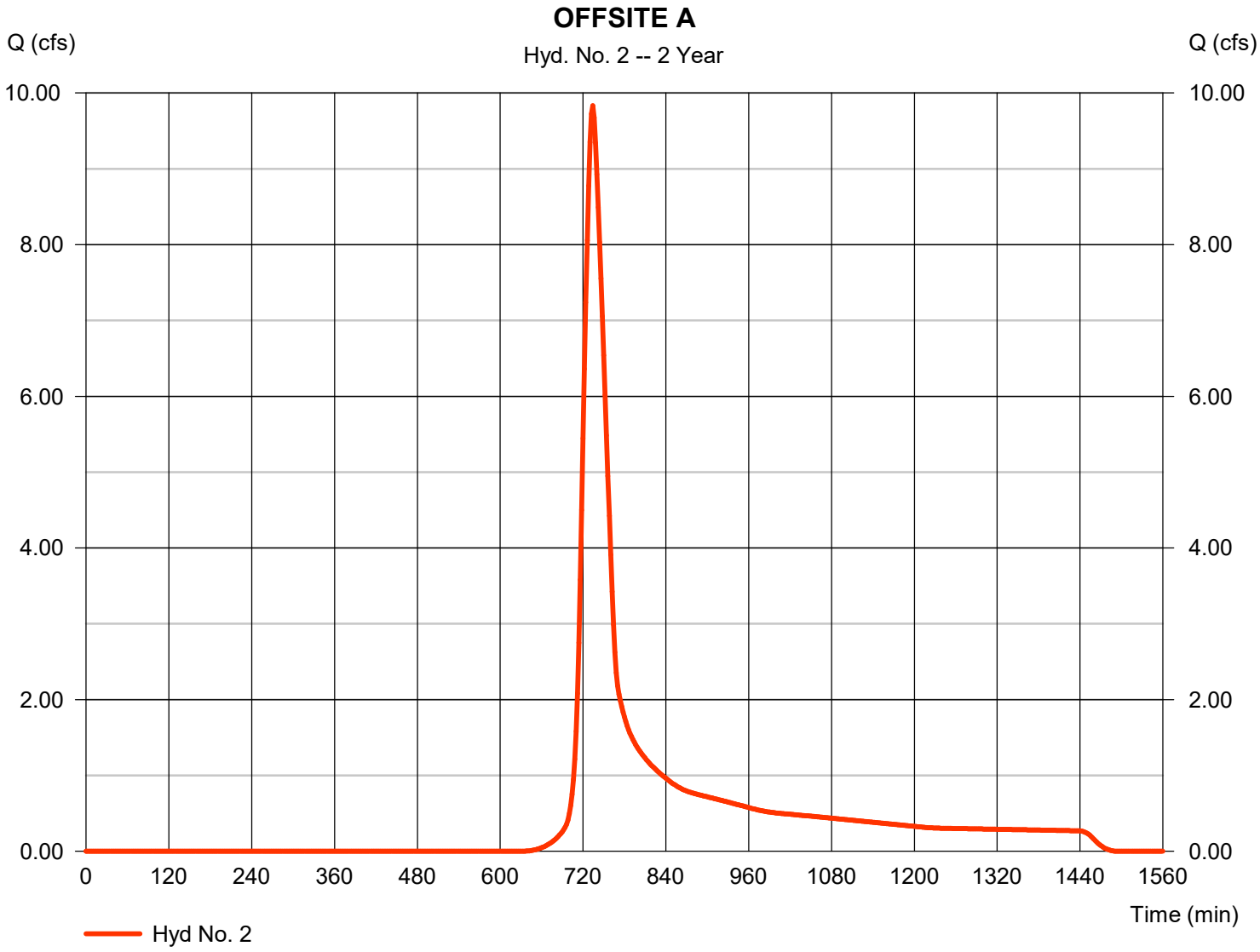


## Hyd. No. 2

OFFSITE A

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 9.833 cfs |
| Storm frequency | = | 2 yrs | Time to peak | = | 734 min |
| Time interval | = | 2 min | Hyd. volume | = | 44,645 cuft |
| Drainage area | = | 8.780 ac | Curve number | = | 72* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 32.40 min |
| Total precip. | = | 3.89 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(8.780 x 72)] / 8.780



# TR55 Tc Worksheet



## Hyd. No. 2

OFFSITE A

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.170 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 100.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 3.89 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 0.49 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 17.24** | **+** | **0.00** | **+** | **0.00** | **=** | **17.24** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 1027.00 | | 0.00 | | 0.00 | | |
| Watercourse slope (%) | = 0.49 | | 0.00 | | 0.00 | | |
| Surface description | = Unpaved | | Paved | | Paved | | |
| Average velocity (ft/s) | =1.13 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 15.16** | **+** | **0.00** | **+** | **0.00** | **=** | **15.16** |
| **Channel Flow** | | | | | | | |
| X sectional flow area (sqft) | = 0.00 | | 0.00 | | 0.00 | | |
| Wetted perimeter (ft) | = 0.00 | | 0.00 | | 0.00 | | |
| Channel slope (%) | = 0.00 | | 0.00 | | 0.00 | | |
| Manning's n-value | = 0.015 | | 0.015 | | 0.015 | | |
| Velocity (ft/s) | =0.00 | | | | | | |
| | | | 0.00 | | | | |
| | | | | | 0.00 | | |
| Flow length (ft) | ({0})0.0 | | 0.0 | | 0.0 | | |
| **Travel Time (min)** | **= 0.00** | **+** | **0.00** | **+** | **0.00** | **=** | **0.00** |

**Total Travel Time, Tc ..... 32.40 min**

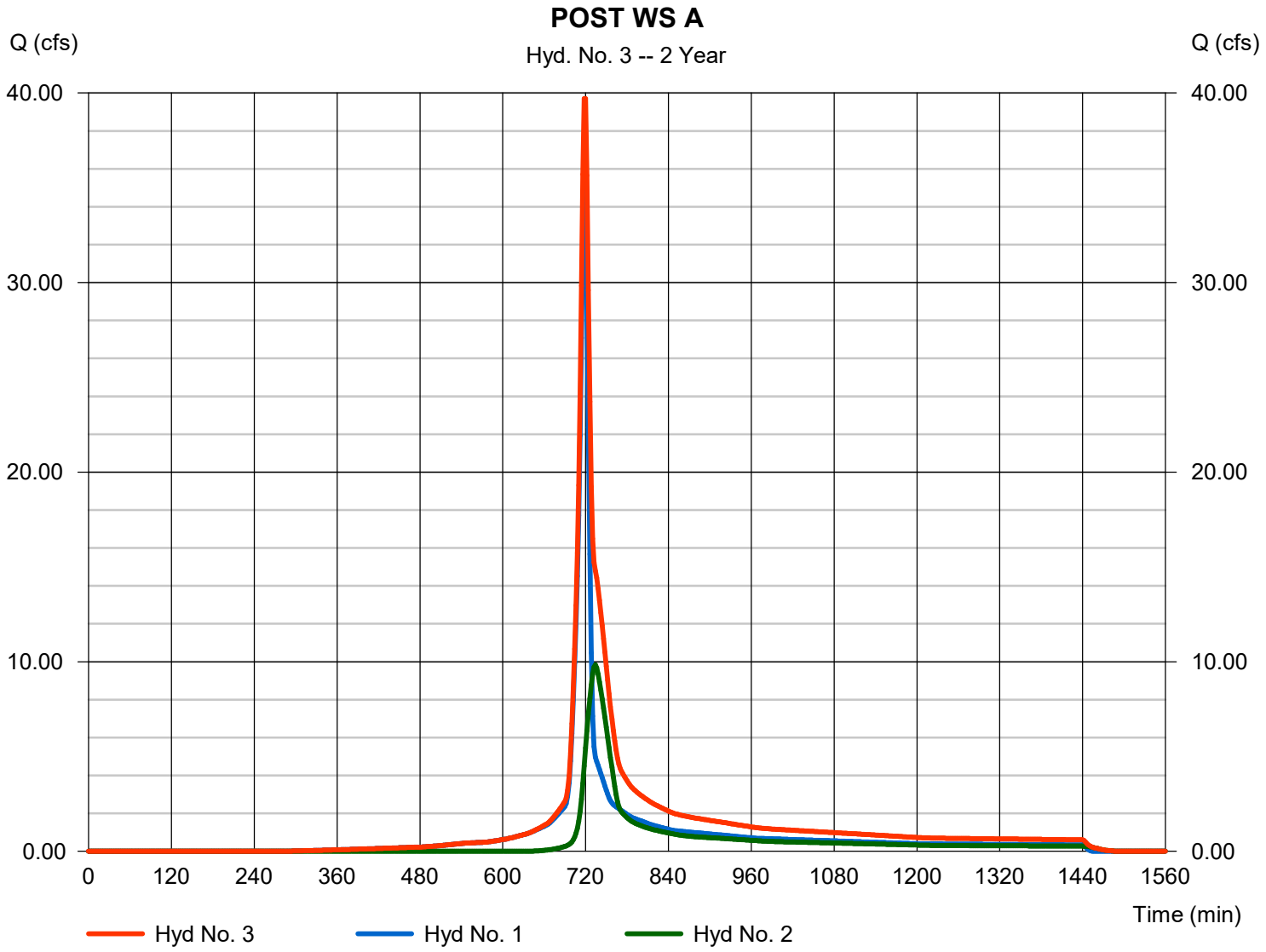
# Hydrograph Report



## Hyd. No. 3

POST WS A

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Combine | Peak discharge | = | 39.71 cfs |
| Storm frequency | = | 2 yrs | Time to peak | = | 720 min |
| Time interval | = | 2 min | Hyd. volume | = | 127,823 cuft |
| Inflow hyds. | = | 1, 2 | Contrib. drain. area | = | 16.920 ac |



# Hydrograph Report

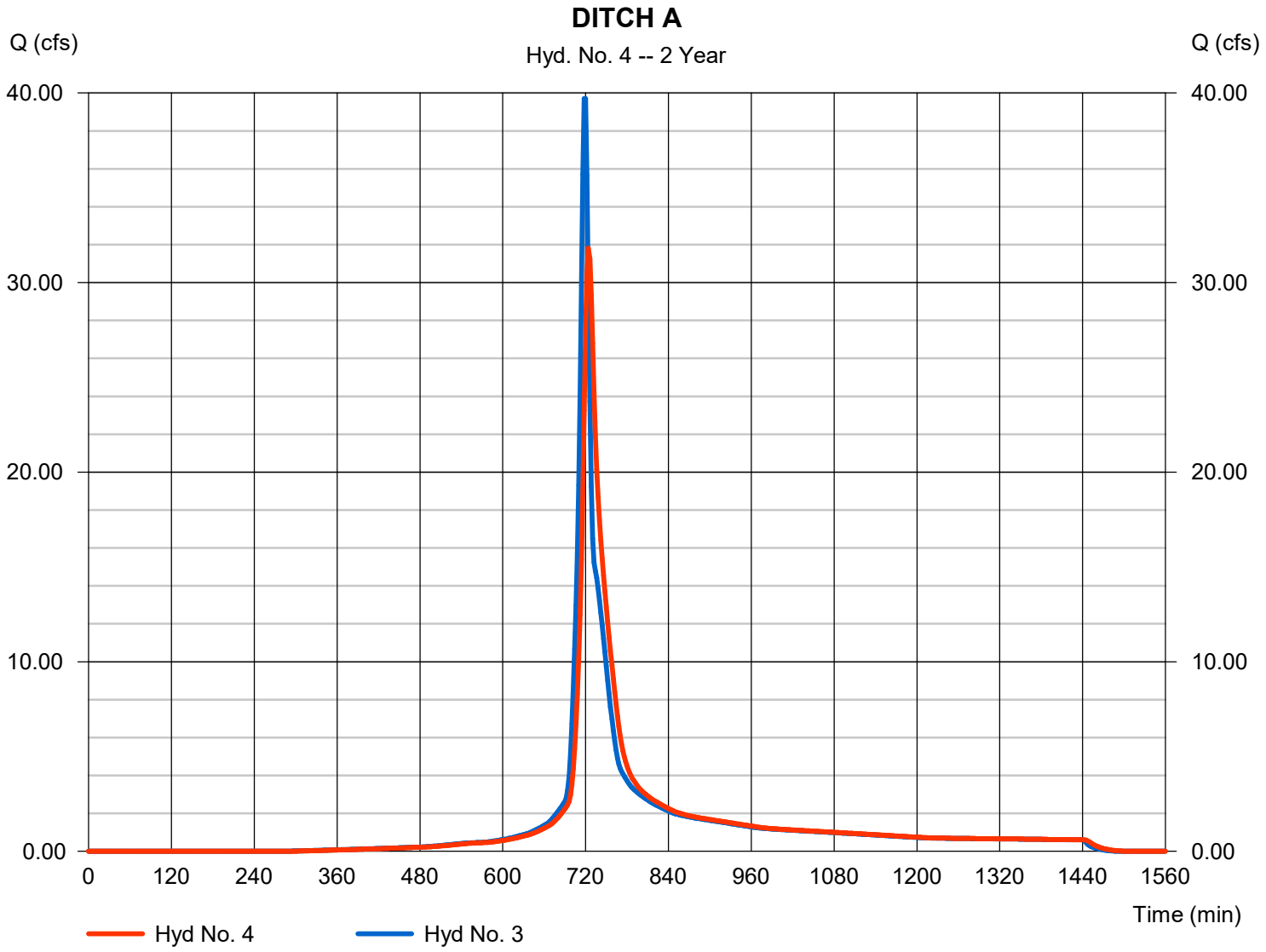


## Hyd. No. 4

DITCH A

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reach | Peak discharge | = | 31.81 cfs |
| Storm frequency | = | 2 yrs | Time to peak | = | 724 min |
| Time interval | = | 2 min | Hyd. volume | = | 127,819 cuft |
| Inflow hyd. No. | = | 3 - POST WS A | Section type | = | Trapezoidal |
| Reach length | = | 2104.0 ft | Channel slope | = | 1.3 % |
| Manning's n | = | 0.035 | Bottom width | = | 3.0 ft |
| Side slope | = | 3.0:1 | Max. depth | = | 3.0 ft |
| Rating curve x | = | 2.306 | Rating curve m | = | 1.248 |
| Ave. velocity | = | 4.06 ft/s | Routing coeff. | = | 0.2526 |

Modified Att-Kin routing method used.



# Hydrograph Report

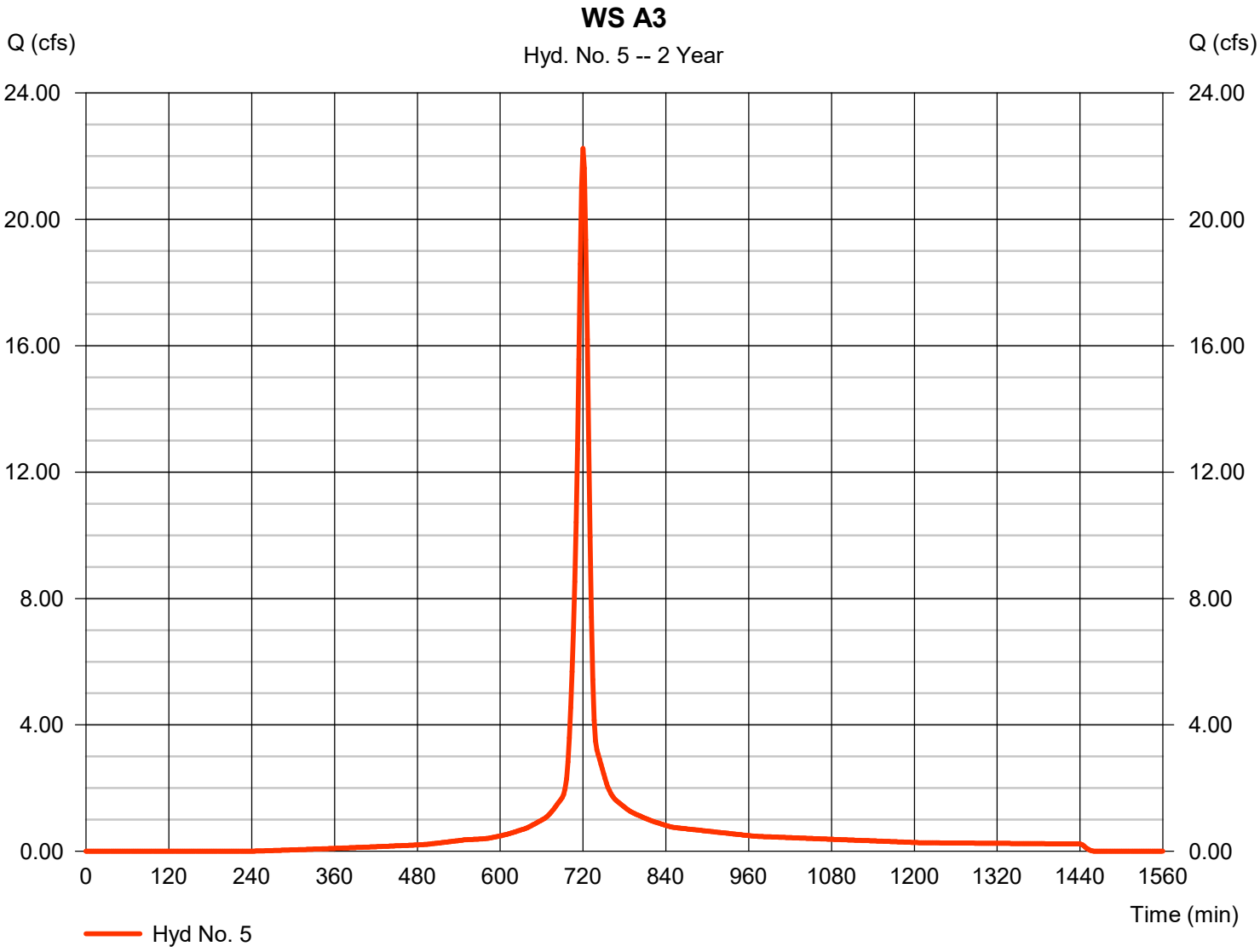


## Hyd. No. 5

WS A3

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 22.25 cfs |
| Storm frequency | = | 2 yrs | Time to peak | = | 720 min |
| Time interval | = | 2 min | Hyd. volume | = | 60,085 cuft |
| Drainage area | = | 5.330 ac | Curve number | = | 92* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 11.30 min |
| Total precip. | = | 3.89 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(4.590 x 91) + (0.740 x 98)] / 5.330



# TR55 Tc Worksheet



## Hyd. No. 5

WS A3

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.035 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 100.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 3.89 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 0.50 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 4.83** | **+** | **0.00** | **+** | **0.00** | **=** | **4.83** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 437.00 | | 0.00 | | 0.00 | | |
| Watercourse slope (%) | = 0.50 | | 0.00 | | 0.00 | | |
| Surface description | = Unpaved | | Paved | | Unpaved | | |
| Average velocity (ft/s) | =1.14 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 6.38** | **+** | **0.00** | **+** | **0.00** | **=** | **6.38** |
| **Channel Flow** | | | | | | | |
| X sectional flow area (sqft) | = 21.97 | | 0.00 | | 0.00 | | |
| Wetted perimeter (ft) | = 1.50 | | 0.00 | | 0.00 | | |
| Channel slope (%) | = 1.35 | | 0.00 | | 0.00 | | |
| Manning's n-value | = 0.035 | | 0.013 | | 0.015 | | |
| Velocity (ft/s) | =29.88 | | | | | | |
| | | | 0.00 | | | | |
| | | | | | 0.00 | | |
| Flow length (ft) | ({0})143.0 | | 0.0 | | 0.0 | | |
| **Travel Time (min)** | **= 0.08** | **+** | **0.00** | **+** | **0.00** | **=** | **0.08** |

**Total Travel Time, Tc ..... 11.30 min**

# Hydrograph Report

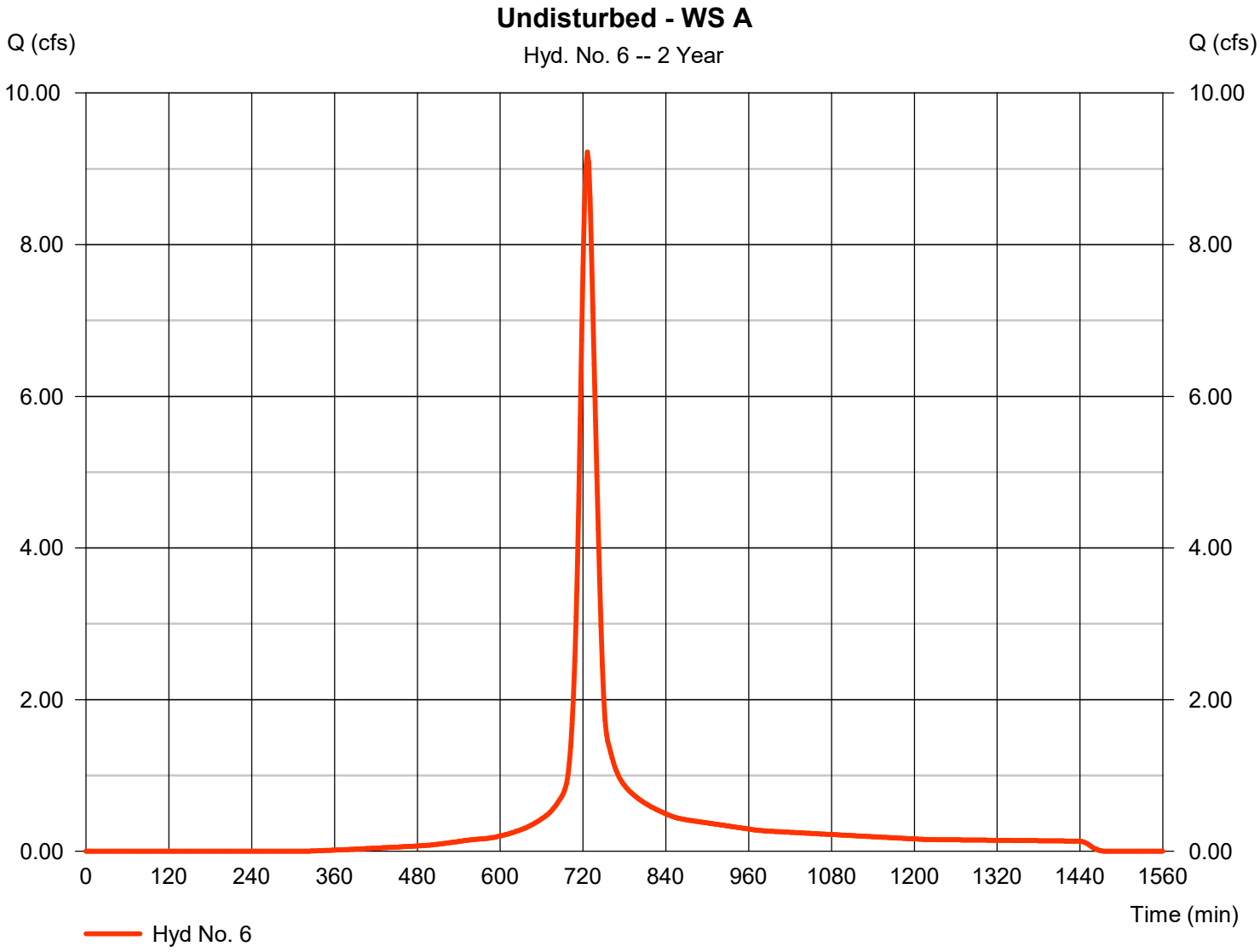


## Hyd. No. 6

Undisturbed - WS A

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 9.222 cfs |
| Storm frequency | = | 2 yrs | Time to peak | = | 726 min |
| Time interval | = | 2 min | Hyd. volume | = | 32,159 cuft |
| Drainage area | = | 3.200 ac | Curve number | = | 89* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 23.39 min |
| Total precip. | = | 3.89 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(0.180 x 72) + (0.750 x 88) + (2.120 x 91)] / 3.200



# TR55 Tc Worksheet



## Hyd. No. 6

Undisturbed - WS A

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.170 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 100.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 3.89 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 1.72 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 10.43** | **+** | **0.00** | **+** | **0.00** | **=** | **10.43** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 1645.00 | | 0.00 | | 0.00 | | |
| Watercourse slope (%) | = 1.72 | | 0.00 | | 0.00 | | |
| Surface description | = Unpaved | | Paved | | Paved | | |
| Average velocity (ft/s) | =2.12 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 12.96** | **+** | **0.00** | **+** | **0.00** | **=** | **12.96** |
| **Channel Flow** | | | | | | | |
| X sectional flow area (sqft) | = 0.00 | | 0.00 | | 0.00 | | |
| Wetted perimeter (ft) | = 0.00 | | 0.00 | | 0.00 | | |
| Channel slope (%) | = 0.00 | | 0.00 | | 0.00 | | |
| Manning's n-value | = 0.015 | | 0.015 | | 0.015 | | |
| Velocity (ft/s) | =0.00 | | | | | | |
| | | | 0.00 | | | | |
| | | | | | 0.00 | | |
| Flow length (ft) | ({0})0.0 | | 0.0 | | 0.0 | | |
| **Travel Time (min)** | **= 0.00** | **+** | **0.00** | **+** | **0.00** | **=** | **0.00** |

**Total Travel Time, Tc ..... 23.39 min**

# Hydrograph Report

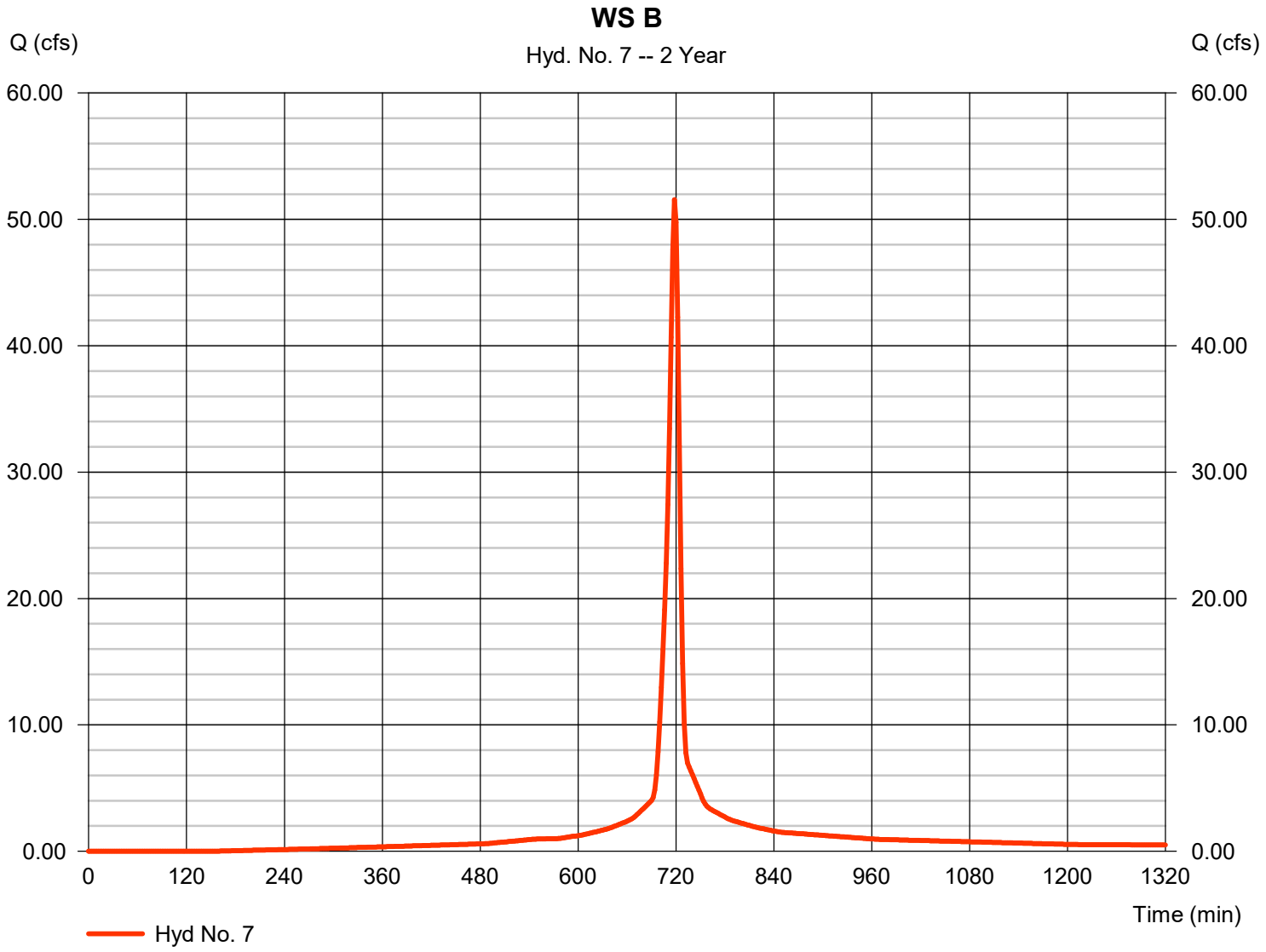


## Hyd. No. 7

WS B

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 51.56 cfs |
| Storm frequency | = | 2 yrs | Time to peak | = | 718 min |
| Time interval | = | 2 min | Hyd. volume | = | 128,574 cuft |
| Drainage area | = | 10.660 ac | Curve number | = | 95* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 7.20 min |
| Total precip. | = | 3.89 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(5.190 x 91) + (5.470 x 98)] / 10.660



# TR55 Tc Worksheet



## Hyd. No. 7

WS B

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.035 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 100.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 3.89 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 0.50 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 4.83** | **+** | **0.00** | **+** | **0.00** | **=** | **4.83** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 99.00 | | 0.00 | | 0.00 | | |
| Watercourse slope (%) | = 0.50 | | 0.00 | | 0.00 | | |
| Surface description | = Unpaved | | Unpaved | | Paved | | |
| Average velocity (ft/s) | =1.14 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 1.45** | **+** | **0.00** | **+** | **0.00** | **=** | **1.45** |
| **Channel Flow** | | | | | | | |
| X sectional flow area (sqft) | = 3.14 | | 21.97 | | 0.00 | | |
| Wetted perimeter (ft) | = 6.28 | | 1.50 | | 0.00 | | |
| Channel slope (%) | = 2.10 | | 1.40 | | 0.00 | | |
| Manning's n-value | = 0.013 | | 0.035 | | 0.015 | | |
| Velocity (ft/s) | =10.44 | | | | | | |
| | | | 30.42 | | | | |
| | | | | | 0.00 | | |
| Flow length (ft) | ({0})67.0 | | 1577.0 | | 0.0 | | |
| **Travel Time (min)** | **= 0.11** | **+** | **0.86** | **+** | **0.00** | **=** | **0.97** |

**Total Travel Time, Tc ..... 7.20 min**

# Hydrograph Report

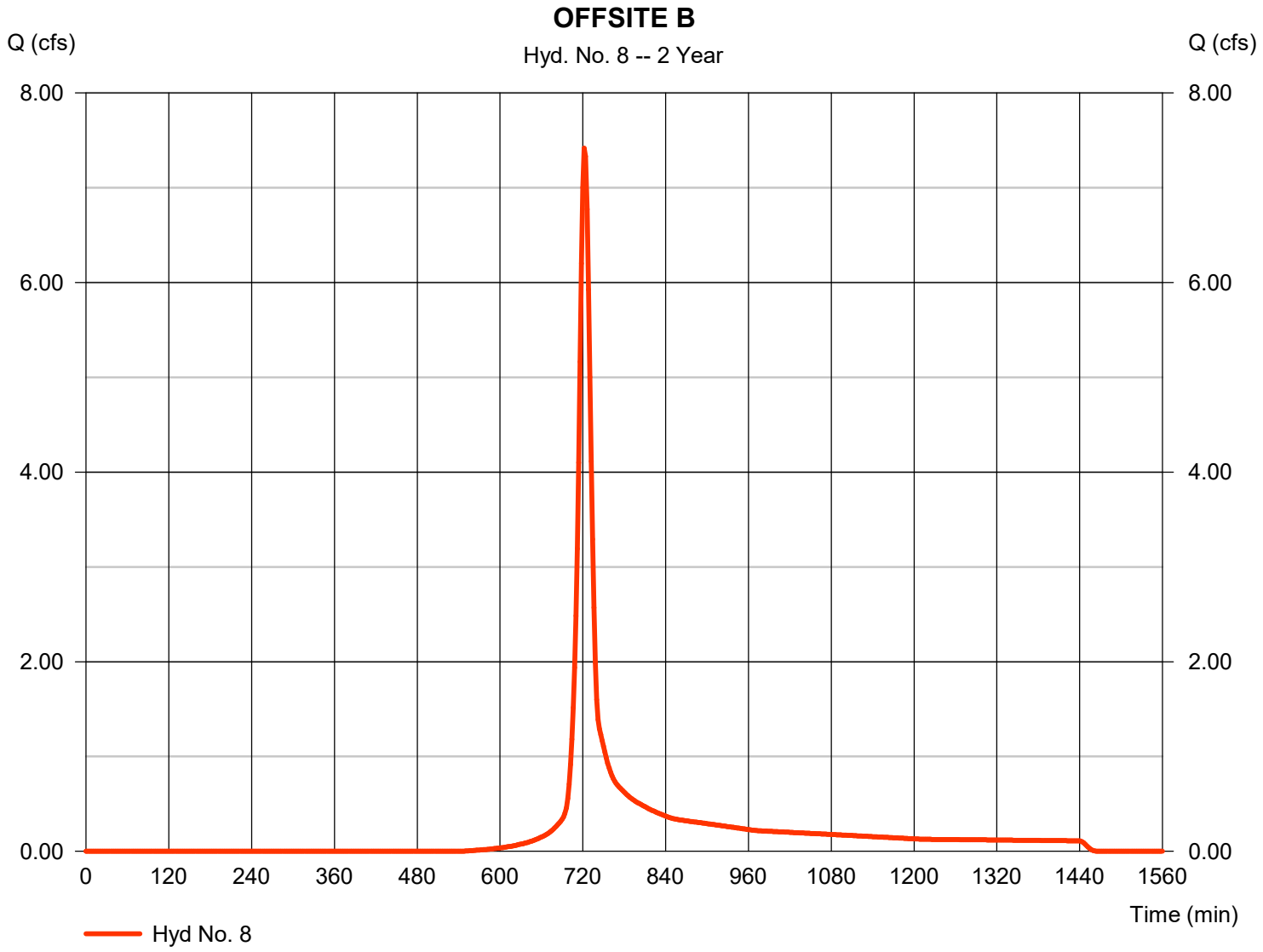


## Hyd. No. 8

OFFSITE B

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 7.418 cfs |
| Storm frequency | = | 2 yrs | Time to peak | = | 722 min |
| Time interval | = | 2 min | Hyd. volume | = | 20,892 cuft |
| Drainage area | = | 3.280 ac | Curve number | = | 78* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 14.40 min |
| Total precip. | = | 3.89 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(1.940 x 72) + (0.580 x 81) + (0.690 x 91) + (0.070 x 98)] / 3.280



# TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025

## Hyd. No. 8

OFFSITE B

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.170 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 100.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 3.89 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 1.65 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 10.61** | **+** | **0.00** | **+** | **0.00** | **=** | **10.61** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 476.00 | | 0.00 | | 0.00 | | |
| Watercourse slope (%) | = 1.65 | | 0.00 | | 0.00 | | |
| Surface description | = Unpaved | | Paved | | Paved | | |
| Average velocity (ft/s) | =2.07 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 3.83** | **+** | **0.00** | **+** | **0.00** | **=** | **3.83** |
| **Channel Flow** | | | | | | | |
| X sectional flow area (sqft) | = 0.00 | | 0.00 | | 0.00 | | |
| Wetted perimeter (ft) | = 0.00 | | 0.00 | | 0.00 | | |
| Channel slope (%) | = 0.00 | | 0.00 | | 0.00 | | |
| Manning's n-value | = 0.015 | | 0.015 | | 0.015 | | |
| Velocity (ft/s) | =0.00 | | | | | | |
| | | | 0.00 | | | | |
| | | | | | 0.00 | | |
| Flow length (ft) | ({0})0.0 | | 0.0 | | 0.0 | | |
| **Travel Time (min)** | **= 0.00** | **+** | **0.00** | **+** | **0.00** | **=** | **0.00** |

**Total Travel Time, Tc ..... 14.40 min**

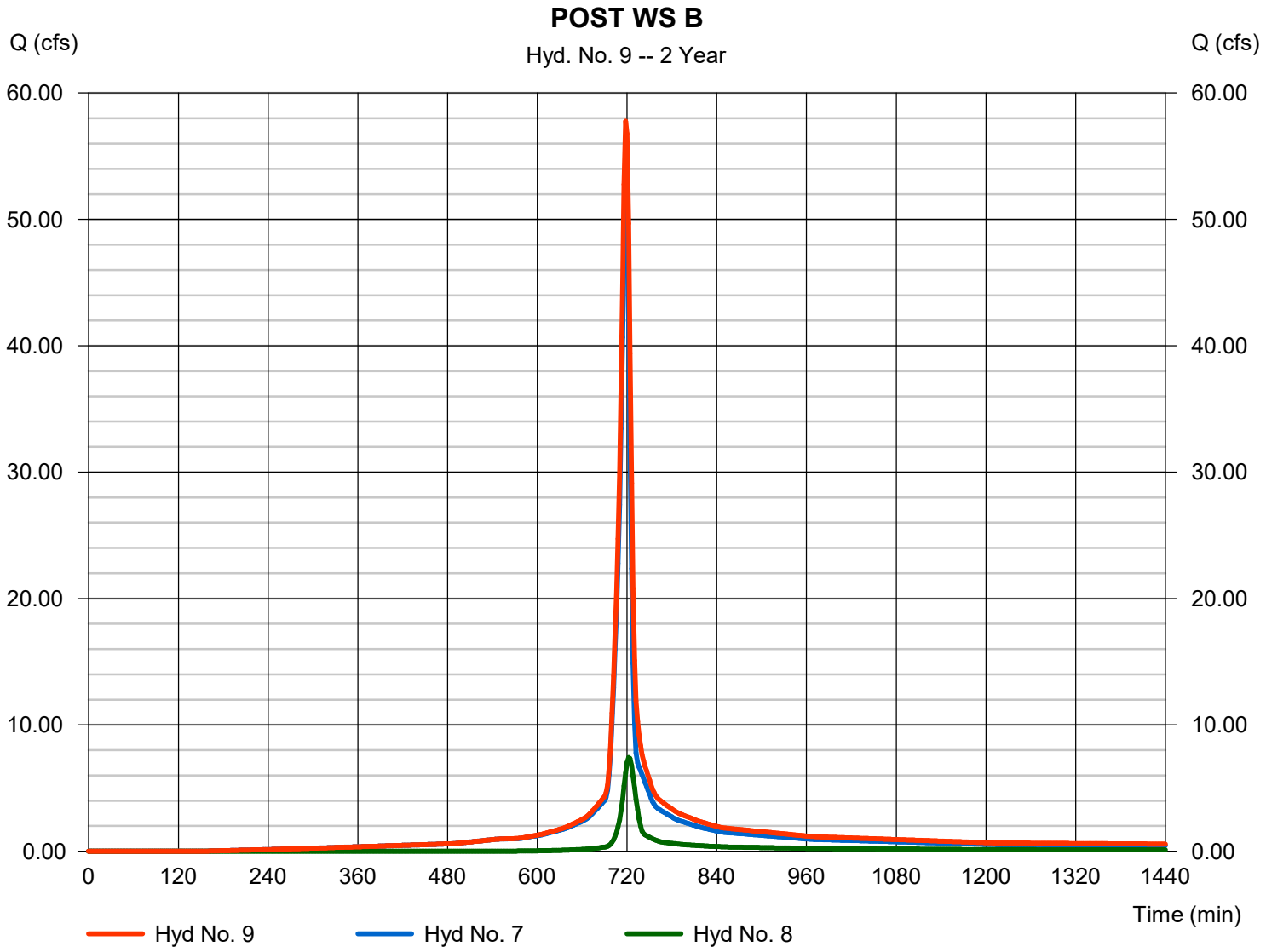
# Hydrograph Report



## Hyd. No. 9

POST WS B

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Combine | Peak discharge | = | 57.76 cfs |
| Storm frequency | = | 2 yrs | Time to peak | = | 718 min |
| Time interval | = | 2 min | Hyd. volume | = | 149,466 cuft |
| Inflow hyds. | = | 7, 8 | Contrib. drain. area | = | 13.940 ac |



# Hydrograph Report

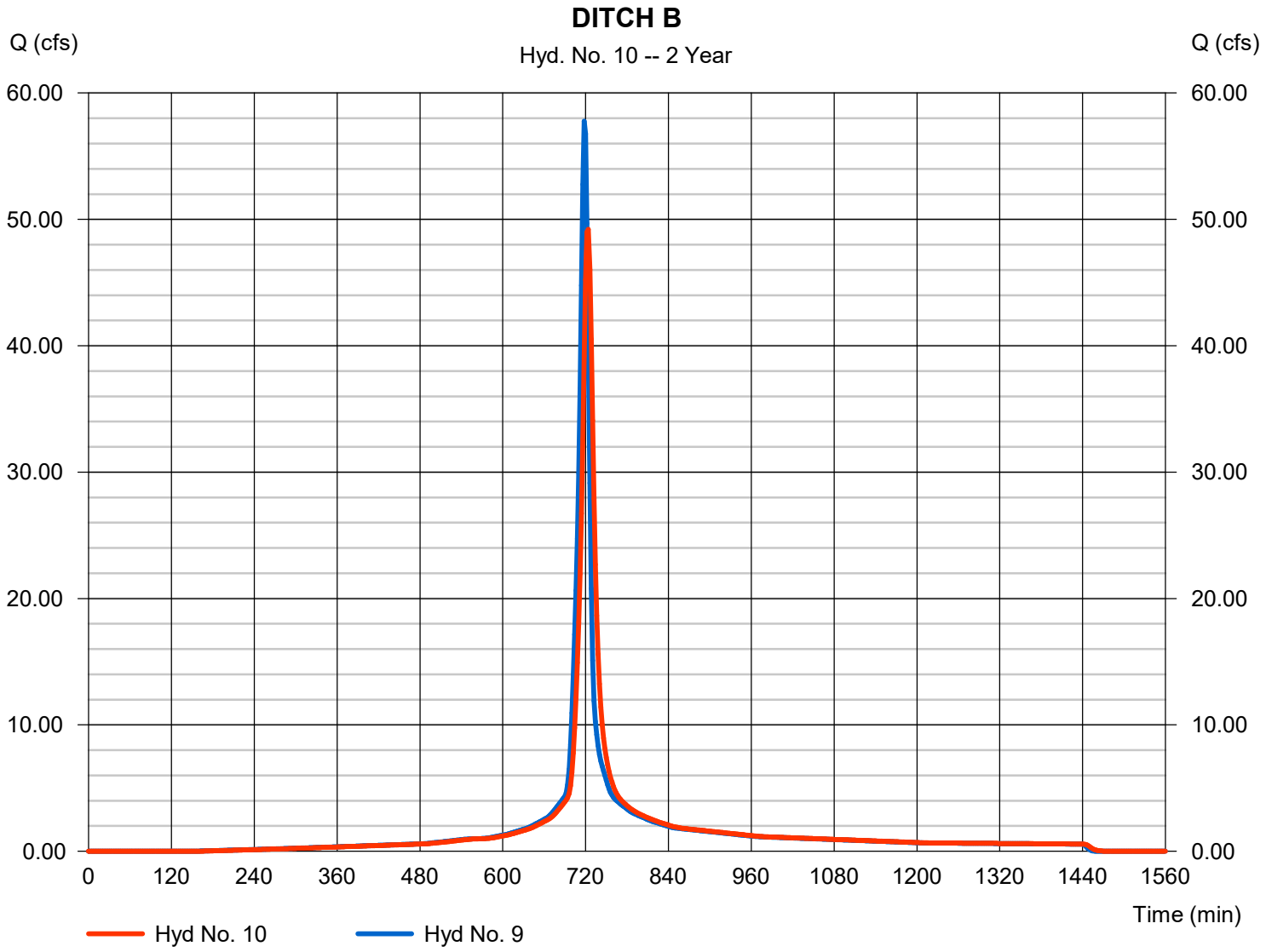


## Hyd. No. 10

DITCH B

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reach | Peak discharge | = | 49.21 cfs |
| Storm frequency | = | 2 yrs | Time to peak | = | 724 min |
| Time interval | = | 2 min | Hyd. volume | = | 149,463 cuft |
| Inflow hyd. No. | = | 9 - POST WS B | Section type | = | Trapezoidal |
| Reach length | = | 1752.0 ft | Channel slope | = | 1.4 % |
| Manning's n | = | 0.035 | Bottom width | = | 3.0 ft |
| Side slope | = | 3.0:1 | Max. depth | = | 3.0 ft |
| Rating curve x | = | 2.421 | Rating curve m | = | 1.248 |
| Ave. velocity | = | 4.55 ft/s | Routing coeff. | = | 0.3256 |

Modified Att-Kin routing method used.



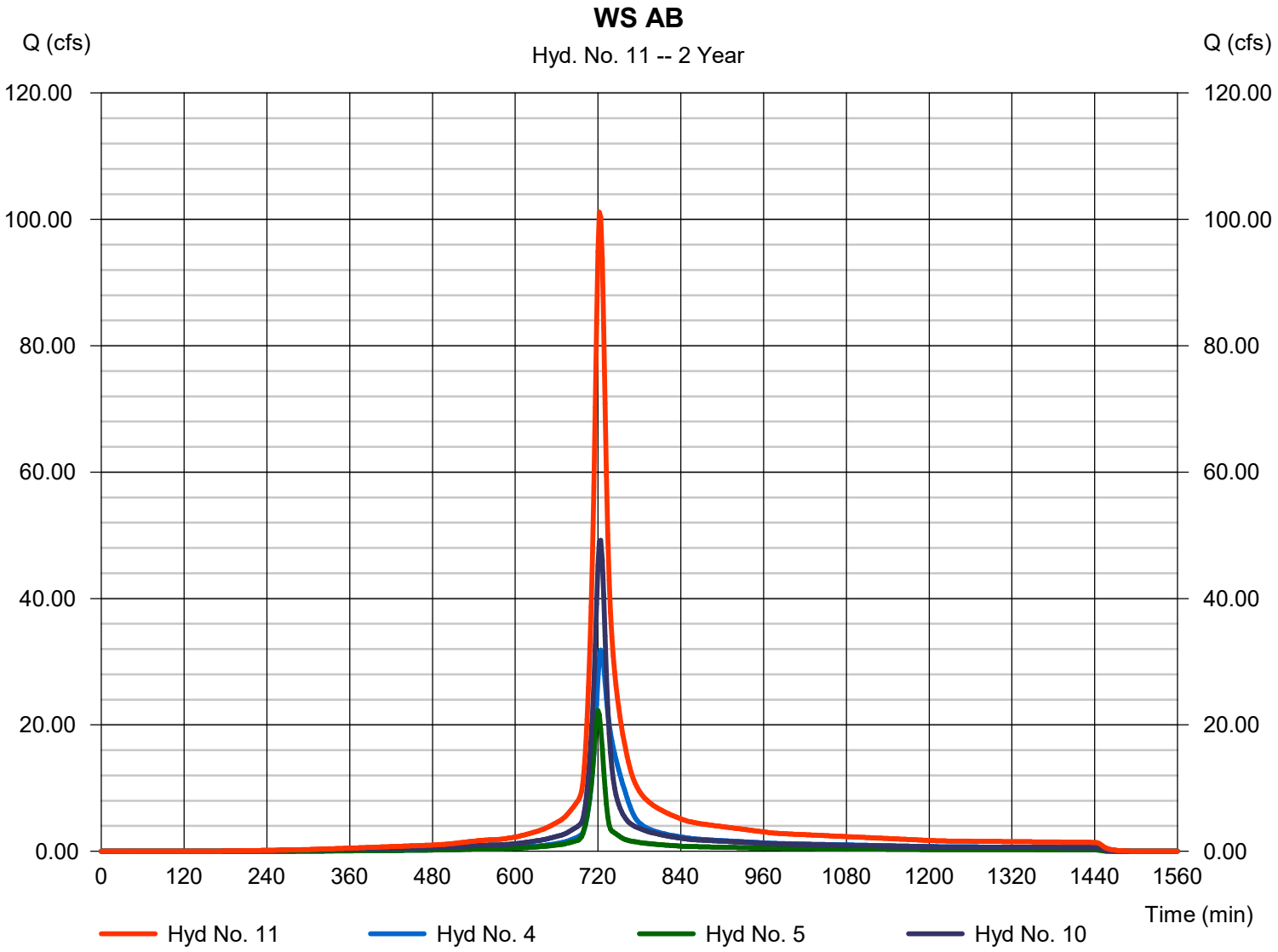
# Hydrograph Report



## Hyd. No. 11

WS AB

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 101.11 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 722 min |
| Time interval | = 2 min | Hyd. volume | = 337,368 cuft |
| Inflow hyds. | = 4, 5, 10 | Contrib. drain. area | = 5.330 ac |



# Hydrograph Report

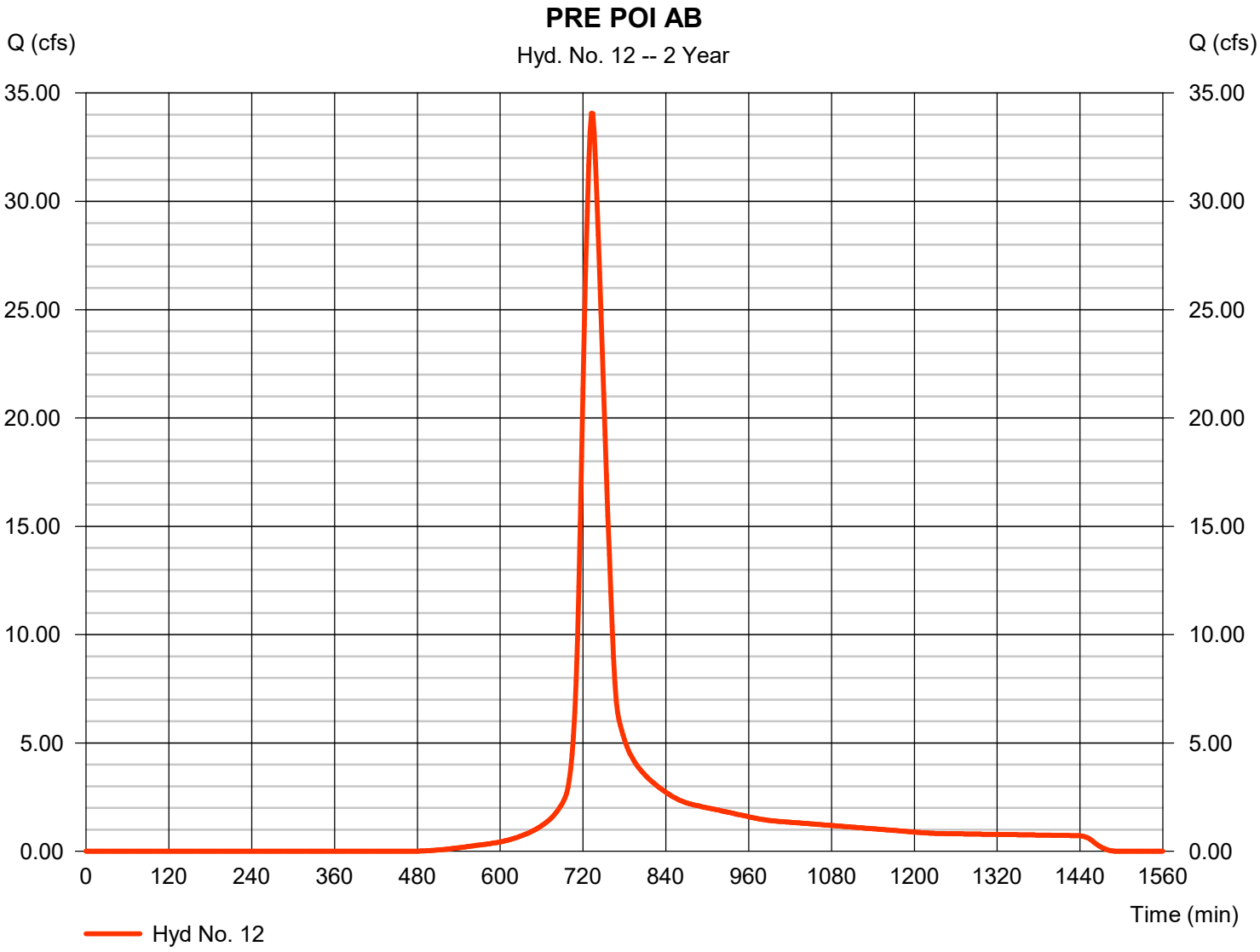


## Hyd. No. 12

PRE POI AB

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 34.07 cfs |
| Storm frequency | = | 2 yrs | Time to peak | = | 732 min |
| Time interval | = | 2 min | Hyd. volume | = | 147,606 cuft |
| Drainage area | = | 19.040 ac | Curve number | = | 82* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 32.80 min |
| Total precip. | = | 3.89 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(8.630 x 72) + (1.450 x 88) + (7.160 x 91) + (1.800 x 91)] / 19.040



# TR55 Tc Worksheet



## Hyd. No. 12

PRE POI AB

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.170 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 100.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 3.89 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 0.50 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 17.10** | **+** | **0.00** | **+** | **0.00** | **=** | **17.10** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 1872.00 | | 0.00 | | 0.00 | | |
| Watercourse slope (%) | = 1.52 | | 0.00 | | 0.00 | | |
| Surface description | = Unpaved | | Paved | | Paved | | |
| Average velocity (ft/s) | =1.99 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 15.68** | **+** | **0.00** | **+** | **0.00** | **=** | **15.68** |
| **Channel Flow** | | | | | | | |
| X sectional flow area (sqft) | = 0.00 | | 0.00 | | 0.00 | | |
| Wetted perimeter (ft) | = 0.00 | | 0.00 | | 0.00 | | |
| Channel slope (%) | = 0.00 | | 0.00 | | 0.00 | | |
| Manning's n-value | = 0.015 | | 0.015 | | 0.015 | | |
| Velocity (ft/s) | =0.00 | | | | | | |
| | | | 0.00 | | | | |
| | | | | | 0.00 | | |
| Flow length (ft) | ({0})0.0 | | 0.0 | | 0.0 | | |
| **Travel Time (min)** | **= 0.00** | **+** | **0.00** | **+** | **0.00** | **=** | **0.00** |

**Total Travel Time, Tc ..... 32.80 min**

# Hydrograph Report

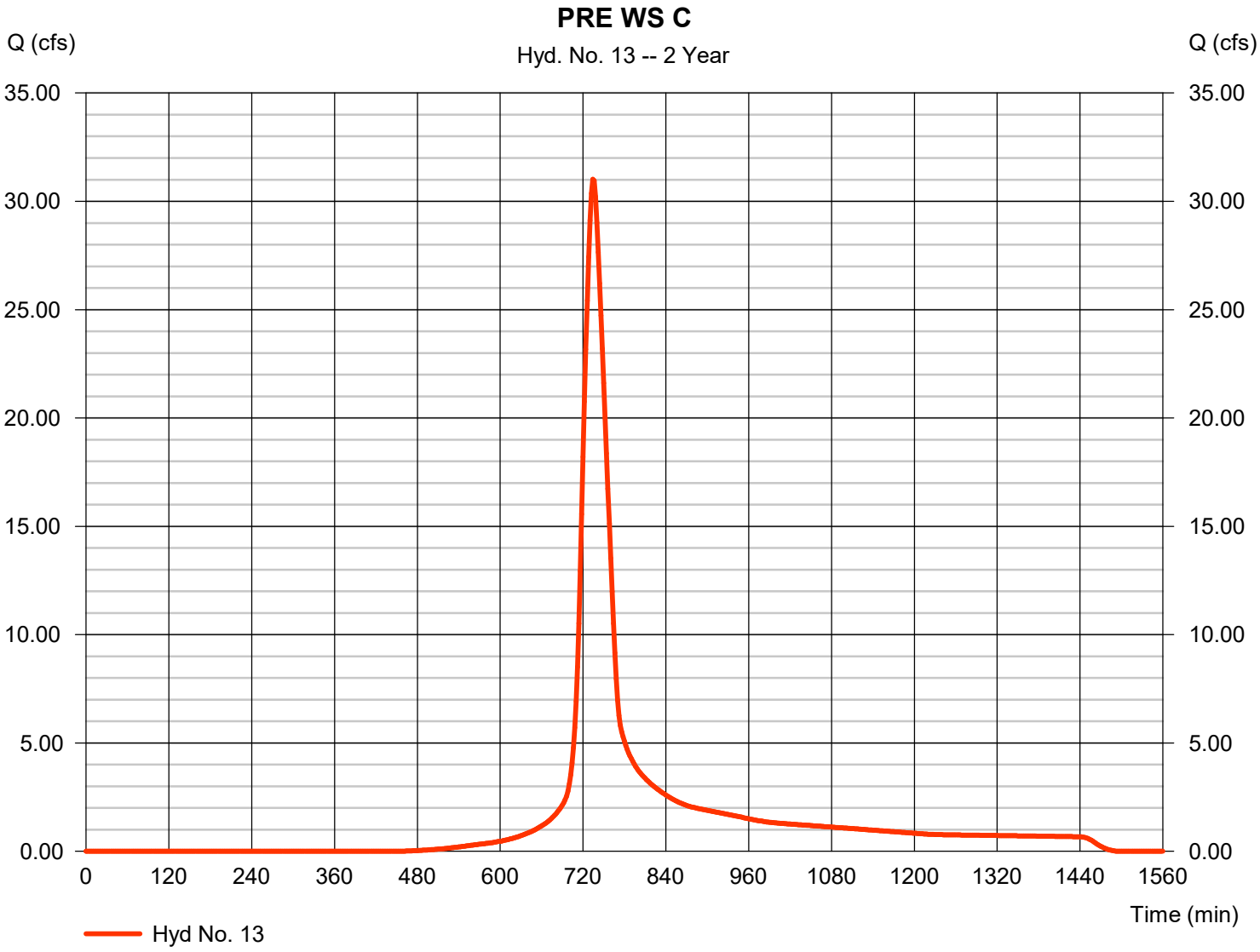


## Hyd. No. 13

PRE WS C

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 31.02 cfs |
| Storm frequency | = | 2 yrs | Time to peak | = | 734 min |
| Time interval | = | 2 min | Hyd. volume | = | 140,667 cuft |
| Drainage area | = | 17.890 ac | Curve number | = | 83* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 34.60 min |
| Total precip. | = | 3.89 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(7.590 x 72) + (0.390 x 81) + (0.830 x 88) + (9.080 x 91)] / 17.890



# TR55 Tc Worksheet



## Hyd. No. 13

PRE WS C

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.170 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 100.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 3.89 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 1.34 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 11.53** | **+** | **0.00** | **+** | **0.00** | **=** | **11.53** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 2584.00 | | 0.00 | | 0.00 | | |
| Watercourse slope (%) | = 1.34 | | 0.00 | | 0.00 | | |
| Surface description | = Unpaved | | Paved | | Paved | | |
| Average velocity (ft/s) | =1.87 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 23.06** | **+** | **0.00** | **+** | **0.00** | **=** | **23.06** |
| **Channel Flow** | | | | | | | |
| X sectional flow area (sqft) | = 0.00 | | 0.00 | | 0.00 | | |
| Wetted perimeter (ft) | = 0.00 | | 0.00 | | 0.00 | | |
| Channel slope (%) | = 0.00 | | 0.00 | | 0.00 | | |
| Manning's n-value | = 0.015 | | 0.015 | | 0.015 | | |
| Velocity (ft/s) | =0.00 | | | | | | |
| | | | 0.00 | | | | |
| | | | | | 0.00 | | |
| Flow length (ft) | ({0})0.0 | | 0.0 | | 0.0 | | |
| **Travel Time (min)** | **= 0.00** | **+** | **0.00** | **+** | **0.00** | **=** | **0.00** |

**Total Travel Time, Tc ..... 34.60 min**

# Hydrograph Report

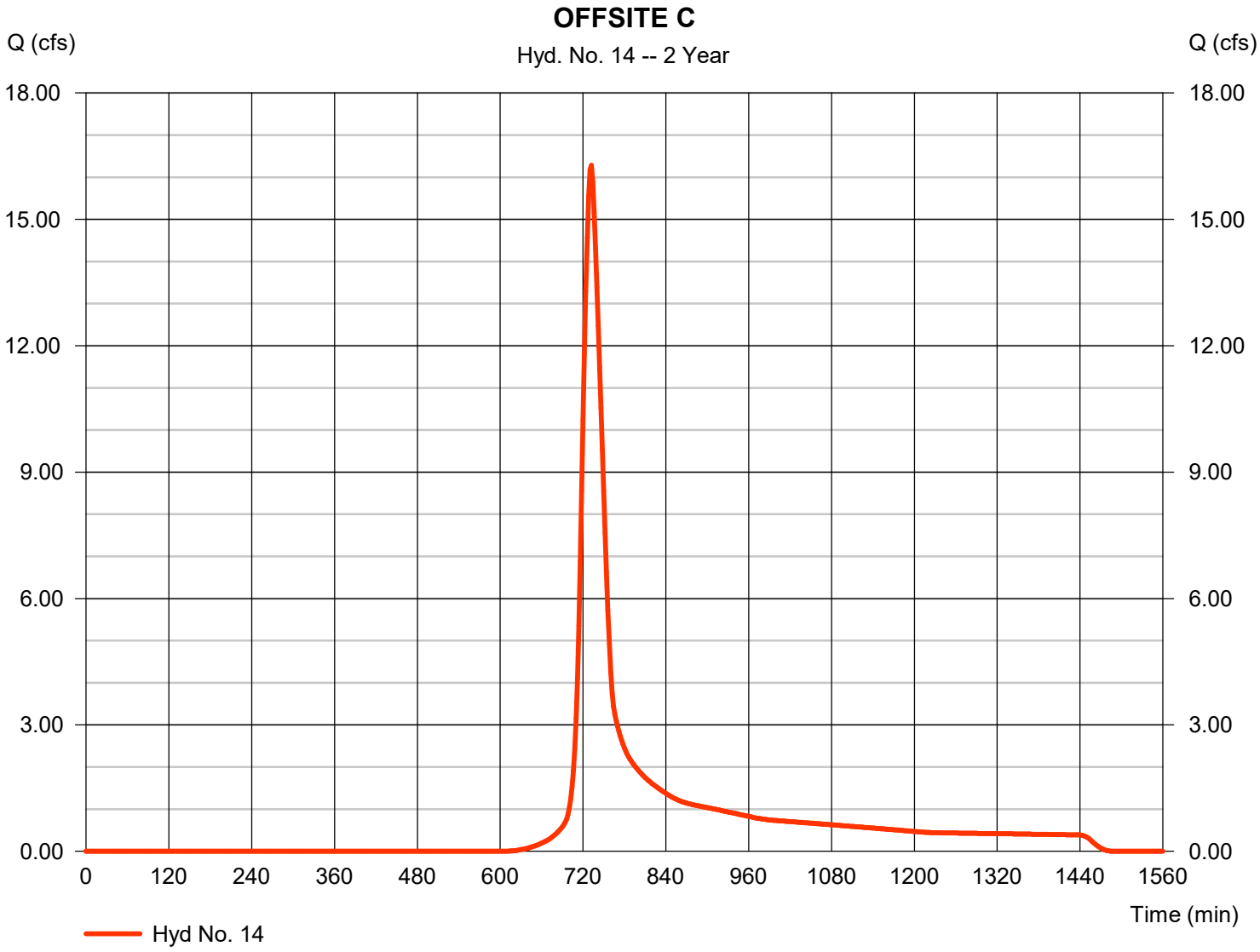


## Hyd. No. 14

OFFSITE C

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 16.28 cfs |
| Storm frequency | = | 2 yrs | Time to peak | = | 732 min |
| Time interval | = | 2 min | Hyd. volume | = | 67,195 cuft |
| Drainage area | = | 12.210 ac | Curve number | = | 74* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 27.00 min |
| Total precip. | = | 3.89 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(10.710 x 72) + (0.620 x 81) + (0.710 x 91) + (0.170 x 98)] / 12.210



# TR55 Tc Worksheet



## Hyd. No. 14

OFFSITE C

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.170 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 100.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 3.89 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 0.62 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 15.69** | **+** | **0.00** | **+** | **0.00** | **=** | **15.69** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 864.00 | | 0.00 | | 0.00 | | |
| Watercourse slope (%) | = 0.62 | | 0.00 | | 0.00 | | |
| Surface description | = Unpaved | | Paved | | Paved | | |
| Average velocity (ft/s) | =1.27 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 11.33** | **+** | **0.00** | **+** | **0.00** | **=** | **11.33** |
| **Channel Flow** | | | | | | | |
| X sectional flow area (sqft) | = 0.00 | | 0.00 | | 0.00 | | |
| Wetted perimeter (ft) | = 0.00 | | 0.00 | | 0.00 | | |
| Channel slope (%) | = 0.00 | | 0.00 | | 0.00 | | |
| Manning's n-value | = 0.015 | | 0.015 | | 0.015 | | |
| Velocity (ft/s) | =0.00 | | | | | | |
| | | | 0.00 | | | | |
| | | | | | 0.00 | | |
| Flow length (ft) | ({0})0.0 | | 0.0 | | 0.0 | | |
| **Travel Time (min)** | **= 0.00** | **+** | **0.00** | **+** | **0.00** | **=** | **0.00** |

**Total Travel Time, Tc ..... 27.00 min**

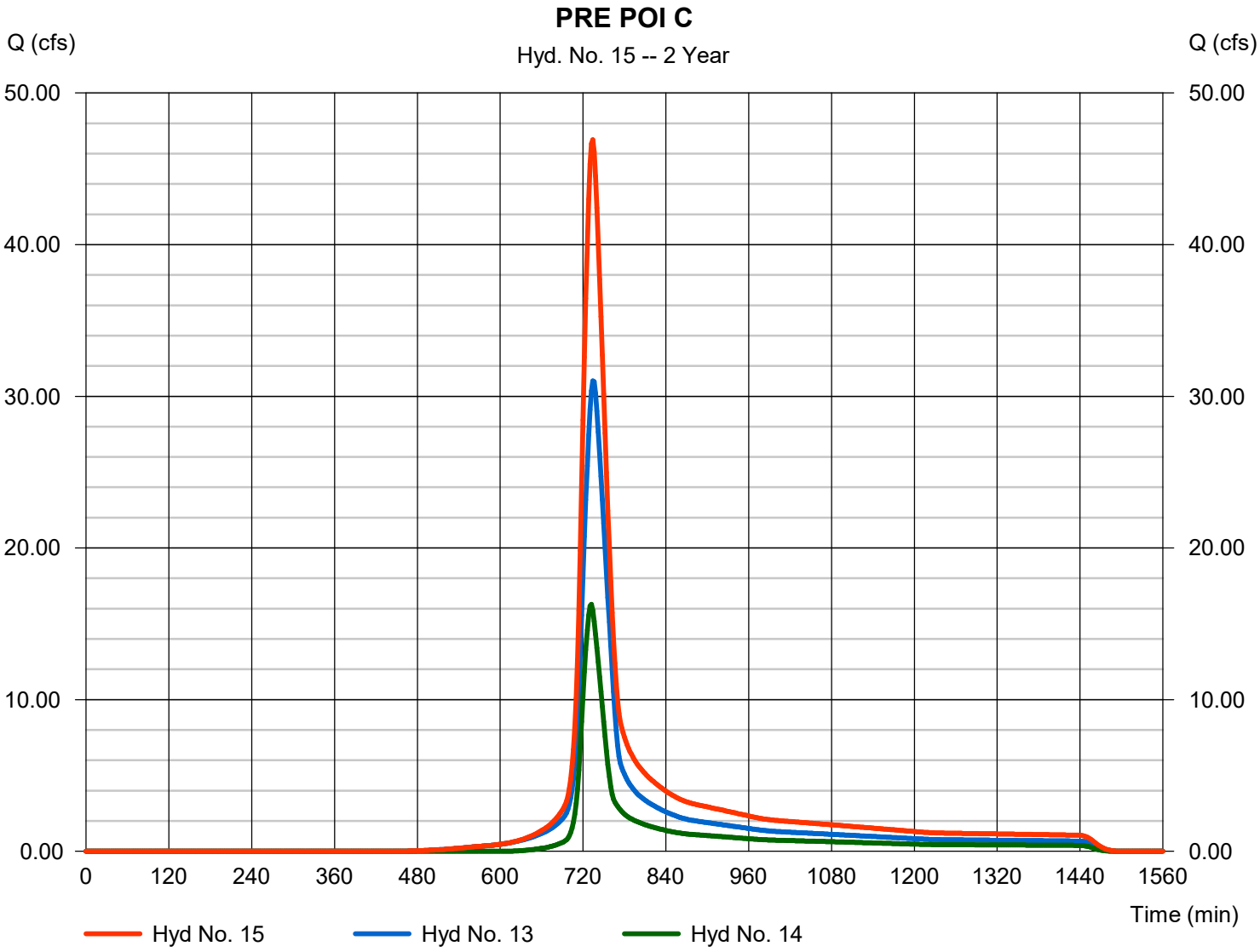
# Hydrograph Report



## Hyd. No. 15

PRE POI C

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 46.91 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 734 min |
| Time interval | = 2 min | Hyd. volume | = 207,862 cuft |
| Inflow hyds. | = 13, 14 | Contrib. drain. area | = 30.100 ac |



# Hydrograph Report

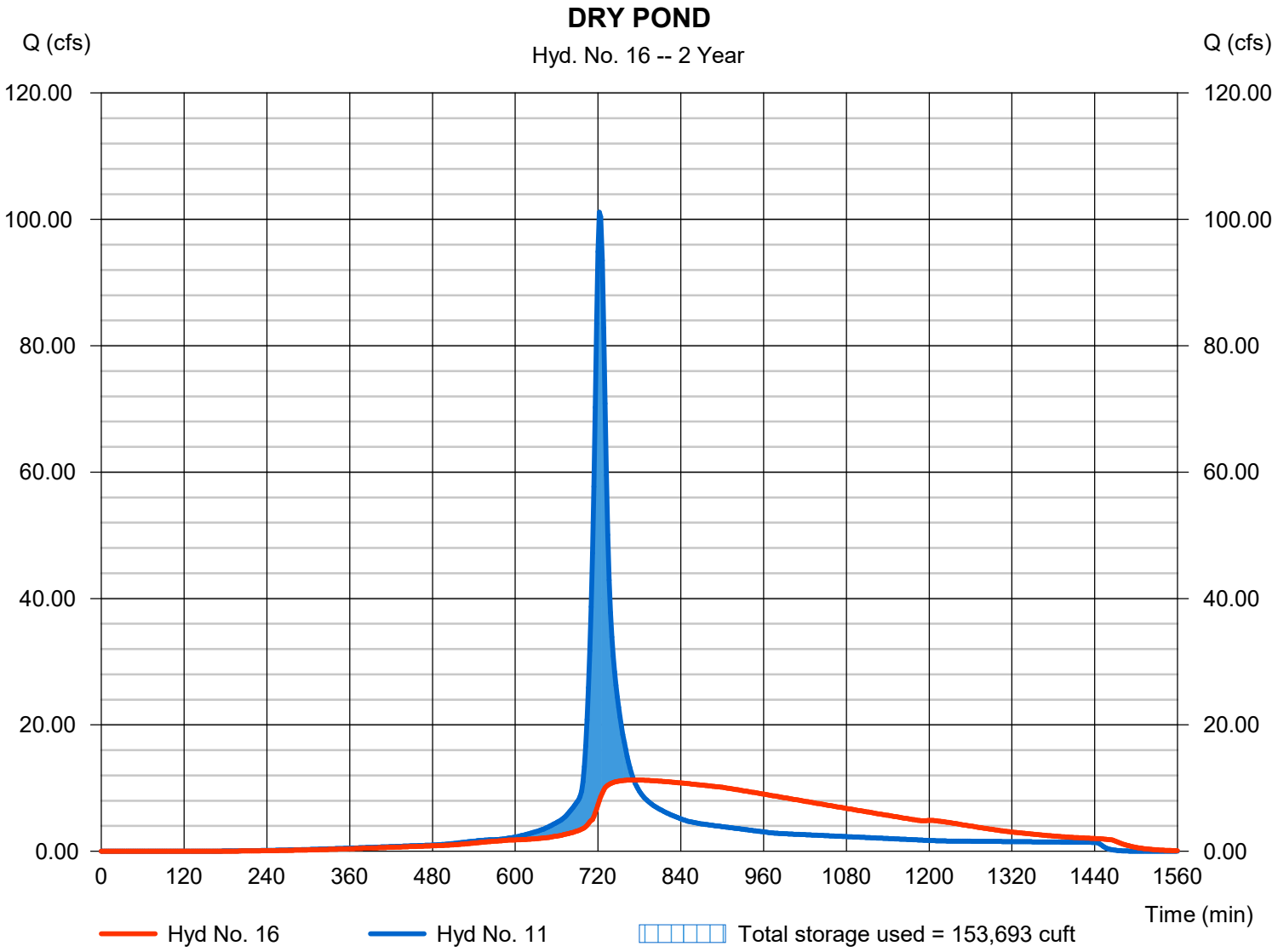


## Hyd. No. 16

DRY POND

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 11.28 cfs |
| Storm frequency | = | 2 yrs | Time to peak | = | 772 min |
| Time interval | = | 2 min | Hyd. volume | = | 337,366 cuft |
| Inflow hyd. No. | = | 11 - WS AB | Max. Elevation | = | 611.32 ft |
| Reservoir name | = | DRY POND | Max. Storage | = | 153,693 cuft |

Storage Indication method used.



# Pond Report



## Pond No. 1 - DRY POND

### Pond Data

**Contours -**User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 609.00 ft

### Stage / Storage Table

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|---|---|---|---|---|
| 0.00 | 609.00 | 13,063 | 0 | 0 |
| 1.00 | 610.00 | 50,447 | 31,755 | 31,755 |
| 2.00 | 611.00 | 117,425 | 83,936 | 115,691 |
| 3.00 | 612.00 | 121,802 | 119,614 | 235,305 |
| 4.00 | 613.00 | 127,271 | 124,537 | 359,841 |
| 5.00 | 614.00 | 133,397 | 130,334 | 490,175 |
| 6.00 | 615.00 | 140,392 | 136,895 | 627,070 |
| 7.00 | 616.00 | 148,314 | 144,353 | 771,423 |

### Culvert / Orifice Structures

| | [A] | [B] | [C] | [PrfRsr] |
|---|---|---|---|---|
| **Rise (in)** | = 18.00 | 0.00 | 0.00 | 0.00 |
| **Span (in)** | = 18.00 | 0.00 | 0.00 | 0.00 |
| **No. Barrels** | = 1 | 0 | 0 | 0 |
| **Invert El. (ft)** | = 608.50 | 0.00 | 0.00 | 0.00 |
| **Length (ft)** | = 58.00 | 0.00 | 0.00 | 0.00 |
| **Slope (%)** | = 0.51 | 0.00 | 0.00 | n/a |
| **N-Value** | = .013 | .013 | .013 | n/a |
| **Orifice Coeff.** | = 0.60 | 0.60 | 0.60 | 0.60 |
| **Multi-Stage** | = n/a | No | No | No |

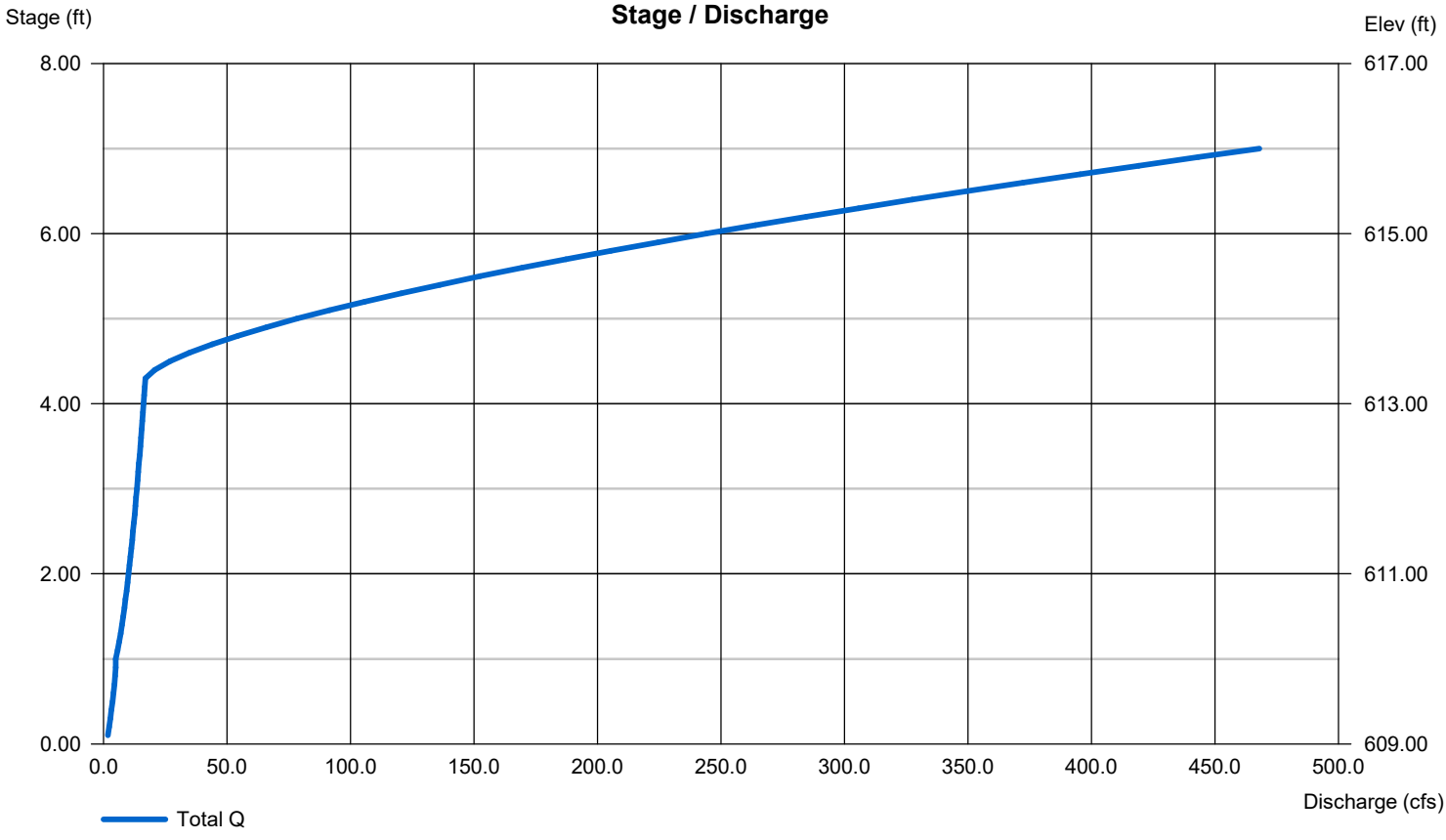
### Weir Structures

| | [A] | [B] | [C] | [D] |
|---|---|---|---|---|
| **Crest Len (ft)** | = 38.00 | 0.00 | 0.00 | 0.00 |
| **Crest El. (ft)** | = 613.29 | 0.00 | 0.00 | 0.00 |
| **Weir Coeff.** | = 2.63 | 3.33 | 3.33 | 3.33 |
| **Weir Type** | = Ciplti | --- | --- | --- |
| **Multi-Stage** | = No | No | No | Yes |

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

**TW Elev. (ft)** = 0.00

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



# Hydrograph Report

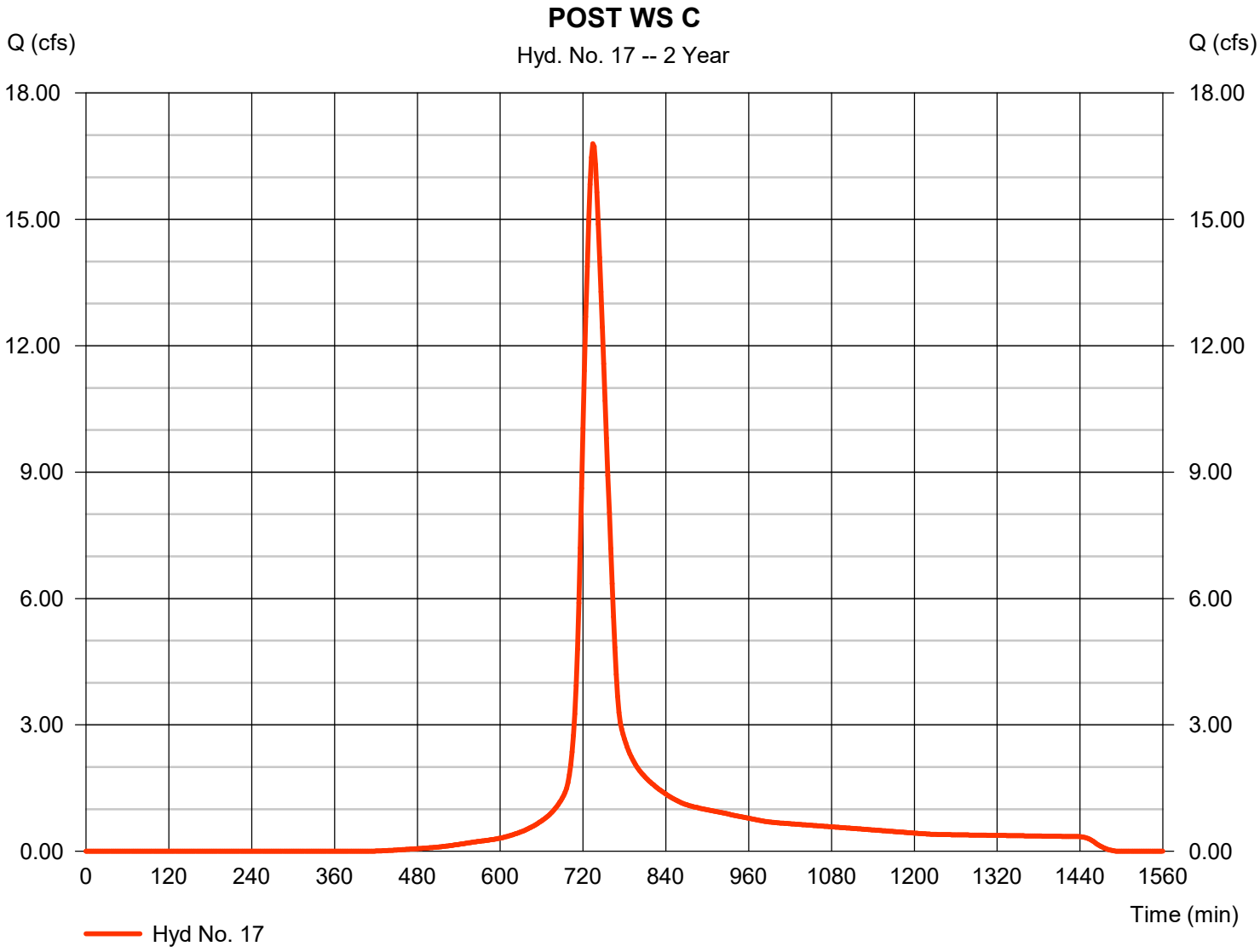


## Hyd. No. 17

POST WS C

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 16.79 cfs |
| Storm frequency | = | 2 yrs | Time to peak | = | 734 min |
| Time interval | = | 2 min | Hyd. volume | = | 76,047 cuft |
| Drainage area | = | 8.980 ac | Curve number | = | 85* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 34.10 min |
| Total precip. | = | 3.89 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(2.480 x 72) + (0.260 x 81) + (0.830 x 88) + (5.410 x 91)] / 8.980



# TR55 Tc Worksheet



## Hyd. No. 17

POST WS C

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.170 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 100.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 3.89 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 1.50 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 11.02** | **+** | **0.00** | **+** | **0.00** | **=** | **11.02** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 2584.00 | | 0.00 | | 0.00 | | |
| Watercourse slope (%) | = 1.34 | | 0.00 | | 0.00 | | |
| Surface description | = Unpaved | | Paved | | Paved | | |
| Average velocity (ft/s) | =1.87 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 23.06** | **+** | **0.00** | **+** | **0.00** | **=** | **23.06** |
| **Channel Flow** | | | | | | | |
| X sectional flow area (sqft) | = 0.00 | | 0.00 | | 0.00 | | |
| Wetted perimeter (ft) | = 0.00 | | 0.00 | | 0.00 | | |
| Channel slope (%) | = 0.00 | | 0.00 | | 0.00 | | |
| Manning's n-value | = 0.015 | | 0.015 | | 0.015 | | |
| Velocity (ft/s) | =0.00 | | | | | | |
| | | | 0.00 | | | | |
| | | | | | 0.00 | | |
| Flow length (ft) | ({0})0.0 | | 0.0 | | 0.0 | | |
| **Travel Time (min)** | **= 0.00** | **+** | **0.00** | **+** | **0.00** | **=** | **0.00** |

**Total Travel Time, Tc ..... 34.10 min**

# Hydrograph Report

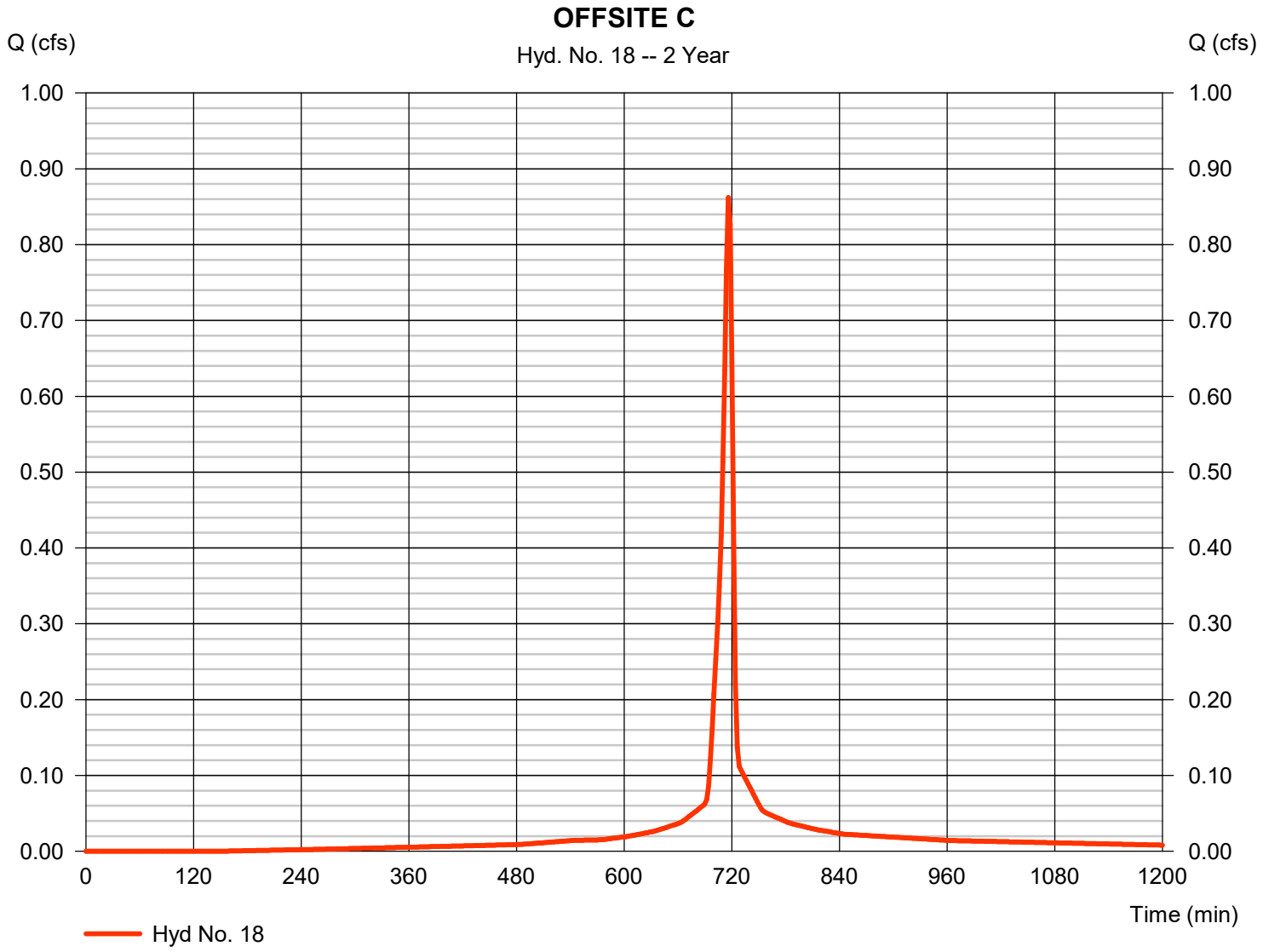


## Hyd. No. 18

OFFSITE C

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 0.862 cfs |
| Storm frequency | = | 2 yrs | Time to peak | = | 716 min |
| Time interval | = | 2 min | Hyd. volume | = | 1,922 cuft |
| Drainage area | = | 0.170 ac | Curve number | = | 95* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | User | Time of conc. (Tc) | = | 5.00 min |
| Total precip. | = | 3.89 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(0.020 x 81) + (0.030 x 91) + (0.120 x 98)] / 0.170



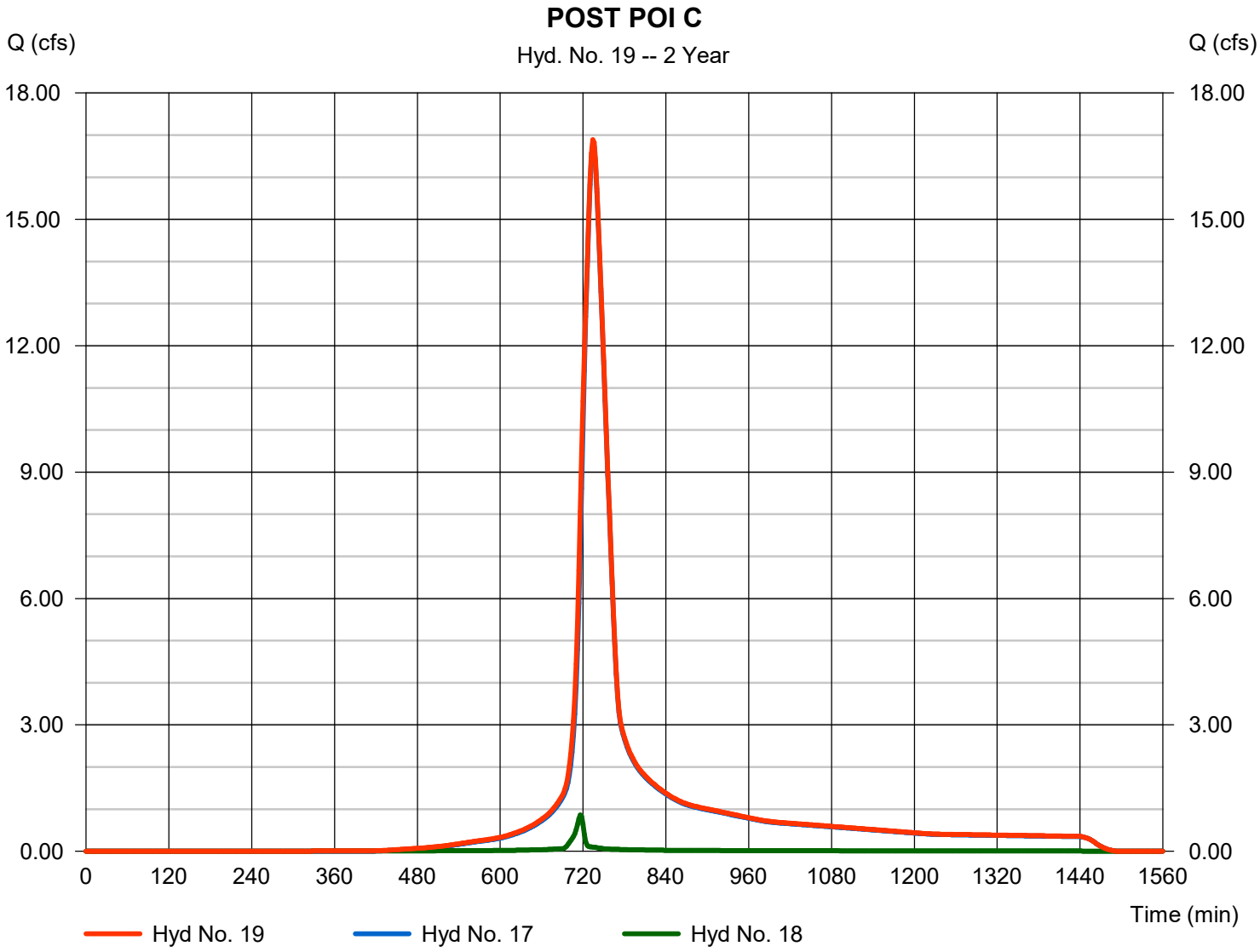
# Hydrograph Report



## Hyd. No. 19

POST POI C

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Combine | Peak discharge | = | 16.89 cfs |
| Storm frequency | = | 2 yrs | Time to peak | = | 734 min |
| Time interval | = | 2 min | Hyd. volume | = | 77,970 cuft |
| Inflow hyds. | = | 17, 18 | Contrib. drain. area | = | 9.150 ac |



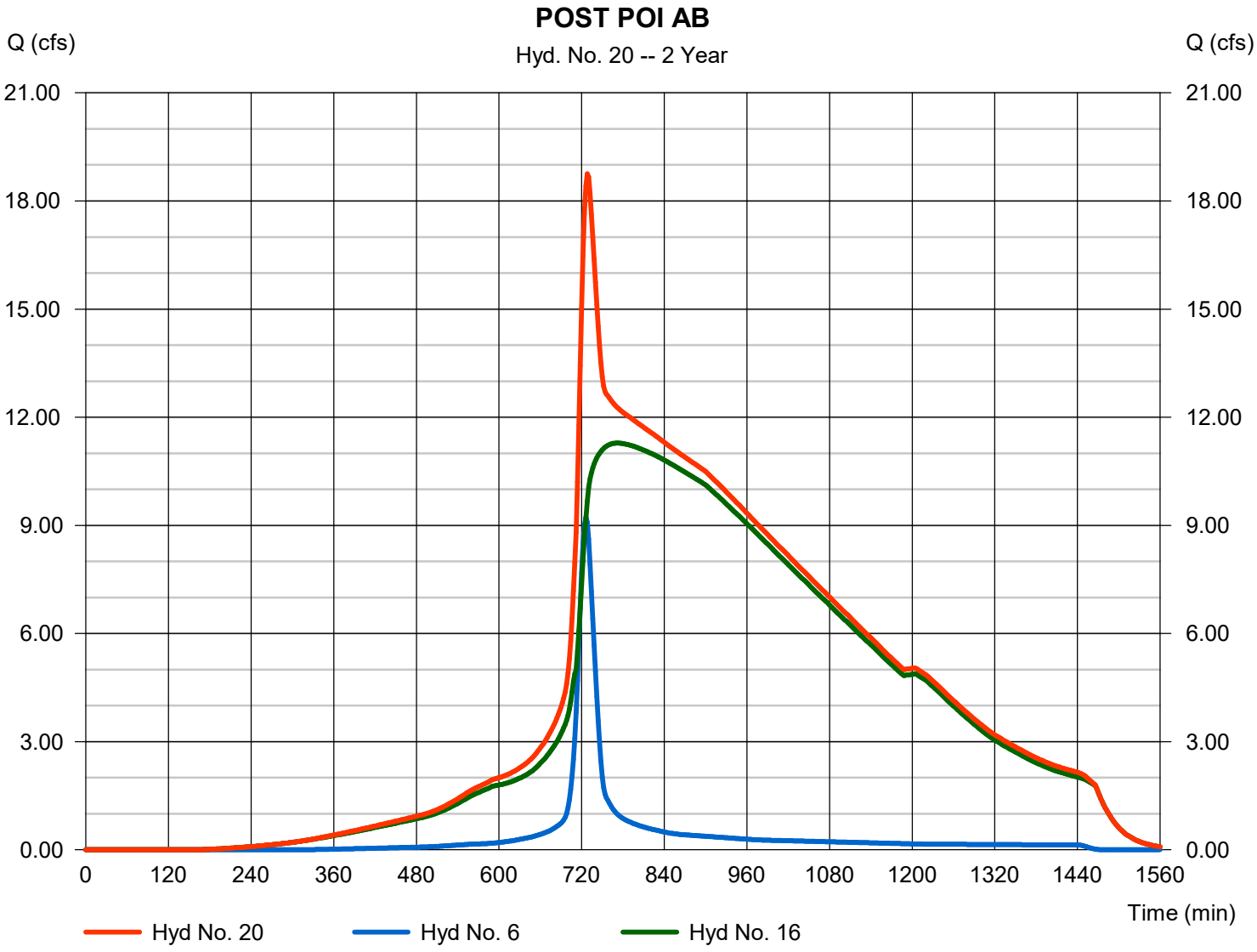
# Hydrograph Report



## Hyd. No. 20

POST POI AB

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Combine | Peak discharge | = | 18.76 cfs |
| Storm frequency | = | 2 yrs | Time to peak | = | 728 min |
| Time interval | = | 2 min | Hyd. volume | = | 369,525 cuft |
| Inflow hyds. | = | 6, 16 | Contrib. drain. area | = | 3.200 ac |



# Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025

| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|
| 1 | SCS Runoff | 78.82 | 2 | 718 | 195,858 | ------ | ------ | ------ | WS A |
| 2 | SCS Runoff | 33.88 | 2 | 732 | 146,403 | ------ | ------ | ------ | OFFSITE A |
| 3 | Combine | 97.64 | 2 | 720 | 342,261 | 1, 2 | ------ | ------ | POST WS A |
| 4 | Reach | 82.89 | 2 | 724 | 342,258 | 3 | ------ | ------ | DITCH A |
| 5 | SCS Runoff | 48.37 | 2 | 720 | 136,980 | ------ | ------ | ------ | WS A3 |
| 6 | SCS Runoff | 21.25 | 2 | 726 | 76,974 | ------ | ------ | ------ | Undisturbed - WS A |
| 7 | SCS Runoff | 107.31 | 2 | 718 | 279,462 | ------ | ------ | ------ | WS B |
| 8 | SCS Runoff | 21.39 | 2 | 722 | 60,654 | ------ | ------ | ------ | OFFSITE B |
| 9 | Combine | 126.00 | 2 | 718 | 340,117 | 7, 8 | ------ | ------ | POST WS B |
| 10 | Reach | 111.16 | 2 | 722 | 340,113 | 9 | ------ | ------ | DITCH B |
| 11 | Combine | 238.22 | 2 | 722 | 819,353 | 4, 5, 10 | ------ | ------ | WS AB |
| 12 | SCS Runoff | 91.13 | 2 | 732 | 398,114 | ------ | ------ | ------ | PRE POI AB |
| 13 | SCS Runoff | 81.17 | 2 | 734 | 372,741 | ------ | ------ | ------ | PRE WS C |
| 14 | SCS Runoff | 52.85 | 2 | 730 | 211,196 | ------ | ------ | ------ | OFFSITE C |
| 15 | Combine | 132.53 | 2 | 732 | 583,938 | 13, 14 | ------ | ------ | PRE POI C |
| 16 | Reservoir | 24.13 | 2 | 774 | 819,350 | 11 | 613.45 | 419,139 | DRY POND |
| 17 | SCS Runoff | 42.09 | 2 | 734 | 194,641 | ------ | ------ | ------ | POST WS C |
| 18 | SCS Runoff | 1.792 | 2 | 716 | 4,178 | ------ | ------ | ------ | OFFSITE C |
| 19 | Combine | 42.29 | 2 | 734 | 198,819 | 17, 18 | ------ | ------ | POST POI C |
| 20 | Combine | 35.46 | 2 | 728 | 896,324 | 6, 16, | ------ | ------ | POST POI AB |

# Hydrograph Report

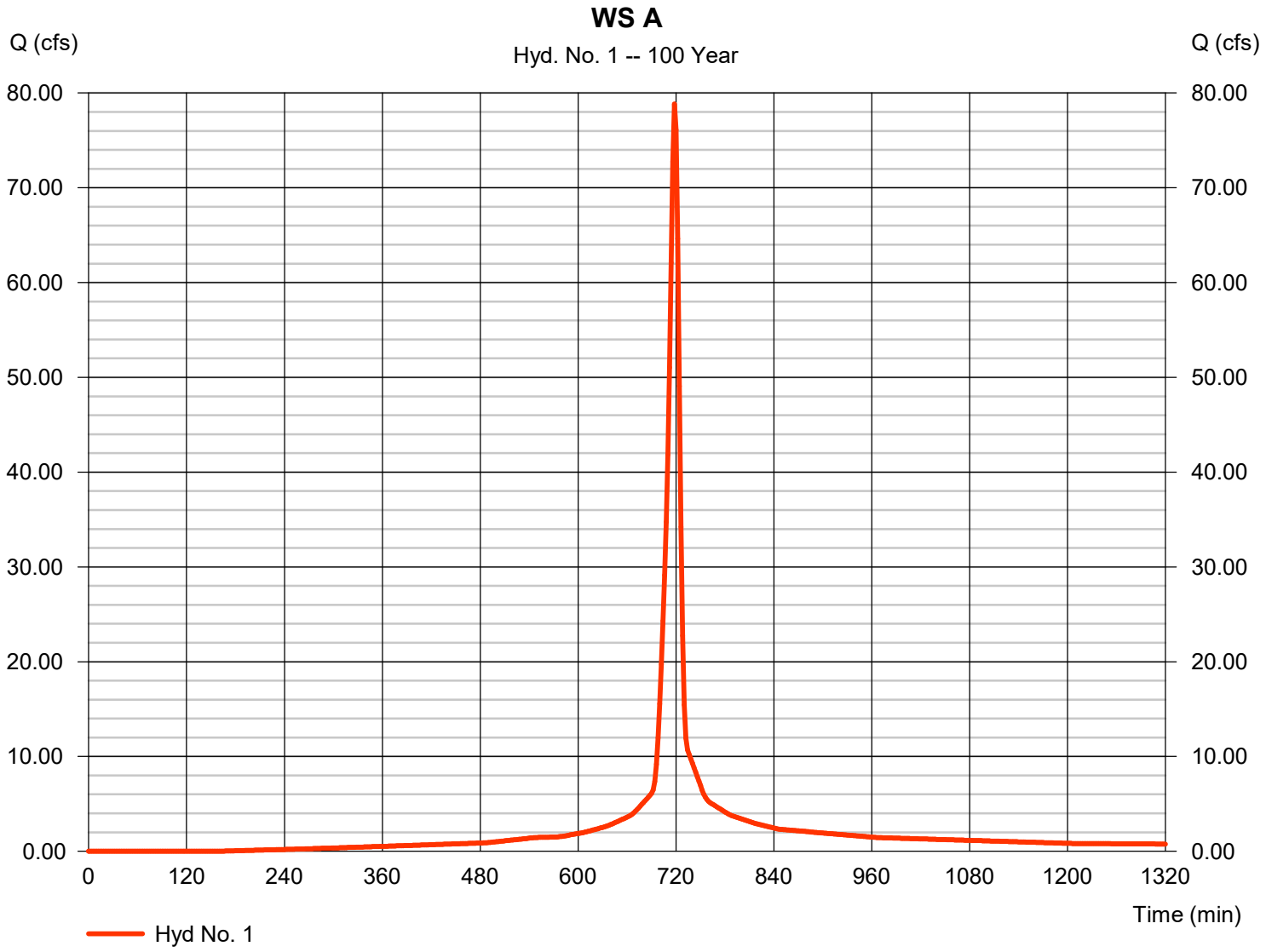


## Hyd. No. 1

WS A

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 78.82 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 718 min |
| Time interval | = | 2 min | Hyd. volume | = | 195,858 cuft |
| Drainage area | = | 8.140 ac | Curve number | = | 90* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 8.30 min |
| Total precip. | = | 7.82 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(1.740 x 72) + (2.310 x 91) + (4.090 x 98)] / 8.140



# Hydrograph Report

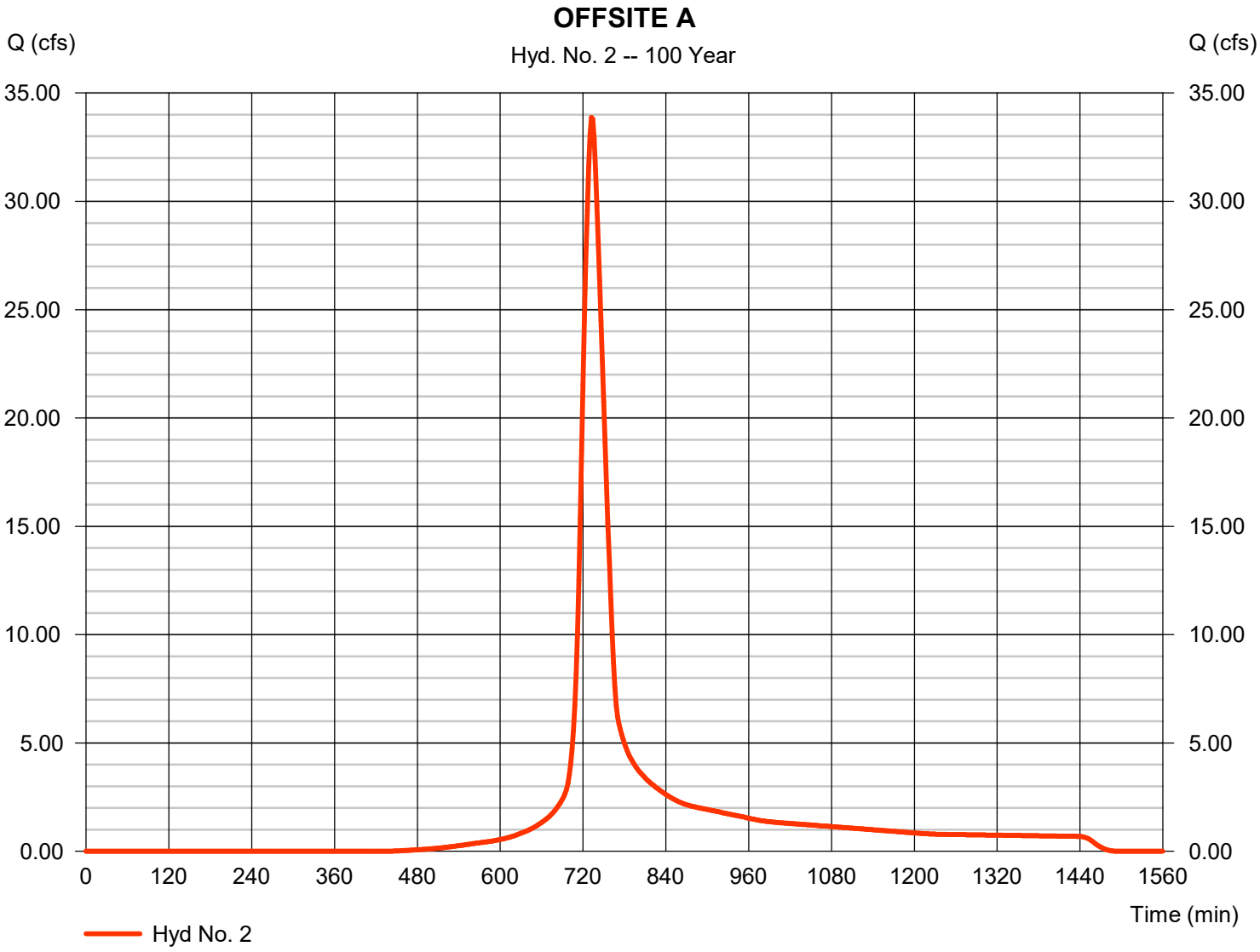


## Hyd. No. 2

OFFSITE A

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 33.88 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 732 min |
| Time interval | = | 2 min | Hyd. volume | = | 146,403 cuft |
| Drainage area | = | 8.780 ac | Curve number | = | 72* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 32.40 min |
| Total precip. | = | 7.82 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(8.780 x 72)] / 8.780



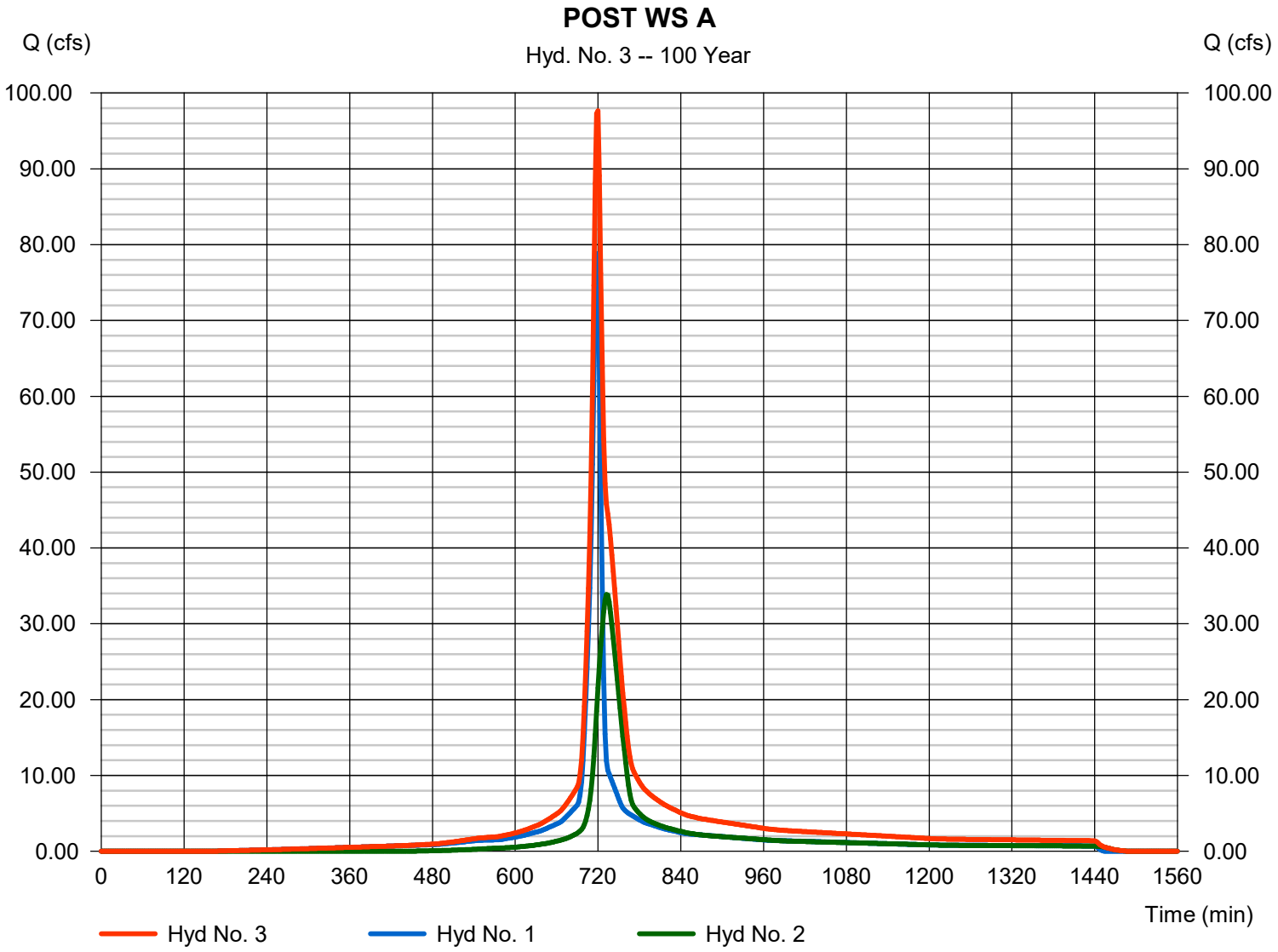
# Hydrograph Report



## Hyd. No. 3

POST WS A

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 97.64 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 720 min |
| Time interval | = 2 min | Hyd. volume | = 342,261 cuft |
| Inflow hyds. | = 1, 2 | Contrib. drain. area | = 16.920 ac |



# Hydrograph Report

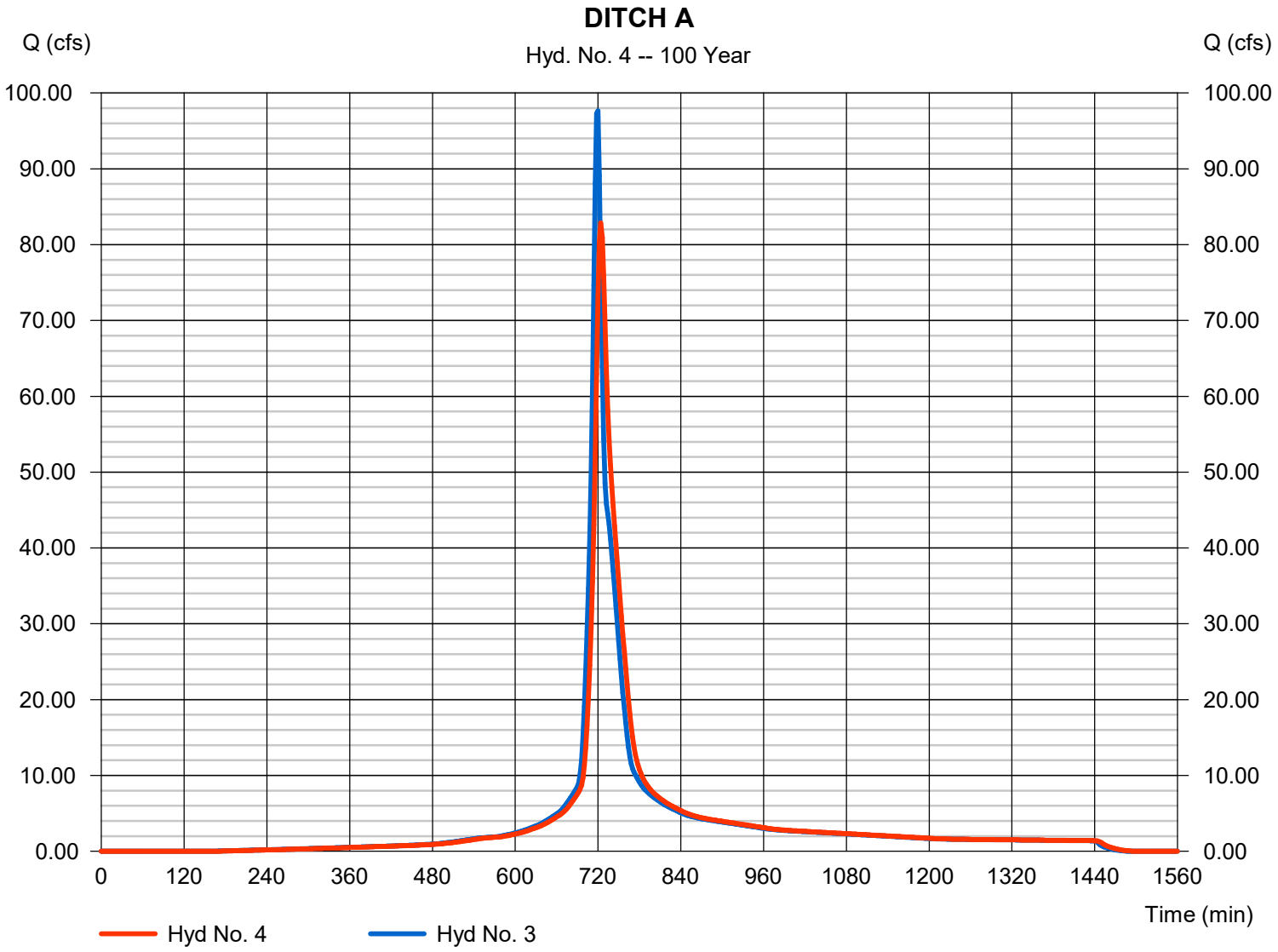


## Hyd. No. 4

DITCH A

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reach | Peak discharge | = | 82.89 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 724 min |
| Time interval | = | 2 min | Hyd. volume | = | 342,258 cuft |
| Inflow hyd. No. | = | 3 - POST WS A | Section type | = | Trapezoidal |
| Reach length | = | 2104.0 ft | Channel slope | = | 1.3 % |
| Manning's n | = | 0.035 | Bottom width | = | 3.0 ft |
| Side slope | = | 3.0:1 | Max. depth | = | 3.0 ft |
| Rating curve x | = | 2.306 | Rating curve m | = | 1.248 |
| Ave. velocity | = | 4.86 ft/s | Routing coeff. | = | 0.2948 |

Modified Att-Kin routing method used.



# Hydrograph Report

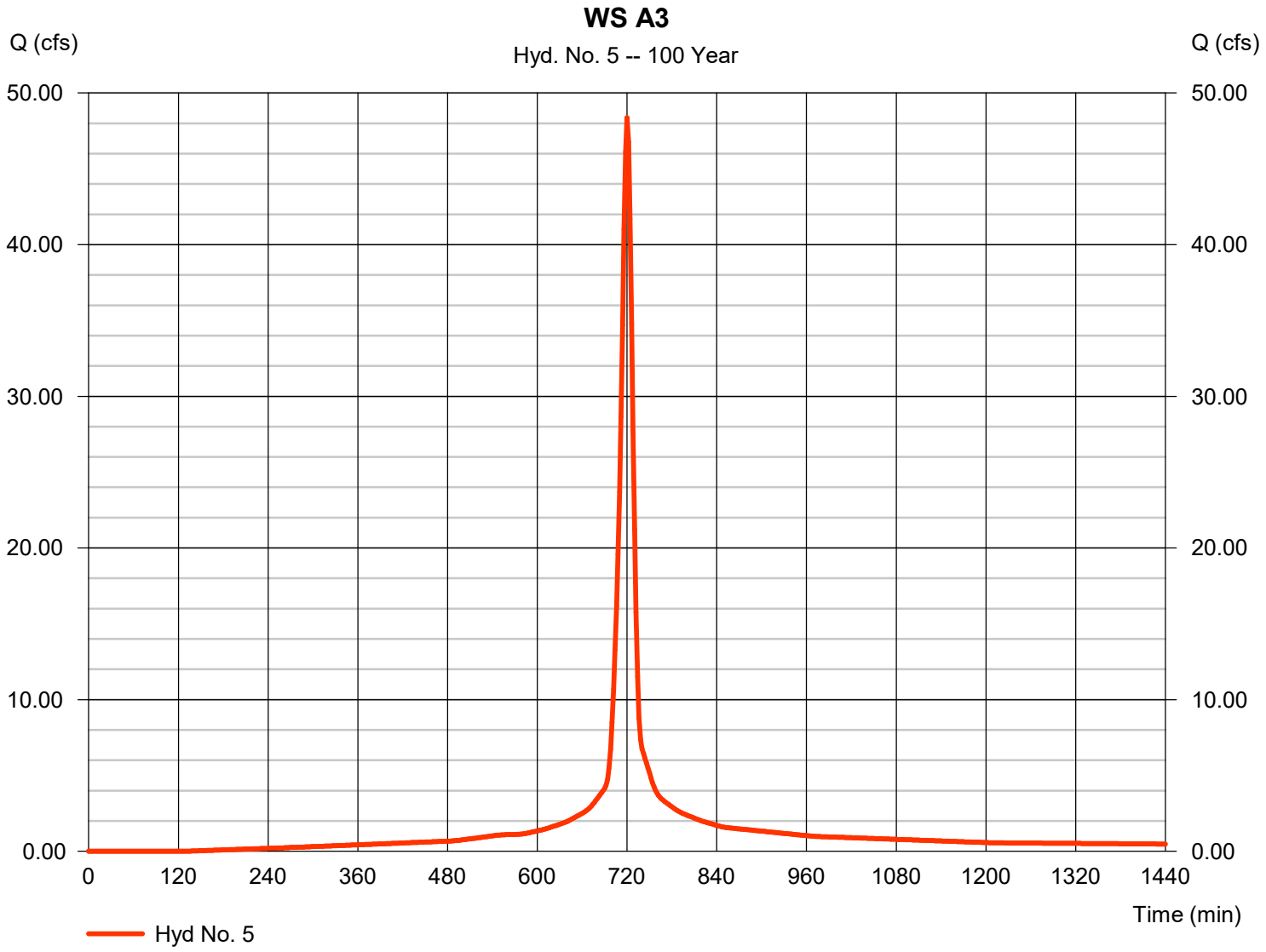


## Hyd. No. 5

WS A3

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 48.37 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 720 min |
| Time interval | = | 2 min | Hyd. volume | = | 136,980 cuft |
| Drainage area | = | 5.330 ac | Curve number | = | 92* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 11.30 min |
| Total precip. | = | 7.82 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(4.590 x 91) + (0.740 x 98)] / 5.330



# Hydrograph Report

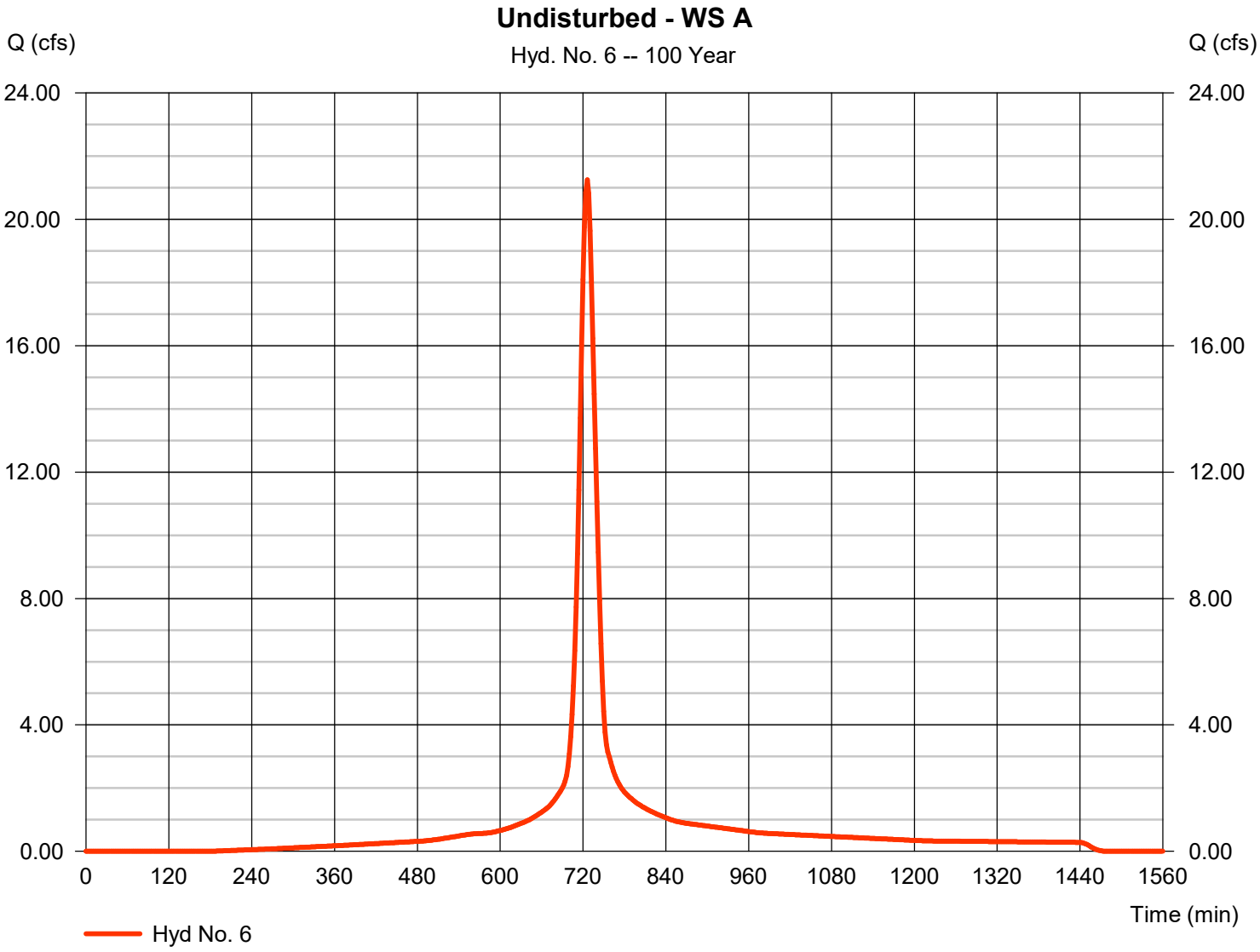


## Hyd. No. 6

Undisturbed - WS A

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 21.25 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 726 min |
| Time interval | = | 2 min | Hyd. volume | = | 76,974 cuft |
| Drainage area | = | 3.200 ac | Curve number | = | 89* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 23.39 min |
| Total precip. | = | 7.82 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(0.180 x 72) + (0.750 x 88) + (2.120 x 91)] / 3.200



# Hydrograph Report

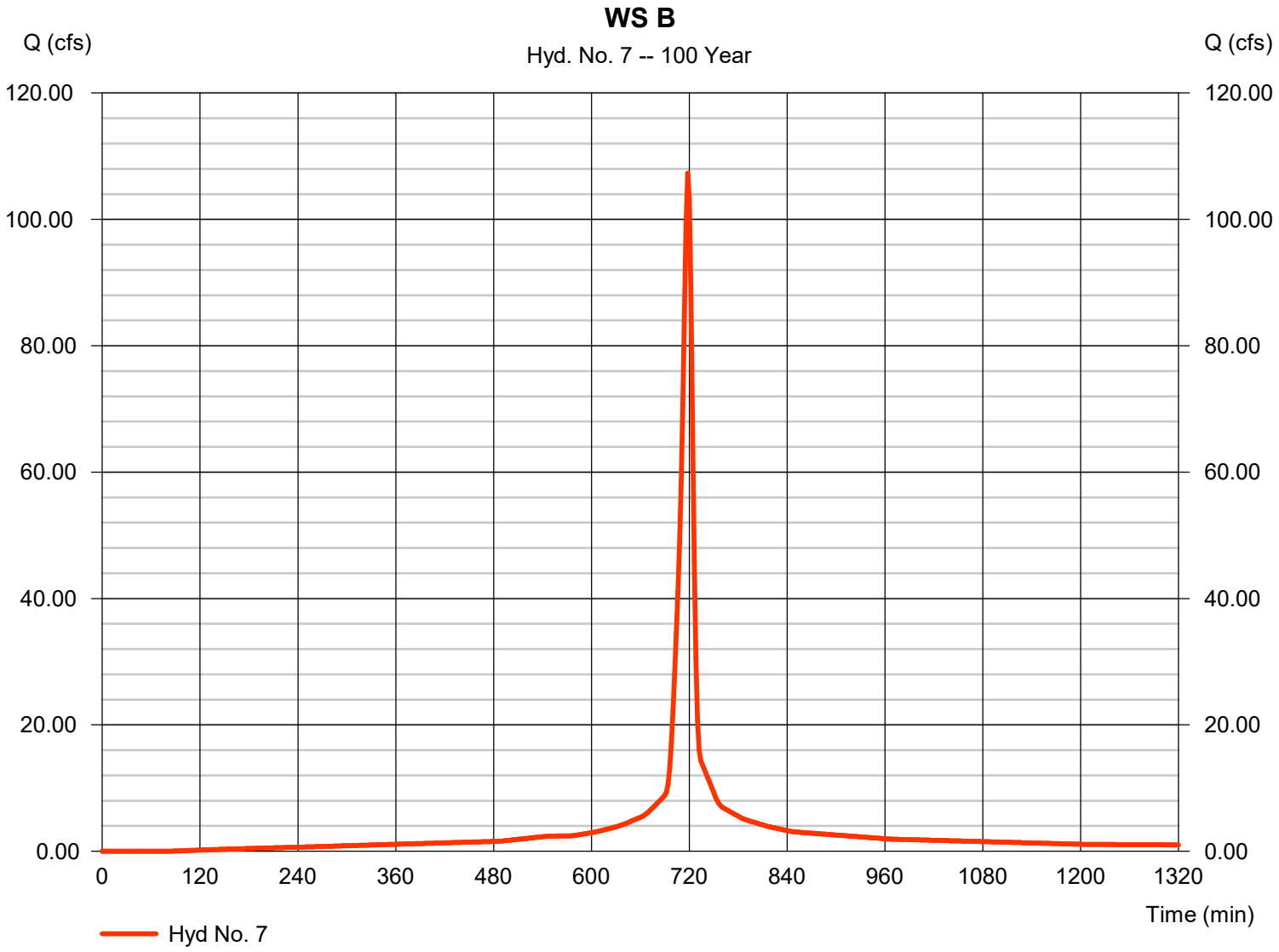


## Hyd. No. 7

WS B

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 107.31 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 718 min |
| Time interval | = | 2 min | Hyd. volume | = | 279,462 cuft |
| Drainage area | = | 10.660 ac | Curve number | = | 95* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 7.20 min |
| Total precip. | = | 7.82 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(5.190 x 91) + (5.470 x 98)] / 10.660



# Hydrograph Report

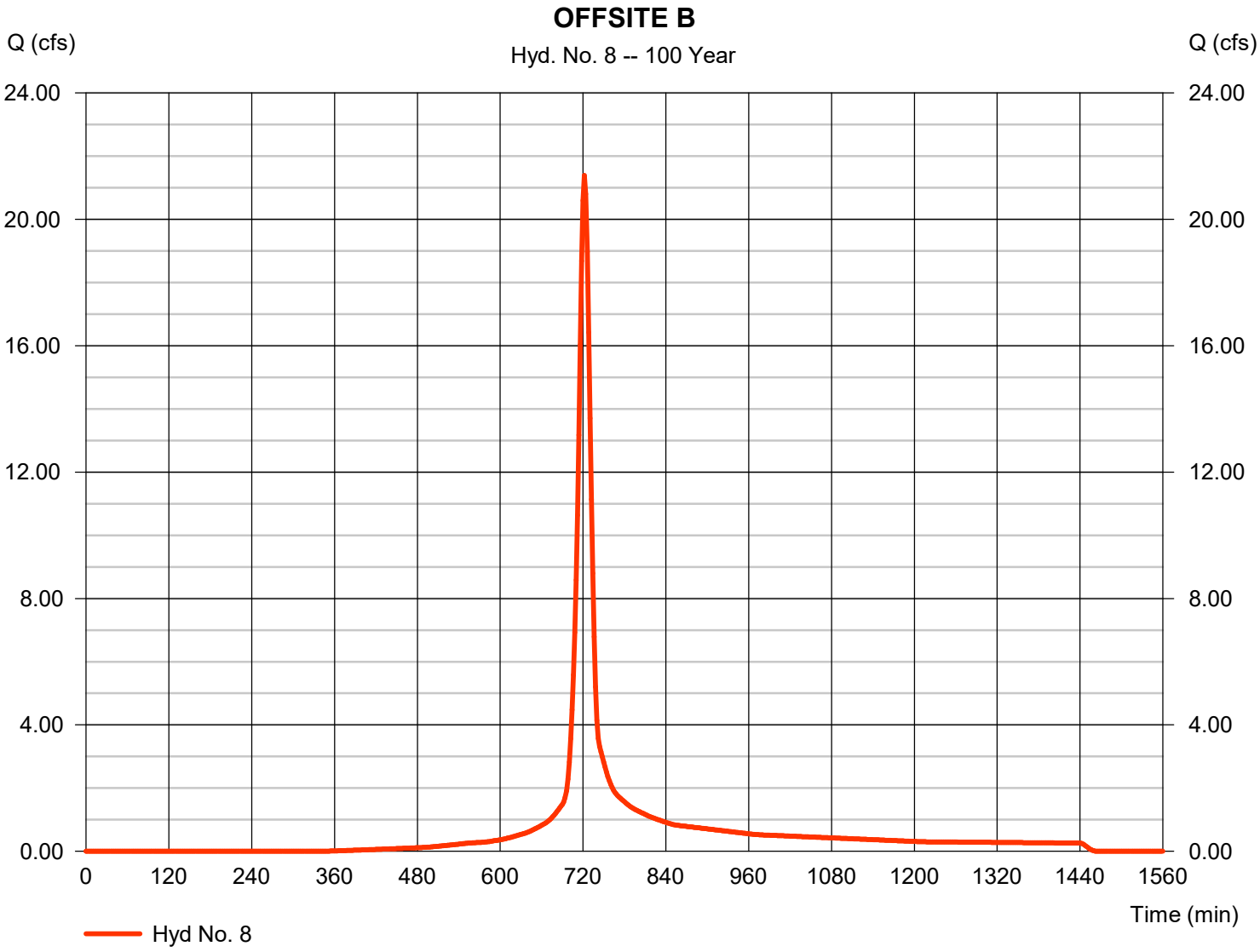


## Hyd. No. 8

OFFSITE B

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 21.39 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 722 min |
| Time interval | = | 2 min | Hyd. volume | = | 60,654 cuft |
| Drainage area | = | 3.280 ac | Curve number | = | 78* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 14.40 min |
| Total precip. | = | 7.82 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(1.940 x 72) + (0.580 x 81) + (0.690 x 91) + (0.070 x 98)] / 3.280



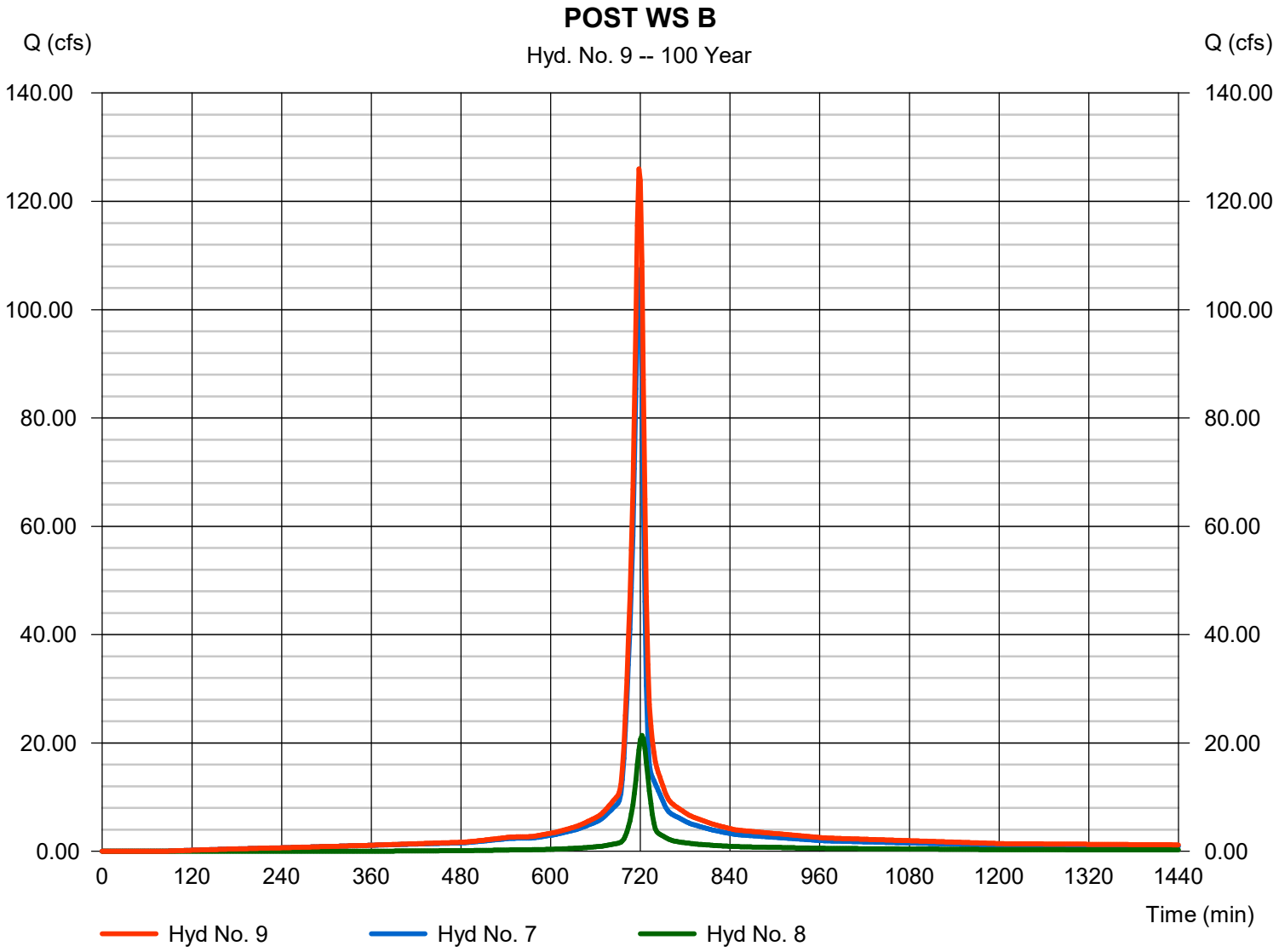
# Hydrograph Report



## Hyd. No. 9

POST WS B

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Combine | Peak discharge | = | 126.00 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 718 min |
| Time interval | = | 2 min | Hyd. volume | = | 340,117 cuft |
| Inflow hyds. | = | 7, 8 | Contrib. drain. area | = | 13.940 ac |



# Hydrograph Report

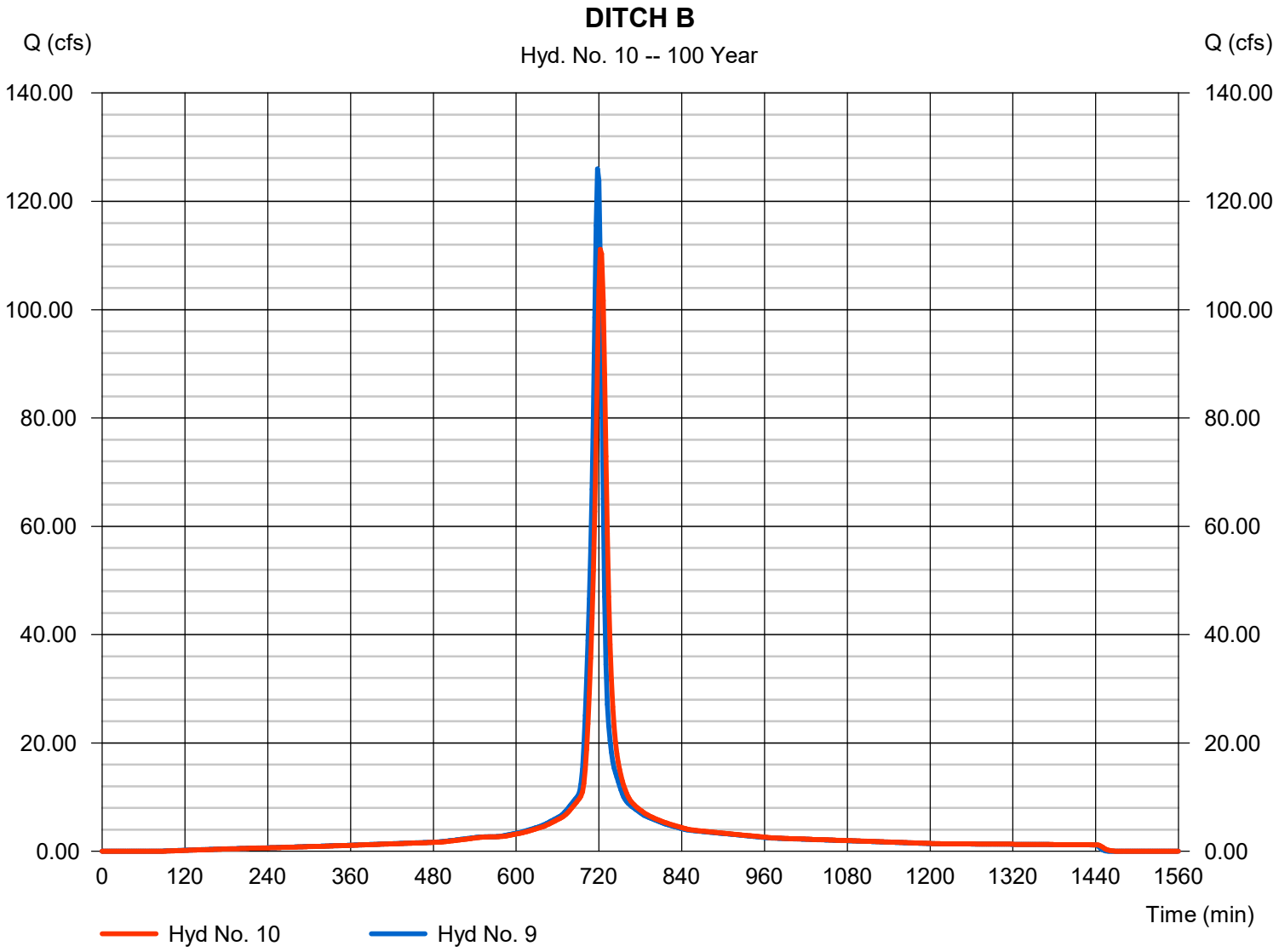


## Hyd. No. 10

DITCH B

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reach | Peak discharge | = | 111.16 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 722 min |
| Time interval | = | 2 min | Hyd. volume | = | 340,113 cuft |
| Inflow hyd. No. | = | 9 - POST WS B | Section type | = | Trapezoidal |
| Reach length | = | 1752.0 ft | Channel slope | = | 1.4 % |
| Manning's n | = | 0.035 | Bottom width | = | 3.0 ft |
| Side slope | = | 3.0:1 | Max. depth | = | 3.0 ft |
| Rating curve x | = | 2.421 | Rating curve m | = | 1.248 |
| Ave. velocity | = | 5.31 ft/s | Routing coeff. | = | 0.3701 |

Modified Att-Kin routing method used.



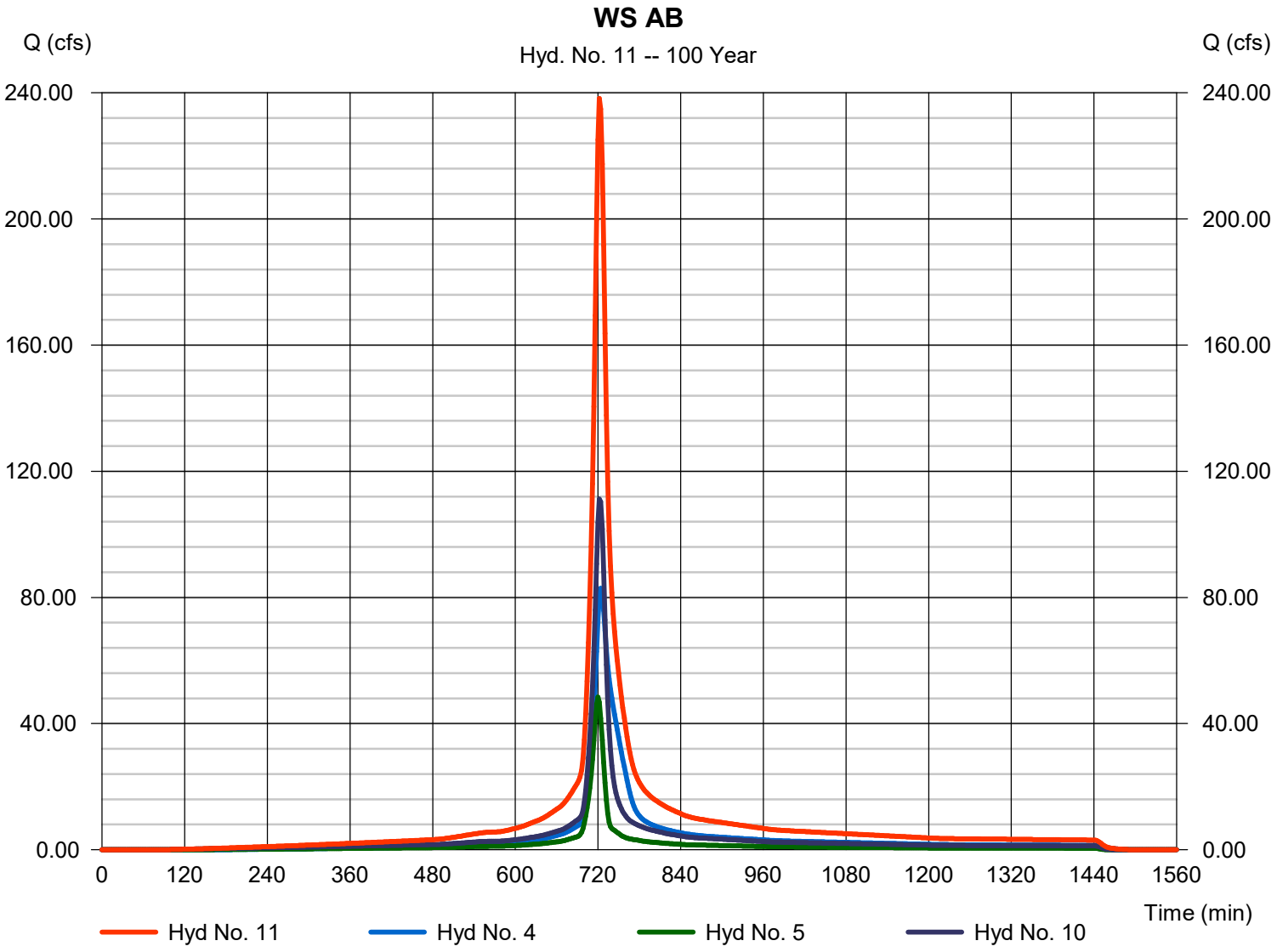
# Hydrograph Report



## Hyd. No. 11

WS AB

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Combine | Peak discharge | = | 238.22 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 722 min |
| Time interval | = | 2 min | Hyd. volume | = | 819,353 cuft |
| Inflow hyds. | = | 4, 5, 10 | Contrib. drain. area | = | 5.330 ac |



# Hydrograph Report

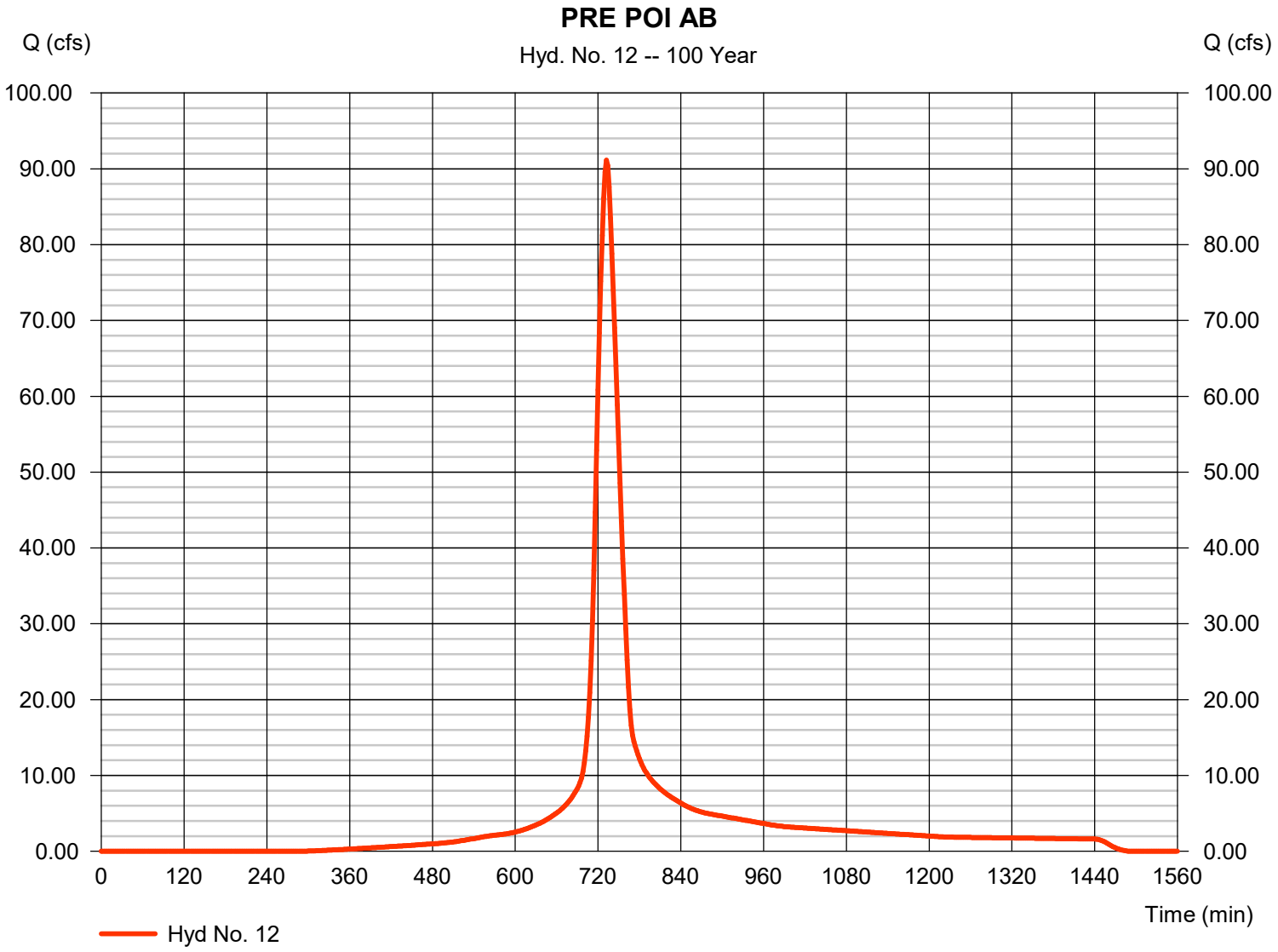


## Hyd. No. 12

PRE POI AB

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 91.13 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 732 min |
| Time interval | = | 2 min | Hyd. volume | = | 398,114 cuft |
| Drainage area | = | 19.040 ac | Curve number | = | 82* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 32.80 min |
| Total precip. | = | 7.82 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(8.630 x 72) + (1.450 x 88) + (7.160 x 91) + (1.800 x 91)] / 19.040



# Hydrograph Report

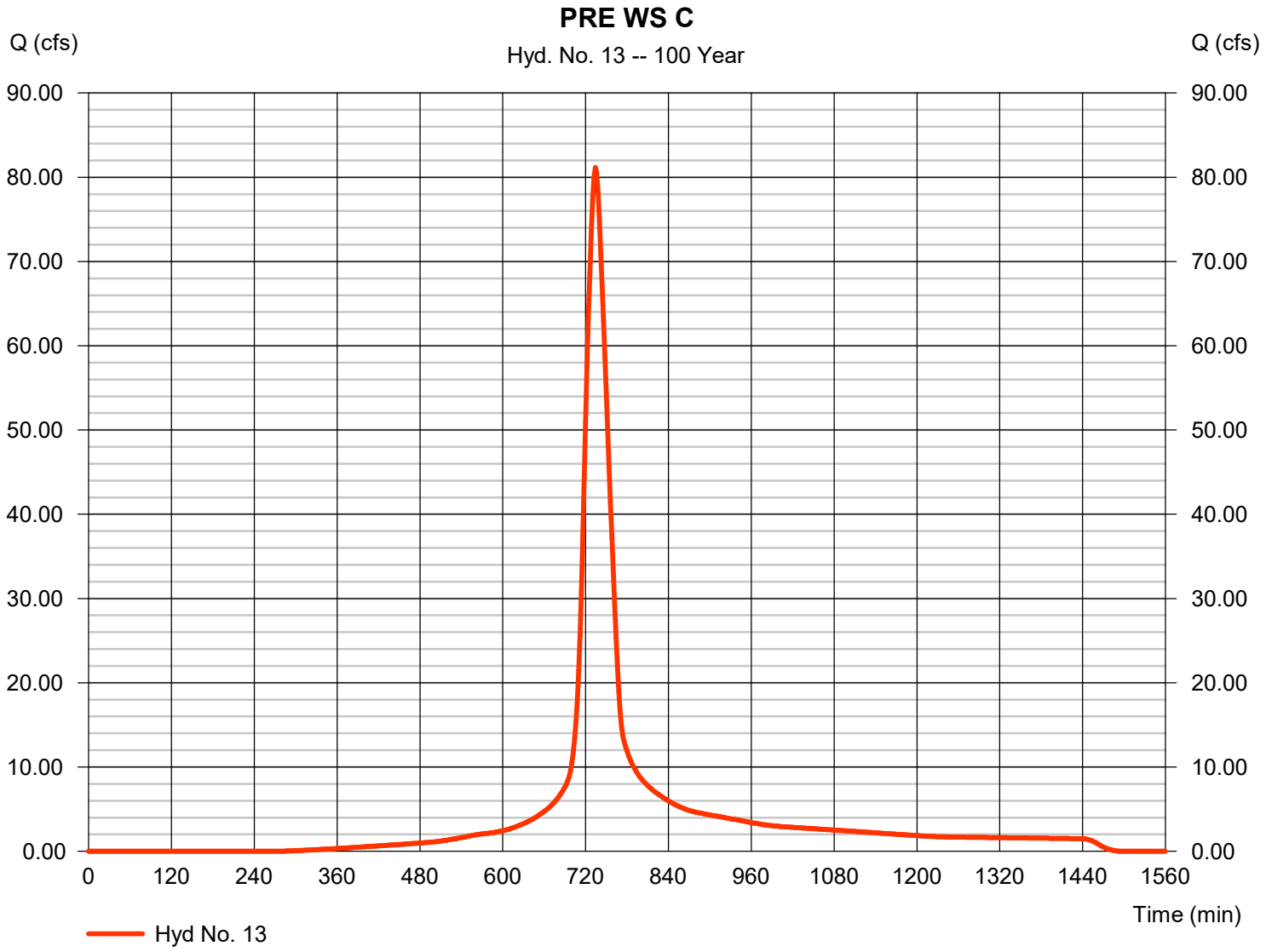


## Hyd. No. 13

PRE WS C

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 81.17 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 734 min |
| Time interval | = | 2 min | Hyd. volume | = | 372,741 cuft |
| Drainage area | = | 17.890 ac | Curve number | = | 83* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 34.60 min |
| Total precip. | = | 7.82 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(7.590 x 72) + (0.390 x 81) + (0.830 x 88) + (9.080 x 91)] / 17.890



# Hydrograph Report

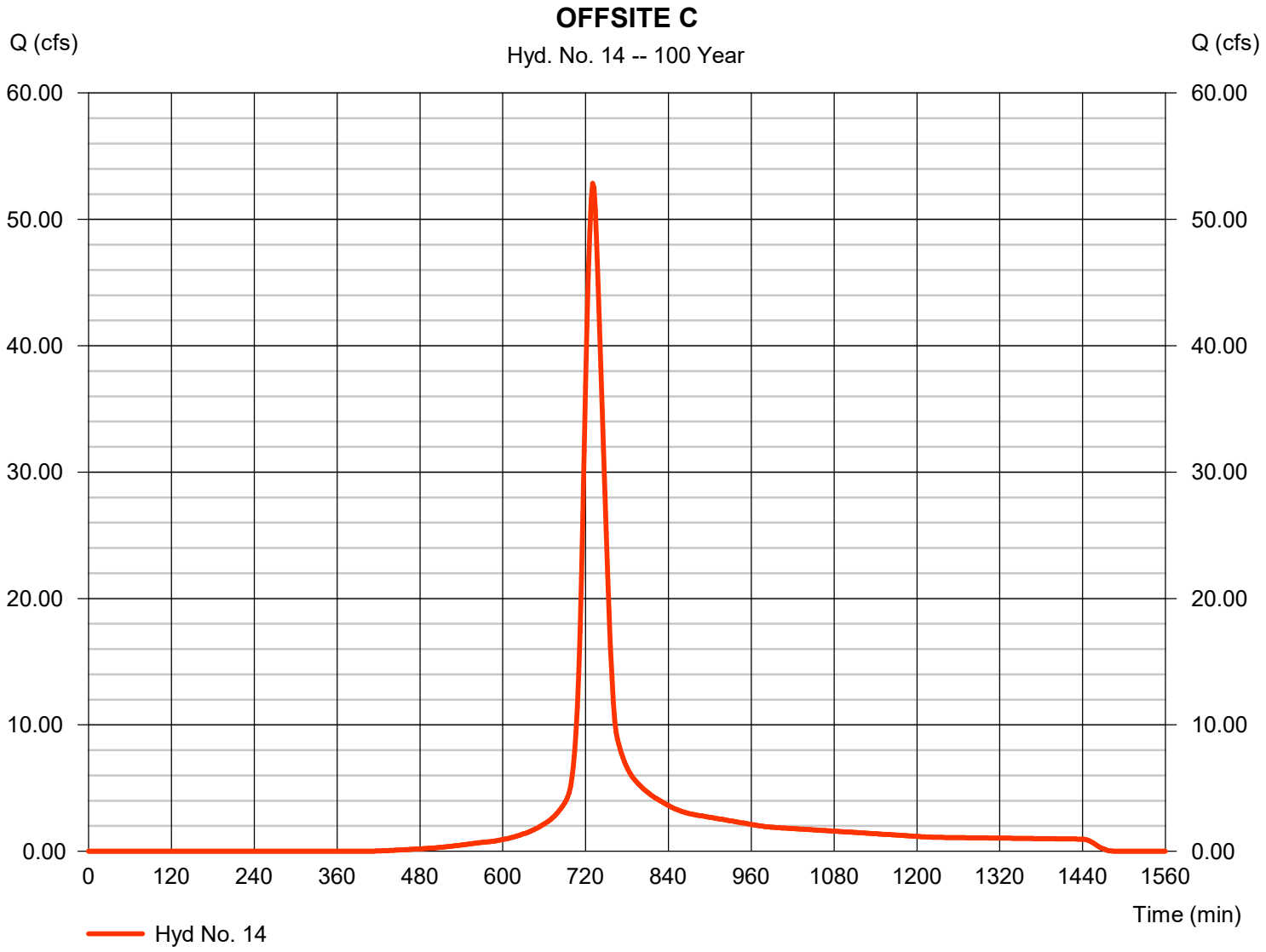


## Hyd. No. 14

OFFSITE C

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 52.85 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 730 min |
| Time interval | = | 2 min | Hyd. volume | = | 211,196 cuft |
| Drainage area | = | 12.210 ac | Curve number | = | 74* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 27.00 min |
| Total precip. | = | 7.82 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(10.710 x 72) + (0.620 x 81) + (0.710 x 91) + (0.170 x 98)] / 12.210



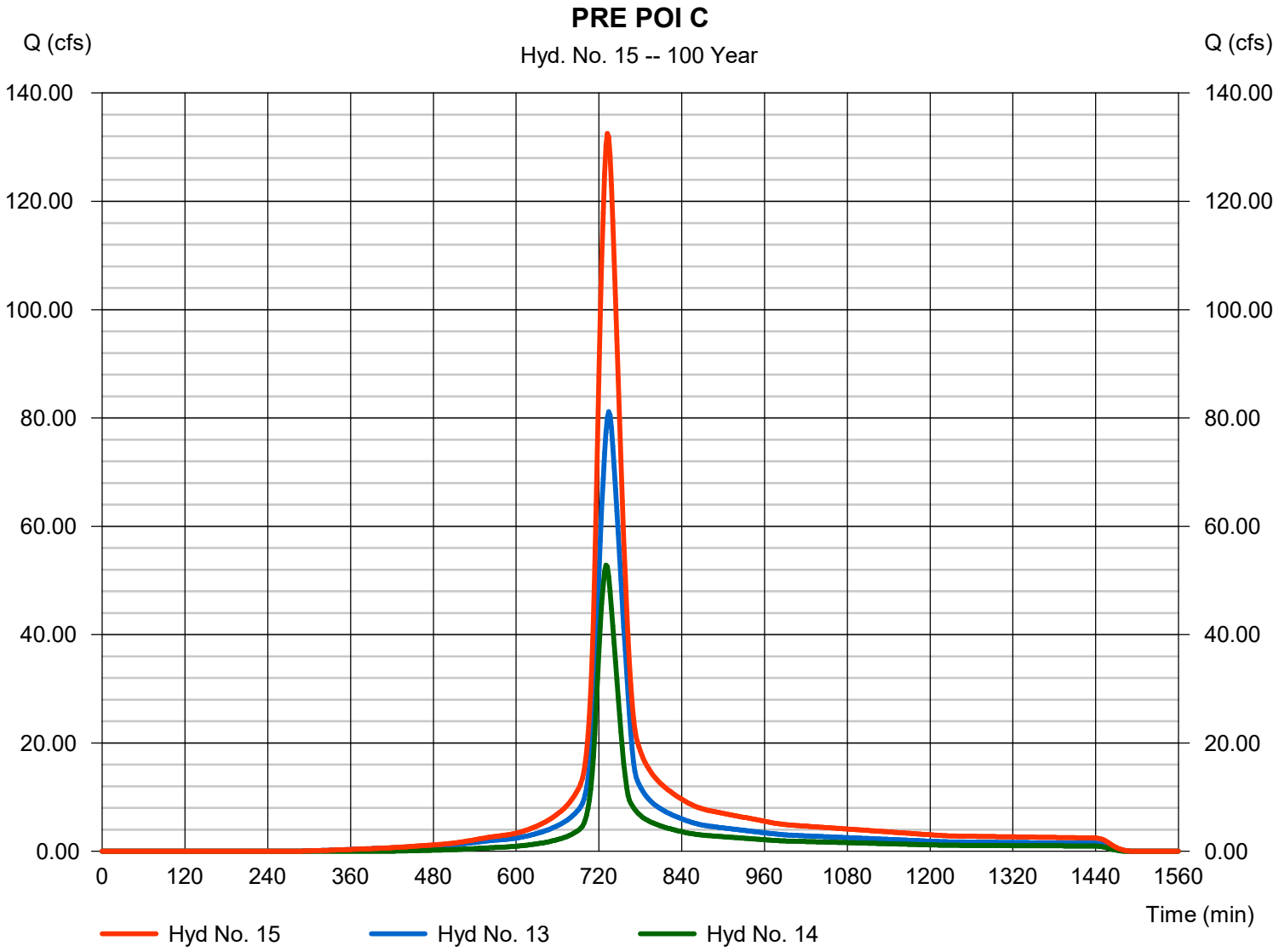
# Hydrograph Report



## Hyd. No. 15

PRE POI C

| | | | |
|---|---|---|---|
| Hydrograph type | = Combine | Peak discharge | = 132.53 cfs |
| Storm frequency | = 100 yrs | Time to peak | = 732 min |
| Time interval | = 2 min | Hyd. volume | = 583,938 cuft |
| Inflow hyds. | = 13, 14 | Contrib. drain. area | = 30.100 ac |



# Hydrograph Report

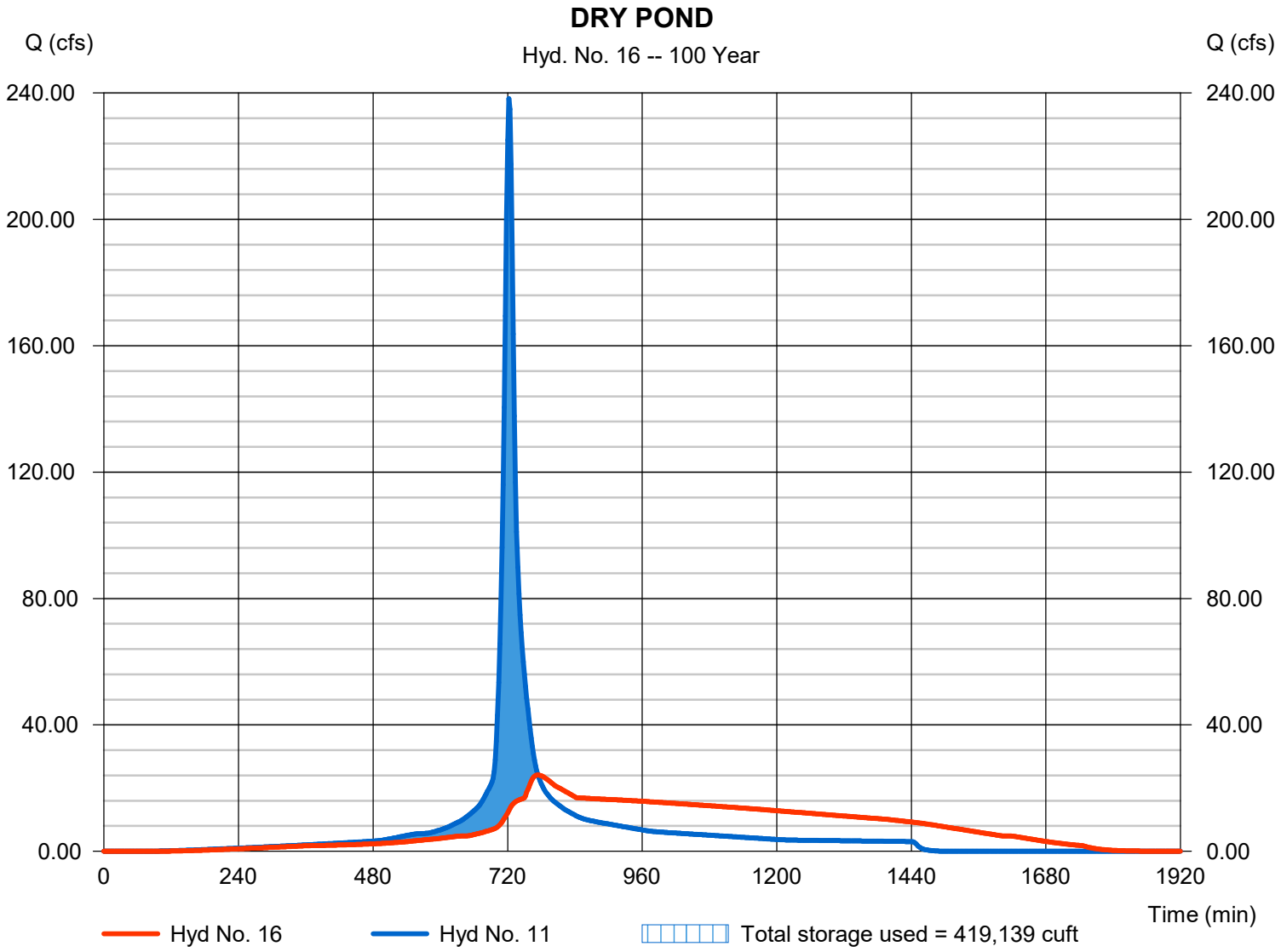


## Hyd. No. 16

DRY POND

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 24.13 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 774 min |
| Time interval | = | 2 min | Hyd. volume | = | 819,350 cuft |
| Inflow hyd. No. | = | 11 - WS AB | Max. Elevation | = | 613.45 ft |
| Reservoir name | = | DRY POND | Max. Storage | = | 419,139 cuft |

Storage Indication method used.



# Hydrograph Report

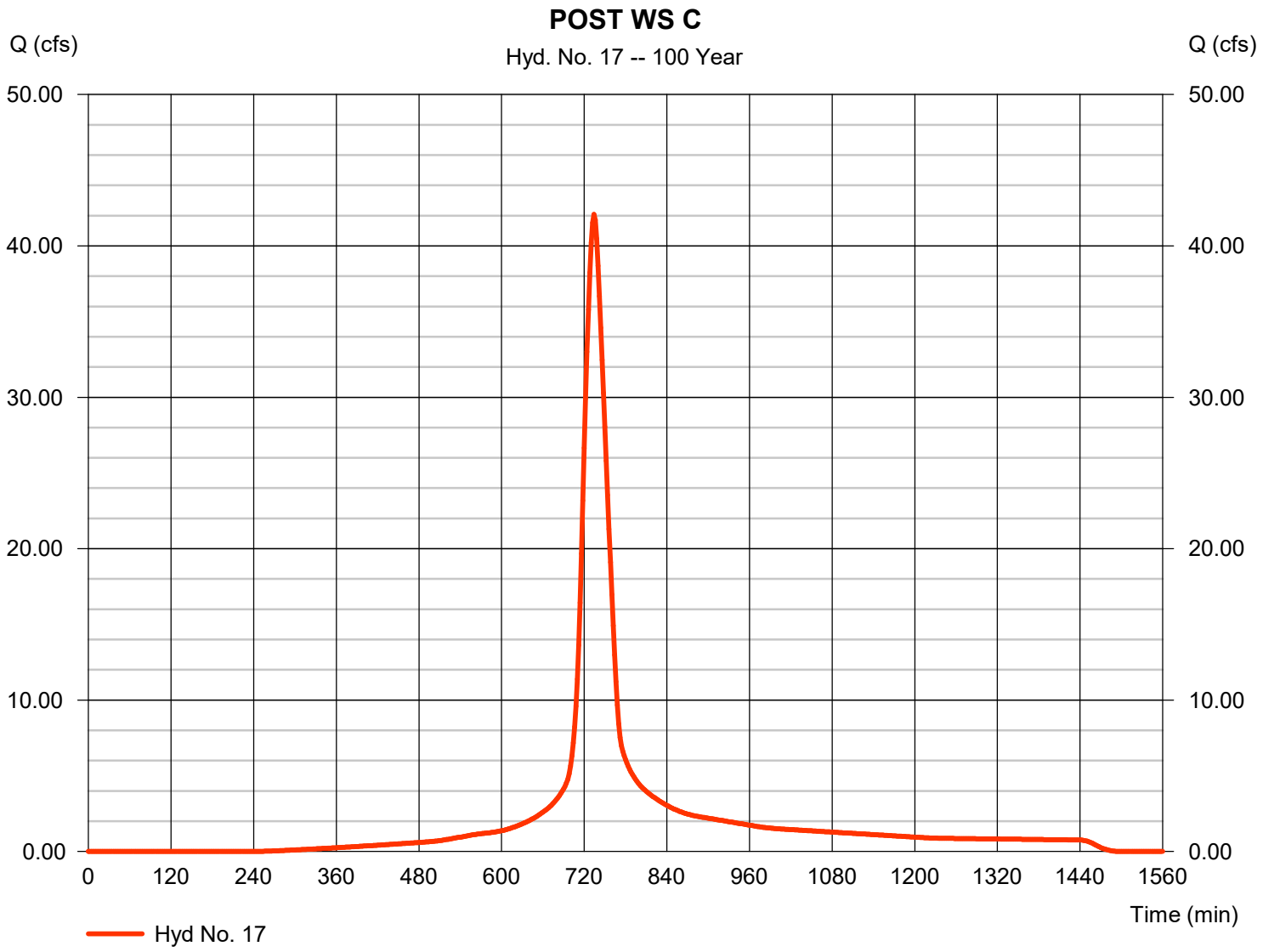


## Hyd. No. 17

POST WS C

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 42.09 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 734 min |
| Time interval | = | 2 min | Hyd. volume | = | 194,641 cuft |
| Drainage area | = | 8.980 ac | Curve number | = | 85* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 34.10 min |
| Total precip. | = | 7.82 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(2.480 x 72) + (0.260 x 81) + (0.830 x 88) + (5.410 x 91)] / 8.980



# Hydrograph Report

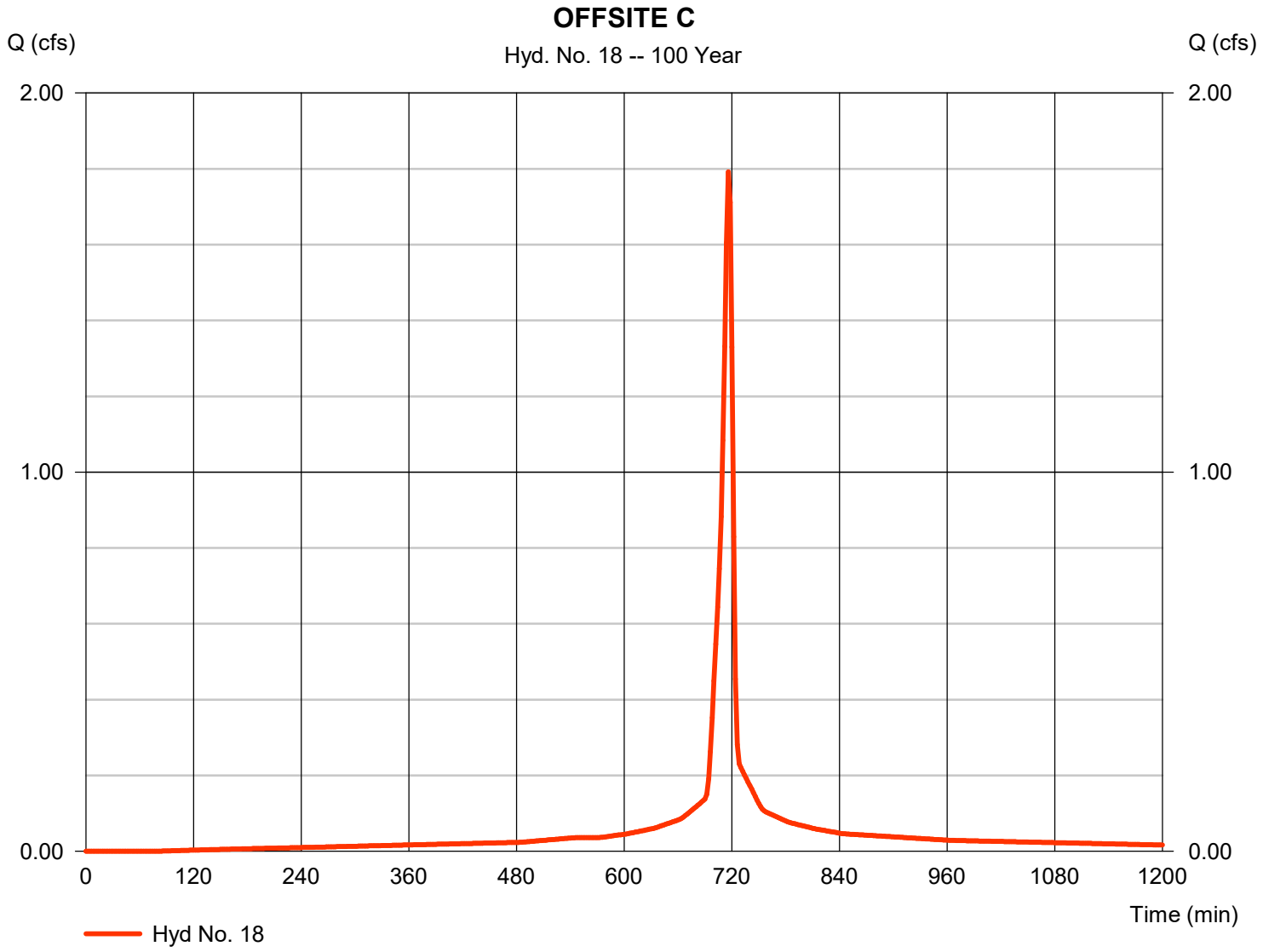


## Hyd. No. 18

OFFSITE C

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 1.792 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 716 min |
| Time interval | = | 2 min | Hyd. volume | = | 4,178 cuft |
| Drainage area | = | 0.170 ac | Curve number | = | 95* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | User | Time of conc. (Tc) | = | 5.00 min |
| Total precip. | = | 7.82 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(0.020 x 81) + (0.030 x 91) + (0.120 x 98)] / 0.170



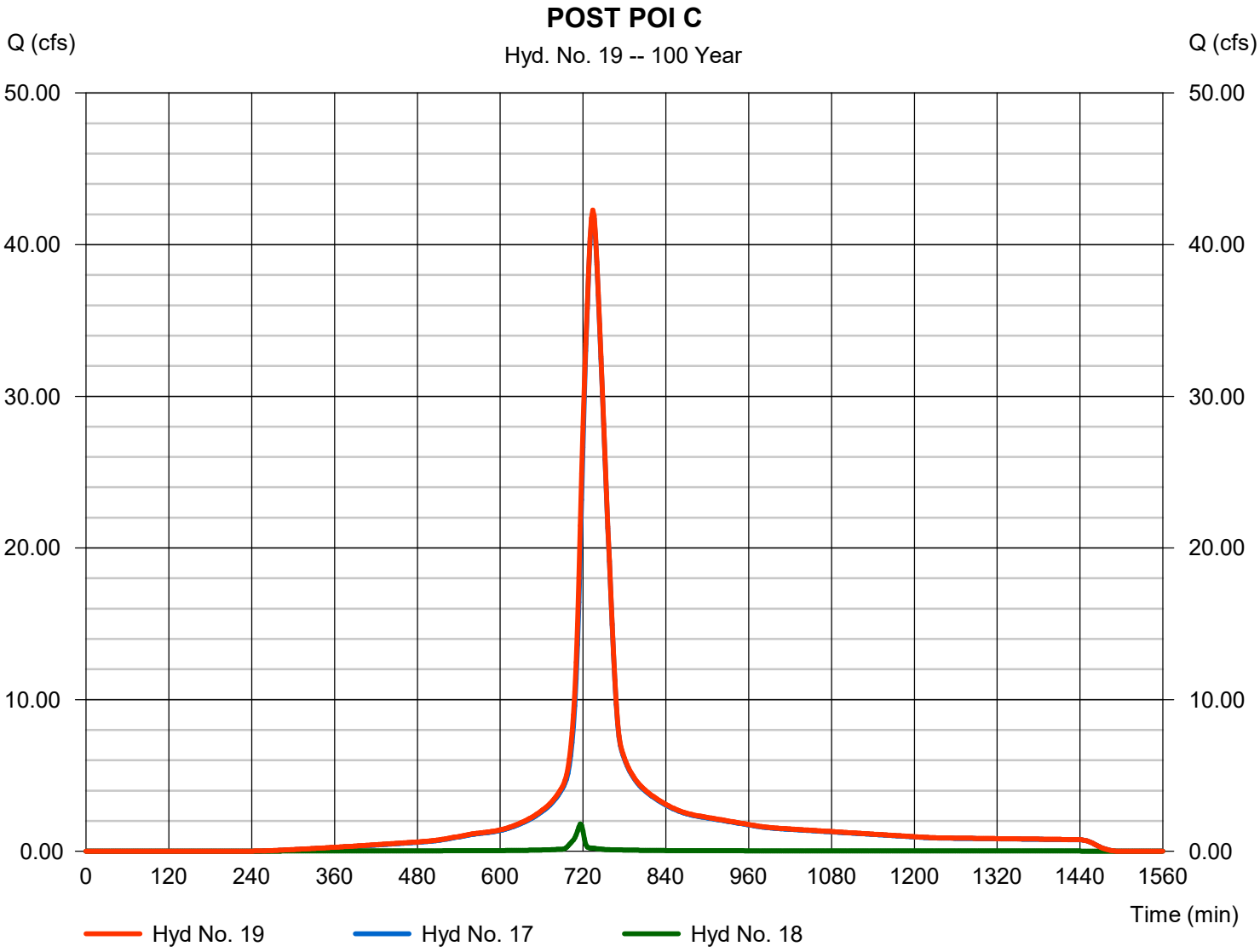
# Hydrograph Report



## Hyd. No. 19

POST POI C

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Combine | Peak discharge | = | 42.29 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 734 min |
| Time interval | = | 2 min | Hyd. volume | = | 198,819 cuft |
| Inflow hyds. | = | 17, 18 | Contrib. drain. area | = | 9.150 ac |



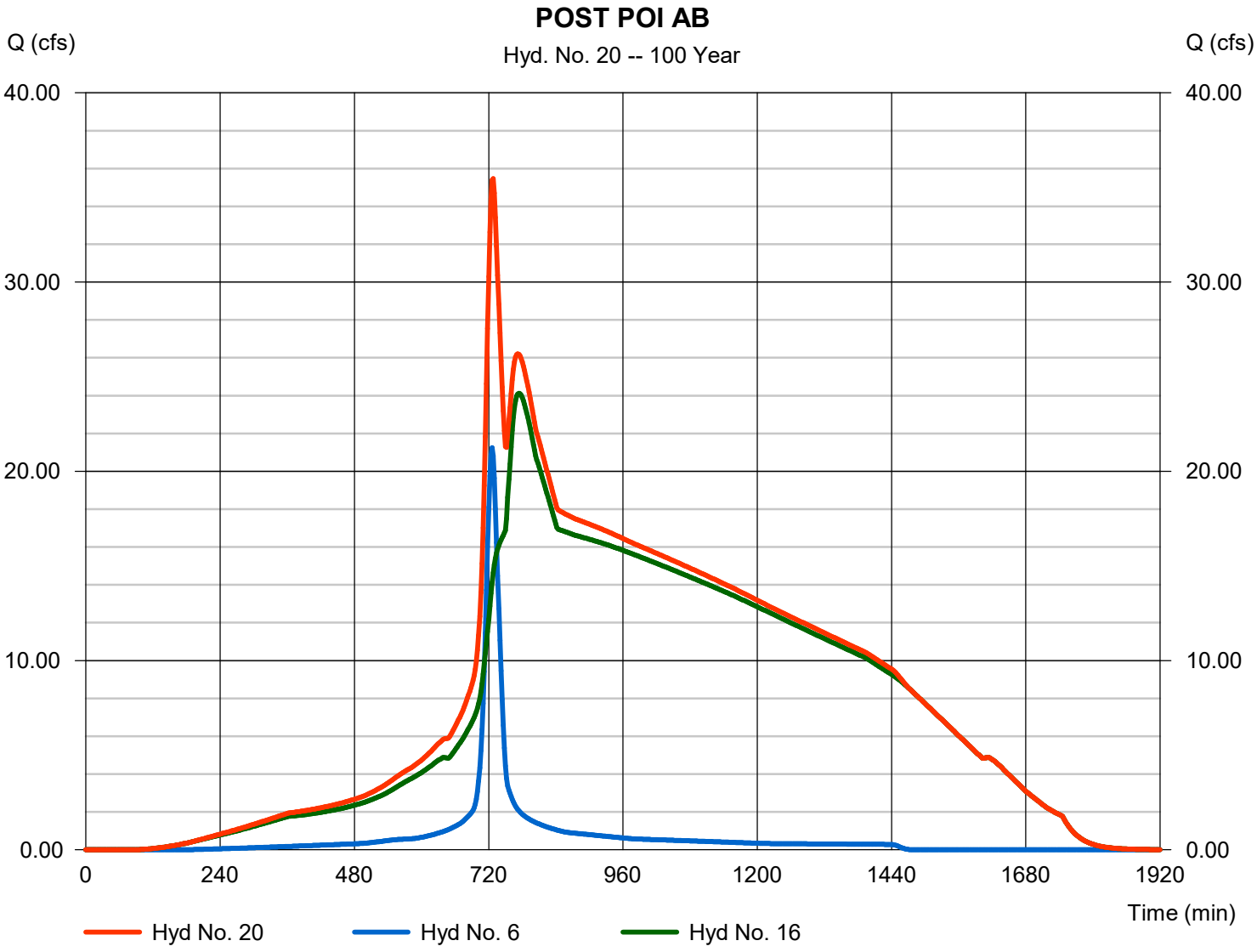
# Hydrograph Report



## Hyd. No. 20

POST POI AB

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Combine | Peak discharge | = | 35.46 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 728 min |
| Time interval | = | 2 min | Hyd. volume | = | 896,324 cuft |
| Inflow hyds. | = | 6, 16 | Contrib. drain. area | = | 3.200 ac |



# Hydraflow Rainfall Report



| Return Period (Yrs) | Intensity-Duration-Frequency Equation Coefficients (FHA) | | | |
|---|---|---|---|---|
| | B | D | E | (N/A) |
| 1 | 59.7370 | 12.3000 | 0.8768 | -------- |
| 2 | 72.8679 | 12.8000 | 0.8792 | -------- |
| 3 | 0.0000 | 0.0000 | 0.0000 | -------- |
| 5 | 78.0930 | 13.1000 | 0.8448 | -------- |
| 10 | 73.4003 | 12.2000 | 0.7983 | -------- |
| 25 | 69.2214 | 11.2000 | 0.7454 | -------- |
| 50 | 64.0304 | 10.2000 | 0.6997 | -------- |
| 100 | 61.0502 | 9.5000 | 0.6622 | -------- |

File name: Mt. Pleasant.IDF

### Intensity = B / (Tc + D)^E

| Return Period (Yrs) | Intensity Values (in/hr) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 5 min | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 |
| 1 | 4.91 | 3.93 | 3.29 | 2.84 | 2.50 | 2.24 | 2.03 | 1.86 | 1.72 | 1.60 | 1.49 | 1.40 |
| 2 | 5.80 | 4.66 | 3.92 | 3.39 | 2.99 | 2.68 | 2.43 | 2.23 | 2.06 | 1.91 | 1.79 | 1.68 |
| 3 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 6.76 | 5.50 | 4.66 | 4.06 | 3.61 | 3.25 | 2.96 | 2.72 | 2.53 | 2.36 | 2.21 | 2.08 |
| 10 | 7.57 | 6.18 | 5.25 | 4.59 | 4.09 | 3.70 | 3.38 | 3.12 | 2.90 | 2.71 | 2.55 | 2.41 |
| 25 | 8.68 | 7.11 | 6.07 | 5.33 | 4.77 | 4.33 | 3.98 | 3.68 | 3.44 | 3.22 | 3.04 | 2.88 |
| 50 | 9.54 | 7.82 | 6.70 | 5.90 | 5.30 | 4.83 | 4.45 | 4.13 | 3.87 | 3.64 | 3.44 | 3.27 |
| 100 | 10.39 | 8.54 | 7.34 | 6.49 | 5.85 | 5.35 | 4.94 | 4.61 | 4.32 | 4.08 | 3.87 | 3.68 |

Tc = time in minutes. Values may exceed 60.

Precip. file name: \\global.gsp\data\nf\na_nf07\5011400\03ProjInfo\00DueDilg\NOAA\Mt. Pleasant.pcp

| Storm Distribution | Rainfall Precipitation Table (in) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1-yr | 2-yr | 3-yr | 5-yr | 10-yr | 25-yr | 50-yr | 100-yr |
| SCS 24-hour | 0.00 | 3.89 | 0.00 | 4.74 | 5.41 | 6.33 | 7.06 | 7.82 |
| SCS 6-Hr | 0.00 | 2.59 | 0.00 | 3.16 | 3.65 | 4.34 | 4.92 | 5.53 |
| Huff-1st | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Huff-2nd | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Huff-3rd | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Huff-4th | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Huff-Indy | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Custom | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

# Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Aug 7 2025

## DITCH A

**Trapezoidal**

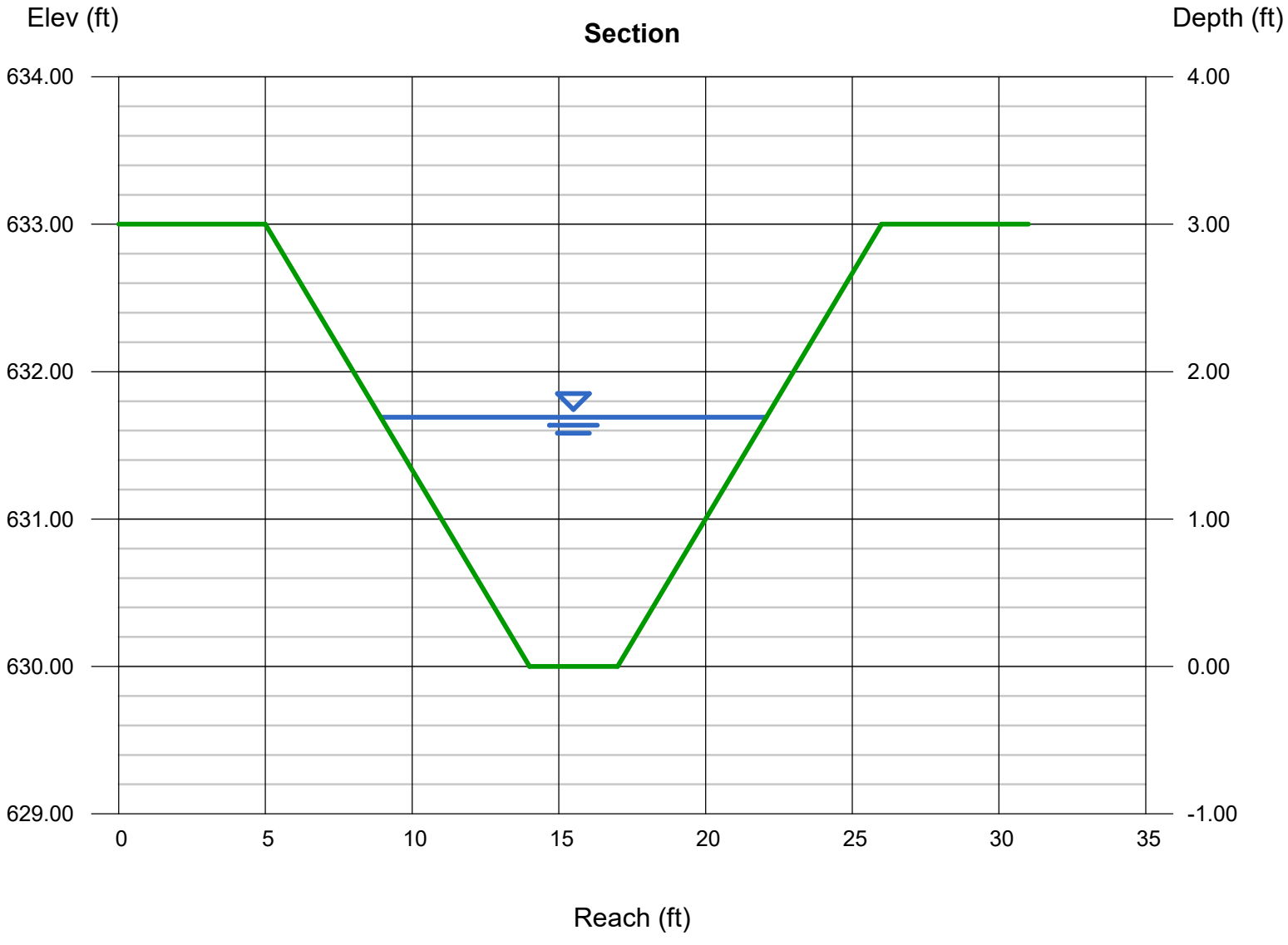
| | |
|---|---|
| Bottom Width (ft) | = 3.00 |
| Side Slopes (z:1) | = 3.00, 3.00 |
| Total Depth (ft) | = 3.00 |
| Invert Elev (ft) | = 630.00 |
| Slope (%) | = 1.15 |
| N-Value | = 0.035 |

**Calculations**

| | |
|---|---|
| Compute by: | Known Q |
| Known Q (cfs) | = 61.75 |

**Highlighted**

| | |
|---|---|
| Depth (ft) | = 1.69 |
| Q (cfs) | = 61.75 |
| Area (sqft) | = 13.64 |
| Velocity (ft/s) | = 4.53 |
| Wetted Perim (ft) | = 13.69 |
| Crit Depth, Yc (ft) | = 1.50 |
| Top Width (ft) | = 13.14 |
| EGL (ft) | = 2.01 |



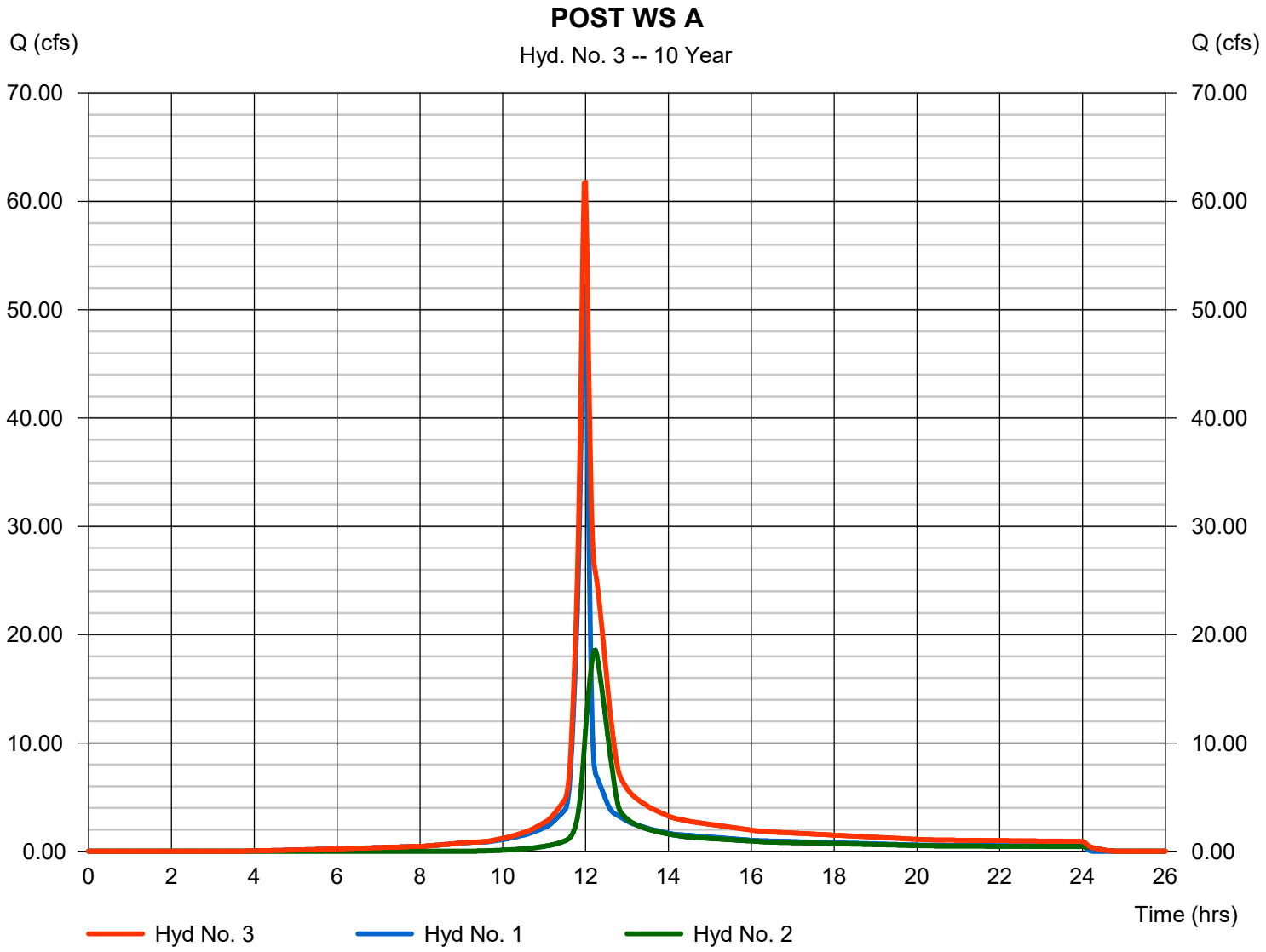
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025 Thursday, 08 / 7 / 2025

## Hyd. No. 3

POST WS A

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Combine | Peak discharge | = | 61.75 cfs |
| Storm frequency | = | 10 yrs | Time to peak | = | 12.00 hrs |
| Time interval | = | 2 min | Hyd. volume | = | 207,510 cuft |
| Inflow hyds. | = | 1, 2 | Contrib. drain. area | = | 16.920 ac |



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## CHANNEL ANALYSIS

> > > A

| | |
|---|---|
| Name | A |
| Discharge | 61.75 |
| Channel Slope | 0.0115 |
| Channel Bottom Width | 3 |
| Left Side Slope | 3 |
| Right Side Slope | 3 |
| Existing Bend Radius | 25 |
| Low Flow Liner | |
| Retardence Class | C 6-12 in |
| Vegetation Type | Bunch Type |
| Vegetation Density | Good 65-79% |
| Soil Type | Clay Loam (CL) |

### SC250

| Phase | Reach | Discharge | Velocity | Normal Depth | Mannings N | Permissible Shear Stress | Calculated Shear Stress | Safety Factor | Remarks | Staple Pattern |
|---|---|---|---|---|---|---|---|---|---|---|
| SC250 Unvegetated | Straight | 61.75 cfs | 4.29 ft/s | 1.75 ft | 0.038 | 3 lbs/ft2 | 1.25 lbs/ft2 | 2.39 | STABLE | E |
| Underlying Substrate | Straight | 61.75 cfs | 4.29 ft/s | 1.75 ft | 0.038 | 3.27 lbs/ft2 | 0.74 lbs/ft2 | 4.45 | STABLE | E |
| SC250 Reinforced Vegetation | Straight | 61.75 cfs | 3.45 ft/s | 1.99 ft | 0.051 | 10 lbs/ft2 | 1.43 lbs/ft2 | 6.99 | STABLE | E |
| Underlying Substrate | Straight | 61.75 cfs | 3.45 ft/s | 1.99 ft | 0.051 | 3.61 lbs/ft2 | 0.82 lbs/ft2 | 4.38 | STABLE | E |
| SC250 Unvegetated | Bend | 61.75 cfs | 4.29 ft/s | 1.75 ft | 0.038 | 3 lbs/ft2 | 2.51 lbs/ft2 | 1.2 | STABLE | E |
| Underlying Substrate | Bend | 61.75 cfs | 4.29 ft/s | 1.75 ft | 0.038 | 3.27 lbs/ft2 | 1.47 lbs/ft2 | 2.22 | STABLE | E |
| SC250 Reinforced Vegetation | Bend | 61.75 cfs | 3.45 ft/s | 1.99 ft | 0.051 | 10 lbs/ft2 | 2.86 lbs/ft2 | 3.5 | STABLE | E |
| Underlying Substrate | Bend | 61.75 cfs | 3.45 ft/s | 1.99 ft | 0.051 | 3.61 lbs/ft2 | 1.65 lbs/ft2 | 2.19 | STABLE | E |

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# ANALYSIS COMPUTATIONS

> > > > View Computation

| Inputs | |
|---|---|
| Channel Discharge (Q): | 61.75 cfs |
| Peak Flow Period (H): | hours |
| Channel Slope (S0): | 0.0115 ft/ft |
| Bottom Width (B): | 3 ft |
| Left Side Slope (ZL): | 3 (H : V) |
| Right Side Slope (ZR): | 3 (H : V) |
| Existing Channel Bend: | Yes |
| Bend Coefficient (Kb): | |
| Channel Bend Radius: | 25 ft |
| Retardance Class of Vegetation: | C 6-12 in |
| Vegetation Type: | Bunch Type |
| Vegetation Density: | Good 65-79% |
| Soil Type: | Clay Loam (CL) |
| **Channel Lining Options** | |
| SC250 Protection Type | Permanent |

| **Basic Relationships** |
|---|
| A = Cross sectional area, ft2 (m2) = (B * D) + ($Z_L$ / 2 * D2) + ($Z_R$ / 2 * D2) |
| Where: |
| B = Base width of channel, ft (m) |
| D = Flow depth, ft (m) |
| $Z_L$ = Left side bank slope (H : 1 V) |
| $Z_R$ = Right side bank slope (H : 1 V) |
| |
| P = Wetted perimeter, ft (m) = B + $Z_L$ * D + $Z_R$ * D |
| R = Hydraulic radius, ft (m) = A / P |
| |
| V = Flow velocity, ft/s (m/s) = Q / A |
| Where: |
| Q = Channel discharge, cfs (cms) |
| |
| Taua Average bed shear stress, psf (Pa) = 62.4 * R * S0 |
| Where: |
| S0 = Gradient of channel, ft/ft (m/m) |
| |
| $Tau_0$ = Maximum bed shear stress, psf (Pa) = 62.4 * D * $S_0$ |
| |

| **Unvegetated Conditions Computations:** |
|---|
| n = Manning's n = a * Tauab |
| |
| and (iteratively solved) |
| $n = 1.486 / Q * A * R(2/3)S_0^{0.5}$ |
| |
| Where: |
| n = Manning's n |
| a = Product specific coefficient from performance testing |
| b = Product specific coefficient from performance testing |

| |
|---|
| $SF_P$ = Product factor of safety = $Tau_T$ / $Tau_0$ |
| |
| Where: |
| TauT = Permissible shear stress from testing, psf (Pa) |
| |
| $Tau_p$ = In place permissible shear, psf (Pa) = $Tau_T$ / alpha * ($Tau_S$ + alpha / 4.3) |
| |
| Where: |
| alpha = unit conversion constant, 0.14 English, 6.5 Metric |
| $Tau_S$ = Permissible shear stress of soil |
| |
| SFL = Factor of safety of installed liner = Taup / Taua |

| **Vegetated Computations:** |
|---|
| n = Manning's n = alpha * Cn* Taua-0.4 |
| |
| and (iteratively solved) |
| $n = 1.486 / Q * A * R(2/3)S_0^{0.5}$ |
| |
| Where: |
| alpha = Unit conversion constant, 0.213 English, 1.0 Metric |
| Cn = Vegetation retardance coefficient |
| |
| $SF_P$ = Product factor of safety = $Tau_{TV}$ / $Tau_0$ |
| |
| Where: |
| $Tau_{TV}$ = Permissible shear stress from testing, psf (Pa) |
| |
| $Tau_p$ = In place permissible shear, psf (Pa) = $Tau_S$ / (1 – $C_{FTRM}$) * (n / $n_S$)2 |
| |
| Where: |
| $C_{FTRM}$ = Coefficient of TRM performance derived from testing $Tau_S$ = Permissible shear stress of soil |
| $n_S$ = Manning's of soil bed if left unprotected |
| $SF_L$ = Factor of safety of installed liner = $Tau_p$ / $Tau_a$ |
| |

SC250

| Phase | Mannings N | Predicted flow depth (D) | Cross sectional area (A) | Wetted perimeter (P) | Hydraulic radius (R) | Flow velocity (V) | Froude number (FR) | Calculated Shear Stress | SFP/SFL |
|---|---|---|---|---|---|---|---|---|---|
| SC250 Unvegetated | 0.038 | 1.75 ft | 14.38 ft2 | 14.04 ft | 1.02 ft | 4.29 ft/s | 0.75 | 1.25 lbs/ft2 | 2.39 (SFP) |
| Underlying Substrate | 0.038 | 1.75 ft | 14.38 ft2 | 14.04 ft | 1.02 ft | 4.29 ft/s | 0.75 | 0.74 lbs/ft2 | 4.45 (SFL) |
| SC250 Reinforced Vegetation | 0.051 | 1.99 ft | 17.9 ft2 | 15.61 ft | 1.15 ft | 3.45 ft/s | 0.57 | 1.43 lbs/ft2 | 6.99 (SFP) |
| Underlying Substrate | 0.051 | 1.99 ft | 17.9 ft2 | 15.61 ft | 1.15 ft | 3.45 ft/s | 0.57 | 0.82 lbs/ft2 | 4.38 (SFL) |
| SC250 Unvegetated | 0.038 | 1.75 ft | 14.38 ft2 | 14.04 ft | 1.02 ft | 4.29 ft/s | 0.75 | 2.51 lbs/ft2 | 1.2 (SFP) |
| Underlying Substrate | 0.038 | 1.75 ft | 14.38 ft2 | 14.04 ft | 1.02 ft | 4.29 ft/s | 0.75 | 1.47 lbs/ft2 | 2.22 (SFL) |
| SC250 Reinforced Vegetation | 0.051 | 1.99 ft | 17.9 ft2 | 15.61 ft | 1.15 ft | 3.45 ft/s | 0.57 | 2.86 lbs/ft2 | 3.5 (SFP) |
| Underlying Substrate | 0.051 | 1.99 ft | 17.9 ft2 | 15.61 ft | 1.15 ft | 3.45 ft/s | 0.57 | 1.65 lbs/ft2 | 2.19 (SFL) |

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## CHANNEL ANALYSIS

> > > A

| | |
|---|---|
| Name | A |
| Discharge | 61.75 |
| Channel Slope | 0.0115 |
| Channel Bottom Width | 3 |
| Left Side Slope | 3 |
| Right Side Slope | 3 |
| Existing Bend Radius | 25 |
| Low Flow Liner | |
| Retardence Class | C 6-12 in |
| Vegetation Type | Bunch Type |
| Vegetation Density | Good 65-79% |
| Soil Type | Loam (MH) |

### SC250

| Phase | Reach | Discharge | Velocity | Normal Depth | Mannings N | Permissible Shear Stress | Calculated Shear Stress | Safety Factor | Remarks | Staple Pattern |
|---|---|---|---|---|---|---|---|---|---|---|
| SC250 Unvegetated | Straight | 61.75 cfs | 4.29 ft/s | 1.75 ft | 0.038 | 3 lbs/ft2 | 1.25 lbs/ft2 | 2.39 | STABLE | E |
| Underlying Substrate | Straight | 61.75 cfs | 4.29 ft/s | 1.75 ft | 0.038 | 2.41 lbs/ft2 | 0.74 lbs/ft2 | 3.28 | STABLE | E |
| SC250 Reinforced Vegetation | Straight | 61.75 cfs | 3.45 ft/s | 1.99 ft | 0.051 | 10 lbs/ft2 | 1.43 lbs/ft2 | 6.99 | STABLE | E |
| Underlying Substrate | Straight | 61.75 cfs | 3.45 ft/s | 1.99 ft | 0.051 | 3 lbs/ft2 | 0.82 lbs/ft2 | 3.64 | STABLE | E |
| SC250 Unvegetated | Bend | 61.75 cfs | 4.29 ft/s | 1.75 ft | 0.038 | 3 lbs/ft2 | 2.51 lbs/ft2 | 1.2 | STABLE | E |
| Underlying Substrate | Bend | 61.75 cfs | 4.29 ft/s | 1.75 ft | 0.038 | 2.41 lbs/ft2 | 1.47 lbs/ft2 | 1.64 | STABLE | E |
| SC250 Reinforced Vegetation | Bend | 61.75 cfs | 3.45 ft/s | 1.99 ft | 0.051 | 10 lbs/ft2 | 2.86 lbs/ft2 | 3.5 | STABLE | E |
| Underlying Substrate | Bend | 61.75 cfs | 3.45 ft/s | 1.99 ft | 0.051 | 3 lbs/ft2 | 1.65 lbs/ft2 | 1.82 | STABLE | E |

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# ANALYSIS COMPUTATIONS

> > > > View Computation

| Inputs | |
|---|---|
| Channel Discharge (Q): | 61.75 cfs |
| Peak Flow Period (H): | hours |
| Channel Slope (S0): | 0.0115 ft/ft |
| Bottom Width (B): | 3 ft |
| Left Side Slope (ZL): | 3 (H : V) |
| Right Side Slope (ZR): | 3 (H : V) |
| Existing Channel Bend: | Yes |
| Bend Coefficient (Kb): | |
| Channel Bend Radius: | 25 ft |
| Retardance Class of Vegetation: | C 6-12 in |
| Vegetation Type: | Bunch Type |
| Vegetation Density: | Good 65-79% |
| Soil Type: | Loam (MH) |
| **Channel Lining Options** | |
| SC250 Protection Type | Permanent |

| **Basic Relationships** |
|---|
| A = Cross sectional area, ft2 (m2) = (B * D) + ($Z_L$ / 2 * D2) + ($Z_R$ / 2 * D2) |
| Where: |
| B = Base width of channel, ft (m) |
| D = Flow depth, ft (m) |
| $Z_L$ = Left side bank slope (H : 1 V) |
| $Z_R$ = Right side bank slope (H : 1 V) |
| |
| P = Wetted perimeter, ft (m) = B + $Z_L$ * D + $Z_R$ * D |
| R = Hydraulic radius, ft (m) = A / P |
| |
| V = Flow velocity, ft/s (m/s) = Q / A |
| Where: |
| Q = Channel discharge, cfs (cms) |
| |
| Taua Average bed shear stress, psf (Pa) = 62.4 * R * S0 |
| Where: |
| S0 = Gradient of channel, ft/ft (m/m) |
| |
| $Tau_0$ = Maximum bed shear stress, psf (Pa) = 62.4 * D * $S_0$ |
| |

| **Unvegetated Conditions Computations:** |
|---|
| n = Manning's n = a * Tauab |
| |
| and (iteratively solved) |
| $n = 1.486 / Q * A * R(2/3)S_0^{0.5}$ |
| |
| Where: |
| n = Manning's n |
| a = Product specific coefficient from performance testing |
| b = Product specific coefficient from performance testing |

| |
|---|
| $SF_P$ = Product factor of safety = $Tau_T$ / $Tau_0$ |
| |
| Where: |
| TauT = Permissible shear stress from testing, psf (Pa) |
| |
| $Tau_p$ = In place permissible shear, psf (Pa) = $Tau_T$ / alpha * ($Tau_S$ + alpha / 4.3) |
| |
| Where: |
| alpha = unit conversion constant, 0.14 English, 6.5 Metric |
| $Tau_S$ = Permissible shear stress of soil |
| |
| SFL = Factor of safety of installed liner = Taup / Taua |

| **Vegetated Computations:** |
|---|
| n = Manning's n = alpha * Cn* Taua-0.4 |
| |
| and (iteratively solved) |
| $n = 1.486 / Q * A * R(2/3)S_0^{0.5}$ |
| |
| Where: |
| alpha = Unit conversion constant, 0.213 English, 1.0 Metric |
| Cn = Vegetation retardance coefficient |
| |
| $SF_P$ = Product factor of safety = $Tau_{TV}$ / $Tau_0$ |
| |
| Where: |
| $Tau_{TV}$ = Permissible shear stress from testing, psf (Pa) |
| |
| $Tau_p$ = In place permissible shear, psf (Pa) = $Tau_S$ / (1 – $C_{FTRM}$) * (n / $n_S$)2 |
| |
| Where: |
| $C_{FTRM}$ = Coefficient of TRM performance derived from testing $Tau_S$ = Permissible shear stress of soil |
| $n_S$ = Manning's of soil bed if left unprotected |
| $SF_L$ = Factor of safety of installed liner = $Tau_p$ / $Tau_a$ |
| |

SC250

| Phase | Mannings N | Predicted flow depth (D) | Cross sectional area (A) | Wetted perimeter (P) | Hydraulic radius (R) | Flow velocity (V) | Froude number (FR) | Calculated Shear Stress | SFP/SFL |
|---|---|---|---|---|---|---|---|---|---|
| SC250 Unvegetated | 0.038 | 1.75 ft | 14.38 ft2 | 14.04 ft | 1.02 ft | 4.29 ft/s | 0.75 | 1.25 lbs/ft2 | 2.39 (SFP) |
| Underlying Substrate | 0.038 | 1.75 ft | 14.38 ft2 | 14.04 ft | 1.02 ft | 4.29 ft/s | 0.75 | 0.74 lbs/ft2 | 3.28 (SFL) |
| SC250 Reinforced Vegetation | 0.051 | 1.99 ft | 17.9 ft2 | 15.61 ft | 1.15 ft | 3.45 ft/s | 0.57 | 1.43 lbs/ft2 | 6.99 (SFP) |
| Underlying Substrate | 0.051 | 1.99 ft | 17.9 ft2 | 15.61 ft | 1.15 ft | 3.45 ft/s | 0.57 | 0.82 lbs/ft2 | 3.64 (SFL) |
| SC250 Unvegetated | 0.038 | 1.75 ft | 14.38 ft2 | 14.04 ft | 1.02 ft | 4.29 ft/s | 0.75 | 2.51 lbs/ft2 | 1.2 (SFP) |
| Underlying Substrate | 0.038 | 1.75 ft | 14.38 ft2 | 14.04 ft | 1.02 ft | 4.29 ft/s | 0.75 | 1.47 lbs/ft2 | 1.64 (SFL) |
| SC250 Reinforced Vegetation | 0.051 | 1.99 ft | 17.9 ft2 | 15.61 ft | 1.15 ft | 3.45 ft/s | 0.57 | 2.86 lbs/ft2 | 3.5 (SFP) |
| Underlying Substrate | 0.051 | 1.99 ft | 17.9 ft2 | 15.61 ft | 1.15 ft | 3.45 ft/s | 0.57 | 1.65 lbs/ft2 | 1.82 (SFL) |

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## CHANNEL ANALYSIS

> > > A

| | |
|---|---|
| Name | A |
| Discharge | 61.75 |
| Channel Slope | 0.0115 |
| Channel Bottom Width | 3 |
| Left Side Slope | 3 |
| Right Side Slope | 3 |
| Existing Bend Radius | 25 |
| Low Flow Liner | |
| Retardence Class | C 6-12 in |
| Vegetation Type | Bunch Type |
| Vegetation Density | Good 65-79% |
| Soil Type | Silt Loam (SM) |

### SC250

| Phase | Reach | Discharge | Velocity | Normal Depth | Mannings N | Permissible Shear Stress | Calculated Shear Stress | Safety Factor | Remarks | Staple Pattern |
|---|---|---|---|---|---|---|---|---|---|---|
| SC250 Unvegetated | Straight | 61.75 cfs | 4.29 ft/s | 1.75 ft | 0.038 | 3 lbs/ft2 | 1.25 lbs/ft2 | 2.39 | STABLE | E |
| Underlying Substrate | Straight | 61.75 cfs | 4.29 ft/s | 1.75 ft | 0.038 | 2.2 lbs/ft2 | 0.74 lbs/ft2 | 2.99 | STABLE | E |
| SC250 Reinforced Vegetation | Straight | 61.75 cfs | 3.45 ft/s | 1.99 ft | 0.051 | 10 lbs/ft2 | 1.43 lbs/ft2 | 6.99 | STABLE | E |
| Underlying Substrate | Straight | 61.75 cfs | 3.45 ft/s | 1.99 ft | 0.051 | 3 lbs/ft2 | 0.82 lbs/ft2 | 3.64 | STABLE | E |
| SC250 Unvegetated | Bend | 61.75 cfs | 4.29 ft/s | 1.75 ft | 0.038 | 3 lbs/ft2 | 2.51 lbs/ft2 | 1.2 | STABLE | E |
| Underlying Substrate | Bend | 61.75 cfs | 4.29 ft/s | 1.75 ft | 0.038 | 2.2 lbs/ft2 | 1.47 lbs/ft2 | 1.49 | STABLE | E |
| SC250 Reinforced Vegetation | Bend | 61.75 cfs | 3.45 ft/s | 1.99 ft | 0.051 | 10 lbs/ft2 | 2.86 lbs/ft2 | 3.5 | STABLE | E |
| Underlying Substrate | Bend | 61.75 cfs | 3.45 ft/s | 1.99 ft | 0.051 | 3 lbs/ft2 | 1.65 lbs/ft2 | 1.82 | STABLE | E |

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# ANALYSIS COMPUTATIONS

> > > > View Computation

| Inputs | |
|---|---|
| Channel Discharge (Q): | 61.75 cfs |
| Peak Flow Period (H): | hours |
| Channel Slope (S0): | 0.0115 ft/ft |
| Bottom Width (B): | 3 ft |
| Left Side Slope (ZL): | 3 (H : V) |
| Right Side Slope (ZR): | 3 (H : V) |
| Existing Channel Bend: | Yes |
| Bend Coefficient (Kb): | |
| Channel Bend Radius: | 25 ft |
| Retardance Class of Vegetation: | C 6-12 in |
| Vegetation Type: | Bunch Type |
| Vegetation Density: | Good 65-79% |
| Soil Type: | Silt Loam (SM) |
| **Channel Lining Options** | |
| SC250 Protection Type | Permanent |

| **Basic Relationships** |
|---|
| A = Cross sectional area, ft2 (m2) = (B * D) + ($Z_L$ / 2 * D2) + ($Z_R$ / 2 * D2) |
| Where: |
| B = Base width of channel, ft (m) |
| D = Flow depth, ft (m) |
| $Z_L$ = Left side bank slope (H : 1 V) |
| $Z_R$ = Right side bank slope (H : 1 V) |
| |
| P = Wetted perimeter, ft (m) = B + $Z_L$ * D + $Z_R$ * D |
| R = Hydraulic radius, ft (m) = A / P |
| |
| V = Flow velocity, ft/s (m/s) = Q / A |
| Where: |
| Q = Channel discharge, cfs (cms) |
| |
| Taua Average bed shear stress, psf (Pa) = 62.4 * R * S0 |
| Where: |
| S0 = Gradient of channel, ft/ft (m/m) |
| |
| $Tau_0$ = Maximum bed shear stress, psf (Pa) = 62.4 * D * $S_0$ |
| |

| **Unvegetated Conditions Computations:** |
|---|
| n = Manning's n = a * Tauab |
| |
| and (iteratively solved) |
| n = 1.486 / Q * A * R(2/3)$S_0^{0.5}$ |
| |
| Where: |
| n = Manning's n |
| a = Product specific coefficient from performance testing |
| b = Product specific coefficient from performance testing |

| |
|---|
| $SF_P$ = Product factor of safety = $Tau_T$ / $Tau_0$ |
| |
| Where: |
| TauT = Permissible shear stress from testing, psf (Pa) |
| |
| $Tau_p$ = In place permissible shear, psf (Pa) = $Tau_T$ / alpha * ($Tau_S$ + alpha / 4.3) |
| |
| Where: |
| alpha = unit conversion constant, 0.14 English, 6.5 Metric |
| $Tau_S$ = Permissible shear stress of soil |
| |
| SFL = Factor of safety of installed liner = Taup / Taua |

| **Vegetated Computations:** |
|---|
| n = Manning's n = alpha * Cn* Taua-0.4 |
| |
| and (iteratively solved) |
| $n = 1.486 / Q * A * R(2/3)S_0^{0.5}$ |
| |
| Where: |
| alpha = Unit conversion constant, 0.213 English, 1.0 Metric |
| Cn = Vegetation retardance coefficient |
| |
| $SF_P$ = Product factor of safety = $Tau_{TV}$ / $Tau_0$ |
| |
| Where: |
| $Tau_{TV}$ = Permissible shear stress from testing, psf (Pa) |
| |
| $Tau_p$ = In place permissible shear, psf (Pa) = $Tau_S$ / (1 – $C_{FTRM}$) * (n / $n_S$)2 |
| |
| Where: |
| $C_{FTRM}$ = Coefficient of TRM performance derived from testing $Tau_S$ = Permissible shear stress of soil |
| $n_S$ = Manning's of soil bed if left unprotected |
| $SF_L$ = Factor of safety of installed liner = $Tau_p$ / $Tau_a$ |
| |

SC250

| Phase | Mannings N | Predicted flow depth (D) | Cross sectional area (A) | Wetted perimeter (P) | Hydraulic radius (R) | Flow velocity (V) | Froude number (FR) | Calculated Shear Stress | SFP/SFL |
|---|---|---|---|---|---|---|---|---|---|
| SC250 Unvegetated | 0.038 | 1.75 ft | 14.38 ft2 | 14.04 ft | 1.02 ft | 4.29 ft/s | 0.75 | 1.25 lbs/ft2 | 2.39 (SFP) |
| Underlying Substrate | 0.038 | 1.75 ft | 14.38 ft2 | 14.04 ft | 1.02 ft | 4.29 ft/s | 0.75 | 0.74 lbs/ft2 | 2.99 (SFL) |
| SC250 Reinforced Vegetation | 0.051 | 1.99 ft | 17.9 ft2 | 15.61 ft | 1.15 ft | 3.45 ft/s | 0.57 | 1.43 lbs/ft2 | 6.99 (SFP) |
| Underlying Substrate | 0.051 | 1.99 ft | 17.9 ft2 | 15.61 ft | 1.15 ft | 3.45 ft/s | 0.57 | 0.82 lbs/ft2 | 3.64 (SFL) |
| SC250 Unvegetated | 0.038 | 1.75 ft | 14.38 ft2 | 14.04 ft | 1.02 ft | 4.29 ft/s | 0.75 | 2.51 lbs/ft2 | 1.2 (SFP) |
| Underlying Substrate | 0.038 | 1.75 ft | 14.38 ft2 | 14.04 ft | 1.02 ft | 4.29 ft/s | 0.75 | 1.47 lbs/ft2 | 1.49 (SFL) |
| SC250 Reinforced Vegetation | 0.051 | 1.99 ft | 17.9 ft2 | 15.61 ft | 1.15 ft | 3.45 ft/s | 0.57 | 2.86 lbs/ft2 | 3.5 (SFP) |
| Underlying Substrate | 0.051 | 1.99 ft | 17.9 ft2 | 15.61 ft | 1.15 ft | 3.45 ft/s | 0.57 | 1.65 lbs/ft2 | 1.82 (SFL) |

# Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Aug 7 2025

## DITCH B

**Trapezoidal**

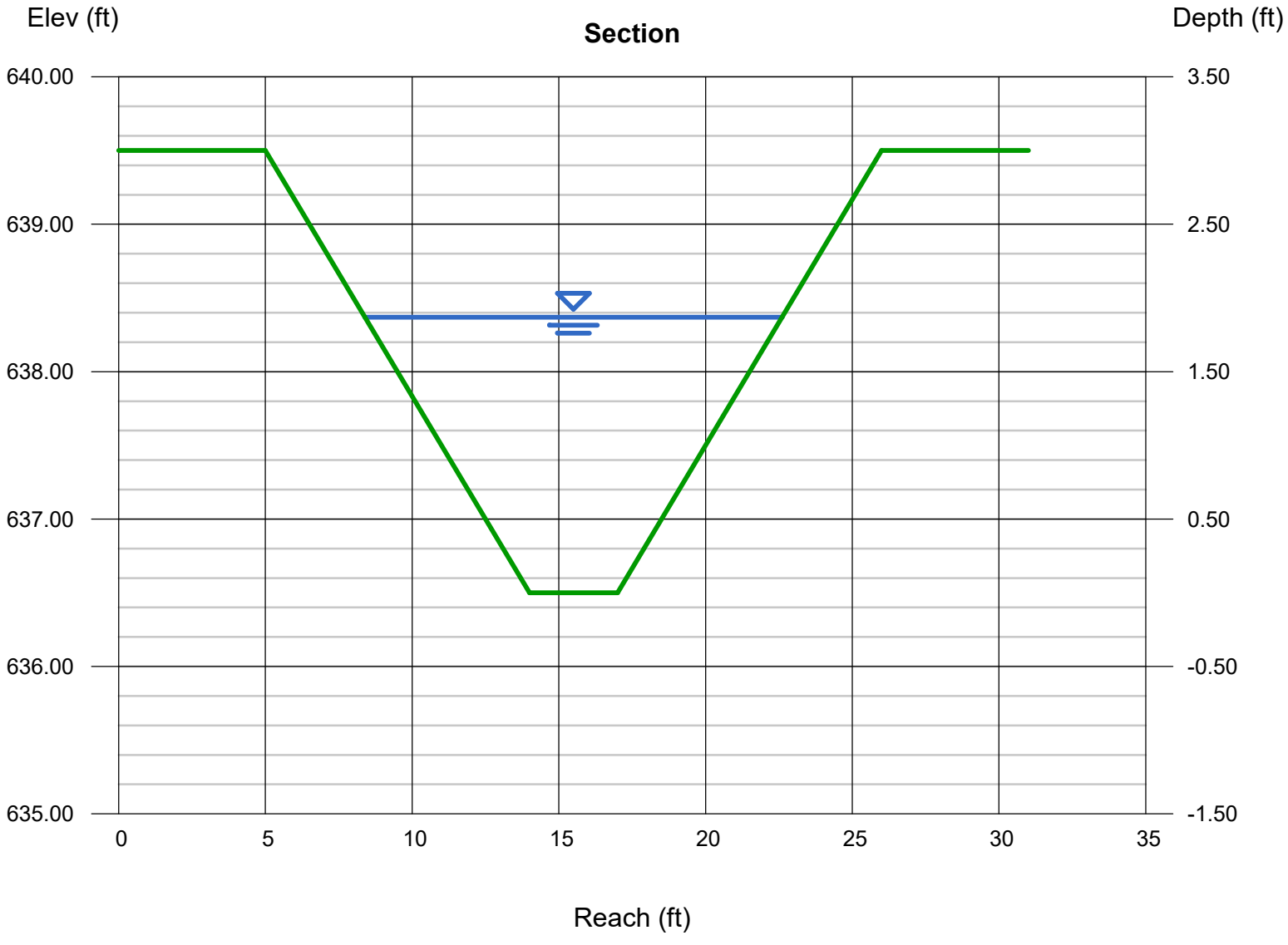
| | |
|---|---|
| Bottom Width (ft) | = 3.00 |
| Side Slopes (z:1) | = 3.00, 3.00 |
| Total Depth (ft) | = 3.00 |
| Invert Elev (ft) | = 636.50 |
| Slope (%) | = 1.38 |
| N-Value | = 0.035 |

**Calculations**

| | |
|---|---|
| Compute by: | Known Q |
| Known Q (cfs) | = 84.12 |

**Highlighted**

| | |
|---|---|
| Depth (ft) | = 1.87 |
| Q (cfs) | = 84.12 |
| Area (sqft) | = 16.10 |
| Velocity (ft/s) | = 5.22 |
| Wetted Perim (ft) | = 14.83 |
| Crit Depth, Yc (ft) | = 1.75 |
| Top Width (ft) | = 14.22 |
| EGL (ft) | = 2.29 |



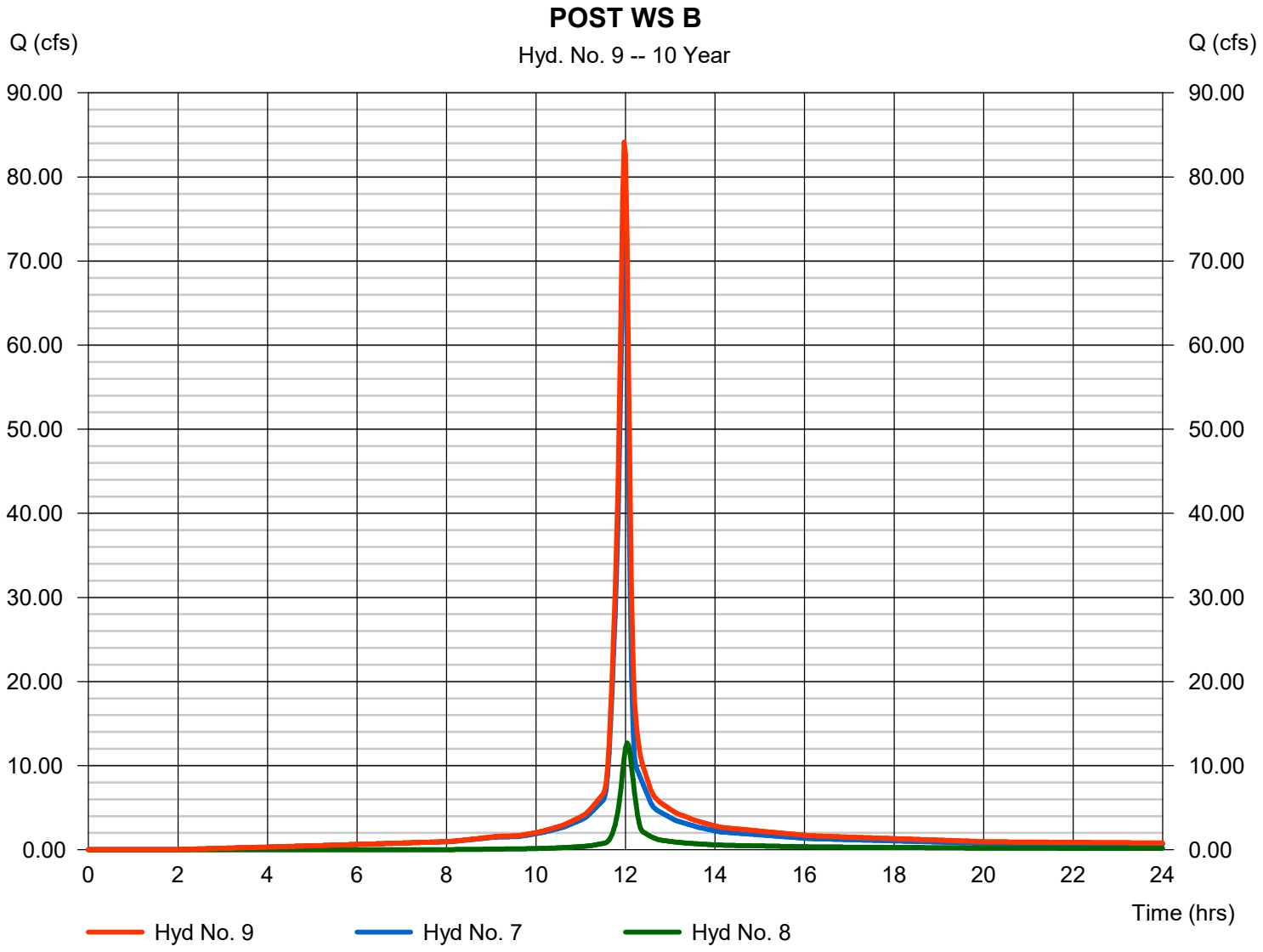
# Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025 Thursday, 08 / 7 / 2025

## Hyd. No. 9

POST WS B

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Combine | Peak discharge | = | 84.12 cfs |
| Storm frequency | = | 10 yrs | Time to peak | = | 11.97 hrs |
| Time interval | = | 2 min | Hyd. volume | = | 222,302 cuft |
| Inflow hyds. | = | 7, 8 | Contrib. drain. area | = | 13.940 ac |



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ECMDS v7.0

## CHANNEL ANALYSIS

> > > B

| | |
|---|---|
| Name | B |
| Discharge | 84.12 |
| Channel Slope | 0.0138 |
| Channel Bottom Width | 3 |
| Left Side Slope | 3 |
| Right Side Slope | 3 |
| Low Flow Liner | |
| Retardence Class | C 6-12 in |
| Vegetation Type | Bunch Type |
| Vegetation Density | Good 65-79% |
| Soil Type | Clay Loam (CL) |

### SC250

| Phase | Reach | Discharge | Velocity | Normal Depth | Mannings N | Permissible Shear Stress | Calculated Shear Stress | Safety Factor | Remarks | Staple Pattern |
|---|---|---|---|---|---|---|---|---|---|---|
| SC250 Unvegetated | Straight | 84.12 cfs | 5.19 ft/s | 1.88 ft | 0.036 | 3 lbs/ft2 | 1.61 lbs/ft2 | 1.86 | STABLE | E |
| Underlying Substrate | Straight | 84.12 cfs | 5.19 ft/s | 1.88 ft | 0.036 | 3.27 lbs/ft2 | 0.94 lbs/ft2 | 3.49 | STABLE | E |
| SC250 Reinforced Vegetation | Straight | 84.12 cfs | 4.28 ft/s | 2.11 ft | 0.046 | 10 lbs/ft2 | 1.82 lbs/ft2 | 5.51 | STABLE | E |
| Underlying Substrate | Straight | 84.12 cfs | 4.28 ft/s | 2.11 ft | 0.046 | 3 lbs/ft2 | 1.04 lbs/ft2 | 2.89 | STABLE | E |

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## ANALYSIS COMPUTATIONS

> > > > View Computation

| Inputs | |
|---|---|
| Channel Discharge (Q): | 84.12 cfs |
| Peak Flow Period (H): | hours |
| Channel Slope (S0): | 0.0138 ft/ft |
| Bottom Width (B): | 3 ft |
| Left Side Slope (ZL): | 3 (H : V) |
| Right Side Slope (ZR): | 3 (H : V) |
| Existing Channel Bend: | No |
| Bend Coefficient (Kb): | 1 |
| Channel Bend Radius: | |
| Retardance Class of Vegetation: | C 6-12 in |
| Vegetation Type: | Bunch Type |
| Vegetation Density: | Good 65-79% |
| Soil Type: | Clay Loam (CL) |
| **Channel Lining Options** | |
| SC250 Protection Type | Permanent |

| **Basic Relationships** |
|---|
| A = Cross sectional area, ft2 (m2) = (B * D) + ($Z_L$ / 2 * D2) + ($Z_R$ / 2 * D2) |
| Where: |
| B = Base width of channel, ft (m) |
| D = Flow depth, ft (m) |
| $Z_L$ = Left side bank slope (H : 1 V) |
| $Z_R$ = Right side bank slope (H : 1 V) |
| |
| P = Wetted perimeter, ft (m) = B + $Z_L$ * D + $Z_R$ * D |
| R = Hydraulic radius, ft (m) = A / P |
| |
| V = Flow velocity, ft/s (m/s) = Q / A |
| Where: |
| Q = Channel discharge, cfs (cms) |
| |
| Taua Average bed shear stress, psf (Pa) = 62.4 * R * S0 |
| Where: |
| S0 = Gradient of channel, ft/ft (m/m) |
| |
| $Tau_0$ = Maximum bed shear stress, psf (Pa) = 62.4 * D * $S_0$ |
| |

| **Unvegetated Conditions Computations:** |
|---|
| n = Manning's n = a * Tauab |
| |
| and (iteratively solved) |
| $n = 1.486 / Q * A * R(2/3)S_0^{0.5}$ |
| |
| Where: |
| n = Manning's n |
| a = Product specific coefficient from performance testing |
| b = Product specific coefficient from performance testing |

| |
|---|
| $SF_P$ = Product factor of safety = $Tau_T$ / $Tau_0$ |
| |
| Where: |
| TauT = Permissible shear stress from testing, psf (Pa) |
| |
| $Tau_p$ = In place permissible shear, psf (Pa) = $Tau_T$ / alpha * ($Tau_S$ + alpha / 4.3) |
| |
| Where: |
| alpha = unit conversion constant, 0.14 English, 6.5 Metric |
| $Tau_S$ = Permissible shear stress of soil |
| |
| SFL = Factor of safety of installed liner = Taup / Taua |

| **Vegetated Computations:** |
|---|
| n = Manning's n = alpha * Cn* Taua-0.4 |
| |
| and (iteratively solved) |
| $n = 1.486 / Q * A * R(2/3)S_0^{0.5}$ |
| |
| Where: |
| alpha = Unit conversion constant, 0.213 English, 1.0 Metric |
| Cn = Vegetation retardance coefficient |
| |
| $SF_P$ = Product factor of safety = $Tau_{TV}$ / $Tau_0$ |
| |
| Where: |
| $Tau_{TV}$ = Permissible shear stress from testing, psf (Pa) |
| |
| $Tau_p$ = In place permissible shear, psf (Pa) = $Tau_S$ / (1 – $C_{FTRM}$) * (n / $n_S$)2 |
| |
| Where: |
| $C_{FTRM}$ = Coefficient of TRM performance derived from testing $Tau_S$ = Permissible shear stress of soil |
| $n_S$ = Manning's of soil bed if left unprotected |
| $SF_L$ = Factor of safety of installed liner = $Tau_p$ / $Tau_a$ |
| |

SC250

| Phase | Mannings N | Predicted flow depth (D) | Cross sectional area (A) | Wetted perimeter (P) | Hydraulic radius (R) | Flow velocity (V) | Froude number (FR) | Calculated Shear Stress | SFP/SFL |
|---|---|---|---|---|---|---|---|---|---|
| SC250 Unvegetated | 0.036 | 1.88 ft | 16.18 ft2 | 14.86 ft | 1.09 ft | 5.19 ft/s | 0.88 | 1.61 lbs/ft2 | 1.86 (SFP) |
| Underlying Substrate | 0.036 | 1.88 ft | 16.18 ft2 | 14.86 ft | 1.09 ft | 5.19 ft/s | 0.88 | 0.94 lbs/ft2 | 3.49 (SFL) |
| SC250 Reinforced Vegetation | 0.046 | 2.11 ft | 19.67 ft2 | 16.34 ft | 1.2 ft | 4.28 ft/s | 0.69 | 1.82 lbs/ft2 | 5.51 (SFP) |
| Underlying Substrate | 0.046 | 2.11 ft | 19.67 ft2 | 16.34 ft | 1.2 ft | 4.28 ft/s | 0.69 | 1.04 lbs/ft2 | 2.89 (SFL) |

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## CHANNEL ANALYSIS

> > > B

| | |
|---|---|
| Name | B |
| Discharge | 84.12 |
| Channel Slope | 0.0138 |
| Channel Bottom Width | 3 |
| Left Side Slope | 3 |
| Right Side Slope | 3 |
| Low Flow Liner | |
| Retardence Class | C 6-12 in |
| Vegetation Type | Bunch Type |
| Vegetation Density | Good 65-79% |
| Soil Type | Loam (MH) |

### SC250

| Phase | Reach | Discharge | Velocity | Normal Depth | Mannings N | Permissible Shear Stress | Calculated Shear Stress | Safety Factor | Remarks | Staple Pattern |
|---|---|---|---|---|---|---|---|---|---|---|
| SC250 Unvegetated | Straight | 84.12 cfs | 5.19 ft/s | 1.88 ft | 0.036 | 3 lbs/ft2 | 1.61 lbs/ft2 | 1.86 | STABLE | E |
| Underlying Substrate | Straight | 84.12 cfs | 5.19 ft/s | 1.88 ft | 0.036 | 2.41 lbs/ft2 | 0.94 lbs/ft2 | 2.57 | STABLE | E |
| SC250 Reinforced Vegetation | Straight | 84.12 cfs | 4.28 ft/s | 2.11 ft | 0.046 | 10 lbs/ft2 | 1.82 lbs/ft2 | 5.51 | STABLE | E |
| Underlying Substrate | Straight | 84.12 cfs | 4.28 ft/s | 2.11 ft | 0.046 | 3 lbs/ft2 | 1.04 lbs/ft2 | 2.89 | STABLE | E |

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# ANALYSIS COMPUTATIONS

> > > > View Computation

| Inputs | |
|---|---|
| Channel Discharge (Q): | 84.12 cfs |
| Peak Flow Period (H): | hours |
| Channel Slope (S0): | 0.0138 ft/ft |
| Bottom Width (B): | 3 ft |
| Left Side Slope (ZL): | 3 (H : V) |
| Right Side Slope (ZR): | 3 (H : V) |
| Existing Channel Bend: | No |
| Bend Coefficient (Kb): | 1 |
| Channel Bend Radius: | |
| Retardance Class of Vegetation: | C 6-12 in |
| Vegetation Type: | Bunch Type |
| Vegetation Density: | Good 65-79% |
| Soil Type: | Loam (MH) |
| **Channel Lining Options** | |
| SC250 Protection Type | Permanent |

| **Basic Relationships** |
|---|
| A = Cross sectional area, ft2 (m2) = (B * D) + ($Z_L$ / 2 * D2) + ($Z_R$ / 2 * D2) |
| Where: |
| B = Base width of channel, ft (m) |
| D = Flow depth, ft (m) |
| $Z_L$ = Left side bank slope (H : 1 V) |
| $Z_R$ = Right side bank slope (H : 1 V) |
| |
| P = Wetted perimeter, ft (m) = B + $Z_L$ * D + $Z_R$ * D |
| R = Hydraulic radius, ft (m) = A / P |
| |
| V = Flow velocity, ft/s (m/s) = Q / A |
| Where: |
| Q = Channel discharge, cfs (cms) |
| |
| Taua Average bed shear stress, psf (Pa) = 62.4 * R * S0 |
| Where: |
| S0 = Gradient of channel, ft/ft (m/m) |
| |
| $Tau_0$ = Maximum bed shear stress, psf (Pa) = 62.4 * D * $S_0$ |
| |

| **Unvegetated Conditions Computations:** |
|---|
| n = Manning's n = a * Tauab |
| |
| and (iteratively solved) |
| $n = 1.486 / Q * A * R(2/3)S_0^{0.5}$ |
| |
| Where: |
| n = Manning's n |
| a = Product specific coefficient from performance testing |
| b = Product specific coefficient from performance testing |

| |
|---|
| $SF_P$ = Product factor of safety = $Tau_T$ / $Tau_0$ |
| |
| Where: |
| TauT = Permissible shear stress from testing, psf (Pa) |
| |
| $Tau_p$ = In place permissible shear, psf (Pa) = $Tau_T$ / alpha * ($Tau_S$ + alpha / 4.3) |
| |
| Where: |
| alpha = unit conversion constant, 0.14 English, 6.5 Metric |
| $Tau_S$ = Permissible shear stress of soil |
| |
| SFL = Factor of safety of installed liner = Taup / Taua |

| **Vegetated Computations:** |
|---|
| n = Manning's n = alpha * Cn* Taua-0.4 |
| |
| and (iteratively solved) |
| $n = 1.486 / Q * A * R(2/3)S_0^{0.5}$ |
| |
| Where: |
| alpha = Unit conversion constant, 0.213 English, 1.0 Metric |
| Cn = Vegetation retardance coefficient |
| |
| $SF_P$ = Product factor of safety = $Tau_{TV}$ / $Tau_0$ |
| |
| Where: |
| $Tau_{TV}$ = Permissible shear stress from testing, psf (Pa) |
| |
| $Tau_p$ = In place permissible shear, psf (Pa) = $Tau_S$ / (1 – $C_{FTRM}$) * (n / $n_S$)2 |
| |
| Where: |
| $C_{FTRM}$ = Coefficient of TRM performance derived from testing $Tau_S$ = Permissible shear stress of soil |
| $n_S$ = Manning's of soil bed if left unprotected |
| $SF_L$ = Factor of safety of installed liner = $Tau_p$ / $Tau_a$ |
| |

SC250

| Phase | Mannings N | Predicted flow depth (D) | Cross sectional area (A) | Wetted perimeter (P) | Hydraulic radius (R) | Flow velocity (V) | Froude number (FR) | Calculated Shear Stress | SFP/SFL |
|---|---|---|---|---|---|---|---|---|---|
| SC250 Unvegetated | 0.036 | 1.88 ft | 16.18 ft2 | 14.86 ft | 1.09 ft | 5.19 ft/s | 0.88 | 1.61 lbs/ft2 | 1.86 (SFP) |
| Underlying Substrate | 0.036 | 1.88 ft | 16.18 ft2 | 14.86 ft | 1.09 ft | 5.19 ft/s | 0.88 | 0.94 lbs/ft2 | 2.57 (SFL) |
| SC250 Reinforced Vegetation | 0.046 | 2.11 ft | 19.67 ft2 | 16.34 ft | 1.2 ft | 4.28 ft/s | 0.69 | 1.82 lbs/ft2 | 5.51 (SFP) |
| Underlying Substrate | 0.046 | 2.11 ft | 19.67 ft2 | 16.34 ft | 1.2 ft | 4.28 ft/s | 0.69 | 1.04 lbs/ft2 | 2.89 (SFL) |

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## CHANNEL ANALYSIS

> > > B

| | |
|---|---|
| Name | B |
| Discharge | 84.12 |
| Channel Slope | 0.0138 |
| Channel Bottom Width | 3 |
| Left Side Slope | 3 |
| Right Side Slope | 3 |
| Low Flow Liner | |
| Retardence Class | C 6-12 in |
| Vegetation Type | Bunch Type |
| Vegetation Density | Good 65-79% |
| Soil Type | Silt Loam (SM) |

### SC250

| Phase | Reach | Discharge | Velocity | Normal Depth | Mannings N | Permissible Shear Stress | Calculated Shear Stress | Safety Factor | Remarks | Staple Pattern |
|---|---|---|---|---|---|---|---|---|---|---|
| SC250 Unvegetated | Straight | 84.12 cfs | 5.19 ft/s | 1.88 ft | 0.036 | 3 lbs/ft2 | 1.61 lbs/ft2 | 1.86 | STABLE | E |
| Underlying Substrate | Straight | 84.12 cfs | 5.19 ft/s | 1.88 ft | 0.036 | 2.2 lbs/ft2 | 0.94 lbs/ft2 | 2.34 | STABLE | E |
| SC250 Reinforced Vegetation | Straight | 84.12 cfs | 4.28 ft/s | 2.11 ft | 0.046 | 10 lbs/ft2 | 1.82 lbs/ft2 | 5.51 | STABLE | E |
| Underlying Substrate | Straight | 84.12 cfs | 4.28 ft/s | 2.11 ft | 0.046 | 3 lbs/ft2 | 1.04 lbs/ft2 | 2.89 | STABLE | E |

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# ANALYSIS COMPUTATIONS

> > > > View Computation

| Inputs | |
|---|---|
| Channel Discharge (Q): | 84.12 cfs |
| Peak Flow Period (H): | hours |
| Channel Slope (S0): | 0.0138 ft/ft |
| Bottom Width (B): | 3 ft |
| Left Side Slope (ZL): | 3 (H : V) |
| Right Side Slope (ZR): | 3 (H : V) |
| Existing Channel Bend: | No |
| Bend Coefficient (Kb): | 1 |
| Channel Bend Radius: | |
| Retardance Class of Vegetation: | C 6-12 in |
| Vegetation Type: | Bunch Type |
| Vegetation Density: | Good 65-79% |
| Soil Type: | Silt Loam (SM) |
| **Channel Lining Options** | |
| SC250 Protection Type | Permanent |

| **Basic Relationships** |
|---|
| A = Cross sectional area, ft2 (m2) = (B * D) + ($Z_L$ / 2 * D2) + ($Z_R$ / 2 * D2) |
| Where: |
| B = Base width of channel, ft (m) |
| D = Flow depth, ft (m) |
| $Z_L$ = Left side bank slope (H : 1 V) |
| $Z_R$ = Right side bank slope (H : 1 V) |
| |
| P = Wetted perimeter, ft (m) = B + $Z_L$ * D + $Z_R$ * D |
| R = Hydraulic radius, ft (m) = A / P |
| |
| V = Flow velocity, ft/s (m/s) = Q / A |
| Where: |
| Q = Channel discharge, cfs (cms) |
| |
| Taua Average bed shear stress, psf (Pa) = 62.4 * R * S0 |
| Where: |
| S0 = Gradient of channel, ft/ft (m/m) |
| |
| $Tau_0$ = Maximum bed shear stress, psf (Pa) = 62.4 * D * $S_0$ |
| |

| **Unvegetated Conditions Computations:** |
|---|
| n = Manning's n = a * Tauab |
| |
| and (iteratively solved) |
| $n = 1.486 / Q * A * R(2/3)S_0^{0.5}$ |
| |
| Where: |
| n = Manning's n |
| a = Product specific coefficient from performance testing |
| b = Product specific coefficient from performance testing |

| |
|---|
| $SF_P$ = Product factor of safety = $Tau_T$ / $Tau_0$ |
| |
| Where: |
| TauT = Permissible shear stress from testing, psf (Pa) |
| |
| $Tau_p$ = In place permissible shear, psf (Pa) = $Tau_T$ / alpha * ($Tau_S$ + alpha / 4.3) |
| |
| Where: |
| alpha = unit conversion constant, 0.14 English, 6.5 Metric |
| $Tau_S$ = Permissible shear stress of soil |
| |
| SFL = Factor of safety of installed liner = Taup / Taua |

| **Vegetated Computations:** |
|---|
| n = Manning's n = alpha * Cn* Taua-0.4 |
| |
| and (iteratively solved) |
| $n = 1.486 / Q * A * R(2/3)S_0^{0.5}$ |
| |
| Where: |
| alpha = Unit conversion constant, 0.213 English, 1.0 Metric |
| Cn = Vegetation retardance coefficient |
| |
| $SF_P$ = Product factor of safety = $Tau_{TV}$ / $Tau_0$ |
| |
| Where: |
| $Tau_{TV}$ = Permissible shear stress from testing, psf (Pa) |
| |
| $Tau_p$ = In place permissible shear, psf (Pa) = $Tau_S$ / (1 – $C_{FTRM}$) * (n / $n_S$)2 |
| |
| Where: |
| $C_{FTRM}$ = Coefficient of TRM performance derived from testing $Tau_S$ = Permissible shear stress of soil |
| $n_S$ = Manning's of soil bed if left unprotected |
| $SF_L$ = Factor of safety of installed liner = $Tau_p$ / $Tau_a$ |
| |

SC250

| Phase | Mannings N | Predicted flow depth (D) | Cross sectional area (A) | Wetted perimeter (P) | Hydraulic radius (R) | Flow velocity (V) | Froude number (FR) | Calculated Shear Stress | SFP/SFL |
|---|---|---|---|---|---|---|---|---|---|
| SC250 Unvegetated | 0.036 | 1.88 ft | 16.18 ft2 | 14.86 ft | 1.09 ft | 5.19 ft/s | 0.88 | 1.61 lbs/ft2 | 1.86 (SFP) |
| Underlying Substrate | 0.036 | 1.88 ft | 16.18 ft2 | 14.86 ft | 1.09 ft | 5.19 ft/s | 0.88 | 0.94 lbs/ft2 | 2.34 (SFL) |
| SC250 Reinforced Vegetation | 0.046 | 2.11 ft | 19.67 ft2 | 16.34 ft | 1.2 ft | 4.28 ft/s | 0.69 | 1.82 lbs/ft2 | 5.51 (SFP) |
| Underlying Substrate | 0.046 | 2.11 ft | 19.67 ft2 | 16.34 ft | 1.2 ft | 4.28 ft/s | 0.69 | 1.04 lbs/ft2 | 2.89 (SFL) |

**Sediment Basin Calculations:**

Total Drainage Area: 36.62 acres

**Required Storage:**

Total Storage Volume: 3618 cf/ac * 36.62 ac = 132,491.16 cf

Wet Storage: 1809 cf/ac * 36.62 ac = 66,245.58 cf

Dry Storage: 1809 cf/ac * 36.62 ac = 66,245.58 cf

- Forebay: 453.6 cf/ac * 36.62 = 16,610.83 cf
- Main Basin: 66,245.58 cf – 16,610.83 cf = 49,634.75 cf

**Provided Storage:**

**Wet Storage:**

- Bottom Dimensions (609.00 ft): 13,063.44 sf
- Permanent Pool Dimensions (611.00 ft): 89,656.47 sf

$$V = \frac{(13{,}063.44 + 89{,}656.47) * 2}{2} = 102{,}719.91\ cf$$

Total Wet Storage (Bottom of Pond to Permanent Pool): 102,719.91 cf > 66,245.58 cf

**Dry Storage:**

Forebay A:

- Bottom of Forebay A Dimensions (611.00 ft): 13,854.73 sf
- Top of Forebay A Dimensions (613.00 ft): 16,704.68 sf

$$V = \frac{(13{,}854.73 + 16{,}704.68) * 2}{2} = 30{,}559.41\ cf$$

Forebay B:

- Bottom of Forebay B Dimensions (611.00 ft): 12,378.46 sf
- Top of Forebay B Dimensions (613.00 ft): 15,570.87 sf

$$V = \frac{(12{,}378.46 + 15{,}570.87) * 2}{2} = 27{,}949.33\ cf$$

Total Forebay Storage: 58,508.74 cf > 16,610.83 cf

Main Basin:

- Dimensions at Permanent Pool (611.00 ft): 89,656.47 sf
- Dimensions at Top (613.00 ft): 95,017.49 sf

$$V = \frac{(89{,}656.47 + 95{,}017.49) * 2}{2} = 184{,}673.96\ cf$$

Main Basin Storage: 184,673.96 > 49,634.75 cf

Total Dry Storage, including Forebay:

58,508.74 cf + 184,673.96 = 243,182.70 cf > 66,245.58 cf

Total Provided Storage:

102,720 cf + 243,183 cf = 345,903 cf > 132,491 cf

**Principal Spillway:**

Elevation: 612.00 ft

$Qp_{5yr,24hr}$= 193.48 cfs

**Emergency Spillway:**

Elevation: 613.29 ft

$Qp_{25yr,24hr}$= 277.51 cfs*

*TR-55 generated via Hydraflow Hydrographs Extension for Autodesk Civil 3D

Weir Length = 38 ft

Design Flow:

277.51 cfs – 31.37 cfs* = 246.14 cfs

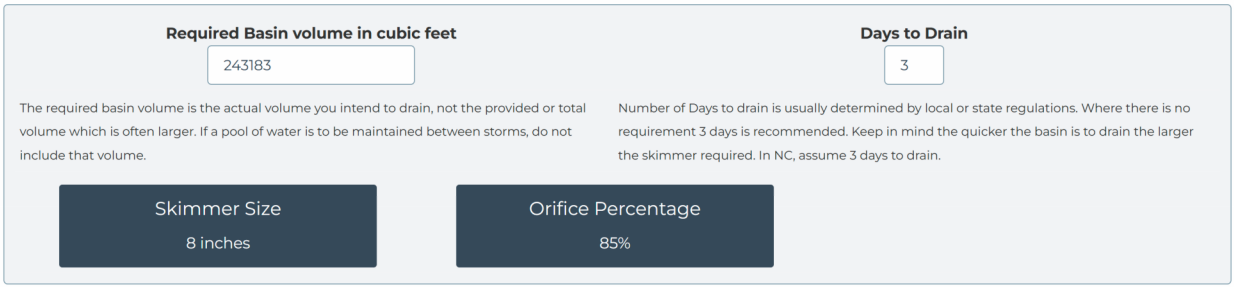
*Interpolated flow credited to 3 ft diameter principal spillway at 1 ft head over crest given by Hydraflow Express Extension for Autodesk Civil 3D

Top of Berm: 616.00 ft

613.29 ft (E-spillway Elev) + 1.71 ft* (depth of 25 yr storm) + 1 ft (min. freeboard) = 616.01 ft

*Flow control depth given by Hydraflow Express Extension for Autodesk Civil 3D at the design flow Q

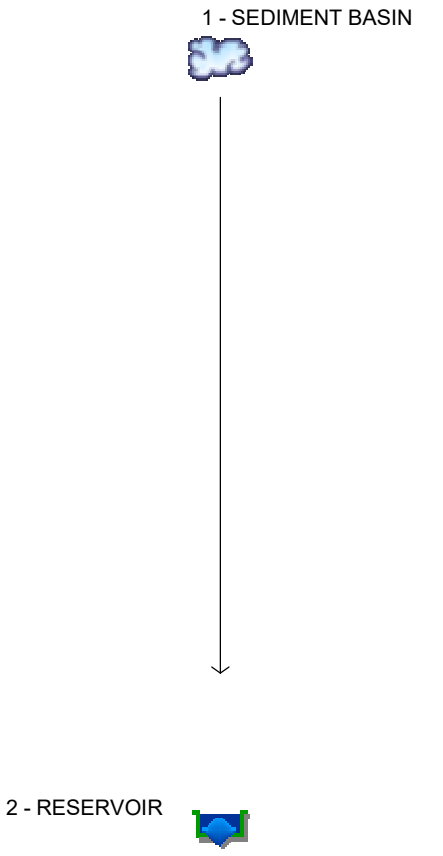
**Skimmer:**




Using the Simple Faircloth Skimmer Sizing Calculator at https://fairclothskimmer.com/sediment-skimmer-calculator/

# Watershed Model Schematic






## Legend

| Hyd. | Origin | Description |
|---|---|---|
| 1 | SCS Runoff | SEDIMENT BASIN |
| 2 | Reservoir | RESERVOIR |

# Hydrograph Return Period Recap



| Hyd. No. | Hydrograph type (origin) | Inflow hyd(s) | Peak Outflow (cfs) | | | | | | | | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1-yr | 2-yr | 3-yr | 5-yr | 10-yr | 25-yr | 50-yr | 100-yr | |
| 1 | SCS Runoff | ------ | ------- | ------- | ------- | 193.48 | ------- | 277.51 | ------- | ------- | SEDIMENT BASIN |
| 2 | Reservoir | 1 | ------- | ------- | ------- | 11.97 | ------- | 14.30 | ------- | ------- | RESERVOIR |

# Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025

| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|
| 1 | SCS Runoff | 193.48 | 2 | 716 | 401,919 | ------ | ------ | ------ | SEDIMENT BASIN |
| 2 | Reservoir | 11.97 | 2 | 760 | 401,853 | 1 | 611.79 | 209,849 | RESERVOIR |

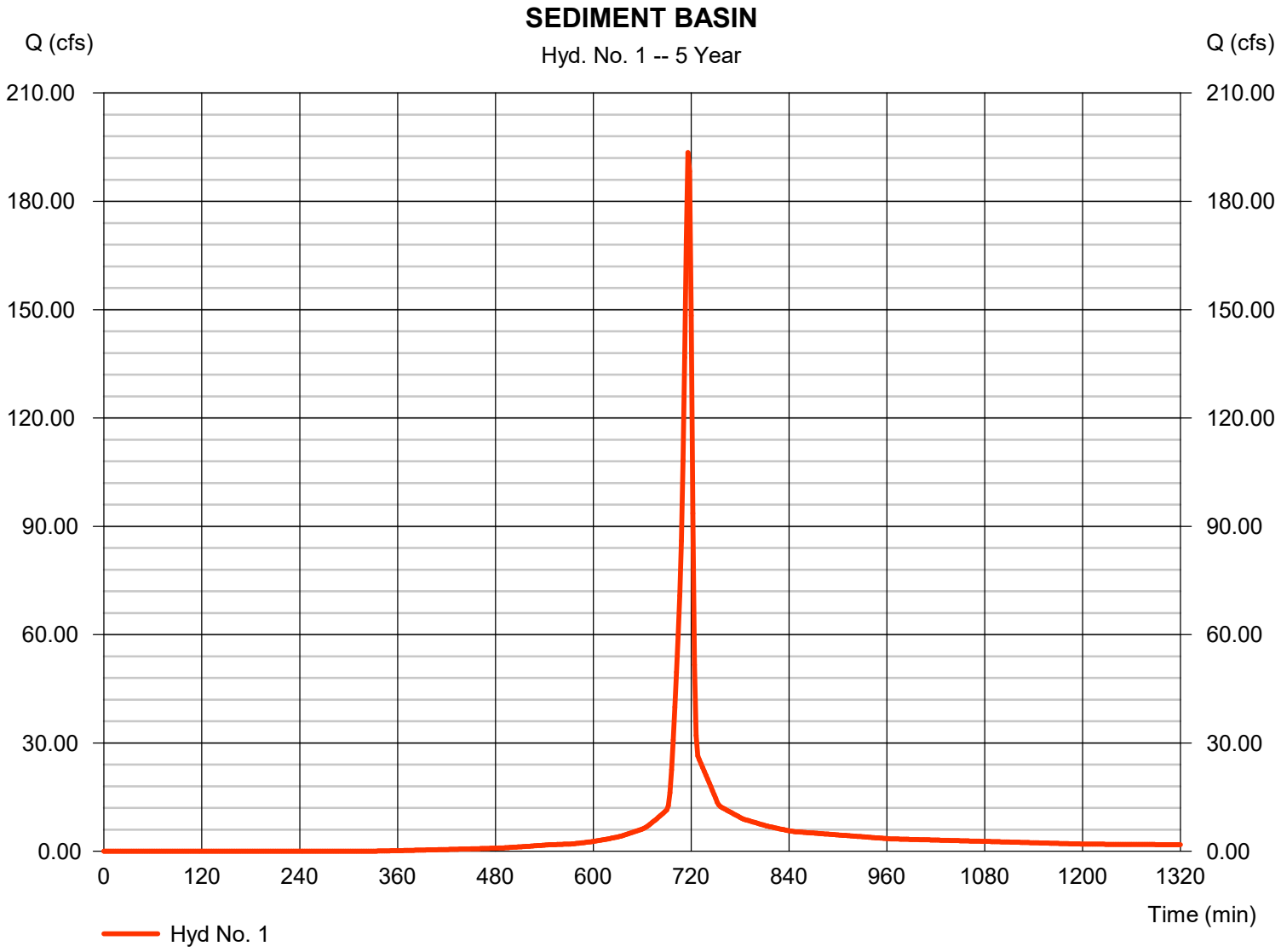
# Hydrograph Report



## Hyd. No. 1

SEDIMENT BASIN

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 193.48 cfs |
| Storm frequency | = 5 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 401,919 cuft |
| Drainage area | = 36.620 ac | Curve number | = 86 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 5.00 min |
| Total precip. | = 4.74 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



# Hydrograph Report

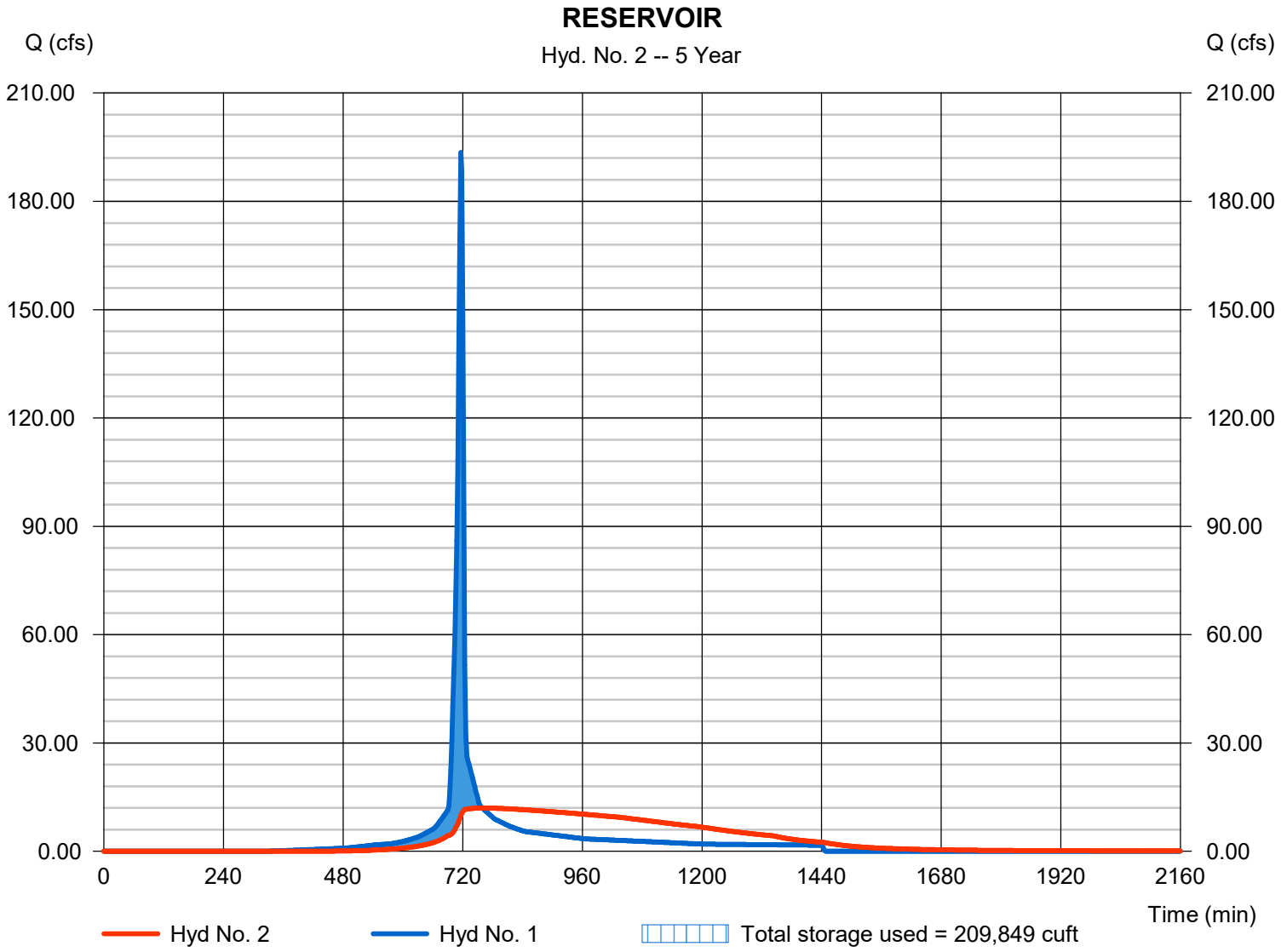


## Hyd. No. 2

RESERVOIR

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 11.97 cfs |
| Storm frequency | = | 5 yrs | Time to peak | = | 760 min |
| Time interval | = | 2 min | Hyd. volume | = | 401,853 cuft |
| Inflow hyd. No. | = | 1 - SEDIMENT BASIN | Max. Elevation | = | 611.79 ft |
| Reservoir name | = | SEDIMENT BASIN | Max. Storage | = | 209,849 cuft |

Storage Indication method used.



# Pond Report



## Pond No. 1 - SEDIMENT BASIN

### Pond Data

**Contours -**User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 609.00 ft

### Stage / Storage Table

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|---|---|---|---|---|
| 0.00 | 609.00 | 13,063 | 0 | 0 |
| 1.00 | 610.00 | 50,447 | 31,755 | 31,755 |
| 2.00 | 611.00 | 117,425 | 83,936 | 115,691 |
| 3.00 | 612.00 | 121,802 | 119,614 | 235,305 |
| 4.00 | 613.00 | 127,271 | 124,537 | 359,841 |
| 5.00 | 614.00 | 133,397 | 130,334 | 490,175 |
| 6.00 | 615.00 | 140,392 | 136,895 | 627,070 |
| 7.00 | 616.00 | 148,314 | 144,353 | 771,423 |

### Culvert / Orifice Structures

| | [A] | [B] | [C] | [PrfRsr] |
|---|---|---|---|---|
| **Rise (in)** | = 18.00 | Inactive | 0.00 | 0.00 |
| **Span (in)** | = 18.00 | 0.00 | 0.00 | 0.00 |
| **No. Barrels** | = 1 | 1 | 0 | 0 |
| **Invert El. (ft)** | = 609.00 | 0.00 | 0.00 | 0.00 |
| **Length (ft)** | = 76.00 | 0.00 | 0.00 | 0.00 |
| **Slope (%)** | = 1.00 | 0.00 | 0.00 | n/a |
| **N-Value** | = .013 | .013 | .013 | n/a |
| **Orifice Coeff.** | = 0.60 | 0.60 | 0.60 | 0.60 |
| **Multi-Stage** | = n/a | No | No | No |

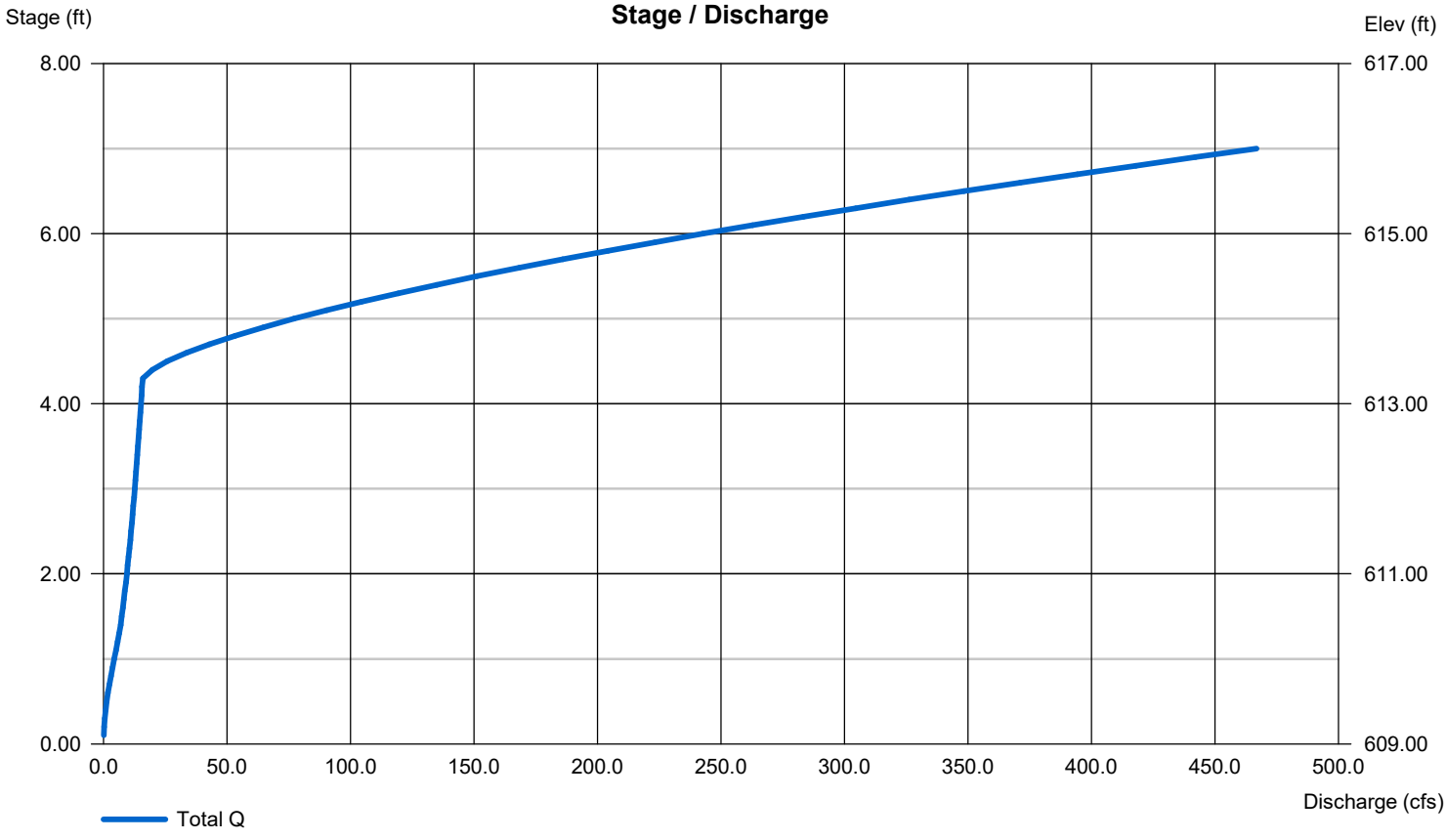
### Weir Structures

| | [A] | [B] | [C] | [D] |
|---|---|---|---|---|
| **Crest Len (ft)** | = 9.42 | 38.00 | 0.00 | 0.00 |
| **Crest El. (ft)** | = 612.00 | 613.29 | 0.00 | 0.00 |
| **Weir Coeff.** | = 3.33 | 2.63 | 3.33 | 3.33 |
| **Weir Type** | = 1 | Ciplti | --- | --- |
| **Multi-Stage** | = Yes | No | No | Yes |

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

**TW Elev. (ft)** = 0.00

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



# Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025

| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|---|---|---|---|---|---|---|---|---|---|
| 1 | SCS Runoff | 277.51 | 2 | 716 | 588,683 | ------ | ------ | ------ | SEDIMENT BASIN |
| 2 | Reservoir | 14.30 | 2 | 774 | 588,606 | 1 | 612.66 | 317,854 | RESERVOIR |

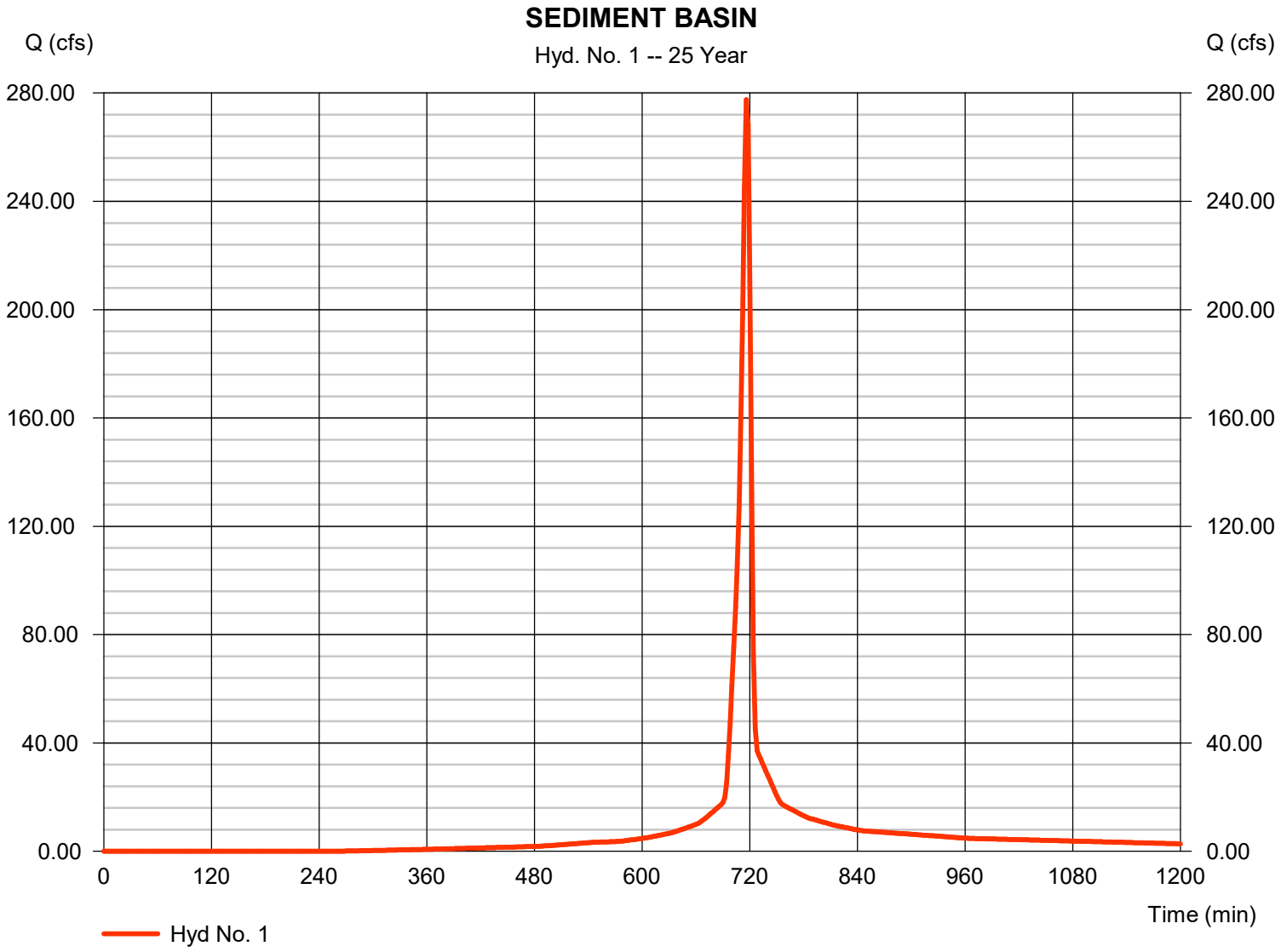
# Hydrograph Report



## Hyd. No. 1

SEDIMENT BASIN

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 277.51 cfs |
| Storm frequency | = | 25 yrs | Time to peak | = | 716 min |
| Time interval | = | 2 min | Hyd. volume | = | 588,683 cuft |
| Drainage area | = | 36.620 ac | Curve number | = | 86 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | User | Time of conc. (Tc) | = | 5.00 min |
| Total precip. | = | 6.33 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



# Hydrograph Report

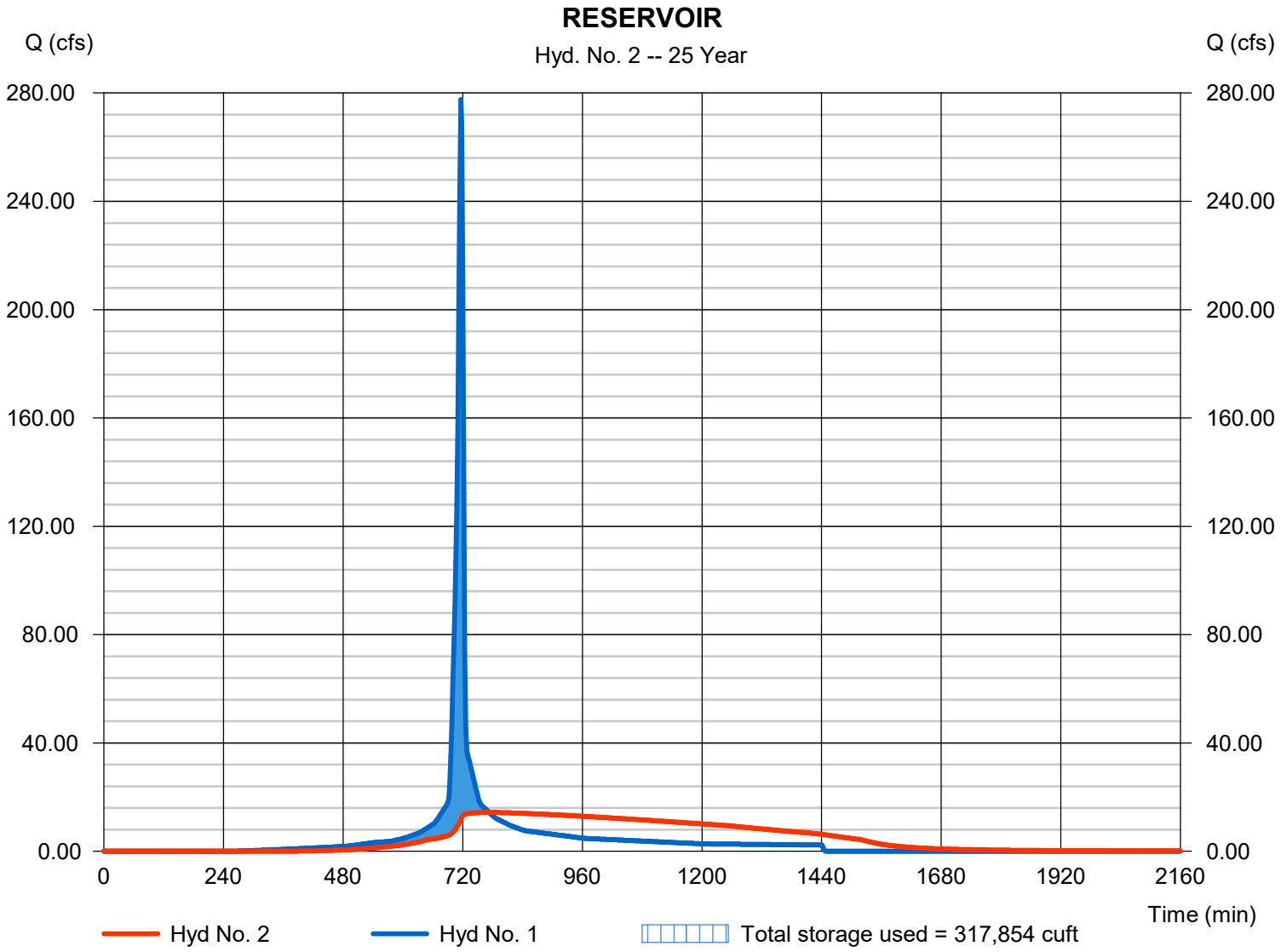


## Hyd. No. 2

RESERVOIR

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 14.30 cfs |
| Storm frequency | = | 25 yrs | Time to peak | = | 774 min |
| Time interval | = | 2 min | Hyd. volume | = | 588,606 cuft |
| Inflow hyd. No. | = | 1 - SEDIMENT BASIN | Max. Elevation | = | 612.66 ft |
| Reservoir name | = | SEDIMENT BASIN | Max. Storage | = | 317,854 cuft |

Storage Indication method used.



# Weir Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, Aug 5 2025

## Principal Spillway-Known Q

**Rectangular Weir**

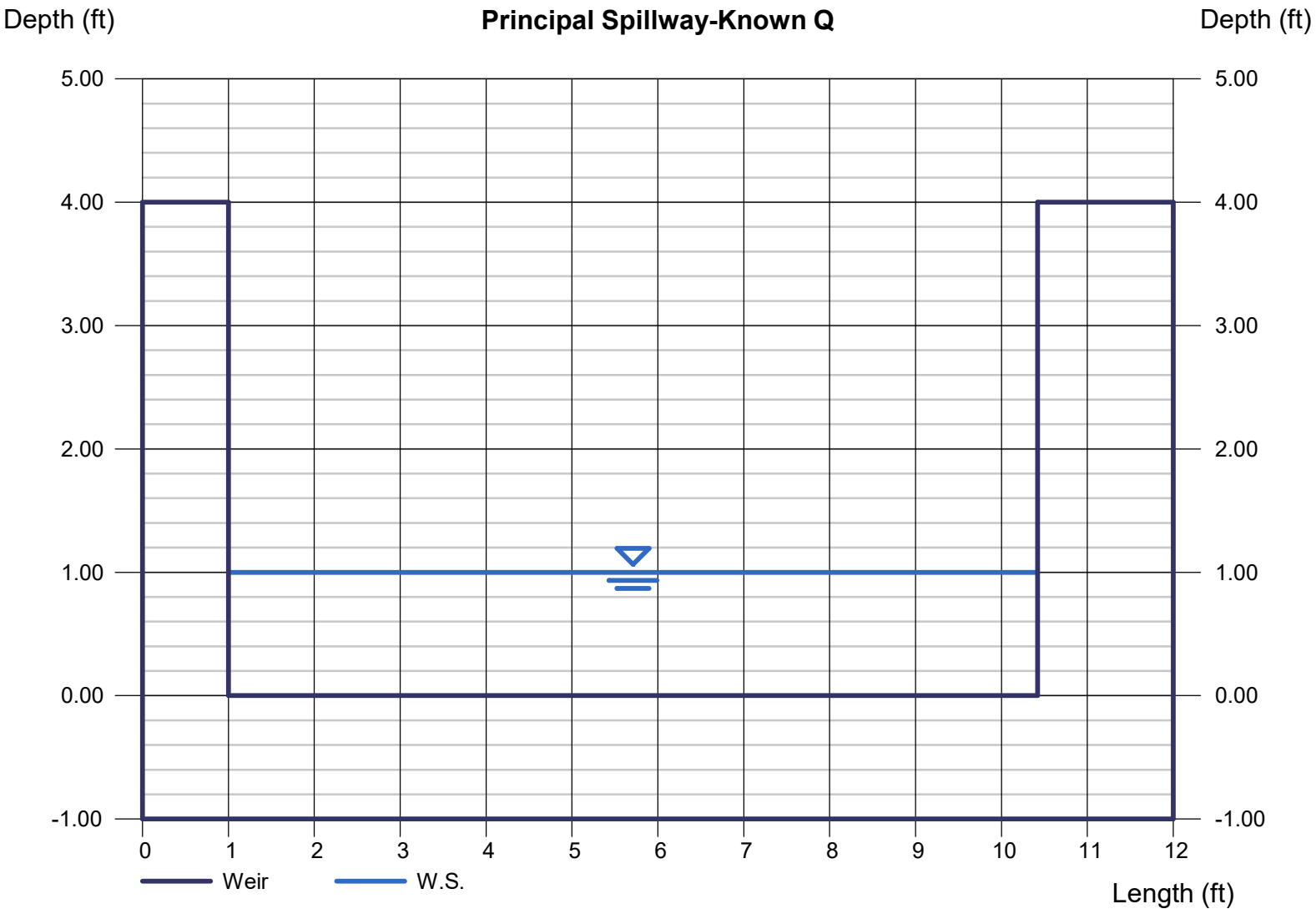
| | |
|---|---|
| Crest | = Sharp |
| Bottom Length (ft) | = 9.42 |
| Total Depth (ft) | = 4.00 |

**Calculations**

| | |
|---|---|
| Weir Coeff. Cw | = 3.33 |
| Compute by: | Q vs Depth |
| No. Increments | = 40 |

**Highlighted**

| | |
|---|---|
| Depth (ft) | = 1.00 |
| Q (cfs) | = 31.37 |
| Area (sqft) | = 9.42 |
| Velocity (ft/s) | = 3.33 |
| Top Width (ft) | = 9.42 |



# Weir Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, Aug 5 2025

## Espillway-Design Q

**Trapezoidal Weir**

| | |
|---|---|
| Crest | = Sharp |
| Bottom Length (ft) | = 38.00 |
| Total Depth (ft) | = 2.71 |
| Side Slope (z:1) | = 3.00 |

**Calculations**

| | |
|---|---|
| Weir Coeff. Cw | = 2.63 |
| Compute by: | Known Q |
| Known Q (cfs) | = 246.14 |

**Highlighted**

| | |
|---|---|
| Depth (ft) | = 1.71 |
| Q (cfs) | = 246.14 |
| Area (sqft) | = 73.75 |
| Velocity (ft/s) | = 3.34 |
| Top Width (ft) | = 48.26 |